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marine social studies project

Coastal Problems and Resource Management

A Secondary Social Studies Course

SAMPLER

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Curriculum Research and Development Group
University of Hawaii at Manoa
1978

This sampler introduces the Marine Social Studies Project and the course, COASTAL PROBLEMS AND RESOURCE MANAGEMENT (CPRM). The package contains an overview of the project and three sample lessons from the pilot materials.

I. PROJECT OVERVIEW

This contains a general description of the project, program goals, and teacher training information. Also included is a detailed description of each unit and a table of contents for the pilot version of the course.

II. SAMPLE LESSONS

These lessons were chosen because they reflect a variety of instructional formats and classroom activities found in CPRM. Teachers' instructions, visual materials, and student readings and worksheets are included.

A. "Gaining Access".

This lesson is part of Unit 2 which details a number of common coastal problems. Student material is presented in a newspaper format. Students read a series of news items concerning problems with recreational access. Several questions are suggested for the teacher to use in the follow-up discussion. Students analyze each story to determine which groups are in conflict and why the conflicts exist.

B. "Analyzing a Coastal Scene"

This is the final activity in Unit 2, and is designed as an evaluation of several ideas presented in the first two units. Students apply what they have learned about coastal ecology and the likely impacts of various coastal activities to the analysis of this coastal scene. The teacher's guide provides key questions for students and several examples of correct responses.

C. "Political Systems"

The final lesson in the sampler is the opening activity in Unit 3, Politics and Resource Management of the Coastal Region. This lesson introduces students to the major elements involved in the decision-making process. Simple systems diagrams are used to identify these major components and the relationships between them. In succeeding lessons, students apply this understanding of the decision-making arena to the analysis of other case studies.

Several other instructional strategies present in the course, such as role-playing activities, simulation games, and a slide-tape presentation are not included in the sampler.

The materials are presently undergoing a final revision before national dissemination begins in the fall of 1978. Projected costs for a classroom set of materials, including teacher's guides, student readings and worksheets, and all support materials (simulation games and audio-visual aids) is $250.

CPRM will be distributed by the Curriculum Research and Development Group, University of Hawaii. For further information, contact:

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marine social studies project

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OVERVIEW: Coastal Problems and Resource Management (CPRM) is a one semester course for secondary school students being developed by the Curriculum and Development Group of the University of Hawaii. It is part of a larger Marine Social Studies Project, which will ultimately include international and open ocean issues to compliment the national environmental and citizenship education themes emphasized in CPRM. The course focuses on the coastal region of the United States and the political, economic and ecological factors involved in the development of coastal resources. The growing demands of an increasing population, a society seeking new energy sources and an environmentally conscious citizenry often collide in coastal areas. This special environment provides a rich and interesting setting for the analysis of many of these most pressing social problems.

PROGRAM GOALS:

1. To increase students appreciation for the beauty, fragility and utility of coastal environments.
2. To identify major social, political, and economic problems involving coastal areas.
3. To identify key elements in the political, legal and economic decision-making process as it relates to management of coastal resources.
4. To relate specific local coastal problems to broader national issues.
5. To investigate the opportunities for citizen participation in decisions affecting coastal resource management.

CURRICULUM FORMAT: The course contains approximately 70 days of instruction, organized in 5 units:

1. Introducing Coastal Regions
2. Coastal Problems
3. Politics and Resource Management of the Coastal Region
4. Management Problems in the Coastal Region
5. Politics and Priorities: Managing Our Coastal Future

A complete Teacher's Guide accompanies the materials. Various instructional approaches are used including filmstrips, overhead transparencies, slides, in-class debates and discussions, case studies, field trips, readings and worksheets, simulation games, and role-playing experiences.

Several lessons in CPRM can be supplemented and enriched with activities that refer to local issues and concerns. A Resource and Instructional Guidebook accompanies the course and suggests ways for teachers to localize the materials by developing case studies, map exercises, field trips and other activities.

TEACHER TRAINING: Teacher training is required. Training sessions will last three to five days and are to be conducted by members of the project staff. Workshops will be conducted in several states this fall and winter.

FUNDING: Funding for the Marine Social Studies Project comes from the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, in the Department of Commerce; Sea Grant, University of Hawaii; and the Hawaii Coastal Zone Management Program, Department of Planning and Economic Development.

COASTAL PROBLEMS AND RESOURCE M NAGEMENT

CONTENT OUTLINE*

UNIT 1: INTRODUCING COASTAL REGIONS

In the opening unit, students are introduced to major features of coastal areas. Topics briefly explored are: the geography of coastal regions, representative ecological systems and human uses of coastal resources. A color filmstrip and other visual aids are used to heighten a sense of the natural beauty and uniqueness of coastal areas, and the fragility of many of their ecosystems. The treatment throughout is designed to increase student interest in coastal areas, and to deepen their concern for the future use and development of these regions.

1. National Seashore Quiz
2. Coastal Region Filmstrip
3. Coastal Geography
4. Coastal Ecology
5. Food Webs
6. The Watershed
7. Coastal Resources
8. Our Coastal Region
9. Slide Show Activity

UNIT 2: COASTAL PROBLEMS

The second unit explores disruptions of coastal environments. Individuals and communities do not always use coastal resources wisely. The resulting pollution, destruction and depletion have served to focus national attention on the endangered coastal areas. The Coastal Resource Development Game begins the unit. This simulation exercise allows students to participate in the uncontrolled development of a bay community and face the resulting environmental chaos. The remainder of the unit explores, in more depth, the problems generated by the game experience: coastal water pollution, sewage and waste disposal, destruction of estuaries and wetlands, loss of historic and aesthetic resources, restricted recreational access, and natural hazards in coastal areas. Students investigate recent case studies from across the United States and their own localitites that illustrate these problems.

1. Coastal Resource and Development Game
2. Game Debriefing
3. Land and Water Uses in the Coastal Region
4. The Problem of Sewage and Waste Disposal
5. The Sky Blue River
6. Oil Pollution
7. Wetlands and Marshes: Problem or Resource?
8. Views, Views, Views
9. Recreational Access
10. Natural Hazards
11. Tsunamis and Hilo, Hawaii: A Case Study
12. Analyzing a Coastal Scene

UNIT 3: POLITICS AND RESOURCE MANAGEMENT OF THE COASTAL REGION

Unit 3 describes and analyzes the development of government intervention in the distribution of coastal resources. The market, once the chief allocation agent, has now been joined by a myriad of regulatory governmental agencies and offices, at the local, state and federal levels. Students are introduced to the politics of coastal areas through systems diagrams. These identify judicial, legislative, regulatory and other public institutions involved in

* Pilot Materials 1978

coastal resource decisions, and show their relationships to each other. The development and rationale behind these various institutions and their management strategies are described and illustrated by case studies.

1. The Political System at Work
2. Resource Allocation and Management
3. Growth and the Environment: A Florida Case Study
4. Management Tools and Options
5. Politics and Management of Coastal Development: The Seaside Case

UNIT 4: MANAGEMENT PROBLEMS IN THE COASTAL REGION

Unit 4 details a number of pressing management problems interfering with the optimum utilization of coastal areas. In many instances the best efforts of planning and management agencies have failed because of lack of coordination, understanding and implementation. Management problems include jurisdictional disputes, agency conflicts, piecemeal planning and lack of a sufficient data base concerning coastal ecology. A major role-playing exercise involving students in decision-making about the future of Boston Harbor concludes this unit.

1. Limits to Regulation: The Taking Issue
2. Jurisdictional Limits
3. Ignorance of Coastal Ecology
4. Incrementalism
5. Parochial Interests: Local vs. Regional Interests
6. Conflicts Between Governmental Agencies: Boston Harbor Case Study

UNIT 5: POLITICS AND PRIORITIES: MANAGING OUR COASTAL FUTURE

This unit focuses on current political and management strategies aimed at confronting the several problems illustrated in previous units. Federal, state, and local legislation is described and evaluated for its potential impact in solving coastal problems. The unit closes with a discussion of the future of coastal areas, encouraging students to weigh important issues of economics, environment, development and preservation. Finally, students participate in a simulation activity designed to increase their awareness of various public and personal participation strategies that can affect decision-making in coastal regions.

1. Coastal Management: National Legislation
2. Coastal Management: State Initiatives
3. Comprehensive Planning: Is It The Answer?
4. Trade-Offs in the Planning Process
5. The Great Debate: Development or Restoration?
6. Possible Coastal Futures
7. Citizen Involvement Game
8. Evaluating Coastal Studies Course

UNIT 2: COASTAL PROBLEMS

LESSON 7: GAINING ACCESS

TIME: 1 DAY

PURPOSE

To introduce students to the concept of access.

To review several ways in which the lack of access can become a serious problem.

MATERIALS NEEDED

In Unit	Additional Materials
Student Reading, "The Daily Splash" (All articles are fictitious, but are based on actual stories. The information in the pie-chart is authentic.)	

PROCEDURE

1. Announce that you have received several copies of a new newspaper which reports on various activities in Hawaii's coastal region.

   Hand out a copy to each student and have them read it.

2. After they finish reading, build a class discussion around the following questions (or you may wish to have students first write out the answers to the questions):

   A. Ask: Which groups seem to be in conflict in the stories? Over what problems?

   Malakana Story:

   (Groups: Malakana Community Association vs. hotel and condominium developers)
   (Problem: the hotels are ruining the view for local residents--people can no longer see the view)

   Surfing Site Story:

   (Groups: Surfers vs. housing developers, industry and hotels; Kehu Beach home owners vs. the state; public in general vs. private land owners on beach)
   (Problem: Too few surfing sites, too little beach space for recreation)

Lanoaku Story:

(Groups: Lanoaku residents vs. hotel and condominium builders)
(Problem: Newcomers are taking over the beach; local residents feel uncomfortable with newcomers and tourists staring at them)

Lilo Beach Story:

(Groups: public vs. developers)
(Problem: not enough parking--developers failed to build parking spaces)

Advertisement:

(Groups: people who buy Kona estate homes vs. general public who wants to use the beach)
(Problem: the beach area may be closed off to the general public)

B. Ask: What general issues are involved in all these stories? How could you summarize the problems written about in the newspaper?

(Generally, the actions of certain groups of people are preventing other groups of people from using beach areas or viewing scenic spots. The common term is "the problem of access".)

C. Ask: In Hawaii, who can own the beach area?

(The shore area below the mean high tide mark is owned by the state; nobody owns it and it is supposed to be available to all. Above this point, the beach may be owned by private individuals or groups.)

D. Ask: In these stories, how were people prevented from using shore areas?

(Through lack of parking, through high buildings blocking visual access, through development of areas ruining popular beach spots.)

E. Ask: Were the actions of any of these groups in these stories illegal?

(It is likely that no laws were broken, yet the results in each case were to prevent people from having access to beach areas.)

F. Ask: Do you know of areas where development or construction has prevented you or others from getting to certain beaches, or where scenic views have been blocked?

THE DAILY SPLASH

vol. I 1977 Hawaii's Coastal Newspaper

RESIDENTS PROTEST LOSS OF SCENIC VIEW

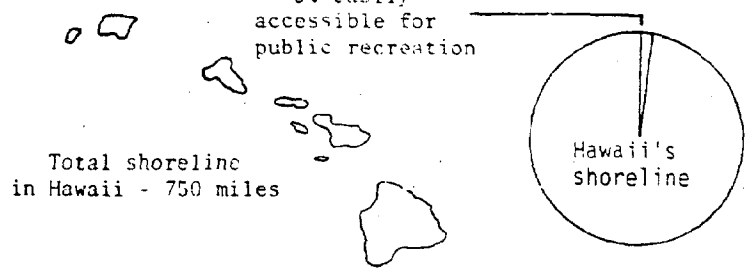
"These new developments are ruining the view--not just for us, but for everybody!" That opinion was expressed by several hundred members of the Malakana Community Association last night as they protested the continuing development of the rural Malakana Beach area.

Malakana Beach offers one of the most scenic views on the island. It has long been an attraction for sight-seers, picnickers and campers. But construction of new homes, condominiums and hotels along the two mile beach threatens to destroy the scenic beauty of the area. Even people driving along the coastal highway no longer have much of a view of the beach.

A new vacation resort planned for the north end of the beach caused these latest complaints from Malakana residents. The quarter mile long complex would have an 8 foot high hedge running along the highway.

"It's not fair for only the tourists and the rich to have this view", said one Malakana resident.

SURFING SITES DECLINING; NEW RECREATION AREAS NEEDED FOR HAWAII'S GROWING POPULATION



A recent survey by the Hawaii Surfing Association shows that the number of good surfing spots is rapidly declining. Housing developments, beach-front hotels and new industrial plants have eliminated over 50% of the best surfing areas.

The Surfing Association announced that they would protest any new development along surfing areas.

State officials said the decline in the number of surfing sites was part of a larger problem in keeping enough beach recreation space for the public. Only 37 miles of Hawaii's 750 miles of shoreline are easily accessible to the public for recreational purposes.

"Everyone on the islands, whether they are long-time residents or newcomers, is affected by this problem", said one state planner. "We simply need more park space, but finding the land and paying for it won't be easy."

Meanwhile, property owners on Kehu Beach announced today they would fight the state's attempt to buy their land for a public beach. "We've saved for years to build a home here," said one Kehu Beach home owner. "If people want a park, they should look somewhere else."

NEW DEVELOPMENT MAKES LOCAL RESIDENTS "UNCOMFORTABLE"

Local residents of the leeward shore met yesterday to announce their opposition to further development in the Lanoaku area.

Several beach users claimed they were unwilling to continue sunbathing and swimming next to the new hotels and condominiums because the new residents and tourists are "always staring down our necks".

One surfer said, "It used to be we could go out alone. But, now all those tourists up there looking down, I just don't feel comfortable coming here anymore."

Other Laonaku residents, including fishermen, complained that the newcomers to the area were taking over the beaches.

Advertisement

KONA GARDEN ESTATES
3 Acre Estates · Fee Simple
Exclusive Private Access to Ocean
Lots in Unit II Now Available

LACK OF PARKING CREATES SERIOUS PROBLEM FOR BEACH USERS

Harry Oiki doesn't go to Lilo Beach anymore. Neither does Sue Montgomery. And they aren't the only ones. It's not that people like Harry and Sue don't want to go, it's just that they can't get there anymore.

Lilo Beach used to be one of the favorite swimming and diving beaches on the South Shore. The area was crowded every weekend. But then came the new shopping center. And then the new subdivision.

The developers were careful to build in several access points so that long-time local residents could get into the area. But they forgot one thing. Parking.

There simply isn't any place to park a car within a quarter mile of the beach. The road is too narrow and there are no open spaces to use.

City officials admit the parking problem has helped turn this once popular beach into what amounts to a private beach for the few nearby residents.

UNIT 2: COASTAL PROBLEMS

LESSON 9: ANALYZING A COASTAL SCENE

TIME: 1 DAY

PURPOSE

To allow students to apply information from Unit 1 and Unit 2 to the analysis and understanding of a coastal scene.

MATERIALS NEEDED

In Unit	Additional Materials
Coastal Scene Drawing	

PROCEDURE

This activity is designed as an evaluation for Units 1 and 2. The strategy is to confront the students with a coastal scene and have them apply what they have learned about coastal geography, ecology, and problems to the analysis of this drawing.

1. Pass out the drawing to each student.

2. Put the following directions on the board, or on ditto:

   List 3 common geographical features of the coastal region found in this picture.

   (Estuary--at the mouth of the river)
   (Sand dune--near the bulldozer)
   (Marsh--along the estuary)
   (Sandy beach--in front of the resort)
   (Wave-cut cliffs--in front of hotel and industry)
   (Harbor--top center of picture)
   (Breakwater--near sailboat)

   List 10 different uses of the coastal area found in this drawing.

   (Tourism, recreational fishing, commercial fishing, industry, recreation, transportation, residential, agricultural, lumber, energy production, hydro-electric power, oil refining, marina, harbor, home for wildlife, scenic viewpoints, waste disposal---students may find other legitimate answers)

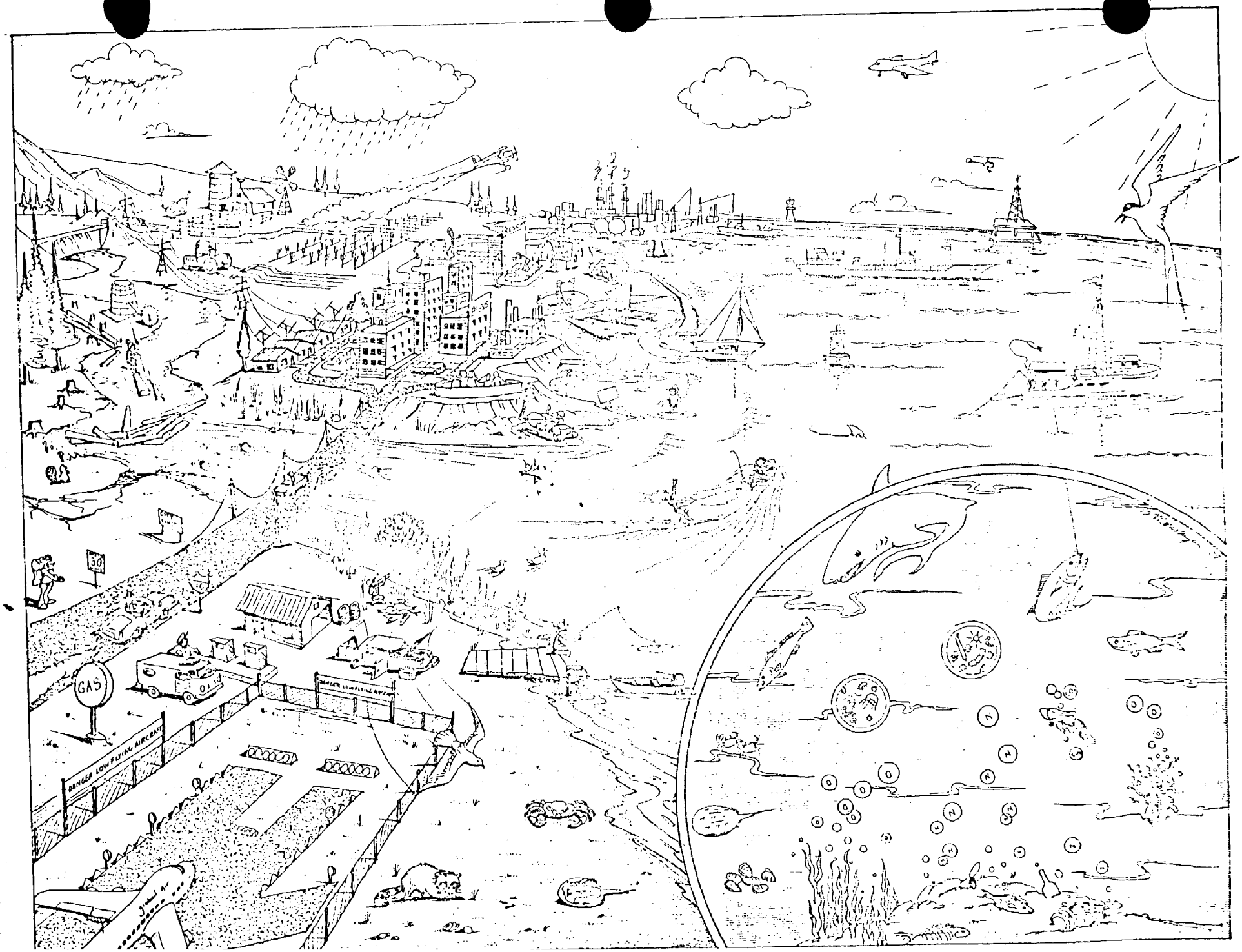
Explain 3 ways in which the natural ecology of this coastal area is threatened:

(Logs are damming the river, preventing fresh water from reaching the estuary; the large dam may also be preventing fresh water from reaching the estuary--both will change the salinity of the estuary)
(Construction may be causing silt to enter the ocean)
(Sewage outfall is dumping raw sewage into the ocean)
(Oil poullution is possible from tankers, refineries, and the oil drilling platform)
(Fertilizers and/or pesticides being sprayed from the airplane may wash downstream to the estuary and into the ocean)
(Construction threatens to fill in the little marsh land remaining)

Which groups of people in this scene are likely to be in conflict with each other? Name at least 4 such conflicts. (For example, the timber owners may be in conflict with conservationists)

(Oil companies vs. resort owners)
(Oil companies vs. tourists)
(Oil companies vs. fishermen)
(Resort developers vs. farmers)
(Harbor users vs. recreational groups)
(Residential vs. agricultural)
(Conservationists vs. airport owners
(Conservationists vs. fishermen)
(Conservationists vs. oil companies)

(Students may find other legitimate conflicts).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DANGER LOW FLYING AIRCRAFT

UNIT 3: POLITICAL AND MANAGEMENT SYSTEMS AT WORK IN COASTAL REGIONS

LESSON 1: THE POLITICAL SYSTEM (PART 2)

MATERIALS NEEDED

In Unit

1 Reading, "The Case of Blue Neck Bay"
1 Transparency for "The Case of Blue Neck Bay"
1 Student Worksheet for "The Case of Blue Neck Bay"
1 Student Handout, "Major Steps in the Case of Blue Neck Bay"

Additional Materials

Overhead Projector
Grease pencil

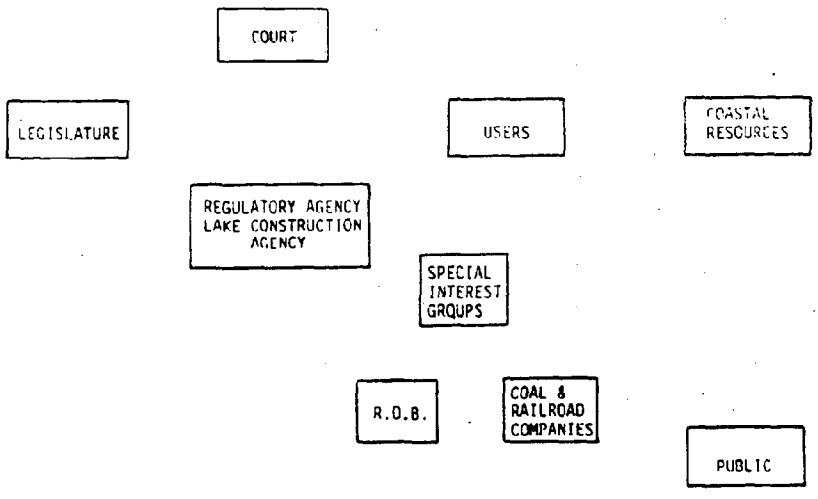
PROCEDURE

1. Assign students the reading, "The Case of Blue Neck Bay". Contrast this story with the fable "A Fish Story" by noting that this reading is based on a true case in the Great Lakes region.

2. After students have read the story, pass out the student worksheet. Tell them that their assignment will be to construct another systems diagram. The first step will be to identify the resources and all the major actors in the story. Ask the students to name these resources and major actors.

   (There are nine: coastal resources, users, public, special interest groups, coal and railroad lobbies, Respect Our Bay, regulatory agenices, legislative body, and the court)

STUDENT WORKSHEET after major actors have been identified



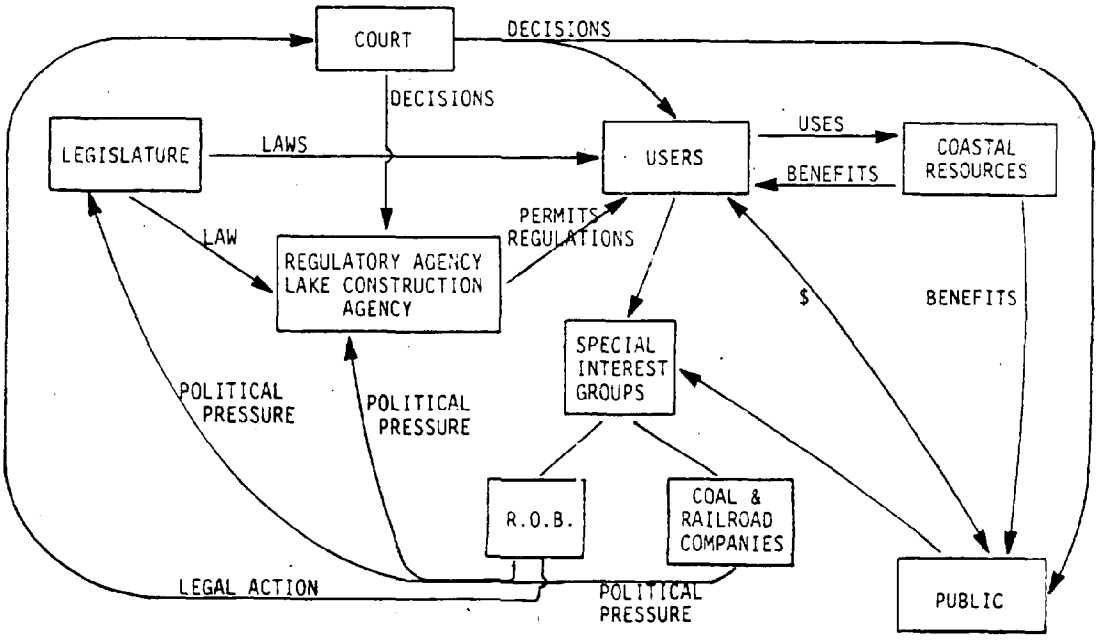
3. After all the major actors have been identified, and the boxes on the worksheet filled in, hand out "Major Steps in the Case of Blue Neck Bay".

   Working individually, either in class or at home, students should use this handout to help them complete the systems diagram. Each of the steps summarizes a major activity in the story and links together two or more of the major actors. Students should read each step and then draw in the relationship arrows on their worksheet.

   You may want to go over steps 1 and 2 with the students to make sure that they start correctly. Use the overhead transparency to do this.

4. After students have completed their diagrams, go over them with the class to insure that there is general understanding about how the system operates. Do this by completing the overhead transparency. Students should follow along and make sure their worksheets correspond to the completed transparency.

COMPLETED WORKSHEET



THE CASE OF BLUE NECK BAY

Blue Neck Bay rests in the upper reaches of the Great Lakes, surrounded by the tall evergreens that border the lake's shore. Some vacation homes and several small villages line the bay. During the hot summer months, tourists and summer residents flock to Blue Neck Bay to enjoy swimming, fishing and camping in the quiet wilderness area.

But Blue Neck Bay is not just a vacation playground. The bay is also a major transportation link for the coal mining industry in this region. A major coal field lies about 75 miles from Blue Neck Bay. Railroad cars haul the coal from the mines to the town of Pine Grove in the upper portion of the bay. Here is is loaded on barges and hauled across the lake to several ports on the industrial eastern shore.

In the mid-1970's the demand for coal greatly increased. Collins Coal Company, which operates the Blue Neck Bay coal field operation, doubled the amount of coal it mined. This meant increased business for Collins Coal, but it could make even more profits if its loading and dock areas in Blue Neck Bay were increased in size. These were too small to handle the growing demand and barges often backed up for several days waiting to be loaded. A new facility would permit more and larger barges to be serviced at the Pine Grove dock.

The Collins Coal Company would not be the only party to benefit from new dock and pier facilities. The Northern Bay Railroad, which transports the coal from the mines to the Blue Neck Bay dock also favored dock expansion. This would permit the railroad to haul more coal, and thus make more money.

To enlarge the dock facilities, the railroad company and Collins Coal had to get approval from the state agency responsible for construction projects on the Lake. Concerns about the environmental impact of such a construction

* This case is based on a real incident in the Great Lakes area.

project would likely be raised. But the two companies believed this would not be a problem, because in the past they had been successful in getting permits for construction activities.

For example, the state legislature had passed several environmental laws over the past 20 years. One of these laws created the Lake Construction Agency which was empowered to protect the lake against unnecessary construction projects. But Collins Coal and the Northern Bay Railroad Company lobbied the legislature and received exemptions from every one of these statutes. A water pollution statute states: "This law shall not apply to coal mining companies". Further, persons favorably disposed toward Collins Coal Company were ranking members of the Lake Construction Agency (LCA). The LCA had never turned down any previous construction request from Collins Coal or from the railroad. Environmental protection laws or regulations which might have restricted their business operations had not been applied to Collins Coal or the railroad. They felt confident that this time would be no different.

Last September, Collins Coal and the Northern Bay Railroad companies asked the LCA for a permit to expand the dock and pier facility at Pine Grove. The LCA said it would study their request and issue a decision in a few months.

In the past, few citizens of Pine Grove had objected to the activities of the two companies. But a year ago, the town of Pine Grove built a new marina and park about one-half mile from the barge facility. Many residents and visitors in the Pine Grove area felt that the new dock area proposed by the coal and railroad companies would interfere with this recreation area. More important, they feared that the essentially quiet and rural atmosphere of the town and the upper part of the bay would be forever changed if expansion was approved.

During the autumn months several citizens in Pine Grove formed the Respect Our Bay Association (ROB). Its primary goal was to halt the expansion of the

dock and pier facility.

In January, the state legislature opened its annual session. ROB members got their representatives to introduce a new Lake Protection Law which would make it illegal to build large structures out into the lake. If this law were to be passed the new dock and pier facility proposed by the railroad and coal companies would not be permitted.

Representatives supporting the coal and railroad interest, however, were too strong, and the law did not pass.

A few weeks later, the Lake Construction Agency (LCA) announced it would hold its last public hearing on the pier and dock facility. If no one brought up serious objections at this meeting, the agency would immediately issue permits to allow Collins Coal and Northern Bay Railroad to begin construction.

ROB made a long presentation at the hearing, explaining how the noise and "industrial nature" of the enlarged loading-unloading facility would disrupt the quiet nature of the bay. Several residents from Pine Grove also testified that the new facility would interfere with the Pine Grove marina. Others argued that the new dock area would seriously pollute the lake environment.

Spokespersons from the coal and railroad companies also made presentations. They argued that their new facility would not disrupt the marina and recreation area, and they said the bay was big enough for all kinds of activities. Outlawing industrial uses would be detrimental to further economic growth of the region.

A week later the LCA announced approval from the construction project.

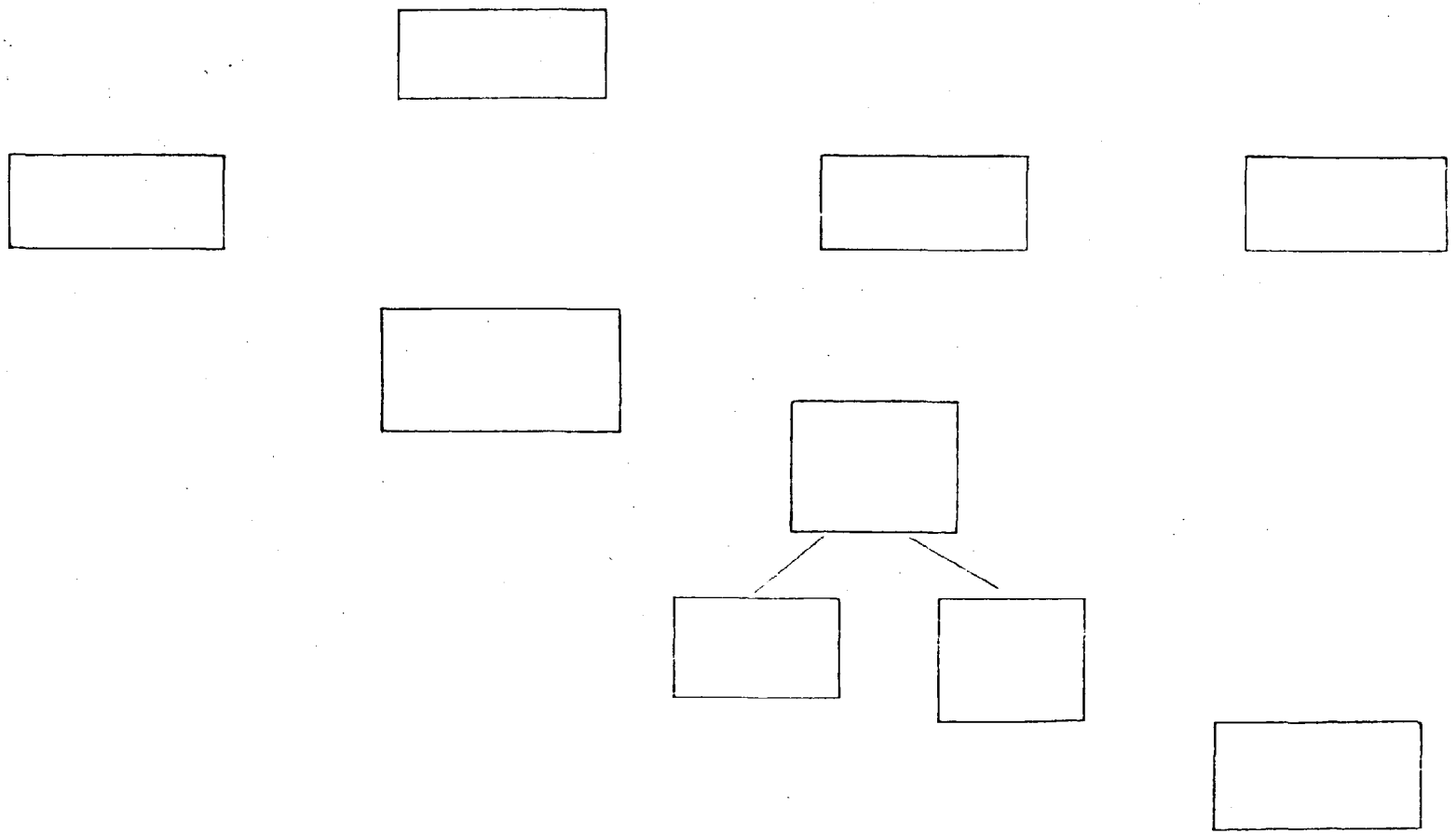
ROB had been defeated twice in its efforts to save the bay. It had one last alternative--to take legal action through the courts. Three days before construction was to begin, ROB filed a lawsuit against the Lake Construction Agency for failing to adequately study the situation. The court ordered a temporary halt to all construction until LCA could demonstrate that it had

considered all the data before granting the permit. After listening to testimony from both the agency and ROB, the court ruled that LCA had not performed fairly. The court halted all construction.

MAJOR STEPS IN THE CASE OF BLUE NECK BAY

1. Some users use the bay as a recreation and transportation resource.
2. These users benefit from their use of the bay.
3. The general public also benefits from both of these uses.
4. The state legislature passed laws concerning use of coastal resources. (One of these laws created the LCA)
5. The coal company and the railroad put pressure on the state legislature to pass certain kinds of laws.
6. A concerned group of recreational users of the bay formed a special interest group called ROB to protest the building of the dock.
7. ROB put pressure on the legislature to pass a new law.
8. Coal and railroad companies put pressure on the legislature to not pass the law. (The legislature failed to pass the law).
9. ROB put pressure on the LCA to deny the permit.
10. Coal and railroad companies put pressure on the agency to allow the permit.
11. The agency granted the permit to the coal and railroad companies for use of the bay.
12. ROB went to court and filed a lawsuit against the agency.
13. The court made a decision to halt construction. This affected the users of the bay, the LCA, and the general public.

BLUE NECK BAY STUDENT WORKSHEET



COASTAL PROBLEMS AND RESOURCE MANAGEMENT

A SECONDARY SOCIAL STUDIES COURSE

SAMPLER

CURRICULUM RESEARCH AND DEVELOPMENT GROUP
UNIVERSITY OF HAWAII AT MANOA © 1979

Coastal Problems and Resource Management

produced by

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The development of Coastal Problems and Resource Management was supported by the Office of Coastal Zone Management, NOAA, Department of Commerce, Grant Number 04-7-158-44035, and the Hawaii Coastal Zone Management Program, Department of Planning and Economic Development, State of Hawaii.

OVERVIEW:

Coastal Problems and Resource Management (CPRM) is a one semester course for secondary school students. The course focuses on the coastal region of the United States and the political, economic and ecological factors involved in the development of coastal resources. The growing demands of an increasing population, a society seeking new energy sources and an environmentally conscious citizenry often collide in coastal areas. This special environment provides a rich and interesting setting for the analysis of many of these most pressing social problems.

PROGRAM GOALS:

1. To increase students appreciation for the beauty, fragility, and utility of coastal environments.

2. To identify major social, political, legal and economic problems involving coastal areas

3. To identify key elements in the political, legal and economic decision-making process as it relates to management of coastal resources.

4. To relate specific local coastal problems to broader national issues.

5. To investigate the opportunities for citizen participation in decisions affecting coastal resource management.

CURRICULUM FORMAT:

The course is organized in 4 units:

Unit I: At The Water's Edge
Unit II: Understanding Coastal Ecology
Unit III: Resource Management: Politics and Planning in the Coastal Region
Unit IV: Case Studies in Resource Management

Various instructional approaches are used including filmstrips, overhead transparencies, slides, in-class debates and discussions, case studies, field trips, readings and worksheets, simulation games, and role-playing experiences. Several lessons in CPRM can be supplemented and enriched with activities that refer to local issues and concerns. The course materials include: Teacher's Guide, Student Readings, Student Worksheets and the Coastal Resource Development Game (Ostrich Bay).

Teacher Materials: A complete set of procedures accompanies each lesson. The procedures can be followed exactly as written, or teachers can adjust them to better fit their classes. All lesson plans use a similar format, each having:

1. a unit and lesson title
2. an estimated time for the activity
3. a purpose of the lesson
4. a list of materials needed
5. an overview of the lesson.

Student Materials: Student materials fall into two categories, student worksheets and student readings. Worksheets are typically filled out by students and then collected by the teacher for evaluation. The readings include case studies, reference materials and other descriptive information that can be handled as in-class or homework assignments.

CONTENT SUMMARY:

Unit I: At the Water's Edge

The initial lessons confront students with activities designed to introduce a variety of important coastal features. The activities orient students to the coast and turn their thinking toward the uses and values of the coastal area. The many benefits of the coast are examined from both a national and local perspective.

Lesson Five, "The Coastal Resource Development Game," personally involves students in several problems and conflicts centered in the coastal area and the interactions of ecological, economical and political concerns. This simulated experience has students participate in the development of a bayside community, and provides opportunities to confront complex problems facing coastal communities. The game introduces many important themes and concepts which are then explored more fully in the remainder of the course.

Unit II: Understanding Coastal Ecology

This unit begins with an introduction of the important ecological processes which take place in the coastal region. Systems diagrams are used to display the basic relationships between producers, consumers and decomposers. The natural process of the coastal ecosystem is described and the effects of certain disruptions to this system are introduced. Oil pollution, sewage and waste disposal, and the destruction of estuaries and wetlands are among important ecological problems studied.

Natural hazards are also discussed in this unit, and Lesson Eight, "Tsunamis and Hilo, Hawaii: A Case Study," provides a specific example of how the presence of tsunamis has affected one coastal community. Students take the roles of citizens of Hilo, who, in the aftermath of a devasting tsunami, try to decide what protective measures to take regarding future disasters.

Unit III: Resource Management: Politics and Planning in the Coastal Region

Emphasis now shifts from ecological concerns to political processes and problems. This unit describes and analyzes the role of government involvement in the coastal region. Two short lessons about the destruction of scenic views and the loss of beach access introduce students to the idea that government decisions affect the ways coastal resources are used. Students are then more formally introduced to the politics of the coastal area through systems diagrams. They identify judicial, legislative, regulatory and public roles and interests as they relate to the coast. Lesson Four, "The Case of Blue Neck Bay," allows the application of these general principles to a specific case. Common strategies for governing coastal resource use are presented in lessons five and six.

The remainder of the unit focuses on management problems and the effects of governmental regulation and influence on effective planning and optimum use of coastal areas. For example, Lesson Ten, "The Taking Issue: Legal Limits to Regulation," examines the delicate balance between the rights of government to regulate land use and the rights of property owners to use land as they see

fit. A final activity has students apply their understanding of resource management strategies and problems to planning the future of a coastal county.

Unit IV: Case Studies in Resource Management:

This unit brings together the previously separated ecological and political arenas in the analysis of several case studies. Through a series of different types of activities, students are involved in the processes and concerns faced by participants in the debates over energy, economics, ecology, and government involvement. Lessons five and six present the general status of national and state legislation as they affect coastal zone management efforts. A final lesson, "Coastal Futures: A Personal Case Study," encourages students to utilize the strategies and concepts introduced throughout the course by developing their vision for the future of the coastal region.

TEACHER TRAINING:

Teacher training is required. Training sessions will last three to five days and are to be conducted by members of the project staff or other designated trainees.

SAMPLER LESSONS:

This sampler contains 4 lessons from COASTAL PROBLEMS & RESOURCE MANAGEMENT. These lessons demonstrate a variety of instructional strategies and student activities. Teacher's Guides, Student Readings, and Student Worksheets are included.

1. THE NATIONAL SEASHORE QUIZ: opens the course and is designed to stimulate awareness of coastal topics. This is not intended as a testing exercise, but as a device to encourage discussion and arouse student interest.

2. OSTRICH BAY: A COASTAL SIMULATION: Only the Game Overview is included in this sampler. Complete game instructions and game materials come with the classroom package. This and other simulation and role-playing activities in the course allow students to experience planning processes, management conflicts, and citizen involvement strategies.

3. GAINING ACCESS: discusses a major problem in nearly all coastal areas, that of maintaining adequate public access to the shore. This lesson also exemplifies a unique feature of the national course design --the insertion of local materials into the course. The access lesson, for example, contains Hawaii stories and has been used in several Hawaii Schools. For other states, newspaper articles relating their particular access problems would replace the Hawaii version.

4. ENERGY AND THE ENVIRONMENT: THE NORTHEAST ATLANTIC: examines the impact energy resource explanation and development can have on a coastal area. Students examine the differences in community needs and interests and how these relate to coastal resource use. They read an account of oil exploration in the Northeast Atlantic and examine the reactions of three areas to the possibility of oil discoveries in "their back yard."

Teacher Page

UNIT I: AT THE WATER'S EDGE

LESSON 1: THE NATIONAL SHORELINE QUIZ

TIME: 1 DAY

PURPOSE

To introduce students to the topic of coastal studies.

MATERIALS

In Package:

Worksheet I-1, "National Shoreline Quiz"

OVERVIEW

In this short introductory lesson, students take and score a quiz on their present knowledge of shoreline topics. The quiz is designed to raise interest and preliminary discussion. It is not to be graded.

PROCEDURE

1. Pass out the "National Shoreline Quiz". Tell students that you want to determine their "S-Q" (Shoreline Quotient) before this course begins. This short quiz will provide you with the necessary information.

2. Have students complete the quiz.

3. Review student answers to each question. Correct answers can be found in step 5. Where appropriate, have students explain why they answered the way they did. Encourage discussion between students with conflicting answers.

4. Have students score their papers and determine their "S-Q".

5. "National Shoreline Quiz" Answer Key.

(1) 30 states

(2) 50%

(3) b - A place along the coast where fresh water and salt water mix.

(4) c - Salt marsh (coastal wetlands)

(5) 99%

(6) 2%

(7) False. (However, in 1975, 70,000 school children in New Orleans ate 12 tons of shark meat for lunch and loved it!)

(8) Fish and shellfish in descending order of economic value to the United States (1977 statistics):

Shrimp
Salmon
Crabs
Tuna
Clams
Menhaden (chiefly used for industrial purposes)
Lobster
Flounder
Oysters
Scallops

(9) Alaska, 5,580 miles; Michigan, 2,900 miles; Florida, 1,250 miles; California, 840 miles; Hawaii, 750 miles; New Hampshire has the shortest coastline, only 13 miles.

(10) 97%

Student
Worksheet I-1

NATIONAL SHORELINE QUIZ

(1) How many of the 50 United States are considered by the U.S. Government to be "coastal states"? (The definition of a coastal state is one that borders the oceans or the Great Lakes.)

_____ states

(2) What percentage of the population of the United States lives within 50 miles of the coastline?

10% 25% 33% 50% 65%

(3) An estuary is:

a. an iceberg that floats too near a coastline.
b. a place along the coast where fresh water and salt water mix.
c. the scientific name for a rock crab.
d. a machine on a whaling ship used to haul whales out of the water.

(4) Which is the most productive in terms of tons of organic matter produced per acre?

a. desert
b. wheat field
c. salt marsh (coastal wetlands)
d. deep ocean

(5) What percentage of trade between continents is carried by ships?

10% 25% 53% 75% 99%

(6) What percentage of the U.S. shoreline is set aside by the government for public recreation?

2% 14% 25% 53% 65%

(7) Sharkburgers are likely to become the next most popular sandwiches in seafood restaurants.

True False

(8) From the following list, name the 5 fish or shellfish which are of most economic value to the U.S.:

Crabs
Tuna
Lobsters
Menhaden
Scallops
Shrimp
Oysters
Flounder
Clams
Salmon

1. _____
2. _____
3. _____
4. _____
5. _____

(9) Which state in the U.S. has the most miles of coastline? (Coastline refers to the length of the general outline of the Seacoast.)

_____

(10) What percentage of the world's water is salt water?

3% 28% 50% 70% 97%

S-Q score _____(Number correct)

S-Q rating

10	A real shoreline genius
7-9	Knows a lot about the shoreline
5-6	Can recognize the shoreline when they see it
3-4	Can recognize the shoreline if someone points it out
0-2	Will probably drown within 10 feet of the shoreline

Teacher Page

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 2: GAINING ACCESS

TIME: 1 DAY

PURPOSE

To introduce students to the problem of lack of public access to shoreline areas

To understand that political action influences the extent of public access

MATERIALS

In Package

Reading III-1, "The Daily Splash"

OVERVIEW

Students read several simulated news stories about loss of public access to the shore, and discuss each case. Students consider whether government action or inaction helps produce access problems, and how government action might protect or restore public access. This lesson and the previous "Views" lesson, are intended to alert students to the role of government in allocating shoreline resources.

PROCEDURE

Part I: The Access Problem

1. Assign Reading III-1, "The Daily Splash."

2. Call on one student to summarize each story. In this summary, have the students answer the following questions. You may want to make this a written assignment first, or just have them answer the questions orally in class.

   a. What groups are in conflict in this story?

   b. What is the basic problem or conflict in this story?

      (1) "Park Department Survey" story:

      Groups: Homeowners, condominum residents, and industry vs. beach users

      Problem: Too little beach space for recreation; increasing population increases pressure to develop

the waterfront plus overcrowded recreational sites

(2) "Lack of Parking" story:

Groups: Developers and homeowners vs. public
Problem: Not enough parking--developers failed to build parking spaces

(3) "Castle Beach" story:

Groups: State government, public beach users vs. Castle Beach land owners

Problem: Landowners don't want to give up their land for public park

(4) "North Shore" story:

Groups: Local residents vs. tourists and newcomers
Problem: New residents and tourists are crowding out long-time beach users

(5) "Advertisement"

Groups: Public vs. developers and prospective buyers
Problem: Beach area will be closed off to general public]

3. Ask the following series of questions to bring out how government is involved in the access problem. As with the "Views" lesson, note government's involvement, but do not detail its role at this time.

a. <u>What general issues are involved in all these stories? Or, what is the common problem reported in the newspaper?</u>

[The actions of certain groups of people are preventing other groups from using beach areas. Some people are being denied access to the beaches.]

b. <u>In these stories, which groups denied or restricted access to recreational areas?</u>

[Private landowners, real-estate developers, hotel owners.]

c. <u>Is there anything that can be done about this?</u>

[In many areas, state and local governments have attempted to provide adequate recreation sites and maintain beach access.]

Student
Reading III-1

THE DAILY SPLASH

Vol. 1 1979 Coastal Newspaper

LACK OF PARKING EMPTIES BEACHES

Frank Mitchell doesn't go to Clearwater Beach anymore. Neither does Jean Guido. And they aren't the only ones. It's not that people like Frank and Jean don't want to go, it's just that they can't get there anymore.

Clearwater Beach used to be one of the favorite swimming and camping beaches in this area. But then came the new subdivision. And, then the new shopping center. The developers put in a public access pathway so that long-time local residents could easily get to the beach. But they forgot one thing. Parking.

There simply isn't any place to park a car within a half-mile of the beach. The road is too narrow and there are no open spaces to use.

City officials admit the parking problem has helped turn this area into what amounts to a private beach for the few nearby residents. One official admits, "Quite frankly, I don't know what we can do about it. Somebody in city government should not have allowed the developers to build along that entire beach front area.

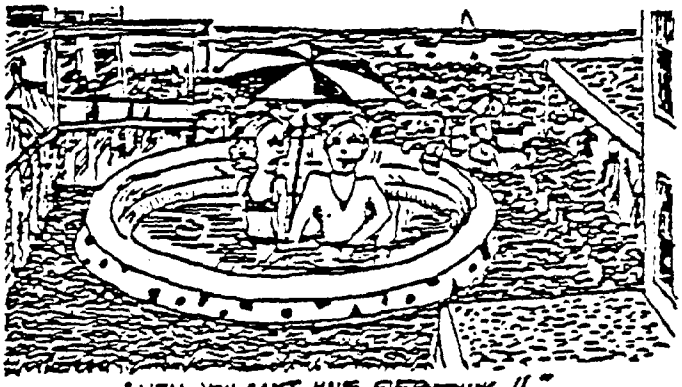
Beach Owners Fight Plan For New State Park

Owners of several undeveloped lots at Castle Beach announced they will fight the state's attempt to buy their land for a new state park.

"We've saved for years to build a home there," said one beach-front property owner. "If people want a park, let them look somewhere else."

The owners will send a petition to the Governor's office expressing their opposition to the park plan.

PARK DEPARTMENT SURVEY FINDS LACK OF PUBLIC RECREATIONAL SITES



"WELL, YOU CAN'T HAVE EVERYTHING !!"

A recent survey by the County Park Department shows that the amount of recreational beach space easily available to the public is declining. Housing developments, beach-front condominiums and new industrial plants have closed over half of the county's best recreation sites to the public.

One park official complained that long-time popular beach spots are being ringed by "Private Property - Keep Out" signs. "The simple fact is that developers have sold off our beaches."

A state planning spokesman said today that the loss of recreation sites is not unique to this area. "All along the coast, communities are faced with the problem of inadequate recreation space. Last weekend, Point Eagle Seashore Park closed its gates at 10:00 in the morning beacuse they had no more parking space.

Most officials predict the problem will get worse if nothing is done to acquire more park areas. "We've had a 30% increase in population here in the past 15 years," reported one county planner. "All signs indicate the population will keep increasing in the future. Finding the land for beach parks and paying for it will not be easy. If the public wants more beach recreation, taxes will surely have to increase."

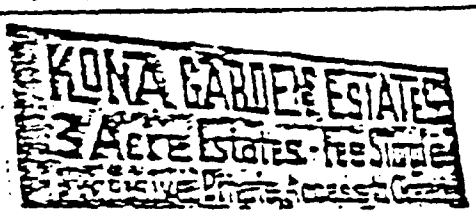
New Developments Ruin Beach For Local Resident

Local residents in the North Shore area met yesterday to announce their opposition to further development. Plans for a new condominium and beach-front hotel along the North Shore prompted the resident's opposition.

Several beach owners claimed there were already too many hotels and condominiums in the area. One lifelong resident complained, "The tourists and newcomers are always staring down our necks. It's been a local beach for a long time, but now I just don't feel comfortable coming here."

Another resident said, "It used to be we could go out on the North Shore beaches anytime. But now there's so many people that I can't get into it."

Other North Shore residents, including fishermen, complained that newcomers were taking over the beaches.



Teacher Page

UNIT: AT THE WATER'S EDGE

LESSON 5: THE COASTAL RESOURCE DEVELOPMENT GAME

TIME: 7-10 DAYS

PURPOSE

To demonstrate how and why coastal development occurs.

To have students confront typical problems associated with rapid economic development in coastal areas.

CAN THE COASTAL WETLANDS BE PRESERVED? Will the Mock Orange Ocellated Ostrich and the Great Grizzly Gator become extinct? What happens when PETROCK (Petrochemical) industries locate on the waterfront? Should a new power plant be approved?

These issues, and other, confront participants in the Coastal Resources Development Game (CRDG), an exciting and informative economic stimulation for 6 to 40 people. CRDG takes players through 5 periods of economic development in Ostrich Bay, a coastal area with typical coastal features and resources. Game players form development companies, buy and sell land, earn income from coastal enterprises, and make political decisions.

Players experience boom periods, economic depression, and war during the game's five rounds of play. Development activities create pollution and other environmental problems, which in turn affect development patterns. Political decisions made by the local County Council control or ignore impending natural calamities and on-going environmental problems. The ever present "Voice of Destiny" announces consequences of political decisions and economic activities. In the end, one group of players is declared Game Winner. But, at what cost?

The post-game debriefing spotlights environmental issues and important historical trends in coastal areas. Debriefing questions generate animated discussion about development strategies, government controls, the costs of pollution, citizen action, preferred futures, and the issues of growth versus conservation and profits versus public interest.

UNIT 4: CASE STUDIES IN SHORELINE MANAGEMENT

LESSON 3: ENERGY AND THE ENVIRONMENT: THE NORTHEAST ATLANTIC

TIME: 1 DAY

PURPOSE

To examine the impact energy resource exploration and development can have on a coastal area

To examine differences in community needs and interests and how these relate to coastal resource use

MATERIALS

In Package

Transparency IV-2, "Pacific Coast"
Transparency IV-3, "Atlantic Coast"
Reading IV-4, "The Atlantic Oil Sweepstakes"

OVERVIEW

Students view two transparencies of the continental shelf which show the location of present and future oil exploration. They then read an account of oil exploration in the northeast Atlantic and examine the reactions of three areas to the possibility of new oil discoveries in their "back yard."

PROCEDURE

1. Review information presented earlier about the continental shelf. Ask:

   a. What is the continental shelf? Where is it located?

      (The continental shelf is the relatively shallow ocean floor bordering the continental land mass. Along the Atlantic Coast of the U.S., the shelf descends gradually. Off the Pacific Coast, the shelf is narrow and steep.)

   b. What valuable coastal resources are associated with the continental shelf?

      (The shallow waters above the shelf are a prime breeding ground for fish; millions of barrels of oil and natural gas are located below the surface of the continental shelf.)

2. Show the transparencies of the continental shelf. Point out

where oil wells are presently located. Indicate where new oil leases have just been awarded to begin exploring for more oil sources. Concentrate particularly on the East coast of the U.S. Ask students:

a. Why are so many new areas being opened up for oil exploration?

[The U.S. is highly dependent on oil as an energy source. The U.S. government is attempting to find more sources of oil in this country so that we have to depend less on foreign oil. The U.S. consumes 30% of the total world demand. In 1976 the U.S. consumed 6.4 billion barrels of oil; the U.S. produced 3.5 billion barrels, or 55% of its demand. We imported 45%. Oil accounted for 47% of all U.S. energy needs; natural gas accounted for 27.3%. These two total almost 75% of all U.S. energy needs. Coal, water power, and nuclear energy account for the rest.

Explain that there is about a 25% chance of finding major oil deposits in these new exploration areas.]

b. If major oil discoveries are made along the East coast, how might this affect coastal areas?

[Support facilities and services that oil companies need for exploration and production will be needed onshore. These include refineries, petrochemical complexes, enlarged ports and harbors, storage and warehouse facilities for supplies, office space for corporate headquarters, construction sites for building production rigs and other needed equipment, helicopter and other airport facilities, storage tanks for oil, etc.]

c. What are some advantages and disadvantages that might come to a coastal area that is near a major oil find?

[Increased supply of oil and natural gas, increased population for some areas, increased pollution of coastal waters, increased shipping traffic, increased employment opportunities, more industrialized areas, disruption of wetlands and estuaries, etc.]

3. Pass out the reading "Atlantic Oil Sweepstakes".

After the class has finished, have students compare their predictions about coastal impacts with the projections made in the article.

a. Were there support facilities mentioned in the article that students failed to list?

b. Were there advantages or disadvantages that East Coast community planners are considering that students failed to note?

c. Did your class think of certain important factors not covered in the article?

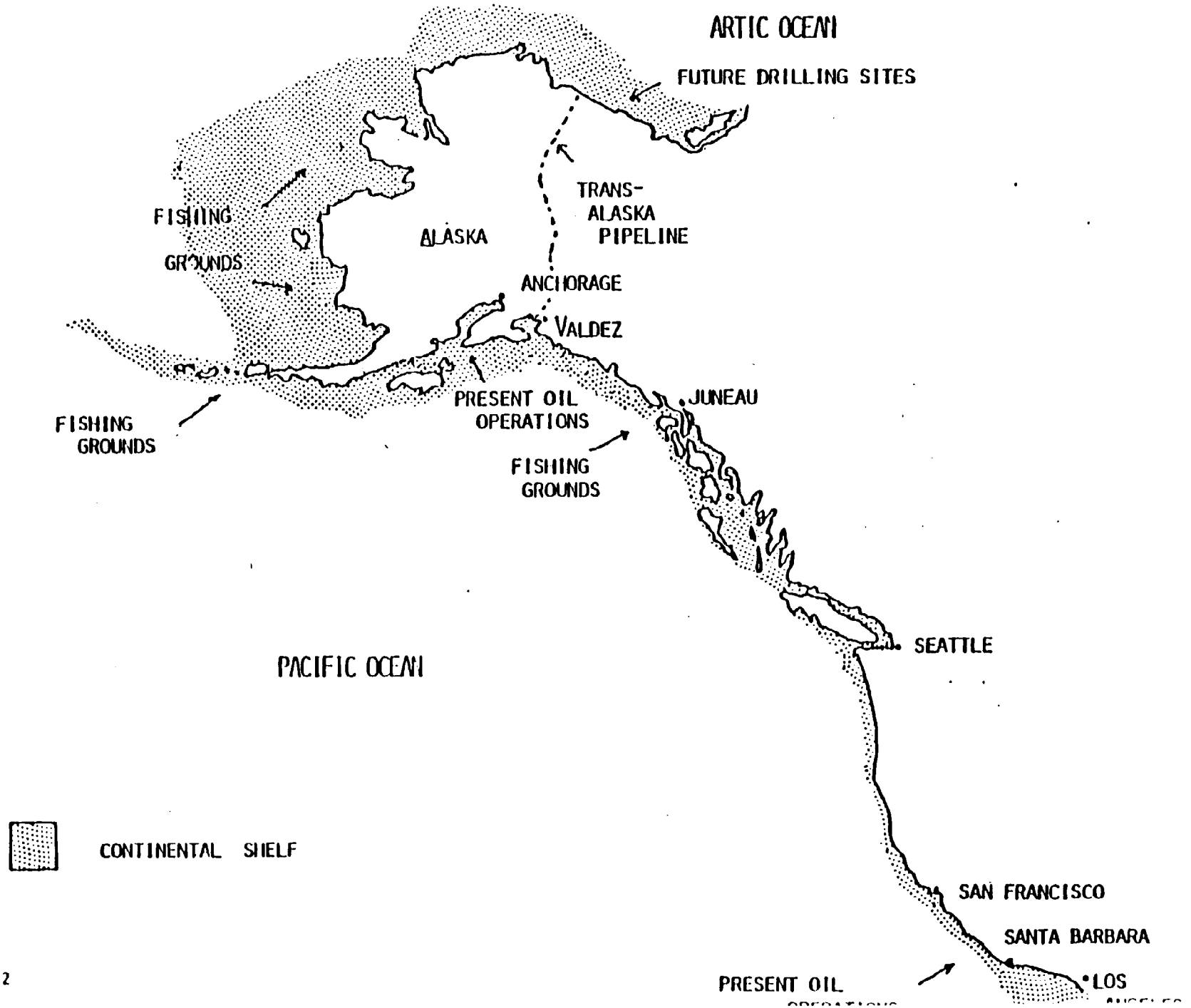
d. What are the positions of the citizens of Cape May, New Jersey, Cape Charles, Virginia, and the state of Rhode Island?

e. How do they differ in their attitudes toward oil companies locating support facilities in their areas?

[Cape May, anti-development; Cape Charles, split; Rhode Island, pro-development.]

f. Which factors does each seem to consider the most important: economic, environmental, or political-social factors?

[Cape May, environmental and political-social; Cape Charles political-social; Rhode Island, economic.]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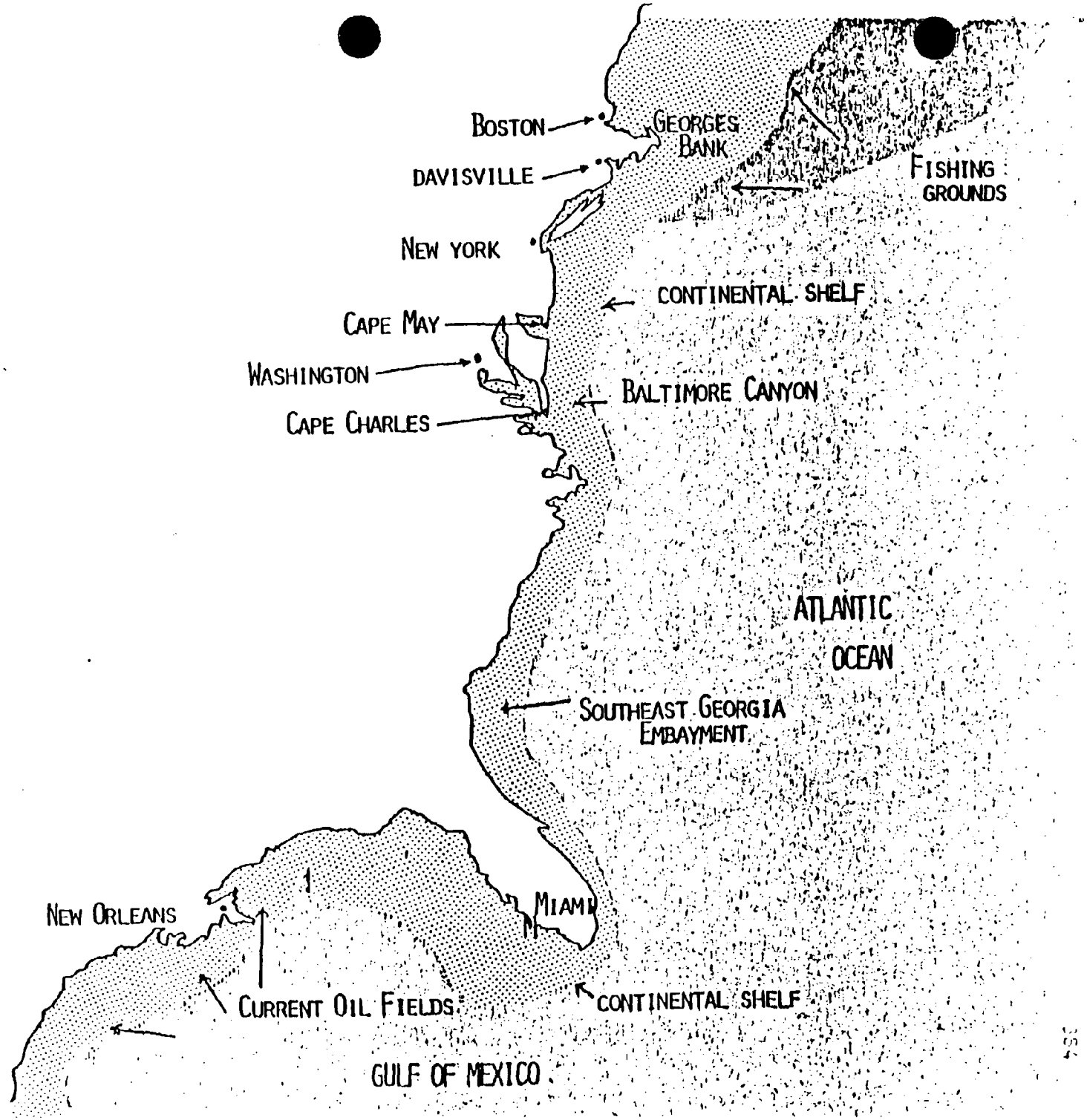
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GEORGES BANK
DAVISVILLE
FISHING GROUNDS
NEW YORK
CONTINENTAL SHELF
CAPE MAY
WASHINGTON
BALTIMORE CANYON
CAPE CHARLES
ATLANTIC OCEAN
SOUTHEAST GEORGIA EMBAYMENT
NEW ORLEANS
MIAMI
CURRENT OIL FIELDS
CONTINENTAL SHELF
GULF OF MEXICO

HIGH STAKES FOR EAST COAST COMMUNITIES

THE ATLANTIC OIL SWEEPSTAKES

$$$ $$$ $$$ $$$ $$$ $$$ $$$ $$$ $$$

The continental shelf is the "front porch" of the United States. Stretching away from the shoreline along the Gulf, Atlantic, and Pacific coasts, the water of the shelf is shallow, nutrient-rich, and teeming with fish. Nearly 90% of all the fish we eat are caught in this valuable "front porch."

Beneath the continental shelf lies other kinds of wealth: oil and gas. These resources may possibly provide important new energy sources for a nation sorely in need of additional petroleum supplies.

One oilman says, "The future of the world's oil industry lies under water." The oil industry already pumps over 20% of the world's oil supply from continental shelves. Along the Gulf of Mexico and off the California coast, oil companies have operated oil rigs for many years. Some 160 platforms dot the Gulf, one-third of all those operating in the world.

New areas of the U.S. continental shelf are now being made available for oil exploration. After long court battles, the U.S. Department of Interior, finally gave the go-ahead for drilling in 1977. The Environmental Protection Agency has approved drilling permits for 10 companies. Primary areas for investigation are the Baltimore Canyon(about 100 miles east of Delaware and New Jersey) and the Southeast Georgia Embayment(a similar distance off the Georgia coast). Other new areas likely to see oil exploration are the Georges Bank area off Massachusetts, and new sites in the Gulf of Mexico and off the Pacific coast.

How much oil is in the shelf, and whether the oil companies can extract it are unknowns at this point. But the odds are high enough that companies like Exxon will be betting up to $100,000 a day for the exploration gamble. In the Baltimore Canyon alone, the oil sweepstakes could yield as much as 1.4 billion barrels of oil and 9.4 trillion cubic feet of natural gas.

The possibility of a major oil discovery is enough to make many areas along the east coast take a serious look at the possible impact of this "good fortune." For several communities, the results of the "Atlantic Oil Sweepstakes" may mean more than just plentiful oil and gas. What happens if these drillers strike it rich?

Oil rigs must be fed--with supplies, with people, and with many other important support services. And, in turn, when oil and gas are produced, they must be sent ashore somewhere to be refined, processed, and transported

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"THE FUTURE

OF THE WORLD'S OIL INDUSTRY

LIES UNDERWATER"

---

to eager customers. Where will these activities be located? How will all of this affect the shoreline of many East coast communities? A look at three areas along the Atlantic seaboard gives some idea of the kinds of opportunities and problems they may face if oil comes to town.

RHODE ISLAND

For many communities in this small state, the possible oil bonanza may be the solution to some serious economic problems. The U.S. Navy recently closed down bases in the state; at Davisville, the Navy pulled out leaving behind warehouses, fueling piers, landing strips, a deepwater port, and many unemployed civilians.

Several city and state officials, including the Governor, convinced oil companies to use the Davisville facilities for supply headquarters during the two to three years of exploration.

Over 30 support companies have moved into Davisville: Rhode Island expects $50 million a year from the Davisville business. In addition, major discoveries in the Baltimore Canyon could mean 2,000 more jobs for local people.

CAPE MAY, NEW JERSEY

There is a community slogan that describes Cape May: "The Nation's Oldest Seashore Resort." Six American Presidents, including Lincoln, have vacationed there. Located on the Southern tip of industrial New Jersey, less than three hours from the New York-Philadelphia urban belt, Cape May is a playground-home to some 750,000 tourists and residents in the hot, humid summer months.

The resort industry is responsible for 90% of the economy in Cape May. Says one local official, "Cape May's economic base is inextricably bound to a high quality natural environment.

60 MILES AWAY, OIL DRILLS BITE INTO THE CONTINENTAL SHELF

By virtue of geography, Cape May may also be bound to the oil boom on the East coast. 60 miles away the oil drills bite into the continental shelf; if oil is found it must be transported to the mainland, and the Cape May area is the closest--and thus cheapest--point. Oil companies have already expressed interest in Cape May as a likely location for a deepwater port. New refineries have been considered. Industrial construction and port activities in this region could bring in 30,000 new jobs by 1985.

Planners in Cape May County consider these potential additions to their community: refineries, natural gas processing and treatment plants, temporary and permanent support bases, steel platform fabrication yards, pipelines, tanker and pipeline port facilities, and pipe-coating yards.

Their analysis predicts that such activities will damage the resort industry and seriously alter the marshland environment that makes up one-third of the county shoreline. An official planning study, conducted in 1977, found "clear opposition" to the development of oil related facilities within Cape May County.

As a result of these and other findings, planners for the county

recommended that the only oil support facilities permitted in this area be 1) a helicopter base at an existing airport, and 2) a small, temporary service base in Cape May Harbor.

CAPE CHARLES, VIRGINIA

15,000 people inhabit this quiet coastal town, located near the tip of the Delaware Peninsula. An agricultural community--a "truck farming town" one resident called it--Cape Charles faces a major decision brought on by the Atlantic oil sweepstakes.

Brown and Root, one of the largest oil rig construction firms, purchased 2,000 acres near Cape Charles for a new construction site. If Brown and Root moves in, it is likely that related industries will follow. One firm, El Paso Gas, has already taken an option on an adjacent piece of land for a natural gas port facility.

The County Board of Supervisors must OK zoning changes from "agricultural" to "industrial" before these new facilities can be built. The Mayor supported this change, arguing that the new oil industry will help the prosperity of the county which has never really recovered since the great depression of the 1930s. 2,000 new jobs would result from the Brown and Root complex alone.

IN CAPE CHARLES, THE MAYOR AND MOST CITIZENS FAVOR THE OIL FACILITIES

The majority of the citizens in the area favor the zoning changes. In recent county elections, all candidates who favored Brown and Root won.

However, there is some criticism of the oil facilities. Opposition to the zoning changes comes from farmers, who are afraid of losing their relative cheap labor supply to the new, higher-paying industries. Many long-time residents of the area fear the industry will completely end their quiet life style, plus cause a big change in who controls local politics.

Despite the opposition, the zoning change won approval from the county supervisors. A farmers' organization challenged the decision in the court and the Virginia Supreme Court is presently considering the case. In the meantime, the citizens of Cape Charles wait and debate the issue, wondering if oil will be discovered, and how their community will react to the changes.

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Lesson 4: The Coastal Scene

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Lesson 6: Coastal Uses

Lesson 7: Student Presentations (Optional)

Lesson 8: National Task Force on Coastal Resources

Lesson 9: Coastal News Report 1 (Optional)

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Lesson 3: Pollution: What is it?

Lesson 4: Sewage: The "Effluent Society"

Lesson 5: Oil Pollution

Lesson 6: Wetlands and Marshes: Problem or Resource?

Lesson 7: Natural Hazards

Lesson 8: Tsunamis and Hilo, Hawaii: A Case Study

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Lesson 10: Coastal News Report 2 (Optional)

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

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Lesson 3: The Political System

Lesson 4: The Case of Blue Neck Bay

Lesson 5: Making Decisions About Coastal Areas

Lesson 6: Management Tools and Strategies

Lesson 7: Local Interests Versus Regional Interests

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Boston Harbor

Lesson 5: Shoreline Management:
National Legislation

Lesson 6: Shoreline Management:
State Initiatives

Lesson 7: Coastal Futures:
A Personal Case Study

TEACHER'S GUIDE

COASTAL PROBLEMS AND RESOURCE MANAGEMENT

TEACHER'S GUIDE

A SECONDARY SOCIAL STUDIES COURSE

CURRICULUM RESEARCH AND DEVELOPMENT GROUP
UNIVERSITY OF HAWAII AT MANOA © 1979

Coastal Problems and Resource Management

produced by

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The development of Coastal Problems and Resource Management was supported by the Office of Coastal Zone Management, NOAA, Department of Commerce, Grant Number 04-7-158-44035, and the Hawaii Coastal Zone Management Program, Department of Planning and Economic Development, State of Hawaii.

Acknowledgements

The process of designing, testing and revising CPRM continued for two years. This final version reflects the combined talent, imagination, and hard work of many people. Major contributors to the development of the course are listed on the previous page, but many others also contributed significantly to the development of CPRM. We would like to take this opportunity to acknowledge their support, time and advice:

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INTRODUCTION TO TEACHERS

Coastal Problems and Resource Management(CPRM) is a one semester course for secondary school students. The course focuses on the coastal region of the United States and the political, economic and ecological factors involved in the development of coastal resources. The growing demands of an increasing population, a society seeking new energy sources and an environmentally conscious citizenry often collide in coastal areas. This special environment provides a rich and interesting setting for the analysis of many of these most pressing social problems.

Specifically, program goals are:

1. To increase students appreciation for the beauty, fragility, and utility of coastal environments.
2. To identify major social, political, legal and economic problems involving coastal areas
3. To identify key elements in the political, legal and economic decision-making process as it relates to management of coastal resources
4. To relate specific local coastal problems to broader national issues
5. To investigate the opportunities for citizen participation in decisions affecting coastal resource management.

This Teacher's Guide is one component of the total CPRM package. The entire classroom package contains the following additional materials: Student Workbooks, Student Readings, filmstrips, transparencies, role-play cards, and "Ostrich Bay: A Coastal Resource Development Game."

The Teacher's Guide contains detailed lesson plans, a copy of support materials for teachers(such as overhead transparency masters), and a copy of all student materials used in the course. Following is a description of both teacher and student materials contained in the Teacher's Guide and an overview of the four units in CPRM.

Teacher Materials: A complete set of procedures accompanies each lesson. The procedures can be followed exactly as written, or teachers can adjust them to better fit their classes. All lesson plans use a similar format, each having:

1. a unit and lesson title
2. an estimated time for the activity
3. a purpose of the lesson
4. a list of materials needed
5. an overview of the lesson
6. specific procedures.

Questions for students to answer in class or as homework assignments are included, and underlined. Suggested answers are given in brackets under the

question. Answer keys for worksheets are provided where necessary.

At a number of points in the lesson procedures, directions call for the teacher to "hand out" or "pass out" information to students. These materials have now been incorporated into the student workbooks and readings. The only lesson in which handouts are used is the Boston Harbor simulation (Unit IV, Lesson 4). It will be necessary for the teacher to duplicate several pages from this lesson to distribute to students. Masters are included in the Teacher's Guide and are labeled "handouts."

Transparency masters appear at the end of the lesson. They are coded by unit and number within the unit (i.e., III-1, III-2, etc.) The code appears at the bottom of the transparencies.

Students Materials: Student materials fall into two categories, student worksheets and student readings. Worksheets are typically filled out by students and then collected by the teacher for evaluation. The readings include case studies, reference materials and other descriptive information that can be handled as in-class or homework assignments. One copy of the student worksheets and readings is included at the back of the Teacher's Guide.

The only written materials not included in the Teacher's Guide are the "Ostrich Bay" game instructions and the "Coastal Scene" filmstrip script. These are both packaged separately but can be inserted into the Teacher's Guide.

Unit I: At the Water's Edge

The initial lessons confront students with activities designed to introduce a variety of important coastal features. The activities orient students to the coast and turn their thinking toward the uses and values of the coastal area. The many benefits of the coast are examined from both a national and local perspective.

Lesson Five, "The Coastal Resource Development Game," personally involves students in several problems and conflicts centered in the coastal area and the interactions of ecological, economical and political concerns. This simulated experience has students participate in the development of a bay side community, and provides opportunities to confront complex problems facing coastal communities. The game introduces many important themes and concepts which are then explored more fully in the remainder of the course.

Unit II: Understanding Coastal Ecology

This unit begins with an introduction of the important ecological processes which take place in the coastal region. Systems diagrams are used to display the basic relationships between producers, consumers and decomposers. The natural process of the coastal ecosystem is described and the effects of certain disruptions to this system are introduced. Oil pollution, sewage and waste disposal, and destruction of estuaries and wetlands are among important ecological problems studied.

Natural hazards are also discussed in this unit, and Lesson 8, "Tsunamis and Hilo, Hawaii: A Case Study", provides a specific example of how the presence of tsunamis has affected one coastal community. Students take the roles of citizens of Hilo, who, in the aftermath of a devastating tsunami, try to decide what protective measures to take regarding future disasters.

Unit III: Resource Management: Politics and Planning in the Coastal Region

Emphasis now shifts from ecological concerns to political processes and problems. This unit describes and analyzes the role of government involvement in the coastal region. Two short lessons about the destruction of scenic views and the loss of beach access introduce students to the idea that government decisions affect the ways coastal resources are used. Students are then more formally introduced to the politics of the coastal area through systems diagrams. They identify judicial, legislative, regulatory and public roles and interests as they relate to the coast. Lesson four, "The Case of Blue Neck Bay," allows the application of these general principles to a specific case. Common strategies for governing coastal resource use are presented in lessons five and six.

The remainder of the unit focuses on management problems and the effects of governmental regulation and influence on effective planning and optimum use of coastal areas. For example, lesson ten, "The Taking Issue: Legal Limits to Regulation," examines the delicate balance between the rights of government to regulate land use and the rights of property owners to use land as they see fit. A final activity has students apply their understanding of resource management strategies and problems to planning the future of a coastal county.

Unit IV: Case Studies in Resource Management

This unit brings together the previously separated ecological and political arenas in the analysis of several case studies. Through a series of different types of activities, students are involved in the processes and concerns faced by participants in the debates over energy, economics, ecology, and government involvement. Lessons five and six present the general status of national and state legislation as they affect coastal zone management efforts. A final lesson, "Coastal Futures: A Personal Case Study," encourages students to utilize the strategies and concepts introduced throughout the course by developing their vision for the future of the coastal region.

UNIT 1: AT THE WATER'S EDGE

LESSON 1: THE NATIONAL SHORELINE QUIZ

LESSON 2: COASTAL FEATURES

LESSON 3: OUR LOCAL COASTLINE

LESSON 4: THE COASTAL SCENE

LESSON 5: THE COASTAL RESOURCE DEVELOPMENT GAME

LESSON 6: COASTAL USES

LESSON 7: STUDENT PRESENTATIONS (OPTIONAL)

LESSON 8: NATIONAL TASK FORCE ON COASTAL RESOURCES

LESSON 9: COASTAL NEWS REPORT #1 (OPTIONAL)

UNIT I: AT THE WATER'S EDGE

LESSON 1: THE NATIONAL SHORELINE QUIZ

TIME: 1 DAY

PURPOSE

To introduce students to the topic of coastal studies.

MATERIALS

In Package:

Worksheet I-1, "National Shoreline Quiz"

OVERVIEW

In this short introductory lesson, students take and score a quiz on their present knowledge of shoreline topics. The quiz is designed to raise interest and preliminary discussion. It is not to be graded.

PROCEDURE

1. Pass out the "National Shoreline Quiz". Tell students that you want to determine their "S-Q" (Shoreline Quotient) before this course begins. This short quiz will provide you with the necessary information.

2. Have students complete the quiz.

3. Review student answers to each question. Correct answers can be found in step 5. Where appropriate, have students explain why they answered the way they did. Encourage discussion between students with conflicting answers.

4. Have students score their papers and determine their "S-Q".

5. "National Shoreline Quiz" Answer Key.

(1) 30 states

(2) 50%

(3) b - A place along the coast where fresh water and salt water mix.

(4) c - Salt marsh (coastal wetlands)

(5) 99%

(6) 2%

(7) False. (However, in 1975, 70,000 school children in New Orleans ate 12 tons of shark meat for lunch and loved it!)

(8) Fish and shellfish in descending order of economic value to the United States (1977 statistics):

Shrimp
Salmon
Crabs
Tuna
Clams
Menhaden (chiefly used for industrial purposes)
Lobster
Flounder
Oysters
Scallops

(9) Alaska, 5,580 miles; Michigan, 2,900 miles; Florida, 1,250 miles; California, 840 miles; Hawaii, 750 miles; New Hampshire has the shortest coastline, only 13 miles.

(10) 97%

UNIT I: AT THE WATER'S EDGE

LESSON 2: COASTAL FEATURES

TIME: 1 DAY

PURPOSE

To introduce some physical features frequently found in coastal areas.

MATERIALS

In Package

Worksheet I-2, "Coastal Features"
Reading I-1, "Coastal Terminology"

OVERVIEW

Students match drawings of a number of coastal features with the written descriptions of those features. (Both natural and man-made features are included.)

PROCEDURE

1. Have students think of their past experiences at or near the shoreline. Ask:

   a. What sort of things do you remember seeing there?

   b. What things are often found near the coast?

   [Beaches, sand, rocks, lighthouses, waves, boats, etc.]

   As students respond, list their responses on the board. After a number of items have been listed, indicate that two categories of items of concern just now are those which are man-made and those which are formed by natural processes.

   If students have not named examples from both categories, have them provide some from the omitted category. Go through the items quickly and have students assign them to one category or the other.

2. Pass out Worksheet I-2, "Coastal Features", Moving fairly quickly through the pictures, have students identify features shown in each of the pictures (verbal response).

3. Assign Reading I-1, "Coastal Terminology". This reading contains definitions and descriptive information about each of the 18 "Coastal Features" drawings.

4. Have students match each drawing with the correct term defined in the reading. Write in the correct term under each drawing.

5. After students have finished labeling the pictures, go over their answers with them. If students disagree on the identification of features, have them explain why they identified the feature as they did.

6. Ask which coastal features listed in the "Coastal Terminology" reading are found in the local area.

7. "Common Coastal Features" identification key:

(1)	Bay	(10)	Sandy Beach
(2)	Sand Dune	(11)	Breakwater
(3)	Groins	(12)	Estuary
(4)	Rocky Beach	(13)	Flood Plain
(5)	Continental Shelf	(14)	Wave-cut Cliff
(6)	Salt Marsh	(15)	Seawall
(7)	Mangrove Swamp	(16)	Spit
(8)	Coral Reef	(17)	Delta
(9)	Barrier Island	(18)	Harbor and Pier

UNIT I: AT THE WATER'S EDGE

LESSON 3: OUR LOCAL COASTLINE

TIME: 1-2 DAYS

PURPOSE

To become familiar with a variety of coastal features and activities commonly found in this region.

Materials for this lesson must be developed locally. An example of how this lesson was written for Hawaii students follows. If a local supplement accompanies this Teachers Guide, materials for this lesson will be found there.

HAWAII MATERIALS

UNIT I: AT THE WATER'S EDGE

LESSON 3: OUR LOCAL COASTLINE(HAWAII VERSION)

TIME: 1-2 DAYS

PURPOSE

To become familiar with a variety of coastal features and activities commonly found in Hawaii.

MATERIALS

In Package

Slides of Hawaii coast
Worksheet, "Island Quiz"

Additional

Slide projector
Screen

OVERVIEW

Students first view a set of slides that visually orients them to Hawaii's shoreline. A "quiz" follows, which serves as a basis for discussion about Hawaii coastal features, economic activities and demographic information.

PROCEDURE

1. Begin with the slides of Hawaii. As you show each slide, have students try to guess where they think the picture was taken. Ask:

   Why do you think so? What makes you say that? Are there other possible places where this might be?

   Announce the location of the picture and feature shown:

   a. Black Sands Beach at Kalapana(Big Island)
   b. Makapuu(Oahu)
   c. Hamakua Coast(Big Island)
   d. Hanauma Bay(Oahu)

e. Kaunakakai(Molokai)
f. Na Pali Cliffs(Kauai)
g. Captain Cook Monument(Big Island)
h. Looking towards Lanai from leeward Maui
i. Wakiki(Oahu)
j. Banzai Pipeline(Oahu)
k. Mauna Kea Beach Hotel(Big Island)
l. Kahe Power Plant(Leeward Oahu)
m. Mauna Loa and Mauna Kea(Big Island)
n. Hanalei Valley(Kauai)
o. Kona(Big Island)

2. After you have finished the set of slides, show them again. Ask students to give a short description of what they see(i.e., mountains, sand beach, ocean, hotels. etc.) Keep a list on the board of their answers.

3. At the conclusion of the second showing, ask:

   a. How would you describe the coast after seeing these pictures?

   b. Do the slides give an accurate picture of the coastal area?

   c. If you were to add other pictures, what would they be?

4. Hand out the "Island Quiz." Explain that the class will now have another chance to describe the coast. Go over the instructions and help them with the first question if there is any confusion about how to take the quiz.

   Emphasize this is not a quiz to be graded.

   Remind the class to be sure and consider the entire state, and not just Oahu when they answer the questions. Give them 5-10 minutes to complete the quiz.

5. Use the answer key to review their answers to each question. To begin, have a few students explain why they answered as they did to the first question. Draw out any disagreement. Then, provide them with the data information on coral reefs. Continue this procedure for each of the questions.

   As you proceed, try to determine what misconceptions the class has about Hawaii's coastal zone. Discuss these in more detail. (For example, many students think the fishing inudstry is far more important than it really is.)

DEBRIEFING DATA FOR ISLAND QUIZ

1. To what extent do you think those features are found in the State of Hawaii?

CORAL REEFS

The most appropriate answer is "Frequently". Coral reefs are found the coastlines of every island in the state. Kauai, Oahu and Molokai all have extensive reef formations. In the United States, Hawaii and Florida are the only two states that have coral reefs.

BARRIER ISLANDS

The answer here is "never." There are no barrier islands in the state. Barrier islands are found in the United States along the east coast and the Gulf of Mexico.

SANDY BEACHES

The answer to this question is not clear-cut. There are a number of sandy beaches on Oahu, but they are much less common on the other islands. Of 934 miles of shoreline in Hawaii, only 184 miles is in the "sandy beach" category...about 20%. "Sometimes" is probably the best answer.

WAVE-CUT CLIFFS

The appropriate answer is "frequently". There is much more rocky, mountainous shoreline in Hawaii than there is sandy beach. 64% of the shoreline is classified as mountainous.

SALT MARSHES

There are very few salt marshes in Hawaii. The most appropriate answer is probably "sometimes", although "never" is not a bad choice. Marshes are not an important feature of the Hawaii coast.

ESTUARIES

The best answer is "sometimes". There are many streams that flow into the ocean, but the area they drain is usually so small that they do not carry much water. Consequently, not much fresh water enters the ocean from streams, except in times of heavy rains.

Large estuarine systems, such as those on the Atlantic Coast or San Francisco Bay are partially enclosed by islands or protected in some way from the open ocean. Except for the Pearl Harbor area, Hawaii does not have this feature. Other prominent estuarine areas in the state are Hanalei and Nawiliwili Harbor on Kauai, and Kohala on the "Big Island".

BAYS

The best answer is "frequently". There are hundreds of small bays around the state, and several large ones such as Hilo Bay and Kaneohe Bay.

CONTINENTAL SHELF

There is no continental shelf around Hawaii. Since the islands were formed by volcanic eruption, the land slopes away very quickly under the sea. As the name implies, continental shelf is found only off the edge of continents.

2. To what extent do these conditions occur along Hawaii's coastal areas?

POLLUTED OCEAN WATER

The most appropriate answer is "moderate". There are a few places where the water is polluted from too much untreated sewage or excess silt in the water. But, by and large, the waters near the Hawaiian coast are very clear and clean. This is especially true when compared to the water quality of much of the mainland coast.

AIR POLLUTION

If it were not for the air over Honolulu, the best answer to this question would be "light". The air over Hawaii is generally clean and low in pollution. Most of Honolulu's pollution is caused by automobiles. Pollution from industry that affects the residents of the islands is minor.

RAINFALL

If you consider the state as a whole, the best answer is "heavy". The average annual rainfall for Hawaii is 73 inches. On the windward sides of each island the rainfall is heavy, while leeward sides tend to be drier. This tremendous variability is due to the mountainous terrain. As the

moist trade winds come in from the sea, they are forced to rise over the windward slopes. Cloudiness and rain are the result. This takes most of the moistness out of the wind and when it reaches the leeward side, less rain is available. Wide variation in Hawaii's rainfall also occurs during the year as the winter months of October to April tend to bring the most rain.

POPULATION LOCATED NEAR SHORELINE

The answer is "heavy". Nearly all the island's population is located near the shoreline due to the rugged, mountainous terrain of the interior regions.

PERCENTAGE OF POPULATION LIVING IN URBAN AREAS

The answer is "high". According to the 1970 census, 84% of the population is urban, only 16% rural. As one might predict this figure is due largely to the impact of Honolulu. On Oahu, the population density is over 600 per square mile; the neighbor islands average only 30 per square mile.

3. How important are these coastal activities to Hawaii's economy?

TOURISM

The answer is "very important". The tourist/visitor industry is the largest generator of jobs in the State. 20% of all civilian jobs are related to tourism.

COMMERCIAL FISHING

The best answer is "not important". The annual value of the commercial catch accounts for less than one percent of the value of the gross state product. The 1974 value of commercial fish landings was $6.2 million; aku accounted for about one-half of the total value. One of the main reasons the fishing industry is not larger is due to the limitation of bait; nuhu is the chief bait for tern and it has a very high mortality rate. This may change in the future, because of the implementation of the 200 mile territorial limit.

HAWAII MATERIALS

AGRICULTURE

The best answer is "somewhat important". More of the land in Hawaii is devoted to agriculture than any other use, including much land on the seacoast. However, the sugar and pineapple industries together generate only about 10% of the state's jobs. Other agricultural activities, including vegetables and melons, coffee, macadamia nuts, livestock and food processing plants account for about 4 and 1/2 percent of the state's jobs.

OFF-SHORE OIL

The answer is "not important". Off-shore oil is found only under the continental shelf and since Hawaii has no continental shelf, it has no off-shore oil.

DEFENSE ACTIVITIES

The answer is "very important". The military is Hawaii's second most important industry, second only to tourism and accounts for 19% of the civilian jobs in the state. Defense expenditures in Hawaii in 1975 were over $1 billion. The Navy and Marine Corps are leaders in terms of personnel and expenditures.

PRECIOUS CORAL INDUSTRY

The best answer is "not important". The maximum sustainability yield from the pink coral Makapuu bed has been estimated to be worth only $100,000 a year. Divers estimate that the black coral beds will be exhausted in 10 to 20 years.

ISLAND QUIZ

1. To what extent do you think these features are found in the state of Hawaii? (Circle the appropriate word.)

CORAL REEFS
Never Sometimes Frequently

BARRIER ISLANDS
Never Sometimes Frequently

SANDY BEACHES
Never Sometimes Frequently

WAVE-CUT CLIFFS
Never Sometimes Frequently

SALT MARSHES
Never Sometimes Frequently

ESTUARIES
Never Sometimes Frequently

BAYS
Never Sometimes Frequently

CONTINENTAL SHELF
Never Sometimes Frequently

2. To what extent do these conditions occur along Hawaii's coastal areas?

POLLUTED OCEAN WATER

slight moderate heavy

AIR POLLUTION

never moderate heavy

RAINFALL

never moderate heavy

POPULATION LOCATED NEAR SHORELINE

never moderate heavy

% OF POPULATION LIVING IN URBAN AREAS

never moderate heavy

3. How important are these coastal activities to Hawaii's economy?

TOURISM

not important somewhat important very important

COMMERCIAL FISHING

not important somewhat important very important

AGRICULTURE

not important somewhat important very important

OFF-SHORE OIL

not important somewhat important very important

HAWAII MATERIALS

DEFENSE ACTIVITIES

not important somewhat important very important

PRECIOUS CORAL INDUSTRY

not important somewhat important very important

UNIT I: AT THE WATER'S EDGE

LESSON 4: THE COASTAL SCENE

TIME: 1 DAY

PURPOSE

To increase student appreciation and concern for the resources and qualities of the coastal area.

MATERIALS

In Package

"Coastal Scene" Filmstrip with casette tape

Additional

Filmstrip projector
Casette tape player
Suitable viewing surface (screen or light-colored wall area)

OVERVIEW

Students view and respond to a filmstrip. The filmstrip is designed to convey a "feeling" for the unique values and special qualities of coastal areas and to introduce some key concepts and facts.

PROCEDURE

1. Show the filmstrip, "The Coastal Scene", instructing students to note major themes or ideas in the presentation.

2. At the conclusion, ask students for their reactions to the filmstrip. The following questions may stimulate student response:

   a. What makes coastal areas such a special place?

   b. What are the unique qualities of coastal areas?

c. Do you enjoy visiting coastal areas? Why or why not?

d. Do such words as "change" and "unpredictable" characterize the shoreline? Why or why not?

e. Do you find the shoreline mysterious? Dangerous?

f. Are there any pictures in the filmstrip that you especially like?

3. Ask students to identify major themes/ideas as presented in the filmstrip. Write their responses on the board.

   Responses might include: Pollution, erosion, change, natural disasters, fisheries, geographic features, human use, recreation, housing, increasing population, over-crowding, harbors, shipping, and the future of coastal areas.

4. At this point, make the assignment of the first "Coastal News Report," due at the close of Unit I. One group of five to six students will be assigned the task of collecting newspaper articles and presenting them to the class in a simulated TV newscast. This will be due in about 2 and 1/2 weeks depending on the time it takes to complete Lessons 5 through 8. See Lesson 9 for procedures for the "Coastal News Report."

UNIT I: AT THE WATER'S EDGE

LESSON 5: THE COASTAL RESOURCE DEVELOPMENT GAME

TIME: 7-10 DAYS

PURPOSE

To demonstrate how and why coastal development occurs.

To have students confront typical problems associated with rapid economic development in coastal areas.

Materials and instructions for the Coastal Resource Development Game are included in the game box.

UNIT I: AT THE WATER'S EDGE

LESSON 6: COASTAL USES

TIME: 1 DAY

PURPOSE

To have students analyze problems caused by conflicting coastal land and water uses.

MATERIALS

In Package

Worksheet I-3, "Coastal Uses Chart"

OVERVIEW

Students specify use requirements for each major use of coastal resources and look for compatible and incompatible uses. Use conflicts from the Coastal Resources game are recalled, and actual conflicts occurring in the coastal environment are analyzed.

PROCEDURE

1. Pass out Worksheet I-3, "Coastal Uses Chart". Note that the chart lists the major ways in which the coastal region was used during the Coastal Resources game. Students are to write down what they consider to be the use requirements for each separate use listed. Use requirements for the first use, Conservation, are given as an example.

2. After students have worked on this task for several minutes, review the list of major uses and the use requirements for each. A completed "Coastal Uses Chart" follows in the Teacher Guide.

3. Have students complete the filling in of the use requirements for each use as review of the "Coastal Uses Chart" proceeds.

4. After completing the review, ask:

   What happens when people want to undertake all these activities in the same coastal area?

   ["Use conflicts" are generated. People using or wanting to use coastal lands for one purpose will often come into conflict with people wanting to use the same lands for some other purpose; or conflicts may occur because uses in adjacent areas are incompatible with one another.

   Human uses may also be incompatible with environmental quality when these uses cause pollution of air or water, loss of wetlands, destruction of cultural and historical sites and a loss of aesthetic qualities of an environment, and preservation of cultural and historical sites.]

5. Emphasize that certain activities are more compatible with each other than are other activities. For example, Shipping and Industry activities are fairly compatible. These activities do not seriously interfere with each other, except in the general competition for available waterfront space. But Industry and Tourism are not as compatible, because industry (factories, refineries, etc.) is unsightly, raises air and water pollutant levels and generally makes the environment less attractive to tourists. Ask:

   How was this situation brought out in the Coastal Resources game?

   [No Tourism activity could be located adjacent to any Industry or Shipping activity. HIRISE activities could not be located adjacent to any Industry activity, etc.]

6. Discuss which uses listed in the "Coastal Uses Chart" seem generally compatible, and which uses seem generally less compatible. Incompatible uses generate use conflicts. Review examples of use conflicts which occurred during the Coastal Resources game (e.g., Public Beachpark vs. selling development rights to plot J-16. Tourism activities vs. Industry activites, location of sewage treatment plant in estuary vs. fishing activities, etc.) Ask:

   What use conflicts have occurred or may occur in our local coastal region?

7. Discuss which coastal uses are the most "fragile". That is, which tend to be most easily or most adversely affected by other coastal area uses. Ask students whether these fragile uses need to be protected, and how this might be done.

8. Homework Assignment:

   Have each student identify and report on a specific use conflict which has occurred or is occurring in the local area or elsewhere in the last few years. Set an appropriate completion date. This is suggested as a short assignment, but it could serve as the basis for a longer term paper topic or research project.

Worksheet I-4
Answer Key

COASTAL RESOURCES DEVELOPMENT GAME (CRDG) -- COASTAL USES CHART

Indicate Use Requirements for each of the following major coastal uses:

1. Conservation

   UNSPOILED, UNDISTURBED AREAS OR AREA RETIRED FROM PRIVATE USE

2. Waste Disposal

   WATER; ACCESS TO RIVER, BAY, OR OCEAN; LAND OR OFFSHORE DUMPING SITES

3. Industry

   LAND WITH WASTE DISPOSAL CAPACITY; OFTEN NEAR HARBOR FACILITIES; ACCESS TO TRANSPORTATION, MARKETS, AND POPULATION CENTERS

4. Commerce

   LAND, NEAR POPULATION CENTERS, AND TRANSPORTATION AND PRIMARY MARKETS

5. Recreation

   ACCESS TO PUBLIC BEACHES PARTICULARLY SANDY BEACHES; CALM WATERS FOR BOATS; MARINAS; UNPOLLUTED WATER FOR SWIMMING; LAND FOR PARKS OR OTHER FACILITIES.

6. Tourism

   LAND, USUALLY NEAR RECREATION, SCENIC, AND/OR CULTURAL-HISTORICAL SITES

7. Residences (Housing)

   LAND, USUALLY NEAR URBAN CENTERS WITH COMMERCIAL AND INDUSTRIAL ACTIVITIES; WASTE DISPOSAL CAPABILITIES; FRESH WATER SUPPLY

8. Agriculture

   LARGE TRACTS OF LAND WITH GOOD DRAINAGE; ACCESS TO TRANSPORTATION FACILITIES AND TO MARKETS

9. Commercial Fishing

   ACCESS TO FISH AND SHELLFISH; NEAR HARBOR AND PORT FACILITIES, INCLUDING PROCESSING PLANTS

10. Transportation

    HARBOR AND PORT FACILITIES; CALM, PROTECTED WATERS; ACCESS TO SHIPPING LANES; SUFFICIENTLY DREDGED CHANNELS

11. Land Transportation

    LARGE TRAITS OF LAND FOR AIRPORTS, RAILROADS AND HIGHWAYS; LINKS TO ALL MAJOR COASTAL AND INLAND ACTIVITIES

12. Mineral Extraction

    ACCESS TO MINERAL DEPOSITS; MINING EQUIPMENT; NEAR TRANSPORTATION SYSTEMS, INCLUDING HARBOR AND PORT FACILITIES

13. Defense

LAND AND HARBOR FACILITIES; ACCESS TO OFFSHORE AREAS; LARGE, DEFENSIBLE TRACTS OF LAND

14. Scenic-Aesthetic Enjoyment

UNDISTURBED VIEWS; QUIET PEACEFUL SURROUNDINGS; ACCESS TO SCENIC VIEWS; PLEASING DESIGN OF BUILDINGS

15. Cultural-Historical Enjoyment

PRESENTATION OF SITES; ACCESS TO SITES

UNIT I: AT THE WATER'S EDGE

LESSON 7: STUDENT PRESENTATIONS (OPTIONAL)

TIME: 1 DAY

PURPOSE

To have students express personal reactions to coastal uses or problems through a visual medium.

To have students communicate their views to other students.

MATERIALS

None

OVERVIEW

Students develop and present a collage, picture, poster, or other display which highlights certain aspects of the coastal region. Students share these personal statements in small groups, and the class then decides which displays make the greatest impact.

PROCEDURE

1. Give the following homework assignment, due in approximately one week (following the "National Task Force" and "Coastal News Report" lessons of Unit 1 and the "Coastal Ecology" lesson of Unit 2):

   > Each student is to create a collage, poster, or display which makes a personal statement about coastal resources -- their use, enjoyment, destruction, or alteration.

   State that students will present and explain these "visual statements" in small groups to other students. Groups will then judge the best presentations.

2. Divide the class into groups of 5-6 students each. Have each student present and explain his/her collage, poster, or display to other group members.

3. Have each group discuss which presentation makes the most important statement with the greatest impact. Each group then chooses one presentation as the best, based on these criteria.

4. Have each group choose one group member to present this best "visual statement" to the entire class. After each presentation, the student who actually created the collage, poster, or display, should be allowed to comment or add to the presentation if he/she wishes.

5. After the presentations, have class members discuss which presentation they thought was best and why. Then have the entire class vote to select the best over-all. Exhibit the collages, posters, or displays of the finalists around the classroom (or display all the projects, if you prefer).

UNIT I: AT THE WATER'S EDGE

LESSON 8: NATIONAL TASK FORCE ON COASTAL RESOURCES

TIME: 2 DAYS

PURPOSE

To familiarize students with the utilization of the coastal region nationally.

To examine the economic importance of the coastal region.

To show how demands on coastal resources have changed over time and to project, where possible, future demands.

MATERIALS

In Package

Reading I-2, "National Task Force Information"
Worksheets I-4, 5, 6, 7, 8, "Data Questionnaire"
Worksheet I-9, "Task Force Recommendation Form"

PROCEDURE

Part 1

1. Tell the students that they have been selected to serve on a National Task Force which will study the coastal regions of the United States and make recommendations for their future use and development.

2. Have students read the "Memo to the National Task Force Members", the first page of Reading I-2. Go over the memo with the students to be sure they understand the assignment.

3. Five "agencies" have sent data to the Task Force: REEF, U.S. Ports and Harbors Agency, National Fisheries Office, National Data Clearinghouse, and Energy Research Associates. Approximately 1/5 of the class should be assigned to read each data set.

4. Hand out Worksheets I-4, 5, 6, 7, and 8, "Data Questionnaires" to the appropriate students. Tell each student to answer the questions using the information in their data set.

5. The five agencies in this activity are fictitious; however, all the data contained in the report is factual and correct.

Part 2

1. After students have completed their "Data Questionnaires", have them form groups, consisting of one person representing each agency. Students should take their "Data Questionnaires" and Task Force data with them.

2. Pass out Worksheet I-9, "Task Force Recommendation Form", to each student. Give the groups the following directions.

   a. Review each of the recommendations on the form.

   b. Discuss possible recommendations in the light of the data from the five agencies. (Urge that each student contribute).

   c. Reach agreement on group recommendations.

   d. Record this recommendation and the reasons for making it on the "Task Force Recommendation Form".

   Set a deadline of 15-20 minutes.

3. After each of the groups has completed this task, review their recommendations. Put each group's recommendations on the board so similarities and differences can be noted. Have groups explain why they chose each option.

   Encourage debate among groups; students should be able to support claims with references to the data.

4. Among generalizations that should emerge from the discussions are the following:

   a. Coastal regions have historically been the scene of concentrated use. Projections for the future suggest:

      (1) Coastal population will increase.

      (2) Demand for new jobs in coastal areas will increase in the future.

(3) Demand for housing will increase.

(4) Ports and harbors will become increasingly busy and larger facilities will be needed.

(5) Estuaries will continue to be a focal point for many activities.

b. Coastal areas contain many resources that are under heavy demand.

(1) Oil, gas, and minerals are found in coastal areas. Demand for these resources is likely to increase.

(2) Recreational areas, including beaches and marinas, are very popular and often overcrowded; demand for coastal recreation activities will likely increase.

(3) Estuarine areas and coastal waters are valuable to the fishing industry and recreational users, but these areas are often being polluted or destroyed.

5. A written assignment to answer the following questions will assist students in summarizing the main points of this lesson. This could be an in-class or homework assignment.

> "Assume your report has been accepted by certain members of Congress as a guide to wise development of coastal regions. These legislators argue that it is in the 'national interest' to protect coastal regions. But representatives from inland states say that it is not a 'national' problem, and that their states are not involved with what happens on the coast. If you were a member of Congress advocating protection, how would you counter this argument? How would you demonstrate that what happens in coastal areas is important to the citizens of all the states, inland as well as coastal?"

[Several points may be brought out. These include the national need for more oil and gas; the importance of the coastal regions to the shipping industry as a carrier of goods for everybody; the need to provide recreational sites for everyone, not just coastal citizens; the increase of seafood products in the American diet; the national focus on the development of the continental shelf and open ocean resources; and the unique scenic and aesthetic qualities of the shoreline that once lost can never be replaced.]

NATIONAL FISHERIES OFFICE
DATA QUESTIONNAIRE

1. Where are most of the U.S. fish and shellfish caught?

   61% of the catch is within 12 miles of the coast.

2. How has the value of the U.S. fish and shellfish catch changed since 1945?

   The value of the catch is worth almost 4 times as much. The future value should rise.

3. Are fish and shellfish becoming a more important or less important part of the American diet? Why?

   Fish and shellfish are becoming a more important part of the diet. One possible reason is the increase in the price of meat.

4. In what ways are estuarine areas important to the fishing interests?

   2/3 of the total value of all U.S. commercial fishing comes from estuarine-dependent species.

5. From the data you have, what major problems are likely to arise in the future regarding the use of coastal resources?

   Over-fishing of certain species could occur. (Students may find other acceptable answers)

NATIONAL DATA CLEARINGHOUSE
DATA QUESTIONNAIRE

1. What percentage of the nation's work force is projected to be employed in coastal counties in 1980? If the trend continues, approximately what percentage of the nation's work force will be employed in coastal counties in 2000?

   46.9 million workers in 1980. Approximately 51-52% (on a rise of 1% per decade)

2. How many people lived in inland areas in 1970? According to the projection, how many people will live in inland areas in 2000?

   Approximately 117 million in 1970. Approximately 117 million in 2000

3. How many people lived in coastal areas in 1970? According to projection, how many people will live in coastal areas in 2000?

   Approximately 98 million in 1970. Approximately 198 million in 2000

4. Approximately what percentage of the U.S. population lived in coastal areas in 1980? According to the projection, what percentage of the U.S. population will live in coastal areas in 2000?

   Approximately 45% in 1970. Approximately 63% in 2000

5. What is the projected rate of growth for inland areas from the present through 2000? What is the projected rate of growth for coastal areas during that same period?

   Approximately 0% for inland areas. Approximately 100% for coastal areas

6. What effect will the projected rise in employment have on the demand for housing in coastal areas from now to 2000?

   The projected rise will lead to an increase in demand for housing.

7. In what ways is land use likely to change to meet housing demands?

   Land will be used more intensively

8. What likely impact will the increase in leisure time have on the use of coastal resources? What kinds of coastal activities will probably be affected?

   People will have more time to spend near the water; coastal resources will be used more frequently. Recreation activities will likely increase the most.

9. How will estuarine areas be affected by increasing population pressures.

   There will be increasing pressure to fill in estuarine areas for housing, industry, recreation and other activities. (Students may find other acceptable answers)

10. From the data you have, what major problems are likely to arise in the future regarding the use of coastal resources?

    Increases in population could lead to housing shortages, plus create serious pollution problems. (Students may find other acceptable answers.)

REEF
DATA QUESTIONNAIRE

1. Which 2 uses of the ocean are presently most valuable to the U.S.? Which 2 uses will be the most valuable in the year 2000?

   Transportation and oil. Transportation and oil.
   Natural gas and energy both show dramatic increases; natural gas rises from less than $1 billion to $8.3 billion while energy jumps from 0 to $6.3 billion.

2. What major mineral resources are found in the U.S. coastal region?

   Sand, gravel, petroleum, natural gas, clay.

3. Which ocean related recreation activities are likely to be the most popular in the 1980's?

   Swimming, fishing, and boating.

4. How productive are estuarine areas compared to other areas, such as the ocean or agricultural lands?

   Estuarine areas are more productive than the other areas.

5. According to the chart, "General Shoreline Data", who owns most of the shoreline? How much of the shoreline is beach?

   Most of the shoreline is privately owned. 33% is beach.

6. In what ways are estuarine areas important to the activities studied in the REEF data packet?

   Estuaries are very productive areas. (Students may find other acceptable answers.)

7. From the REEF perspective what major problems are likely to arise in the future regarding the use of coastal resources?

   Pollution could increase from the continued development of oil, gas, and other ocean resources; recreation facilities could become over-crowded; attempts to expand recreation areas could be a problem since 70% of the shoreline is privately owned. (Students may find other acceptable answers.)

U.S. PORTS AND HARBORS AGENCY
DATA QUESTIONNAIRE

1. Compare the number of pleasure craft expected to be in use in 2000 with the number in use in 1964.

   The number of pleasure craft will triple.

2. What % of boat slips in marinas are presently in use? How much do you predict marina space will have to increase through the year 2000?

   94%. Marina space will have to approximately triple to keep pace with the increase in the number of boats.

3. What kinds of changes are likely to occur in ship dimensions over the next two decades?

   Ship dimensions will greatly increase.

4. What are changes in ship dimensions going to mean for most U.S. harbors?

   Ship harbors will have to be deepened and widened to make room for the larger vessels.

5. How much more tonnage will U.S. ports handle in the year 2000 (estimated) than in 1970?

   Approximately 3 times as much

6. In what ways are estuarine areas important to the shipping interests?

   Over 75% of the nation's ports are located on estuaries.

7. From the data you have, what problems are likely to have in the future regarding the use of coastal resources?

   Harbor and ship channels will have to be enlarged which may cause environmental disruptions; boating accidents may increase with the growing number of small boats; more space will be needed for marinas. (Students may find other acceptable answers.)

ENERGY RESEARCH ASSOCIATES
DATA QUESTIONNAIRE

1. Where is most new drilling for oil and gas likely to take place?

   In the continent shelf, along the Gulf of Mexico and the Atlantic Coast.

2. What are the projected energy demands for the year 1990? How do these compare with present needs?

   Anywhere from 50-60 to millions of barrels of crude oil equivalent per day. This is approximately 20 million barrels higher than present needs.

3. What percentage of the U.S. population is projected to live in coastal counties in 1980? What does this trend mean for energy use in coastal areas?

   50%. More and more of our energy will be used in coastal areas. More power plants and other energy-related activities will be located in those areas.

4. In what ways are coastal areas vital to the future of energy exploration and production in the U.S.?

   Many of our energy sources are located in coastal areas. Future drilling for oil and gas will occur on the continental shelf.

5. From the data you have, what problems are likely to arise in the future regarding the use of coastal resources?

   More pollution from oil and gas drilling and from other energy-related activities.

UNIT I: AT THE WATER'S EDGE

LESSON 9: COASTAL NEWS REPORT (OPTIONAL LESSON)

TIME: 1 DAY

PURPOSE

To increase students' awareness of current issues, problems and events affecting coastal areas.

MATERIALS

In Package

Newspaper or magazine clippings

OVERVIEW

Students simulate a television news program, "The Coastal News Report". A similar lesson concludes each unit of the course (the format can be used more often if desired). Each student in the class should be involved in at least one news report during the semester. The TV news format is only one suggested way to make reporting and discussion of coastal news stories interesting and entertaining for the class. Other reporting schemes may be tried. The primary objective is to have students read newspapers and magazines regularly with attention to and understanding of coastal themes.

PROCEDURE

1. Select 4-6 volunteers to prepare and present a "Coastal News Report." Explain that all students will participate in this exercise at some time during the semester.

2. Explain that the reporting group is to collect news items about the coast (coastal issues, problems, events) and prepare these for presentation to the class on an assigned date. The presentation will take the form of a TV newscast.

Several stories may be presented, including local and national items, plus weather and sports stories that are related to the coast. Students role play news personalities, with one person handling national news, another the sports scene, etc.

The report team may make its presentation as imaginative as it wishes, but news stories should be based on actual news accounts the students have collected from magazines, newspapers, etc.

(For example, a local story on pollution might inspire an interview with an inhabitant of the polluted waters, such as a fish or mollusk, about the harmful conditions).

3. Have the news team choose a "News Director" to act as team leader. Meet with team members prior to presentation to advise on news subjects and presentation techniques.

   You might require each team member to write out a script for his/her news items collected as part of the assignment.

4. Debrief the news presentation asking questions that reflect major themes developed in Unit I.

5. Invite other students to report on or raise questions about coastal events recently in the news which the "TV Report" did not mention.

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 1: COASTAL ECOSYSTEMS
LESSON 2: FOOD WEBS
LESSON 3: POLLUTION: WHAT IS IT?
LESSON 4: SEWAGE: THE "EFFLUENT SOCIETY"
LESSON 5: OIL POLLUTION
LESSON 6: WETLANDS AND MARSHES: PROBLEM OR RESOURCE?
LESSON 7: NATURAL HAZARDS
LESSON 8: TSUNAMIS AND HILO, HAWAII: A CASE STUDY
LESSON 9: ANALYZING COASTAL ECOLOGY
LESSON 10: COASTAL NEWS REPORT #2 (OPTIONAL)

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 1: COASTAL ECOSYSTEMS

TIME: 2 DAYS

PURPOSE

To present elementary concepts of ecology and relate these to coastal ecosystems.

To show ways human activities can interfere with coastal ecology.

MATERIALS

In Package

Reading II-1, "Coastal Ecology"
Worksheets II-1, "Coastal Ecology Worksheet"
Transparencies II-1-9, "Coastal Ecology and Human Interference"

Additional

Overhead projector
Grease Pencil

OVERVIEW

Students review basic ecological concepts, and see several ways human activities may disrupt coastal ecosystems. This lesson is developed through a series of transparencies. Students follow the presentation by filling in their worksheet pages that correspond to the transparencies. Major ideas presented in this lesson are reinforced throughout Unit II.

PROCEDURE

1. Assign Student Reading II-1, "Coastal Ecology" as homework after completing Unit I, Lesson 9. This reading can also be done during class time.

2. Pass out Student Worksheet II-1.

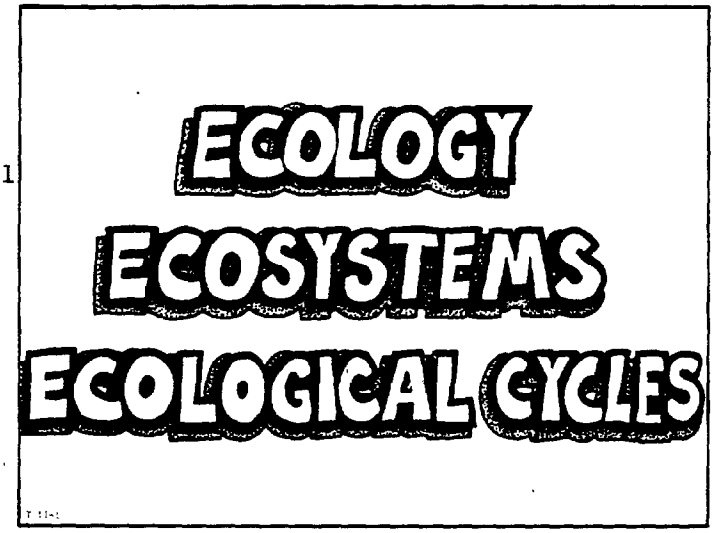
3. Show Transparency Set II-1. Follow the teacher's notes which accompany each transparency. The "Commentary" sections contain basic descriptive information. You may wish to supplement this information with additional data or local examples. The "Questions" sections are intended to keep students actively involved in the presentation as each transparency is completed. Suggested answers, in brackets, follow most of the questions. You may wish to supplement the "Questions" section as well.

   In any case, major ideas presented in this lesson will be reinforced throughout Unit II.

4. As you introduce new elements and relationships, draw these on the transparency. Both "starting" and "completed" diagrams are shown in the Teacher's Guide.

5. Homework Assignment: Have students investigate cases of interference with coastal ecosystems. Each student should report on a specific coastal area, the type and source of interference, and how the problem might be corrected or lessened. This may be given as a short assignment or it can be made a full-length term paper. It may also be assigned as an individual or group work.

Transparency II-1



Commentary

The Student Text reading discussed the science of ecology, defined ecosystems, and introduced the concept of ecological cycles.

Questions

a. What is ecology? What do ecologists study or look for?

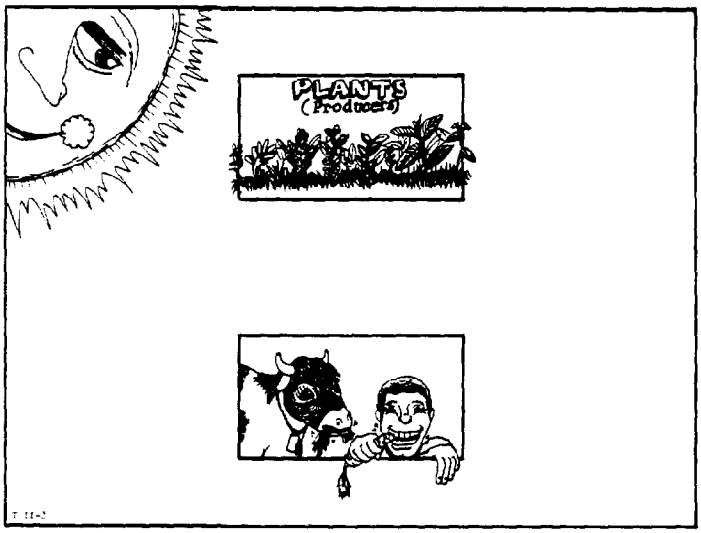
b. What is an ecosystem?

c. Can you name some ecosystems?

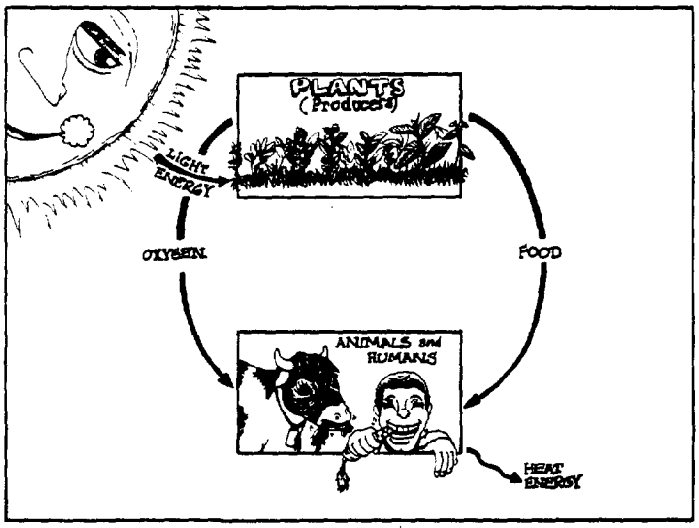
d. What is an ecological cycle? Why are these cycles important?

e. What are some examples of ecological cycles?

Transparency II-2
(Starting)



Transparency II-2
(Completed)



Commentary

One basic ecological cycle is the Producer-Consumer cycle. Photosynthesis and metabolism are the two processes which "drive" this cycle.

Ecologists and biologists call plants "primary producers".

Questions

a. Where do plants get the energy to grow?

[Light energy from the sun.]

b. How is the sun's energy captured by plants?

[By the process of photosynthesis.]

c. In what form is energy stored in plants?

[In the chemical bonds of carbohydrates and other plant matter.]

d. What do plants produce as they convert sunlight into plant matter during photosynthesis?

[Oxygen and carbohydrates. For purposes of this presentation, carbohydrates will be generalized to "food".]

e. What happens to carbohydrates and oxygen?

[They become inputs for animals including humans which are "consumers"; bacteria also receive them, but this will be discussed later.]

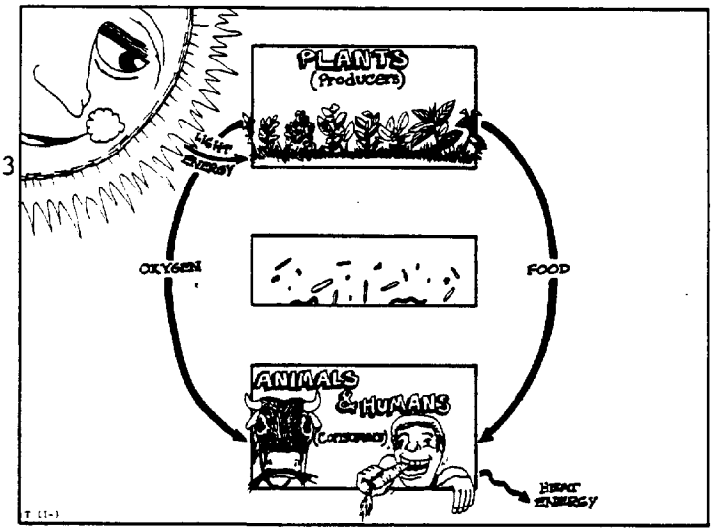
f. What happens to the energy which is stored in plant matter?

[This plant matter is transformed by the process of metabolism in animals and man into work and heat, that is, body temperature. The heat output of these consumers are represented on the diagram as a wavy line. It is lost to the system and is not reused.]

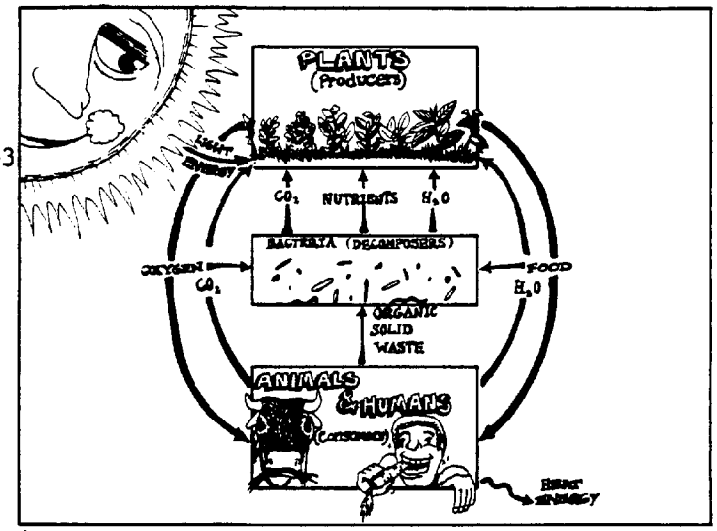
g. Coastal areas have a great concentration of "primary producers". Why would this be so?

[Because in addition to plants on land, the near-shore waters contain heavy concentrations of seaweed and tiny aquatic plants called plankton, or often, algae. While microscopic in size, phytoplankton are extremely important in producing oxygen and food for aquatic animals ranging from minnows to certain types of whales.]

Transparency II-3
(Starting)



Transparency II-3
(Completed)



Commentary

Students have completed the first diagram showing outputs and inputs in the first state of the producer-consumer cycle. Students are now ready to describe the full cycle with the addition of one new set of actors, "decomposers".

Questions

a. What are the outputs of animals and man?

(Carbon dioxide (CO_2), waste water (H_2O), and organic solid wastes.)

b. Where do these outputs go?

(They are reused by plants.)

c. Can organic solid wastes be used directly by plants?

[No. They must be broken down first by the action of bacteria and fungi, which are called "decomposers".]

d. What are the inputs the decomposers use up in the process of decomposition?

[Oxygen and wastes. Wastes come from both animals and plants. Wastes from plants are indicated by the arrow from "food" to bacteria.]

e. What are the outputs then of the decomposers?

[Water (H_2O), carbon dioxide (CO_2), and nutrients, especially nitrates (a form of nitrogen) and heat energy, which is lost to the system.]

f. Are decomposers also consumers?

[They consume waste as food and produce the CO_2 and H_2O as do other consumers.]

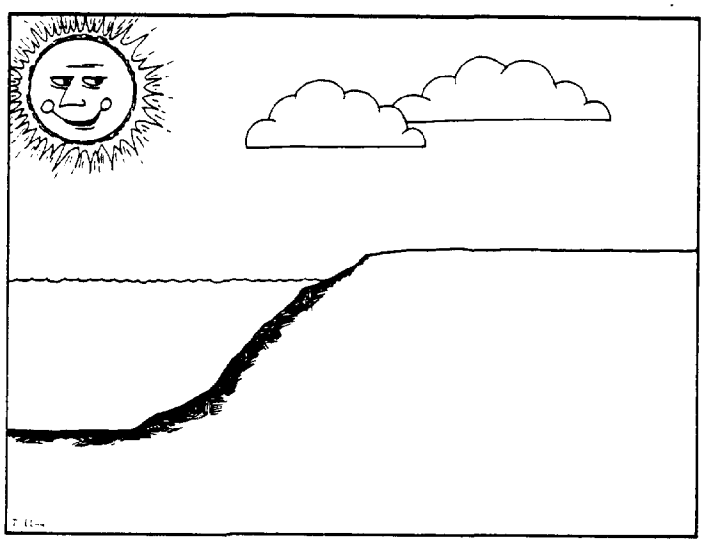
g. What are some generalizations we can make about the producer-consumer cycle now that we see all the outputs and inputs of the actors?

[The cycle is continuous. Photosynthesis supports metabolism and metabolism supports photosynthesis.

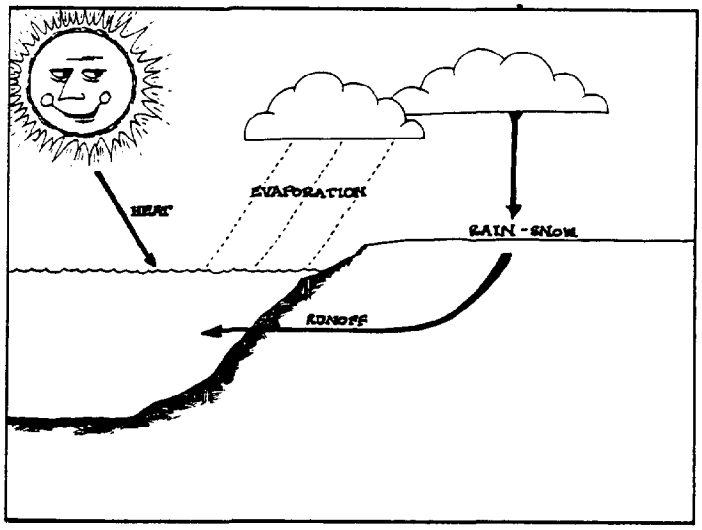
The cycle is very tightly interlocked. Only heat energy is lost and not returned to the system.

Central to the successful operation of the cycle is the work of the decomposers. The balance between production-consumption-decomposition is delicate. Problems can occur when too much industrial and sewage waste is brought into the system from outside. This creates an overbundance of bateria. In aquatic ecosystems, bacteria tend to use up oxygen supplies, depriving other organisms of this vital substance.

Transparency II-4
(Starting)



Transparency II-4
(Completed)



Commentary

A second basic ecological cycle in coastal ecosystems is the water, or hydrologic cycle, driven by the processes of evaporation, condensation, and precipitation.

Questions

a. Can anyone explain "why does it rain"?

[The sun is always at work heating sea water and other surface waters. As the water heats, some of it "evaporates", or vaporizes, and then condenses again in the colder upper air forming clouds. This vapor-laden air produced over lakes, rivers, forests, grasslands, and the ocean is pushed by winds across land areas. The moisture in the clouds then falls back to earth in the form of rain and snow. This is called precipitation. Water which does

not pass through the ground into underground water reservoirs (called aquifers) flows back through streams and rivers to the ocean. Ultimately this water evaporates, continuing the cycle.]

b. Does anyone know how much of the water on earth is sea water?

[There are 8.7 million cubic miles of water on the planet. 97.3% is ocean water and therefore unusable for drinking or agriculture.]

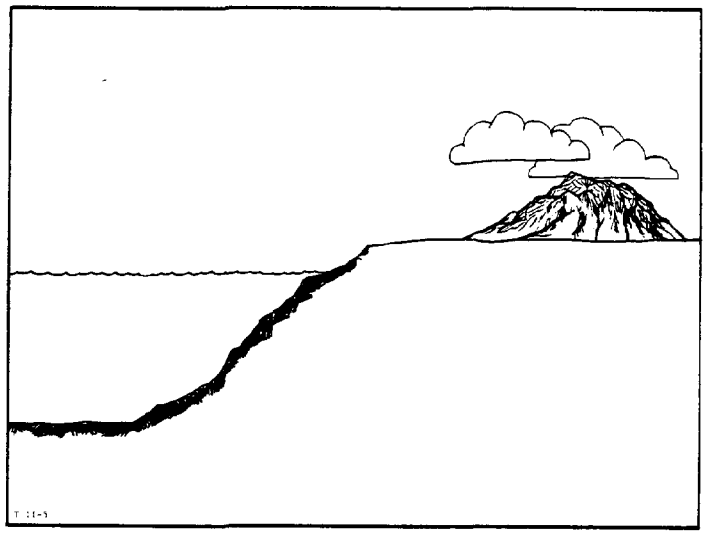
c. How much of the remaining 2.7% fresh water do you think is available for our use?

[More than three-fourths of this water is locked up either in glaciers or polar ice; much of the remainder is entombed underground in reservoirs too far below the earth's surface to be reached. Thus of all the world's fresh water, only .0037% or 1 part in 270 is accessible to us.]

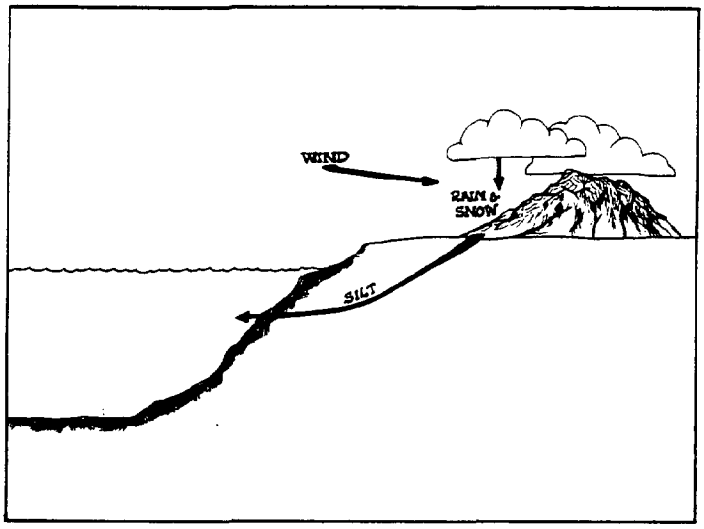
d. How has this fact affected human life and civilization patterns?

[Much of the land area of the globe is not suitable for settlements because of poor water supply. Most coastal areas, on the other hand, because of their closeness to the oceans, have weather patterns which typically produce a relatively large amount of rainfall and therefore coastal areas can sustain large populations and/or large-scale agricultural operations. This is one reason much of the world's population is concentrated in coastal areas.]

Transparency II-5
(Starting)



Transparency II-5
(Completed)



Commentary

An important process which occurs in coastal ecosystems is related to the water cycle. This is the geologic process of erosion.

Questions

a. What happens to dirt and pebbles in rivers when it rains?

[Dirt and pebbles are transported downstream by the force of the water flowing toward sea level.]

b. What is this transported material commonly called?

[Silt or sediment.]

c. Where does the silt go?

[It usually accumulates at river mouths, often creating new coastal lands.]

d. How would you describe the process of erosion?

[The movement of water in the hydrologic cycle and the action of wind and of gravity combine to wear down the land. Eroded materials are washed down streams into rivers and finally to the sea.]

e. Do geological processes only work to break down land forms and deposit eroded material on the coast?

[No. Taking a long-term view, the geologic actions of nature can also be considered a cycle. Land and mountains are constantly being formed anew. Earthquakes and volcanoes may add wholly new land forms suddenly at any time.]

f. Can you think of any examples of earthquakes or volcanoes creating new land forms?

[e.g., Hawaiian Islands.]

g. What are some well-known examples of erosion?

[e.g., Grand Canyon.]

h. Are there any examples of erosion in this area?

Transparency II-6
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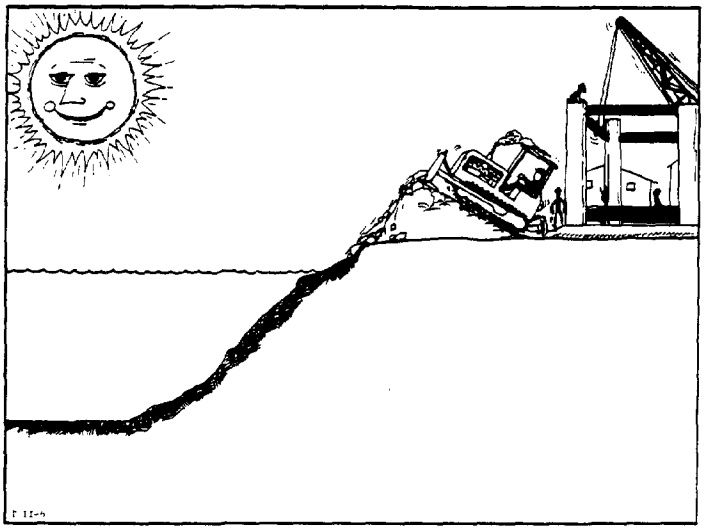

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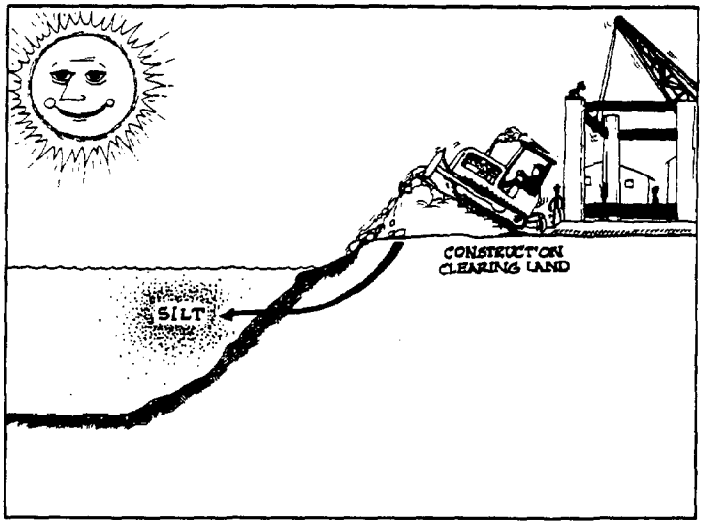

Commentary

Thus far the transparencies have shown how undisturbed natural systems work. Often, however, something interferes with these undisturbed operations. In coastal ecosystems, four major kinds of interference may occur and produce an imbalance in the ecosystem. Each of these interferences can be or are the result of human activities.

First, the amount of sunlight entering the ecosystem may be decreased.

Questions

a. Why is sunlight important?

[Sunlight provides the energy source for photosynthesis. If plants cannot grow, plant feeding animals cannot survive in their usual numbers. This in turn threatens other species which feed on the plant-feeders.]

b. What might interfere with sunlight entering a coastal ecosystem?

[Near-shore waters can suffer from an excess of silt. Smog is a minor contributor to sunlight interference in coastal waters.]

c. How would excess silt affect the aquatic ecosystem?

[In two ways: first, silt clouds the water and blocks the normal amount of sunlight from penetrating the surface water. Thus fewer green plants are formed. This connection can be seen by reviewing the completed ecosystem worksheet. Second, silt and sediments can suffocate bottom dwelling, or shell-fish blanket spawning areas making it difficult for the young to survive.]

d. How might too much silt get into the water?

[From development on coastal lands or improper agricultural or grading practices. These can create conditions under which rain water runoff carries great quantities of silt into near-shore waters. The presence of silt is natural, but there is frequently an excess of silt in coastal waters off developed areas. The main source of sunlight interference in coastal ecosystems is silt.]

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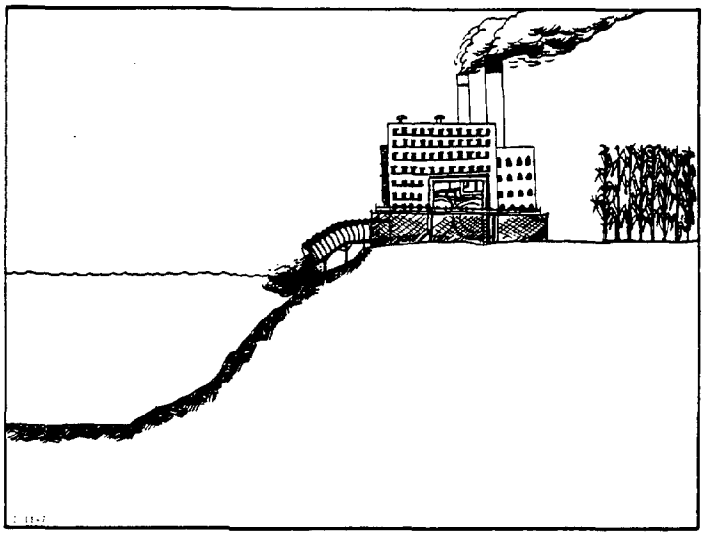

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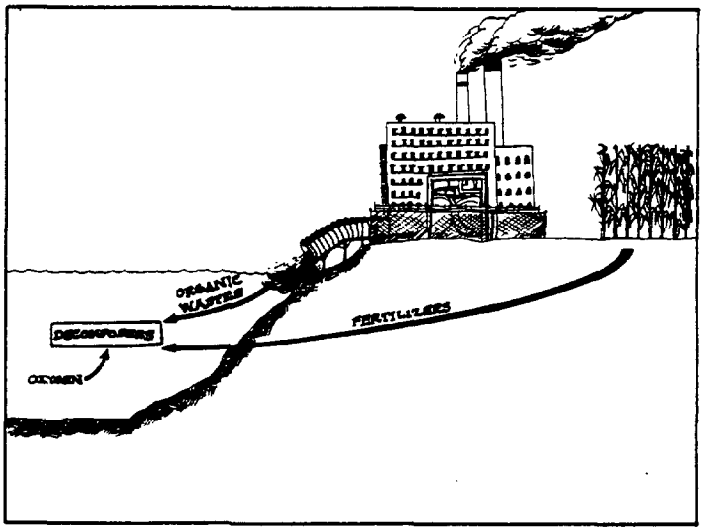


Commentary

A second source of interference for coastal ecosystems is oxygen interference.

Questions

a. Why is oxygen important? Is there free oxygen in water?

[There is a small amount of dissolved oxygen in water. It is normally enough for marine organisms. All animals need adequate supplies of oxygen to live.]

b. What might interfere with oxygen levels in aquatic coastal ecosystems?

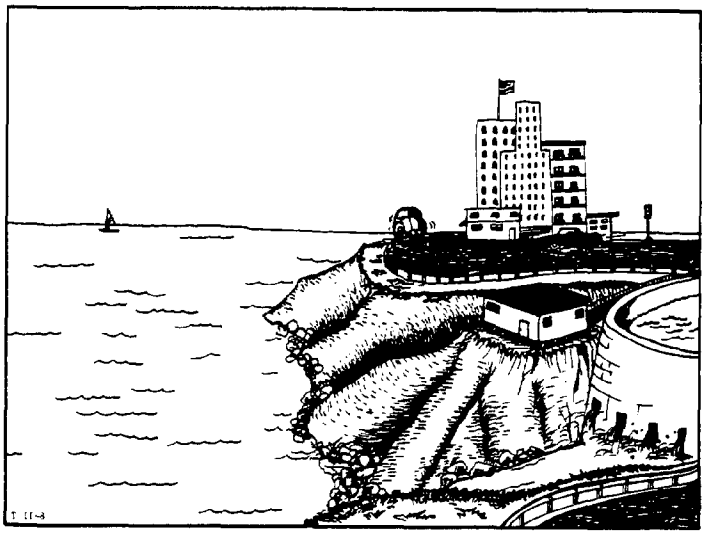
[Too much organic waste in the water.]

c. When there is too much waste, the dissolved oxygen level is lowered. How does this excess waste lend itself to a lowering of oxygen levels?

[An excess of nutrients from the wastes overstimulates plant growth, particularly algae. A dense algal population cannot be sustained for long because as the thickness of the algal layer in the surface water increases, the light required for photosysnthesis in the lower algal layer is cut off. The algae dies, leaving organic debris generated by plants. The decomposers use up the dissolved oxygen in the water. An over-supply of plants and bacteria in a body of water thus causes larger animals like fish to leave the area or to die due to suffocation. This situation is what is called "eutrophication".]

d. Has anyone seen or lived near a body of water which has become polluted this way?

Transparency II-8
(Starting)



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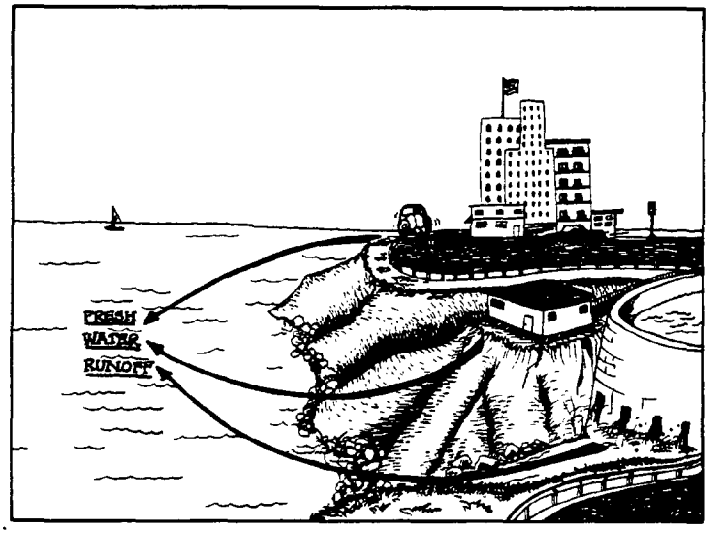

Commentary

A third way in which coastal ecosystems can be interfered with is through changing the salinity of the water.

Questions

a. What is salinity?

[This refers to the amount of salt dissolved in the water. If water becomes too salty or too fresh, it can kill those plants or animals living in the water which are sensitive to salinity changes.]

b. What might interfere with natural salinity conditions?

[Putting too much fresh water in the salt water or preventing

enough fresh water from entering the salt water. A river system which empties into the ocean brings in just enough fresh water so that young aquatic animals like fish and shrimp are nurtured and the plants and animals which have adjusted to the usual mixture of fresh and salt water can grow well.]

c. How could this flow of fresh water be affected?

[In two ways: a dam might be built which blocks off the flow of water into the ocean; or conversely, paving of areas near the ocean or construction of flood control canals might cause rain water to pour too fast into the ocean.]

d. Are there examples in this area where such a change has taken place?

Transparency II-9
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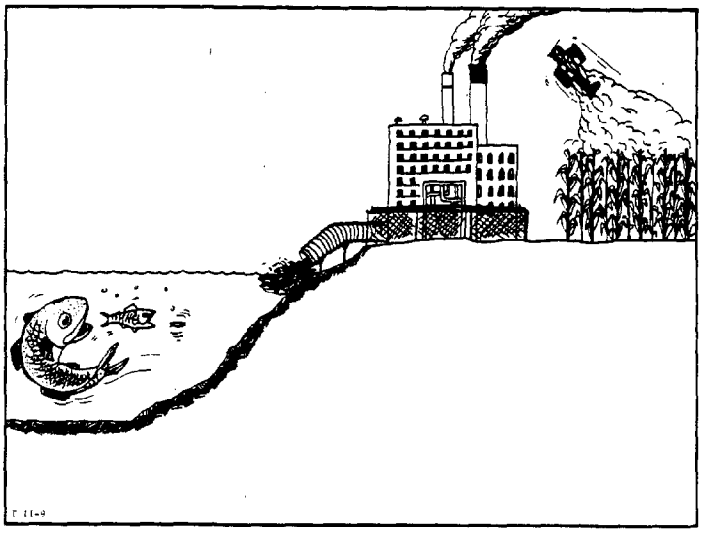

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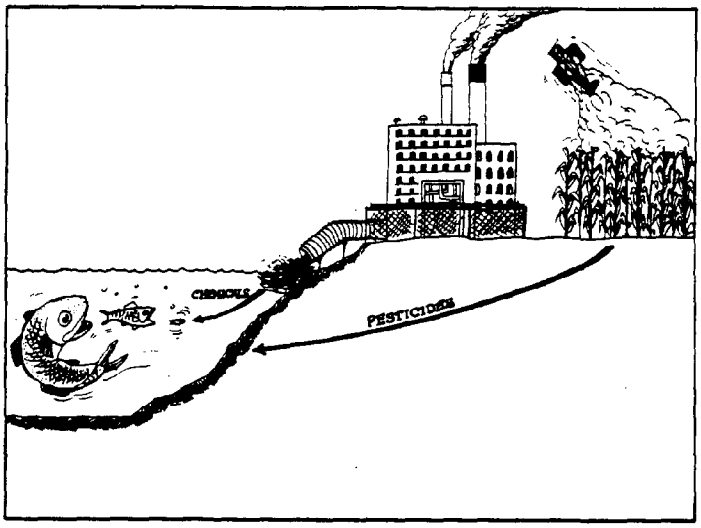


Commentary

A fourth way in which coastal ecosystems can be damaged is by adding poisons.

Questions

a. How are poisons added to the system?

[Primarily from industrial wastes and agricultural pesticides.]

b. What poisons are added?

[Industrial chemicals, heavy metals like mercury, zinc, copper, acids, and pesticides like DDT.]

c. What happens to these poisons once they enter the system?

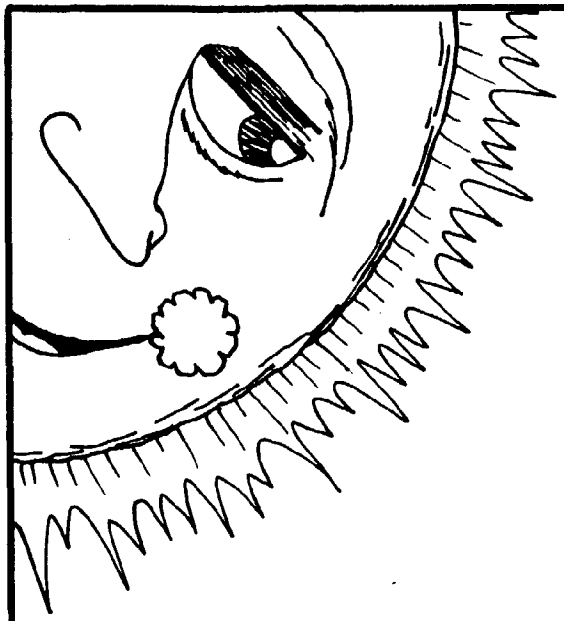
[Aquatic organisms and plants take them into their systems. The poisons cannot be metabolized; they accumulate in the tissues and fibers of the animals and plants. The poisons are then passed upward through the food chain in increasing concentrations. If the concentration becomes great enough, animals which eat the infected animals will suffer toxic effects.]

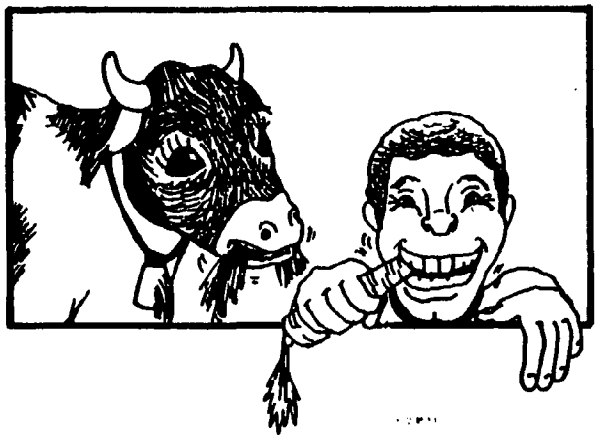
5. Homework Assignment: Have students investigate cases of interference with coastal ecosystems. Each student should report on a specific coastal area, the type and source of interference, and how the problem might be corrected or lessened. This may be given as a short assignment or it can be made a full-length term paper. It may also be assigned as an individual or group work.

ECOLOGY

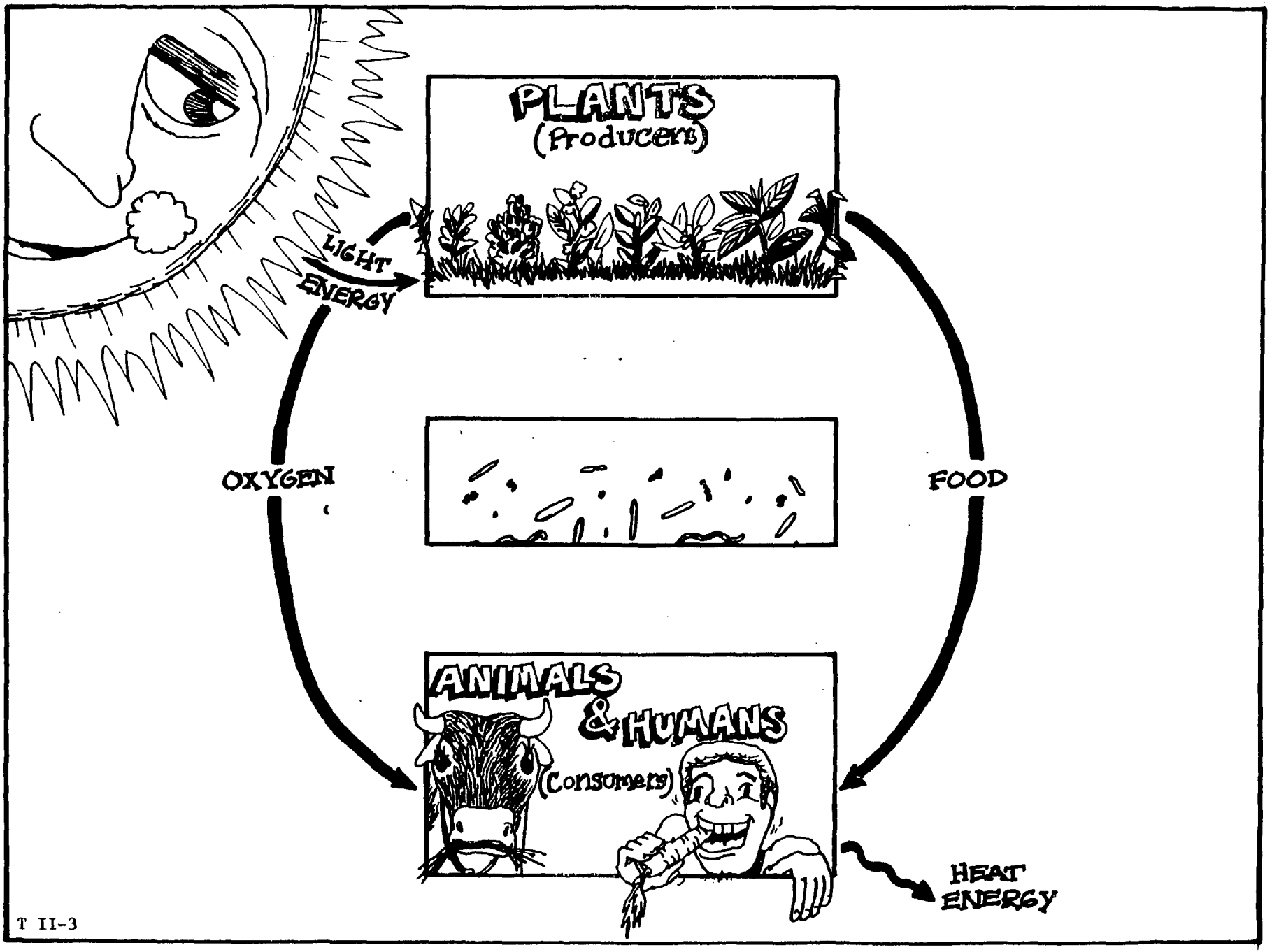
ECOSYSTEMS

ECOLOGICAL CYCLES

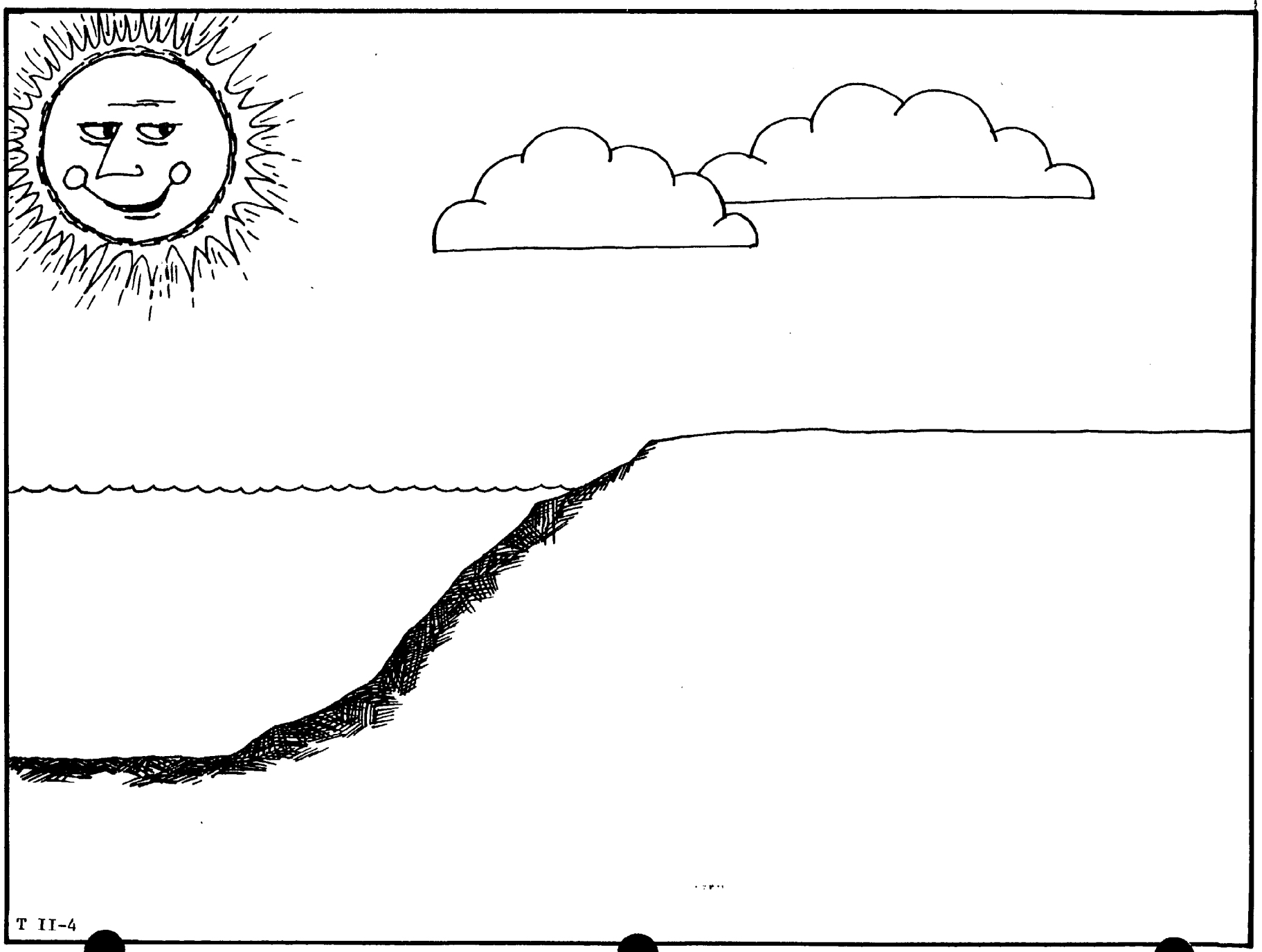




T II-2


PLANTS
(Producers)
LIGHT
ENERGY
OXYGEN
FOOD
ANIMALS
& HUMANS
(Consumers)
HEAT
ENERGY

T II-3



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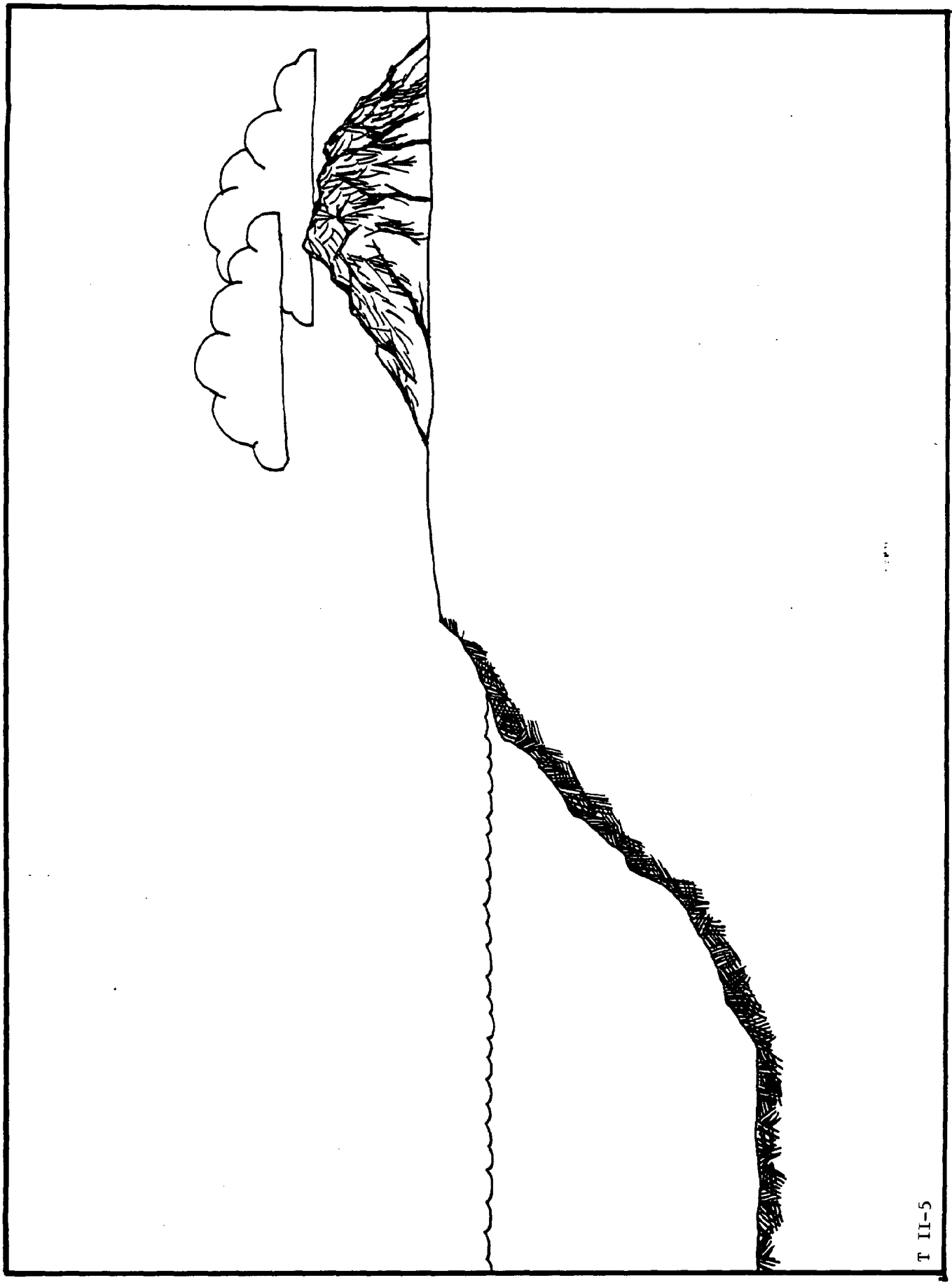

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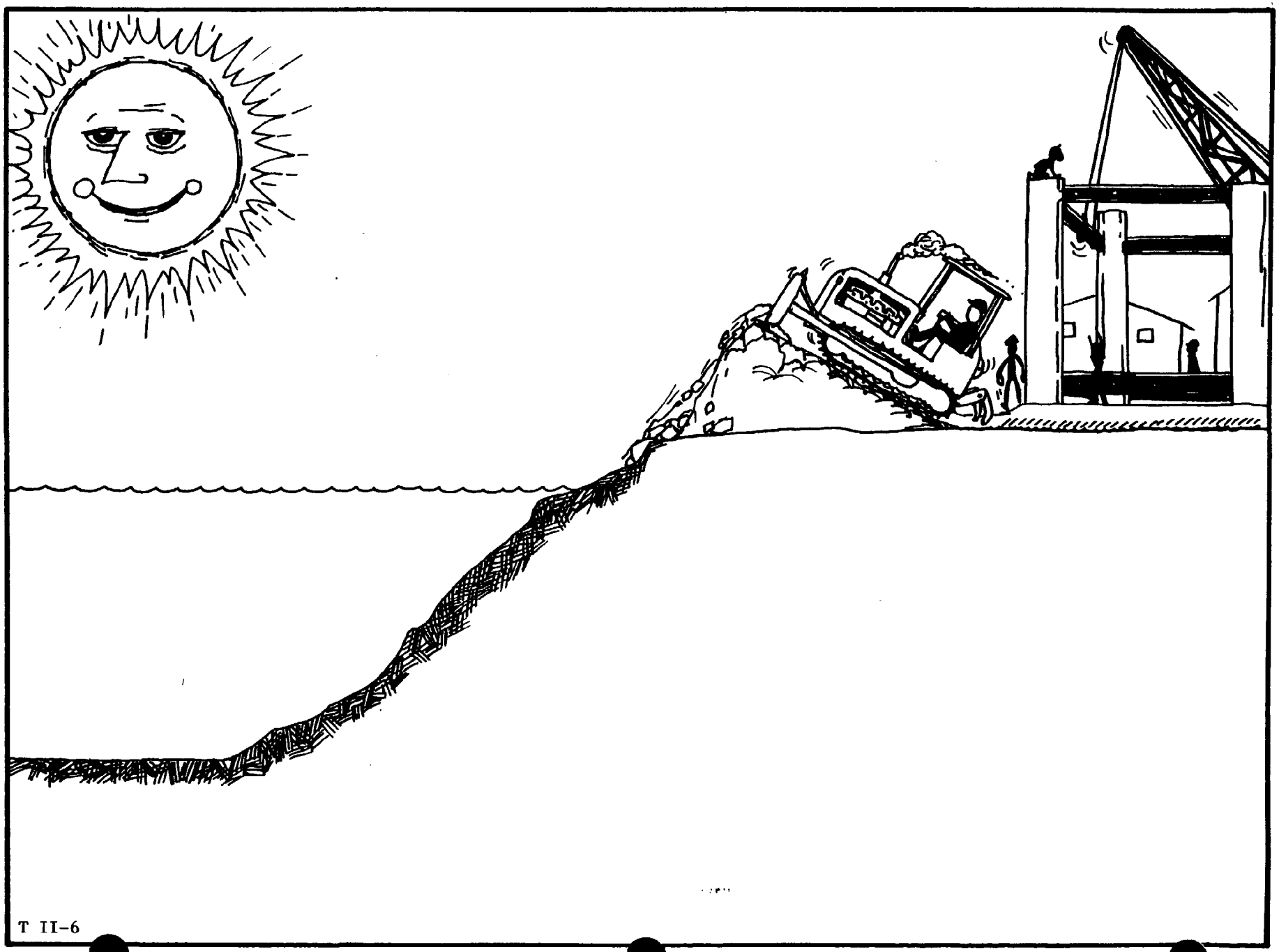

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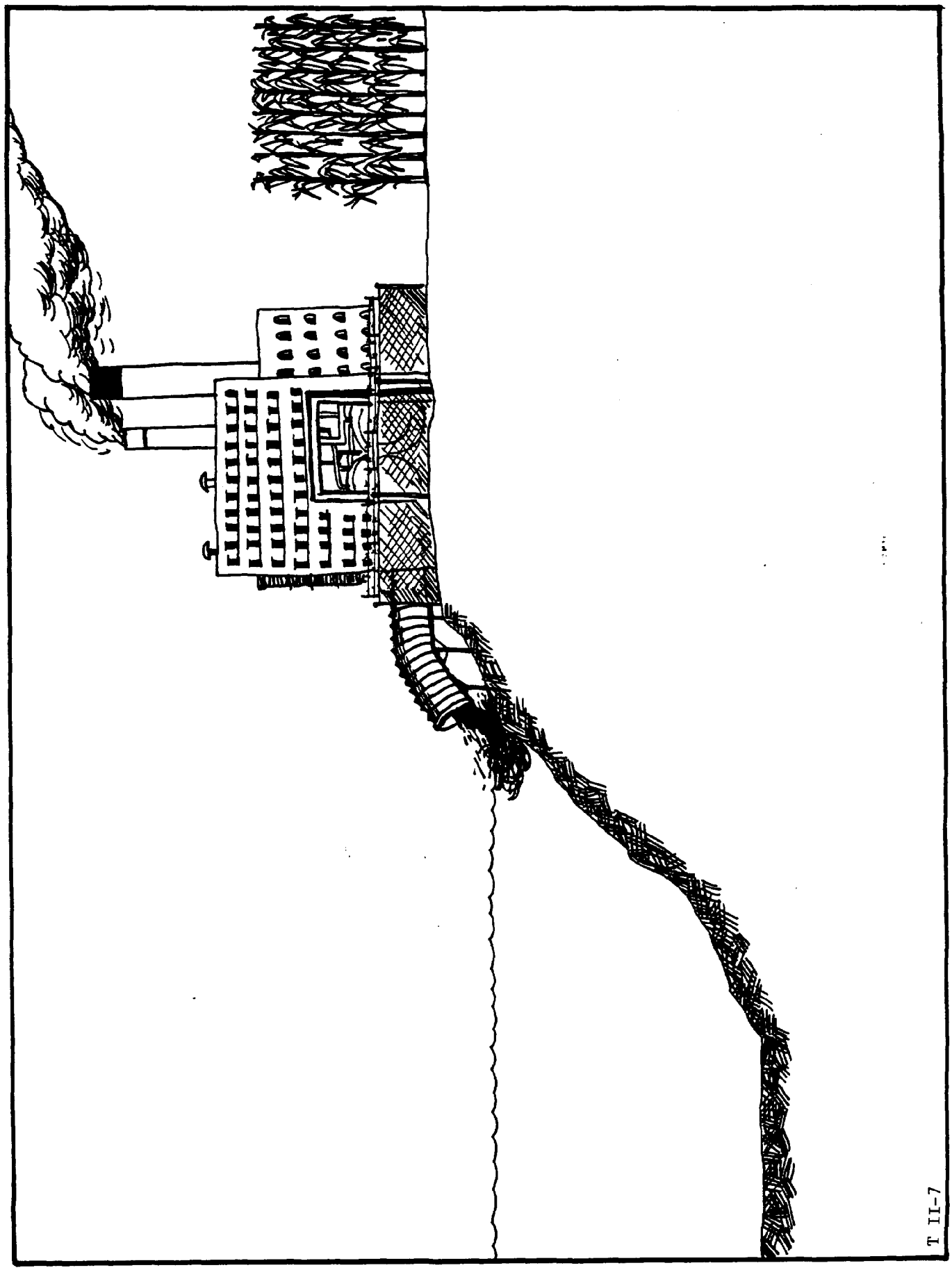

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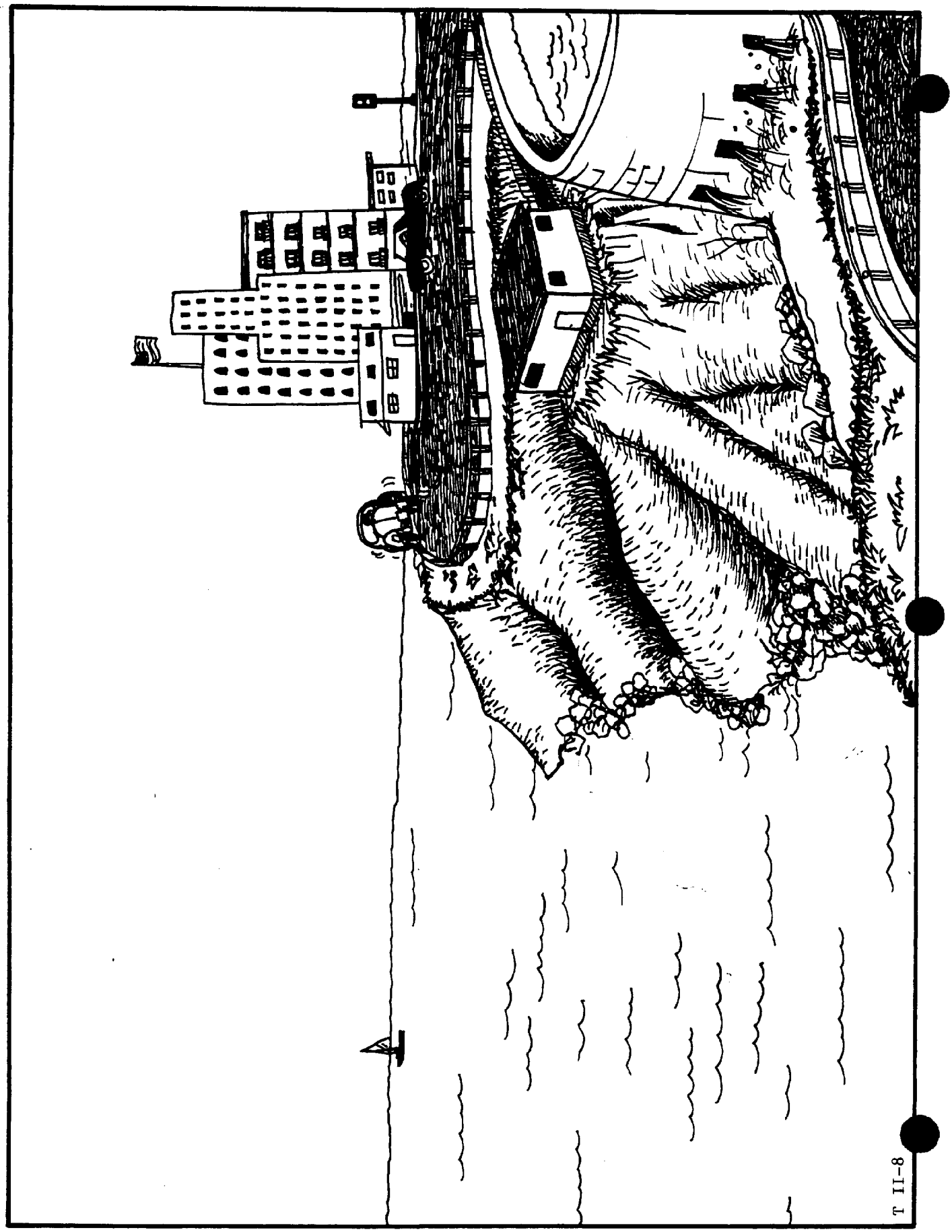

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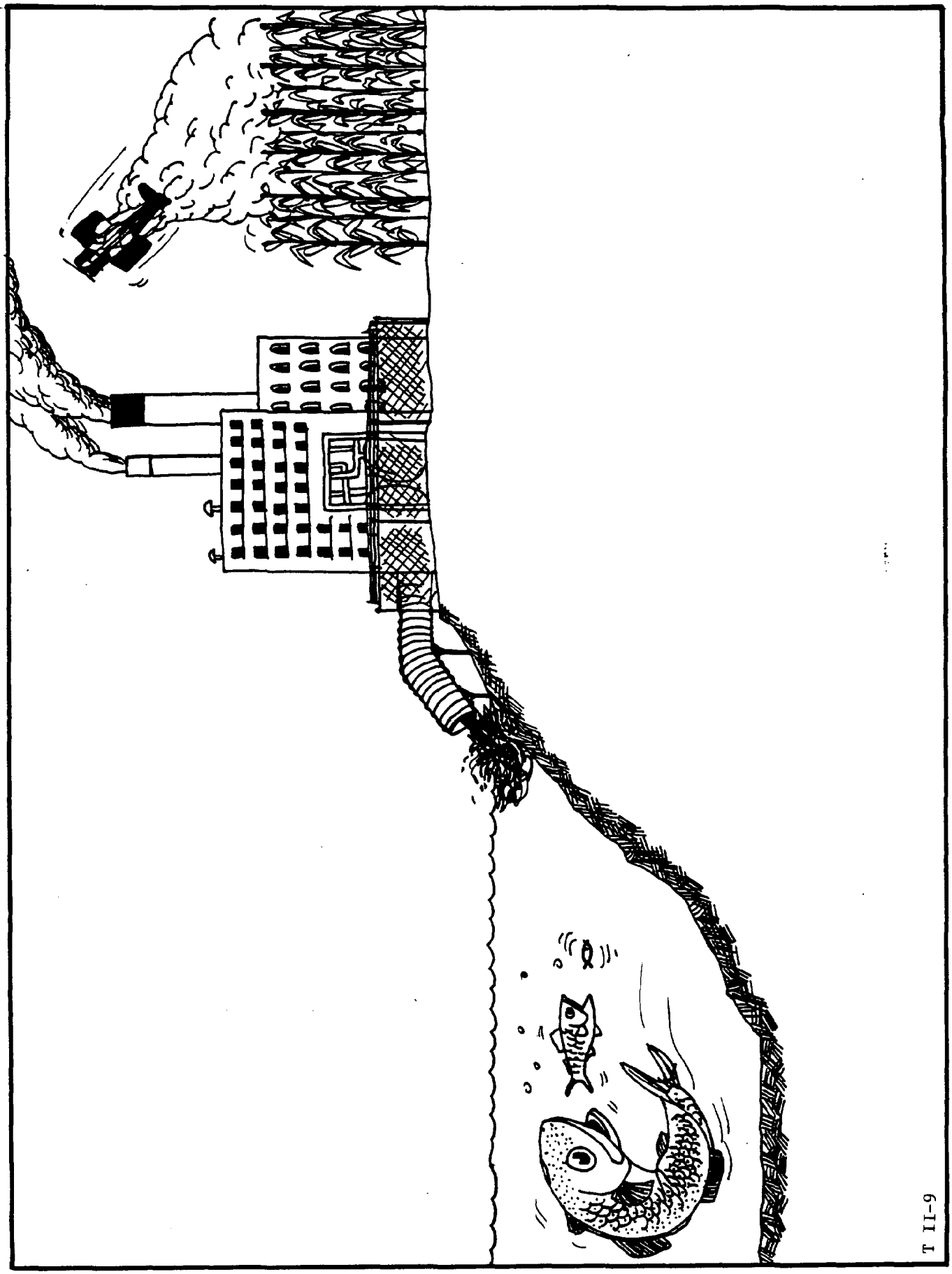


T II-9

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 2: FOOD WEBS

TIME: 1-2 DAYS

PURPOSE

To present food chains and food webs.

MATERIALS

In Package

Worksheet II-2, "Marsh Food Web"
Worksheet II-3, "Food Chain Plant and Animal "Picture Sets"
Transparency II-10, "Production Pyramid"

Additional

Overhead projector
Grease pencil

OVERVIEW

Through discussion, students work toward a definition of food chains. Sample food chains are constructed by students. These food chains are then incorporated into one interrelated food web for a marsh ecosystem. The transfer of energy from producer to consumer is discussed.

PROCEDURE

Part 1: Food Chains

1. Ask the following series of questions:

   a. Why do we eat?

      [To get energy and material for body building. Food is our body's source of energy. A portion of each bit of food we eat is converted into energy as our bodies metabolize or process the food back into carbon dioxide, water, and wastes.

   b. Who has eaten potatoes lately?

      [State that potatoes are a source of energy.]

c. Where did the energy in potatoes originally come from?

[From the sun. The sun is the ultimate source of all energy found in food; food incorporates and stores solar energy.]

2. Write "Food Chain" on the chalkboard. Ask:

Can anyone explain this term?

[A food chain lists a sequence of organisms that eat each other. It starts with the solar energy originally captured in the process of photosynthesis in plants. A food chain tells "who eats whom or what," and where the energy goes.]

Then ask:

Who ate tuna recently?
Who ate hamburger?
Who ate shrimp?
Who ate corn?
Who ate jello?

3. Construct a food chain for each of the above foods, or energy sources. Write a student's name on the board. Draw an arrow from what the student ate to the student's name. For example, the student who ate corn:

Student ← Corn

Ask: Where does corn get its energy?

[From the Sun.]

Link the sun to corn to complete the food chain.

Student ← Corn ← Sun

Work out the food chain for each of the other examples. Have students try to identify each link in the chain.

The food chains for each of the foods listed are:

Student ← Tuna ← Small fish ← Zooplankton (animal plankton) ← Algae ← Sun

Student ← (Hamburger Cow)* ← Grain ← Sun

Student ← Shrimp ← Zooplankton ← Algae ← Sun

Student ← (Jello Gelatin Seaweed)* ← Sun

*A parenthesis is used here to show that the prepared form of this food which humans eat is still that food. Hamburger is finely ground cow, Jello is processed seaweed, etc.

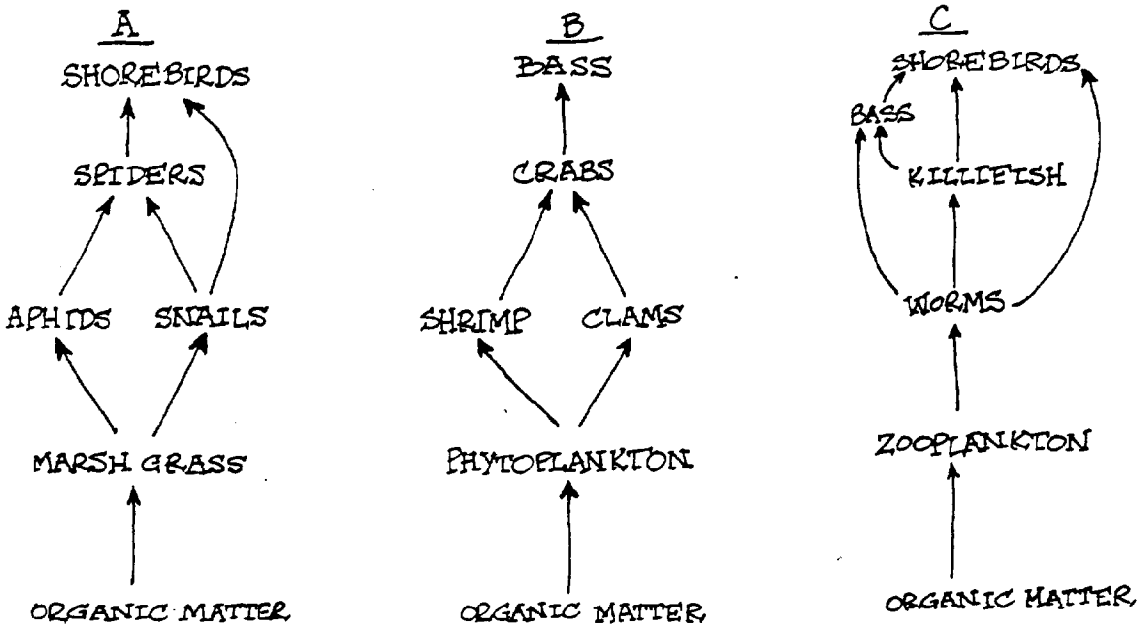
4. Suggest that an important part of understanding coastal ecology is understanding how coastal food chains work. To illustrate some coastal food chains, the class will look at a marsh ecosystem.

5. Arrange the class in groups of three. Hand out one complete set of plant and animal food chain pictures to each group. Have each student choose one of the three sets and construct a food chain from the plants and animals in the set.

   Each student should draw the food chain on a piece of notepaper, arranging the chain so the last or highest order "eater" is at the top. Highest order animals are those that principly eat other animals and are usually not eaten themselves while living (e.g., lions). Note that some plants or animals in a set may be food sources for more than one other animal in the set.

   Students should draw arrows between the members in the set to show who eats whom, with the arrow pointed toward the eater. For example:

The correct food chains are as follows:



6. After all students have drawn their food chains, call one student up to the board to draw Set A, one to draw Set B, and one to draw Set C plants and animals in a food chain. Have other students correct any errors in their own food chains.

Part 2: Constructing a Food Web

1. State the food chains by themselves do not illustrate the real complexity of an ecosystem. To get a better picture, one needs to construct food webs, which show how various food chains are linked together.

2. Hand out Worksheet II-2, "Marsh Food Web", to each student. Ask each student to merge the three separate marsh food chains already drawn on the board into one large, interrelated food web. This should be done by writing the name of one plant or animal in each of the blank boxes shown on the worksheet, and then drawing arrows to show who eats whom or what.

   Note that the "Marsh Food Web" worksheet shows one new feeder in the additional box at the top. That feeder is us -- humans.

3. Have students work in the same three-person team to complete their food webs. Call on one team to draw the completed food web on the board.

   [The completed "Marsh Food Web" appears at the end of the Teacher's Guide for this lesson.]

4. Discuss the completed marsh food web. Ask:

   a. What foods are the foundation of this whole food web?

      [The marsh grasses, organic matter, zooplankton, and phytoplankton -- the "primary producers" and "first order" consumers at the bottom.]

   b. What would happen if any of these energy sources were missing or seriously reduced?

      [The lives of all the animals on up through the food web would be threatened.]

   c. Would humans be threatened?

      [Fortunately, humans have many sources of food -- grains, beans, vegetables, fruits, and meat, poultry, dairy products, etc. However, the human population is certainly not well fed worldwide, and therefore, every source of food is important to preserve and if possible enhance.]

d. What conclusions might you draw from this?

[We need to protect the foundations of the food web, i.e., the "primary producers" and "first order" consumers. These sources are estuarine areas, marshes, near-shore waters.]

e. Are these areas threatened?

[Yes!]

f. How?

[By dredging, filling in, sunlight interference, oxygen interference, dumping of too much waste, salinity interference, adding poisons.]

Part 3: The Production Pyramid

1. State that another aspect of food webs which students need to be aware of is the transfer of energy up through a food chain. Ask:

Is much of the energy found at the lower levels of the food web transferred to each new consumer?

[No. Most of it is lost along the way.]

2. This loss is depicted in the "Production Pyramid." Show Transparency II-10, "The Production Pyramid," or reproduce the transparency master and distribute copies to all students.

Explain that the "Production Pyramid" shows that with each transfer of energy up a food chain, the loss of energy is very high. Phytoplankton (microscopic plants and algae) trap in their substance only three-tenths of one percent (.3% or .003) of the total energy from sunlight they receive.

Animal plankton eating phytoplankton retain only one-tenth of the energy in the algae, or three one-hundredths of one percent (.03% or .0003) of the original solar energy.

Fish eating the animal plankton retain less than three one-thousandths of one percent (.003% or .00003) of the original sun energy: 3 units of energy out of the original one hundred thousand units which reached the phytoplankton.

Put another way, approximately 90% of the original energy is lost with each transfer of energy along a food chain. Only 10% is used each time. Have students think about the following situation:

> Suppose you ate 3 tunafish sandwiches and gained one pound of weight. This would be equal to eating how much phytoplankton? How much photoplankton had to be consumed at the bottom of the food web to enable you to eat those 3 sandwiches and gain that one pound of weight? It takes 10 lbs. of fish to process 1 lb. of prepared tuna fish.

The food chain in this case is:

Humans ← Tuna ← Small Fish ← Zooplankton ← Phytoplankton ← Sun

[The answer is 10,000 pounds of phytoplankton. The energy relationship is:

1 lb	humans
10 lbs	tuna
100 lbs	small fish
1,000 lbs	zooplankton
10,000 lbs	phytoplankton

(Write these amounts on the transparency to the right of the Pyramid.)

Students may note that one cannot really gain one pound from eating 3 tunafish sandwiches, if one has to eat 10 pounds of fish to gain one pound of human weight. This is correct. The person who ate 3 tunafish sandwiches would only temporarily weigh one pound more, until his or her body metabolized the food and 90% of it would then be excreted as water and solid waste.

Ten thousand pounds of phytoplankton would be billions and billions of individual organisms. Fortunately nature is very productive at this level. Algae and other plants and animals at the bottom of the pyramid normally live in adequate quantities to supply the consumption requirements of the pyramid. But there are factors or conditions which can wipe out this surplus.

Ask: Can you suggest any of these factors?

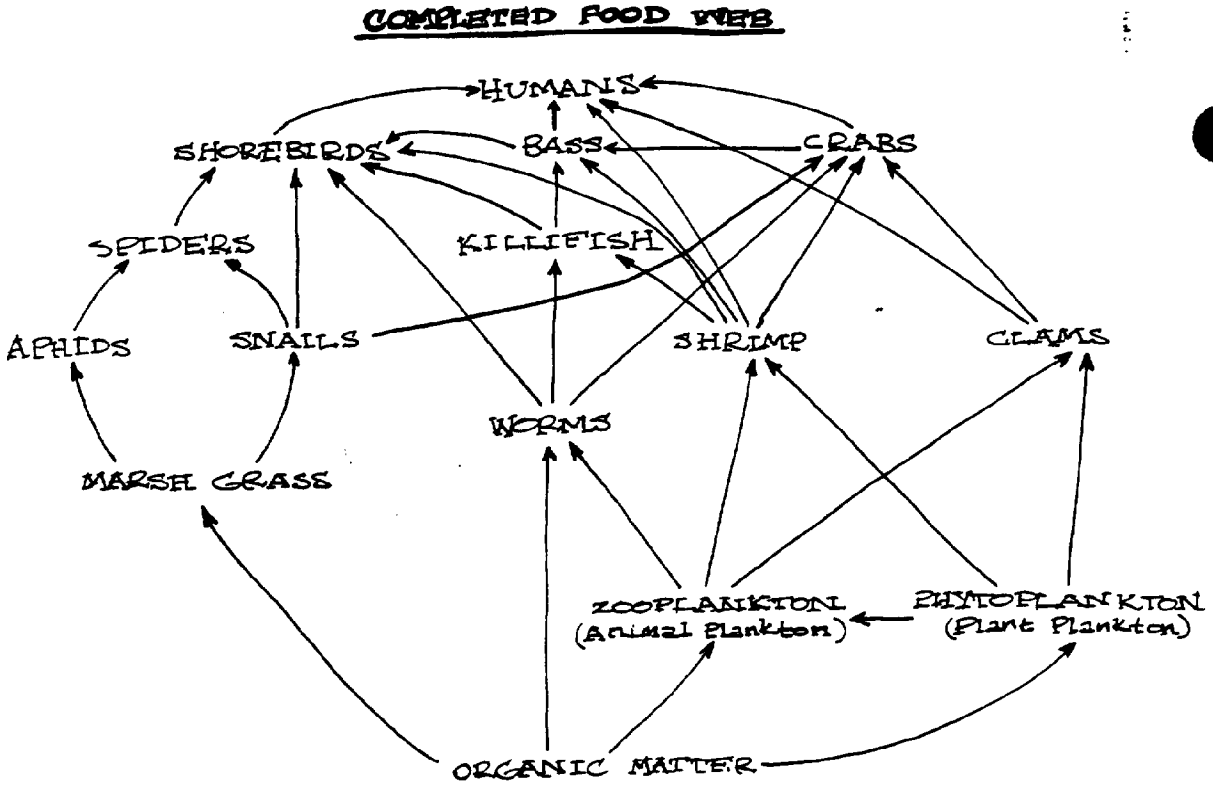
[The first is a high birth-rate among higher order consumers such as humans. This has, as we know, happened.

Another is the practice of eating higher off the production pyramid -- that is, eating more meat and fish and less grains and vegetables.

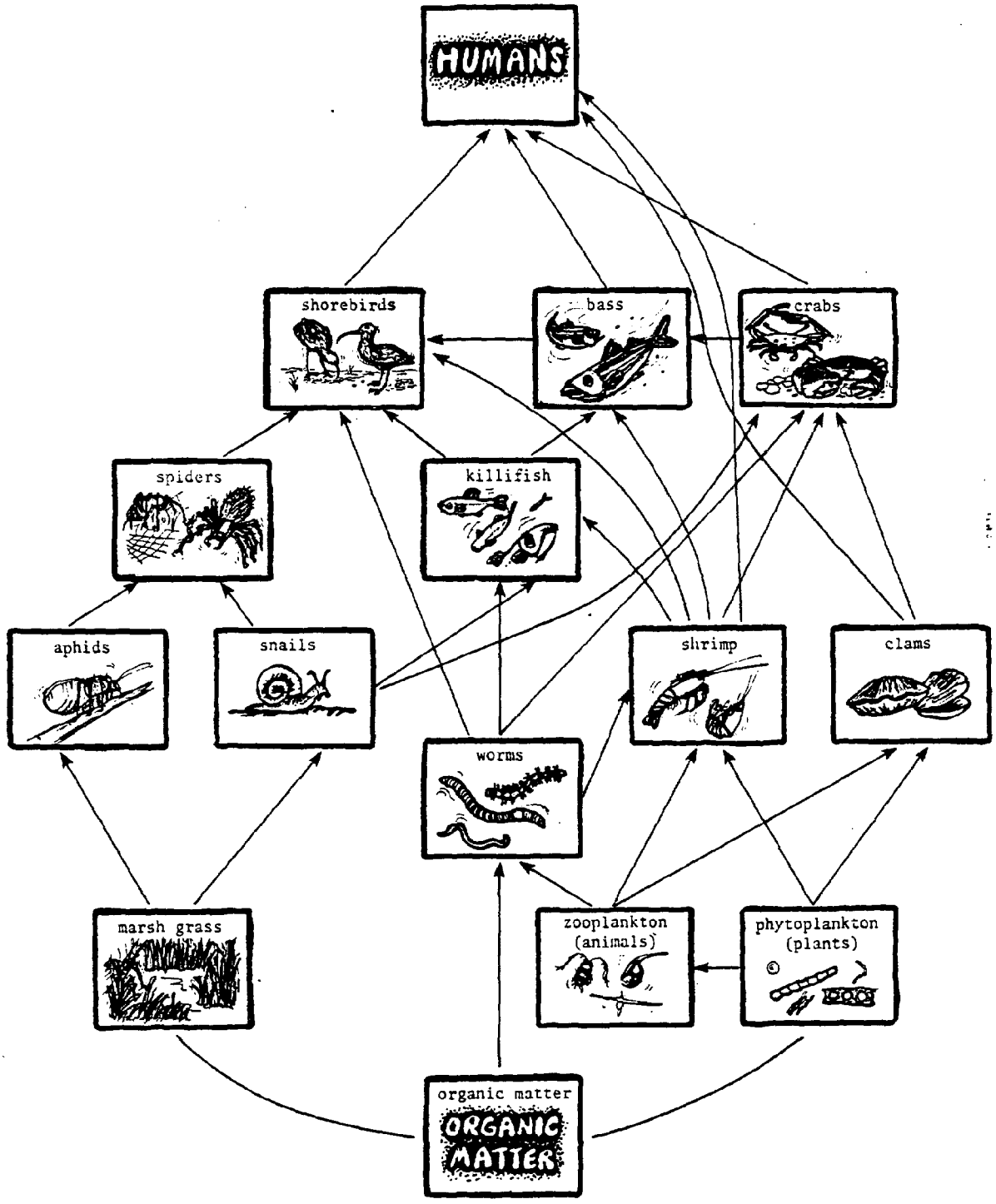
It is much less efficient to gain one pound by eating meat and fish than by eating grains and vegetables. Getting energy from meat and fish requires that there be more primary production, and more first and second order consumption.

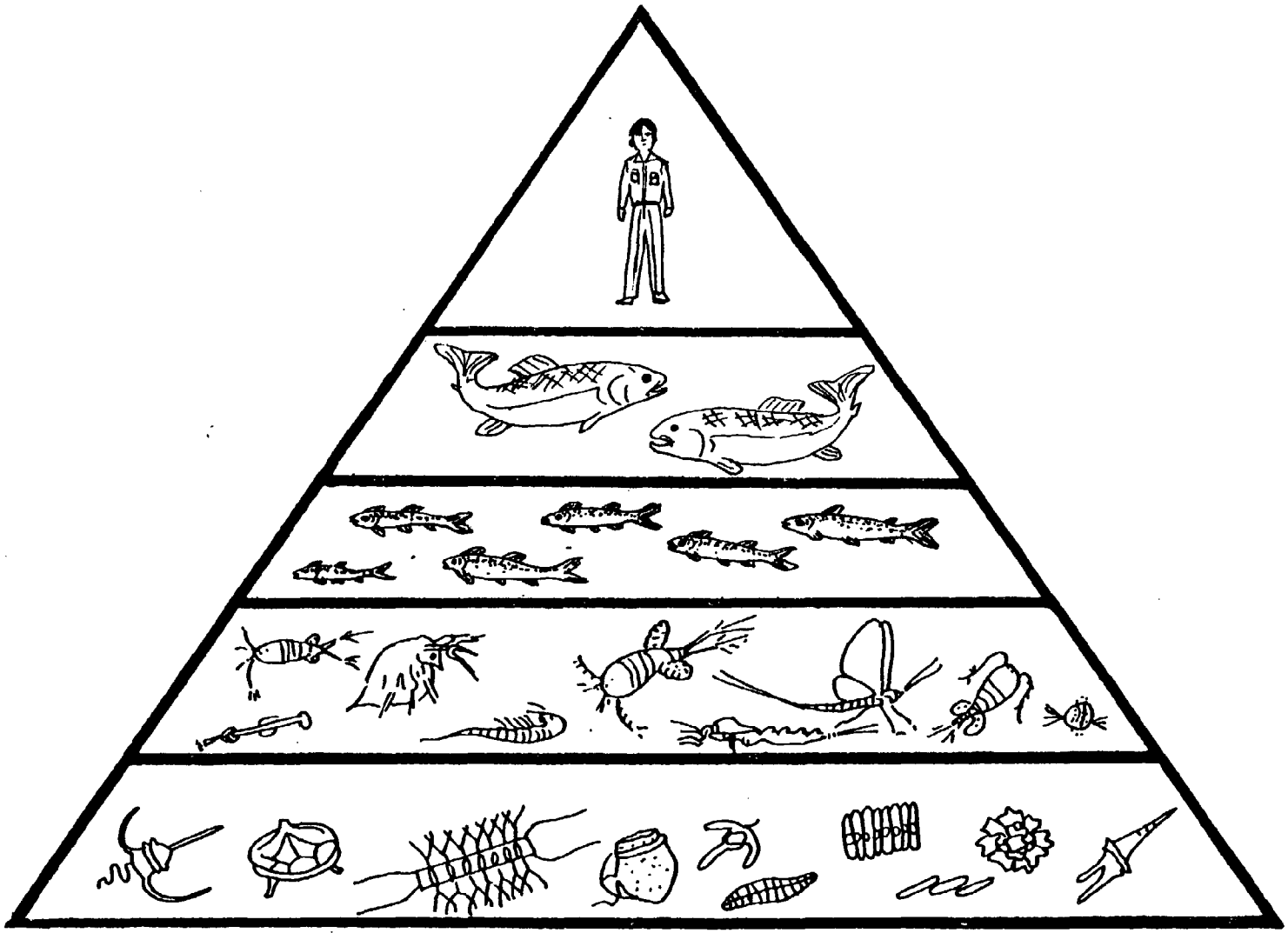
A third is the making of estuaries and other bountiful ecosystems less productive. This is precisely what is happening in many places because of the stresses on coastal ecosystems caused by various human activities.]

It may be difficult to realize how dependent we really are on creatures in the world we don't even see, like microscopic plankton, or don't pay much attention to, like worms and spiders, and how important it is to preserve their habitats. But the facts of food webs and the "Production Pyramid" make it clear that we cannot continue to ignore or disregard this dependence.



Worksheet II-3
Answer Key





T II-10

PRODUCTION PYRAMID

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 3: POLLUTION: WHAT IS IT?

TIME: 1 DAY

PURPOSE

To define pollution.

To examine different types of pollutants and their impact on waterways.

MATERIALS

In Package

Reading II-2, "Pollutants in the Waterways"
Worksheet II-4, "Pollution Chart"
Reading II-3, "Savannah Marshlands: A River That Kills"

Additional

Clear glass container
Salt
Match
Sand
Other "pollutants"

OVERVIEW

This lesson contains two parts. Students first develop a general definition of pollution. Subsequent readings and activities look at various kinds of pollutants and how pollution affects coastal areas.

PROCEDURE

Part 1: Defining Pollution

1. Show the class a clear, empty glass container. You will place several ingredients in the container. After each new ingredient is added, ask the class if they think the ingredient is a pollutant. In the beginning stages, accept all opinions; as the exercise moves forward, more specific answers will be developed.

2. Put sand or fine dirt in the glass. Fill with water by tipping the glass to one side. This should prevent the sand from mixing in the water. Then ask:

a. Is sand or sediment a pollutant?

[Accept any answer.]

b. Is the water polluted?

[Accept any answer.]

3. Explain that one way to check if the water is polluted would be to see if people or marine life could use the water. Ask:

a. Could fish live in this?

[Yes, however, if too much sand or sediment is introduced, it can suffocate fish and shellfish.]

b. Could people drink this?

[It would depend on the nature of the sediments.]

4. Shake the glass container so that the sediment is suspended in the water. Then ask:

a. Is the sediment now a pollutant?

[Accept any answer.]

b. Is the water now polluted?

[Accept any answer.]

c. Could fish live in this?

[Excessively turbid water will clog gills of fish and suffocate shellfish.]

d. Could people drink this?

[Most likely, no.]

5. Hold a lighted match beneath the glass and announce that the water is now 5° higher. Then ask:

a. Is heat a pollutant?

[Accept any answer.]

b. Is the water polluted?

[Accept any answer.]

c. Could fish live in this?

[Many fish species die if water temperatures are raised only a few degrees.]

d. Could people drink it or swim in it?

[Probably.]

6. Pour "sea" salt in the glass container. Then ask:

a. Is sea salt a pollutant?

[Accept any answer.]

b. Is the water polluted?

[Accept any answer.]

c. Could salt water fish live in this?

[Yes, unless the quantity of salt was above or below the normal salinity levels of the ocean.]

d. Could people drink this water?

[No.]

7. You may add other substances if you wish, such as a drop of oil or a dirty looking object, to represent waste products. Continue asking questions similar to those indicated above.

8. After this short demonstration concludes, review students' answers to these questions:

a. Is salt a pollutant?

[It depends; for salt water animals, no; for fresh water animals or for drinking purposes, yes.]

b. Is sand or sediment a pollutant?

[Again, it depends. In normal quantities and in a quiet state, no. But, if large quantities of sediment are deposited in an area, or if the sediment is continuously in a suspended state, this can create serious problems for marine life and recreation uses.]

c. Is heat a pollutant?

[Probably not for human use, but it can seriously harm marine life.]

d. Could clean, fresh water ever be a pollutant?

[If too much fresh water enters estuarine areas, it can seriously harm animals who need certain levels of salt in the water to live.]

9. Have students develop a definition of pollutants and pollution based on the previous discussion by asking:

a. What is a pollutant?

[Anything in the environment that is in sufficient quantity to cause a disruption of natural biological processes.]

b. When is water considered polluted?

[When the amount of pollutants reach levels that make water unsafe for drinking or undesirable for recreation or conservation uses, or destruction of marine life occurs.]

Part 2: Investigating Common Pollutants

1. Assign the reading, "Pollutants in the Waterways." Hand out the accompanying worksheet, "Pollution Chart," for students to fill in as they read. Explain that the first category is filled in as an example.

2. After students have finished the reading and completed the worksheet, ask:

a. How satisfactory are current sewage treatment practices for handling these eight common pollutants?

[For several pollutants, conventional treatment processes are not very effective.]

b. Which of the eight pollutants is likely to cause the most problems for the future? Why?

3. Explain that pollution is a frequent problem with serious incidents occurring throughout the country. An interesting case study of how certain kinds of pollutants can actually affect waterways is provided by the Savannah River. If you have a map of the United States, point out the location of the river.

4. Assign the Reading II-3, "The Savannah Marshlands: A River that Kills." After the students have completed the reading, discuss the contents:

   a. What was the problems explained in this reading?

      [Ecology of marshlands is seriously threatened by combined upriver pollution.]

   b. What was the cause?

      [Industrial wastes and municipal sewage reaching the marshland areas; the synergistic or combined effect of pollutants.]

5. You may want to share with students the following update on the Savannah marshlands situation:

   In 1965 and again in 1969, federal and state authorities imposed deadlines for serious pollution abatement by each of the "Big Three" polluters. By 1971, none of the three had as yet met the deadlines and were technically in violation of the law, though none was prosecuted or fined. Since then, the situation has improved. Many pollution abatement projects have been completed. Georgia has a new Coastal Marshlands Land Act and research institutions on Sapelo and Skidaway Islands as well as an Institute for Ecology which are studying the ecology of the marshlands.

Answer Key

POLLUTION CHART

CATEGORY	SOURCES	THREAT
Oxygen-demanding Wastes	Domestic sewage; industrial wastes; comes from plant and animal wastes	Can deprive water of oxygen; a danger to fish and plants
Disease-causing Agents	Infectious organisms from surface and ground water; from industrial wastes and sewers	May cause disease in man or other animals
Plant Nutrients	Sewage, industrial wastes and drainage from fertilized lands; main nutrients are carbon, nitrogen and phosphorus	Over-stimulates plant growth, causes unsightly conditions, and unpleasant odors and wastes.
Synthetic organic Chemicals	Detergents, synthetic organic pesticides, chemicals and wastes; from homes, fields and industry	May poison fish and oth aquatic life; possibly harmful to humans- can cause taste and odor problems. Long term effects unknown.
Inorganic chemicals and Mineral substances	Metal salts, solid matter and other chemical compounds; from mining and manufacturing sites, oil fields, agricultural practices and natural sources	Interfere with natural stream purification; destroy fish and other wildlife; cause excessive hardness of water supplies; increases maintenance costs to boat owners
Sediments	Particles of soils, sands and minerals from land and paved areas--often comes from construction projects	Fill stream channels and harbors causing expensive dredging operations; fill reservoirs, erode power turbines; reduce fish and shellfish populations; prevent sunlight from penetrating water.
Radioactive Substances	From mining and processing of radioactive ores; from power reactors and from nuclear testing	A threat to humans
Heat	Hot water from power plants and industry	Reduces the capacity of water to absorb oxygen; kills fish and aquatic life.

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 4: SEWAGE: THE "EFFLUENT SOCIETY"

TIME: 1 DAY

PURPOSE

To examine the origin, treatment, and disposal of sewage

To examine how the treatment and disposal of sewage affects coastal ecosystems

MATERIALS

In Package

Reading II-4, "New Creature from the Deep: The Sludge"
Worksheet II-5, "Sewage Treatment Process"
Transparency II-11, "Bacteria and Plants"
Transparency II-12, "City Sewer System"
Transparancy II-13, "Primary Sewage Treatment"
Transparency II-14, "Secondary Sewage Treatment"

Additional

Overhead Projector
Grease Pencil
Suitable Viewing Surface (screen or light colored wall area)

OVERVIEW

Part I of this lesson explains why sewage treatment plants are needed. Students review some basic ideas from Lesson 2, "Coastal Ecosystems." In Part II, transparencies show how typical sewage treatment processes work. In the final section, students read about a common problem affecting sewage treatment facilities: Where to dump sludge and other residues from the treatment process.

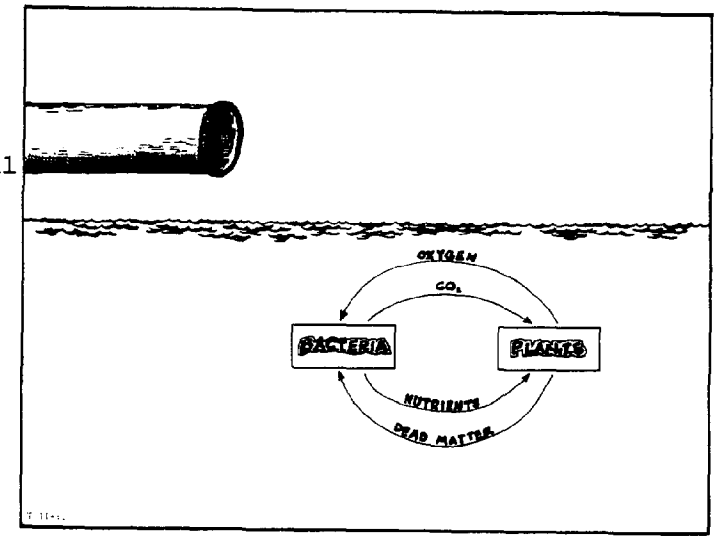
PROCEDURE

Part 1: Why Sewage Treatment?

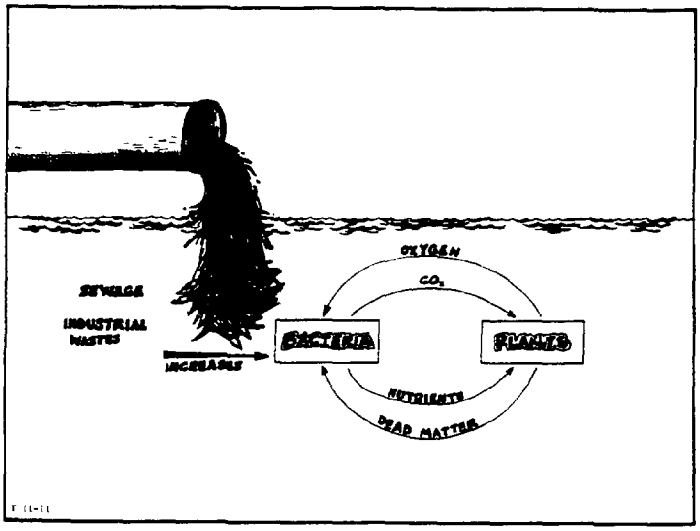
1. Explain to students that one of the most common sources of pollution is waste water from homes, industry, and agricultural areas. The transparencies show where sewage and other waste products come from, where they go, and what impact they have on coastal regions.

2. Show transparency, "Bacteria and Plants." This reviews some of the material presented in the ecology lesson. Explanation for this transparency follows under Commentary headings. Suggested questions are also included. When you reach the addition of wastes to the system, draw this on the transparency.

Transparency II-11
(Starting)



Transparency II-11
(Completed)



Commentary

The transparency describes the basic, balanced relationship between bacteria and plants. Each provides what the other needs. Bacteria also receive wastes and dead matter from animals, but since this transparency concentrates on bacteria and plants, animal waste has been left out.

Questions

Since bacteria normally clear the water of wastes, why is sewage treatment necessary?

(When too much sewage or waste enters the water, the system breaks down. The bacteria cannot do their job. The results are contaminated water, foul

odors, and a dangerous, polluted situation. Some kinds of bacteria in water must be killed because they are harmful to people and animals.]

Commentary

When wastes are added to the water, the bacteria multiply at a very fast rate. The wastes are "food" for the bacteria. As the bacteria process waste, more nutrients are produced.

Questions

a. By looking at the transparency, can you see what impact the increase in nutrients will have on this system?

[As the bacteria multiply, they consume oxygen at a very fast rate. This causes the oxygen levels to decrease to the point where larger animals such as fish can no longer live in the area. As the algae grow, it blankets the upper levels of the water with a murky green slime. This prevents sunlight from reaching other plants and they die.]

Commentary

Excess wastes can stimulate algae and bacteria growth, but can be harmful to other forms of marine life. In the case of Lake Erie and other bodies of water that have received too many waste products, the levels of oxygen in the water have been so low that even the bacteria begin to die. There is not enough bacteria to consume the dead matter and other waste products. This leads to a lack of nutrients in the water which reduces the level of primary producers, such as algae and plankton. At this point, practically no life can be supported. A body of water in this condition can be considered "dead".

Part 2: Sewage Treatment Processes

1. Show the transparency, "City Sewer System." Explain to the students that a few cities have had sewer systems for thousands of years. Around 1850, underground water-carrying systems, like the one in the transparency, became common in Europe and America.

2. Review the transparency with the class so they see where the wastes originate and where they go:

   a. Where in this picture are wastes and waste water coming from?

      [Homes, city buildings, industry, and rain water.]

   b. Where do the wastes and waste water go?

      [Either directly into the river, or to the treatment plant and then to the river.]

   Point out the valve in the middle of the picture, and ask:

      What might this be used for?

      [The valve indicates that this pipe can be opened or closed. During periods of heavy flooding the treatment plant may not be able to carry all of the water coming into it. It is sometimes necessary to direct some of the water straight into the river. This means raw sewage can enter waterways even when a city has treatment facilities.]

3. Have several of students explain how they think sewage treatment plants work. This should give you a general idea of their perceptions about how waste water is treated. If misconceptions exist, you can concentrate more on these areas as you begin the following explanation.

   Pass out the student worksheet, "Sewage Treatment Processes." Students should take notes on this sheet during the discussion.

4. Show the transparency, "Primary Sewage Treatment." Explain that primary treatment and secondary treatment are the two basic kinds of sewage treatment.

   The following information helps explain how this stage in the treatment process works.

      Sewage enters the treatment system through a large screen. This blocks large floating particles and objects, such as rags, sticks, etc. After the sewage has been screened, it goes to a grit chamber. Here sand, cinders, small stones, etc., fall to the bottom.

The sewage still contains a number of potentially harmful materials (chemicals and bacteria). These materials are removed in the sedimentation tank, the next stage of the sewage treatment process. The flow of the sewage is slowed in this tank and the suspended solids gradually sink to the bottom. This mass of solids is called sludge.

To complete the primary treatment of the sewage water -- called effluent -- chlorine is added. The chlorine kills almost all of the disease-causing bacteria that remain, and also helps eliminate nasty odors. Ths treated water is then emptied into a stream, river, or ocean unless it enters a secondary treatment process.

5. Place the transparency "Secondary Treatment Process" adjacent to the "Primary Treatment Process" transparency. Connect them at the point to indicate that the secondary process begins where the primary treatment ends.

Explain that the secondary stage is added to the treatment process to remove pollutants that the primary stage cannot handle. There are several different kinds of secondary treatment. The one most commonly used is the "activated sludge" process pictured here.

6. Remove the "Primary Treatment Process" transparency. The following information helps explain how the secondary treatment process works:

The effluent leaves the settling tank and goes directly to an aeration tank. Here it is mixed with air and sludge loaded with bacteria. The bacteria in the air and the sludge helps break down many remaining pollutants.

The sludge, which now contains millions of bacteria, can be used again by returning it to the aeration tank.

After the aeration tank, the effluent moves to another sedimentation tank which removes harmful bacteria. The final step is to chlorinate the water.

This secondary process is now required by law in all major cities across the U.S. It is 95% effective in cleansing plant and animal wastes from sewage. It is not very helpful in removing other kinds of pollutants. Industrial poisons can pass untreated through this system.

Part 3: The Sludge Problem

1. Remind students of a major theme in the ecology lesson: "All wastes have to go somewhere." In the primary and secondary treatment processes, there is still one element unaccounted for. Ask:

   a. What happens to the left-over sludge?

      [Some sludge is buried, some is used for fertilizer, and in many coastal communities, sludge is dumped into the ocean.]

2. Assign the reading, "New Creature from the Deep: The Sludge." Have students consider the problem of where sludge goes as they read.

3. After students finish the reading, have them examine what happens to sewage and waste products, including sludge, in their community. Students might investigate several questions:

   a. What kinds of sewage treatment processes are used?

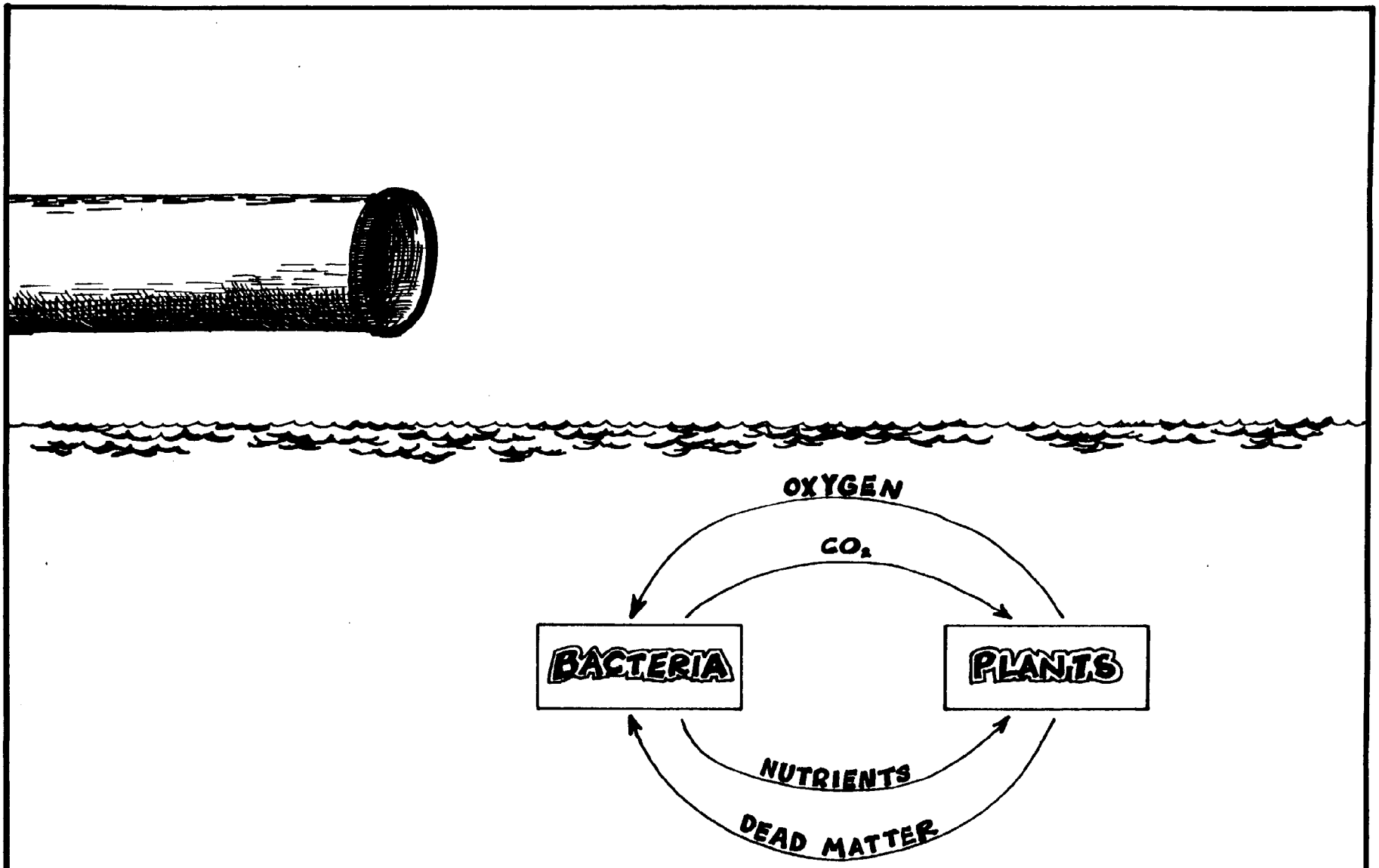
   b. Where is the waste water outfall? What impact does this outfall have on the surrounding area?

   c. What happens to the sludge?

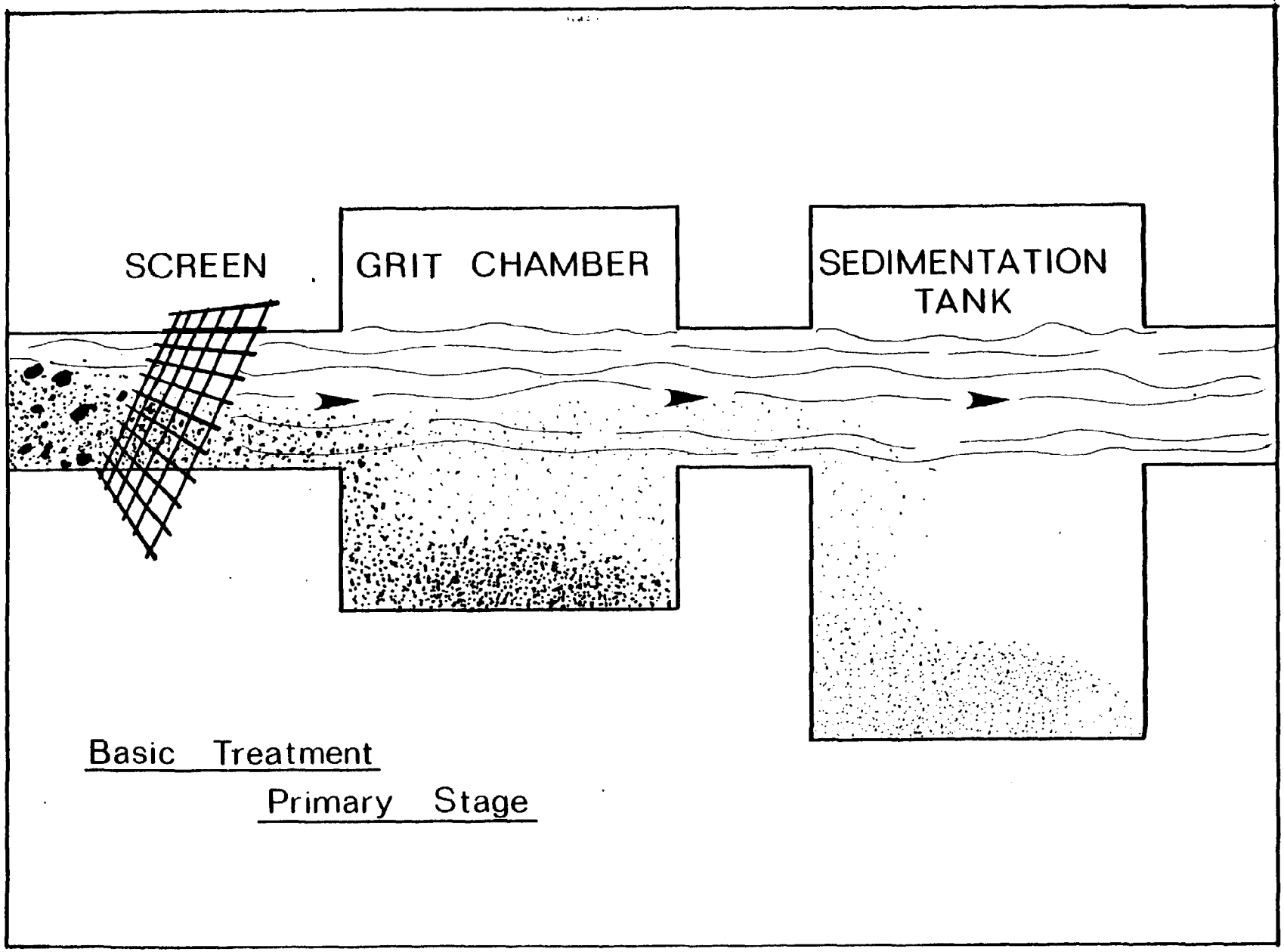
   d. Are there serious pollution problems in the area resulting from inadequate sewage treatment?

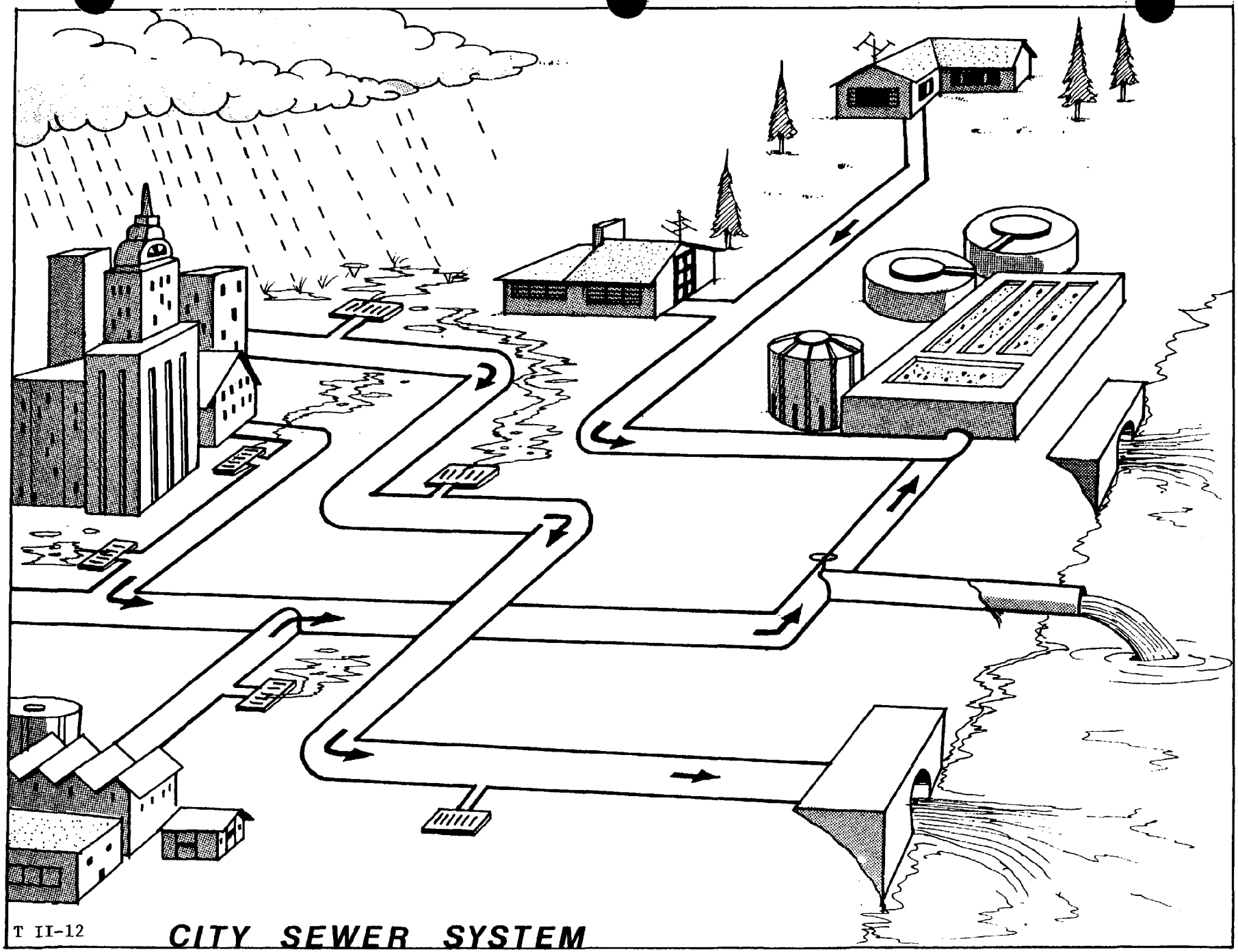
   e. If so, what kinds of proposals have been suggested for improving the situation?

   You may want to have a group of students investigate these questions in some detail, and prepare a report for the class. Field trips can often be arranged to visit sewage treatment facilities.



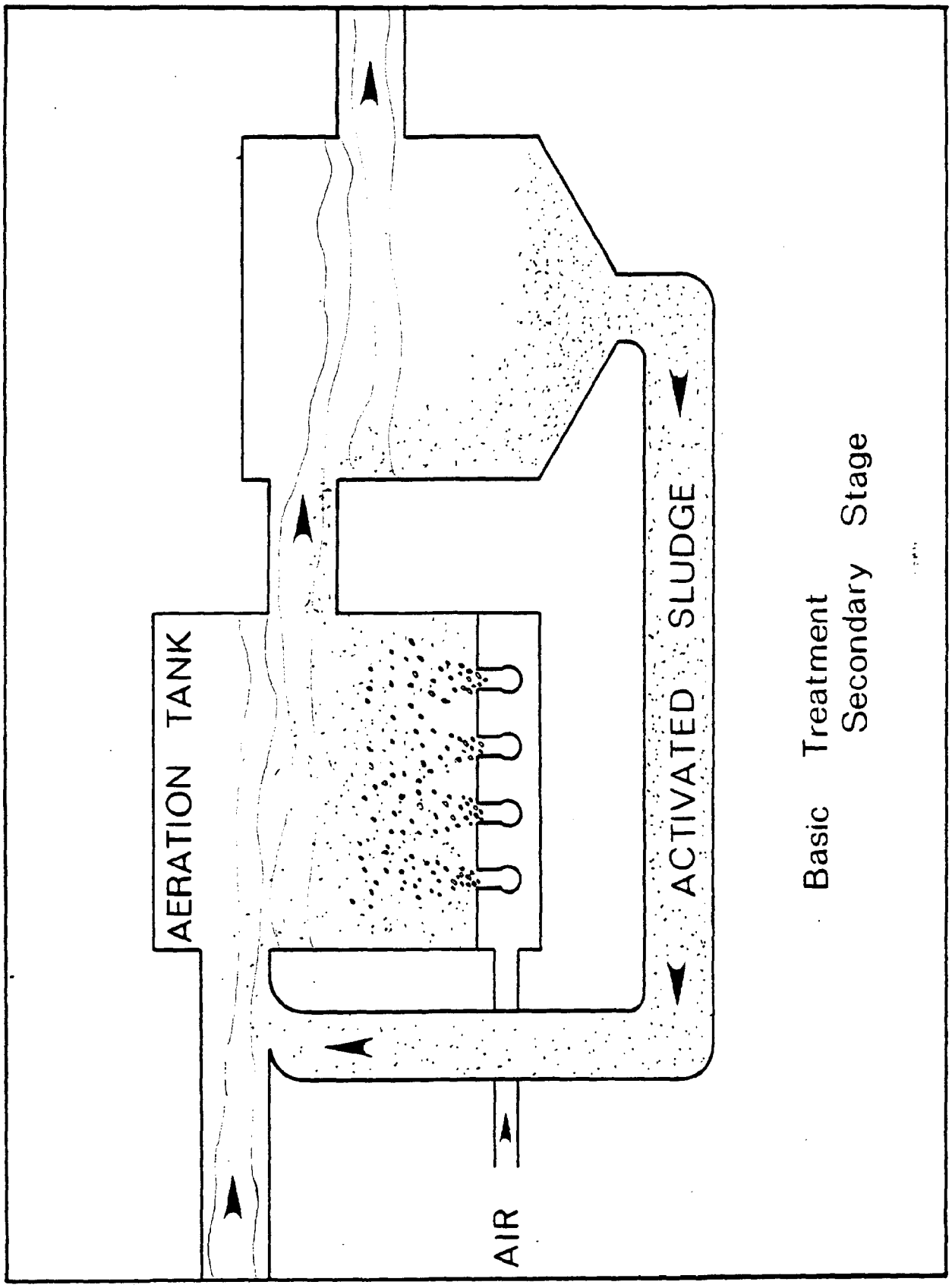
T II-11


SCREEN
GRIT CHAMBER
SEDIMENTATION TANK
Basic Treatment
Primary Stage



T II-12

CITY SEWER SYSTEM


AERATION TANK
ACTIVATED SLUDGE
AIR
Basic Treatment
Secondary Stage

T II-14

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 5: OIL POLLUTION

TIME: 1 DAY

PURPOSE

Have students become more aware of the environmental problems involving supertankers and oil spills.

MATERIALS

In Package

Transparency II-15, "The Growth of Oil Tankers"
Reading II-5, "Oil on Troubled Waters"

Additional

World Map
Overhead Projector
Suitable viewing surface (screen or light-colored wall area)

OVERVIEW

Students view a transparency showing the increase in the size of oil tankers over time. Discussion questions bring out the economic importance of oil and the benefits of larger ships. Students then read, "Oil on Troubled Waters," which examines some of the environmental problems accompanying the growing search for oil. Finally, students consider the question of how much a clean environment costs, and if they are willing to pay the price.

PROCEDURE

1. Show the tanker transparency. Indicate that these ships are the largest of the periods represented. For example, today, the largest tankers weigh about 475,000 tons. Ask students:

   Why have tankers gotten bigger?

   [As the need for oil increases, more oil must be transported from oil fields to countries around the world. Oil companies have found it is cheaper to build a few large tankers to carry the oil rather than several smaller ones. Bigger ships are also extensively automated, meaning less money is spent on crews.]

2. If you have a world map, point out the location of the Suez Canal. Explain that in 1967 the Middle East War closed the Suez Canal.

   As the tanker transparency shows, there was a tremendous increase in the size of the tankers from 1956 to 1967. Ask the class:

   Why would the closing of the Suez Canal help cause an increase in the size of tankers?

   [Ships departing the oil-rich Mideast now had to go completely around the coast of Africa to reach Europe or the Western Hemisphere. Longer distances meant increased transportation costs. By using larger tankers the oil industry transported more oil at one time, thus offsetting the increased transportation costs.]

3. Tell the class that many people fear that the marine environment will suffer if supertankers continue to be used. The following questions should encourage students to consider the "pros and cons" of this argument.

   a. What are the threats to coastal ecosystems from large tankers?

      [Dangers of oil spills from accidents or collisions; spillage of oil from routine cleaning and maintenance of the tankers; harbors will have to be dredged to much greater depths to allow these large tankers to enter, and such dredging disrupts plant and animal life.]

   b. Why do we have to import oil in the first place?

      [Domestic oil production supplies only about 60% of the petroleum products we need; until nuclear or solar energy, or some other substitute becomes easily and cheaply available, America will continue to run on petroleum. This means imports will continue.]

   c. What would be the likely impact on the U.S. if supertankers did not exist?

      [Oil transportation prices would rise leading to an increase in oil prices.]

4. Assign the reading, "Oil on Troubled Waters." To review, ask questions similar to the following:

   a. Which users of coastal regions are most likely to be affected by oil spills?

      [Wildlife, recreational users, tourist industry and fishing industry.]

   b. What are the major ways oil can get into the water and pollute the sea?

      [Spills from tankers, spills from drilling operations, from industry, and from routine cleaning of tankers.]

   c. One scientist recommended that the U.S. should get more of its oil from off-shore drilling operations rather than importing it from other countries. Why?

      [Far less oil is spilled in drilling operations than in transporting oil.]

   d. What would be some possible consequences to the environment if we were able to do this?

      [Less chance of oil spills from tankers; more drilling operations for off-shore oil along U.S. coast, which might increase the possibilities of another Santa Barbara-type incident; increase in off-shore drilling may bring increase in on-shore petro-chemical industries.]

5. The following questions ask students to consider the problem of who pays for a clean environment.

   Explain that the last two lessons have dealt with the general problem of pollution. Most people would like to see pollution stopped. Ask:

   a. Why haven't oil companies, for instance, eliminated all chances of oil pollution? Why don't they build smaller, safer ships?

      [One major reason is that stopping pollution is expensive; it costs money to build safer ships and to institute procedures that would be nearly fail-safe.]

b. What would be the effect on gasoline prices if oil pollution were ended?

[Gasoline prices would go up. Oil companies would pass along the costs of eliminating pollution to their customers. Further no system will ever be completely fail-safe, particularly one that relies on ocean transport.]

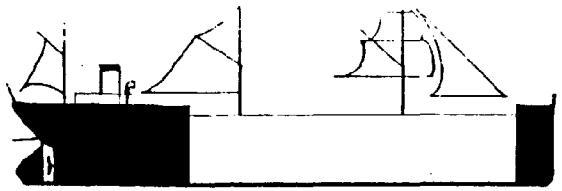
Present the following hypothetical situation:

Oil companies have discovered that they can eliminate all oil pollution, but gas prices will increase to $2.00 a gallon.

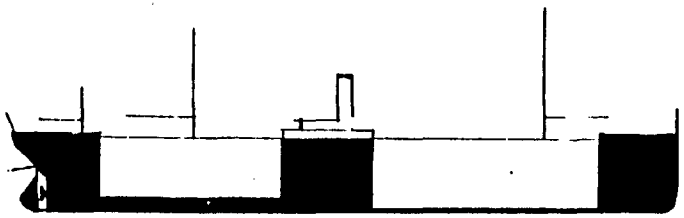
Poll students to determine if they would be willing to pay this price. If most protest, keep lowering the cost until a majority approves. Point out that if the class voted for less than $2.00 per gallon, they are willing to put up with some pollution.

Further, if students are willing to put up with more pollution than currently exists, gas prices might be lower than they are at present. Part of the price of gas today represents what people are generally willing to pay for a cleaner environment. How much are you willing to pay determines, to a large extent, how clean the environment will be.

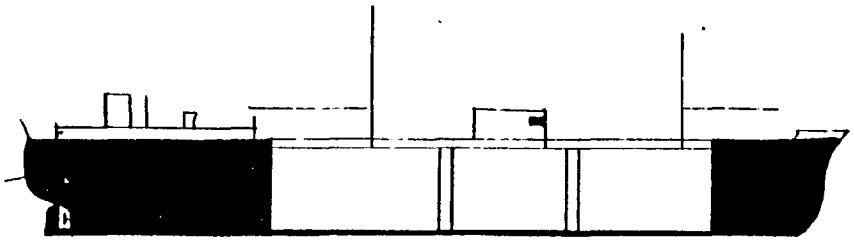
THE GROWTH OF OIL TANKERS



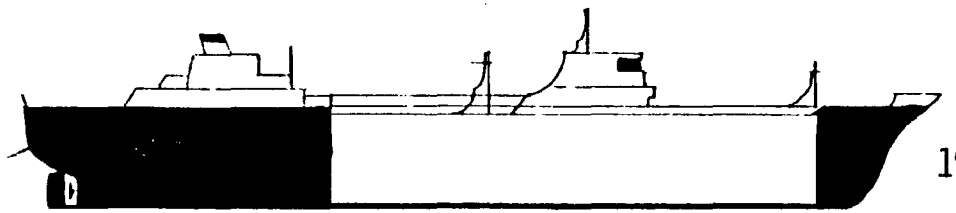
1886 2,300 Tons



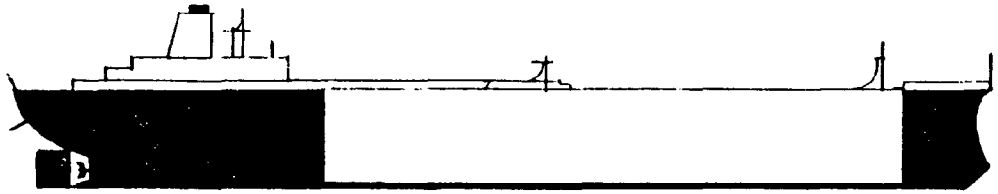
1918 8,000 Tons



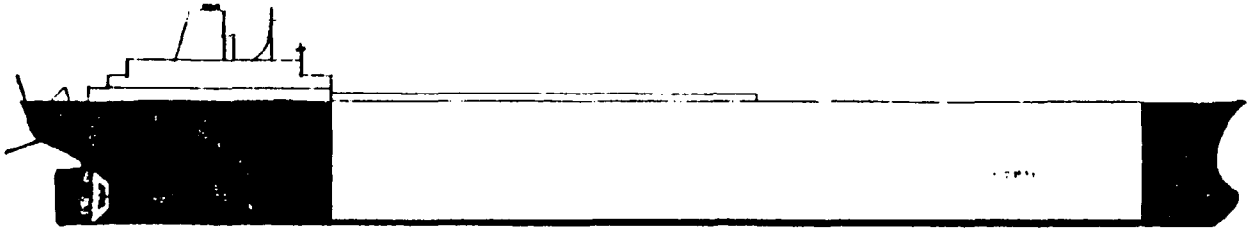
1950 16,000 Tons



1956 47,750 Tons



1967 200,000 Tons



2000 1,000,000 Tons (?)

T II-

UNIT II: UNDERSTAND COASTAL ECOLOGY

LESSON 6: WETLANDS AND MARSHES: PROBLEM OR RESOURCE?

TIME: 1 DAY

PURPOSE

To understand the changing values placed on wetland areas.

To realize the current status of wetlands in the United States.

MATERIALS

In Package

Reading II-6, "Changing Status of Wetlands" (Parts 1, 2, and 3)
Reading II-7, "Wetlands Face a Murky Future"

OVERVIEW

Students first consider a number of the negative things associated with wetland areas to see why people have typically considered wetlands useless. They then read a short three-page reading that examines the change in attitudes toward wetlands since 1900. A final reading and discussion provides an overview of the status of wetlands today.

PROCEDURE

1. Begin by asking:

   a. What are your reactions to the following: slimy mud, alligators, quicksand, tall prickly grass, mosquitoes, decaying plants and animals?

      [The responses will probably be negative.]

   b. How would you like to live near an area like this?

      [The answer will probably be no.]

   Explain that all these things are associated with many marsh and wetland areas along the coast.

2. Have students read, "Changing Status of Wetlands." Ask a student to explain the main point of each reading. Then ask:

   a. Are attitudes toward marsh areas the same in each reading?

      [No, there is a complete reversal in attitudes from destroying the useless marshland to creating new marshlands.]

   b. According to these readings why were marsh areas filled in?

      [To eliminate health hazards; to provide space for housing, agriculture, recreation, tourism, business and industry.]

   c. According to the last article, why are marshes being created?

      [Because these areas support much wildlife and are a nursery for many commercial fish stocks.]

   d. Which article do you think was published first? Which article do you think is the most recent?

      [The correct answers are Reading 1, 1908; Reading 2, 1947; Reading 3, 1976.]

   e. What do you think accounts for the changing perspective and attitudes toward marshes?

      [People now realize that marsh land has both commercial and conservation value in its natural, undisturbed state.]

3. Assign the reading, "Wetlands Face a Murky Future." After students finish, review the major points of the reading by asking:

   a. What are the major reasons for the destruction of marsh and wetlands areas?

      [Population pressures; demand for housing; excessive filling; pollution from power plants and industry; upstream pollution that works its way downstream.]

   b. Which users of coastal resources are most likely to suffer from continued filling and development of wetlands areas?

      [Fishing industry, recreational fishermen, and wildlife.]

c. Which users might benefit from the filling and development of wetlands areas?

[Housing contractors and real estate developers; home-owners, industry, and shipping interests.]

d. Compare what happened to tideland and estuary areas in the Ostrich Bay Coastal Resources Development Game with what has actually happened to these areas.

e. What do you see as the likely future for wetlands areas?

4. Point out local areas that have been filled for development. In nearly every coastal city, some major housing projects, business, parks, airports, etc., are located on former wetland areas.

For a homework assignment, have students find maps of the local shoreline from 50 or 100 years ago. Compare the location and shape of the shoreline then with its present-day boundaries. The extent of filling can be easily noted.

Have a group of students -- or the entire class -- write a report on major filling operations in your local area. The report could answer the following questions:

a. Where has the filling occurred?

b. When were the major projects completed?

c. Why were the areas filled?

d. What kinds of impact has the filling had on the environment?

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 7: NATURAL HAZARDS

TIME: 1 DAY

PURPOSE

To survey a variety of natural hazards that affect coastal regions.

MATERIALS

In Package

Reading II-8, "Natural Hazards in the Coastal Region"

OVERVIEW

This lesson surveys natural hazards in the coastal region from a national perspective. Students also consider the natural hazard problem in the local area. This general overview provides an introduction to the specific case study which follows in Lesson 8.

PROCEDURE

1. Ask students to name natural hazards that occur in coastal areas. Answers should include volcanic eruptions, earthquakes, floods, hurricanes, subsidence, erosion, landslides and tsunamis. If they fail to include any of these, add them to the list. Then ask:

   Which of these natural hazards pose a threat to our coastal region?

2. Assign Reading II-8, "Natural Hazards in the Coastal Region." After students finish, review by asking:

   a. According to the reading, where are each of these natural hazards most likely to occur in the U.S.?

      [Hurricane: Atlantic and Gulf Coast; Earthquakes: West Coast, including Alaska; Tsunamis: West Coast, including Alaska and Hawaii; Volcanic Eruptions: Alaska and Hawaii; Floods: all areas are affected, especially the Gulf Coast; Erosion: all areas are affected, but possibly most serious in the Northeast; Subsidence: all coastal areas could be affected; Landslides: all coastal areas could be affected.]

b. How can people increase the possibility of damage from natural hazards?

[By living in areas prone to damage; by destroying natural protection against natural hazards, such as sand dunes and salt marshes; by building inadequate structures; by failing to heed warnings.]

3. For an optional assignment, have each student investigate a natural disaster that has occurred in a coastal area. Students could write a short report describing the incident, and the damage it created to both the man-made and the natural environment. Encourage investigation of disasters that have occurred in the local region and elsewhere.

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 8: TSUNAMIS AND HILO, HAWAII: A CASE STUDY

TIME: 2-3 DAYS

PURPOSE

To review the causes and effects of tsunami damage to Hilo, Hawaii, in 1946 and 1960.

To consider, from the perspective of Hilo citizens, a wide variety of protective measures against future tsunamis.

MATERIALS

In Package

Reading II-9, "A Tale of Two Tsunamis"
Tsunami Filmstrip
Hilo Role-play Card Set
Adjustment Option Filmstrip
Worksheet II-6, "Adjustment Option Package"
Reading II-10, "Four Years After the Wave"

Additional

Filmstrip Projector
Suitable viewing surface (screen or light-colored wall area)

OVERVIEW

This lesson contains five parts. In Part 1, students read a dramatic account of the two Hilo tsunami disasters. In Part 2, Students take on a new identity: residents of Hilo and various governmental officials who want some type of protection for Hilo. Part 3 outlines six possible adjustment options for tsunami protection. Students analyze the costs and benefits of each. In Part 4, the students meet as a town council to decide which option is best for Hilo. Finally, in Part 5, students read an account of what Hilo decided and compare their choices and priorities with those actually made.

PROCEDURE

Part 1: Tsunami!

1. Pass out the reading, "A Tale of Two Tsunamis."

2. Review the assignment by asking students to discuss their reactions to the two disasters.

3. Show the Tsunami Filmstrip, reading the accompanying script as you show the slides:

TSUNAMI COMMENTARY

#1 Pacific Seismic Belt	A sudden displacement of the earth's crust will cause an earthquake and, in some cases, a tsunami. The shaded area shows the seismically active belts of the Pacific. Most of the tsunamis reaching Hawaii originate in these belts.
#2 Tsunami Chart	It is estimated that a tsunami reaches the Hawaiian chain at least once a year. Of course, many of these are so small they completely escape notice. Others do not.
#3 Map of the Big Island	Of all the islands affected by tsunamis, the "Big Island" of Hawaii appears to be especially vulnerable. The city of Hilo is the second largest port in Hawaii and the commercial, legislative, and industrial center of the county of Hawaii. It is also this area which has suffered the most destruction from tsunami forces. The severest tsunamis struck in 1946 and 1960.
#4 Path of the '46 Tsunami	At 1:59 a.m., April 1, 1946, the sea-bottom was displaced in the Aleutian chain. The resulting earthquake was recorded on seismographs all over the Pacific. The seismic sea wave, however, was not tracked. Travelling at an average speed of 490 mph, the tsunami reached Hawaii a short five hours later -- without warning and with devastating force.

#5
Damage to Hilo

Buildings were picked up by the waves and smashed. Cars were swept away. Fifteen school children were carried out to sea. Entire blocks were swept clean of buildings leaving only piles of debris. Eight-ton chunks of rock were lifted off the breakwater and dumped into the bay.

#6
Tsunami data chart

Hilo suffered tremendous losses. There were 161 injured, 96 dead, and $25 million in property damage in the Hilo area. Most of the damage was caused by wave action, flooding, falling timbers, and collapsing buildings.

#7
Data chart on plans and actions

Such a tragedy could not be permitted to happen again. Data was collected. Studies were made. It was noted that certain types of buildings withstood the waves better than others. It was found that the breakwater, though damaged, had reduced the height and violence of the waves in the enclosed area. It was predicted that loss of life could be nearly or entirely eliminated by the establishment of an effective warning system. Some suggested that seawalls and plantings could further reduce wave impact. Restrictions of building in the danger zone were discussed.

By 1960, the existing breakwater had been repaired and an early warning system established.

#8
Path of '60 Tsunami

Hawaii had thirteen hours advance warning when a tsunami originating off the coast of Chile began to move across the Pacific. Moving at 450 miles per hour, the wave travelled 6,800 miles to strike Hawaii a few minutes after midnight on May 23, 1960.

#9 Damage to Hilo	Except for the boats which had set out for the safety of the deep ocean, the scene was almost identical to that of the '46 tsunami. Terrified people ran through the streets before the onrushing waves. Some made it to safety. Others did not. Cries of those trapped in collapsed buildings could be heard. Cars were picked up and thrown down again.
#10 Waterline map of '46 and '60 tsunamis	The tsunami-damaged area of the '60 tsunami was about equal to the damage of '46. The broken black line indicates the water line in 1960.
#11 Comparative data chart	When the damage was totalled, the cost was high. 53 injured, 61 dead, $50 million in property damage. The major cause? Again, wave action, flooding, and collapsed buildings.

4. Following the filmstrip, debrief the presentation by asking:

   a. <u>What similarities and differences can you find between the 1946 and 1960 tsunamis</u>?

      [In '46 there was no warning system and no advance warning. In '60 there were both. In both there was damage to people and property and the major causes were the same although there were fewer deaths and injuries in the '60s tsunami. The dollar figure for property damage was higher in '60 though inflation probably accounts for much of the difference.]

   b. <u>Although several plans for protecting Hilo were suggested following the '46 tsunami, only the early warning system was implemented. Why</u>?

      [Special interest groups may have objected to some. Some may have been too expensive. They might not have had the technology for some others.]

c. Why do you think the early warning system did not eliminate most injuries and deaths in the '60 tsunami?

d. In what ways, if any, was the early warning system effective?

[Some people, such as fishermen, did evacuate the area.]

e. What might have been more effective?

Part 2: Role-Playing Hilo Residents

1. Explain that during this activity, students are to imagine they are residents of tsunami-stricken Hilo. Pass out the role-play cards. Make sure students carefully read the information and learn their new "identity".

2. Point out that each role card is letter coded. Ask them to locate other "residents" with the same letter code.

3. When the groups are assembled, explain that the goal of each is to share experiences, exchange information and find out what interests they have in common which might bind them together as a group. Explain that there will be a "reporter" sitting with each group who will take notes on the conclusions reached.

4. After a few minutes ask the "reporters" to explain to the class what each member of their group has in common. What interests are represented and what concerns are expressed for the future.

Part 3: Options for Protecting Hilo

1. Explain that in this part of the lesson each of the groups will consider what steps, if any, they would take to reduce the damage from any future tsunami. As residents and members of groups representing special interests, students will have the opportunity to evaluate six proposed adjustments for future tsunami protection.

2. Distribute one copy of Worksheets 6 "Adjustment Option Package," to each group. Explain that the packet contains information on the six adjustments and an adjustment rating card for each person except the newspaper reporter.

3. Show the adjustment option filmstrip, summarizing each option as suggested in the commentary. After you explain each adjustment ask students if there are any other additional advantages or disadvantages to the option they would like to consider.

ADJUSTMENT SLIDES COMMENTARY

#1
Early Warning Systems

Although Hilo had thirteen hours advance warning of the '60 tsunami, there were still many lives lost and many injuries. Studies following the tsunami showed that many people did not take the warning seriously. The Early Warning System adjustment calls for a more effective warning system plus educational programs designed to inform people of tsunami dangers as well as steps they can take to protect themselves and their property. The plan calls for the development of emergency procedures and evacuation strategies for the Hilo area. Some advantages of the adjustment are: 1) the minimal cost would be shared by the county and state from within existing budgets; 2) it provides lead time for people to find safer grounds and to remove some personal possessions; 3) it provides emergency services to those in need; 4) it requires no changes in present land use patterns; and 5) it has no ecological consequences.

Some disadvantages are: 1) this type of warning system has not been that effective in the past; 2) it does not entitle Hilo to Federal disaster program funds; 3) it does not provide protection against severe property damage.

#2
Barrier Breakwater

This adjustment proposes that a barrier breakwater be constructed across Hilo Bay as indicated in the drawing. It would be 20 feet wide at its base and would extend seven feet above water.

Breaks would be included in the design to reduce strain and to maintain circulation in the bay. Some advantages of this adjustment are: 1) damage to people and property inside the harbor and on land would be reduced significantly and even possibly eliminated; 2) present land use patterns would not be disrupted;

3) the cost of the project would be offset by the millions saved in property damage from future tsunami's; and 4) federal monies would finance much of the project.

Some disadvantages are that: 1) there is no certainty that the barrier would stand up under the full force of a tsunami; 2) the cost of the project is high and would involve tax increases or reduction of present state and county services; 3) the breakwater would seriously affect the natural currents of the bay, possibly causing severe ecological consequences; 4) it would interrupt the view of the bay, and might be aesthetically displeasing.

#3
Open Space

This adjustment calls for a new city plan which would remove residential, commercial, and industrial activities from the tsunami vulnerable area as indicated by the shaded area in the drawing. Land in the area would be purchased and re-zoned as open space to be developed into a park area. Planted earth embankments would provide additional wave protection along the shoreline. Some advantages of this adjustment are: 1) damage to people and property would be greatly reduced by moving homes and businesses to higher areas of the city; 2) the park would be aesthetically pleasing and would eliminate the need for unsightly barrier structures; 3) the ecology of Hilo Bay would not be disrupted.

Some disadvantages are that: 1) the project is expensive; 2) many people would be uprooted and forced to relocate; 3) some might be forced to sell their property against their will; and 4) the plan does not protect the harbor area.

#4
Tsunami-proof Buildings

Following the '46 and '60 tsunamis, it was discovered that certain types of structures withstood the waves better than others. This adjustment calls for the establishment and enforcement of strict building regulations requiring reinforced structures within the tsunami vulnerable area. Some advantages of this adjustment are: 1) it would reduce damage to property and would provide greater protection for those who live and work in the area; 2) it does not require changes in present land use patterns; 3) cost to the city and county would be minimal as building costs would be absorbed by the residents and businesses in the area; 4) it would not disturb the ecology of Hilo Bay.

Some disadvantages are: 1) the buildings would be expensive; 2) there is no proof that they would be totally tsunami proof; 3) people might be forced to build structures they do not choose to build; and 4) it does not provide protection for the harbor area.

#5
Shorewall

This adjustment proposes that a shorewall be built along the shoreline of Hilo Bay as shown in the drawings. The shorewall would be made of solid concrete 20 feet high. Some advantages are: 1) it would protect people and property behind the shorewall; 2) it is less costly than the barrier breakwater; 3) it would not interfere significantly with present land use patterns; and 4) it would enable Hilo to take advantage of Federal disaster program funding.

Some disadvantages are: 1) there is no guarantee that the shorewall would be able to withstand the full force of a major tsunami; 2) it would block the view of the bay and might be aesthetically displeasing; 3) it could create flood problems if, for example, a wave went over the top of the wall; 4) it might affect the ecology of Hilo Bay; and 5) it protects only the area directly behind it.

#6 No Action	A final adjustment is to take no action at all, but to leave Hilo as it is with no further protective action. Some advantages might be: 1) no further interference with the forces of nature; 2) no cost for planning or implementing tsunami protective measures; 3) no ecological consequences; 4) no disturbance of present land use patterns. Some disadvantages are: 1) no reduction in damage to people and property in future tsunamis.

4. Direct students to consider each of the adjustments in light of their interests as a group and to rate each option as indicated. Following this, each group should try to reach a consensus on the adjustment or combination of adjustments it wishes to support.

5. Circulate among the groups, checking to see that each student understands what option he or she favors, and encouraging the groups to reach a final decision.

6. After the groups finish, ask the reporter to report on the activities and decisions of his or her group.

Part 4: Reaching a Final Decision

1. Point out that until now students have met as members of groups with common special interests. However, the decision that faces Hilo must be made by the entire community. All groups will now participate in a "Town Meeting" to hear the "pros and cons" of each option as judged by other citizens of Hilo. A vote will then be taken to decide upon one option or a combination of options.

2. Call the meeting to order and ask for reactions to Adjustment Option #1. Ask:

   Would anyone like to speak for this option?

   Would anyone like to speak against this option?

   Move through the six options, eliciting some comment about each one.

3. After each option has been discussed ask if anyone would like to propose a new option that combines certain parts from two or more of the original choices. For example, it might be possible to combine Option 4, Tsunami-proof buildings, with Option 1, the Early Warning System. Compromise should be a theme of this meeting since all the citizens of Hilo will likely be affected by this decision.

4. Call for a vote on the options and any compromise solutions. More than one vote may be needed if the first vote is not conclusive, or only "weeds out" a couple of the possibilities.

Part 5: What Really Happened?

1. Assign Reading II-10, "Four Years After the Wave."

   Explain that the class will have the chance to compare their decisions with the decisions actually made in Hilo.

2. After students finish reading, ask the following:

   a. What did the people of Hilo decide to do?

      [The community decided on a combination of the open-space plan and the warning system; the enlarged breakwater plan, originally approved, was later scrapped.]

   b. How was this similar or different with what the class decided?

   c. What were some major factors or concerns that the people of Hilo had in deciding on a protection plan?

      [(1) Cost of the plan
      (2) Who would pay the bill
      (3) Damage to the environment
      (4) Effectiveness of the plan
      (5) Necessity of removing people and buildings from the threatened area.]

d. Considering the protection plan the community of Hilo adopted, which of these factors were the most important in Hilo?

[The community believed it was important to remove people from the area; they did not believe in the effectiveness of several of the other plans, such as tsunami-proof buildings; cost was not seen as a major limitation in that the open-space plan was expensive.]

e. Which of these factors were most important to our class?

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 9: ANALYZING COASTAL ECOLOGY

TIME: 1 DAY

PURPOSE

To allow students to apply information from Unit I and Unit II to the analysis and understanding of a coastal scene.

MATERIALS

In Package

Worksheet II-7, "Coastal Scene"

OVERVIEW

This activity is designed as an evaluation for Units I and II. Students are confronted with a drawing of a coastal scene and required to apply what they have learned about coastal geography, ecology, and problems to the analysis of this picture.

PROCEDURE

1. Hand out the "Coastal Scene" drawing to each student.

2. The following questions are suggested as possible evaluation items. You may put these on the blackboard or hand them out to the class. You may choose to modify these or add others to fit your own purposes.

   a. What common features of the coastal region are found in this picture?

      [Estuary -- at the mouth of the river; sand dune -- near the bulldozer; marsh -- along the estuary; sandy beach -- in front of the resort; harbor -- top center of the picture; breakwater -- near sailboat, etc.]

   b. What uses of the coastal area are shown?

      [Tourism, recreational fishing, commercial fishing, industry, recreation, transportation, residential, agricultural, lumber, energy production, hydroelectric power, oil refinery, marina, harbor, home for wildlife, scenic viewpoints, waste disposal, etc.]

c. In what ways is the natural ecology of this coastal area threatened?

[Logs are damming the river, preventing enough fresh water from reaching the estuary; the large dam may also be preventing enough fresh water from reaching downstream; construction may be causing too much silt to enter the ocean; sewage outfall may be dumping raw sewage in the ocean; oil pollution is possible from tankers, refineries and the oil drilling platform; fertilizers and/or pesticides being dumped from the airplane will wash downstream to the estuary; construction threatens to fill in the little marshland remaining; etc.]

d. Which groups of people in this scene are likely to be in conflict with each other (i.e., timber owners may be in conflict with conservationists)?

[Oil companies vs. resort owners; oil companies vs. tourists; oil companies vs. fishermen; resort developers vs. farmers; harbor users vs. recreation groups; residential vs. agricultural; conservationists vs. airport owners; conservationists vs. oil companies; conservationists vs. fishermen; etc.]

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 10: COASTAL NEWS REPORT #2

TIME: 1 DAY

PURPOSE

To increase student's awareness of current issues, problems, and events affecting coastal areas.

MATERIALS

In Package

none

Additional

Newspaper and/or magazine clippings

OVERVIEW

This is the second "Coastal News Report"; a similar lesson can conclude each unit of the course. (Formal lesson plans are not included for Unit's III and IV but you can follow this same format).

PROCEDURE

1. Identify 4-6 volunteers who did not participate in the first "Coastal News Report."

2. The Groups's task is to collect news items about coastal problems from newspapers and magazines. They are to prepare a short presentation to the class in the form of a T.V. newscast.

3. Some of the stories for this "Coastal News Report" should emphasize the ecology and natural environment of the coastal region. For example, stories could focus on the natural beauty of the area, a description of the natural ecology of marshes or other locations, interesting animals that inhabit the area, and how people have interferred in the natural ecological processes.

4. After the newscast is finished, debrief the presentation by asking questions about the content of the news stories. Some questions should focus on the major themes in Unit 2, how people have interferred with the naturally functioning ecosystems. Make sure students understand the links between people's actions and disruptions of the ecology of the area.

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 1: VIEWS, VIEWS, VIEWS

LESSON 2: GAINING ACCESS

LESSON 3: THE POLITICAL SYSTEM

LESSON 4: THE CASE OF BLUE NECK BAY

LESSON 5: MAKING DECISIONS ABOUT COASTAL AREAS

LESSON 6: MANAGEMENT TOOLS

LESSON 7: LOCAL INTERESTS VERSUS REGIONAL INTERESTS

LESSON 8: JURISDICTIONAL PROBLEMS

LESSON 9: REGULATIONS AND PERMITS: CAN WE AFFORD THEM?

LESSON 10: THE TAKING ISSUE: LEGAL LIMITS TO REGULATION

LESSON 11: MANAGING A COASTAL COUNTY

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 1: VIEWS, VIEWS, VIEWS,

TIME: 1 DAY

PURPOSE

To introduce students to the problem of loss of scenic views

To understand that political decisions affect a community's ability to protect scenic views

MATERIALS

In Package

Filmstrip, "Views, Views, Views"

Additional

Filmstrip projector

OVERVIEW

Students view a series of contrasting pictures, designed to highlight the destruction of scenic coastal views. Students define the elements of an aesthetically pleasing area, and discuss how governmental action may affect the scenic qualities of an area. This lesson, and the following lesson on beach access, are designed to make students aware that government decisions affect the way shoreline resources are used.

PROCEDURE

1. Show the filmstrip, "Views, Views, Views." After each picture, ask for student reactions:

   a. What words would you use to describe this picture?

   b. What does this picture make you think about?

2. Some of the pictures probably received a more positive reaction than others. Focus on those pictures receiving a positive response Ask:

   a. If you were actually present in these areas, what kinds of things would be attractive to you?

   b. What is it about the attractive scenes that you like?

[Answers will likely include nice view, feeling of quiet, solitude, peacefulness, interesting colors, abundance of vegetation, etc.]

Explain that this list constitutes a partial, but fairly complete list of things that go into a definition of a "scenic view." Students may disagree about which characteristics to include. Build on these differences by suggesting that not everyone has to agree on what is "scenic" or beautiful.

3. Ask the following series of questions to bring out that government is involved in maintaining aesthetically pleasing areas. Move through these questions fairly quickly. Make sure government's role is noted, but don't stop to elaborate or define its interests. This is accomplished in later lessons.

   a. What kinds of activities or problems have contributed to the not-so-pleasant views you have just seen?

      [Overcrowded beaches, commercial activities, boating, industrial development, pollution from unknown activities, etc.]

   b. How did these activities or uses make the area unattractive?

      [Pollution, over-crowded conditions, poorly designed buildings, etc.]

   c. Do you know places in this coastal area where scenic views have been marred or destroyed by certain activities?

   d. Is it possible to preserve or protect scenic areas and the attractiveness of the coastal environment?

   e. How might this be done?

      [Governments can pass laws and regulations to stop pollution, restrict the kinds of buildings allowed in certain areas, etc.]

   f. Why hasn't government always acted to prevent the blocking or destruction of scenic views?

      [Government has not always considered it their responsibility to protect these kinds of resources; development and real estate interests have often protested against such laws; buying land to protect certain areas is often too expensive for government; students may add other reasonable explanations.]

   g. Are there laws, regulations, zoning ordinances, or other restrictions in this community which in some way protect scenic views?

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 2: GAINING ACCESS

TIME: 1 DAY

PURPOSE

To introduce students to the problem of lack of public access to shoreline areas

To understand that political action influences the extent of public access

MATERIALS

In Package

Reading III-1, "The Daily Splash"

OVERVIEW

Students read several simulated news stories about loss of public access to the shore, and discuss each case. Students consider whether government action or inaction helps produce access problems, and how government action might protect or restore public access. This lesson and the previous "Views" lesson, are intended to alert students to the role of government in allocating shoreline resources.

PROCEDURE

Part I: The Access Problem

1. Assign Reading III-1, "The Daily Splash."

2. Call on one student to summarize each story. In this summary, have the students answer the following questions. You may want to make this a written assignment first, or just have them answer the questions orally in class.

   a. What groups are in conflict in this story?

   b. What is the basic problem or conflict in this story?

      [(1) "Park Department Survey" story:

      Groups: Homeowners, condiminum residents, and industry vs. beach users
      Problem: Too little beach space for recreation; increasing population increases pressure to develop

the waterfront plus overcrowded recreational sites

(2) "Lack of Parking" story:

Groups: Developers and homeowners vs. public
Problem: Not enough parking--developers failed to build parking spaces

(3) "Castle Beach" story:

Groups: State government, public beach users vs. Castle Beach land owners

Problem: Landowners don't want to give up their land for public park

(4) "North Shore" story:

Groups: Local residents vs. tourists and newcomers
Problem: New residents and tourists are crowding out long-time beach users

(5) "Advertisement"

Groups: Public vs. developers and prospective buyers
Problem: Beach area will be closed off to general public]

3. Ask the following series of questions to bring out how government is involved in the access problem. As with the "Views" lesson, note government's involvement, but do not detail its role at this time.

. What general issues are involved in all these stories? Or, what is the common problem reported in the newspaper?

[The actions of certain groups of people are preventing other groups from using beach areas. Some people are being denied access to the beaches.]

b. In these stories, which groups denied or restricted access to recreational areas?

[Private landowners, real-estate developers, hotel owners.]

c. Is there anything that can be done about this?

[In many areas, state and local governments have attempted to provide adequate recreation sites and maintain beach access.]

d. Are the access problems reported in these news stories influenced by the action or inaction of government?

[Yes.]

e. What might government have done in these cases to protect public access?

[1) Purchased land for public parks; 2) Passed laws and regulations which made developers provide public access and public parking areas; 2) Passed laws which made beach areas public property and prohibited owners from owning all of the beach; 4) Students may find other legitimate answers.]

f. If government could have done these things, why didn't it? What are some reasons why the public access situation is as bad as these news stories indicate?

[1) Waterfront land may be too expensive for many governments to buy outright; 2) Governments may not have planned for enough access ahead of time and there may now be little land available; 3) Developers and private landowners, who often have considerable political influence, may oppose public access laws; 4) Students may give other legitimate reasons.]

Part II: Local Access Problems (Optional)

1. Have students investigate shoreline access problems in the local area. (A similar set of questions could be added concerning the topic of the preceeding "Views" lesson.) This project may be presented as a short assignment involving one student, a small group, or it might serve as the basis for a term paper.

2. Students should answer two general questions:

   a. Are there adequate public recreation facilities in this area?

   b. If yes, what factors have made this possible? If no, why aren't there more recreation sites available?

3. Several specific questions which could be investigated are:

   a. Are there enough public beaches or marina sites?

   b. Is there sufficient parking at each site?

   c. Do population trends for your area indicate a greater demand for parks in the future?

   d. Are there plans to build new parks or improve existing ones?

e. In your state, who owns the beach? Is it considered a public heritage, or may private individuals own the beach?

f. Are there state or local ordinances which require public access roads or walkways to beaches? Are new developments required to provide public access to shoreline areas?

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 3: THE POLITICAL SYSTEM

TIME: 2 DAYS

PURPOSE

To introduce students to the major elements and relationships in political and management systems of the coastal region

MATERIALS

In package

Transparency II-3
Reading III-2, "A Fish Story"
Worksheet III-1, "A Fish Story"
Transparency III-1, "A Fish Story"

Additional

Overhead projector
Grease pencil

OVERVIEW

Students first review the concept of a systems diagram and how it may be used to understand political systems. Students then read a fable which step-by-step introduces the major components and processes in the political arena. With the assistance of an overhead transparency, students diagram these relationships. This activity is followed by a review which provides students with further opportunity to examine the various relationships and processes in their diagrams. The application of the general principles to a specific case follows in the next lesson.

PROCEDURE

Part I: Political Systems Diagram

1. Review the ecological systems diagram presented in Unit 2, Lesson 1 on Transparency II-3. Restate two basic elements of a systems diagram:

   a. It identifies the major parts of the system.
   b. It shows how they are related to each other.

   To review Transparency II-3, ask:

c. What are the major parts indicated in this system?

[Producers, consumers and decomposers.]

d. Give some examples of the relationships between the major parts.

[Producers provide food for consumers; producers get carbon dioxide from consumers; consumers get oxygen from producers; etc.]

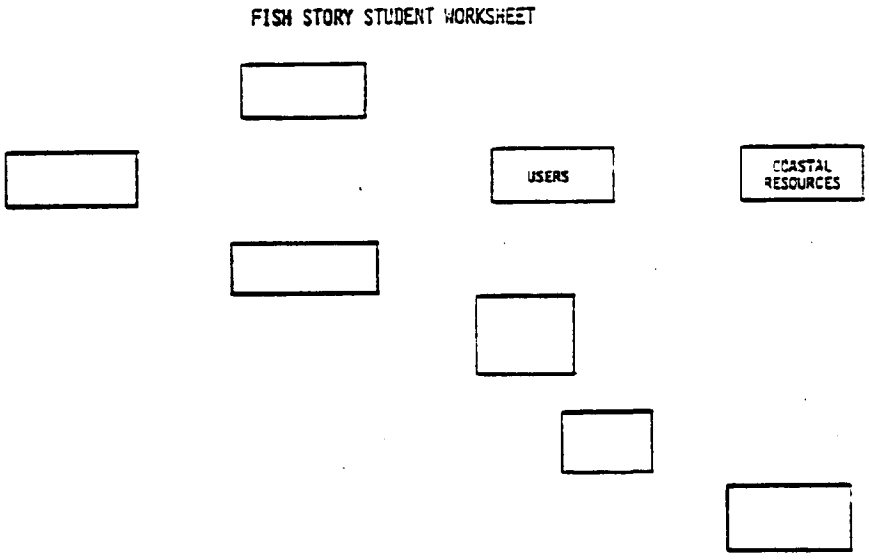
2. Remind students that a systems diagram is helpful in identifying the major parts of a system and in showing how these parts are related. Explain that the diagram on the transparency is a systems diagram of an ecological system. In today's lesson the class will use the idea of a systems diagram to look at the political system. Ask:

a. Based on what you know about systems diagrams, what general things are likely to be included in a political systems diagram?

[A political systems diagram will include the major parts of the political system and show how they are related to each other.]

3. Tell students that they are now going to read a story about a coastal region. As the story progresses, they should begin to draw a systems diagram of the relationships developed in the story. Assign Reading III-2, "A Fish Story," and pass out student Worksheet III-1. Have students read Section 1 of the reading and then help them fill out the worksheet.

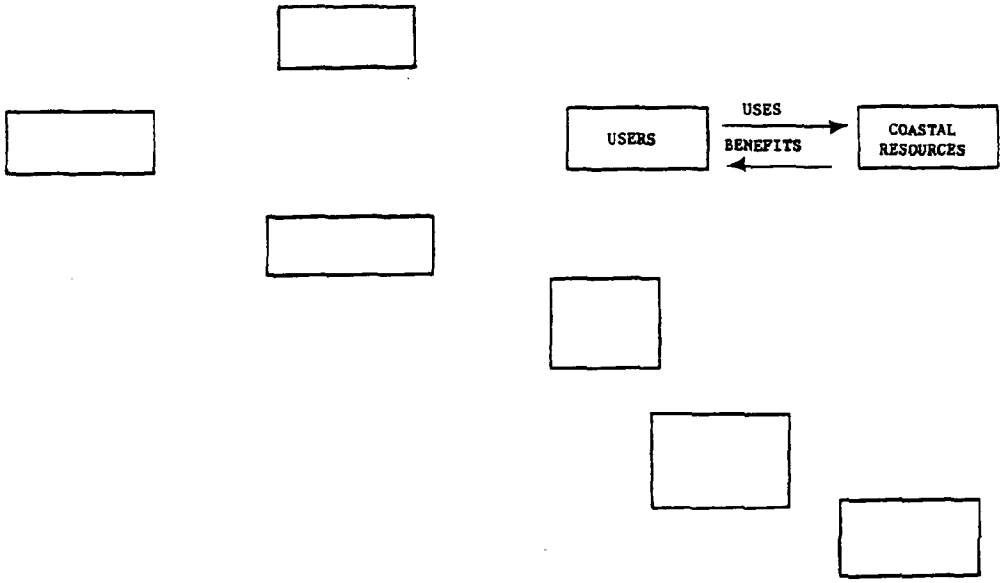
4. Place Transparency III-1, "A Fish Story," on the overhead projector. Have students fill in their worksheets as you write on the transparency.



On the worksheet, the user box and the coastal resource box are already filled in. Ask students to describe the relationship between the "Users" (the fisherman) and the "Coastal Resource" (the fish). As a satisfactory description emerges, write the terms "uses" and "benefits" in the appropriate places on your transparency. Students should draw in the arrows and write the terms in the same manner on their worksheets.

It is helpful for students to use the same vocabulary so that the class works from a common base.

STUDENT WORKSHEET (After reviewing Section 1)

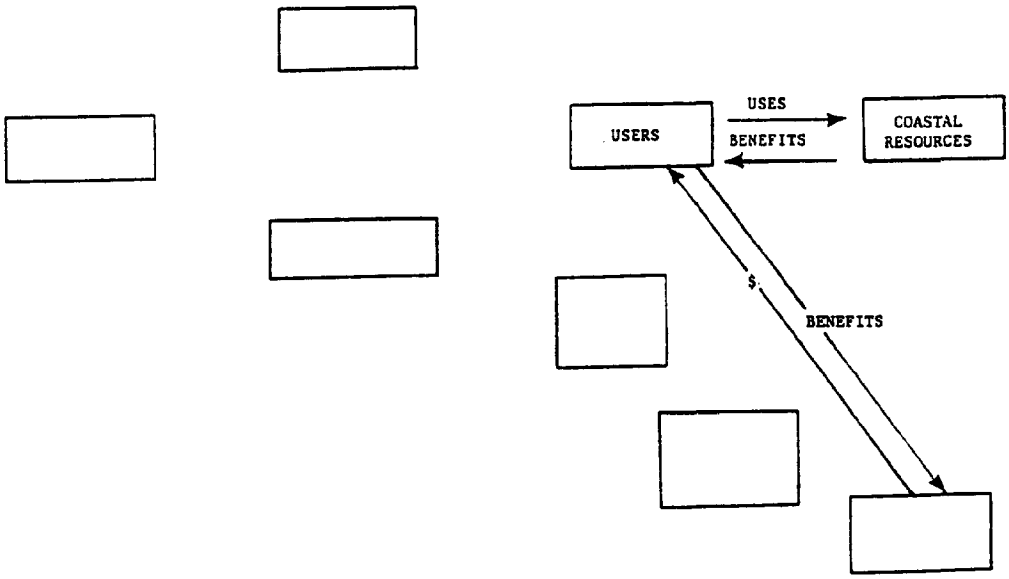


After students have finished filling out this part of the worksheet assign the second part of the reading.

5. Tell students to now expand their systems diagrams. Lead them through a brief summary of the new actors and relationships that appear in section 2. The new actor is the "public." The "public" differs from "users" in that the public represents recreational or general users of coastal resources. "Users" have a commercial interest at stake; their livelihood depends directly on the use of coastal resources. The public receives coastal resources from the fisherman (users). The line, labeled benefits, between the public and the users indicate this. For the benefits, the public pays money to the user. The user, in turn, buys equipment from certain members of the public. The dollar line between the users and the public represents this exchange.

   Have the students write these in on their worksheets as you fill in the transparency.

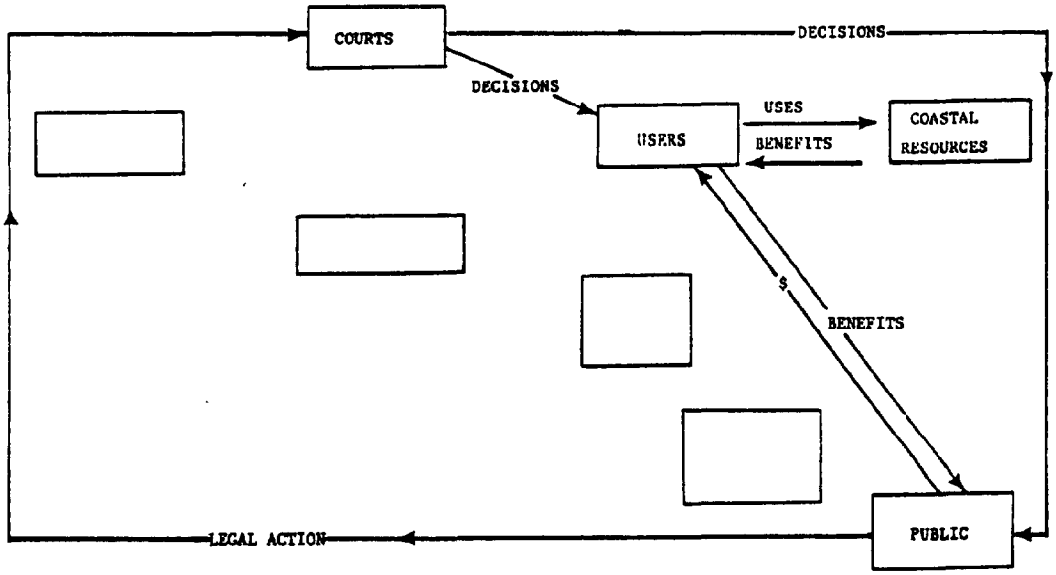
STUDENT WORKSHEET (After reviewing Section 2)



Assign the third part of the reading.

6. After students have read section 3, lead them through a brief summary of the new actors and relationships described. The "court" is the new actor. The public is related to the court

STUDENT WORKSHEET (After reviewing Section 3)

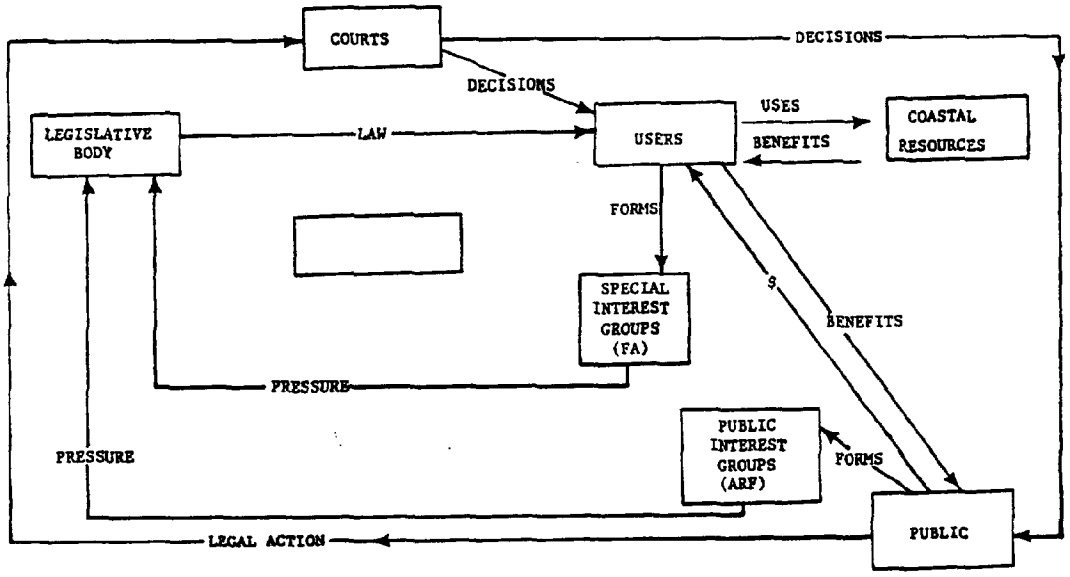


in that people can bring legal action through the courts. Decisions link the court to the user and the public.

Have students write this in as you write on the transparency. Then, assign section 4 of the reading.

7. After students have read section 4, lead them through a brief summary of the new actors and relationships described. The new actors introduced in this section are the "special interest groups," "public interest groups" and the "legislative body." Special interest groups consist mainly of those people who are direct commercial users of specific coastal resources. The Fishermen's Association (F.A.) is in this direct user category. Public interest groups get their support from the general public. Against Rotten Fish (ARF) is composed of citizens who have a strong concern about the use of coastal resources.

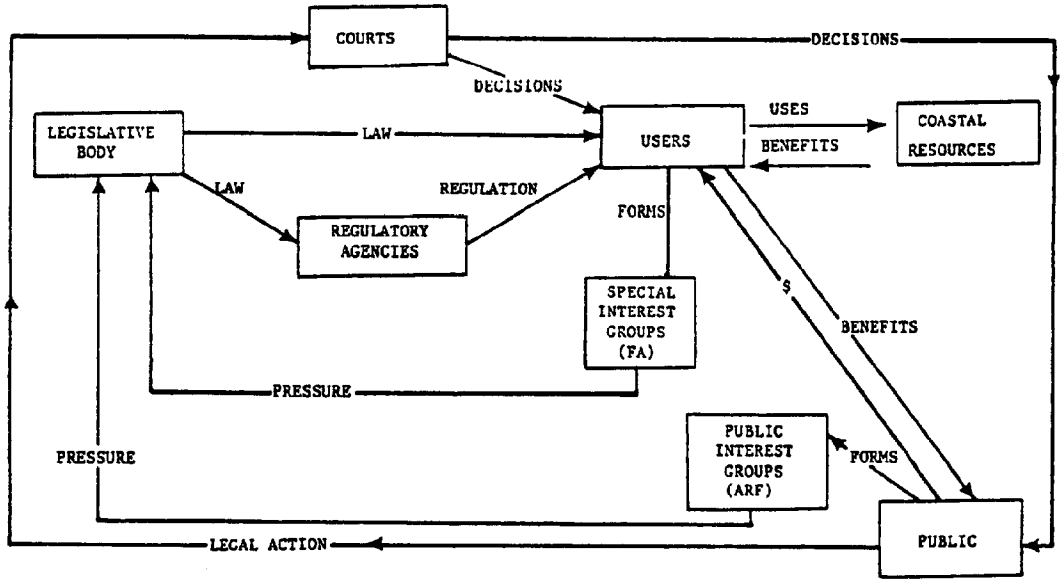
STUDENT WORKSHEET (After reviewing Section 4)



After students finish filling in their worksheets, assign the final section of the reading.

8. After students read section 5, help them fill in the new information from the final reading. The new actor introduced to the system is the "regulatory agency." It is connected to the legislative body in that the legislature passes laws which establish the agency. The agency then sets regulations and standards which affect the use of coastal resources.

STUDENT WORKSHEET (After reviewing Section 5)



Part II: Review

1. Review the completed diagram. All boxes should be filled in and the major connecting arrows and relationships shown.

   Emphasize that this diagram cannot show the entire political picture. It does not include the many informal ties and agreements which affect how the system works. Also, the diagram only considers one level of government. A complete picture would link local, state and federal government. Nonetheless, the diagram is useful for pointing out the ways several of the major parts in the system interact with each other.

2. The following questions may be asked to determine if students understand how the various parts of the system operate.

   a. According to the diagram, if you as a member of the general public wanted something done about the way coastal resources are used, what could you do?

      [Become involved in a public interest group and apply pressure on the legislature to pass new laws; bring legal action against a user of a coastal resource by going through the courts.]

   b. Could special interest groups use the courts? If so, what new lines would have to be drawn?

      [Lines from special interest groups to the court, labeled "legal action."]

   c. In what ways can a special interest group or a public interest group exert "pressure" on a legislative body?

[Writing letters to representatives and other public officials; visiting public officials; attending legislative sessions; sending letters to the public urging support of various issues; signing petitions; advertising on television, radio or in newspapers; campaigning for candidates who support your group's positions; etc.]

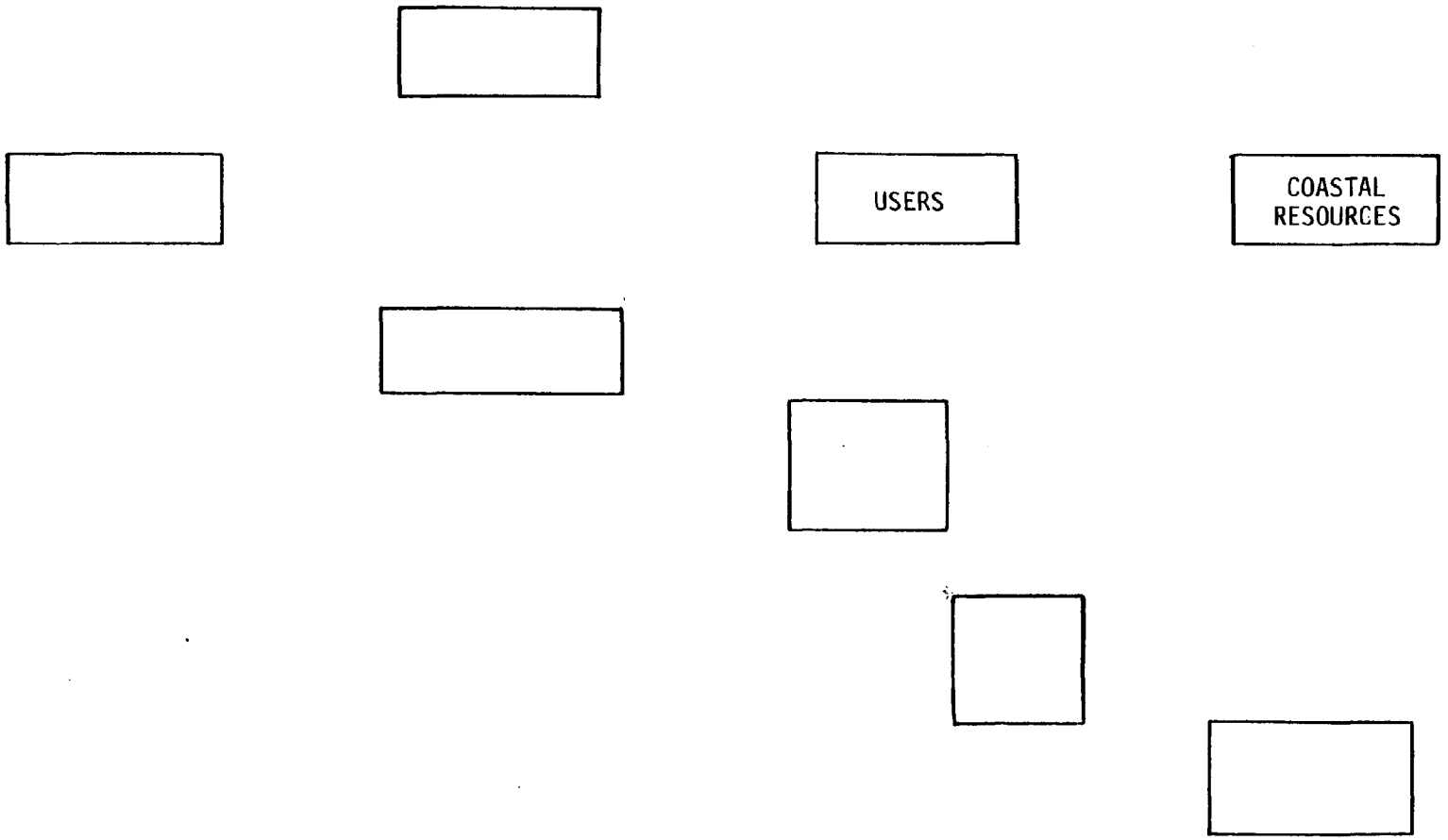
d. Give some examples of legislative bodies at the local, state and national levels.

[City councils, state legislatures, U.S. Congress.]

e. According to the diagram, there are two ways a legislative body can affect the way coastal resources are used. Trace these paths.

[One way is to pass laws directly affecting the use of coastal resources. A second way is to create agencies which regulate and monitor the way coastal resources are used.]

FISH STORY TRANSPARENCY



UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 4: THE CASE OF BLUE NECK BAY

TIME: 1 DAY

PURPOSE

To apply an understanding of basic political processes to the analysis of a case study

MATERIALS

In Package

Reading III-3, "Blue Neck Bay"
Worksheet III-2, "Blue Neck Bay"
Transparency III-2, "Blue Neck Bay"

OVERVIEW

Students read a case study based on a real incident in the Great Lakes region. They then apply their knowledge of the basic political process introduced in the previous lesson to the analysis of this case.

PROCEDURE

Part I: Political Systems Diagram

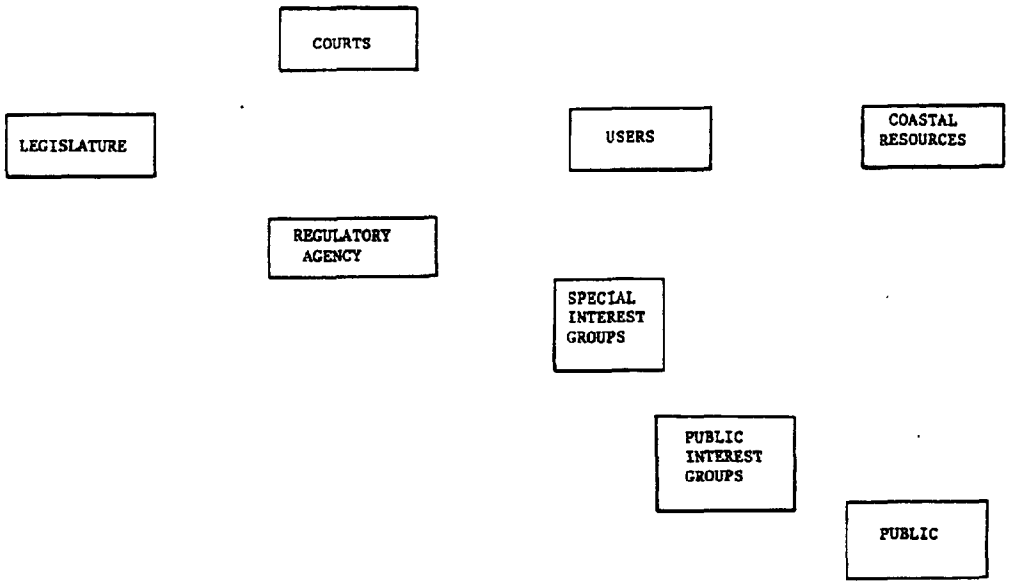
1. Assign students Reading III-3, "Blue Neck Bay." Contrast this story with the fable "A Fish Story" by noting that this reading is based on a true case in the Great Lakes region.

2. After students have read the story, pass out student worksheet III-2. Tell students that their assignment will be to construct a systems diagram. Using the "Fish Story" worksheets as a guide, have students identify all the major actors in this case, and determine in which box each actor's name should be put. (See filled in worksheet on next page.)

3. After all the major actors have been identified and the boxes filled in, have students read the last page of Reading III-3, "Major Steps in the Case of Blue Neck Bay."

   Students may use this outline to help them complete the systems diagram. Each of the statements summarizes a major event or situation in the story and links together two or more of the major actors.

STUDENT WORKSHEET after major actors have been identified



You may want to go over statements 1 and 2 with students to make sure they start correctly. Transparency III-2, "Blue Neck Bay," may be used to do this.

4. After students have finished their own diagrams, use Transparency III-2 to review their work. Go through the diagram step-by-step, asking students where each new arrow should be drawn. Students should follow along and make sure their worksheets correspond to the completed transparency. (See completed worksheet on next page.)

5. After completing the systems diagram, ask:

   a. What advantages did the interested citizens of Pine Grove gain by forming ROB?

      [Public interest groups are usually able to organize and carry out efforts more effectively than individual citizens.]

   b. What tactics did ROB use to try to influence the use of coastal resources?

      [ROB pressured legislators to sponsor a new bill, made presentations before the LCA, and filed a law suit against the LCA.]

   c. What do you think will now happen to ROB after it celebrates this victory? Why?

      [Students should consider whether ROB will disband or capitalize

on its momentum from this victory.]

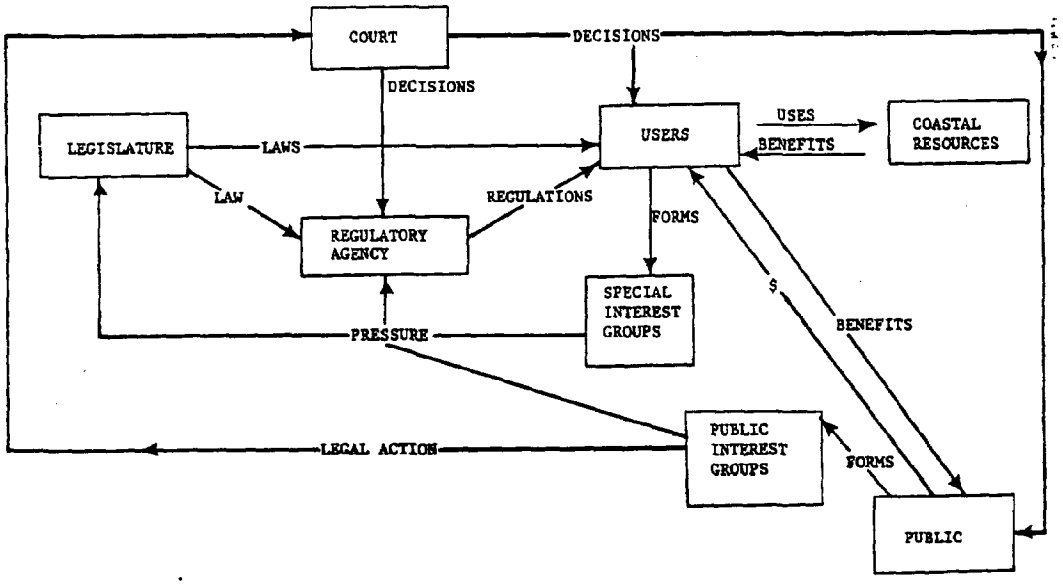
d. How do you think the coal and railroad companies will likely respond to this setback? What can or will they do next? Why?

[Students should consider whether these interests will fight the decision, attempt to find another docking site, or give in to public sentiment.]

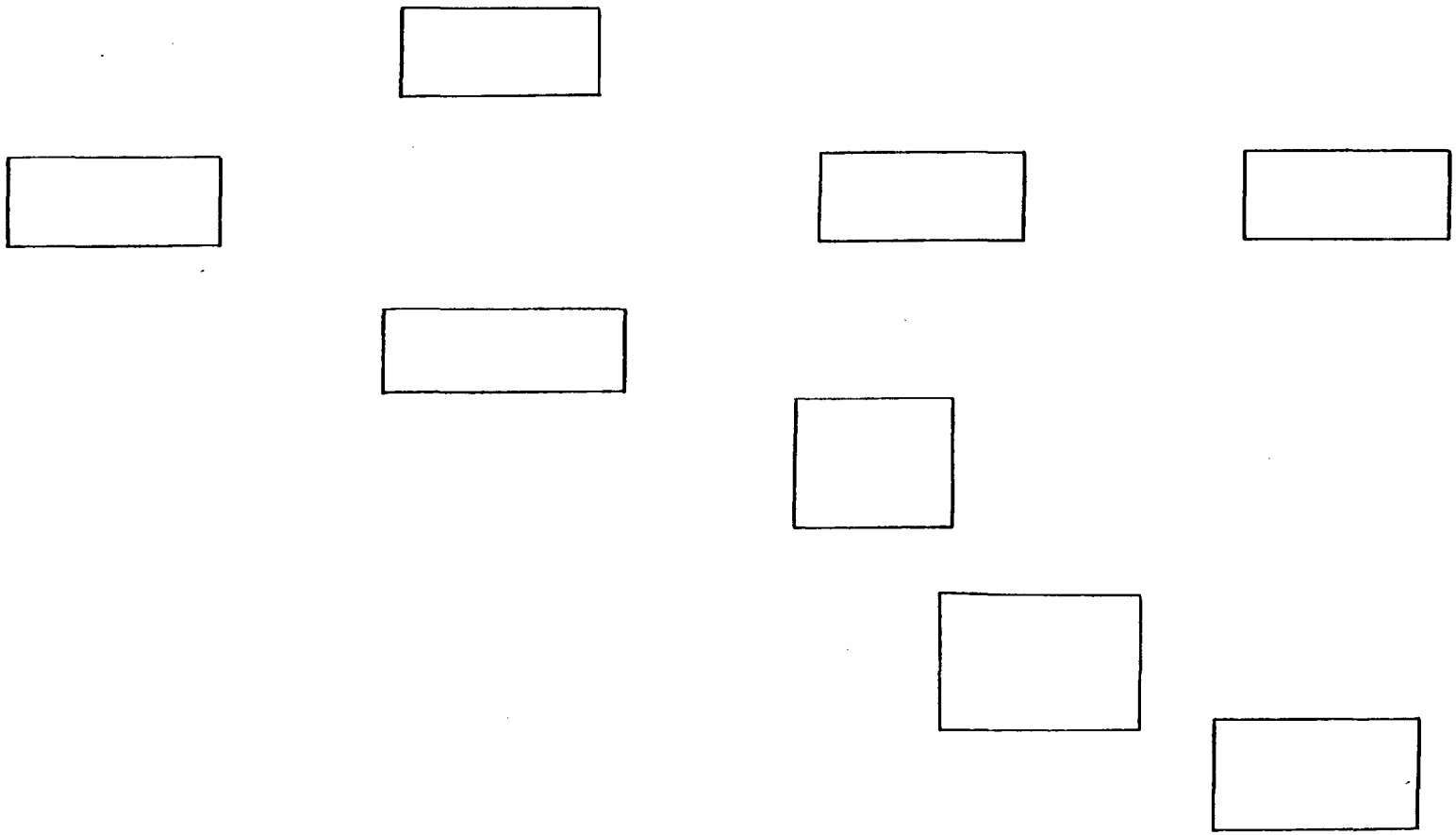
e. If the coal and railroad companies fight this decision, where does the political diagram suggest their next move might be?

[They could bring additional pressure on the legislature or the regulatory agencies; they could appeal the court decision to a higher court.]

COMPLETED WORKSHEET



BLUE NECK BAY TRANSPARENCY



T III-2

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 5: MAKING DECISIONS ABOUT COASTAL AREAS

TIME: 1 DAY

PURPOSE

To introduce a strategy for making resource management decisions

To demonstrate that decisions about coastal resources usually carry both beneficial and adverse effects

MATERIALS

In Package

Reading III-4, "The Future of Bayshore Island"
Worksheet III-3, "Planning Worksheet"

OVERVIEW

In the previous 2 lessons, students developed a general model of the political process as it operates in coastal areas. The emphasis was upon who is involved in the political process. In the next 2 lessons, students examine how communities plan and manage the use of coastal resources. In this lesson, students first read a short description of a coastal community considering a major decision about the use of beachfront land. Students examine the several concerns community officials have in trying to reach their decision. Students then complete a planning worksheet which systematically examines the costs and benefits of the community's options.

PROCEDURE

1. Ask students to imagine a family trying to decide if they should buy a new car. What are some of the factors they would consider? What kinds of things would they want to think about before trading cars? (For example, one thing they would want to consider is how long their old car is likely to last. Is it on its "last legs" or is it still in good shape?). Write their answers on the board. Students may give several important concerns the family might have. Following are several possible answers:

    a) How much does the new car cost?
    b) Can they afford it?
    c) What are the repair costs on their old car?
    d) Can they find the kind of new car they want?
    e) Are the demands they have as a family likely to change with respect to the kind of car they need? (e.g., maybe they are planning to do a lot of traveling or camping in the next few years and they need a larger, sturdier car.)

2. Make a short transition from this example to the topic of this lesson:

> "By thinking about these kinds of questions, the family can decide what to do about their new car. They are considering the advantages and disadvantages of trading their old car for a new one. This process is a helpful way of organizing evidence. You consider both options, and look at the advantages and disadvantages of each. People who make decisions about how to use coastal areas do the same kind of analysis. By weighing the advantages and the disadvantages, people can better understand the consequences of their decisions".

Explain to students that in this and the following lesson, they will be studying ways communities plan and manage the use of coastal resources.

3. Have students read "The Future of Bayshore Island" (Reading III-4). This is a short reading about some community officials trying to make a decision about the best use of a coastal area. This is a fictional story.

4. After students finish, have them specifically examine the kinds of concerns expressed by the planners. From this, students then see the kinds of questions most planning and management officials ask when making decisions about the use of coastal resources. Ask:

   a. <u>What kinds of questions or concerns did the planners have?</u>

   b. <u>What various aspects or consequences of the proposed hotel resort where they analyzing?</u>

   [Students may suggest several answers. Be sure their list includes the following:

   (1) What advantages would the resort provide for the economy? What disadvantages would the resort bring to the economy?

(2) What advantages would the resort provide for the environment? What disadvantages would the resort inflict upon the environment?
(3) What are the advantages of the resort to the city government? What disadvantages would there be to the city government?
(4) How would the resort affect public access to the area?
(5) How would the resort affect the general "character" of the area?
(6) What does the public seem to want?]

Point out that the planners were not only interested in the immediate impact the resort might have, but also in the long-term impact.

5. Explain to students that decision-makers ask similar questions about most activities or uses planned for coastal areas. Three general categories can be developed.(Write these on the board.)

   a. Economic: advantages and disadvantages for the commercial/business sector
   b. Environmental: advantages and disadvantages to the environment
   c. Political/Social: advantages and disadvantages to the local government, to the ease of access, to the powerful political figures, etc.

6. Pass out Worksheet III-3. Note that the three categories developed in step 4 are on the sheet. Have the students fill in the worksheet with the data contained in the planners' transcript. Students can work together in pairs or by themselves. If you think they will need help with this activity, go through each section with them. Use the suggested answers in the Teacher's Key as a basis for reviewing student answers.

7. After students are finished with the worksheet, note that the worksheet does not tell them what they should do, but does help insure that they will consider a wide range of factors. Then, ask:

   a. <u>What other information would you like to have before making a decision?</u>

   b. <u>Do you think the new resort should be built? Why?</u>

   c. <u>What are the most important factors in helping you reach this decision?</u>

   d. <u>How did you decide which are the most important factors?</u>

PLANNING WORKSHEET

QUESTION: Should a resort complex be built on the West Shore of Bayshore Island?

ECONOMY

Advantages	Disadvantages
Employ 200 people	None specifically listed, but the hotel could hurt already existing cottages and small resorts
$2 million tourist dollars a year	
New stores and restaurants will open	
Other hotels will follow	
25,000 tourists in the summer	
Land values will rise for nearby residents	

ENVIRONMENT

Advantages	Disadvantages
Hotel will provide sewage treatment facilities	Beach vegetation destroyed
	Sand dunes leveled

POLITICAL/SOCIAL

Advantages	Disadvantages
25% gain in tax revenues for city	City must expand highway, provide extra police protection, and improve water treatment facilities
Possibility of 100% increase in tax revenues	
New public services could be built	May cause access problem
More modern, richer life style for community	Fishermen may losing fishing area
	A possible end to the quiet life-style
Mayor may gain support from those favoring hotel	Mayor may suffer loss of support from fishermen and others

Are there other advantages or disadvantages to building the resort that should be considered, but which do not fit into these three categories?

1. If the new hotel goes in, the beach park cannot be built.

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 6: MANAGEMENT TOOLS

TIME: 2 DAYS

PURPOSE

To introduce and review specific means which governments use to influence or control coastal development

MATERIALS

In Package

Reading III-5, "Managing Coastal Resources"(includes "Resource Management Plans," "Resource Management: Six Examples," and "Analyzing Management Tools")

OVERVIEW

Students consider several ways government may intervene to influence or control coastal development. Six management strategies are analyzed through a series of short examples.

PROCEDURE

Part I: Management Tools

1. Review the preceeding lesson by noting that it discussed some factors government officials often consider when making decisions about the use of coastal resources. This lesson looks at several ways governments actually control or influence the use of coastal resources.

2. Assign the first section of Reading III-5, "Resource Management Plans." After students have completed the reading, ask:

   a. What is the "management tool kit?"

      [The strategies government can use to control or guide development.]

   b. What characteristics must effective resource management plans have?

c. What can happen if a resource management plan is ineffective, or does not exist in a given area?

[The pace of economic growth and the quality of the environment will change without conscious planning and without the input of public concerns. This could lead to a number of unanticipated and unwanted outcomes.]

3. Have students read the six examples in the "Managing Coastal Resources" reading. After they finish, ask students to explain what management tool was used in each example. Ask:

a. What resource or activity is the government trying to control?

b. What management tool is the government using?

[Example 1:
a. The government is trying to preserve agricultural land.
b. The management tool is the purchase or acquisition of land. By acquiring ownership to this land, government can control how the land is used.

Example 2:
a. Government wants to protect a famous landmark.
b. Government used the management tool of zoning

Example 3:
a. Government is trying to control the use of the beach and near-shore area.
b. Government is using a regulation and permit system to control specific uses in this area.

Example 4:
a. Government is trying to reduce the density of building.
b. Government is establishing a tax policy which encourages certain types of development.

Example 5:
a. Government wants to improve and add new recreational facilities.
b. Government is reaching this objective by directly improving, restoring, and developing recreational facilities. This option is called improvement of public facilities, or more specifically, capital improvements.

Example 6:
a. Government is encouraging further development in the coastal area.
b. Government is directing future growth towards this area by the placement of a highway, or more generally, the placement of a key public facility.]

4. Have students look at the third section of the reading, "Analyzing

Management Tools." Advantages and disadvantages of use are listed under each of the six management tools. To help students compare these six strategies, ask the following questions:

a. Which of these options will tend to cost government the most money?

[All of these options could cost the government money to implement. Acquisition and improvement of public facilities will likely lead to the biggest government expenditures. Acquisition can also cost government money by removing land from use in the taxable private sector. The permit system costs money to implement and enforce; taxation policies that lead to a reduction in revenues can cost government money; zoning can cost money by restricting the extent of industry and other activities which generate tax revenues; studies to determine the impact of placement of public facilities can be expensive.]

b. If government wants to encourage business or industry to come into a coastal area, which options might it choose? Why?

[1) Zoning: Areas can be specifically zoned for industry and business. Land in low levels of economic use can be rezoned for more intensive use. For example, land previously zoned for housing or agriculture might be rezoned for industry.

2)Taxation policies: Government could establish lower tax rates for businesses which would encourage owners to expand existing operations or build new ones. Such reductions are often set for a limited number of years, with regular rates reimposed after developed is well established.

3)Improvement of public facilities: By building better roads, port facilities, etc., a community could become more attractive to new businesses.

4)Placement of public facilities: Government could locate public facilites in such a way to promote business growth.]

c. If government wants to discourage new business or industry from an area, which options could it use?

[Zoning ordinances, taxation policies, failure to improve public facilities, and a strong regulation and permit system could all discourage new business activity.]

d. If government wants to prohibit all development in certain areas, what options might it use?

[Acquisition. Zoning ordinances or regulations which prohibit all development in an area could be ruled unconstitutional by the courts.]

e. If government wanted to reduce environmental problems caused by existing land uses, which options would it likely use?

[Regulation and permit system is frequently used. Governments use this option to try to establish strict standards and to force users to meet these standards. Taxation policies are sometimes used by levying additional taxes on activities which produce pollution and other environmental damages.]

f. If government wants to add addtional public facilities, or improve existing ones, which options might it choose?

[Acquisition and/or improvement of existing public facilities.]

g. Which of these six options would pose the most enforcement problems?

[The standards and procedures developed by a regulation and permit system are often difficult to enforce. Zoning plans are sometimes hard to carry out because people ask for and receive an exception, or variance, from the zoning ordinance.]

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 7: LOCAL INTERESTS VERSUS REGIONAL INTERESTS

TIME: 2 DAYS

PURPOSE

To illustrate management problems arising from the conflict between local interests and state, regional, or national interests

MATERIALS

In Package

Reading III-6, "Gotham Times-Picayune Editorial"
Reading III-7, "Neptune Beach City Council Public Hearing"
Transparency set III-3-6, "Local-Regional Conflicts"

Additional

Overhead projector

OVERVIEW

Students read an editorial which describes a conflict over the closing of a small, local beach park to a nearby metropolitan area. Students give their own opinions about the issue and then read or listen to a transcript of the public hearing which explains the reasoning behind the decision. A concluding lecture, accompanied by transparencies, highlights key factors in local-regional conflicts and gives students actual examples of this problem.

Part I: What Should Neptune Beach Do?

1. Explain to the class that the preceeding lessons have shown how government is involved in making decisions about the use of coastal resources. The next four lessons all examine problems governments have in trying to implement and enforce their resource management plans.

2. The first part of this lesson includes a transcript of a public hearing regarding a beach park decision(Reading III-7). You may assign this transcript as a reading or as a skit to be presented in class.

   Procedures for using this transcript as a reading begin in step 3. If you plan to do the skit, use the following procedures:

a. Ask for student volunteers to perform a skit to be presented in class. Assign roles and have each student read his or her part in the script. Explain that the skit will portray a public hearing held by the coastal town of Neptune Beach to consider the request of its big city neighbor, Gotham, to open Neptune Beach's recreational facilities to Gotham residents.

The roles are:

Mr. (or Ms.) Bosley	Neptune Beach City Council Chairperson
Mr. (or Ms.) Cabrillo	Gotham Planning Dept. representative
Sheila Porter	Neptune Beach resident
Euclid Haines	Neptune Beach businessman
Chief Rankin	Neptune Beach Chief of Police
Sharon Benitski	Neptune Beach high school student
Al Escobedo	Neptune Beach fishing boat captain
Mr. Yarborough	Neptune Beach sewage treatment plant manager
Cal Ostend	Neptune Beach architect

b. Ask participants to meet outside or at the rear of the classroom to rehearse their parts. Encourage them to give character to their parts, not just read them, and to paraphrase or ad lib as they wish.

c. Assign the rest of the class Reading III-6, "Gotham Times-Picayune Editorial." Explain that in many coastal states, particularly the Atlantic States, beaches are under the control of the local community, not of the state.

After students have read the editorial, ask:

(1) Do you agree or disagree with this editorial? Why?

(2) Is the anger of the newspaper editor justified?

(3) Why do you think the city of Neptune Beach made this decision?

d. Arrange the classroom as a "hearing room." When skit participants are ready, give the class this background information:

> You are going to see the public hearing which was held by the Neptune Beach City Council prior to the vote on the Gotham request for access to the Neptune Beach Municipal Beach Park. You already know how the Council voted from the newspaper editorial. Mr.(or Ms.) Bosley is the Council Chairperson and will now conduct the hearing.

d. Go to step 3 for the remainder of the lesson.

2. If you do not wish to do the skit, begin with these procedures:

   a. Assign Reading III-6, "Gotham Times-Picayune Editorial." Explain that in many coastal states, particularly the Atlantic states, beaches are under the control of the local community, not of the state.

      After students have read the editorial, ask:

      (1) Do you agree or disagree with this editorial? Why?

      (2) Is the anger of the newspaper editorial justified?

      (3) Why do you think Neptune Beach made this decision?

   b. Assign the Reading III-7, "Neptune Beach City Council Public Hearing." Explain that this reading is a transcript of a public hearing of the Neptune Beach City Council. This hearing was held to discuss the decision noted in the newspaper editorial.

   c. Continue with step 3 for the remainder of the lesson.

3. Following the "hearing" or the reading, review each of the arguments given against opening the beach to the general public. Ask:

   a. How valid are the various arguments presented against opening the beach to Gotham residents?

   b. Should the Neptune Beach City Council have voted the other way? Why?

4. For homework, each student is to write a letter-to-the-editor responding to the "Beach Decision is Wrong" editorial. The student may express any reaction to the controversy. The letter may focus on specifics or respond to the issue in general. Announce that letters will be posted in the classroom so everyone can see the range of responses.

Part II: Local-Regional Conflicts

1. Invite any student to read his or her "Letter-to-the-Editor" aloud to the class. If no one volunteers, call on two or three students to read their letters. Ask for reactions. If all the letters read thus far state basically the same position, ask if anyone has a different view.

2. State that the Neptune Beach vs. Gotham conflict illustrates a basic political problem which occurs frequently in coastal areas

(as well as in inland areas). This problem is between local interests and regional interests, or put another way, as local interests versus interests of the general public.

3. The following presentation is keyed to Transparencies III-3-9, "Local-Regional Conflicts." Suggested comments and questions accompany each transparency.

4. Transparency III-3, "Local Government Decisions:"

Commentary: The Gotham versus Neptune Beach controversy was fictional, but it illustrates two important real facts:

a. Local governments are in a strong position to determine what uses are made of the shoreline

b. Local governments have good reasons for wanting to keep the situation this way

Decentrialized decision-making is an important political fact of life as far as land use regulation is concerned. As a rule, local governments approve specific shoreline uses under their jurisidction if benefits are to be felt locally, and costs are to be distributed throughout the region. Conversely, local governments usually will not approve a use if the costs are to be borne locally, while the benefits will be distributed throughout the larger region. In other words, if the local people have to pay the costs while other people receive the benefits, the local government will disapprove. If local residents receive benefits and much or all of the costs are paid by others, the local government will usually approve.

Questions:

a. Why do conflicts so frequently occur between local governments or between local governments and state and federal government?

[Because local interests are often in conflict with regional interests in specific political decisions. If costs will be local and benefits regional, or if costs will be regional and benefits local, there is a basis for conflict.]

b. Are there or have there been examples of "parochial interests" causing a political conflict in our local area?

5. Transparency III-4, "Shoreline—State of Maine"

Commentary: Clashes between the interests of local governments

or communities and the public at large are common. For example, the state of Maine has just under 3,000 miles of shoreline, but most of it has been given over to private development. Most of the 127 local government units have encouraged unlimited coastal development, being eager for increased return on taxable property and for the jobs that development brings.

Questions:

a. What positive local effects occur when local governments permit private ownership and development of beaches?

[The amount of taxation on property increases and provides local government with increased revenues; jobs are created in local communities.]

b. What are the costs to the region, or the state of Maine, in this case?

[As a result of such actions and the pro-development policies of local governments, only 1.4% of the Maine coastline is in public. The traditional access of the public to the rest of the coastal area has been drastically reduced. At many public recreation spots on the coast, people have to begin lining up by dawn on hot summer weekends if they want a spot at a public beach.]

6. Transparency III-5, "San Francisco Bay:"

Commentary: Around San Francisco Bay, local governments frequently granted permission to business or public agencies to fill in near-shore waters for various new activities. These included marina facilities, housing developments, commercial recreation areas, small public parks, sewage treatment plants, and industrial developments. These projects increased local tax revenues, plus offered increased recreation facilities to residents of the immediate area.

However, the cumulative effect of such filling activities began to alter the ecology of the entire San Francisco Bay. In 1963, a report warned that since a large part of the bay was very shallow and could easily be filled, the bay might be reduced to a river. Several citizens groups asked the California State Legislature to establish an agency which would exert regional authority over the bay.

Questions:

a. How do you think local governments responded to this idea of a regional agency? Why?

[Many local governments in the bay area opposed the concept because it reduced their authority. They did not want to lose control of a part of their area -a jurisdiction- to another government office. If the agency was approved, regional concerns would become more important than local income, a policy local governments typically oppose.]

b. What do you think happened? Why?

[The disturbing prediction of a "San Francisco River" captured the public imagination. In 1969 the California Legislature passed a bill establishing the San Francisco Bay Conservation and Development Commission. This agency was given bay-wide powers to regulate all changes in existing use in San Francisco Bay. This seriously restricted the powers of local communities to make decisions affecting the use of the bay. In this case, the rules of the game had been changed to favor and protect the interests of the region and the general public.]

7. Transparency III-6, "Gerwitz v. City of Long Beach"

Commentary: A conflict similar in some ways to the fictional Gotham vs. Neptune Beach problem was settled in 1971 by a California court of law. The city of Long Beach, California, passed an ordinance restricting the use of a municipal beach to local residents only, although the beach had been used by the public at large for over 30 years.

Questions:

a. What decision do you think the court should make in this case? Why?

b. How do you suppose the court actually ruled? Why?

[In Gerwitz vs. City of Long Beach, the court threw out the ordinance finding that there had been a complete and irrevocable dedication of the beach park to the public at large. The court held that the city had earlier put itself in the position of holding that property as a public trust; therefore it could not divert the beach to other uses, sell it, or restrict public access to it without specific authorization from the state legislature.

In this case, the court found that the regional benefits of this area as a park outweighed any local benefits that might come to Long Beach in restricting access to the beach.]

c. What ruling do you think a court might make in the Gotham-Neptune Beach conflict?

[It could go either way; there are precedents on both sides.]

8. Collect all letter-to-the-editor homework assignments from students for display on classroom walls.

LOCAL GOVERNMENTS

(1) ARE IN A STRONG POSITION TO DETERMINE SHORELINE USES

(2) WANT TO KEEP THAT STRONG POSITION

LOCAL GOVERNMENTS AND SHORELINE USE DECISIONS

APPROVE

IF

BENEFITS LOCAL

COSTS REGIONAL

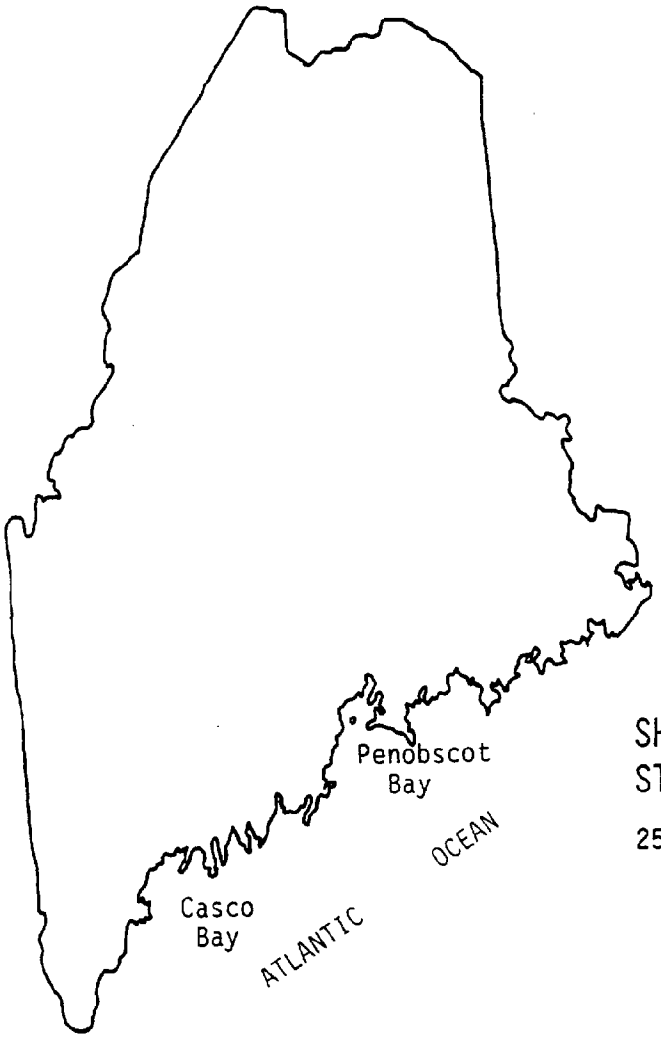
RESIST

IF

COSTS LOCAL

BENEFITS REGIONAL

MAINE

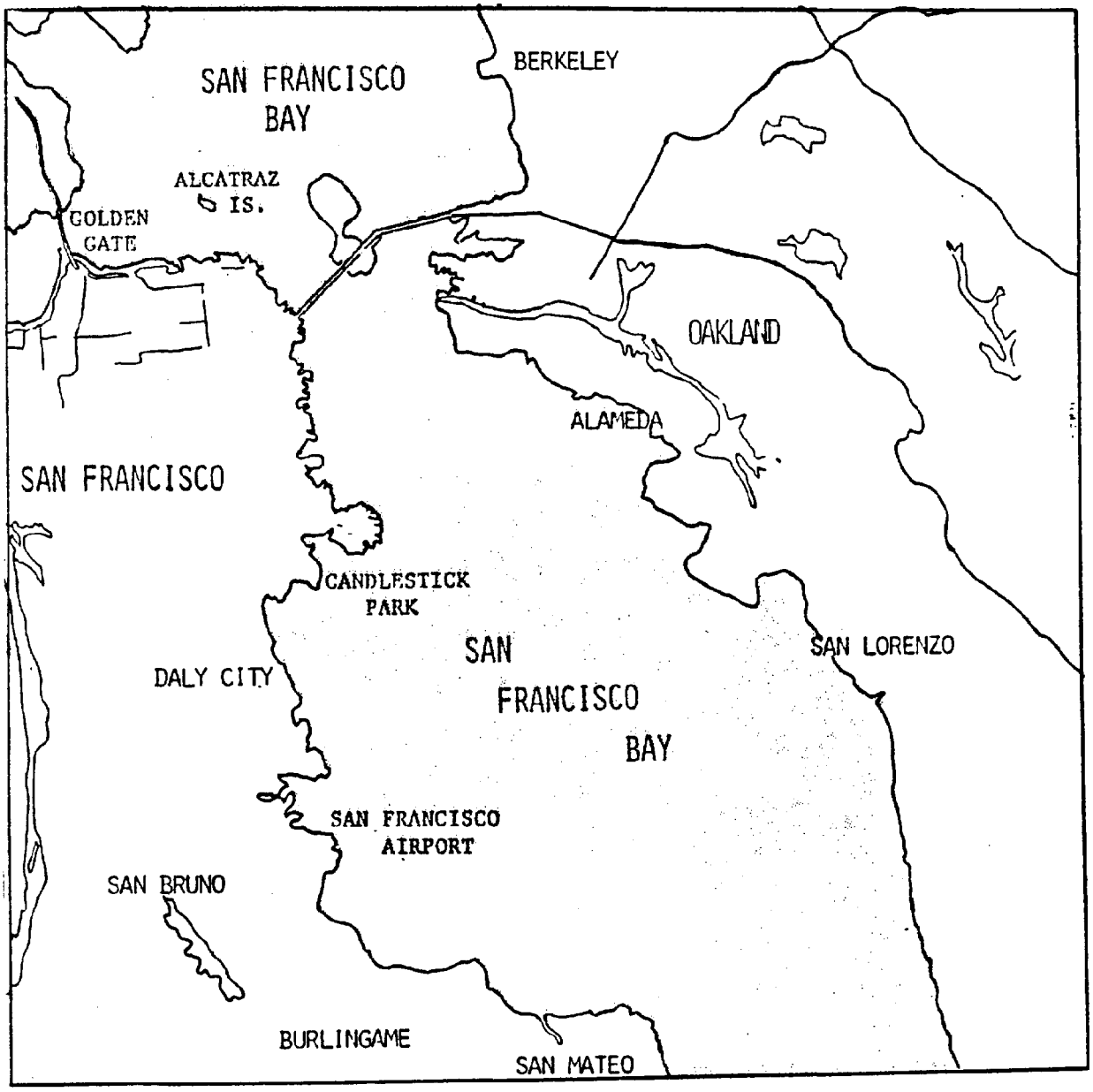


SHORELINE --
STATE OF MAINE

2578 miles -- IN PRIVATE OWNERSHIP

34 miles -- IN PUBLIC OWNERSHIP

SAN FRANCISCO BAY



CITY OF LONG BEACH PASSES RESIDENTS ONLY ORDINANCE (1971)

COURT DECIDES CASE: GERWITZ VS. CITY OF LONG BEACH (1972)

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 8: JURISDICTIONAL PROBLEMS

TIME: 1 DAY

PURPOSE

To illustrate some problems caused by setting jurisdictional boundaries

MATERIALS

In Package

Transparency III-7, "Coastal Towns-Before"
Transparency III-8, "Coastal Towns-After"
Worksheet III-4, "Beach Park-Before and After"

Additonal

Overhead projector

OVERVIEW

Students view two transparencies which show how the setting of jurisdictional boundaries led to conflicting uses of a coastal area. Students then write their own description of a jurisdictional problem based on "before and after" drawings of a coastal scene.

PROCEDURES

1. Place Transparency III-7 on the overhead projector. Then read the following description:

> The city of Rockport, located on the left, was first settled more than 150 years ago. Good agricultural land, a natural harbor and a fresh water supply from the river made Rockport an attractive place to live. The city grew quickly and Rockport became one of the busiest ports in the state. In the 20th century, however, the growth of Rockport leveled off. The harbor was not deep enough for modern cargo ships and the port facilites were in disrepair. The people of Rockport decided that if their city were to prosper, they would have to expand their port facilities to attract industry and use a large portion of their land for industrial purposes.
>
> The town of Carson, although only two miles from Rockport, is

in a different state. Carson, on the right, is a suburban, residential community. Unlike Rockport, Carson is a relatively young town. It is in a period of rapid growth. Property values have risen as the beach facilities, clean air, and "country living" offered by Carson have attracted many people to the area. The open space zoning along the shore has kept the beach facilities open for the enjoyment of all, and the dunes provide an effective windbreak for the town. Most citizens of Carson feel that the town represents a fine example of careful planning.

2. Place Transparency III-8 on the overhead projector. Then ask two questions:

   a. What has happened?

      [The two communities have expanded toward each other. There is heavy industry on one side of the jurisdiction line next to a residential area on the other side.]

   b. Where is the boundary or jurisdiction line between the two states?

      [The river.]

   c. What does "jurisdiction" mean?

      [Jurisdiction refers to the legal area of control. Within this area, a governmental unit, such as a city, state or regulatory agency has control over what happens. The area of jurisdiction for a governmental unit is usually more restricted than its area of interests.]

   d. What effects do you think the Rockport development might have upon the environment of the Carson area?

      [The breakwater and enlarged port facilities could disrupt the estuary; the estuary and dune areas are seriously disrupted by industrial development; outfalls could pollute the river.]

   Explain that jurisdictional boundaries often do not respect ecological boundaries. Developments in one part of an ecosystem, such as the dune area, can cause problems in the undeveloped part.

   e. How could this Rockport-Carson situation have happened?

      [The people of Rockport wanted one type of community, while the people of Carson wanted another; the people of Carson had no control over what the people of Rockport did, and vice-versa. Carson's area of interest extended beyond its jurisdiction, but the boundary line restricted what Carson could do.]

   f. Will life in Carson be affected by the actions of Rockport? How?

3. Divide the class into groups of three. Distribute to each group Worksheet III-4. Explain that each group is to consider the drawings and to develop a plausible story to answer the following:

   a. What is happening in the two diagrams?

   b. How or why could it have happened?

   c. What kinds of problems might result from the effects of what happened?

   d. What steps might have been taken to avoid the kinds of problems which were created?

   Ask each group to select a spokesperson to lead the activity, and explain their answers to the class.

   After the groups have completed the assignment, call on several to explain their story.

4. Note that jurisdiction problems can also occur when one governmental unit tries to expand its authority into areas where another governmental unit has control.

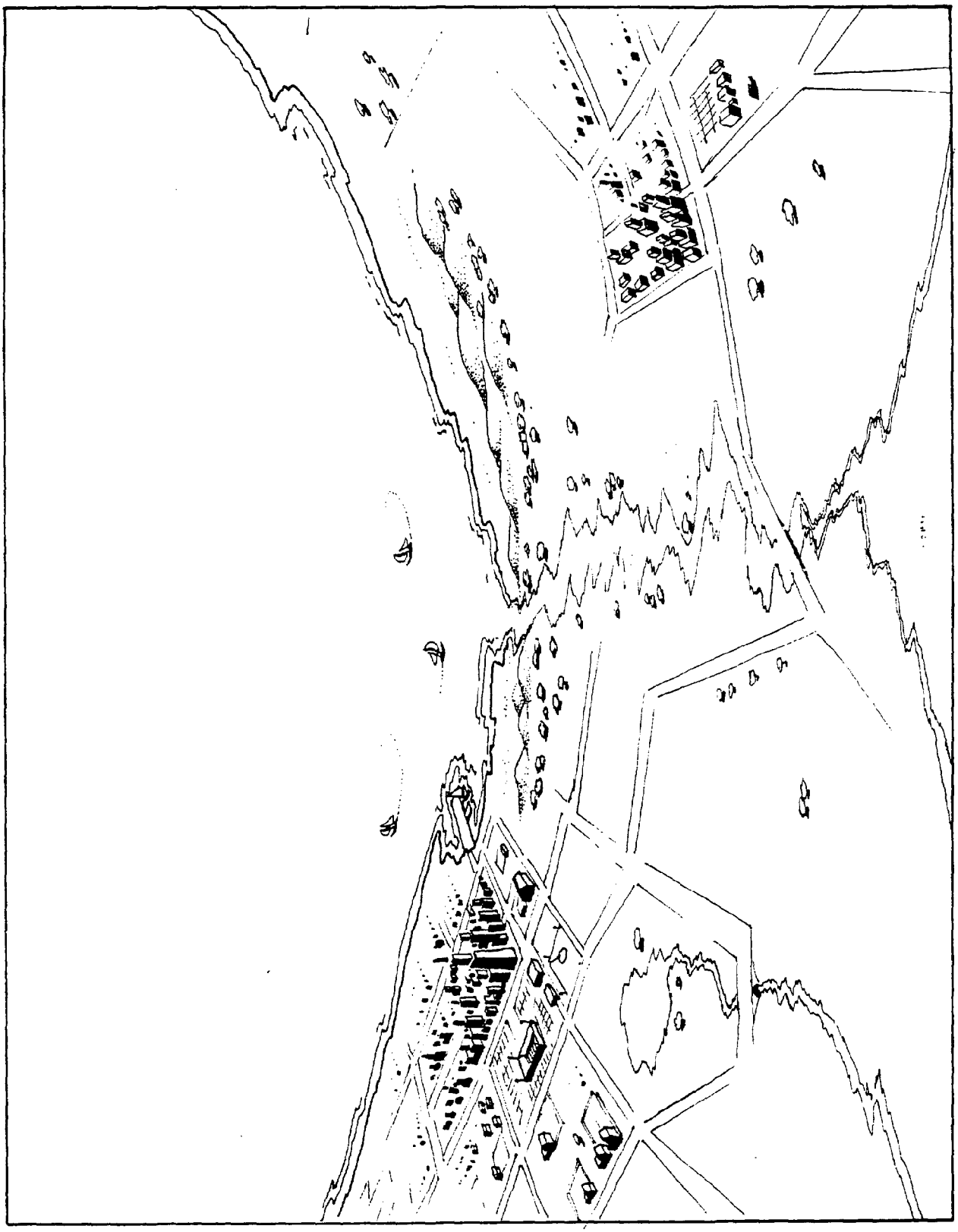
   Jurisdiction problems also result when two or more governmental units both claim to have authority or jurisdiction over the same area or problems, or when no governmental unit claims jurisdiction over an area. This latter problem sometimes happens when a major problem occurs and no one wants to take responsibility. Ask:

   a. Are there any examples of these types of jurisdiction problems in your coastal area?

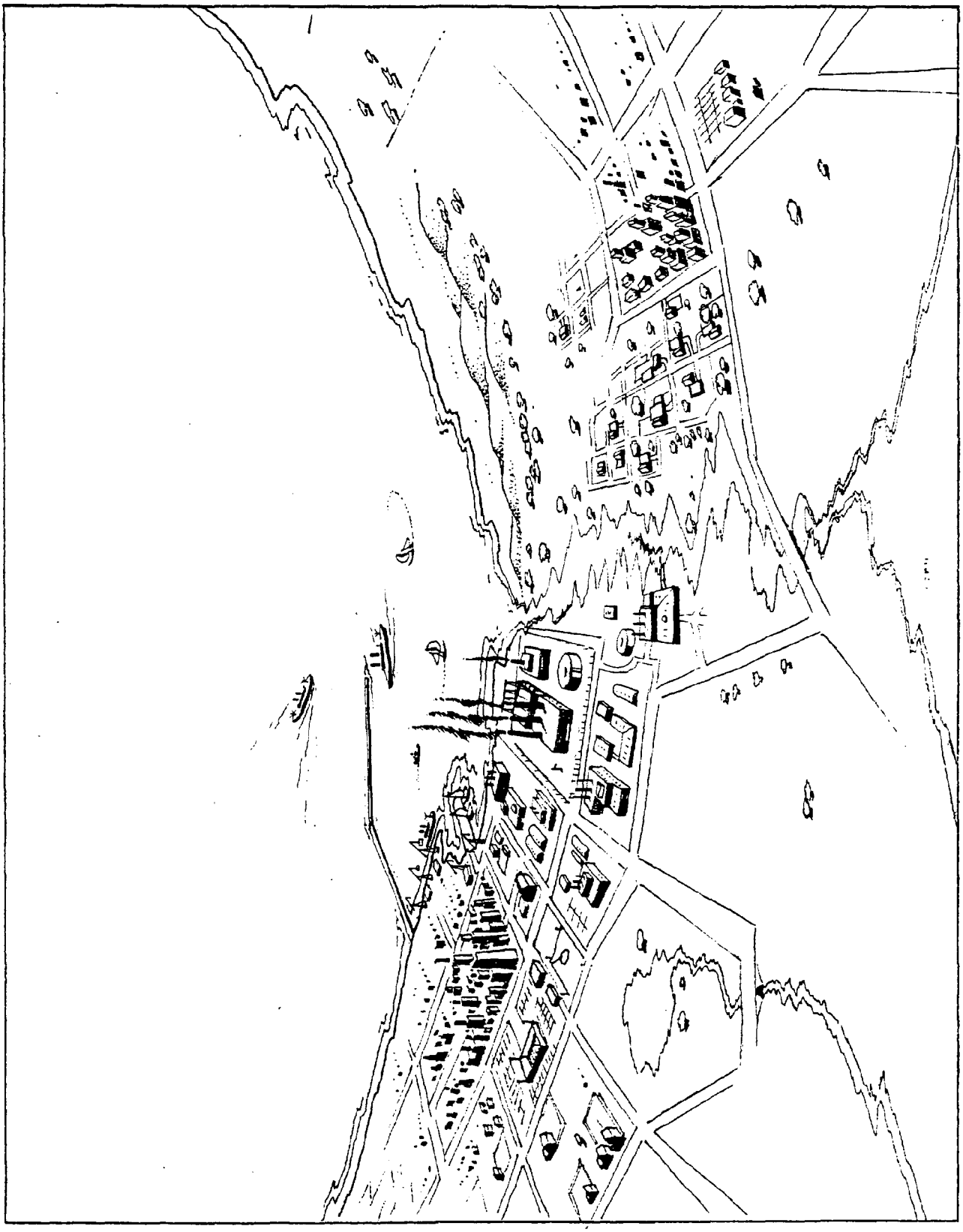
5. As a final discussion question, ask:

   a. What steps do you think could be taken to manage the kinds of problems that often result from jurisdictional boundaries?

   [Cooperation between adjoining jurisdictions; regional rather than jurisdictional planning; placing entire ecosystems, such as estuaries, under one jurisdiction; making sure jurisdictional boundaries are clearly drawn and responsibilities clearly designated.]



T III-7



T III-8

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 9: REGULATIONS AND PERMITS: CAN WE AFFORD THEM?

TIME: 1 DAY

PURPOSE

To introduce students to some problems created by the regulation process

MATERIALS

In Package

Reading III-8, "Editorial Page"
(includes "A Message from the Editor,"
"There Must Be a Better Way," and "Seven Replies")

OVERVIEW

Students read a letter-to-the-editor from a housing developer complaining about too much government interference with his building plans. Students are asked to consider who is to blame for this problem. They then read seven replies to the original letter and discuss some advantages and disadvantages of government regulation.

PROCEDURE

1. Have students read the "Message from the Editor" and the letter, "There Must Be A Better Way," in Reading III-8.

2. After students have finished the letter, ask:

   a. Who is Mr. Eagerton?

      [A builder, a member of the Association of Concerned Developers.]

   b. What is his project?

      [Seaside Housing Project.]

   c. What are Mr. Eagerton's biggest complaints?

      [Answers will likely include: 1) too many agencies involved in the permit process; 2) too many delays in issuing permits; 3) too much cost involved; 4) too many levels of government involved.]

   d. Suppose you had planned to buy a house in the Seaside Project.

Now your costs are much higher. Whom do you blame for this situation? Why?

3. Have students read the seven responses to Mr. Eagerton's letter. After they finish, ask several students to summarize the main points of each letter.

   Some of the letters argue that the permit process is useful. Ask:

   a. Why do the letters say permits and agency review are necessary?

      [Answers will likely include:

      (1) To look at the long-term environmental impacts of the project
      (2) To prevent local decision-makers from having total control
      (3) To protect the shoreline environment
      (4) To meet minimum standards for safety and health
      (5) To have experts review projects]

   Several points were brought out against the permit process. Ask:

   b. What problems concerning permit and agency review do the letters complain about?

      [Answers will likely include:

      (1) Too time consuming, which increases the cost of development
      (2) Outsiders making decisions that local people can make better
      (3) Nobody really takes a broad perspective
      (4) Each agency has too narrow a view
      (5) Too many levels of government are involved
      (6) Excessive paper work

4. Ask students to now reconsider their earlier answer to the question:

   Who or what produced the higher costs? Why?

5. Have students discuss whether the permit system is worthwhile, and if so, what kinds of permits are reasonable. Ask:

   a. What kinds of permits do you think are reasonable?

b. What characteristics would a reasonable permit have?

c. What could be done to solve some of the problems mentioned in the letters?

[Many governments have suggested the following reforms:

(1) Establish strict time limits that agencies must meet
(2) Consolidate the review process so that two or more agencies work together to study requests and issue permits]

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 10: THE TAKING ISSUE: LEGAL LIMITS TO REGULATION

TIME: 2-3 DAYS

PURPOSE

To define and illustrate the concepts of eminent domain and police power

To review government's rationale for controlling land use

To compare and contrast government's ability to control land use through the process of eminent domain and the police power

MATERIALS

In Package

Worksheet III-5, "Shoreline Plans"
Worksheet III-6, "Proposed Shoreline Regulations"
Reading III-9, "Coastal Land Use and The Taking Issue"
Worksheet III-7, "The Balancing Process"
Transparency III-9, "The Balancing Process"
Reading III-10, "Dooley v. Town Plan and Zone Commission of Town of Fairfield"
Reading III-11, "McCarty v. City of Manhattan Beach"
Reading III-12, "Morris County Land Company v. Parsippany-Troy Hills Township"
Reading III-13, "Just v. Marinette County

Additonal

Overhead projector
Grease pencil

OVERVIEW

In Parts I and II, students draw up development plans for a coastal land holding, and then are confronted by government's use of eminent domain and the police power. Students consider whether various government regulations go too far in controlling their privately-owned land. In Part III, students apply their understanding of government land-use regulation by comparing their judgments to actual rulings in several court cases.

PROCEDURE

Part I: Eminent Domain

Teacher's Guide

1. Pass out Worksheet III-5, "Shoreline Plans." Students may work individually or in pairs.

   Have students imagine they have just bought the sizeable piece of coastal land described on their worksheet. They can afford to develop the land in any way they choose.

   Ideas might include a home, business, shopping center, recreation area, ranch, resort hotel--anything. Once they have decided how they want to develop their coastal land students should sketch or write a brief description at the bottom of the page explaining their ideas.

2. When students have finished, call on several to explain briefly their plans to the class.

3. Announce that you have just received news of a state recreation plan that will likely affect their personal development plans. The state has decided to build a new park in an area which includes their land. Consequently, the students must sell their land to the state. The state will purchase the land for the fair market value. Ask:

   a. Does the government have the right to take away your land?

      [Accept any answer.]

   b. What if you didn't want to sell? Could you refuse? What about private property rights?

      [The government does have the power to take your land. This power has repeatedly been held by nearly all governments as an inherent power, one necessary for effective government. In the United States, the federal government, the states, and the local municipalities(when authorized by the state) have the power to take land.]

4. Tell the class that the U.S. Constitution places certain limits on the government's power to take private property. The Fifth Ammendment to the Constitution states:

   > No person...shall be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation.

   Ask:

   What does this clause guarantee? What could happen if it were not written into the Constitution?

   [It guarantees that private property can't be taken from the

owner unless it is for public use and the owner is fairly compensated.]

5. Write four key phrases on the board: "private property," "due process," "public use," and "just compensation." Ask students if they can explain what each of these means.

   a. Private Property--This refers to a collection of rights, including the right to transfer title and to do with one's own object or land in any manner not prohibited by law. Private property does not refer directly to the land or to an object, but to certain rights of use. The term property is often used in conversation to refer to real estate or land. This use can lead to confusion when the topic of discussion is property rights. For clarity the word property is used throughout this lesson to mean rights.

   b. Due Process--This means the government must follow established legal procedures if it wishes to take your land or other property.

   c. Public Use--This means any use of land or other property from which the entire community can freely benefit. Two examples are the building of a highway or a defense installation. In the coastal resources simulation game, the Navy took over three plots of land. The group that owned these plots had to sell this land because the Navy's use of the land was for public benefit.

   d. Just Compensation--This means a fair price must be paid for the land or other property. If the government takes your property for public use, it must pay you the fair market value. Sometimes the owner appraises the property at a higher value than the government. If this happens, the courts may be called upon to determine what amounts to just compensation.

Part II: <u>The Police Power and Land</u>

1. The "Management Tools and Strategies" lesson explained some reasons why the process of acquisition of land, through the power of eminent domain is not used every time that the government wants to control land use. Ask:

   <u>Do you recall why the power of eminent domain is not used more often by government?</u>

   [The primary reason is the expense involved; further, the process is time consuming and not popular with land owners. Also, there is the traditional belief that a goodly share of things in this country should be privately owned and operated.]

   Explain that for many reasons, it is often impractical for the state to purchase land. But, it still wants to exercise some control over how the land is used. Government can do this by passing regulations or ordinances which encourage or prevent certain kinds of development in coastal areas. The state has (next page)

Explain that this reading goes into more detail on the subject and will provide them information to help decide when a regulation unreasonable interferes with their rights to use private land the way they wish.

7. Review the reading by asking:

   a. Which two methods of controlling land use does this reading discuss?

      [Eminent domain and police power.]

   b. Explain the difference between these two government powers.

      [Eminent domain refers to the power of the state to take property for public use. Police power refers to the power of government to legislate in the public interest, and to protect the public welfare. Mechanisms for controlling land use without aquiring ownership draw their authority from the police power. These include zoning, the permit system, agency, and legislative regulations, codes, ordinances, etc.]

   c. What is the "taking issue?"

      [The question of how far government can go in regulating land. How far does the police power of the state go before a "taking" of the land occurs?]

   d. How has the extent of the police power changed over the years?

      [The extent of the police power is expanding, although the courts have not always agreed on the limits of this expansion.]

   e. Do you agree that the state should have the right to regulate land use?

   F. Do you think there should be limits on the power to regulate the uses of private property? Why?

Part III: The Balancing Process

1. Briefly summarize the "taking issue:"

   Land use can be controlled to some extent, but if the regulation goes too far, it will be considered a taking.

2. Explain that this is the guiding principle by which the courts decide taking issues. But what is meant by "too far" is not always agreed upon by the court. Just as the class probably had different opinions about which regulations were "reasonable" and "unreasonable so do the courts reach different conclusions about the legality of certain regulations

the right to do this under what is called "the police power" of the state. In order to legally use the police power, the government must demonstrate that the regulation is protecting the public health, safety, or welfare.

2. Have students take out their land development plans again. Also, pass out Worksheet III-6, "Proposed Shoreline Regulations." Explain that the government still wants to control development in this area, but for several reasons, they have decided not to purchase the land in order to do it. Instead, the state is considering a new series of regulations which will help control coastal development.

3. Read each regulation. Ask students to consider what impact the regulation may have on their plans and whether they think the regulation is reasonable or unreasonable. Students can judge each regulation by circling the appropriate choice on their worksheets.

4. After you have finished reading all the regulations, poll students about each one. Review each, asking students to raise their hands if they circled reasonable, and then if they circled unreasonable. Note at what point a majority of students raise their hands indicating an unreasonable regulation. Ask:

   a. At which point did the regulations seriously begin to affect your development plans?

   b. Do any of the regulations leave you without any reasonable use of your land?

   c. Will any of these regulations make your land worth less money?

      [Regulations 4 and 5 particularly restrict uses of the land and thereby diminish land values.]

   d. Are any of these regulations violating the Fifth Amendment by taking property without just compensation?

      [Regulations 4 and 5 might be considered illegal.]

5. Explain to the class that the term "taking" in the Fifth Amendment clause may mean more than just physically taking land from an owner. It also means that the state cannot take away all your reasonable uses of the land through over-regulation. The state cannot pass just any regulation. If a regulation goes too far, and takes away too many of your reasonable uses of the land, the regulation may be unconstitutional.

6. Assign Reading III-9, "Coastal Land Use and The Taking Issue."

3. Pass out Worksheet III-7, "The Balancing Process." Display the "Balancing Process" transparency, III-9.

   Explain that this transparency illustrates the balancing process: the court weighs the societal benefits of a particular regulation against the degree to which it violates private property rights. In order to reach a decision, the court asks certain questions. Some of the most important ones are:

   a. Does the regulation significantly reduce the value of the land? If the loss is high, the regulation may be a taking.

   b. Does the regulation leave the owner with any reasonable use of the land? If there are few remaining uses of the land, the regulation may be a taking.

   c. Is the regulation seeking to prevent a hazard to the public health, safety, or general welfare? If so, a regulation may be considered legitimate.

   d. Is the regulation intentionally seeking to use private land to benefit the public? If yes, the power of eminent domain rather than the police power should likely be used. A regulation which intentionally provides beneficial goods or services will probably be considered a taking.

   Generally, a regulation which strongly supports the public health, safety or welfare and has low impact on private property rights will be considered legitimate.

   A regulation which supports the public health, safety or welfare but has a high impact on private property rights is likely to be considered a taking.

4. Have students apply the balancing process to the first proposed shoreline regulation they earlier rated (regulation 1 on Worksheet III-6).

   Students should consider each of the four concerns on the balancing scale with regard to the regulation requiring environmental impact studies. Place checkmarks on the scale in the appropriate locations as the class responds. Ask:

   a. How much damage to property value is caused by the regulation?

   b. How many remaining reasonable uses of the land does the regulation allow?

   c. Is the regulation trying to prevent a hazard to the public health, safety or welfare?

d. Is the regulation intentionally providing the public with a good or service? (beyond those reasons included in the public health, safety or welfare).

The following conclusion is likely to be reached:

> Regulation 1 would tend to score high on societal benefits and low on loss of private property rights. It could bring benefits to the public health, safety and welfare, and is not likely to cause serious loss of property value. It would be considered legitimate; in fact, requirement of environmental impact studies is a common procedure in most cases.

5. Students should now apply the balancing process to the remaining regulations. After they have finished, ask several students how and why they rated each regulation. Although these are fictious regulations, it is likely the court would rule in the following ways:

   a. Regulation 2--Probably legitimate, unless the restriction on removing vegetation made the property nearly worthless.

   b. Regulation 3--Probably legitimate; zoning is considered a reasonable exercise of the police power as long as it is not excessively restrictive. This ruling would still leave some reasonable uses of the land.

   c. Regulation 4--Probably a taking; since the permitted uses are all benefits for the general public, it is likely the government should have used the power of eminent domain.

   d. Regulation 5--Probably a taking; this leaves the owner with with no reasonable uses of the land, and the damage to economic value is likely to be high.

6. Explain that the class will now apply the balancing process to actual court cases. Assign Reading III-10, "Dooley v. Town Plan and Zone Commission of Town of Fairfield." After students have read the case, ask one student to summarize the facts of the case for the class.

   Place the "Balancing Process" transparency on the overhead. Then lead the class in discussion to determine if a taking has occurred. Place checkmarks in the appropriate locations as the class responds to each question.

7. When the chart is complete, call for an over-all decision. Encourage debate among students if conflicting opinions are held. Then, give the class the actual decision reached in the case:

   The court ruled the zoning regulation a taking, for the following reasons:

   a. Since uses of the land were restricted to largely public uses, the town of Fairfield should have used the power of eminent domain to achieve these objectives.

   b. The regulation caused Dooley to suffer a 75% loss in property value.

   c. Most of Dooley's land was above the area subject to flooding.

   Ask the class to compare the court's decision with their own findings:

   Did the court weigh the factors in the case as the class did?

8. Assign Reading III-11,"McCarthy v. City of Manhattan Beach." Review and judge this case as you did with the Dooley case, again using the "Balancing Process" transparency.

   After the class decision is reached, give them the court's finding:

   The court ruled that the zoning regulation was a legitimate exercise of the police power, and not a taking. The court found:

   a. The regulation would prevent a hazard to the public health and safety.

   b. Single-family dwellings were not a reasonable use of the land because of periodical flooding.

   c. Allowing McCarthy to charge user fees did permit a reasonable use of the land.

   Ask the class to compare the court's decision with their own finding.

   You may want to give the class this final conclusion to the case:

   McCarthy's beach land was later condemned and purchased by by the state through the process of eminent domain. The land was appraised and compensation paid to McCarthy on the land's value as a beach site, and not as a residential home site.

9. Arrange the class into groups of three or four students. Explain that each group is to judge a case by using the balancing process. Each group should elect a "chief judge" to lead the discussion and to report the group's decision.

   Assign Reading III-12, "Morris County Land Company v. Parsippany-Troy Hills Township" to half of the groups, and Reading III-13, "Just v. Marinette County" to the other half.

10. After allowing a reasonable amount of time to make their judgements, begin discussing group findings. Summarize the facts in the Morris case. Then ask the "chief judge" from each group that studied the Morris case

    a. What did your group decide?

    b. Why did it reach this decision?

    Encourage some debate among groups if findings or reasoning differs.

    Repeat this procedure with the groups studying the Just case.

11. Compare the groups' decisions with the actual decision in the two cases:

    Morris County Land Improvement Company v. Parsippany-Troy Hills Township

    The court rejected this ordinance, on the grounds that the main purpose of enacting the regulation was for the purpose of retaining the meadows in their natural state for a public benefit. The remaining permitted uses were public or quasi-public. Therefore, the regulation constituted a "taking" of the property of the Morris County Land Company.

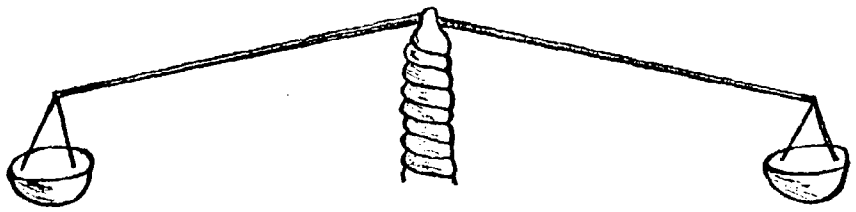
    Just v. Marinette County

    The court decided that the wetlands restrictions were a legitimate exercise of state police power. While the court agreed that the restrictions depreciated the value of the Justs' property, it determined that the depreciation was not based upon the use of the land in its natural state but upon what the value of the land would be if it were altered. In its natural state, the land had little commercial value. Therefore, the Justs did not suffer any loss in property value since the land was still in its natural state. While loss of value is a consideration in determining whether a taking has occurred, the court held that changing the character of the land did not outweigh the expense of damaging the public's right to the land in its natural state.

12. Have the class compare the two decisions. Even though the case facts were similar, the decisions were not. This is because the courts interpreted the question of property damage much differently. In Just, the court ruled that judgment about loss of property value must be made on land in its present condition, not after it has been altered in some way. Many environmentalists found this ruling supportive of efforts to protect wetland areas. However, other courts have not fully accepted the Just decision. Some rulings have followed this decision, and others have ignored it.

THE BALANCING PROCESS

PRIVATE PROPERTY RIGHTS vs. THE PUBLIC WELFARE



LOW	DAMAGE TO ECONOMIC VALUE	HIGH
MANY	REMAINING USES OF LAND	LOW
CLEARLY NEEDED	HAZARD PREVENTION	NOT NEEDED
INCIDENTAL	PUBLIC GOOD OR SERVICE PROVIDED	INTENTIONAL

T III-9

UNIT 3: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 11: MANAGING A COASTAL COUNTY

TIME: 2-3 DAYS

PURPOSE

To combine major ideas from Unit 3 into one summary activity

To apply an understanding of resource management strategies to developing a management plan

To see how various problems in the resource management process can affect a management plan

MATERIALS

In Package

Worksheet III-8, "McCord County" (includes "Overview" "Land Use Map" and "Planning Assignment".)

OVERVIEW

Students are presented with a description of a fictional coastal county. They then prepare a county plan using their knowledge of resource management strategies. Students then explain how various political and management problems could affect their plans.

PROCEDURE

1. Explain to students that in this activity, they will apply what they have learned about management tools and strategies to guide development in coastal regions. This lesson acts as a summary of Unit 3.

2. Give students the following overview:

> Officials of McCord County (a fictional area) are trying to determine the future of their coastal area. You are to act as members of a planning office and prepare a plan for McCord County.
>
> McCord County officials agree that the county must have a high standard of living, and that the area must be a pleasant and attractive place. But they disagree on how this should be done. Some officials want to see the county attract more industry. This will bring in more jobs for the area, plus lead to general economic growth.
>
> Other officials fear the pollution and unsightly conditions that industry could bring. These officials want to see more tourism

in the area. New hotels, resorts, and condominiums could bring in thousands of people each tourist season which would lead to more jobs for county citizens.

County officials have decided to ask for two plans reflecting these different ideas for future development.

3. Divide the class into two groups. Designate one the "industry" group and the other the "tourism" group. Each group is to prepare a plan which reflects its orientation. Within these two large groups, students may work in pairs or alone.

4. Have students read the McCord County Worksheet (III-8). Explain that there are three major sections to the worksheet:

   a. A description and map of McCord County. You should read and study the map for background information. This will provide you with suggestions on how to develop your plan. You should use the maps to show where new developments will take place.

   b. Seven possible goals for the future of McCord County. You should read all seven goals and decide which are the most important. The "industry" planning group will probably rank these goals differently than will the "tourism" group.

   c. Planning sheet. Each of the seven possible goals is listed, with room to explain how the goals can be achieved. You will use the six management tools we discussed in previous lessons to achieve the goals. You may decide that some of the goals are unnecessary or unimportant, and you do not want to achieve them. If this is the case, explain why they are not worth accomplishing.

   Give students sufficient time to complete this exercise; it will probably take most of one period to finish. You may want to go over the general description and the map with the class.

5. Following are suggested answers as to which management tools to use to achieve the seven county goals. These are not the only responses students might generate. Other defensible options for achieving the various goals are possible. Any evaluation of answers will need to consider the appropriateness of action suggested, and the overall logic of their plan.

   Goal 1: MAINTAIN AND EXPAND RECREATIONAL ACCESS AND RECREATIONAL FACILITIES

   How to achieve this: Acquisition and improvement of public facilities are the most likely choices. The industry group may decide not to do this; if so, they should explain that new park facilities do not seem important in attracting new industry.

Goal 2: PRESERVE AGRICULTURAL LAND AND TIMBER LAND

How to achieve this: Zoning will keep lands in agricultural and open space categories. The groups may decide not to do this; if so, they should explain that these lands are needed for other activities.

Goal 3: ATTRACT NEW INDUSTRY

How to achieve this: Rezone areas for industrial use; offer taxation policies which will favor industry; improve public facilities such as harbors and bridges.

Goal 4: PROVIDE NEW RESIDENTIAL AREAS

How to achieve this: Rezone areas for residential use; be sure groups have done this if these plans will lead to a growth in population.

Goal 5: COASTAL LEVELS OF POLLUTION

How to achieve this: Regulation and permit systems to require better treatment of waste products will likely accomplish this goal. The tourist group should emphasize this more than the industry group.

Goal 6: IMPROVE PUBLIC FACILITIES AND SERVICES (OTHER THAN RECREATION)

How to achieve this: The management tool most likely to be used is improvement of public facilities. Acquisition and placement of public facilities may also be used. Bridge, highway and harbor improvements, plus new schools, and sewage treatment facilities will be needed if plans call for an increase in housing or an increase in tourism or industry.

Goal 7: KEEP COUNTY TAX RATES AS LOW AS POSSIBLE

How to achieve this: Tax revenues will likely increase as tourism and industry are brought into the community. New industry, in particular, will lead to higher tax revenues. Also, the county could sell its marsh lands for extra revenue. In general, re-zoning land from agricultural and timber to residential-commercial, and industrial uses should increase revenues.

6. After students have completed the assignment, ask students to review their plans to make sure they have considered the consequences of their various proposals:

a. If your plan encourages new business, do you also plan to improve roads, harbors, parks, etc?

b. If your plan is likely to lead to an increase in population, do you also plan to add public facilities, such as schools? Do you plan for additional housing?

c. If your plan calls for improvements in public facilities, does your plan also indicate where additional tax dollars for these improvements will come from?

d. What impact is your plan likely to have on the environment?

e. Does your plan allow the development of all land between Ocean View Road and the shore? If so, how will this affect this "scenic" drive?

7. After students have completed the planning assignment worksheet and filled in the McCord County map, call for volunteers to briefly describe their plans. (To assist students in their presentations you could make a transparency of the original Land Use Map or draw a reasonable facsimile on the board).

   Two or three plans from the tourist group should be presented. Students quickly show where new development will occur and why these locations have been chosen. From these descriptions you can then make a few comments about the kinds of development ideas the tourist group has presented.

   Repeat this procedure for the industry group. Then ask the class:

   a. Generally, how do the plans disagree?

   b. Are there areas of agreement?

   c. Do you think you would like to live in this area as it is described in the "tourism plan?" In the "industry plan?"

   d. Could both tourism and industry be brought into the county? How?

8. Explain that in the real world, a county would be affected by outside or unplanned events which could alter or upset their plans. The kinds of management problems studied in this Unit (local vs. regional conflicts, the "taking issue", etc.) can occur at any time.

   Assume the county has accepted the tourism plan. Future growth in McCord County will try to follow their ideas. Ask students in the tourism group how the following events could alter their plans:

   a. McCurdy County, just up the Olman River from McCord County, announced this morning that a huge new industrial facility will be located on the Olman River. The company has a history of pollution problems.

(This could cause pollution problems for McCord County, and might seriously affect the tourism plan. Even though McCord County might have strict pollution laws, they would be ineffective in stopping pollution from another county.)

b. A McCord County industrial firm announced yesterday that it will sue McCord County if its new pollution regulations are passed. Company officials say the regulations are so unreasonable that they take away their right to effectively operate their business.

(If the court rules in favor of industry it could hurt McCord County's attempt to regulate pollution. This might encourage other businesses to locate there, and as a result, hurt the tourism plan.)

Now assume that McCord County has adopted the industry plan. Future growth in the area will follow the ideas in this proposal. Ask students in the industry group to predict how the following events could alter their industry plans:

c. The state Department of Tourism announced yesterday that it was going to purchase all agricultural lands between the Olman River and the harbor. The lands will be kept as open space so that the view of the ocean from the "scenic highway" can be preserved.

(This is likely to hurt industry which saw this site as a prime location for new facilities. This might have been anticipated if the county and state had cooperated in their planning efforts.)

d. The federal government in Washington, D.C. announced today that it would purchase the marsh areas in McCord County as a wildlife sanctuary. Officials said that this sanctuary was needed to help preserve one of the few remaining undeveloped marshes in this part of the country.

(This action might seriously affect expansion of harbor facilities, and would slow industry's move into McCord County.)

9. Collect students' maps and worksheets. After you have evaluated them, place the maps on the bulletin board so the class can compare the different planning schemes.

UNIT 4: CASE STUDIES IN SHORELINE MANAGEMENT

LESSON 1: THE EMERGENCE OF RESOURCE MANAGEMENT: FLORIDA
LESSON 2: THE ECONOMY AND THE ENVIRONMENT: SOUTH CAROLINA
LESSON 3: ENERGY AND THE ENVIRONMENT: THE NORTHEAST ATLANTIC
LESSON 4: PLANNING AND MANAGEMENT CONFLICTS: BOSTON HARBOR
LESSON 5: SHORELINE MANAGEMENT: NATIONAL LEGISLATION
LESSON 6: SHORELINE MANAGEMENT: STATE INTIATIVES
LESSON 7: COASTAL FUTURES: A PERSONAL CASE STUDY

Teacher's Guide

UNIT IV: CASE STUDIES IN SHORELINE MANAGEMENT

LESSON 1: THE EMERGENCE OF RESOURCE MANAGEMENT: FLORIDA

TIME: 2 DAYS

PURPOSE

To examine the growth of resource management practices of a coastal region.

MATERIALS

In Package

Worksheet IV-1, "Outline Map of Florida"
Transparency IV-1, "Coastal Problem Map of Florida"
Reading IV-1, "Florida"
Worksheet IV-2, "Florida Data Chart"

OVERVIEW

Students investigate the natural resources of Florida and speculate about possible environmental problems on the Atlantic and Gulf coasts. They then read a history of Florida's coastal development and complete a data chart which highlights key information. Summary questions reflect on how and why government involvement in developing coastal resources evolved.

PROCEDURE

Part 1: Florida's Natural Resources

1. Hand out Worksheet IV-1, "Outline Map of Florida", to each student. Ask students to investigate the natural resources of Florida, filling in their worksheets the information requested. Students will need to use encyclopedias or other reference books to complete the worksheet. Indicate that this will be the first step in analyzing Florida as a case study of an area which has experienced several problems in coastal resource use and resource management.

2. After students finish their worksheets call on various students, asking each to report briefly on one research item. Begin with "weather" and conclude with "State Capital and major cities." Have students fill in any missing information on their maps as discussion proceeds. (Draw a large outline map of Florida on

the chalkboard and have each student reporting place any geographical information on this map.) Then ask:

a. How might these natural resources of Florida be used (or, how were they used)?

[Timber for paper mills and lumber; weather/long coastline for tourism and missile launching complex; etc.]

b. What would be the likely impacts of large population increase on Florida's natural resources?

[Students should predict that many resources would be used extensively and that environmental problems would likely result.]

3. Show transparency IV-1, "Coastal Problem Map of Florida" and review types of adverse impact which in fact,did occur.

Part 2: The History of Florida's Coastal Development

1. Assign the first section of Reading IV-1, "Florida: 1821-1900", and hand out Worksheet IV-2, the "Florida Data Chart".

Students should analyze why the problems identified on the "Coastal Problem Map" occurred as they read the first section. Also ask students to think about the information asked for on the Data Chart.

2. As students are reading, draw a facsimile of the Data Chart on the chalkboard. Call on several students to come up to the board and write in the information asked for. Review and fill in any missing information, if necessary.

OR

Make a transparency of the teacher's completed Data Chart and place on overhead projector at this time, covering answers. Call on students to report on information asked for on Data Chart, uncovering answers on completed Data Chart as disucssion proceeds.

3. Pass out Part Two of the student reading (Florida: 1900-1945). Ask students to read and then fill in the "1900-1945" section of their Data Charts.

4. Review students' Data Chart responses to the "Florida: 1900-1945" reading. Call on several students for answers, or have several students write answers on chalkboard again, as with section one of the reading.

5. Ask students to describe major changes or continuities between the first development period (1820-1900) and the second (1900-1945). Then ask:

   a. What factors do you see as responsible for the continuing rapid growth and development of Florida?

      [Students should refer to: (1) increased population: (2) wider economic opportunities; (3) government policies favoring development; and (4) few restrictions on resource use.]

   b. Do you think the patterns of growth you have been observing will continue in the 1940 to present time period?

   Ask students to make some predictions as to what they think will take place in the 1945-Present time period and to record these in the first column of the "1945-Present" time period on their Data Charts.

6. Pass out Part Three of the student reading ("Florida: 1945-Present). Ask students to read and then complete their Data Charts, filling in the second column of the "1945-Present" time period.

7. Review student responses to the Data Chart for the "1945-Present" section.

8. Have students review their Data Charts in order to summarize this reading. Ask:

   a. How would you briefly describe or characterize Florida's coastal resource use in each of the three time periods?

      [Students should suggest something like the following:

      1821-1900: Complete freedom to use resources as desired, strong encouragement by government of maximum exploitation of natural environment

      1900-1945 Development continues; government agencies guide and regulate resource use, but generally ineffective or unwilling to seriously control resource exploitation

      1945-Present: Environmental groups become more popular; new and stronger environmental protection laws are passed; new agencies are created to contend development.]

b. What title would you suggest for each section of the reading?

9. Ask students to make some judgments about Florida politics. Ask:

a. Which management tools did Florida's state and local governments use to control or influence coastal resources?

b. Were these tools effective or ineffective? Why?

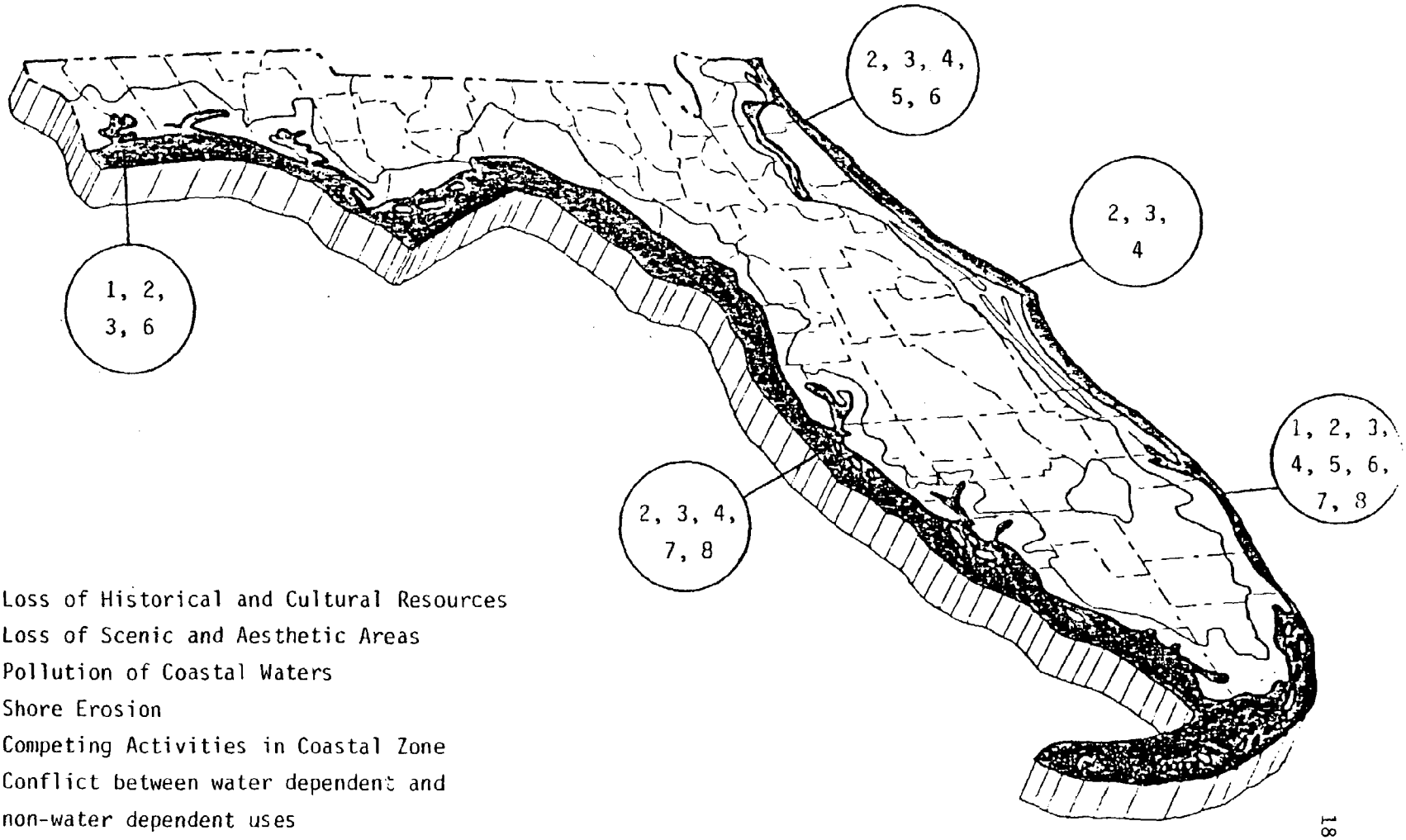
c. Do you approve of the way Florida's coastal resources were developed? Was the rapid development of Florida's coast important?

d. How important is it to now place environmental protection ahead of further growth and economic development?

e. Do you think the government is acting properly now? Should stronger measures be taken or has restriction and regulation already gone too far?

10. For a possible homework assignment - or a class debate - divide students into two groups, one pro-environment and one pro-development. It could be argued that the state and local governments who backed favorable growth policies have ruined many of Florida's coastal resources. On the other hand, it could be argued that the environmental groups who seek to slow or halt much coastal development will eventually cause a setback in Florida's economy. Ask each group to write a report or prepare a short statement.

COASTAL PROBLEM MAP OF FLORIDA



Key

① Loss of Historical and Cultural Resources
② Loss of Scenic and Aesthetic Areas
③ Pollution of Coastal Waters
④ Shore Erosion
⑤ Competing Activities in Coastal Zone
⑥ Conflict between water dependent and non-water dependent uses
⑦ Destruction of Wetlands
⑧ Loss of Beach Access

FLORIDA DATA CHART

POPULATION LEVEL AND GROWTH RATE	1837 -- 48,223 1900 -- 500,000 (1000% increase)
RESOURCES USED (HOW AND BY WHOM?)	AGRICULTURAL LANDS -- COTTON AND ORANGES (IMMIGRANT SOUTHERN COTTON PLANTERS, CITRUS FARMERS) APALACHIOCOLA HARBOR -- SHIPPING TIMBERLANDS -- LUMBER OPERATIONS COASTAL LANDS -- FOR RAILROAD LINES, RESIDENCES, CITIES, CANALS
SOCIAL/POLITICAL DEVELOPMENTS	INDIANS RELOCATED TO RESERVATION CARIBBEAN PIRATES ELIMINATED RAILROAD INTERESTS AND CERTAIN INDIVIDUALS AMASS GREAT POWER POLITICAL DISSATISFACTION AMONG GENERAL PUBLIC OVER THIS SITUATION
ENVIRONMENTAL IMPACTS	"RECLAMATION" OF SOME SWAMP LANDS BEST AGRICULTURAL LANDS USED FOR COTTON AND ORANGES TIMBERLANDS CUT (Over-all: NO SERIOUS ADVERSE IMPACT YET, POPULATION STILL SMALL AND CONCENTRATED IN EASILY HABITABLE AREAS)

FLORIDA DATA CHART

POPULATION LEVEL AND GROWTH RATE	1900 -- 500,000 1940 -- 1,897,414 (400% increase)
RESOURCES USED (HOW AND BY WHOM?)	COASTLINE AREAS -- LANDFILL (FOR HOUSING, COMMERCE, HOTELS, MARINAS, AND INDUSTRY) EVERGLADES -- DRAINED (FOR AGRICULTURAL USE, EG. SUGAR CANE, VEGETABLES, BEETS) (PLUS CONTINUATION OF PREVIOUS USES)
SOCIAL/POLITICAL DEVELOPMENTS	LIBERAL REFORM GOVERNOR ELECTED IN 1901 "PROGESSIVE" POLITICAL PROGRAM PUSHED (AGAINST "SPECIAL INTERESTS")
ENVIRONMENTAL IMPACTS	MUCH OF EVERGLADES DRAINED EVERGLADES FLOODING IN 1920's OVERDRAINAGE IN 1930's COASTAL WATERS POLLUTED, SALT WATER INTRUSION, FISHING GROUNDS DESTROYED, EUTROPHICATION, DESTRUCTION OF MANGROVE SWAMP AREAS

FLORIDA DATA CHART

POPULATION LEVEL AND GROWTH RATE	1940 -- 1,897,414 1960 -- 5,000,000 1973 -- 7.8 million (AND INCREASING AT RATE OF 6,000 PER WEEK)
RESOURCES USED (HOW AND BY WHOM?)	AIRPORTS, ROADS, BEACHES, AND SCENERY (TOURISM) BEACHFRONT (HOTELS) MANGROVE SWAMPS, ESTUARIES, MARSHES (LANDFILL FOR HOUSING, HOTELS, INDUSTRY) CENTRAL HIGHLANDS (DISNEYWORLD AND NEW CITIES)
SOCIAL/POLITICAL DEVELOPMENTS	COASTAL LAND VALUES SKYROCKET INDIVIDUAL GROSS INCOME LEVELS MORE THAN DOUBLE (FROM $4,608 TO $11,115 BY 1965)
ENVIRONMENTAL IMPACTS	SHORELINES ERODED, POLLUTION INCREASING WILDLIFE ENDANGERED, FURTHER INTRUSION OF SALT WATER, MORE SWAMPS AND MARSHES DESTROYED AGRICULTURAL AND INDUSTRIAL WASTES INCREASE

UNIT 4: CASE STUDIES IN SHORELINE MANAGEMENT

LESSON 2: THE ECONOMY AND THE ENVIRONMENT: SOUTH CAROLINA

TIME: 2 DAYS

PURPOSE

To focus on the conflict between environmental preservation and economic development

MATERIALS

Reading IV-2, "Do Chemicals and Carolina Mix?"
Worksheet IV-3, "Planning Worksheet"
Reading IV-3, "Six Fact Sheets"

OVERVIEW

Students read a brief description of a proposal to build a chemical plant in an estuarine area. This is also a region suffering from a sluggish economy and high enemployment. Fact sheets present arguments on both sides of the issue. Students complete a planning worksheet which helps them analyze the advantages and disadvantages of the proposal.

PROCEDURE

1. Explain to the class that this case, involving the location of a chemical plant along the South Carolina coast, is based on a 1970 incident. The actual outcome of the case will be given at the end of the lesson.

   All information contained in the fact sheets comes from evidence available at the time. However, the names of the agencies and interest groups(with the exception of Badishe-Analin and Soda Fabrik Co. and Hilton Head Resort) identified in the fact sheets are fictitious.

2. Assign Reading IV-2, "Do Chemicals and Carolina Mix?" and the "Planning Worksheet" to each student. Three possible procedures for handling this lesson are described in steps 3,4, and 5. Choose the procedure which best fits your class. Step 3 describes a "Press Conference" approach; step 4 outlines a class debate; step 5 handles the assignment as a class reading.

3. Select six students and assign each a fact sheet(Reading IV-3). They will represent the interest group or government office described on the sheet. Have them sit together facing

the rest of the class. The remaining students should not look at the "Six Fact Sheets" reading at this time.

Explain that the remainder of the class will act as the "Beaufort Area Planning Commission." The commission members' task is to gather information so they can decide to approve or disapprove the BASF proposal. They will write this information on their worksheets. The students will have to ask questions of each of the six representatives. The representatives should only give information that the students ask for. Thus, the adequacy of the information available depends on the quality of the questions asked.

Have each representative read aloud their short summary(on top of the fact sheet) explaining who they are and what their position is. Then, allow the commission members to ask questions in order to get the information necessary to complete their "Planning Worksheets."

After all questions have been asked, have students hand in their worksheet for grading, or simply discuss with them the quality of their questions and the information they received. Use the suggested answers in the teacher's guide as a basis for reviewing their answers.

Ask if there is any other information they would like to have before making a decision. Then ask for a decision on the BASF case:

a. Should BASF be permitted to locate in the Beaufort area?

b. Which of the factors on the worksheet seem to be the most important in helping you reach a decision?

c. How did you decide which of the factors are the most important?

See step 6 for the actual outcome of this case.

4. Select six students and give each a fact sheet(Reading IV-3). They will represent the interest group or government office described on the sheet. Have them sit together facing the rest of the class.

Announce to the class that these six representatives will be engaged in a short debate regarding the location of the BASF plant in the Beaufort area. Have each of the six students read their fact sheet. After all have finished, allow for dicussion or debate among them, and the rest of the class.

Students should take notes on their worksheets during the

presentations and debates.

After all questions have been aked, have each student complete their worksheet and turn it in for grading, or, discuss how the students filled in their worksheets. Compare answers, noting any major differences of opinion. Use the suggested answers in the teacher's key to the "Planning Worksheet" as a basis for the review.

Then ask:

a. Is there any other information you would like to have before making a decision on this issue?

b. Should BASF be permitted to locate in the Beaufort area?

c. Which of the factors on the worksheet seem to be the most important in helping you reach a decision?

d. How did you decide which of the factors was the most important?

See step 6 for the actual outcome of this case.

5. Have all students read the "Six Fact Sheets"(Reading IV-3). Students could work alone or in small groups.

Each student should fill out his or her worksheet using the information provided in the fact sheets.

After the worksheets are completed, have students hand them in for grading; or, have a few students read their answers to the different sections. Compare answers,noting any major differences.

Ask if there is any other information they would like to have before making a decision on this issue. Then, ask for a decision on the BASF proposal:

a. Should BASF be permitted to locate in the Beaufort area?

b. Which of the factors on the worksheet seem to be the most important in helping you reach a decision?

c. How did you decide which of the factors was the most important?

See step 6 for the actual outcome of this case.

6. In 1971, BASF withdrew its plans to build in the Beaufort area,

citing pressure from environmental and resort groups, and the long delays likely to result from lawsuits filed against them. BASF built their new facility near an already existing plant in Michigan.

PLANNING WORKSHEET

QUESTION: Should BASF be permitted to build a chemical plant on the Colleton River?

ECONOMY

Advantages	Disadvantages
Plant will employ 1000 people	May disrupt jobs in fishing and resort industries
5-7000 additional jobs will be created	Pollution, noise, etc. may hurt convention, tourist business
Other BASF factories will follow	
3000 construction workers employed	
$2 million to construction business	
Help offset predicted business recession	
$3000 average increase for all Beaufort citizens	
$3 million increase in retail sales	
BASF jobs are steadier and higher paying than other jobs in the area	
Increase the number of manufacturing jobs available	

ENVIRONMENT

Advantages	Disadvantages
BASF says it will treat waste water	Colleton River may be damaged from waste water
BASF says it will meet all state pollution standards	Colleton River estuary is one of two unspoiled estuaries on East coast
	Water temperature changes from factory wastes could affect river animals
	Dredging river could damage oyster beds, shrimp, and the Beaufort water supply
	BASF has polluted rivers in Europe
	BASF has never announced final plans for pollution control

POLITICAL/SOCIAL

Advantages	Disadvantages
Increased tax revenues	Many new public services will have to be built
Helps Covernor in bid to bring more industry to South Carolina	BASF receives five year tax exemption
	Area will become more industrialized, noiser, more congested with traffic

Are there any other advantages or disadvantages to building BASF's chemical complex that should be considered, but which do not fit into these three categories?

(Students may place some of the concerns listed above in this space.)

UNIT 4: CASE STUDIES IN SHORELINE MANAGEMENT

LESSON 3: ENERGY AND THE ENVIRONMENT: THE NORTHEAST ATLANTIC

TIME: 1 DAY

PURPOSE

To examine the impact energy resource exploration and development can have on a coastal area

To examine differences in community needs and interests and how these relate to coastal resource use

MATERIALS

In Package

Transparency IV-2, "Pacific Coast"
Transparency IV-3, "Atlantic Coast"
Reading IV-4, "The Atlantic Oil Sweepstakes"

OVERVIEW

Students view two transparencies of the continental shelf which show the location of present and future oil exploration. They then read an account of oil exploration in the northeast Atlantic and examine the reactions of three areas to the possibility of new oil discoveries in their "back yard."

PROCEDURE

1. Review information presented earlier about the continental shelf. Ask:

   a. What is the continental shelf? Where is it located?

      (The continental shelf is the relatively shallow ocean floor bordering the continental land mass. Along the Atlantic Coast of the U.S., the shelf descends gradually. Off the Pacific Coast, the shelf is narrow and steep.)

   b. What valuable coastal resources are associated with the continental shelf?

      (The shallow waters above the shelf are a prime breeding ground for fish; millions of barrels of oil and natural gas are located below the surface of the continental shelf.)

2. Show the transparencies of the continental shelf. Point out

where oil wells are presently located. Indicate where new oil leases have just been awarded to begin exploring for more oil sources. Concentrate particularly on the East coast of the U.S. Ask students:

a. Why are so many new areas being opened up for oil exploration?

[The U.S. is highly dependent on oil as an energy source. The U.S. government is attempting to find more sources of oil in this country so that we have to depend less on foreign oil. The U.S. consumes 30% of the total world demand. In 1976 the U.S. consumed 6.4 billion barrels of oil; the U.S. produced 3.5 billion barrels, or 55% of its demand. We imported 45%. Oil accounted for 47% of all U.S. energy needs; natural gas accounted for 27.3%. These two total almost 75% of all U.S. energy needs. Coal, water power, and nuclear energy account for the rest.]

Explain that there is about a 25% chance of finding major oil deposits in these new exploration areas.

b. If major oil discoveries are made along the East coast, how might this affect coastal areas?

[Support facilities and services that oil companies need for exploration and production will be needed onshore. These include refineries, petrochemical complexes, enlarged ports and harbors, storage and warehouse facilities for supplies, office space for corporate headquarters, construction sites for building production rigs and other needed equipment, helicopter and other airport facilities, storage tanks for oil, etc.]

c. What are some advantages and disadvantages that might come to a coastal area that is near a major oil find?

[Increased supply of oil and natural gas, increased population for some areas, increased pollution of coastal waters, increased shipping traffic, increased employment opportunities, more industrialized areas, disruption of wetlands and estuaries, etc.]

3. Pass out the reading "Atlantic Oil Sweepstakes".

After the class has finished, have students compare their predictions about coastal impacts with the projections made in the article.

a. Were there support facilities mentioned in the article that students failed to list?

b. Were there advantages or disadvantages that East Coast community planners are considering that students failed to note?

c. Did your class think of certain important factors not covered in the article?

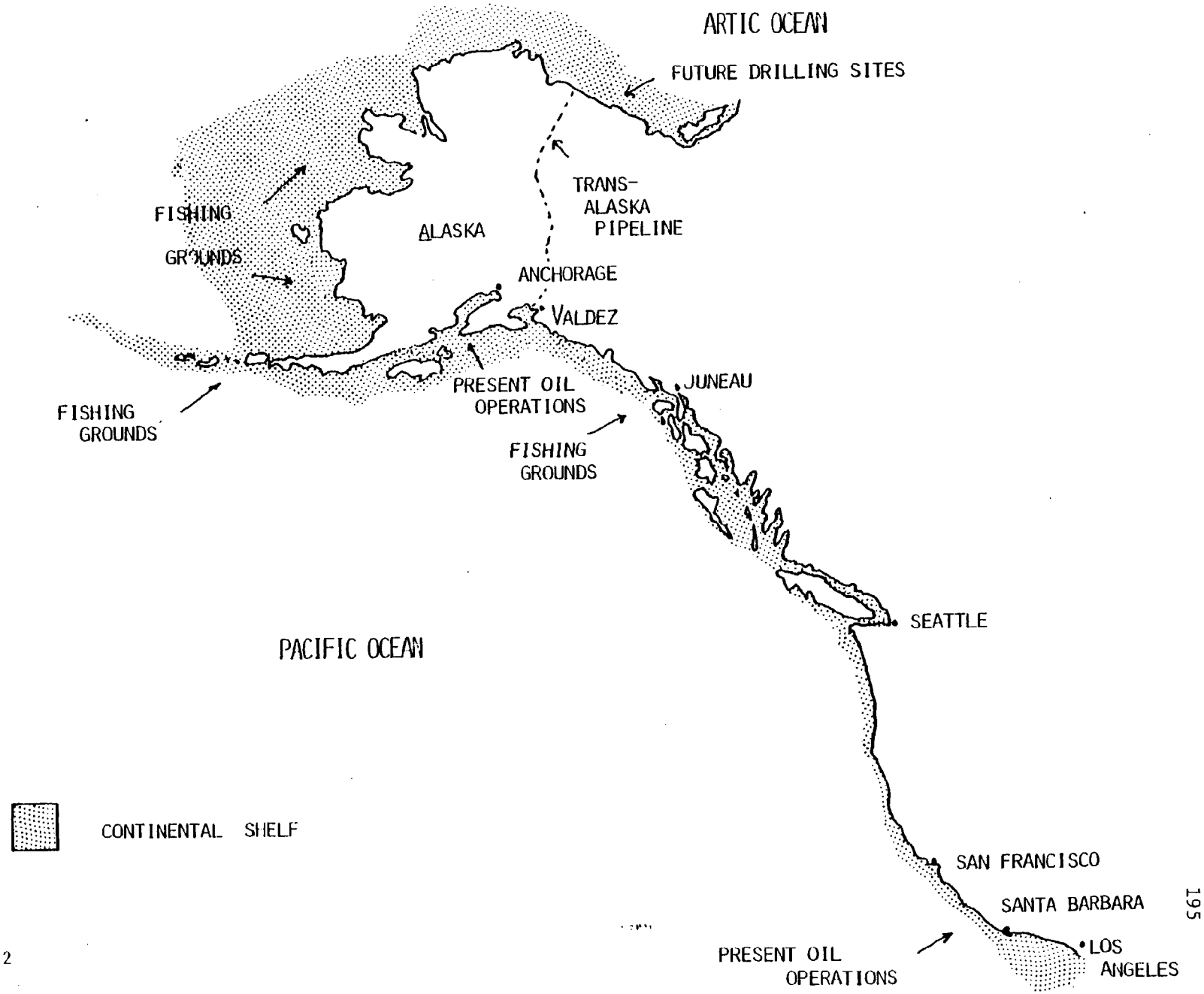
d. What are the positions of the citizens of Cape May, New Jersey, Cape Charles, Virginia, and the state of Rhode Island?

e. How do they differ in their attitudes toward oil companies locating support facilities in their areas?

[Cape May, anti-development; Cape Charles, split; Rhode Island, pro-development.]

f. Which factors does each seem to consider the most important: economic, environmental, or political-social factors?

[Cape May, environmental and political-social; Cape Charles political-social; Rhode Island, economic.]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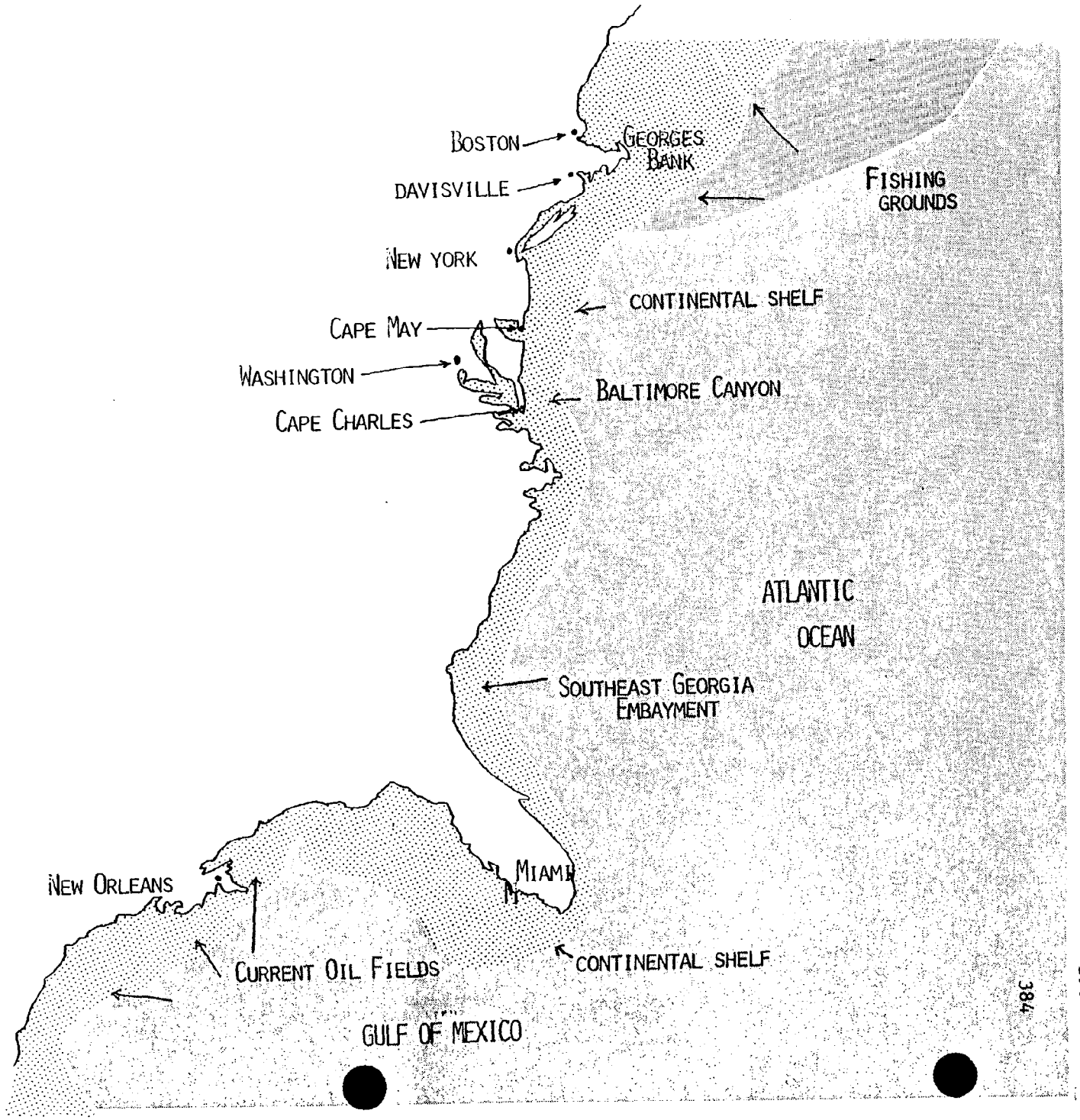

BOSTON
GEORGES BANK
DAVISVILLE
FISHING GROUNDS
NEW YORK
CONTINENTAL SHELF
CAPE MAY
WASHINGTON
BALTIMORE CANYON
CAPE CHARLES
ATLANTIC OCEAN
SOUTHEAST GEORGIA EMBAYMENT
NEW ORLEANS
MIAMI
CURRENT OIL FIELDS
CONTINENTAL SHELF
GULF OF MEXICO

UNIT 4: CASE STUDIES IN SHORELINE MANAGEMENT

LESSON 4: PLANNING AND MANAGEMENT CONFLICTS: BOSSTOWN HARBOR

TIME: 2-3 Days

PURPOSE

To give students a realistic experience of the conflicts which frequently occur among political decision makers

MATERIALS

In Package

Reading IV-5, "Bosstown Harbor Planning Conference Program"
Transparency IV-4, "Bosstown Harbor"
Transparency IV-5, "Container Dock vs. Traditional Handling Method"
Transparency IV-6, "Harbor Pollution"
Transparency IV-7, "Conference Issues"
*Handout IV-1, "Conference Position Papers" (includes BOSSPORT Delegation, Clean Delegation, DNR Delegation, USBA Delegation, BURP Delegation, Office of the Mayor)
Worksheet IV-4, "Voting Sheet"
*Handout IV-2, "Task Force Chairperson's Report Form"
Worksheet IV-5, "Conference Report"
*Handout IV-3, "Task Force Summaries"
Reading IV-6, "Boston Harbor: The Real Thing"
Reading IV-7, "RM: Growth Pains"

*These handouts are not included in the Student Workbook. Make copies from the masters included in the Teachers Guide.

Additional

Stick-on Name Tags
Overhead Projector

OVERVIEW

Students receive an overview of Bosstown Harbor (in reality, Boston Harbor, circa 1970) and the major issues confronting this seaport area. Students join one of six interest groups to be represented at a planning conference. The class then participates in the conference, debating and voting on each issue. A debriefing session, including two short readings, concludes the lesson. The Bosstown Harbor activity simulates the clash of opposing interests. Disagreement and different viewpoints are built into the groups' positions on the various issues. Little agreement will be reached at the conference. This design is intentional so that students will experience first hand the problems many coastal planning efforts have.

PROCEDURE

Part I: Introducing Bosstown Harbor

1. Begin by having students think about what they consider to be good planning. Ask:

   How many of you have been involved this year in planning an event, like a school dance or a pep rally?

   What was your experience? Was the planning easy? Did everyone cooperate with you? How could you or others have made things work better?

   What do you think is needed to make planning effective?

   (Responses might include: Good communication; general agreement about goals; willingness to work together; ability to compromise; acceptance of leaders in the planning group.)

2. State that students will participate in a coastal "Planning Conference" during the next few days.

   Explain that students will role-play delegates representing interests from all levels of government who have been invited to attend a conference. The purpose of this conference is to develop a management plan for the future of "Bosstown Harbor," a major port on the east coast.

   Remind the class that successful role-playing means students must understand and adopt the beliefs of the delegates they represent. They should not deviate from the role they are assigned. At the conclusion of this lesson, there will be time to discuss their own personal feelings, observations, etc. However, during the role-play exercise, it is important for them to accurately and enthusiastically represent their position.

3. Have students read the "Bosstown Harbor Planning Conference Program" (Reading IV-5). Make it clear to students that this is a mock conference, and that all the participating agencies or groups named in the program are fictional, though the issues to be dealt with are real.

   (The factual backdrop for this simulation is the real port of Boston, Massachusetts. This should not be "announced" until the role-play is completed.)

4. After students have read the Planning Conference Program, divide the class into six equal groups. Assign each group to be one of the six delegations listed in the Program.

   Reseat students by delegation.

5. After students have been re-grouped, present the following background sketch of "Bosstown Harbor" using the overhead projector.

SHOW TRANSPARENCY IV-4: "BOSSTOWN HARBOR"

"Bosstown has much to be proud of in its history, but past management of its waterfront resources has not been very good. What is the situation today? Bosstown is no longer a leading seaport.

"Technological change and government neglect have pushed Bosstown into the backwaters of the shipping industry. Technological change has undermined Bosstown's position in two ways.

"First, an indispensable function of the seaport up to now has been to supply oil to much of the New England region. But a new generation of very large oil transport ships, the so-called oil "super-tankers," is coming to dominate oil transport. These new tankers are too big to enter the Inner Harbor area where all the oil receiving facilities of the port are presently located (Belsea area). Dredging the harbor channel to accommodate these supertankers would be so costly it's not a realistic option."

SHOW TRANSPARENCY IV-5: "CONTAINER DOCK VS. TRADITIONAL HANDLING METHOD"

"The other major function of the port has been to handle general cargo shipping. New technologies have challenged Bosstown here as well.

In the last decade, the increasing use of container ships, like the one shown in the top drawing, has revolutionized the worldwide sea cargo trade, cutting transport costs and manpower needs dramatically. Cargo which once took days to load or unload using the methods shown in the lower sketch, takes only hours to load or unload on container ships.

"Ports which want to remain competitive in the cargo trade must finance and construct expensive container dock terminals, large storage area, and be located such that there are good connections with truck and railroad routes.

"The port of Bosstown is losing out in this competition. It has not modernized. Past management neglect, lack of funds, and the resistance of port labor has blocked innovation. There are no operational container terminals in Bosstown, and the inland transport connections from the docks have not been improved.

"Can this situation be turned around?"

SHOW TRANSPARENCY IV-6: "HARBOR POLLUTION"

"Government neglect and poor planning in the past, have also brought on other serious problems. The harbor is a visual and an environmental disgrace. Crumbling piers, rotting wharves, run-down warehouses and ragtail commercial operations line the Inner Harbor.

"Only a tiny fraction of the shoreline is now devoted to public recreation. Public beaches throughout the harbor are overcrowded. Water pollution has been one way of unintentionally solving the problem of overcrowding. Becuase of serious bacterial contamination of harbor water, the beaches are frequently closed by order of the State Department of Health.

"Some 460 million gallons of partially treated sewage enter the harbor every day from other public and private sewage outfalls. Recent studies have found that much of the harbor bottom is covered by a three-foot thick layer of sludge.

"Between industrial wastes, sewage, sludge, bacteria and oil, one wishing to remain healthy dares not swim in the harbor or in the rivers which feed into it."

SHOW TRANSPARENCY IV-7: "CONFERENCE ISSUES"

"Several specific issues will have to be decided by the conference:

a. Should the port area be expanded and new containerized facilities built?
b. How should the Bosstown waterfront area be re-developed?
c. Are present pollution controls adequate?
d. Is a new deepwater port facility for oil tankers needed?
e. Should the harobr's islands become private recreation sites?
f. Should the federal government take a leadership role in the planning of Bosstown Harbor?

SUMMARY(ADDRESS DELEGATES DIRECTLY)

"This is the situation you must address. Decisions must be made at this conference and priorities set for guiding harbor policy during the coming years. As the Governor emphasized to you in his message, technological change, urban growth, waterfront renewal, increased environmental concerns, new energy needs, and strong recreational demands--these pressures have converged upon us all at once, and challenge us to think ahead, work together, and plan better.

"Can the Port of Bosstown and the Bosstown waterfront be salvaged? Where do we go from here?

PART III: Conference Preparation

1. Have each group select a delegation leader.

2. Explain that the conference will be divided into two Task Force sessions, one on Inner Harbor problems and one on Outer Harbor problems. One-half of the representatives from each group will attend the Inner Harbor session and the other half the Outer Harbor session. The specific issues to be discussed at each session are listed on the "Conference Position

Papers."

3. Hand out to each member of a delegation their group's "Conference Position Paper," Handout IV-1. (The BOSSPORT delegation receives the "BOSSPORT Position Paper," the CLEAN delegation receives the "CLEAN Position Paper," etc.)

   After the groups have read the position papers, have each decide which students will at tend which Task Force(Inner Harbor or Outer Harbor).

   After these assignments are made, each person must fill out a "Voting Sheet"(Worksheet IV-4). This will help them remember their position on the various issues. The "Voting Sheet" should be taken with them to the Task Force session.

4. Ask the delegation leaders to be certain that each students is assigned to present the delegation's position on at least one of the major issues to be discussed during the Task Force meetings. Many students will have to be responsible for representing the delegation on two issues. The delegation leader represents the group on at least one issue, also.

5. After these assignments have been made, ask each group to develop a short statement of the delegation's views on "what should be done about Bosstown Harbor and why." This statement will be presented as the delegation's "Opening Remarks" at the beginning of the Task Force sessions.

PART III: Conference Session

1. Pass out blank stick-on name tags and have students write the names of their delegation on the tags in large letters(i.e., BURP, DNR,CLEAN, etc.). Have students wear these name tags throughout the conference session.

2. Have students form two large groups, Inner Harbor Task Force and Outer Harbor Task Force. All representatives from each small group should sit as a unit in each Task Force.

   Each Task Force session will run independently. Students in one session will not need to know what is going on in the other session.

3. Call the conference session "to order." The first order of business is for each Task Force to select a Task Force Chairperson(or you may wish to appoint chairpersons). After the selection, hand out a Task Force Chairperson's Report Form(Handout IV-2) to each new chairperson.

   Review the Task Force meeting procedure outlined on the Chairperson's report form. All votes on proposals will be by delegation. Each delegation

has one vote; therefore, there should always be six votes cast. A two-thirds approval, or four votes, is needed for any proposal to pass.

Announce that the Task Force sessions may now proceed. BOSSPORT should make the first proposal in each session.

4. Circulate between the two Task Force groups. If a group is deadlocked, suggest it move ahead with a vote, or a motion to "table" so the remaining proposals may be presented.

   Remind students of the role-playing requirements. They should accurately and enthusiastically portray their positions. Check how the voting is proceeding. The answer key for the "Task Force Summaries" sheet indicates the direction the voting should take. If this is not the case, roles are not being followed.

5. Before the conference ends, pass out a "Conference Report"(Worksheet IV-5) to students and collect the Task Force Chairperson's Report Form. Each student is to complete the "Conference Report." These will be used during the debriefing session, and can be collected for evaluation purposes at the end of the Bosstown Harbor exercise.

PART IV: Debriefing the Conference

1. Fill in the "Task Force Summaries" form(Handout IV-3) from the results recorded on the two "Chairperson's Report Forms." Duplicate the completed "Task Force Summaries" for class distribution(or put the results on an overhead transparency).

2. Seat students in their original delegation groups. Begin conference "debriefing." Write names of the six delegations on the chalkboard.

   Invite students from each of the delegations except BOSSPORT to describe what they thought of the BOSSPORT delegates' position--what BOSSPORT's basic outlook was, what its goals were, its attitude, etc. Do not allow BOSSPORT delegates to respond to this description. Write student responses on the chalkboard under "BOSSPORT."

   Repeat this procedure for each of the five delegation groups, so that each delegation is described as the other participants at the conference saw that delegation.

3. Invite students in the BOSSPORT delegation to react to what has been said about the BOSSPORT group. BOSSPORT delegates should respond by stating what priorities they took to the conference, and why.

   Repeat this procedure with each of the remaining delegations; be sure each has an opportunity to respond to the other delegations' characterizations.

4. Ask students to discuss their "Conference Reports" with other members of their delegation and to evaluate the conference. Make it clear that there are some judgments about how successful the delegation was in reaching its goals, and how successful the conference was in generating a clear plan to "salvage" Bosstown Harbor.

   Ask delegation leaders in each group to report their delegation's evaluation of the conference, indicating what was accomplished, if anything, from the delegation's point of view, and from an over-all point of view.

5. Have students identify the "problem areas" of their conference Task Force. Ask:

   What were the major problems with the conference?

   [Students should mention the following:

   a. Each group pushed its own ideas and ignored the other's interests and concerns.
   b. Each group had different ideas about what was important. No group would compromise its beliefs.
   c. No one took a broad view of the situation; everyone was so concerned with their own position that the general goal of the conference was not reached.]

   If you are planning to evaluate the "Conference Reports," collect them at this time.

PART V: Summary Readings

1. State that the conference simulation was intentionally set us so that some of the real difficulty of planning for coastal management, as well as some of the complexities of dealing with the coastal zone could be demonstrated. Not every planning meeting is so divisive. However, in this case, the positions and the issues were based on real conflicts over proper resource management of a real coastal area.

2. In the early 1970s, all of the issues and positions students discussed in the simulation were hotly contested in Boston, Massachusetts. The map in the conference "program" is actually a map of Boston Harbor, with all place names slightly changed. The information given to each group is based on resource materials describing the Boston Harbor situation.

3. Have students read "Boston Harbor: The Real Thing" (Reading IV-6). This reading describes later developments concerning the issues raised during the planning conference. After students have read this article, ask:

   Is anyone surprised at how things turned out? Why?

4. Assign Reading IV-7, "RM: Growth Pains." After reading this article, have each student write down at least one idea, or positive step, which might be taken to improve the management process.

5. Review "RM: Growth Pains" reading. Ask:

   a. What are some of the reasons given in the reading for the many disagreements among planners or decision-makers over proper coastal management?

      [Answers should refer to:

      (1) Individual agencies or interest groups often bring only their own narrow perspective to the coastal debate;
      (2) With so many planners and regulators involved in management decisions, there is often poor communication and lack of leadership;
      (3) Agencies often work at cross-purposes.]

   b. What happened with environmental protection efforts in the example of Rhode Island?

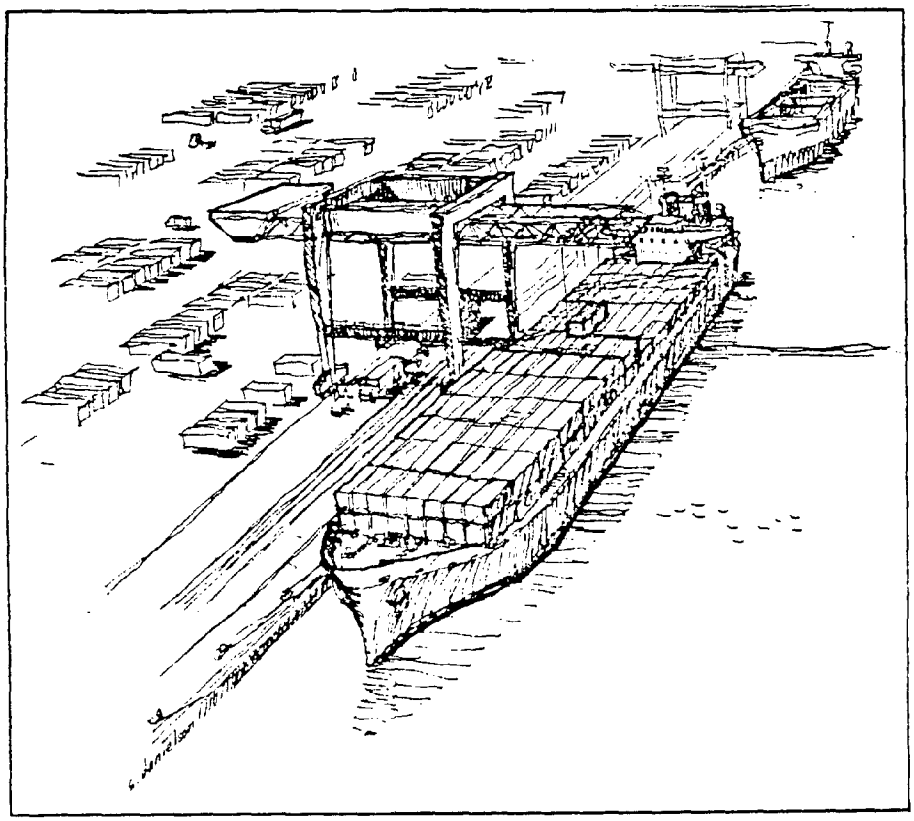
      [By 1975, Rhode Island had legislated into existence thirty-six state agencies which were involved in one area or another of environmental protection and/or resource management. Thw work of these agencies was not highly coordinated.]

   c. Why was the Natural Resource Group so critical of the state government's management process?

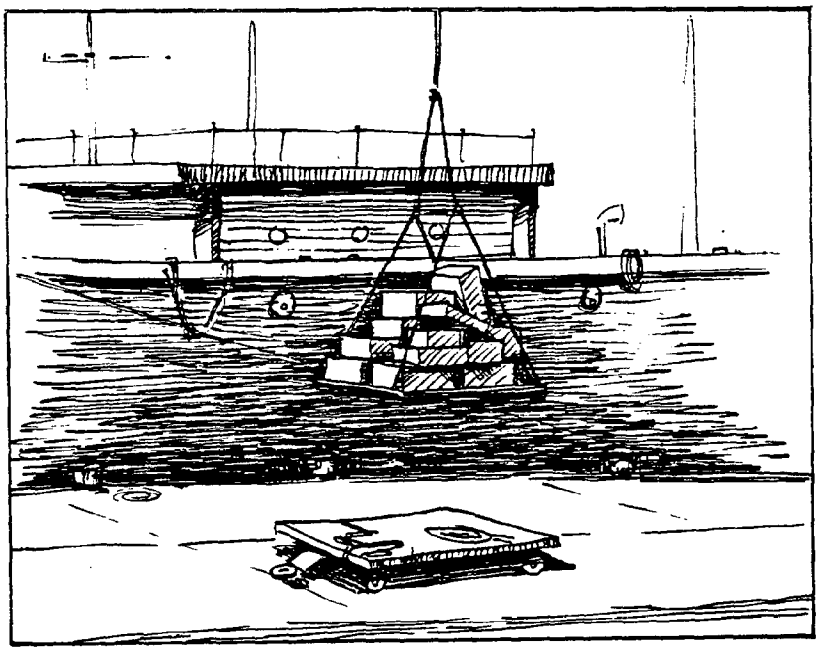
      [There is no comphrensive environmental or management policy; there is no unified, long-range approach to the situation. Also, there is a "piecemeal approach" which brings about a tangle of conflicting laws and regulations, inefficiency and power struggles.]

6. Call on several students to give an idea which could be taken to improve the management process. Write each suggestion on the board and continue "brainstorming" until all ideas or steps which students have thought of are listed. Establish the following ideas, if not suggested by students themselves:

   a. Better communication is needed; there should be more consultation among all decision-makers throughout the planning process.
   b. Leadership is needed; there should be a lead agency or office which coordinates the general planning process.
   c. Citizen involvement is needed; policies will more likely represent public needs rather than special interest groups, if many citizens are actice participants in the planning process.
   d. Comphrensive planning is needed; coastal management efforts should take into account as many factors as possible, including economic, enrionmental and social concerns.

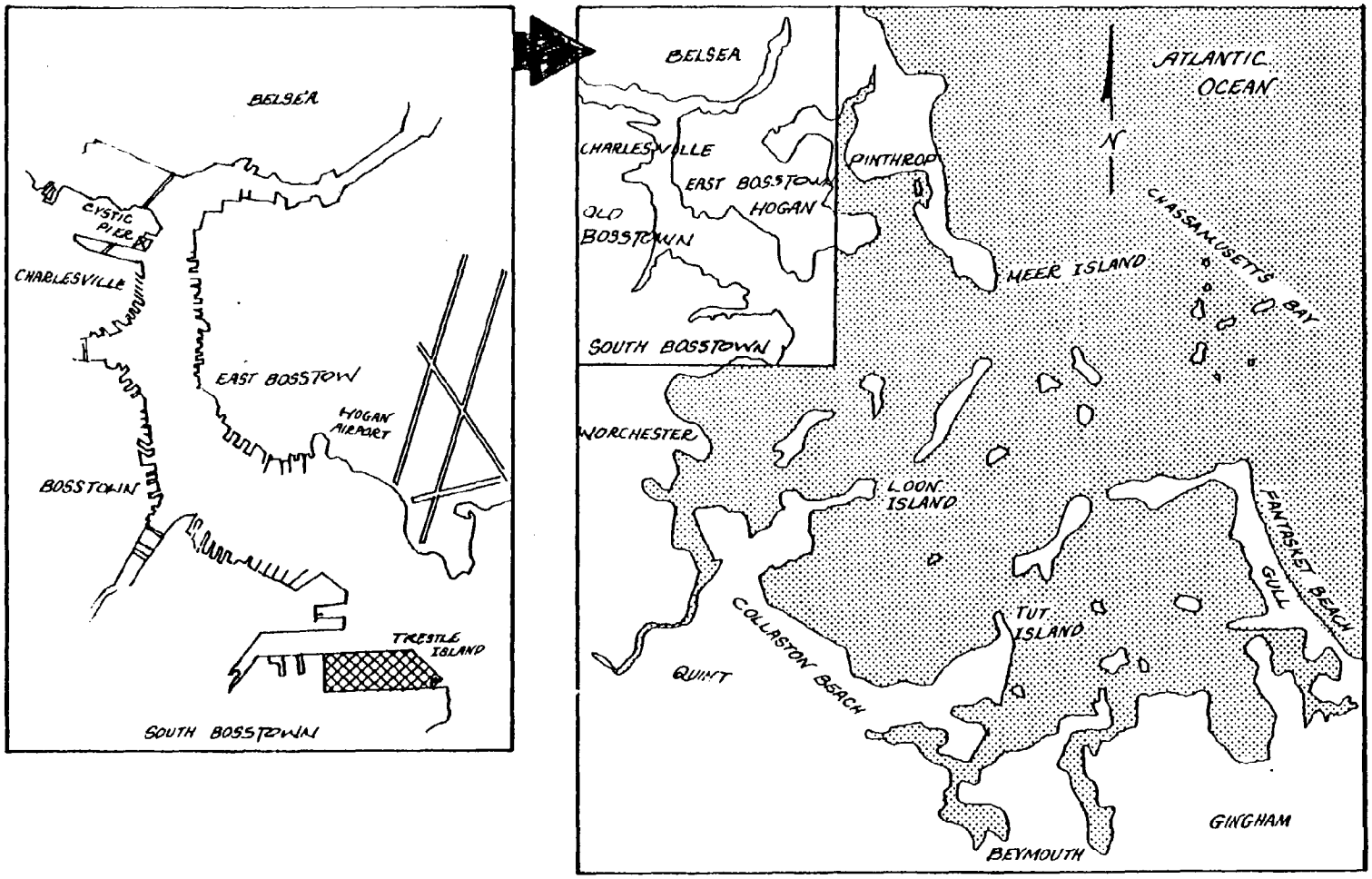


CONTAINERIZED SHIPPING METHODS



TRADITIONAL CARGO HANDLING METHOD

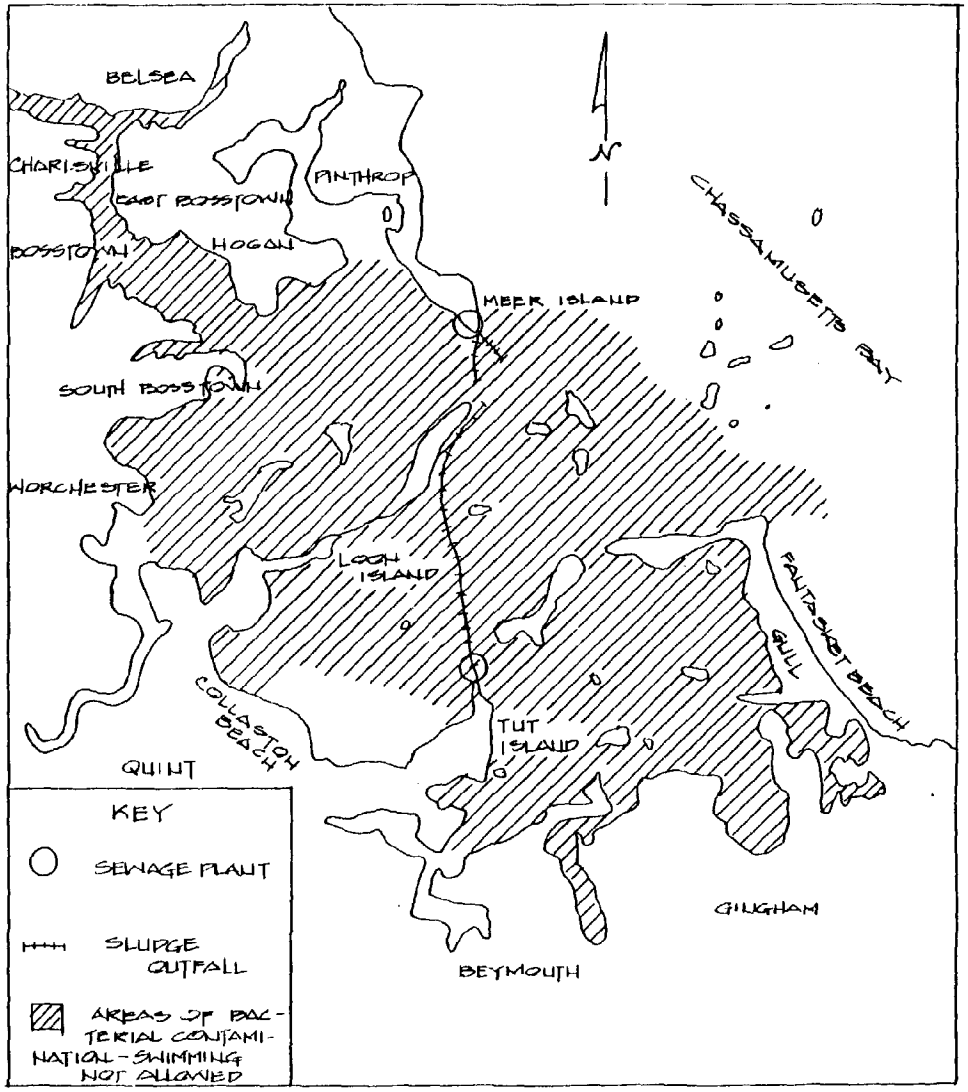
BOSSTOWN HARBOR: Bosstown has a first class natural harbor, encompassing 47 square miles of water, 180 miles of tidal shoreline, and 30 islands. It is also the American port closest to Europe. The section running through Bosstown itself is called the INNER HARBOR, and the rest, the OUTER HARBOR. A large metropolitan area containing over 2.5. million people borders the entire harbor.



INNER HARBOR (ALL COMMERCIAL PORT OPERATIONS IN THIS AREA)

OUTER HARBOR (DARKENED AREA)

BACTERIAL POLLUTION IN BOSSTOWN HARBOR



CONFERENCE ISSUES

1. HARBOR MODERNIZATION???
2. WATERFRONT REDEVELOPMENT???
3. TOUGHER POLLUTION CONTROLS???
4. DEEPWATER PORT???
5. HARBOR ISLANDS FOR RECREATION???
6. ROLE OF FEDERAL GOVERNMENT???

Handout IV-1

BOSSTOWN PORT AUTHORITY(BOSSPORT) DELEGATION:

CONFERENCE POSITION PAPER

1. BOSSPORT'S PRIORITIES

   A. We want to build new container ship docking terminals and an off-shore deepwater oil facility. We believe the economic success of the port depends on the acceptance of these proposals.

   B. We want new business and commerce to be attracted to Bosstown. We believe BURP's plan for a financial and commercial waterfront area is the best means for developing these activities.

   C. We feel BOSSPORT knows best how to run the port, and we want no outside interference with our decisions.

2. POSITION ON ISSUES: INNER HARBOR TASK FORCE

   A. WATERFRONT REDEVELOPMENT: We support BURP's plan. This plan will not conflict with our harbor expansion plans, and will create a much needed waterfront district.

      If CLEAN's plan is accepted, it will close off too many areas to port expansion. Container facilities will then have to be built in other, less desireable locations.

   B. ROLE OF FEDERAL GOVERNMENT: We oppose interference with our management of the port by federal agencies. We do not support the development of a national management plan if this will reduce our ability to act.

   C. ENVIRONMNETAL PROTECTION: We oppose proposals for stricter pollution controls. Money should be spent where it will do the most good--for the improvement of port <u>facilities</u>, not the harbor <u>water</u>. Many more jobs depend on the port's economic growth than on the port's clean water. A vocal minority is trying to frighten the public and pressure conference participants. The pollution problem isn't nearly as bad as the professional troublemakers, like those at CLEAN, make it appear.

3. BOSSPORT PROPOSAL(TO BE INTRODUCED IN INNER HARBOR TASK FORCE)

   In recognition of the primary importance of economic development to the future well-being of Bosstown, BOSSPORT proposes that container dock terminals be built for Bosstown Harbor.

   Containerized shipping has become the primary means of handling goods in

other major Atlantic and European ports. It reduces freight rates and labor costs. The ports of New York and Baltimore, for example, have already drawn a significant portion of Bosstown's cargo trade since they introduced containerized facilities. Failure to move immediately towards containerized facilities will result in a disastrous decrease in jobs, and thus decrease the economic well-being of this area.

4. POSITION ON ISSUES: OUTER HARBOR TASK FORCE

   A. HARBOR ISLANDS: We support purchase of these islands for recreational use, but we must make it clear that energy and port needs come first. If there is a conflict over uses in the Outer Harbor area, BOSSPORT has to take whatever steps are necessary to maintain the well-being of the harbor area.

   B. POLLUTION CONTROLS: Proposals for new water quality standards and improvements in sewage treatment are not in our best interest. We believe present standards and enforcement procedures are tough enough. Insufficient time has been allowed for shipping companies to meet even the current oil pollution requirements. New laws could hurt Bosstown Harbor business. Money spent for pollution control would be better spent for making improvements to port facilities. The pollution problem isn't nearly as bad as professional trouble-makers, like those at CLEAN, make it appear.

   C. ROLE OF FEDERAL GOVERNMENT: See "2-B" under Inner Harbor Task Force.

5. BOSSPORT PROPOSAL(TO BE INTRODUCED IN OUTER HARBOR TASK FORCE)

   In recognition of the critical importance of energy needs to the future well-being of Bosstown and the entire northeast coast, BOSSPORT proposes the development of a major deepwater port facility in the Outer Harbor.

   Bosstown will lose its position as a major petroleum port within the next decade unless it upgrades its oil receiving facilities. Present terminals are old and lack room for expansion. Worse yet, they only service small tankers of World War II vintage. Potential benefits from the new terminal facilities would include reduced fuel costs and the addition of nearly 10,000 new jobs in related industries.

   Bigger ships also mean <u>fewer</u> ships; therefore, a deepwater port would bring <u>less</u> danger from oil spills, not <u>more</u>. Overall water quality would likely be improved. Everyone will benefit from new facilities: consumers by lower fuel bills, the unemployed by new jobs, oil and shipping companies by opportunities for expanded service, and the port and city of Bosstown by increased public revenues. The construction of these facilities is the safe, sensible far-sighted way to insure that Bosstown will continue to be a key oil imports terminal.

Handout IV-1

U.S. BUSINESS ADMINISTRATION (USBA) DELEGATION:

CONFERENCE POSITION PAPER

1. USBA'S PRIORITIES

A. The concerns of the Federal Government must be heard at the conference. We must insure that local and state proposals do not interfere with projects which are needed for meeting the national demands for energy and the efficient distribution of these oil supplies.

B. The Federal Government should take the lead in planning the future of Bosstown Harbor.

2. POSITION ON ISSUES: INNER HARBOR TASK FORCE

A. HARBOR EXPANSION AND MODERNIZATION: We support expanded port operations. The northeastern United States needs to be certain that oil and other important goods flow smoothly in and out of this region. Bosstown has recently declined in importance as a seaport and as a regional business center. Industry has fled to other neighboring states, those with lower taxes and less demanding labor unions. Bosstown needs new port facilities to help economic growth return to the area, and to maintain a strong port system for the country.

B. WATERFRONT REDEVELOPMENT: We support the BURP plan which would stimulate new business enterprise. The Bosstown Harbor area needs new business opportunities to secure future growth for the port. If the port is to expand and modernize, it only makes sense that the waterfront area do the same.

C. POLLUTION CONTROLS: The Federal Government supports higher air and water quality standards for Bosstown Harbor. Experience in other areas of the country shows that polluted harbors are not favored by the public. Clean, well maintained harbors are in the best interest of the public and commerce.

3. USBA PROPOSAL (TO BE INTRODUCED IN INNER HARBOR TASK FORCE)

In recognition of the urgent need for improved coastal resource management, USBA recommends that the Federal Government take the lead role in planning the future of Bosstown Harbor. Many of the problems faced by Bosstown are of national importance; the northeast coast needs a modern, clean harbor facility. Since the importance of the decisions to be made at this conference extends well beyond this immediate areas, the Federal Government is the only one that can provide the necessary leadership. Without strong leadership, the conference and the Harbor, will suffer.

4. POSITION ON ISSUES: OUTER HARBOR TASK FORCE

A. DEEPWATER OIL PORT: The Outer Harbor is large enough to be used for both recreational and commercial purposes, if planning is done wisely. We will support a well though out deepwater port plan for oil receiving terminals in the outer Harbor. The long term energy needs of the region will require the development of such a facility.

Bosstown is the chief intake point for the oil distribution system in the New England region. BOSSPORT must keep up with modern methods if the oil distribution system is to be maintained in good working order and the needs of the people in the region for oil and gas supplies are to be met. A deepwater complex in many ways would reduce the likelihood of oil spills, while increasing the efficiency and capacity of the port to process oil. Recreational use of the area would be restricted somewhat by these new facilities, but would not be excluded.

B. HARBOR ISLANDS: These islands are a fine recreational resource and should be made available for public use.

C. POLLUTION CONTROLS: We support state efforts to improve air and water quality. However, we must be certain that water quality standards do not interrupt port operations or oil receiving and refining processes.

5. USBA PROPOSAL (TO BE INTRODUCED IN OUTER HARBOR TASK FORCE)

In recognition of the urgent need for improved coastal resource management, USBA recommends that the Federal Government take the lead role in planning the future of Bosstown Harbor. Many of the problems faced by Bosstown are of national importance. The northeast coast needs a modern, clean harbor facility. Since the importance of the decisions to be made at this conference extends well beyond this immediate area, the federal government is the only one that can provide the necessary leadership. Besides, the other groups represented at this conference don't seem to be able to agree on much of anything. Without strong leadership, the conference and the Harbor, will suffer.

Handout IV-1

CITIZENS LEAGUE FOR EFFECTIVE ACTION NOW (CLEAN) DELEGATION:

CONFERENCE POSITION PAPER

1. CLEAN'S PRIORITIES

A. We want to see the waterfront and the harbor returned to the people. Government agencies have been mismanaging our coastal resources, and ignoring the public's need for better recreational facilities. We want the harbor and the waterfront to become "people-oriented" again, and we will let everyone at the conference know that the public will is going to be heard on this issue.

B. We must defeat the BURP plan. If it is approved, it will destroy many buildings and replace them with ugly high-rises.

C. We want to end the dumping of sludge and partially treated sewage into Bosstown Harbor. We want better enforcement of harbor water quality standards so public beaches and Outer Harbor islands can once again be safely used by the public. The harbor presently is only a step away from being an open sewer.

2. POSITION ON ISSUES: INNER HARBOR TASK FORCE

A. HARBOR EXPANSION AND MODERNIZATION: We oppose the proposed BOSSPORT projects. They conflict with our goals of increasing public uses of the waterfront and upgrading the harbor environment.

B. WATERFRONT REDEVELOPMENT: We bitterly oppose BURP's proposal for this district. The BURP plan calls for wholesale demolition in the district, and construction of new high-rise offices, apartments, and hotels bordered by a shoreline expressway which will virtually cut off access to the shoreline. This plan should be scrapped immediately.

Urban renewal in this district should be involved in renovating historic buildings, providing shoreline access, making open spaces, developing small marinas, and creating a shoreline park. Our residential-oriented plan would result in the creation of a thriving, new waterfront neighborhood, as opposed to BURP's plan for a commuter-oriented business district.

C. ROLE OF FEDERAL GOVERNMENT:

We oppose the idea of federal leadership and planning. A major reason for opposition is the fact that USBA favors the BURP plan for waterfront redevelopment. However, we do believe some kind of coordinated planning is necessary.

D. POLLUTION CONTROLS: We want to see more consideration given to the environmental impact of proposed harbor projects and activities. We want the pollution in the Inner Harbor cleaned up and stopped. We support increased powers for the state agencies to deal harshly with polluters.

A harbor water quality report just released shows that the harbor has become grossly polluted. Almost 90% of the shellfishing areas in the harbor have been closed or restricted. Further closing of public beaches is likely unless something is done to lower pollution levels. There is substantial evidence that sludge is a principal source of disease-carrying bacteria in the harbor area. A new drying process to turn sludge into fertilizer could be set up on Meer Island. This project would cost $18 million initially, and only $150,000 a year afterwards, a small price to pay for a public health improvement facility.

3. CLEAN PROPOSAL (TO BE INTRODUCED IN INNER HARBOR TASK FORCE)

Bosstown needs a people-oriented waterfront. We propose the CLEAN plan be accepted for restoring the waterfront district.

The waterfront district, has been in slow decline for decades, yet the area has the advantage of having many historic buildings, and is convenient to the state capitol district and many other historic landmarks. A strong waterfront revival has already begun, and many old factories have been remodeled into attractive apartment buildings. The population in the waterfront district has risen almost 100% in the last five years. Continued growth and new commercial development is guaranteed, if the whole district isn't demolished as the BURP plan proposes. Restoring old buildings, as we advocate is also less expensive than building the new high-rises as BURP proposes. CLEAN believes Bosstown will become an admired, trend-setter in returning inner-city waterfronts to the people if our plan is approved.

4. POSITION ON ISSUES: OUTER HARBOR TASK FORCE

A. DEEPWATER OIL PORT: We will fight any proposal which restricts the use of the outer harbor by the public or which would further degrade the environment of the harbor and the shoreline. A deep-water oil port would do both. Thus, we oppose this plan.

B. HARBOR ISLANDS: We strongly support purchase of the Outer Harbor islands and their dedication for public recreational uses.

C. POLLUTION CONTROLS: We want the pollution in the Outer Harbor, cleaned up and stopped so beaches can be re-opened and the harbor islands fully enjoyed. The just released pollution report shows appalling conditions in the harbor. We must see that action is taken to turn this situation around, no matter how much opposition comes from the business-industrial interests. Any delegate who votes <u>for</u> purchase of the harbor islands, but <u>against</u> water quality improvement and control is a hypocrite.

D. ROLE OF FEDERAL GOVERNMENT: See "2-C" under Inner Harbor Issues.

5. CLEAN PROPOSAL (TO BE PRESENTED IN OUTER HARBOR TASK FORCE)

Pollution reduction in the Outer Harbor should be an immediate priority. CLEAN proposes the following actions:

A. Strict enforcement of new water quality standards, with heavy fines assessed against all polluters.

B. Construction of new sewage treatment facilities.

C. Implementation of a new sludge-drying program at Meer Island to end direct dumping of sludge into Bosstown Harbor.

Handout IV-1

BOSSTOWN URBAN RENEWAL PROGRAM (BURP) DELEGATION:

CONFERENCE POSITION PAPER

1. BURP'S PRIORITIES

   A. Economic growth in the harbor and waterfront area depends on an expanded port and a new, modern waterfront.

   B. We want to be sure the CLEAN proposal is defeated. Their plan will eliminate any chance of modernizing the harbor.

2. POSITION ON ISSUES: INNER HARBOR TASK FORCE

   A. HARBOR EXPANSION AND MODERNIZATION: A modern port facility is badly needed in Bosstown. Combined with our plan to rebuild the waterfront area, this proposal will once again help make the harbor area a leading factor in Bosstown's economy. We support the BOSSPORT proposal.

   B. POLUTION CONTROLS: We do not support stricter water quality standards or construction of new sewage treatment plants. Neither of these are necessary and both are very costly. Given the present state of city finances, pollution control should not, at this time, be given a high priority.

   C. ROLE OF FEDERAL GOVERNMENT: We oppose a federal management plan. Federal officials who are not familiar with our needs here in Bosstown should not be in a position to decide whether or not our waterfront plans are appropriate. BURP's freedom of action could be severely limited. Why create another level of bureacracy? We want to keep Bosstown's waterfront under local control.

3. BURP PROPOSAL (TO BE INTRODUCED IN INNER HARBOR TASK FORCE)

   In recognition of the need to bring business and tourism back to Bosstown BURP proposes an urban renewal plan for the Bosstown waterfront district.

   Decayed buildings, empty wharfs, rotting piers, abandoned wharehouses, and tenement houses now line the waterfront. We should first apply the bulldozer, then create an entirely new waterfront. We should provide new housing for the poor and the elderly in addition to new highrises and business plazas in the waterfront to attract business and tourism back to the area. A new shoreline expressway will make the waterfront more accessible and will also shorten the trip from the waterfront to Hogan Airport.

   Our waterfront proposal will open up the waterfront for new urban and commercial uses, eliminate blight and create an entirely new waterfront for the use of all of our citizens.

4. POSITION ON ISSUES: OUTER HARBOR TASK FORCE

A. DEEPWATER OIL PORT: We oppose the construction of a deepwater oil port. BOSSPORT is exaggerating the "energy crisis." Smaller ships and barges can continue to service our inner harbor oil receiving terminals. BOSSPORT's proposals are expensive, unnecessary, and potentially harmful to the environment.

B. HARBOR ISLANDS: We support the purchase of the Harbor Islands for public recreational uses. The islands can be used for hiking, picnicking, sailing, and fishing. It is appropriate that the state government purchase these islands, as they will be used by people from all over the state.

C. POLLUTION CONTROLS: The water of the Outer Harbor is polluted, but the costs of restoring and maintaining high water quality are unacceptable. Construction of new sewage treatment plants and removal of sludge from the harbor bottom would be very costly. Given the present state of city finances, pollution control should not presently be given a high priority.

D. ROLE OF FEDERAL GOVERNMENT: See "2-C" under Inner Harbor Issues.

5. BURP PROPOSAL (TO BE INTRODUCED IN OUTER HARBOR TASK FORCE)

We have no proposals to make in this task force. Listen, and make our positions known, but do not make any specific proposals.

OFFICE OF THE MAYOR OF BOSSTOWN DELEGATION:

CONFERENCE POSITION PAPER

1. MAYOR'S OFFICE PRIORITIES

A. The Office of the Mayor supports economic growth in the Harbor area. However, the Mayor cannot risk losing the political support from longshore and other unions by favoring any plan which calls for a reduction in the number of port jobs.

B. The Office of the Mayor supports restoration of the waterfront district in order to promote tourism and preserve Bosstown's historical traditions.

C. The Office of the Mayor supports efforts to provide more waterfront recreation facilities.

D. The Office of the Mayor opposes stricter water quality standards and new sewage treatment plants because of the expense involved. The city cannot afford these projects.

2. POSITION ON ISSUES: INNER HARBOR TASK FORCE

A. HARBOR EXPANSION AND MODERNIZATION: We oppose BOSSPORT's plan to build new container facilities. Such port expansion and development will interfere with the waterfront restoration programs which have wide popular support. We also oppose containerization facilities because this will result in a reduction of the port labor force. The Mayor needs the support of labor and must back the longshoreman's union on "no containerization" at this time.

We also oppose BOSSPORT on this proposal because they have failed to file environmental impact statements for any of its projects.

B. WATERFRONT REDEVELOPMENT: The Mayor's office opposes the BURP plan and supports the CLEAN plan. We believe it is important to preserve the historic traditions of this city; modernization programs are needed, but not in this area.

C. ROLE OF FEDERAL GOVERNMENT: The Mayor's office opposes federal government leadership in the planning of the Harbor. The federal government has already gobbled up too much power, and is making too many decisions that the states and cities should be making for themselves.

The states have the right to manage their own coastlines, and the states have traditionally delegated this authority to local governments. We oppose any efforts by the federal government to change this situation.

D. POLLUTION CONTROLS: We oppose stricter water quality standards. If passed, this would mean the city has to build new sewage treatment facilities. City engineers have doubts that there would be a significant improvement in water quality as a result of new sewage treatment plants. There are more immediate problems which the public expects the city to be addressing, such as the increasing crime rate, unemployment, and the building of a new sports arena. Pollution control is not the Mayor's highest priority.

3. OFFICE OF THE MAYOR'S PROPOSAL: (TO BE INTRODUCED IN INNER HARBOR TASK FORCE)

Do not offer any proposals in this task force. Listen, and make our position known, but do not offer any specific proposals.

4. POSITION ON ISSUES: OUTER HARBOR TASK FORCE

A. DEEPWATER OIL PORT: Although the prospect of many new jobs from such a port is attractive, the Mayor's Office cannot publicly support this BOSSPORT project because of the current political atmosphere. Environmental groups are determined to prevent such a project, and they have wide public support. We oppose the deepwater port in order to maintain the Mayor's reputation as a supporter of the environment (and to offset criticism which the Mayor's position on pollution controls will generate).

B. HARBOR ISLANDS: The Mayor's Office supports the purchase of the Harbor Islands. There is a real need for additional coastal recreational areas, and the use of state funds to create new park sites is appropriate.

C. ROLE OF FEDERAL GOVERNMENT: See "2-C" under Inner Harbor issues.

D. POLLUTION CONTROLS: See "2-D" under Inner Harbor issues.

5. OFFICE OF THE MAYOR'S PROPOSAL: (TO BE INTRODUCED IN OUTER HARBOR TASK FORCE)

Do not offer any proposals in this task force. Listen, and make our position known, but do not offer any specific proposals.

Handout IV-1

STATE DEPARTMENT OF NATIONAL RESOURCES (DNR) DELEGATION:

CONFERENCE POSITION PAPER

1. DNR'S PRIORITIES

A. We favor a serious attempt to improve air and water quality in Bosstown Harbor.

B. We want improved coastal recreational opportunities for the public.

2. POSITIONS ON ISSUES: INNER HARBOR TASK FORCE

A. HARBOR EXPANSION AND MODERNIZATION: We oppose Bossport's plan to expand and modernize the harbor area. Bossport has failed to file an environmental impact statement with our office, as required by law. Even though we believe Bossport's plans may be appropriate, we cannot approve them at this time.

B. WATERFRONT REDEVELOPMENT: The DNR office opposes the BURP plan because it will cause serious air pollution problems. BURP's plan for high-rise office and hotel buildings promotes a suburban, commuter lifestyle which will increase auto exhausts. Further it will cut back public recreation opportunities.

DNR supports the CLEAN plan for rennovation of the Bosstown waterfront area. The CLEAN plan will promote a very liveable, friendly neighborhood and will discourage commuter lifestyles. Plus, the CLEAN plan supports public recreation areas and public use of the waterfront areas.

C. ROLE OF FEDERAL GOVERNMENT: We are certainly aware of the need for overall planning and cooperation of state and federal agencies. But the federal government is being too pushy, and is trying to ram its leadership down our throats. They should be involved in the planning process, but we oppose the federal government having a leadership role.

3. STATE DNR PROPOSAL (TO BE INTRODUCED IN INNER HARBOR TASK FORCE)

In recognition of the declining quality of air and water in the Bosstown waterfront area, DNR proposes that atronger laws be passed giving DNR increased powers to enforce air and water quality standards. We need these new laws so that we can take polluters to court and fire or imprison them. Only then can we have a waterfront area worth living in.

The present conditions are certainly serious enough to support our position. Ninety percent of the shellfishing areas in the harbor have been closed or restricted. Several public beaches have also been closed.

4. POSITION ON ISSUES: OUTER HARBOR TASK FORCE

A. DEEPWATER OIL PORT: We oppose such a project. The need is not proven, and if Bossport builds this port, it would cause serious environmental damage. The possibility of major oil spills make this project unthinkable. Our coastal resources are too valuable to threaten in this way. Further, Bossport has not proven its case that a deepwater port will really provide 10,000 new jobs. This port will also severely interfere with recreational uses of the Outer Harbor.

B. POLLUTION CONTROLS: We strongly support any proposals to help control pollution in the harbor. The recent report harbor water quality shows serious problems with disease-carrying bacteria. And, increased recreation opportunities (which we favor) depend on reducing pollution in the harbor.

C. ROLE OF FEDERAL GOVERNMENT: See "2-C" under Inner Harbor Issues.

5. STATE DNR PROPOSAL (TO BE INTRODUCED IN OUTER HARBOR TASK FORCE)

In recognition of the need for increased coastal public recreation sites, the state DNR recommends that the state purchase the Outer Harbor islands. These islands can be used for picnicking, hiking, sailing, and fishing. The waterfront area badly needs these new recreation sites.

TASK FORCE CHAIRPERSON'S REPORT

PROCEDURE FOR CHAIRPERSON:

1. Invite each delegation to present its "Opening Remarks."

2. Ask for a show of hands to see how many delegations have proposals to present in the Task Force.

3. Begin presentation of proposals with the BOSSPORT delegation. Delegates should state the full supporting "case" when presenting the proposal.

4. Call for comments, questions, objections from other delegations. You may participate in this debate, too.

5. Following discussion of a proposal, call for a vote to approve or disapprove. Voting should be done by show of hands, one vote per delegation (six votes).

6. Record vote results in space below; then open the floor for presentation of another proposal.

   Proceed as earlier; after a supporting case and a proposal is presented, invite comments and questions, and then call for a vote.

VOTING REPORT:

1. Record YES or NO vote of each delegation on each proposal. Show total votes at right. Under "Decision," write "YES" or "NO." A proposal must receive four (4) votes to pass.

PROPOSAL	RECORD VOTES (YES or NO)						TOTAL		DECISION
	BOSSPORT	BURP	MAYOR	STATE DNR	USBA	CLEAN	YES	NO	YES/NO

TASK FORCE SUMMARIES

INNER HARBOR TASK FORCE

PROPOSAL	BOSSPORT	BURP	MAYOR	STATE DNR	USBA	CLEAN	YES	NO	PASSED
HARBOR EXPANSION AND MODERNIZATION									
WATERFRONT REDEVELOPMENT: BURP PLAN									
WATERFRONT REDEVELOPMENT: CLEAN PLAN									
ROLE OF FEDERAL GOVERNMENT									
POLLUTION CONTROLS									

OUTER HARBOR TASK FORCE

PROPOSAL	BOSSPORT	BURP	MAYOR	STATE DNR	USBA	CLEAN	YES	NO	PASSED
DEEPWATER OIL PORT									
HARBOR ISLANDS									
POLLUTION CONTROLS									
ROLE OF FEDERAL GOVERNMENT									

TASK FORCE SUMMARIES

INNER HARBOR TASK FORCE

PROPOSAL	BOSSPORT	BURP	MAYOR	STATE DNR	USBA	CLEAN	YES	NO	PASSED
HARBOR EXPANSION AND MODERNIZATION	YES	YES	NO	NO	YES	NO	3	3	NO
WATERFRONT REDEVELOPMENT: BURP PLAN	YES	YES	NO	NO	YES	NO	3	3	NO
WATERFRONT REDEVELOPMENT: CLEAN PLAN	NO	NO	YES	YES	NO	YES	3	3	NO
ROLE OF FEDERAL GOVERNMENT	NO	NO	NO	NO	YES	NO	1	5	NO
POLLUTION CONTROLS	NO	NO	NO	YES	YES	YES	3	3	NO

OUTER HARBOR TASK FORCE

PROPOSAL	BOSSPORT	BURP	MAYOR	STATE DNR	USBA	CLEAN	YES	NO	PASSED
DEEPWATER OIL PORT	YES	NO	NO	NO	YES	NO	2	4	NO
HARBOR ISLANDS	YES	YES	YES	YES	YES	YES	6	0	YES
POLLUTION CONTROLS	NO	NO	NO	YES	YES	YES	3	3	NO
ROLE OF FEDERAL GOVERNMENT	NO	NO	NO	NO	YES	NO	1	5	NO

UNIT 4: CASE STUDIES IN SHORELINE MANAGEMENT

LESSON 5: SHORELINE MANAGEMENT: NATIONAL LEGISLATION

TIME: 2 DAYS

PURPOSE

To familiarize students with the major federal legislative act affecting management of the coastal region

MATERIALS

In Package

Worksheet IV-6, "Format For A Legislative Act"
Reading IV-8, "The Coastal Zone Management Act of 1972"

OVERVIEW

Students review several problems with the use of coastal resources. They use this list as a basis for drafting their own coastal management legislation. Their legislation is then compared with the actual Coastal Zone Management Act.

PROCEDURES

Part I: Reviewing Coastal Resource Problems

1. Write the words "Coastal Problems" and "Management Problems" as column headings on the chalkboard. Ask students to review in their minds all the coastal and management problems brought out in the course thus far.

2. Pair students up and aks each to take out one piece of notepaper. Have each student pair work together to write down as many of the coastal and management problems, including a short description of each, as can be recalled.

3. Review the lists of coastal and management problems the students report. Call on several students to list one of their problems. Continue to review until all the major problems covered in the course have been recalled. Write each problem on the board under the appropriate heading. The list may include several answers; the following are likely responses:

COASTAL PROBLEMS	MANAGEMENT PROBLEMS
Sewage and waste disposal	Limits to regulatory powers (Taking Issue)
Oil pollution	Jurisdictional disputes
Wetlands protection	Ignorance of coastal ecology
Recreational access	Disregard for coastal ecology
Natural hazards	Local vs. regional interest
Conflicting uses	Conflicting priorities
Depletion of natural resources	Narrow perspective among decision makers
Fragility of natural ecosystems	Uncoordinated permit system (delays, "red tape," etc.)

4. Ask students to now think about solutions to these problems. How should government respond to this situation?

Part II: Drafting a Coastal Management Act

1. Announce that students will become lawmakers and will have to decide what action the federal government should take to deal with the coastal and management problems which have just been reviewed. Their lawmaking task is to draft a "National Coastal Management Act" to become law for the whole country.

2. Arrange the class in "Congressional Committees" of three to four students each. Keep the original review session pairs intact if possible.

3. Pass out the "Format For A Legislative Act" worksheet to members of each committee. Explain that the committees will follow the three sections of the worksheet.

   Section 1 includes the findings of the committee regarding problems in coastal resource use. Students will put many of their coastal and management problems they identified earlier in this section.

   Section 2 includes the goals of the Act. These could range from "preserving coastal resources" to "encouraging the use of coastal resources in the development of new energy sources." Groups should decide on one or more goals and list them here.

   Section 3 briefly describes what new laws you propose, and how they will be put into effect.

4. Have the committees begin deliberations on drafting their version of a "National Coastal Management Act." You can require each student to hand in a completed worksheet or have each group work on it as a joint project.

Announce that you will collect these "acts" and that students should be prepared to present and defend their ideas.

5. When students have completed the assignment, ask each committee to report on their draft of the management act. If there are significant differences among the various committee drafts, encourage discussion and debate.

6. Pass out Reading IV-8, "The Coastal Zone Management Act of 1972." After students have read this summary of the actual Congressional Act, discuss differences between the students' versions and the actual law. Ask:

   Do you think the Coastal Zone Management Act or any federal law can make a serious difference in or change how we use our coastlines? Why?

UNIT 4: CASE STUDIES IN SHORELINE MANAGEMENT

LESSON 6: SHORELINE MANAGEMENT: STATE INITIATIVES

TIME: 1-3 DAYS

PURPOSE

To familiarize students with the major legislative acts in their state which have an impact on management of the coastal region

MATERIALS

In Package

None

Additional

Newspaper clippings of state-wide coastal issues(optional)

OVERVIEW

Students first review several environmental, social, and planning problems associated with the use of coastal resource in their states. They then examine legislation passed in their state which attempts to deal with shoreline problems. This teaching plan is designed so that you and/or your students add much of the substantive information about your state. You should contact the state Coastal Zone Management office for information about the state's coastal areas and the status of shoreline management legislation. The CZM office may be able to provide slide shows, speakers, and various kinds of publications to share with your class.

PROCEDURE

1. Begin by asking students to name major coastal problems that exist in the state. Write the answers on the board. You can use the news clippings collected for the "TV News Shows" at the conclusion of Units 1, 2, and 3 for specific examples of coastal problems.

2. Ask students what kinds of legislation or new laws would help solve these problems. Have students suggest specific laws or regulations.

   Ask students if they know of any legislation that the state has already passed to deal with shoreline problems.

3. Remind students that one possible source of new legislation is the state's Coastal Zone Management Program. The object of this program is to develop a comprehensive plan for the management of coastal areas.

   To review the content of the state's CZM plan, ask the class to find the answer to the following questions. Three ideas for arranging a class activity to answer these questions are given in procedure #4.

   a. What are the boundaries of the state' coastal zone? Remember, once boundaries are determined, the CZM agency has a great deal of control over what goes on there.

   b. How where the boundaries decided upon?

   c. What kinds of land uses in the shoreline area are encouraged?

   d. Are certain kinds of land uses in coastal areas prohibited?

   e. What areas have been designated as "areas of particular concern?" These are areas that deserve special protection or attention. Some areas may be so identified because of their environmental uniqueness, their historical or cultural significance, or their intensity of development.

   f. What impacts on the state's coastal region will the CZM legislation likely have?

   g. Has the CZM program recommended any new laws be passed? If so, have they been passed or defeated?

4. Different procedures can be used by the class to answer these questions:

   a. Have each student answer all or some of the questions. Use newspaper accounts and CZM publications as sources.

   b. Address these questions to the state CZM speaker if one visits your class. Students might then write a brief report based on their findings.

   c. Have students play the role of state shoreline planners. Hand out information on the state's shoreline, including maps and data on different kinds of uses. If available, include projections of future demands on the shoreline.

      Have students use this data to answer these questions as though they were preparing a state shoreline plan.

Teacher's Guide

UNIT 4: CASE STUDIES IN SHORELINE MANAGEMENT

LESSON 7: COASTAL FUTURES: A PERSONAL CASE STUDY

TIME: 2 DAYS

PURPOSE

To make predictions about the future of the local coastal region.

MATERIALS

In Package

Worksheet IV-7, "Coastal Futures"
Worksheet IV-8, "Guidelines For Preferred Future Scenario"
Worksheet IV-9, "Guidelines For Probable Future Scenario"

OVERVIEW

Students consider several important factors about the future of coastal areas. They then develop their own scenarios of the local shoreline projecting a "probable" and a "preferred" future for the coastal region.

PROCEDURE

1. Explain to the class that up to this time they have been studying the shoreline and its problems from the perspective of many different people and groups. In this lesson, the future of the local coastal region will be described and analyzed from the perspective of each student. Pass out the "Coastal Future" worksheets and review the worksheet assignment with students.

2. Arrange students in small groups of 3 - 4 students each to discuss and to complete the "Coastal Future" assignment.

3. After the groups have finished, designate one-half of the groups the "Preferred Future" groups, and the other half the "Probable Future" groups.

   Pass out the "Guidelines For Preferred Future Scenario" and the "Guidelines for Probable Future Scenario" to the appropriate groups.

   Each group should now prepare a 3-5 minute presentation describing the group's view of the preferred or probable future of the local coastal area. Guidelines for this "scenario" are in the worksheets.

4. Assist each group in formulating the content and style of its presentation. Allow students enough time to prepare a good presentation.

5. Have the "Preferred Coastal Future" groups give their presentations first. Limit each group to 3-5 minutes.

   Discuss with the class any substantive differences among the "Preferred Coastal Future" presentations. Work toward a consensus or definition of the priorities which students have presented as being essential to their "preferred coastal futures."

6. Have "Probable Coastal Future" groups give their presentations.

   Discuss differences which have come out between the "Preferred" and the "Probable" futures scenarios.

7. Discuss students' views of steps which can or need to be taken to lessen, redirect, or relieve present and future stresses on the local coastal environment.

8. For a possible homework assignment, have students write a letter to his/her State Representative and/or State Senator describing their hopes and fears concerning the local coastal region, and suggesting at least one positive step to bring out the future the student <u>prefers</u>. Students could write or type these letters and turn them in to you for reading before mailing.

STUDENT WORKSHEETS

COASTAL PROBLEMS AND RESOURCE MANAGEMENT

A SECONDARY SOCIAL STUDIES COURSE

STUDENT WORKSHEETS

CURRICULUM RESEARCH AND DEVELOPMENT GROUP
UNIVERSITY OF HAWAII AT MANOA © 1979

Coastal Problems and Resource Management

produced by

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The development of Coastal Problems and Resource Management was supported by the Office of Coastal Zone Management, NOAA, Department of Commerce, Grant Number 04-7-158-44035, and the Hawaii Coastal Zone Management Program, Department of Planning and Economic Development, State of Hawaii.

Acknowledgements

The process of designing, testing and revising CPRM continued for two years. This final version reflects the combined talent, imagination, and hard work of many people. Major contributors to the development of the course are listed on the previous page, but many others also contributed significantly to the development of CPRM. We would like to take this opportunity to acknowledge their support, time and advice:

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Elizabeth Lance, Office of Coastal Management, Raleigh, N.C.
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Marilyn Tomita, Social Studies Teacher, Kaimuki High School, Honolulu, HI
Donald Young, FAST Science Project, University of Hawaii, Honolulu, HI

NATIONAL SHORELINE QUIZ

(1) How many of the 50 United States are considered by the U.S. Government to be "coastal states"? (The definition of a coastal state is one that borders the oceans or the Great Lakes.)

_____ states

(2) What percentage of the population of the United States lives within 50 miles of the coastline?

10% 25% 33% 50% 65%

(3) An estuary is:

a. an iceberg that floats too near a coastline.
b. a place along the coast where fresh water and salt water mix.
c. the scientific name for a rock crab.
d. a machine on a whaling ship used to haul whales out of the water.

(4) Which is the most productive in terms of tons of organic matter produced per acre?

a. desert
b. wheat field
c. salt marsh (coastal wetlands)
d. deep ocean

(5) What percentage of trade between continents is carried by ships?

10% 25% 53% 75% 99%

(6) What percentage of the U.S. shoreline is set aside by the government for public recreation?

2% 14% 25% 53% 65%

(7) Sharkburgers are likely to become the next most popular sandwiches in seafood restaurants.

True False

(8) From the following list, name the 5 fish or shellfish which are of most economic value to the U.S.:

Crabs
Tuna
Lobsters
Menhaden
Scallops
Shrimp
Oysters
Flounder
Clams
Salmon

1. _____
2. _____
3. _____
4. _____
5. _____

(9) Which state in the U.S. has the most miles of coastline? (Coastline refers to the length of the general outline of the Seacoast.)

_____

(10) What percentage of the world's water is salt water?

3% 28% 50% 70% 97%

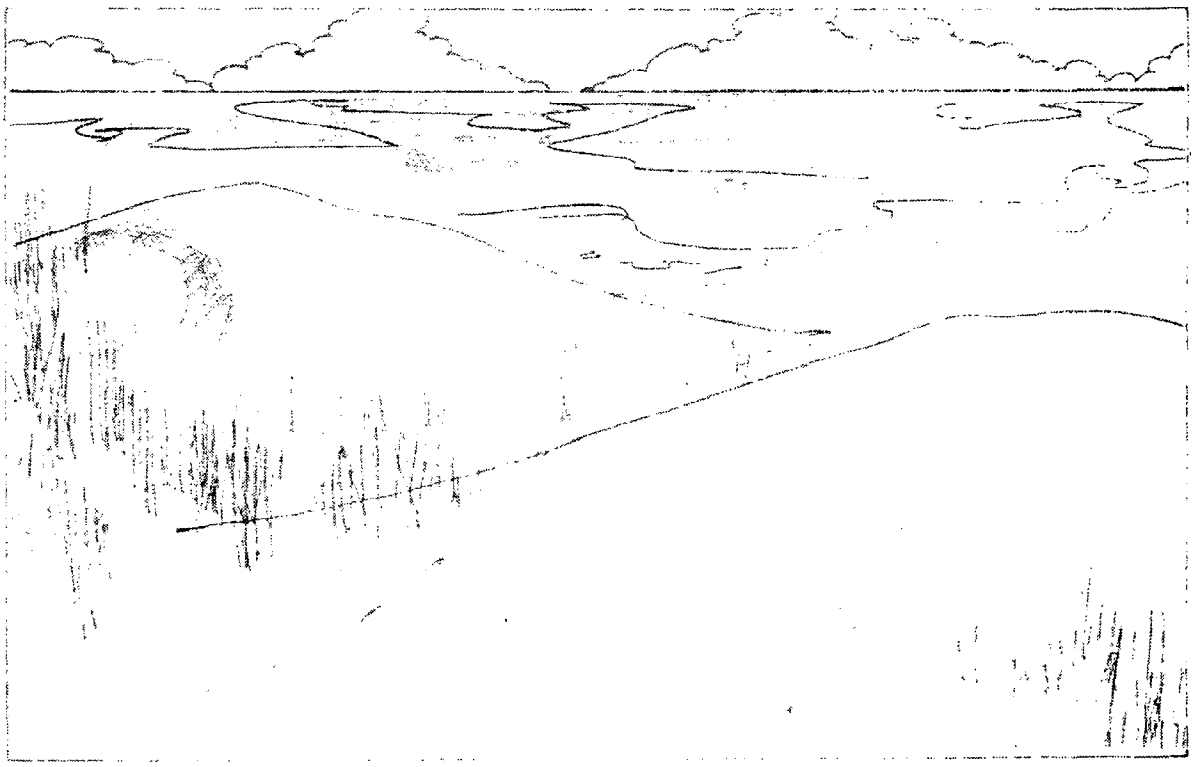
S-Q score _____(Number correct)

S-Q rating

10	A real shoreline genius
7-9	Knows a lot about the shoreline
5-6	Can recognize the shoreline when they see it
3-4	Can recognize the shoreline if someone points it out
0-2	Will probably drown within 10 feet of the shoreline

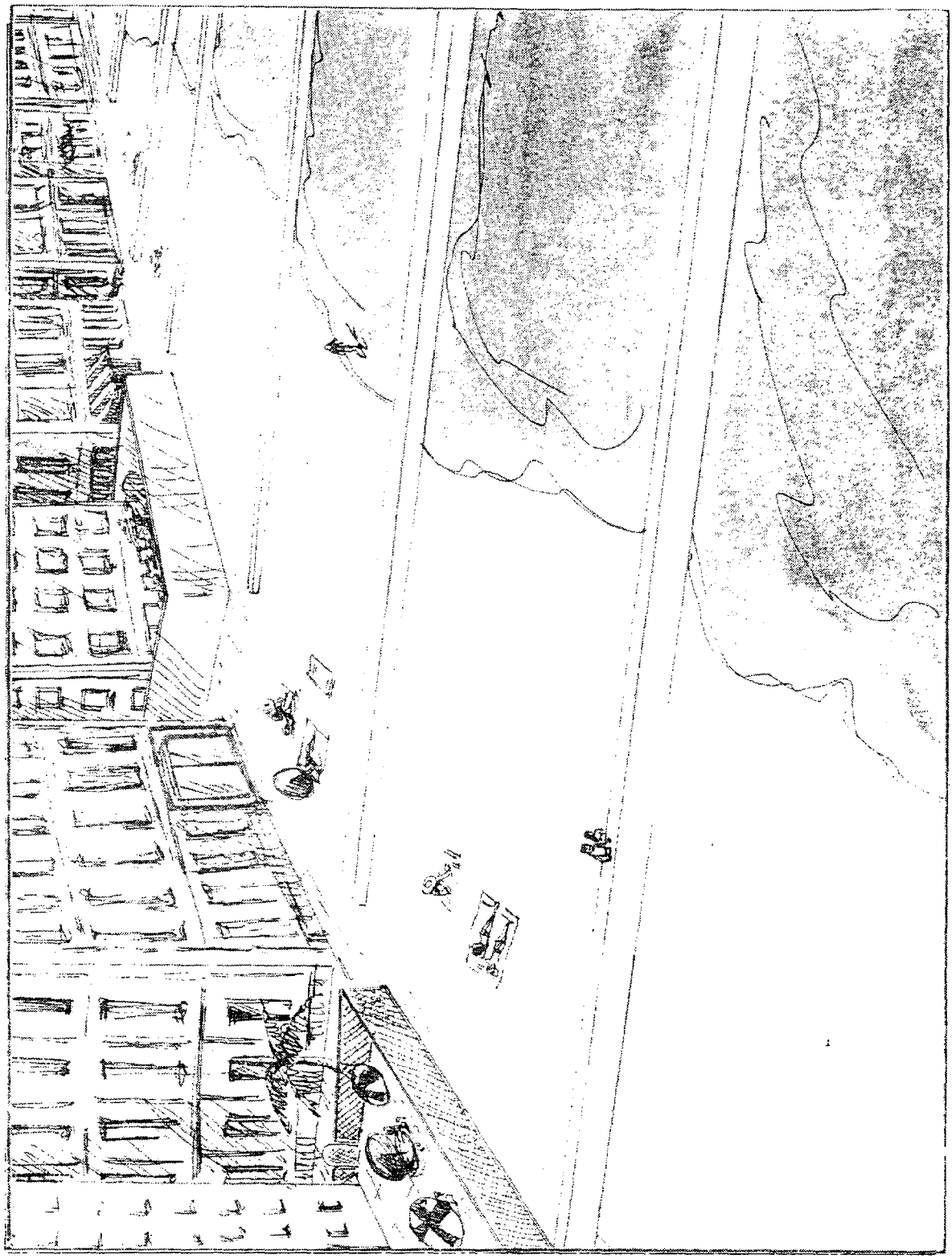
Worksheet I-2

COASTAL FEATURES



1. _____

2. _____



3. _____

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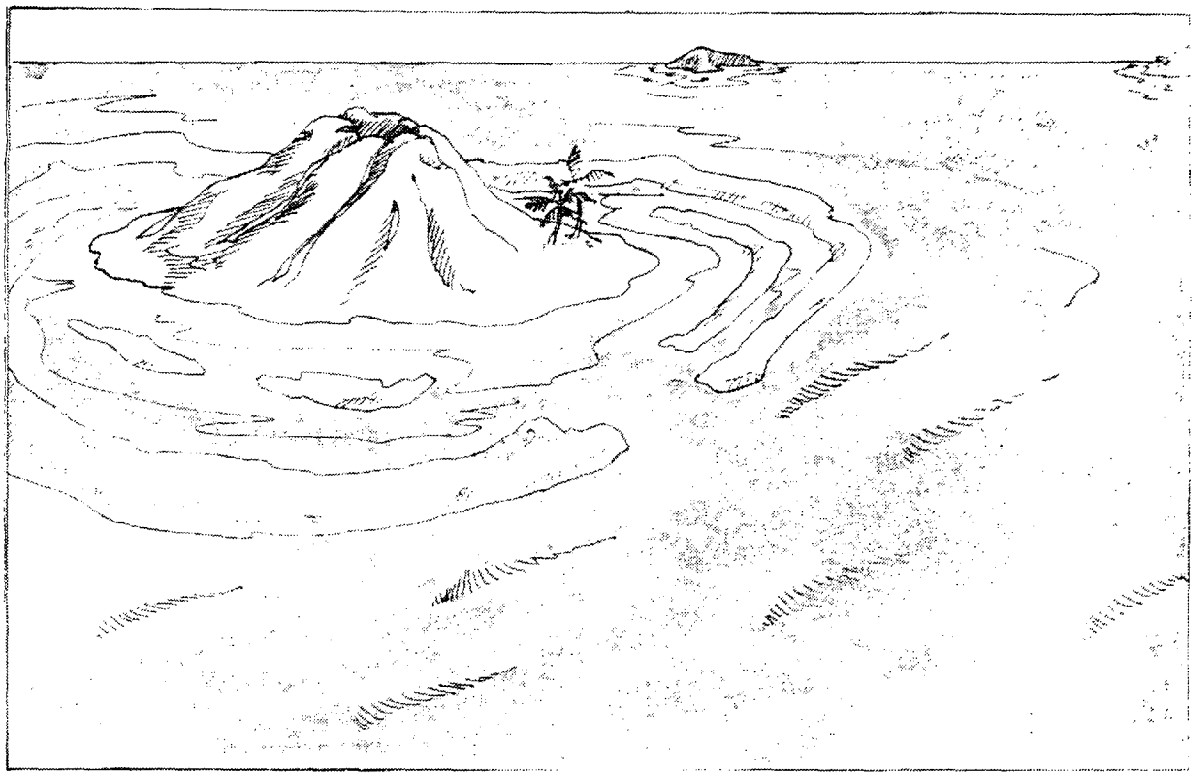
7. _____



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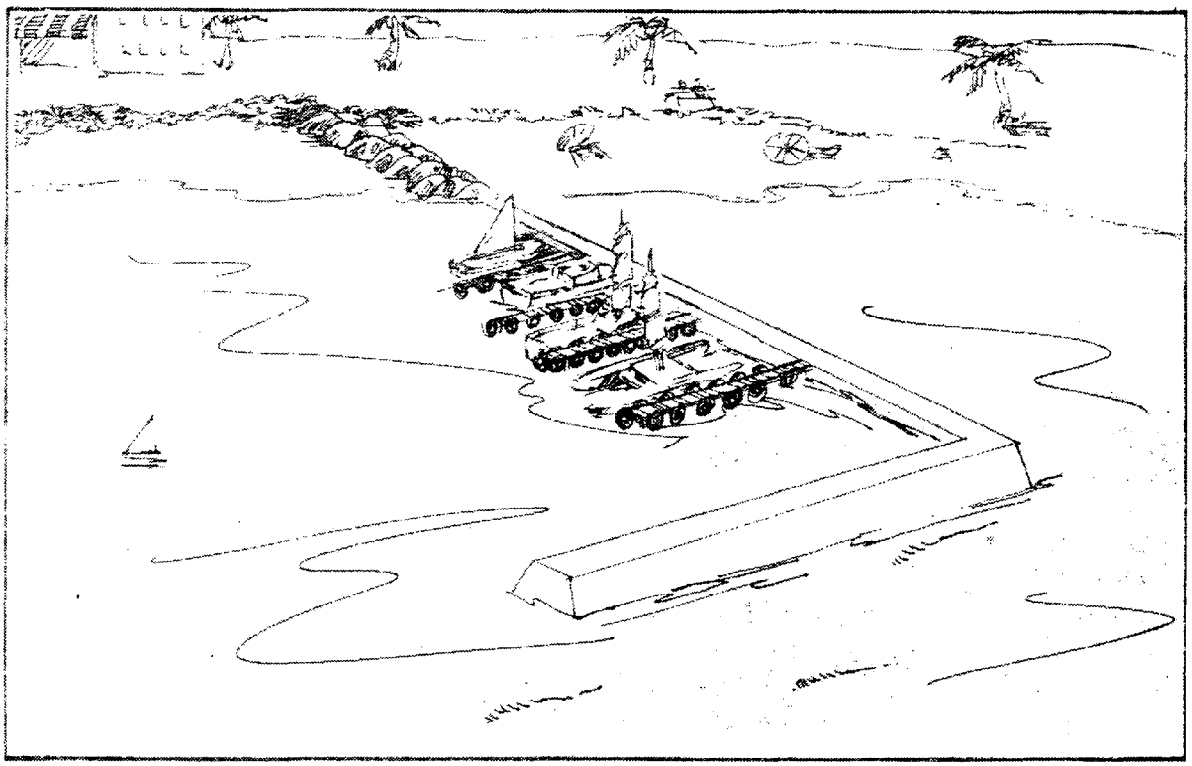

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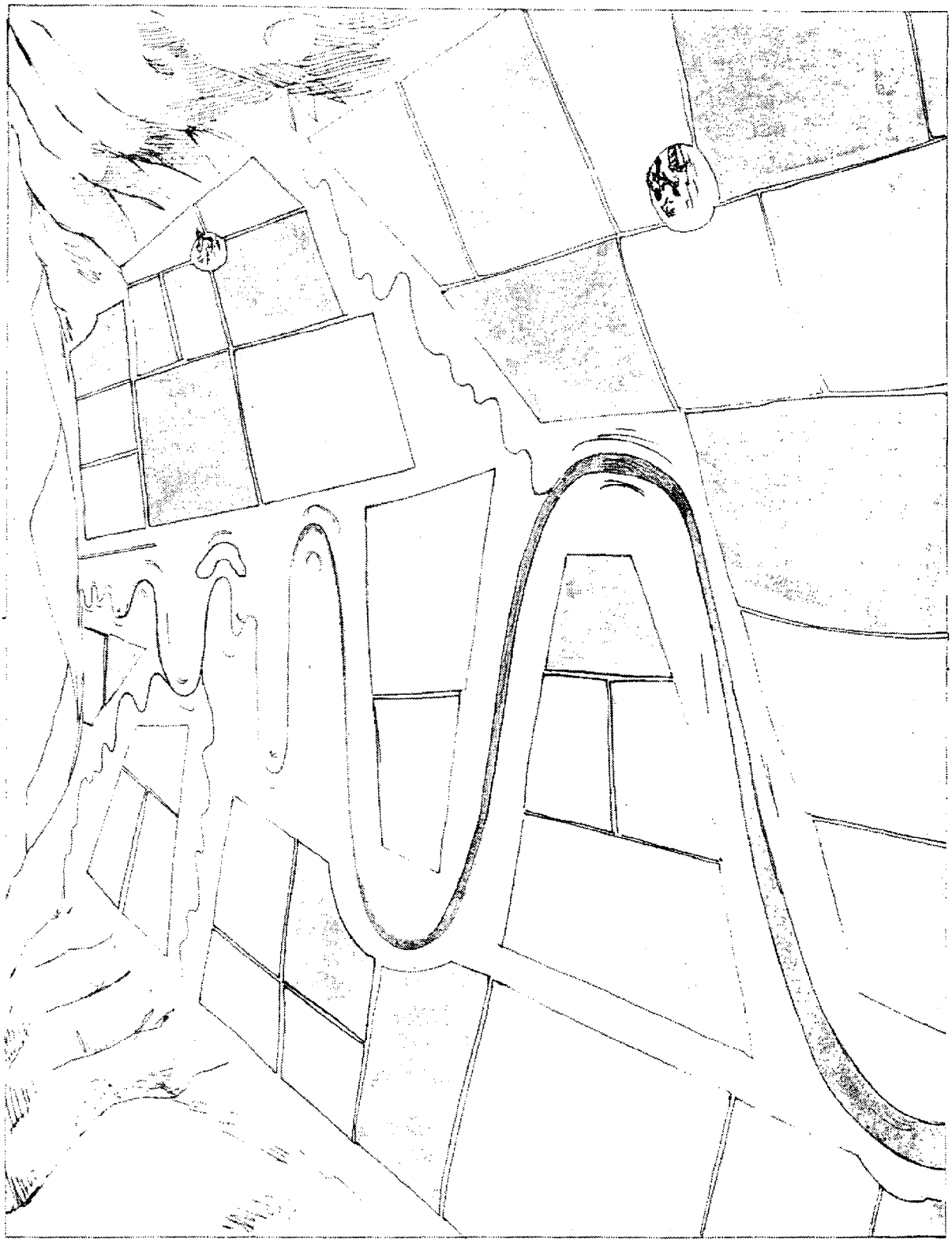
12.



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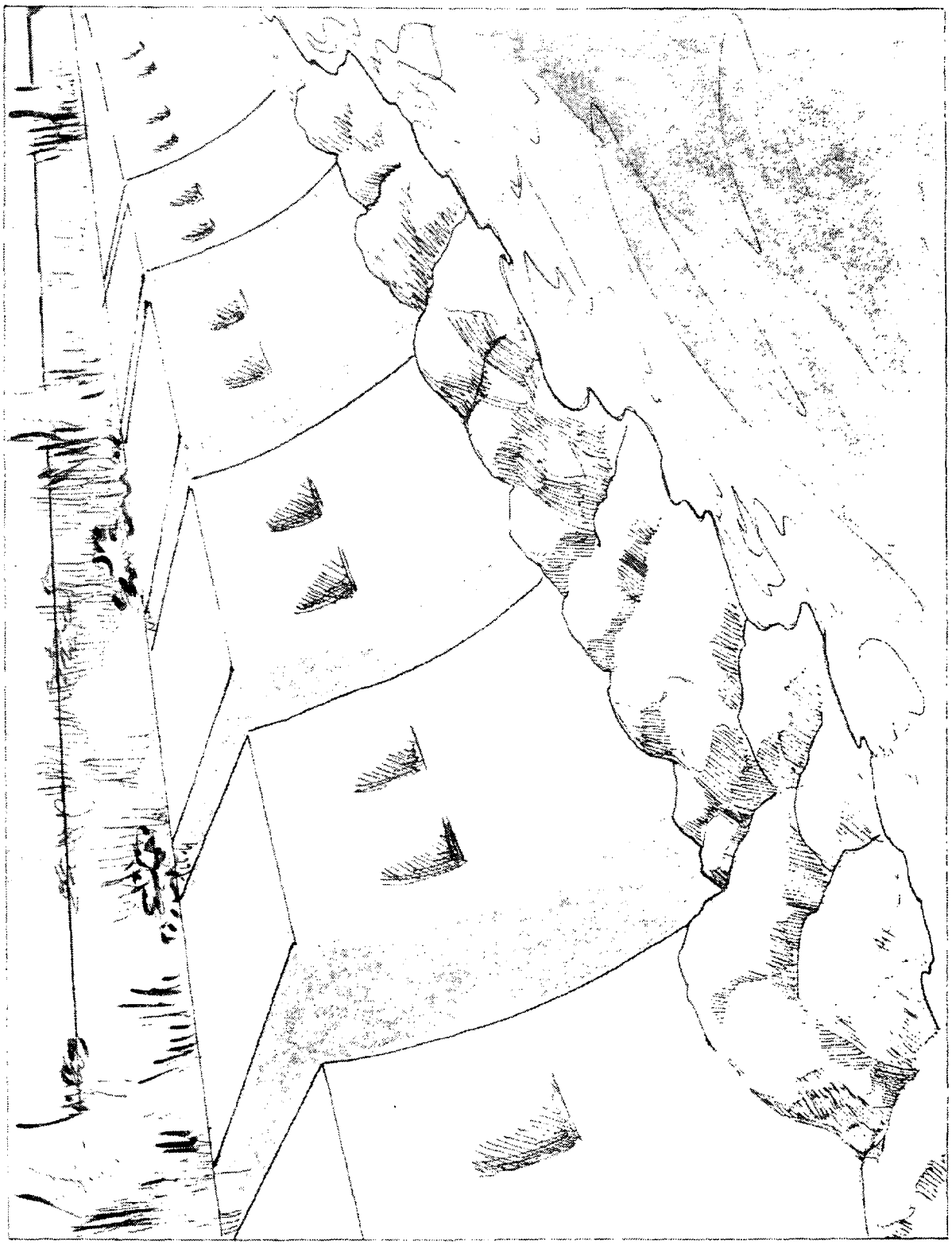
14



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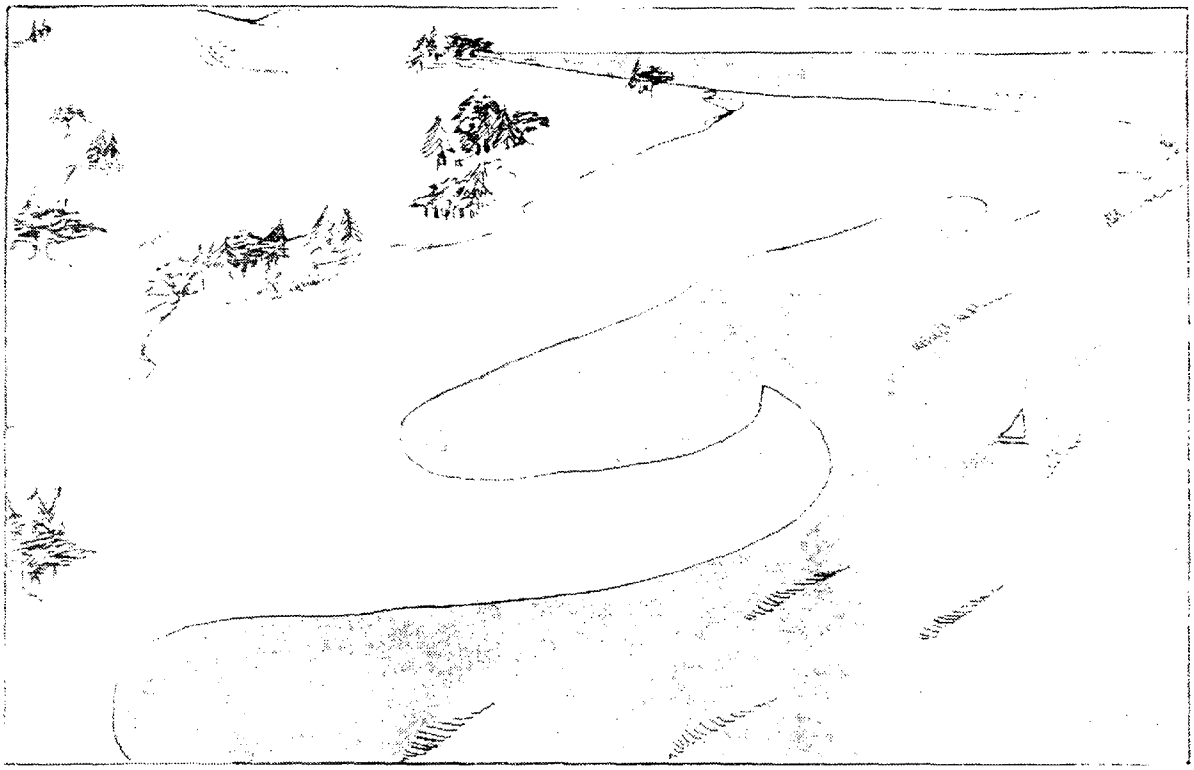
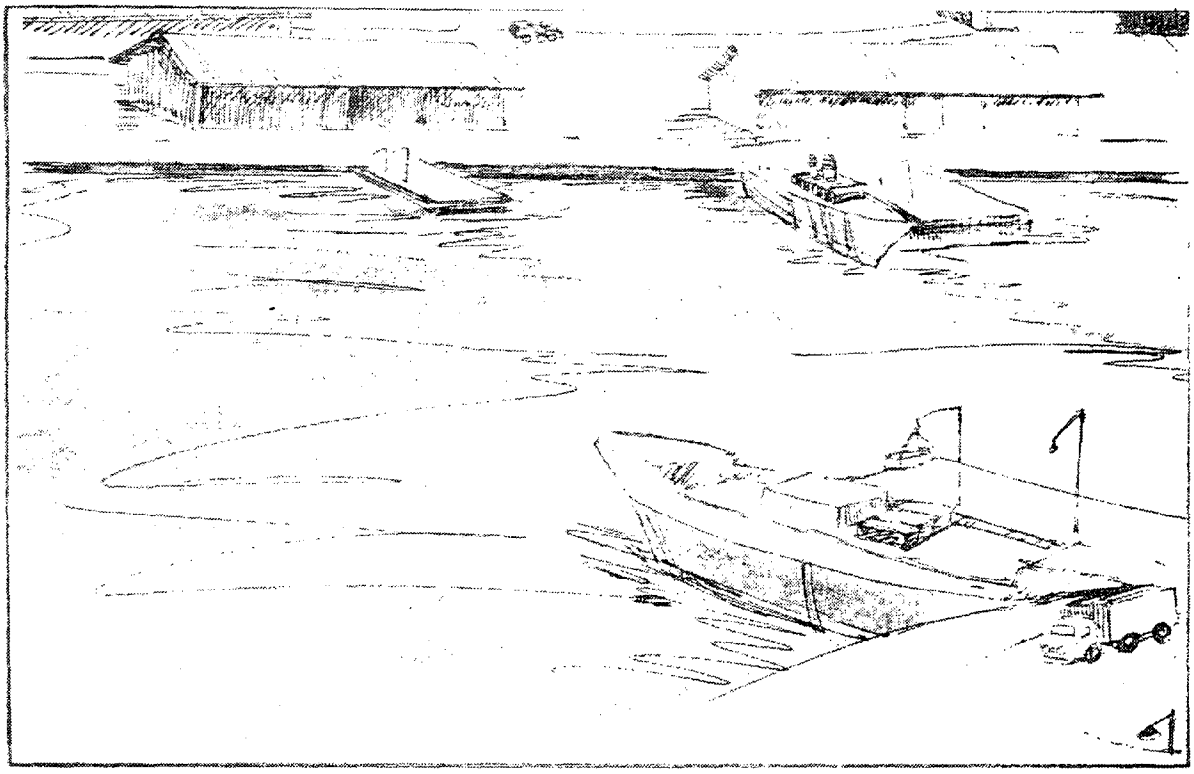


16. _____

17. _____



18. _____

Worksheet I-3

COASTAL RESOURCES DEVELOPMENT GAME (CRDG) -- COASTAL USES CHART

Indicate Use Requirements for each of the following major coastal uses:

1. Conservation
2. Waste Disposal
3. Industry
4. Commerce
5. Recreation
6. Tourism
7. Residences (Housing)
8. Agriculture
9. Commercial Fishing
10. Transportation
11. Land Transportation
12. Mineral Extraction
13. Defense
14. Scenic-Aesthetic Enjoyment
15. Cultural-Historical Enjoyment

NATIONAL FISHERIES OFFICE
DATA QUESTIONNAIRE

1. Where are most of the U.S. fish and shellfish caught?

2. How has the value of the U.S. fish and shellfish catch changed since 1945?

   Based on this information, would you expect the future value of the fish and shellfish catch to rise or fall?

3. Are fish and shellfish becoming a more important or less important part of the American diet? Why?

4. In what ways are estuarine areas important to the fishing interests?

5. From the data you have, what major problems are likely to arise in the future regarding the use of coastal resources?

NATIONAL DATA CLEARINGHOUSE
DATA QUESTIONNAIRE

1. What percentage of the nation's work force is projected to be employed in coastal counties in 1980? If the trend continues, approximately what percentage of the nation's work force will be employed in coastal counties in 2000?

2. How many people lived in inland areas in 1970? According to the projection, how many people will live in inland areas in 2000?

3. How many people lived in coastal areas in 1970? According to projection, how many people will live in coastal areas in 2000?

4. Approximately what percentage of the U.S. population lived in coastal areas in 1980? According to the projection, what percentage of the U.S. population will live in coastal areas in 2000?

5. What is the projected rate of growth for inland areas from the present through 2000? What is the projected rate of growth for coastal areas, during that same period?

6. What effect will the projected rise in employment have on the demand for housing in coastal areas from now to 2000?

7. In what ways is land use likely to change to meet housing demands?

8. What likely impact will the increase in leisure time have on the use of coastal resources?

   What kinds of coastal activities will probably be affected?

9. How will estuarine areas be affectively increasing population pressures?

10. From the data you have, what major problems are likely to arise in the future regarding the use of coastal resources?

REEF DATA QUESTIONNAIRE

1. Which 2 uses of the ocean are presently most valuable to the U.S.? Which 2 uses will be the most valuable in the year 2000?

2. What major mineral resources are found in the U.S. coastal region?

3. Which ocean related recreation activities are likely to be the most popular in the 1980's?

4. How productive are estuarine areas compared to other areas, such as the ocean or agricultural lands?

5. According to the chart, "General Shoreline Data", who owns most of the shoreline? How much of the shoreline is beach?

6. In what ways are estuarine areas important to the activities studied in the REEF data packet?

7. From the REEF perspective what major problems are likely to arise in the future regarding the use of coastal resources.

Worksheet I-7

U.S. PORTS AND HARBORS AGENCY
DATA QUESTIONNAIRE

1. Compare the number of pleasure craft expected to be in use in 2000 with the number in use in 1964.

2. What % of boat slips in marinas are presently in use? How much do you predict marina space will have to increase through the year 2000?

3. What kinds of changes are likely to occur in ship dimensions over the next two decades?

4. What are changes in ship dimensions going to mean for most U.S. harbors?

5. How much more tonnage will U.S. ports handle in the year 2000 (estimated) than in 1970?

6. In what ways are estuarine areas important to the shipping interests?

7. From the data you have, what problems are likely to have in the future regarding the use of coastal resources?

ENERGY RESEARCH ASSOCIATES
DATA QUESTIONNAIRE

1. Where is most new drilling for oil and gas likely to take place?

2. What are the projected energy demands for the year 1990? How do these compare with present needs?

3. What percentage of the U.S. population is projected to live in coastal counties in 1980? What does this trend mean for energy use in coastal areas?

4. In what ways are coastal areas vital to the future of energy exploration and production in the U.S.?

5. From the data you have, what problems are likely to arise in the future regarding the use of coastal resources?

NATIONAL TASK FORCE RECOMMENDATION FORM

Four recommendations concerning crucial problems in coastal areas must be made by your group. Check which recommendation your group favors. If you find neither "A" nor "B" acceptable, your group can write its own recommendation. Be sure to explain why your group made its choice. Support your explanation with reference to your data.

RECOMMENDATION #1: POPULATION

A.____Population growth should be allowed to continue as projected for coastal areas.

B.____Population growth should be limited in coastal areas.

C.____(Other)

Explain why your group made this recommendation.

RECOMMENDATION #2: OIL

A.____Future oil exploration and production should be prohibited in coastal areas.

B.____Oil exploration and production should be allowed to continue in coastal areas.

C.____(Other)

Explain why your group made this recommendation.

Worksheet I-9

NATIONAL TASK FORCE RECOMMENDATION FORM

RECOMMENDATION #3: ESTUARIES

A.____Estuarine areas should be protected from future development; new industries, housing, and harbors should be located elswhere.

B.____Development in and around estuarine areas should be allowed to continue.

C.____(Other)

Explain why your group made this recommendation.

RECOMMENDATION #4: RECREATION

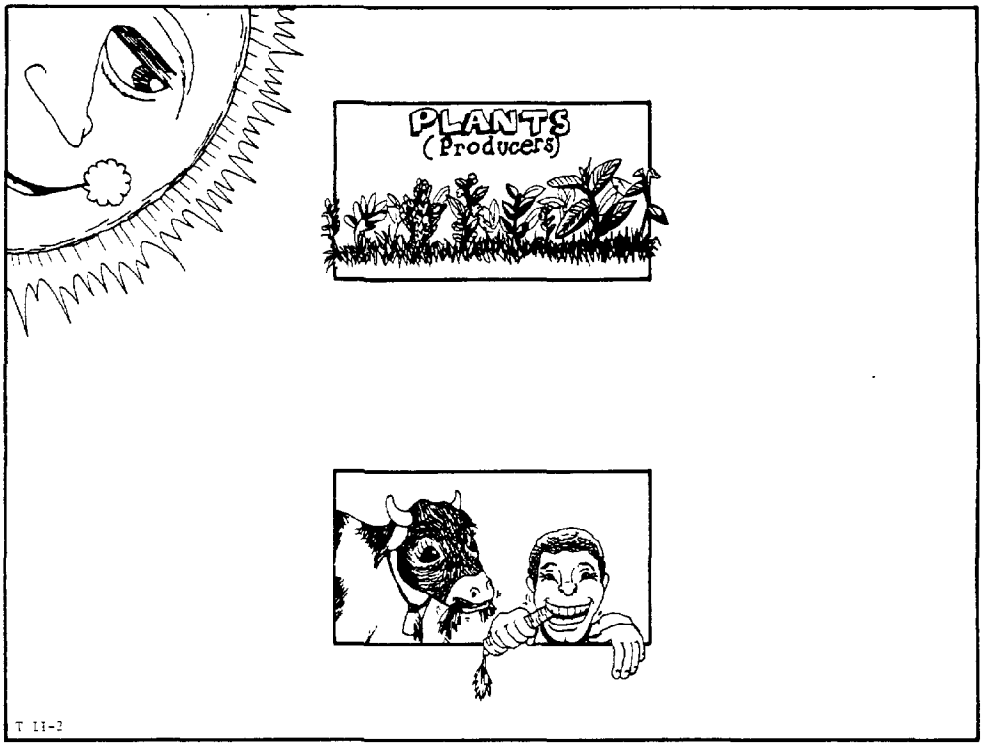
A.____New recreation sites, including marinas and beaches, should be developed.

B.____The number of existing recreational sites should not be expanded.

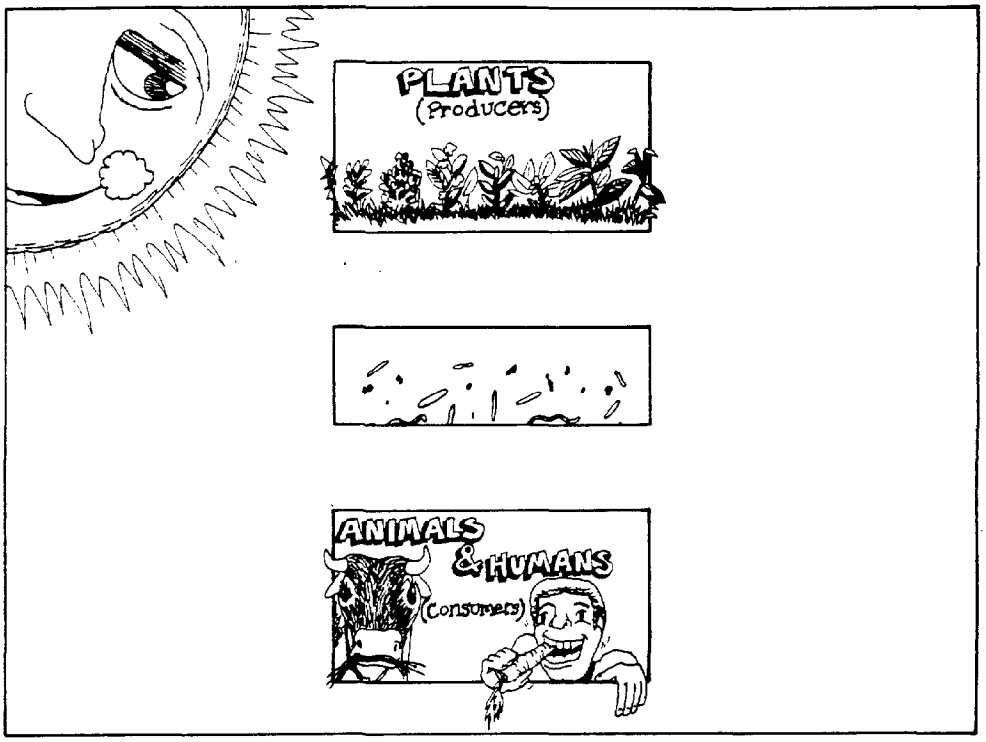
C.____(Other)

Explain why your group made this recommendation.

Drawing #1



Drawing #2



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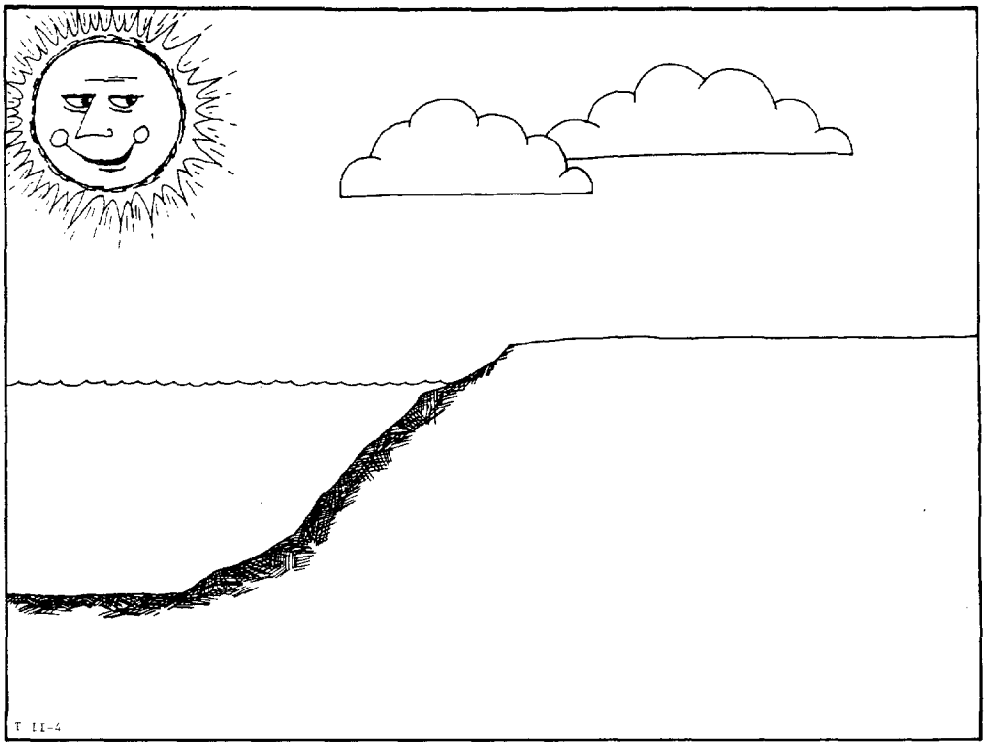

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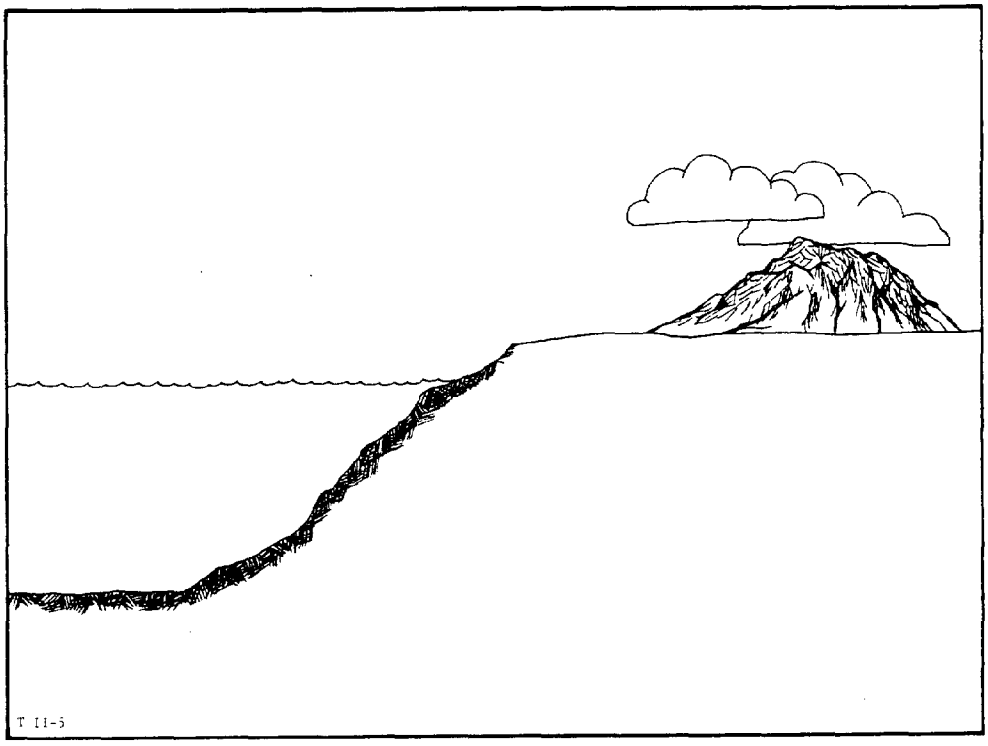
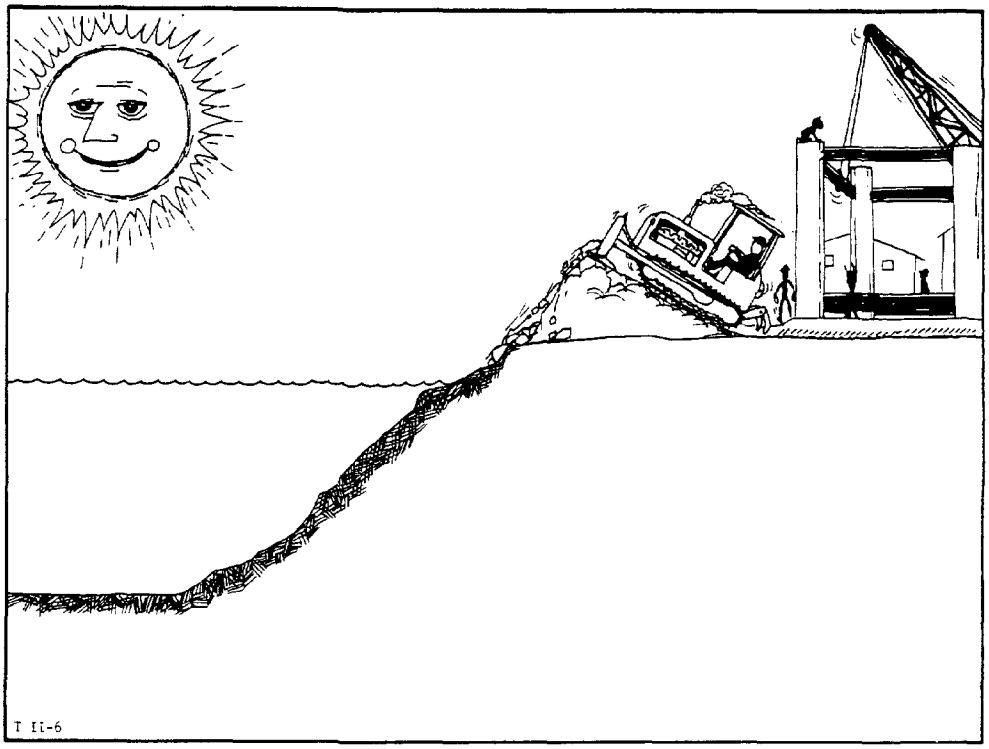


Drawing #5



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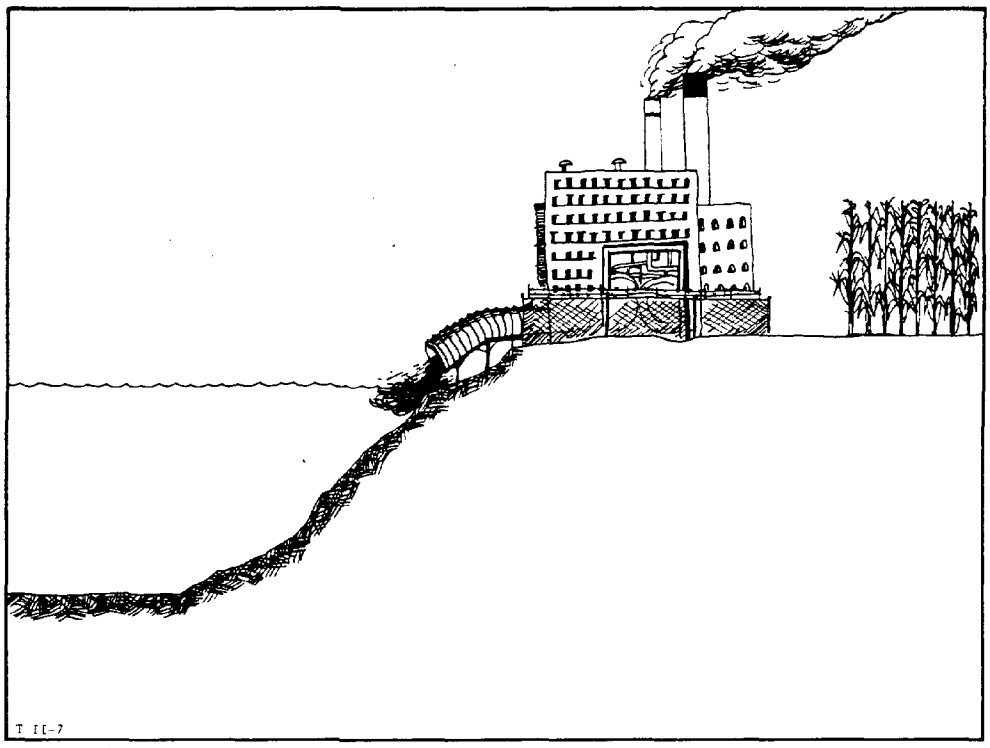

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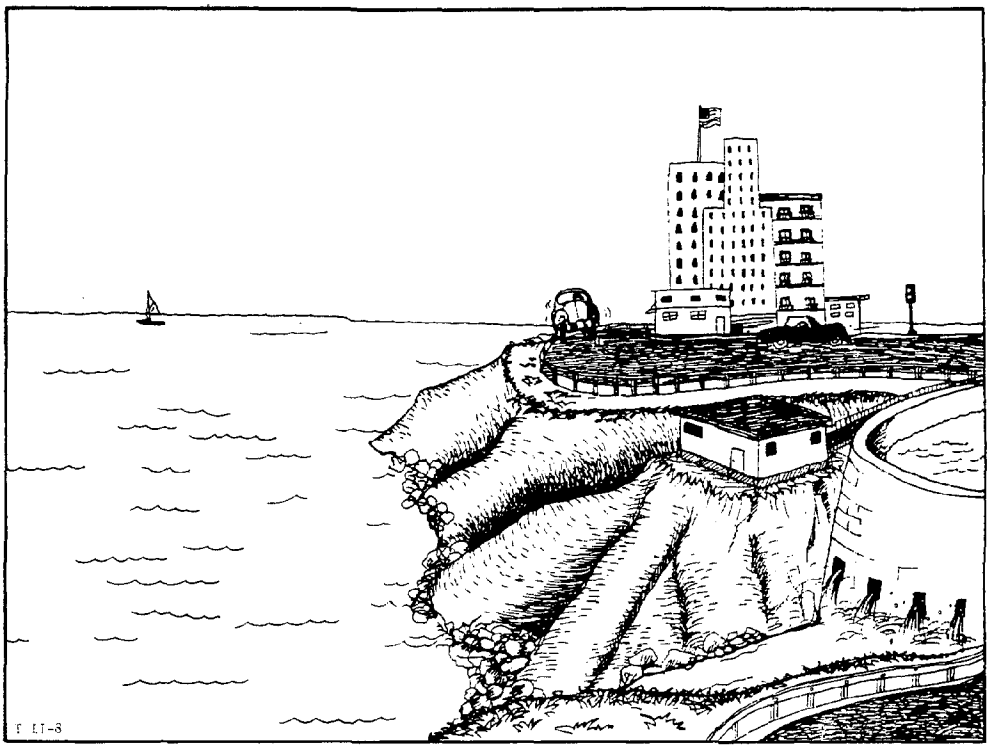
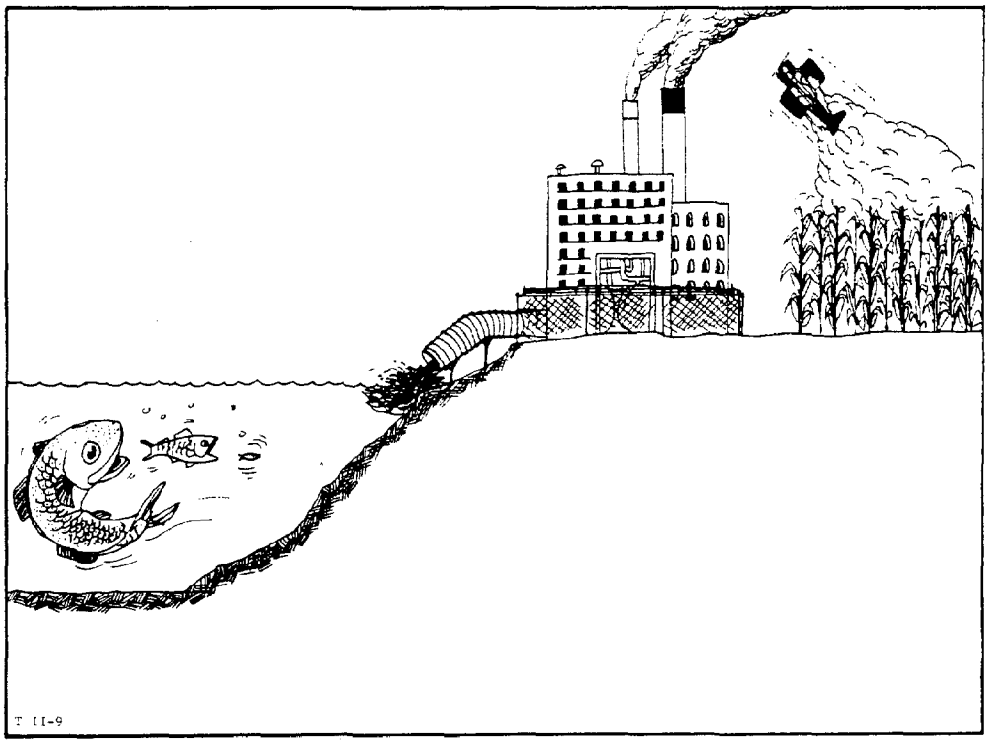


Drawing #8



shorebirds
spiders
snails
marsh grass
aphids
organic matter
ORGANIC MATTER
bass
shrimp
clams
phytoplankton (plants)
crabs
organic matter
ORGANIC MATTER
organic matter
ORGANIC MATTER
killifish
worms
bass
shorebirds
zooplankton (animals)

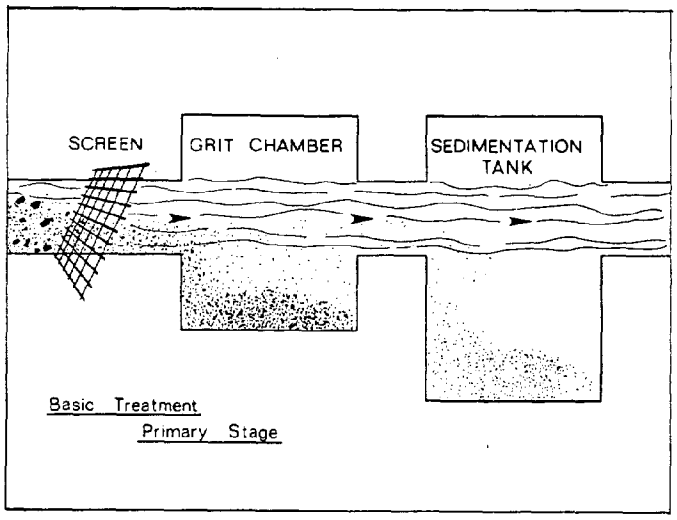
HUMANS

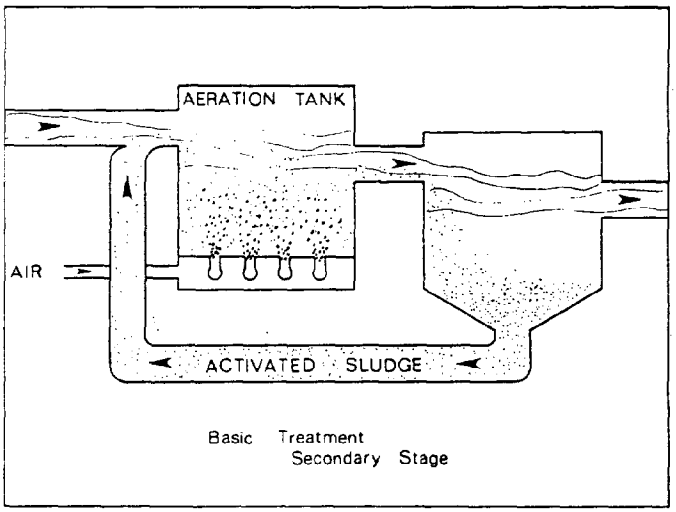
Worksheet II-4

POLLUTION CHART

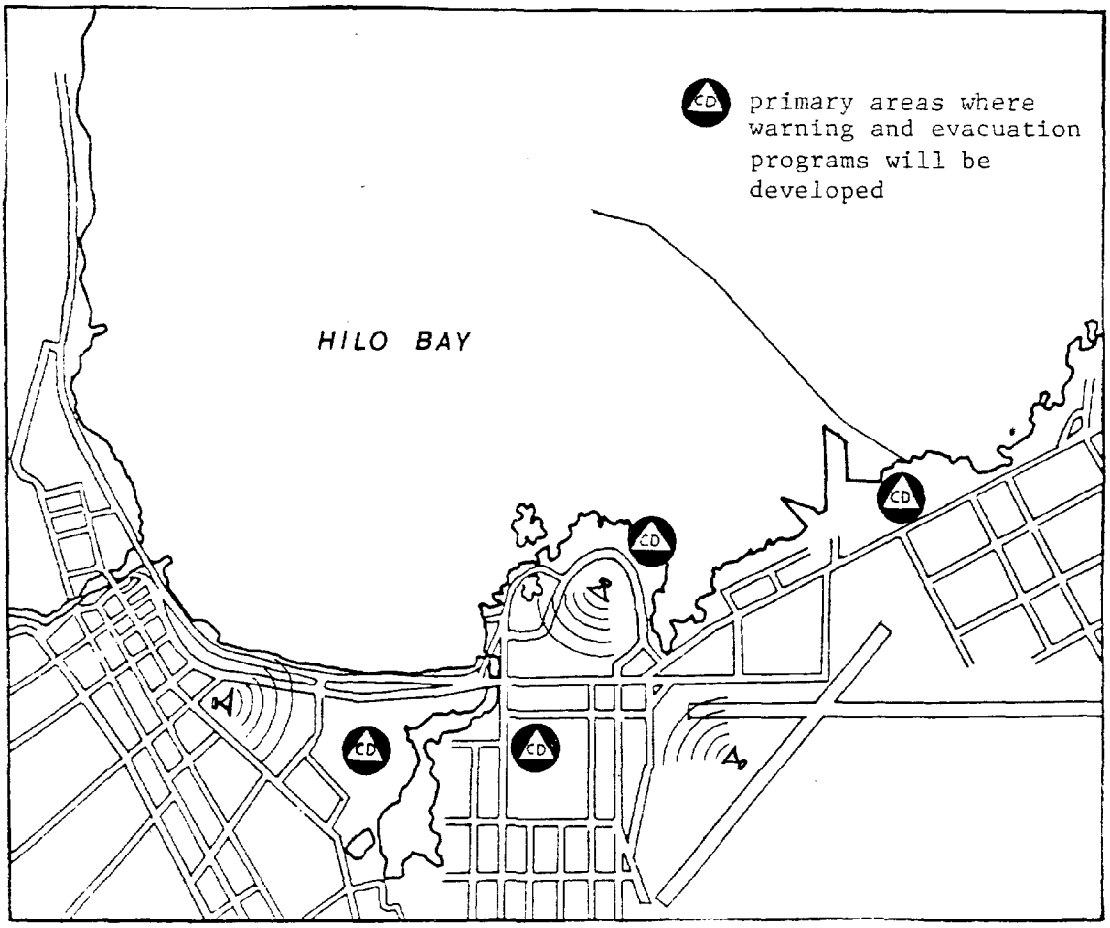
CATEGORY	SOURCES	THREAT
Oxygen-demanding wastes	Domestic sewage; industrial wastes; comes from plant and animal wastes	Can deprive water of oxygen; a danger to fish and plants
Disease causing agents		
Plant nutrients		
Synthetic organic chemicals		
Inorganic chemicals and mineral substances		
Sediments		
Radioactive substances		
Heat		

Sewage Treatment Process





ADJUSTMENT OPTION #1 - EARLY WARNING SYSTEM



OPTION: An effective warning system will be developed and educational programs conducted to inform people about tsunami dangers and steps they can take to protect themselves and their property. A set of emergency procedures and evacuation strategies for Hilo will be developed.

COST: Minimal - to be paid by county and state from within existing budgets.

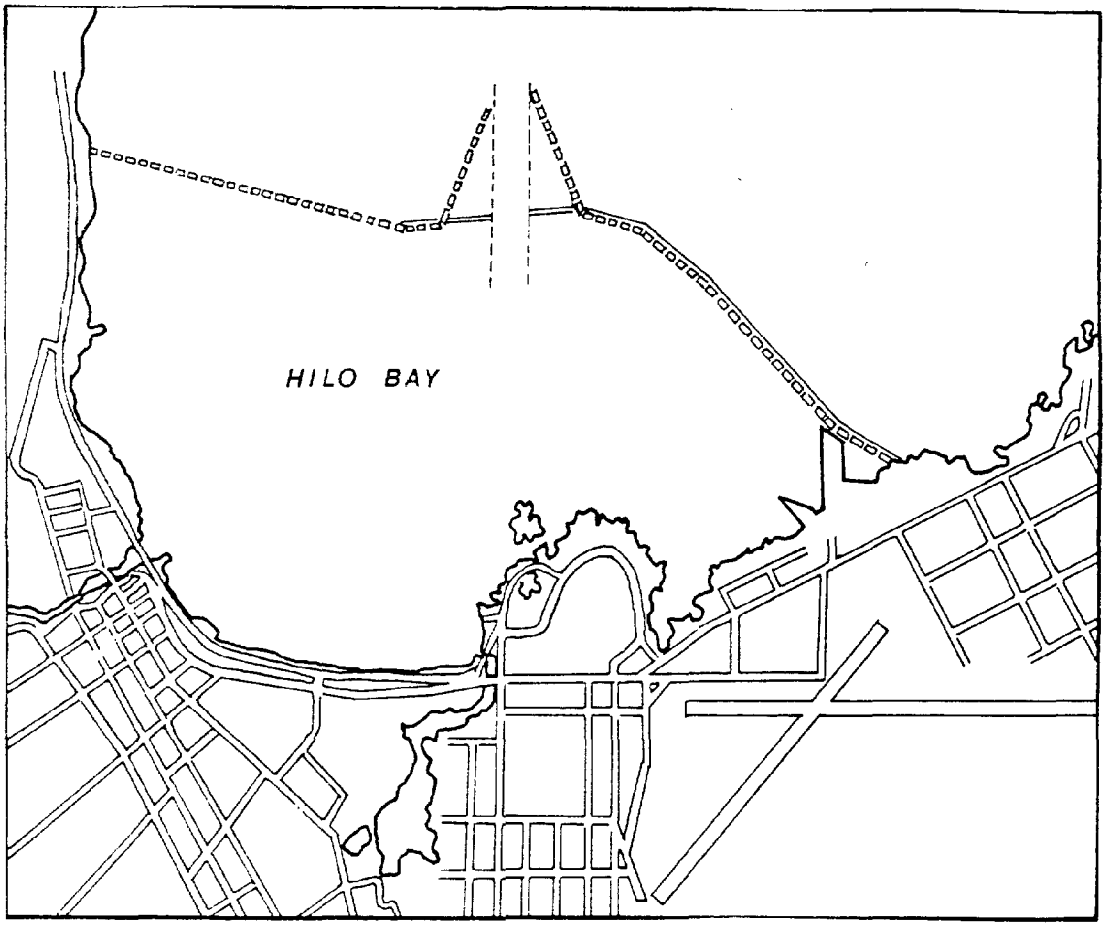
SOME ADVANTAGES:

1. low cost;
2. provides lead time for evacuation and removal of personal property;
3. provides emergency services for those in need;
4. no change in present land use patterns;
5. no ecological consequences

SOME DISADVANTAGES:

1. somewhat inneffectual in the past;
2. does not entitle Hilo to federal disaster program funds;
3. does not provide protection against social and economic dislocations.

ADJUSTMENT OPTION #2 - BARRIER BREAKWATER



OPTION: A barrier breakwater will be constructed across Hilo Bay. It will be 20 feet at its base and will extend seven feet above water. Breaks included in the design would reduce strain and maintain circulation in the Bay.

COST: Extremely high cost - to be paid by federal, state and county governments.

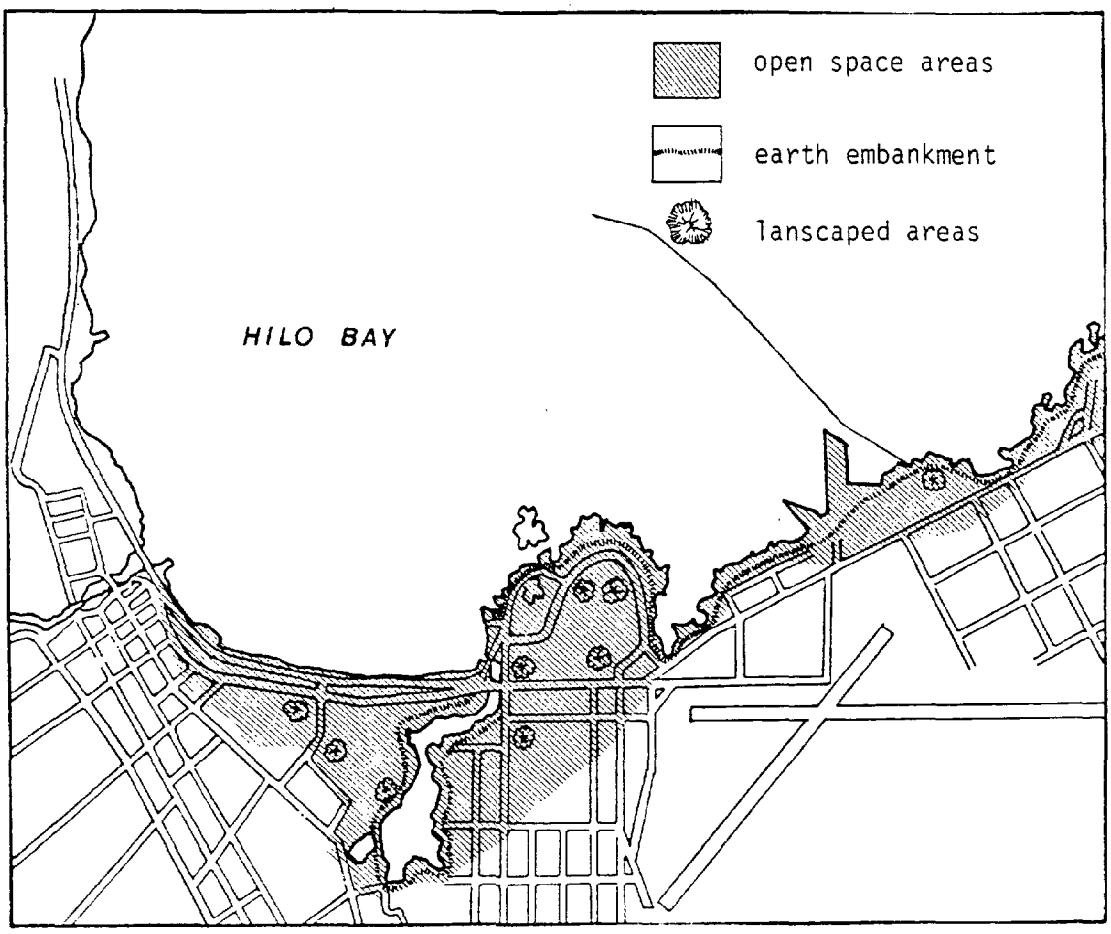
SOME ADVANTAGES:

1. danger to people and property in harbor and onshore would be reduced and possibly eliminated;
2. no change in present land use patterns;
3. cost of project offset by millions saved in damage from future tsunamis;
4. federal money would finance much of the project.

SOME DISADVANTAGES:

1. not certain that the barrier would stand up under full force tsunami;
2. cost would involve tax increases or reduction of present state and county services;
3. severe ecological consequences for Hilo Bay.

ADJUSTMENT OPTION #3 - OPEN SPACE



OPTION: A new city plan will remove residential, commercial and industrial activities from the tsunami vulnerable area. Land will be purchased and rezoned as open space to be developed into a park area. Planted earthen embankments along the shore line will provide additional protection.

COST: Extremely high cost - to be paid by federal, state and county governments.

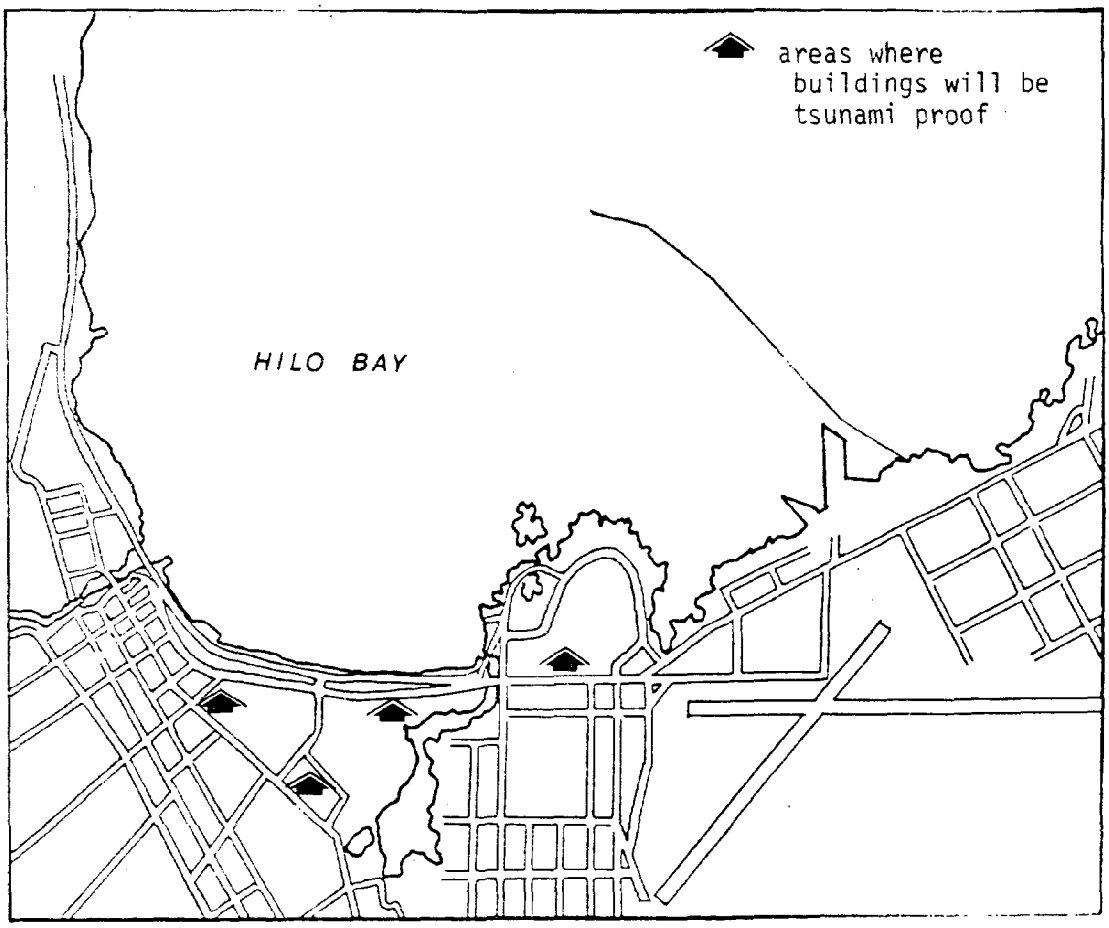
SOME ADVANTAGES:

1. reduced danger to people and damage to property;
2. aesthetically pleasing park;
3. ecology of Hilo Bay would not be disrupted.

SOME DISADVANTAGES:

1. cost would involve tax increases or reduction of present state and county services;
2. many people would be uprooted and forced to relocate;
3. some might be forced to sell their property against their will;
4. does not protect harbor area.

ADJUSTMENT OPTION #4 - TSUNAMI-PROOF BUILDINGS



OPTION: The establishment of strict building regulations will require the building of reinforced structures within the tsunami vulnerable area.

COST: Minimal to state and county. Major costs to be absorbed by individual builders.

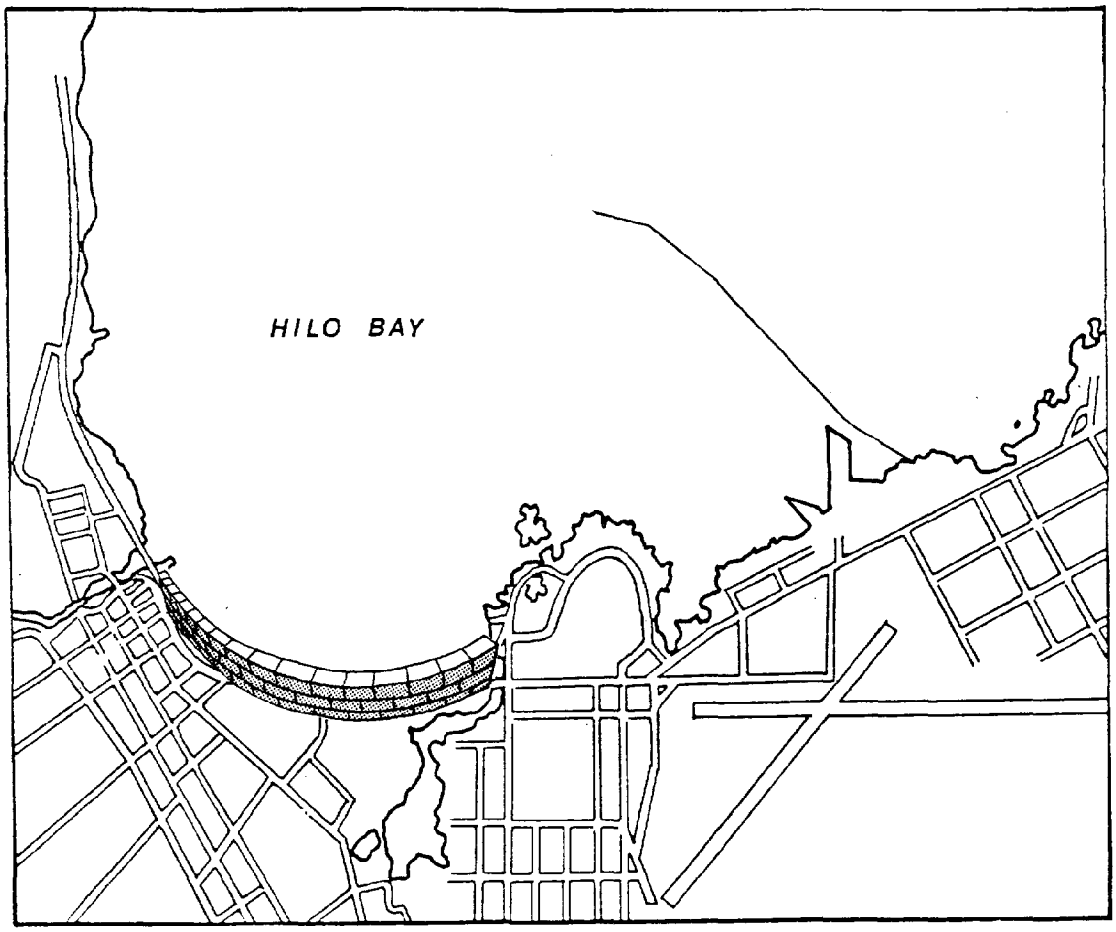
SOME ADVANTAGES:

1. reduced damage to property and greater protection for those who live and work in the area;
2. no change in present land use patterns;
3. cost to city and county minimal - would not require tax increase;
4. would not disturb the ecology of Hilo Bay.

SOME DISADVANTAGES:

1. construction of "tsunami-proof" buildings is expensive;
2. no guarantee they would be totally tsunami-proof;
3. people might be forced to build structures they would not otherwise choose to build;
4. does not provide protection for the harbor area.

ADJUSTMENT OPTION #5 - SHOREWALL



OPTION: A shorewall will be built along the shoreline of Hilo Bay. It will be made of solid concrete 20 feet high.

COST: High but less expensive than the barrier breakwater or open space adjustments - to be paid by federal, state and county governments.

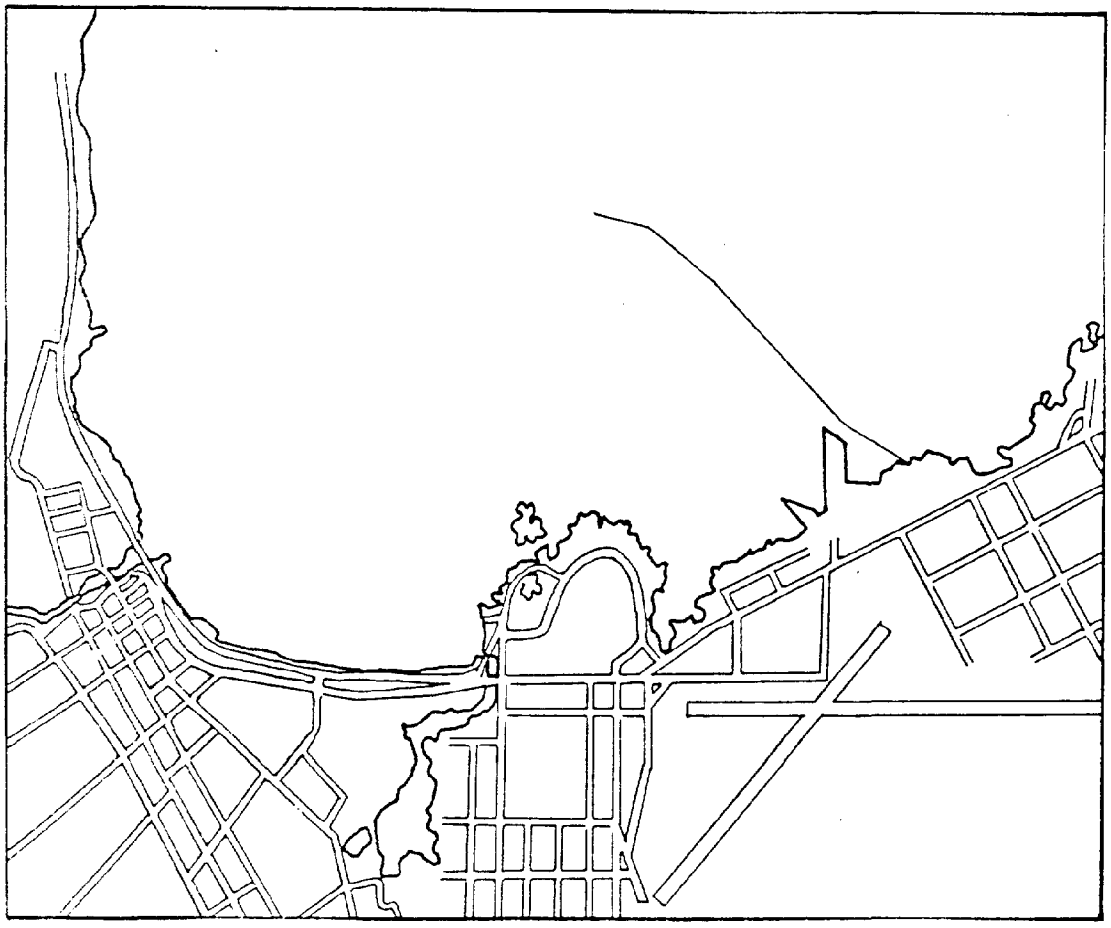
SOME ADVANTAGES:

1. protection of people and property behind the shorewall;
2. lower cost than barrier breakwater or open space;
3. no significant change in present land use patterns;
4. would entitle Hilo to federal disaster program funding.

SOME DISADVANTAGES:

1. no guarantee the shorewall would withstand major tsunami;
2. aesthetically unattractive;
3. could create flood problems if wave went over wall;
4. might affect ecology of Hilo Bay;
5. protects only the area directly behind it.

ADJUSTMENT OPTION #6 - No Action



OPTION: This adjustment is no adjustment. Leave Hilo as is - taking no further protective action.

COST: No cost involved in planning or implementing.

SOME ADVANTAGES:

1. non-interference with forces of nature;
2. no initial dollar costs to bear;
3. no ecological consequences;
4. no disturbance of present land use patterns.

SOME DISADVANTAGES:

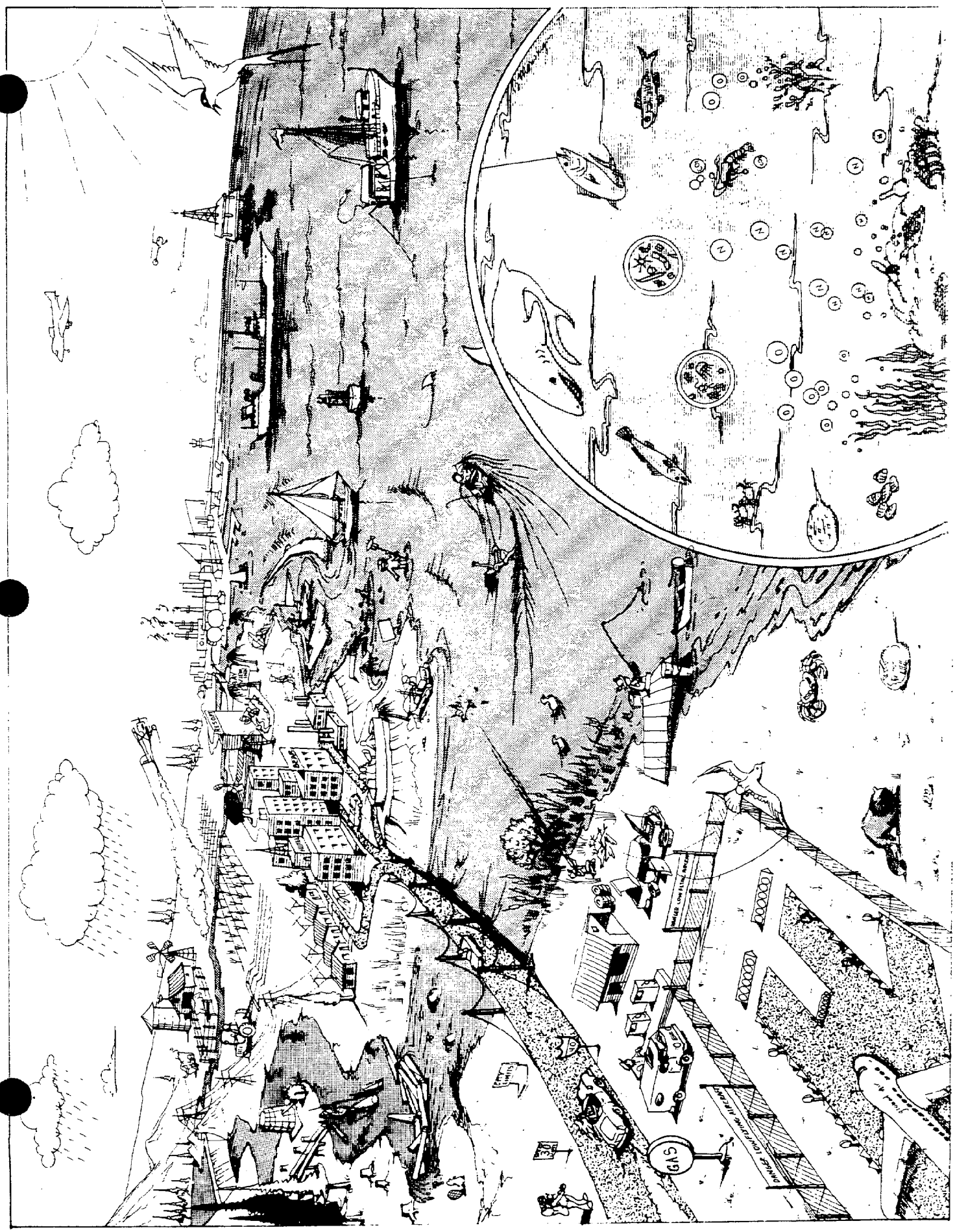
1. no reduction in number of deaths and injuries;
2. no reduction in damage to personal or real property;
3. no reduction in social or economic dislocation resulting from tsunami damage.

Worksheet II-6

ADJUSTMENT RATING CARD

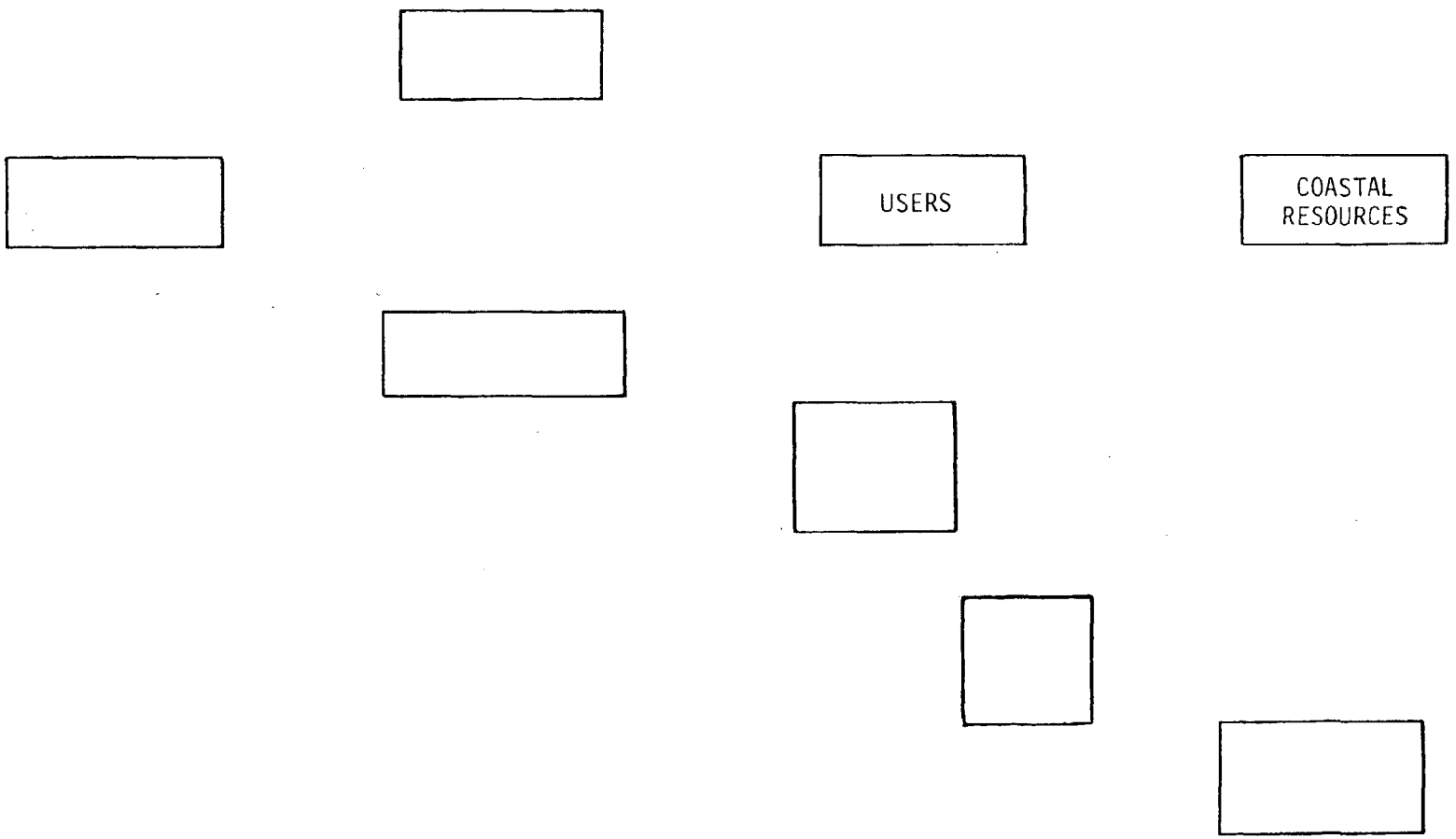
	HIGHLY DESIRABLE	DESIRABLE	UNDESIRABLE	COMMENTS
#1 Early Warning System				
#2 Barrier-Breakwater				
#3 Open Space				
#4 Tsunami-Proof Buildings				
#5 Shorewall				
#6 No Action				

Worksheet II-7

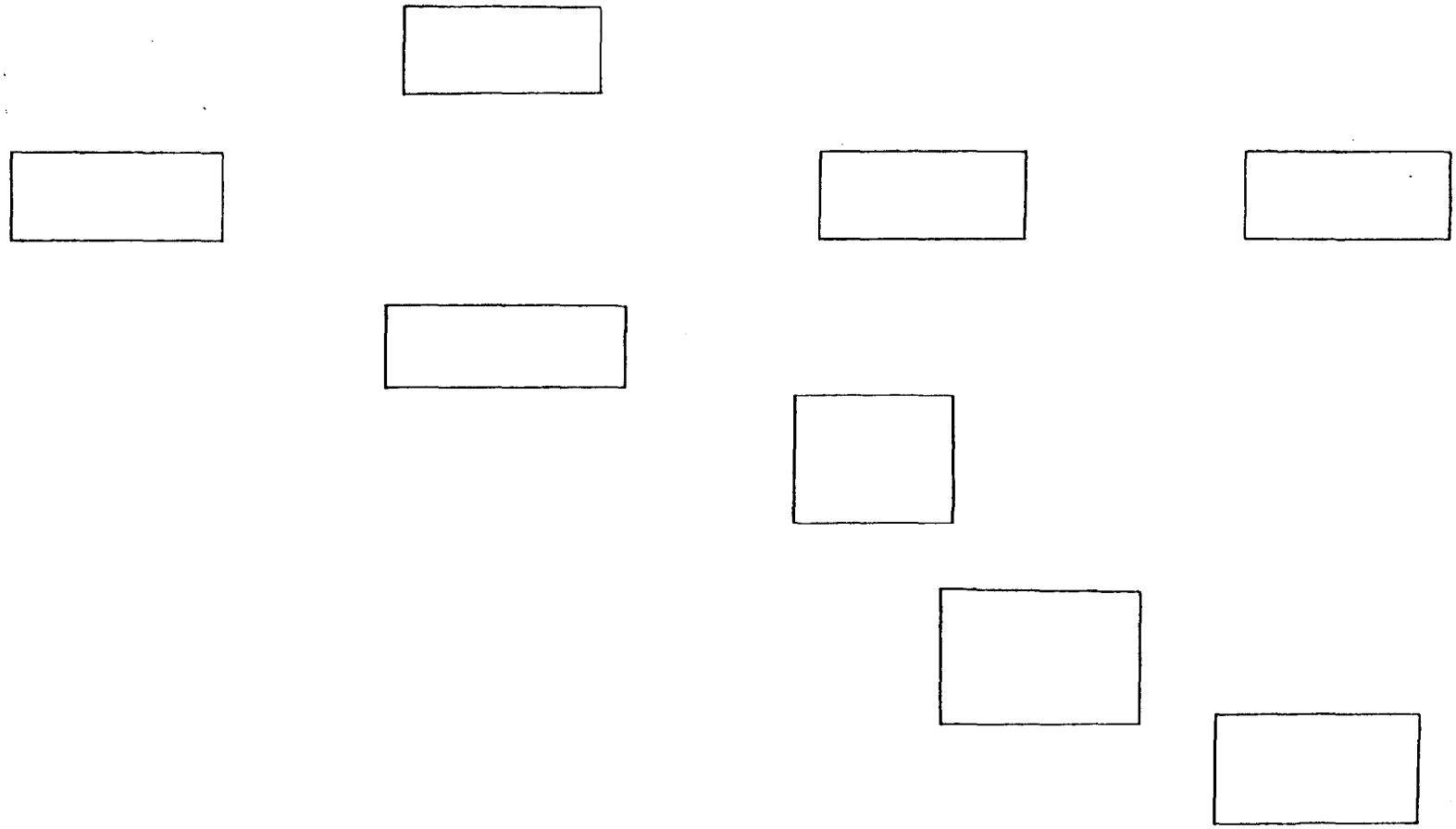


Worksheet III-1

FISH STORY WORKSHEET



BLUE NECK BAY STUDENT WORKSHEET



PLANNING WORKSHEET

QUESTION: Should a resort complex be built on the West Shore of Bayshore Island?

ECONOMY

Advantages Disadvantages

ENVIRONMENT

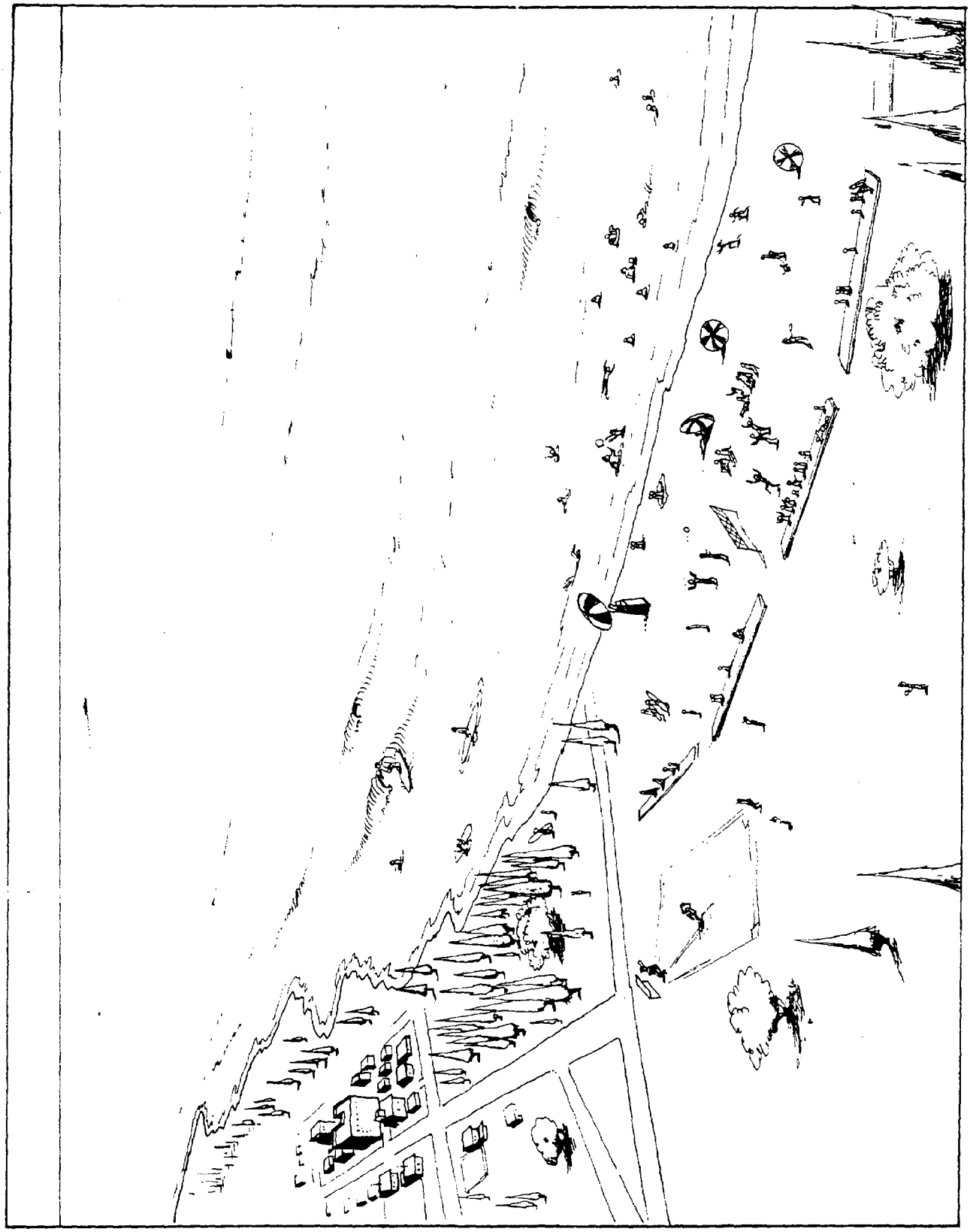
Advantages Disadvantages

POLITICAL/SOCIAL

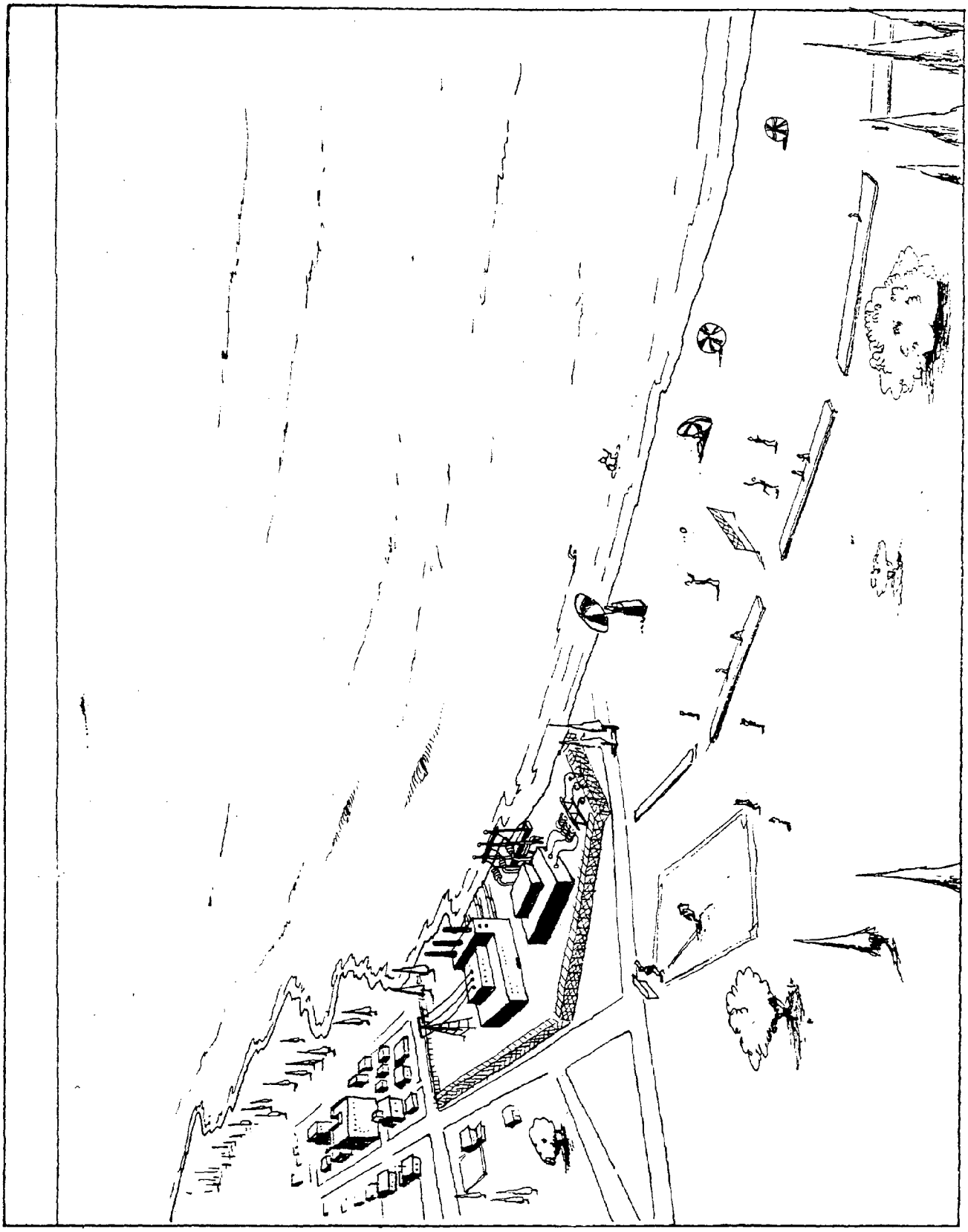
Advantages Disadvantages

Are there other advantages or disadvantages to building the resort that should be considered, but which do not fit into these three categories?

Worksheet III-4 "Beach Park-Before"



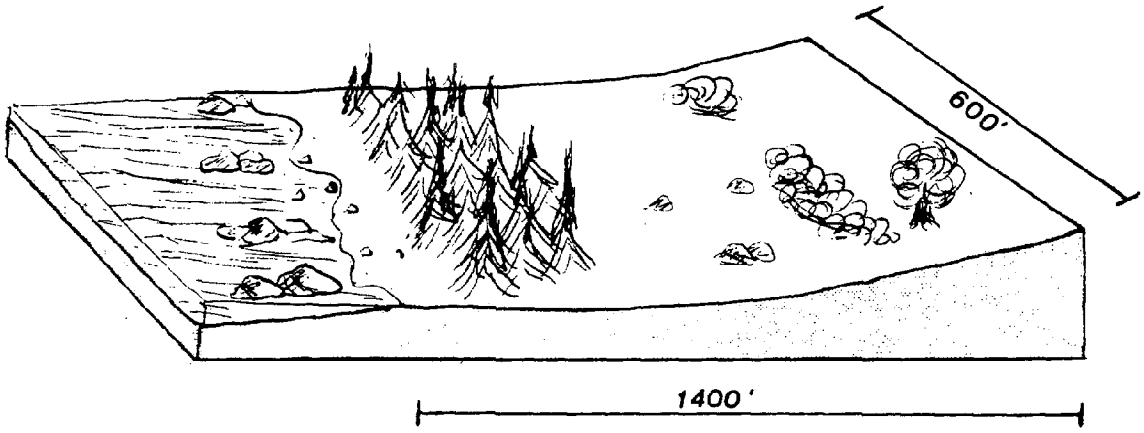
Worksheet III-4 "Beach Park-After"



SHORELINE PLANS

PROPERTY: Your property consists of 20 acres of land located along the northwest Pacific Coast. You have 600 feet of ocean frontage and the remainder of your land lies in a roughly rectangular shaped area behind. You do have some usable beach, although it is quite rocky and almost completely covered by water at high tide. The remainder of your land slopes gently upward from the shore and is populated by various plants and grasses. There are few trees on on your land except for a stand of tall trees growing along the shoreline. These shoreline trees obscure the ocean view from all points behind them.

SKETCH:



DEVELOPMENT PLANS:

Worksheet III-6

PROPOSED SHORELINE REGULATIONS

1. An environmental study must be conducted before a building permit will be issued. If the study shows that your development plans pose no serious threat to the coastal environment, a permit will be granted.

   REASONABLE UNREASONABLE

2. Land developers must apply for a permit before any natural vegetation is removed from the property. If clearing of land is likely to result in erosion rpoblems you will not be allowed to remove vegetation.

   REASONABLE UNREASONABLE

3. This land will be zoned for residential uses only. Other activities, such as industry or tourism, will be permitted to locate in other areas.

   REASONABLE UNREASONABLE

4. This land will be zoned as "open space" allowing only recreational activities such as boating, swimming, camping, and hiking. No homes, ranches, or farms are allowed.

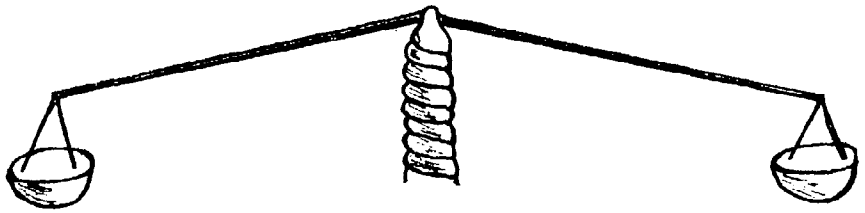
   REASONABLE UNREASONABLE

5. This land may not be developed in any way. A freeze will be put in effect on all coastal development for an indefinite period.

   REASONABLE UNREASONABLE

THE BALANCING PROCESS

PRIVATE PROPERTY RIGHTS vs. THE PUBLIC WELFARE



LOW — HIGH

How much damage to property value is caused by the regulation?

MANY — FEW

How many remaining reasonable uses of the land does the regulation allow?

CLEARLY NEEDED — NOT NEEDED

Is the regulation needed to prevent a public hazard?

SUCH PROVISION IS INCIDENTAL — SUCH PROVISION IS INTENTIONAL

Is the intent or effect of the regulation to provide the public a good or service?

If the weight of the judgments tilts the scales to this side, the regulation is likely to be ruled <u>legal</u>.

If the weight of the judgments tilts the scales to this side, the regulation is likely to be ruled a <u>taking</u>.

Worksheet III-8

McCORD COUNTY OVERVIEW

OVERVIEW: McCord County has a small, but growing population. In the past, the economy of the county has depended mostly upon agriculture, timber, and small businesses. But during the past decade, two major industrial plants have opened adjacent to the harbor. Population has increased almost 50%, from 17,000 to 30,000. However, the area is still relatively undeveloped. Almost one-half of the land remains in agricultural and timber activities. All undeveloped land is presently zoned for agriculture or timber.

HOUSING: Land for new housing is needed. If any new industry or tourist activities come into the area, more housing will need to be built. A housing developer has already proposed that all undeveloped land between Ocean View Road and the shoreline be re-zoned from agriculture to residential.

TRANSPORTATION; The two lane Ocean View Road is the main coastal highway. Recently, state officials named this road a "scenic highway". County officials have already noted a heavier flow of traffic along this highway and expect traffic to increase even more during the peak tourist season. Congestion, due to heavy truck traffic is already frequent near the narrow bridge crossing Olman River. A new housing development on the south side of Ocean View Road (to the west of town) has also added considerable traffic.

HARBOR: The harbor area is adequate for present needs, but if new industry locates in this area, harbor facilities will have to be expanded. The state owns the harbor facility and is seriously thinking it should expand the McCord County Harbor. A study by a harbor construction company recommends that any new harbor facilities should be placed in the marsh along the Olman River. This would be considerably cheaper than enlarging the present site.

RECREATION: At present, the major recreational facility in McCord County is Ocean Side Park, located northwest of the city. This popular area is frequently overcrowded and has an inadequate parking facility. The park has occassionally been closed due to pollution from the sewage treatment plant on the Olman River.

WATER FACILITIES: There is sufficient water supply in McCord County to support a population of almost 100,000. However, the sewage treatment plant was built several years ago and is suspected of being the major polluter of the Olman River, the marsh area and the ocean shoreline. Any increase in population means a new treatment plant must be built.

SCHOOLS: The public school students in McCord County are served by the two high schools in Ocean City. Many residents believe the schools are overcrowded; any future development will require new schools.

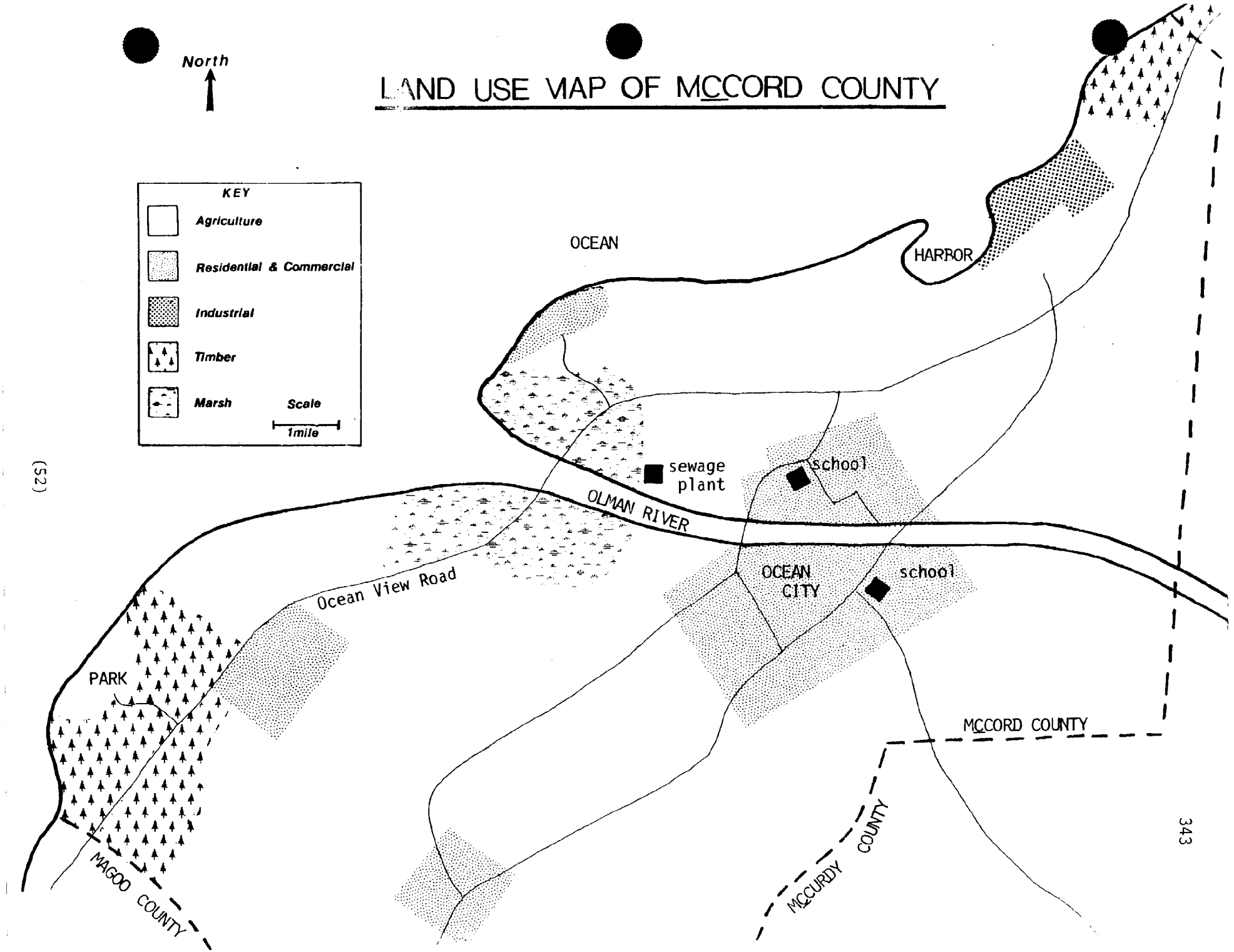
BUSINESS PROSPECTS: Industry. Industry officials believe McCord County has strong potential as a business community. Owners of two new industries would like to expand. They are asking the county to re-zone the land between the river and the harbor from agricultural to industrial. This land is the best choice for industry since it is close to the harbor, and would be close to the new harbor facilities if they are built in the marsh area.

Tourism. Tourism officials also see McCord County as a possible site for new business. Since Ocean View Road has been chosen as a "scenic highway" tourist traffic has already increased. Hotel and resort owners recently visited McCord County and announce that they would like to buy land between the park and Olman River if it is rezoned to commercial. Another important concern for the tourism representatives is that recreation space in the county is inadequate. If new recreation sites aren't provided, fewer resorts will be built. Tourism officials are also concerned about the expansion of industrial sites. If many new industries locate in McCord County, the tourism officials feel that it will seriously hurt their business.

TAXATION POLICIES: Land in McCord County is taxed in the following manner, from highest to lowest rates:

1) Industrial land
2) Residential and commercial land
3) Agricultural and timber land

At present, McCord County's tax revenues (the money it receives from taxes) are barely covering county expenses. Additional tax dollars will have to be raised, or services will have to be cut and needed new facilities, such as schools and parks will not be built. Some officials are advocating that the county should sell the marsh lands to raise additional funds.


North
LAND USE MAP OF MCCORD COUNTY
KEY
Agriculture
Residential & Commercial
Industrial
Timber
Marsh
Scale
1mile
OCEAN
HARROR
sewage plant
school
OLMAN RIVER
Ocean View Road
OCEAN CITY
school
PARK
MCCORD COUNTY
MAGOO COUNTY
MCCURDY COUNTY

PLANNING ASSIGNMENT

TASK 1: The county government has decided upon seven major goals to guide its approach to the long-term development of the county. To you, some of these seven goals may be more important than others. Some goals may be in conflict with other goals. Considering your point of view(tourism or industry), list the seven county goals in order from most important to least important.

Goal 1: MAINTAIN AND EXPAND RECREATIONAL ACCESS AND FACILITIES
Goal 2: PRESERVE AGRICULTURAL AND TIMBER LAND
Goal 3: ATTRACT NEW INDUSTRY
Goal 4: PROVIDE NEW RESIDENTIAL AREAS
Goal 5: CONTROL LEVELS OF POLLUTION
Goal 6: IMPROVE PUBLIC FACILITIES AND SERVICES(OTHER THAN RECREATION)
Goal 7: KEEP COUNTY TAX RATES AS LOW AS POSSIBLE

COUNTY GOALS IN ORDER OF IMPORTANCE:

1._____

2._____

3._____

4._____

5._____

6._____

7._____

TASK 2: In the space below identify which management tool could be used to achieve each goal. Also, explain how each tool might be used. Examine the map of McCord County carefully in order to show where new improvements might be built, land acquired, zoning changed, etc. If you do not think some of these goals are worthwhile, indicate that you do not want to achieve them, and explain why you made this decision.

Goal 1: MAINTAIN AND EXPAND RECREATIONAL ACCESS AND FACILITIES

How might this be achieved?

Where will these facilities be improved or located?

Goal 2: PRESERVE AGRICULTURAL AND TIMBER LAND

How might this be achieved?

Which areas will be preserved?

Goal 3: ATTRACT NEW INDUSTRY

How might this be achieved?

Where will industry be located?

Goal 4: PROVIDE NEW RESIDENTIAL AREAS

How might this be achieved?

Where will residential areas be located?

Goal 5: CONTROL LEVELS OF POLLUTION

How might this be achieved?

Goal 6: IMPROVE PUBLIC FACILITIES AND SERVICES(OTHER THAN RECREATION)

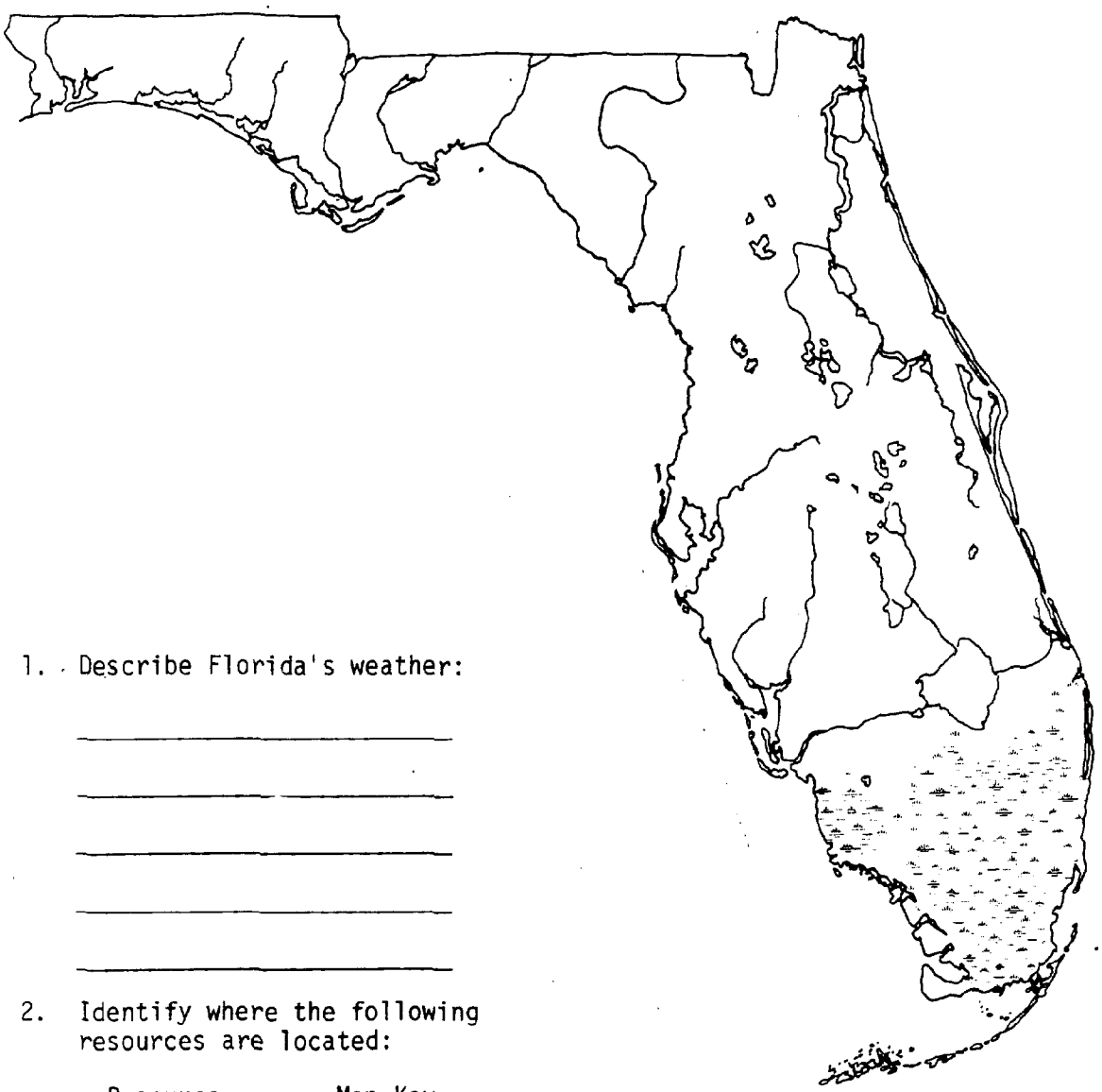
How might this be achieved?

Where will these facilities be located?

Goal 7: KEEP COUNTY TAX RATE AS LOW AS POSSIBLE

How might this be achieved?

FLORIDA



1. Describe Florida's weather:

_____

_____

_____

_____

_____

2. Identify where the following resources are located:

Resource	Map Key
Estuarine areas	"E"
Timberlands	"T"
Agricultural lands	"A"
Oil fields	"O"
Fishing areas	"F"
Mineral deposits	"M"
Harbors	"H"

3. Label major lakes, rivers and cities.

FLORIDA DATA CHART

	1821 - 1900	1900 - 1945
POPULATION LEVEL AND GROWTH RATE		
RESOURCES USED (How and by whom?)		
SOCIAL/POLITICAL DEVELOPMENTS		
ENVIRONMENTAL IMPACTS		

FLORIDA DATA CHART

	1945-Present (Predicted)	1945-Present (Actual)
POPULATION LEVEL AND GROWTH RATE		
RESOURCES USED (How and by whom?)		
SOCIAL/POLITICAL DEVELOPMENTS		
ENVIRONMENTAL IMPACTS		

Worksheet IV-3

PLANNING WORKSHEET

QUESTION: Should BASF be permitted to build a chemical plant on the Colleton River?

ECONOMY

Advantages

Disadvantages

ENVIRONMENT

Advantages

Disadvantages

POLITICAL/SOCIAL

Advantages

Disadvantages

Are there other advantages or disadvantages to building BASF's chemical complex that should be considered, but which do not fit into these three categories?

VOTING SHEET

INNER HARBOR ISSUES	MY POSITION FOR/AGAINST	REASONS FOR MY POSITION
1. Harbor expansion and Modernization: Should BOSSPORT expand the harbor and build containerized facilities?		
2. Waterfront Redevelopment: Should the waterfront area be restored to preserve its historic tradition, or be torn down to build a modern commercial and residential area?		
3. Role of Federal Government: Should the federal government have a major role in deciding the future of Bosstown harbor?		
4. Pollution Controls: Should tough pollution laws be passed and enforced for the Inner Harbor area?		

VOTING SHEET

OUTER HARBOR ISSUES	MY POSITION FOR/AGAINST	REASONS FOR MY POSITION
1. Deepwater Oil Port: Should BOSSPORT build a deepwater port facility?		
2. Harbor Islands: Should harbor islands be purchased by the state for recreation purposes?		
3. Pollution Controls: Should new, tough pollution laws be passed and enforced for the Outer Harbor?		
4. Role of Federal Government: Should the federal government have a major role in deciding the future of Bosstown Harbor?		

NAME_____DELEGATION_____TASK FORCE #_____

1. My Delegation's Planning Proposal was ( ) approved ( ) not approved.

2. I feel our proposal ( ) was given a fair hearing ( ) was not given a fair hearing.

3. The basic outlook (goals/attitudes) of each delegation seemed to be: (include a description of your own delegation.)

   BOSSPORT --

   B.U.R.P. --

   BOSSTOWN MAYOR --

   STATE D.N.R. --

   U.S.BUS. AD. --

   C.L.E.A.N. --

4. Would you describe this conference as successful? Why or why not? (what specific problems occurred?)

Worksheet IV-6

FORMAT FOR A LEGISLATIVE ACT

TITLE: NATIONAL COASTAL MANAGEMENT ACT

SEC.1: COMMITTEE FINDINGS

This section describes the reasons for this new law. Several statements should be listed citing political, economic, and ecological facts of the situation, and summarizing the major problems of the present situation.

The Congress finds that:

(1)

(2)

(3)

(4)

SEC.2: DECLARATION OF POLICY

This section describes the main objectives which the Congress seeks to achieve through passage of the Act.

The Congress finds and declares that it is the national policy to:

(1)

(2)

(3)

(4)

Worksheet IV-6

Sec.3: OPERATIONAL SECTION

Here are listed the specific laws you propose and how they will be enforced. You will need to consider whether the federal government in Washington will be in charge, or will you allow the states to plan and carry out the program? Who will be in charge of enforcing these laws and regulations? Will there be fines or penalties for those who violate the Act?

(1)

(2)

(3)

(4)

(5)

(6)

COASTAL FUTURES

Instructions: Complete the three assignments below in the space provided for each.

1. Based upon the knowledge you now have of coastal problems and of resource management, list several problems that currently affect our local coastal region.

2. Identify and describe in the boxes below: (1) one problem of the present which you think will be effectively solved in 2000; (2) one problem of the present which you think will not be effectively solved; (3) one problem which will have in fact worsened; and (4) one problem which may be entirely new.

3. Identify two or more causes of the problem you list in #1 above. Identify one positive step in each case which you think might or should be taken to lessen, redirect, or relieve the cause of the problem. Indicate whether this positive step should/would be taken by you as an individual, by a special interest group, or by the government.

---

1. LOCAL COASTAL PROBLEMS

(1)_____

(2)_____

(3)_____

(4)_____

(5)_____

(6)_____

2. PROBLEMS

A Problem which will be effectively solved:	A Problem which will not be effectively solved:
A Problem which will worsen:	A Problem which may arise:

(COASTAL FUTURES)

3. CAUSES OF PROBLEMS

(1) Cause of Problem: _____

_____

_____

_____

CATEGORY: Economic Social Environmental Political (Circle One)

ACTION STEP To Lessen, Redirect, or Relieve this cause:

(2) Cause of Problem: _____

_____

_____

_____

CATEGORY: Economic Social Environmental Political (Circle One)

ACTION STEP To Lessen, Redirect, or Relieve this cause:

(3) Cause of Problem: _____

_____

_____

_____

CATEGORY: Economic Social Environmental Political (Circle One)

ACTION STEP To Lessen, Redirect, or Relieve this cause:

GUIDELINES for Preferred Future Scenario

(A) CONTENT

A "Scenario" presents a specific possible future. Your presentation group's scenario should capture vividly your group's ideas on

(1) what the coastal environment and situation would be like in 2000 if the present trends and situations you consider to be "positive" become even more important or widespread, and

(2) how it might come about that these trends or situations become more important and widespread.

Thus, your scenario should both describe what your preferred coastal future will be like, and give a "chronology" of several imagined future events which could have happened to lead up to this "preferred future of 2000."

Scenario writing is like writing a play or a novel about the future. Your scenario should be pointed, and dramatic.

(B) FORMAT

You may present your scenario in any way your group wishes to get across its main ideas. Possibilities range from a straightforward reading of your scenario to making collages, doing a slide or slide/tape show, acting out a short "play," to doing anything your group can imagine.

GUIDELINES for Probable Future Scenario

(A) CONTENT

A "Scenario" presents a specific possible future. Your presentation group's scenario should capture vividly your group's ideas on

(1) what the coastal environment and situation will be like if present trends and situations you are now aware of simply continue. Your group's view of our coastal future may turn out to be generally negative, positive, or mixed. The main focus in this assignment is on probability -- do you think it will really be this way in 2000?

(2) how this probable future might come about -- what actions, trends or imagined events would lead up to this probable future your group envisions?

Thus, your scenario should both describe what future your group sees as probable, and give a "chronology" of imagined circumstances or events bringing this probable future about.

Creating a scenario is like writing a play or a novel about the future. Your scenarios should be pointed, and dramatic.

(B) FORMAT

You may present your scenario in any way your group wishes to get across its main ideas. Possibilities range from a straightforward reading of your scenario to making collages, doing a slide or slide/tape show, acting out a short "play," to doing anything your group can imagine.

COASTAL PROBLEMS AND RESOURCE MANAGEMENT

STUDENT READINGS

A SECONDARY SOCIAL STUDIES COURSE

CURRICULUM RESEARCH AND DEVELOPMENT GROUP
UNIVERSITY OF HAWAII AT MANOA © 1979

COASTAL PROBLEMS AND RESOURCE MANAGEMENT

A SECONDARY SOCIAL STUDIES COURSE

produced by

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The development of Coastal Problems and Resource Management was supported by the Office of Coastal Zone Management, NOAA, Department of Commerce, Grant Number 04-7-158-44035, and the Hawaii Coastal Zone Management Program, Department of Planning and Economic Development, State of Hawaii.

Acknowledgements

The process of designing, testing and revising CPRM continued for two years. This final version reflects the combined talent, imagination, and hard work of many people. Major contributors to the development of the course are listed on the previous page, but many others also contributed significantly to the development of CPRM. We would like to take this opportunity to acknowledge their support, time and advice:

Edith Chave, HMSS Marine Science Project, University of Hawaii, Honolulu, HI
Pat Chesser, Social Studies Teacher, Kalaheo High School, Kailua, HI
Matthew Chow, Science Teacher, Hilo High School, Hilo, HI
John Craven, Dean of Marine Programs, University of Hawaii, Honolulu, HI
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John Ellington, Social Studies Coordinator, North Carolina
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Dallas Jelsma, Social Studies Teacher, Hilo High School, Hilo, HI
Barbara Klemm, HMSS Marine Science Project, University of Hawaii, Honolulu, HI
Jim Lanier, Virginia Institute of Marine Science Gloucester Pt., VA.
Kem Lowry, Pacific Urban Studies Planning Program, University of Hawaii, Honolulu, HI
Elizabeth Lance, Office of Coastal Management, Raleigh, N.C.
Lundie Mauldin, Sea Grant, Raleigh, N.C.
Terry Meyer, Social Studies Teacher, Mid Pacific Institute, Honolulu, HI
Dick Poirier, Hawaii Coastal Zone Management Program, Honolulu, HI
Tom Speitel, HMSS Marine Science Project, University of Hawaii, Honolulu, HI
Ray Tabata, Sea Grant, University of Hawaii, Honolulu, HI
Marilyn Tomita, Social Studies Teacher, Kaimuki High School, Honolulu, HI
Donald Young, FAST Science Project, University of Hawaii, Honolulu, HI

INTRODUCTION TO STUDENTS

The materials in this book of readings are meant to be used along with teacher presentations, worksheets, and other Coastal Problems and Resource Management Course activities. They are not designed to be read and understood by themselves but will make sense as they are assigned by the teacher and as the course moves along.

You will notice that each page has several numbers on it. The numbers to be used throughout this book are those found at the bottom center of the page in parenthesis ( ). These are the numbers referred to in the Contents. Ignore the numbers in the upper right corner as they are for teacher reference. The headings in the upper left corner (Reading I-1) refer to the Unit in which the Reading is included and the number of the Reading within that Unit, e.g. Reading I-1 means that this reading is in Unit I and is the 1st reading in Unit I.

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COASTAL TERMINOLOGY

BARRIER ISLANDS

Many coastal areas have a number of long, low islands located just off shore. These low ridges of sand and gravel are called barrier islands, and are separated from the coastline by lagoons, sounds or bays. These islands provide the natural protection for coastal regions against hurricanes and other storm related activities. Barrier islands are found along most of the Atlantic Coast south of New York, the Gulf Coast, and in northern Alaska. On the Pacific Coast, barrier islands are rare and are found only in a belt along northern Oregon and southern Washington.

BAY

A wide, open curving indentation of the sea or a lake into the land is called a bay. Bays are both large and small, ranging from a few hundred feet across to hundreds of miles wide. Because the waters within are protected, bays are frequently much calmer than the surrounding ocean or lakes. Many ports are located on bays to take advantage of the quiet waters (i.e. San Francisco, California).

BEACHES

Beaches are made of sand, rock, and/or gravel and are covered and uncovered as the tides move in and out. The beach is a dynamic environment with sediments being washed landward by wave action, moved seaward by backwash and carried laterally along the shore by the currents.

ROCKY BEACHES

Beaches filled with small rocks and large boulders jutting out into the waters are called rocky beaches. As the tides come in and go out, these rocks are covered and uncovered by water. A large number of plants and animals (such as rock crabs, barnacles, seaweed, mussles, etc.) make the rocky beach their home. Tide pools are a common feature of rocky beaches. When the tide goes out, little pools are left behind trapped between the rocks. These pools are filled with marine organisms and present a great opportunity to view the seaworld close-up.

SANDY BEACHES

Sandy beaches are composed of tiny fragments of shell, coral or rock (coarsely and/or finely ground). These beaches are constantly shifting as material is constantly added or taken away. Because of the heat of the sand and the constant wash of the waves, many animals live underground in the sandy beach environment. A few inches below the surface live a variety of animals, including shrimp, clams, crabs, beetles, and worms.

BREAKWATERS

A breakwater is a low, wall-like structure built to reduce or eliminate wave action in the region between the breakwater and the shore. Generally made of large rocks or concrete, breakwaters are often constructed as an aid to coastal navigation. In the calm waters behind the breakwater, boats can travel and dock safely.

CONTINENTAL SHELF

The relatively shallow ocean floor extending out from the continental land mass is called the continental shelf. Along the Atlantic Coast of the U.S. the shelf usually descends gradually (five to 10 feet per mile) and extends out as much as 200 miles. On the Pacific side, the shelf extends offshore only about 40-45 miles. The Continental Shelf is a highly valuable region for mineral and commercial fishing resources.

CORAL REEFS

Corals are animal colonies that grow only in shallow, clear, tropical waters. In large numbers they form reefs near the shoreline, which rise to or nearly to the surface of the water. There are three types of coral reefs: fringing reefs, barrier reefs, and atolls. Fringing reefs grow along rocky shores of islands and continents and are found very close to shore, while barrier reefs parallel the shores for great distances (i.e. Great Barrier Reef, Australia) and are relatively distant from the shore. An atoll is a ring-shaped reef that encloses a lagoon. Coral reefs are noted for their beautiful colors and formations; they are the home for a rich and colorful array of fish and other marine life. Coral reefs are found only in the coastal waters of two states, Florida and Hawaii.

DELTA

Deltas occur wherever rivers deposit more sediment into the sea than can be carried away by waves or currents. This sediment accumulates until it rises above the water level. These delta areas are relatively flat and commonly contain marshy areas, lagoons, and lakes. The Mississippi River delta in the Gulf of Mexico is the largest delta region in the United States.

ESTUARIES

Estuaries occur at the mouths of rivers where fresh and salt water mix. The flow of the river and the pulse of the tides combine fresh and salt water. Estuaries are one of the most naturally productive regions on earth, supporting a wide variety of animal and plant life. Marshes are frequently found in estuarine areas.

FLOOD PLAIN

The flat area that borders a river channel is called the flood plain. It is subject to flooding and is composed of sediment deposited by the river during periods of high water.

GROINS

Groins are man-made rock, concrete, steel, or timber structures which extend from the shore out into the water. They are built to prevent the drifting of sand caused by wind, waves and currents. Shorefront owners often build groins (in some areas called jetties) to prevent their beaches from being washed away.

HARBOR

A harbor is a part of an ocean, sea, or river that is sufficiently protected from wind, waves, and currents to be used by vessels for the transfer of passengers and cargo from ship to shore. Harbors are either natural or artificial. Natural harbors are those that can be used without major engineering improvements. Artificial harbors have been created through construction to afford protection from waves, currents, and wind or to deepen the bottom for larger ships.

MANGROVE SWAMPS

In warm climates marshy areas are often covered with mangrove trees which grow in salt water. These trees begin growing at the land's edge and move out to deeper water. Dead leaves from the mangroves, plus droppings from birds that live in the trees help make mangrove swamps very rich in nutrients and supportive of much wildlife.

PIER

A pier is a platform that extends out into the water from the shore. It can be used to dock boats, to fish, and for other waterfront activities. Piers are made of a variety of materials including steel, timber and concrete.

SALT MARSH

Low, heavily vegetated areas within reach of ocean tides are called salt marshes. These marshes are often abundant along coasts with many bays or barrier islands. Marshes are dominated by grasses and support diverse communities of organisms including shellfish, birds, crabs and fish. Salt marshes are frequent along the Atlantic and Gulf states.

SAND DUNES

A sand dune is a mound, hill or ridge of wind-blown sand. Dunes are formed where there is a source of sand, a wind strong enough to carry it, and a land surface on which to deposit it. Until plant life grows on the dune, the dune is likely to blow away or move along, pushed by the wind. Once plants take hold, the dune is likely to remain in one location. Sand dunes serve as protection for areas in times of flooding or high winds.

SEAWALLS

Seawalls are man-made structures constructed along the edge of the shore to provide protection against erosion, wind and water damage. They can provide a substitute for natural features, such as sand dunes. Seawalls are also called bulkheads or revetments.

SPITS

Spits are narrow strips of sand extending into bays or lagoons. Spits are connected to the coast line or to an island, and are formed by waves and currents piling up sand and sediment.

WAVE-CUT CLIFFS

Wave-cut cliffs are steep slopes cut against the land by waves and shore currents. The continuing force of the surf steadily erodes away the face of the cliff. The exact speed of erosion is mainly determined by the composition of the cliff. Wave-cut cliffs are extensive along the Pacific Coast.

Reading I-2

Office of Coastal Resources

M E M O R A N D U M

TO: National Task Force Members

FROM: Office of Coastal Resources

RE: Task Force Directions

It is becoming increasingly apparent to citizens throughout the country that coastal areas (including the Great Lakes region) are coming under enormous pressures from use and abuse.

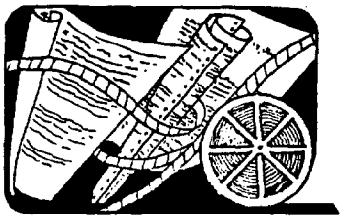
The value and importance of coastal resources to all Americans should be clear. If we continue to allow these resources to be misused, we will jeopardize their use by future generations.

These concerns for coastal regions are shared at the highest levels of government. There is a need now to evaluate the nation's use of coastal regions and their resources. You have been selected to participate as a member of the National Task Force on Coastal Use. This task force will review available data on this subject concerning: (1) the changing use of coastal resources; (2) the degree to which demand upon coastal resources is increasing; (3) the extent of the damage already evident in coastal areas.

You will be asked to make recommendations on several vital issues. Your assistance will help this office formulate coastal policy recommendations for submission to the U.S. Congress.

To aid you in your deliberations, the Office of Coastal Resources has enclosed a data package which various agencies have compiled from current sources. This material includes charts, tables, maps and graphs concerning coastal resource use. Please consider this information and discuss its implications before arriving at your conclusions.

Recommendations should be submitted using the forms provided by our office. Forward all forms to: Office of Coastal Resources, Washington, D.C. 20202. Your assistance is greatly appreciated.



National Data Clearinghouse

Director, National Task Force
Office of Coastal Resources
Washington, D.C.

We would be most happy to share with you what information we have regarding occupational and population trends in the United States. Attached is a set of data concerning population growth and occupational statistics, with emphasis on the coastal areas.

In addition, our researchers have included information related to the amount of leisure time available to the average American.

Some other potentially useful facts:

- The 30 coastal and Great Lakes states currently contain more than 75% of the population.
- Estuarine regions within these states constitute 15% of the state's land, but contain 33% of the coastal population.
- The seven largest metropolitan regions in the U.S. have significant portions of their areas within the coastal zone.
- Agriculture is an important commercial activity in many coastal areas. In California, for example, 35 million acres of agricultural land are located within coastal counties. This land supports 350,000 job holders.

National Data Clearinghouse would be interested in the results of your Task Force work.

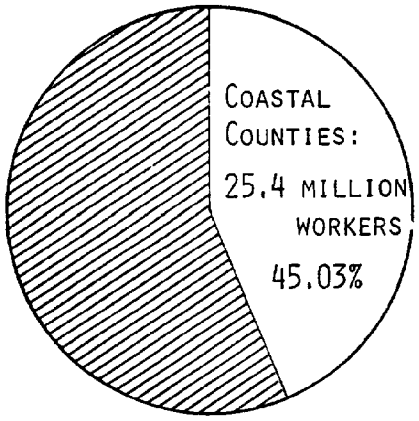
Sincerely,

B. A. Werker

B. A. Werker
Research Director

PERCENTAGE OF TOTAL U.S. LABOR
EMPLOYED IN 394 COASTAL COUNTIES, 1950-80

TOTAL U.S.: 56.4 MILLION WORKERS

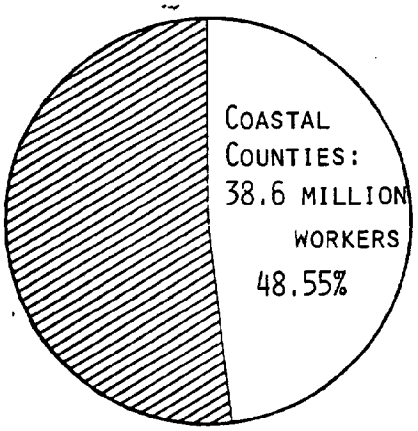


1950

TOTAL U.S.: 64.6 MILLION WORKERS

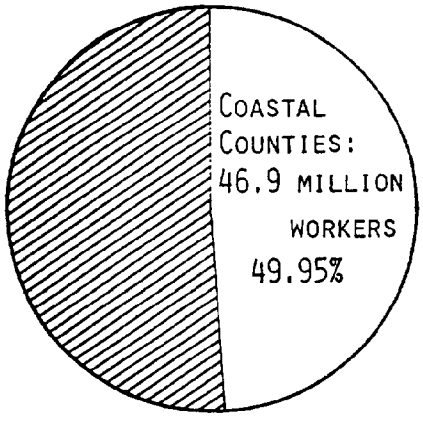
1960

TOTAL U.S.: 79.5 MILLION WORKERS



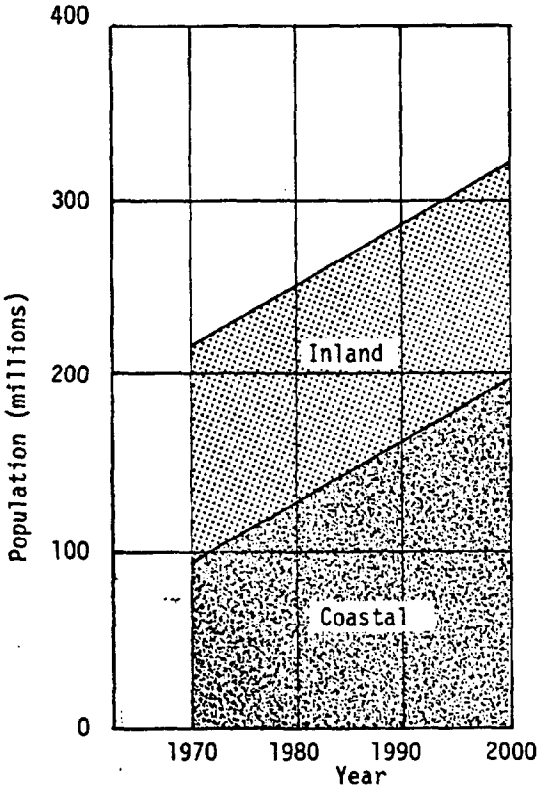
1970

TOTAL U.S.: 93.8 MILLION WORKERS

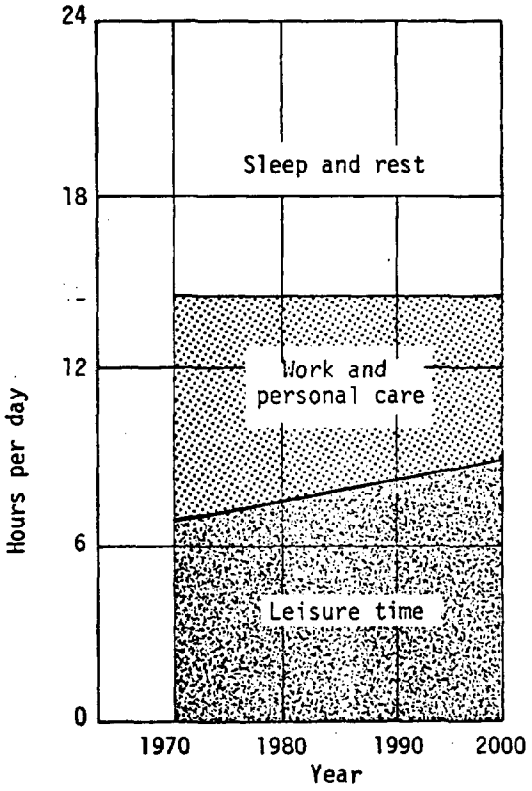


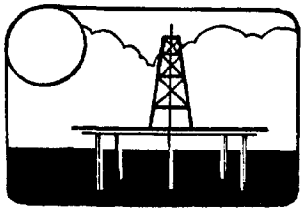
1980

GROWTH OF U.S. POPULATION
IN INLAND AND COASTAL AREAS



GROWTH OF LEISURE TIME
PER EACH 24 HOURS





REEF
Resources
Energy
Economy
Food

Director, National Task Force
Office of Coastal Resources
Washington, D.C.

We received your letter requesting data on ocean resources and the economic value of the coastal zone, and would be happy to help with what information we have.

One valuable source is the Magnuson study, recently released by the U.S. Senate Commerce Committee, concerning the economic value of the ocean. A summary table derived from this report is enclosed.

Related information compiled by our staff is presented in graphs demonstrating the comparative value of terrestrial and marine production. Other diagrams present general shoreline data and uses of the coastal zone, including recreation and the extraction of mineral resources.

Two other facts may be of interest to your committee:

- Between 1922 and 1955, over one-quarter of the salt marshes in the United States were destroyed.
- Most marine life is concentrated in the coastal areas, comprising only 3% of the total ocean area.

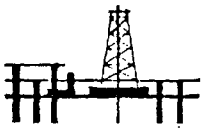
Thank you for the opportunity to be of assistance.

Sincerely,

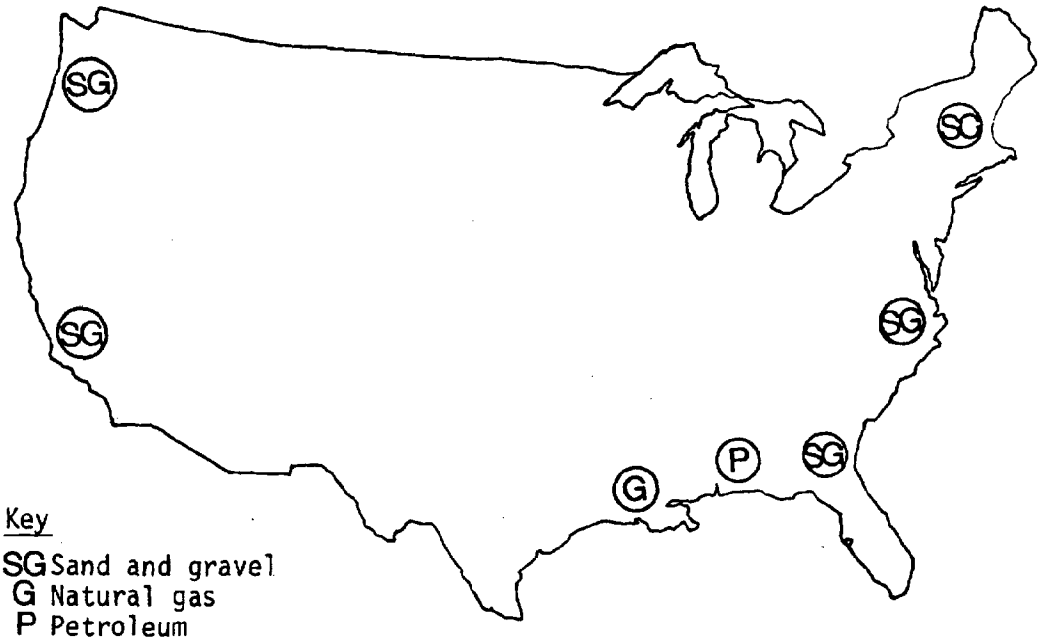
Anne Chovey

Anne Chovey
REEF Associate Director

THE VALUE OF THE OCEANS TO THE U.S. ECONOMY

Ocean Activities	1973	2000
 **OIL** Offshore production	$2.4 bil.	$10.5 bil.
NATURAL GAS Offshore production	$800 mil.	$8.3 bil.
TRANSPORTATION Cost of shipping goods in U.S. vessels	$2.6 bil.	$11.4 bil.
RECREATION Spending for recreation in or on oceans	$1.0 bil.	$2.5 bil.
ENERGY Power from ocean currents, tides, thermal gradients	0	$6.3 bil.
FISH Catch for food, industrial uses	$880 mil.	$4.0 bil.
MANGANESE Nodules mined by U.S. ships.	0	$300 mil.

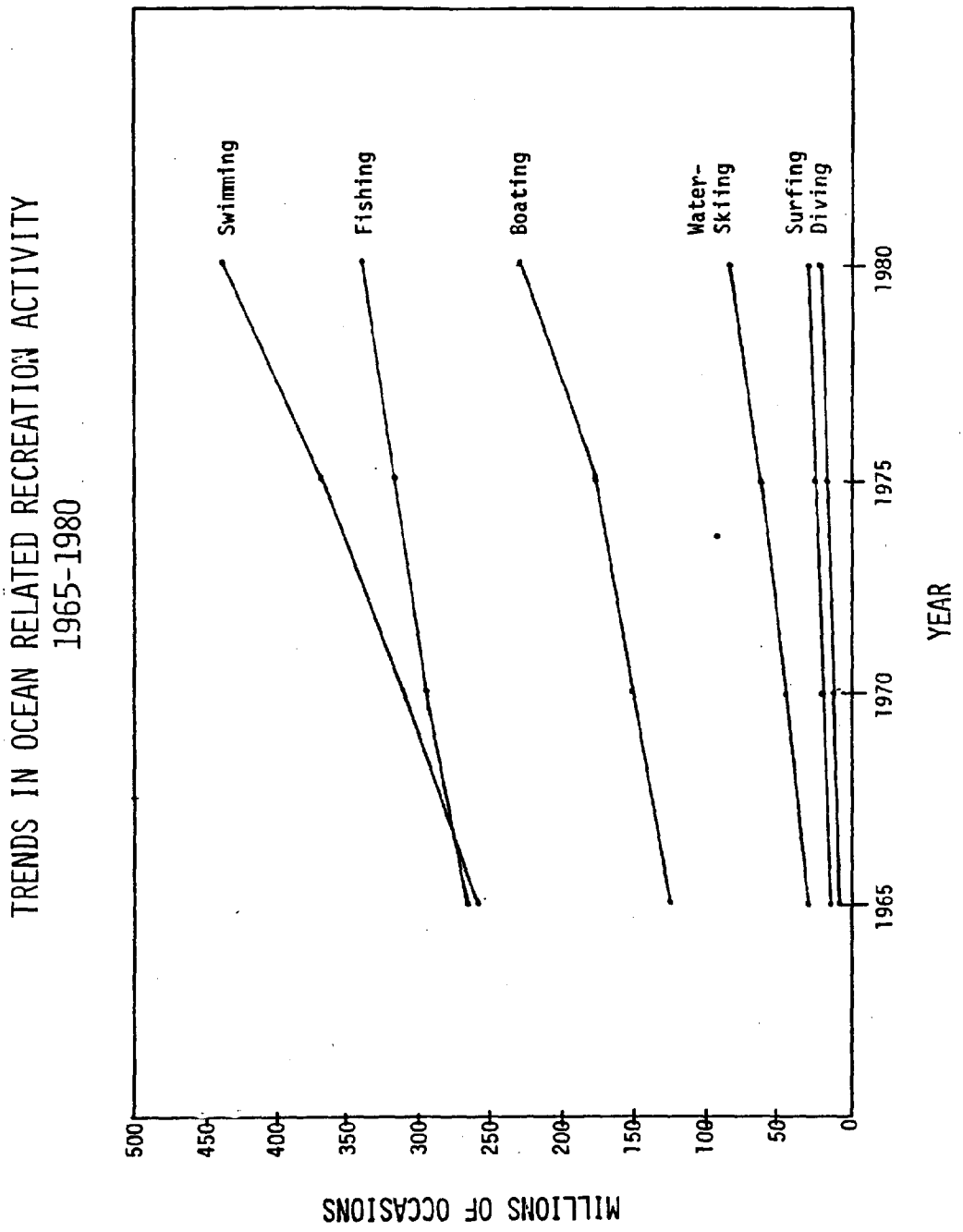
MAJOR COASTAL MINERAL RESOURCES



Key

SG Sand and gravel
G Natural gas
P Petroleum

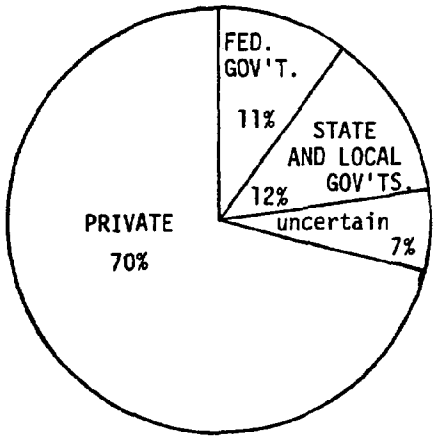
Region & Commodity	Number of Operations	Quantity Produced Amount	Units	Value
North Atlantic				
Sand and gravel	116	10,068,000	tons	$10,611,000
Middle Atlantic				
Sand and gravel	232	12,299,000	tons	20,193,000
South Atlantic				
Sand and gravel	6	137,000	tons	89,000
Gulf of Mexico				
Petroleum	311	775,970	barrels	92,138,579
Natural gas	830	12,977,008	cu. ft.	22,540,516
Natural gas	138	3,321,951	gallons	64,513,281
Clay	5	6,724,608	tons	36,036,697
Pacific Southwest				
Sand and gravel	216	64,696,906	tons	73,307,506
Pacific Northwest				
Sand and gravel	155	26,750,606	tons	34,447,779


TRENDS IN OCEAN RELATED RECREATION ACTIVITY
1965-1980
Swimming
Fishing
Boating
Water-Skiing
Surfing Diving
500
450
400
350
300
250
200
150
100
50
0
1965
1970
1975
1980
YEAR
MILLIONS OF OCCASIONS

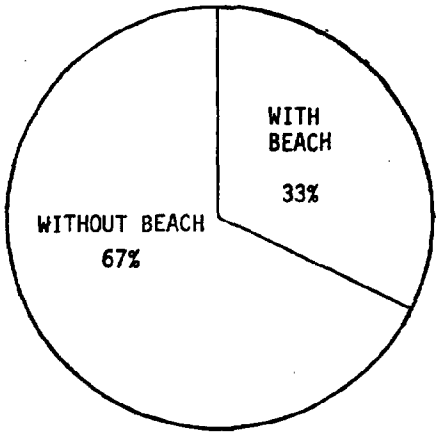
(13)

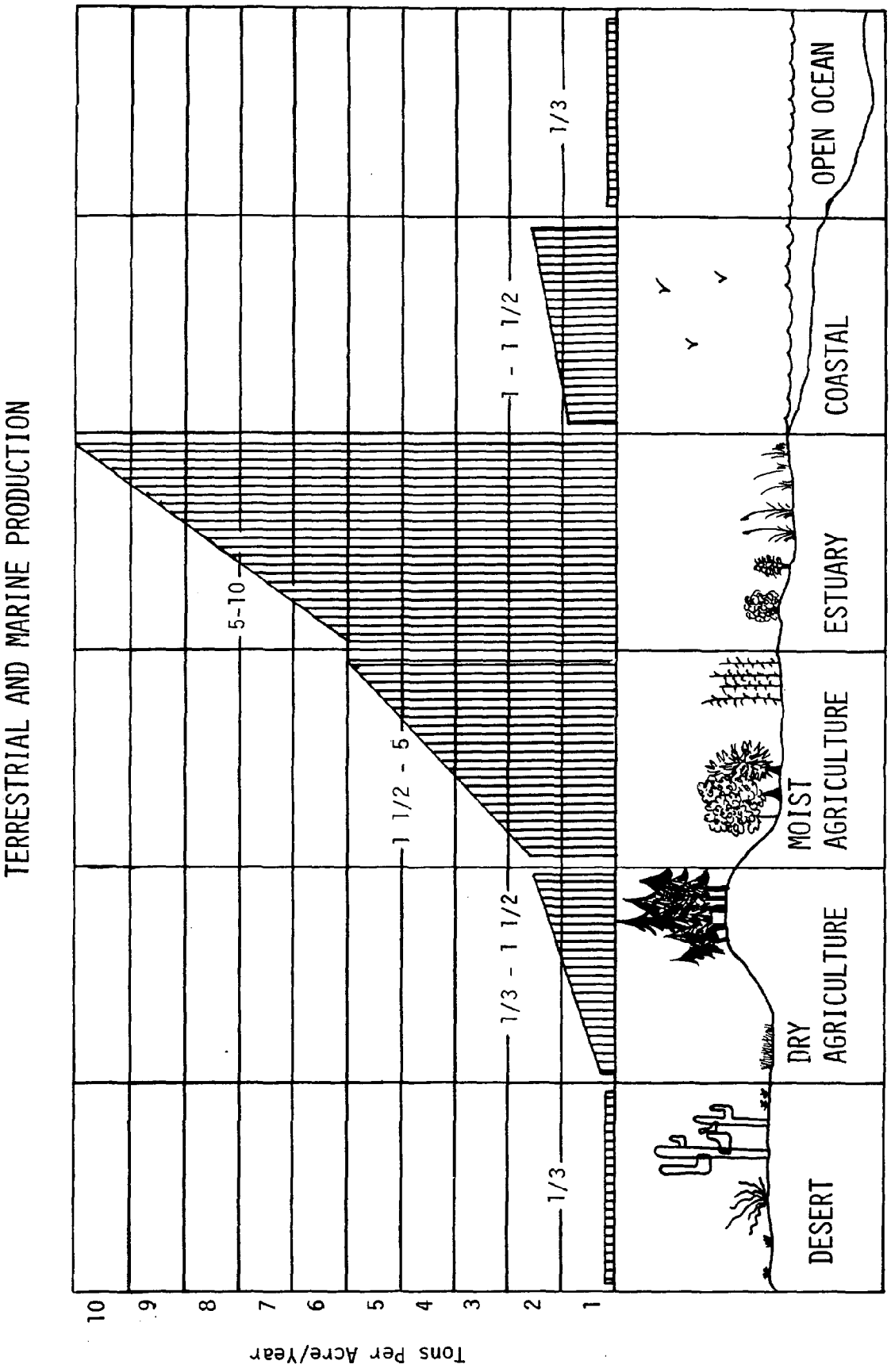
GENERAL SHORELINE DATA

Shoreline Ownership (excluding Alaska)

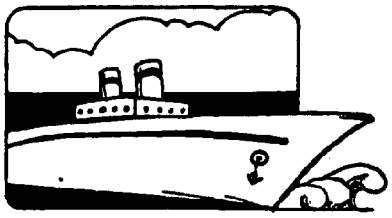


Shoreline Physical Characteristics
(Excluding Alaska)




TERRESTRIAL AND MARINE PRODUCTION
Tons Per Acre/Year
10
9
8
7
6
5
4
3
2
1
5-10
1 1/2 - 5
1/3 - 1 1/2
1/3
1 - 1 1/2
1/3
DESERT
DRY AGRICULTURE
MOIST AGRICULTURE
ESTUARY
COASTAL
OPEN OCEAN

(15)



U.S. Ports and Harbor Agency

Director, National Task Force
Office of Coastal Resources
Washington, D.C.

In response to your recent request, we have compiled some information regarding boating and shipping uses in coastal areas.

Enclosed is a series of charts and graphs which depict:

(1) A comparison of trade handled by ship and airplane

(2) The impact and demand for marinas

(3) Estimates on the size of large vessels in the future

(4) The amount of cargo handled by U.S. ports

Some other important facts to consider include the following:

* Present world sea commerce traffic lanes use only 1% of the entire ocean surface, resulting in conflict over traffic space.

* Over 40 of the largest 50 U.S. cities have thriving port activities.

* Most channels in these ports are only 35 to 45 feet deep--too shallow to accommodate growing ship dimensions.

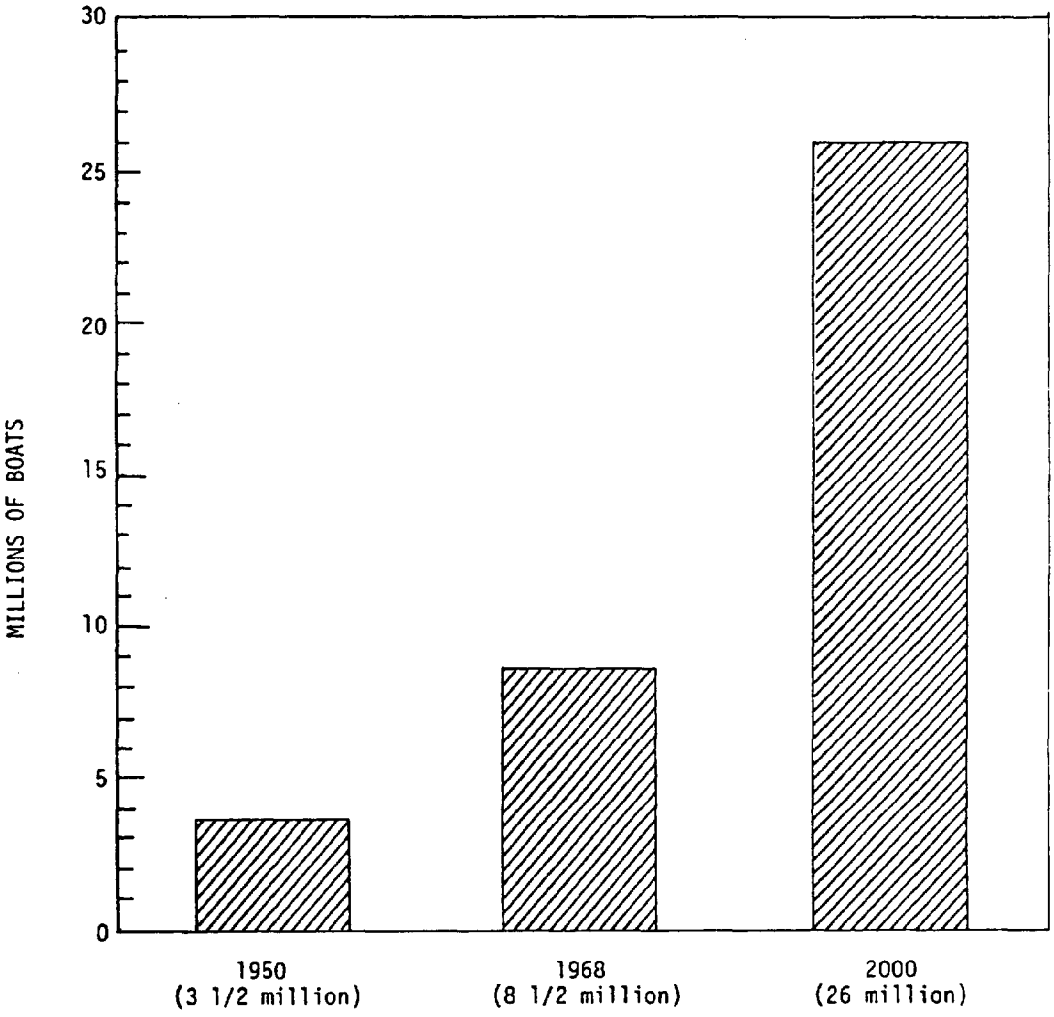
* Over 75% of the nation's ports are located on estuaries.

We hope that this information will prove helpful in your efforts.

Sincerely,

I. I. Captain
Public Information Assistant

GROWTH IN NUMBER OF PLEASURE CRAFT IN U.S.



IMPACT OF MARINAS

As with most water-based recreation activities, boating is heavily dependent upon related land-based facilities. Both freshwater and saltwater boating require the following land-based services:

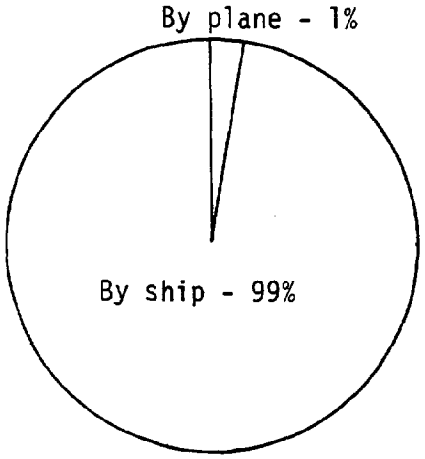
(1) Sales outlets
(2) Major servicing
(3) Maintenance
(4) Fuel
(5) Access or mooring
(6) Storage
(7) Transportation
(8) Lodging
(9) Food
(10) Recreation
(11) Weather notification

DEMAND FOR MARINA FACILITIES

In a nationwide study of 417 marinas by the National Association of Engine and Boat Manufacturers, it was reported that the lack of slips and moorings was the largest single factor retarding the sale of new boats and motors. From the 417 marinas:

(1) There was a total of 35,592 slips
(2) 94 percent of these slips were occupied
(3) 397 said more boats could be sold if more slips were available
(4) 77 percent of all marinas were 100 percent occupied

INTERCONTINENTAL TRADE HANDLED BY SHIP AND AIRPLANE

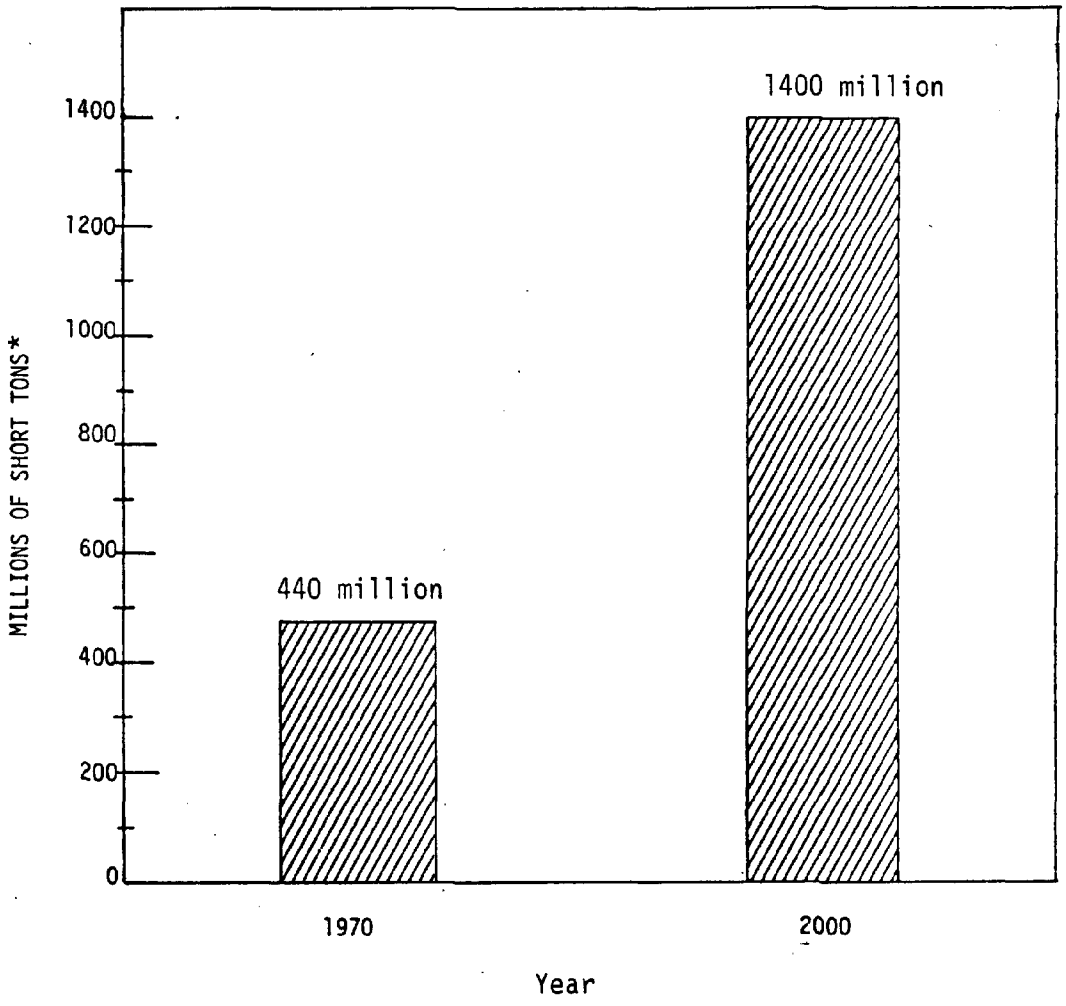


PROJECTED SHIP DIMENSIONS 1970-2000

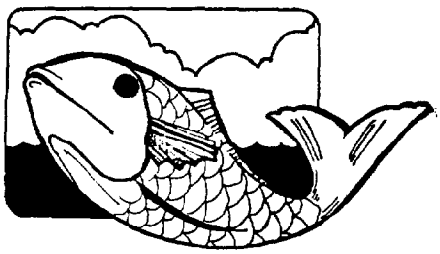
Type of Ship	1970	1980	1990	2000
General Cargo or Container Ships				
Length (feet)	850	930	1010	1050
Draft (feet)*	36	39	40	40
Tankers				
Length (feet)	1135	1460	1570	1570
Draft (feet)	72	98	104	104

*Draft is the depth of water a ship draws when loaded.

SHIPPING TONNAGE HANDLED BY U.S. PORTS 1970-2000



*Short Ton = 2,000 lbs



National Fisheries Office

National Task Force Members
Office of Coastal Resources
Washington, D.C.

Our office is pleased to provide you with the information regarding fishing resources of the ocean and coastal area. We have enclosed the graphs and tables showing the following:

* Per capita consumption of commercial fish and shellfish since 1960

* The changes in worth of fish and shellfish in the U.S. since 1950

* The amount of fish caught by the U.S. from varying distances offshore

In considering the future of U.S. fishing resources, the following facts about estuarine resources should be kept firmly in mind:

--Many popular seafoods such as crab, shrimp, oyster, salmon, and flounder, are all dependent on estuaries for their development.

--Fish valuable for industrial uses, such as menhaden, are also dependent on estauries.

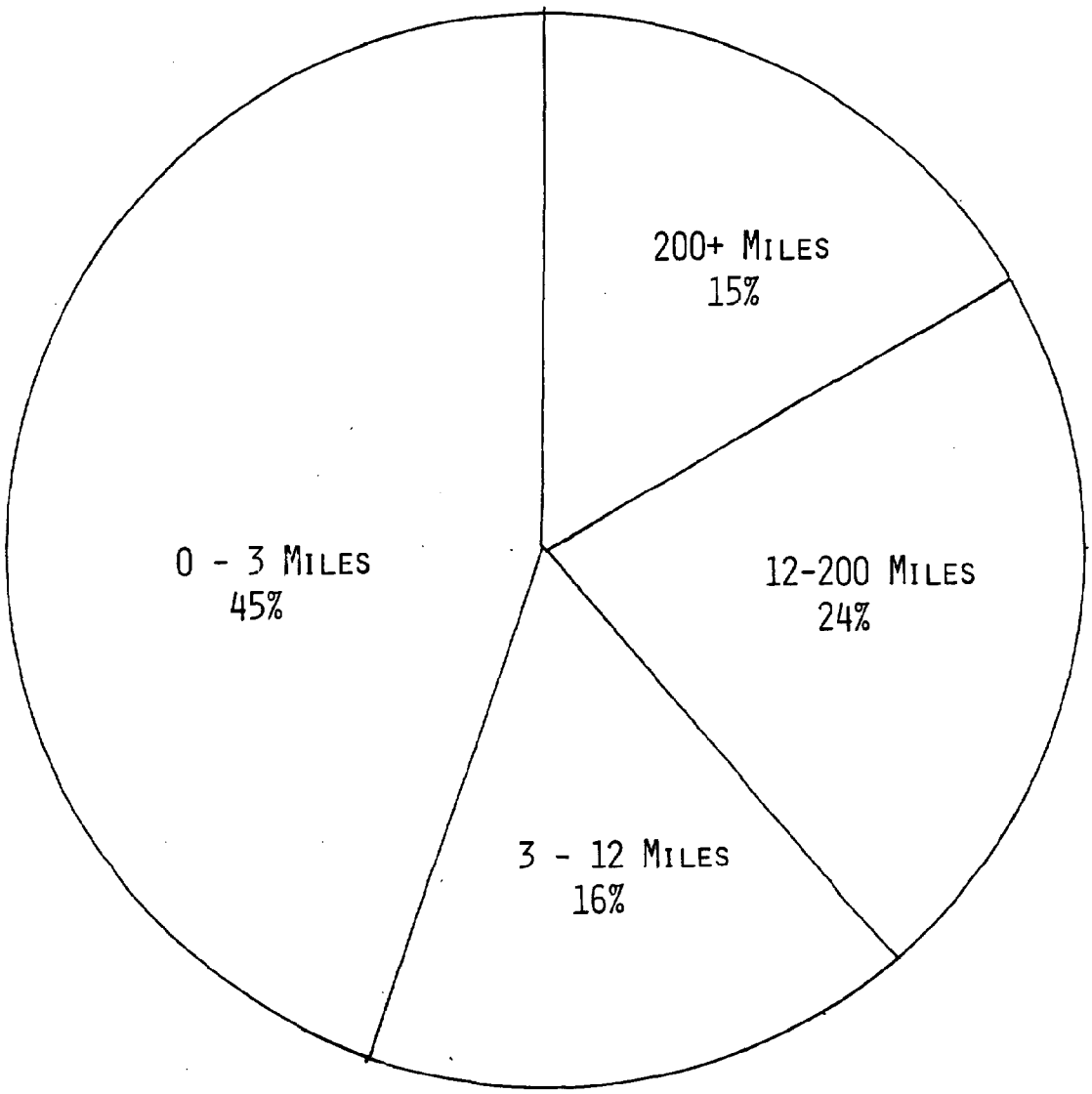
--In any given year, about two-thirds of the total value of all U.S. commercial fishing comes from estuarine-dependent species.

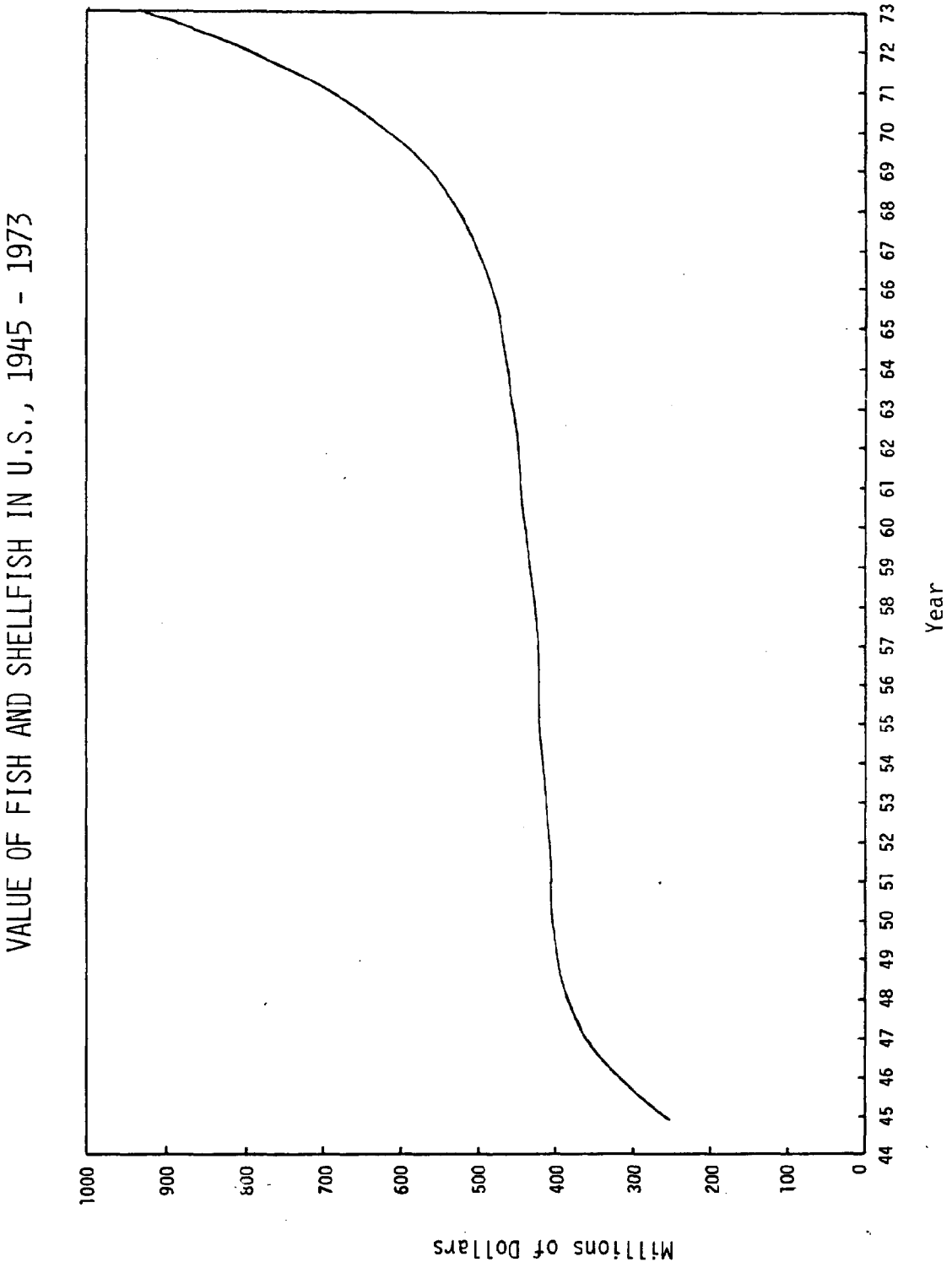
The National Fisheries Office is concerned with public awareness of the uses of the coastal zone, and hopes this information will help you with your research.

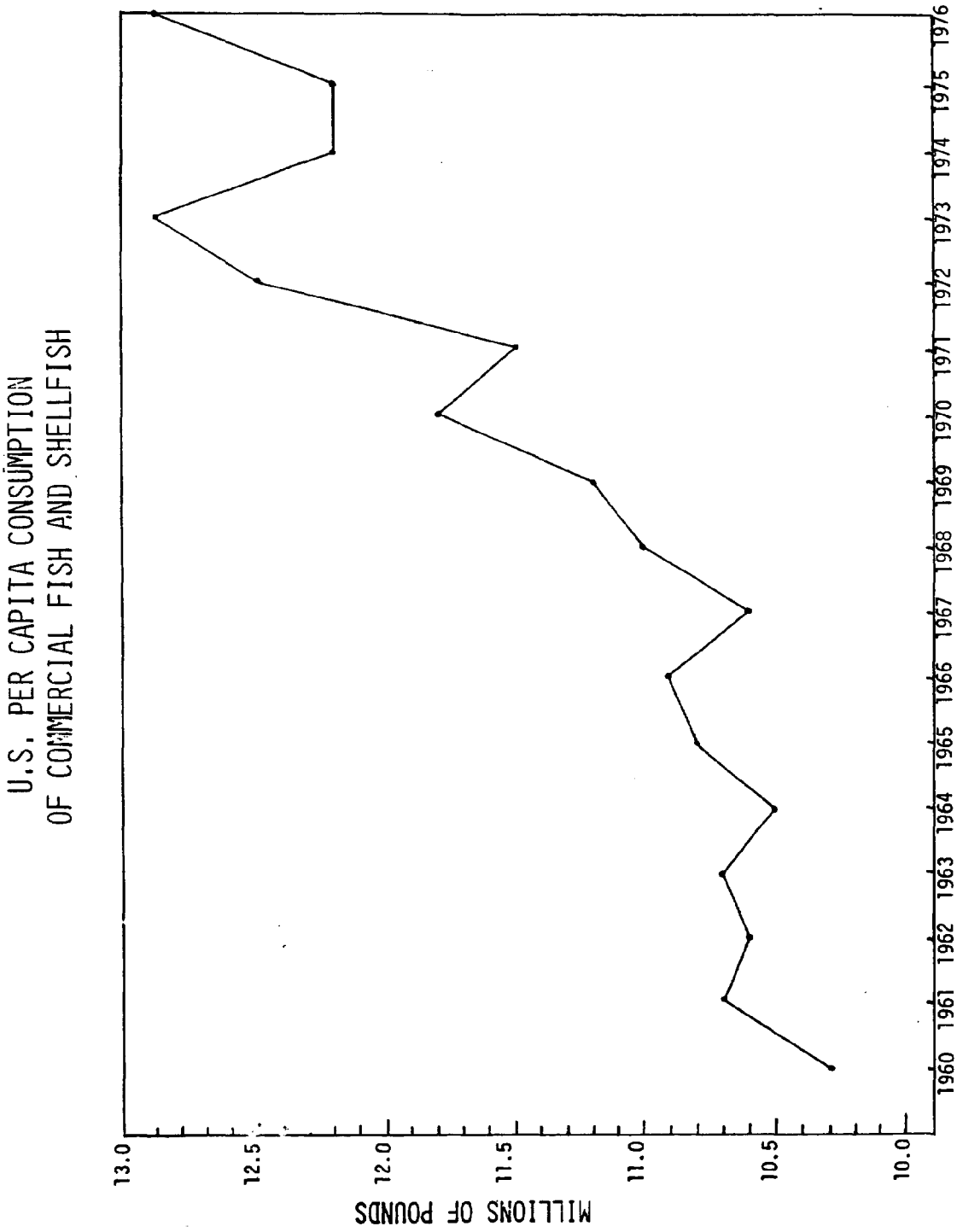
Sincerely,

C. Fisher
Public Relations Officer

PERCENTAGE OF COMMERCIAL U.S. FISH AND SHELLFISH CATCHES BY DISTANCE FROM U.S. SHORES 1976




VALUE OF FISH AND SHELLFISH IN U.S., 1945 - 1973
Millions of Dollars
1000
900
800
700
600
500
400
300
200
100
0
Year
44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73


U.S. PER CAPITA CONSUMPTION
OF COMMERCIAL FISH AND SHELLFISH
MILLIONS OF POUNDS
13.0
12.5
12.0
11.5
11.0
10.5
10.0
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
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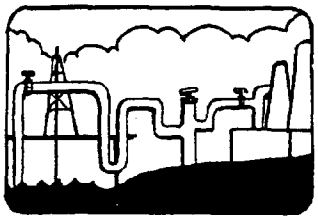
1972
1973
1974
1975
1976

(24)



ENERGY
Research Associates

National Task Force Members
Office of Coastal Resources
Washington, D.C.

Our researchers have drawn together the following information which may help you understand the relationship between U.S. energy needs and the coastal region.

1. The coastal region is a site of intensive energy use. Fifty percent of the manufacturing facilities in the U.S. are located in the coastal region, and nearly 50% of our population lives in coastal counties.

2. Many of our energy sources are located in coastal areas, particularly oil and gas.

3. In the future, most of our oil and gas will come from offshore areas; this is because most of the easily located inland sites have already been found.

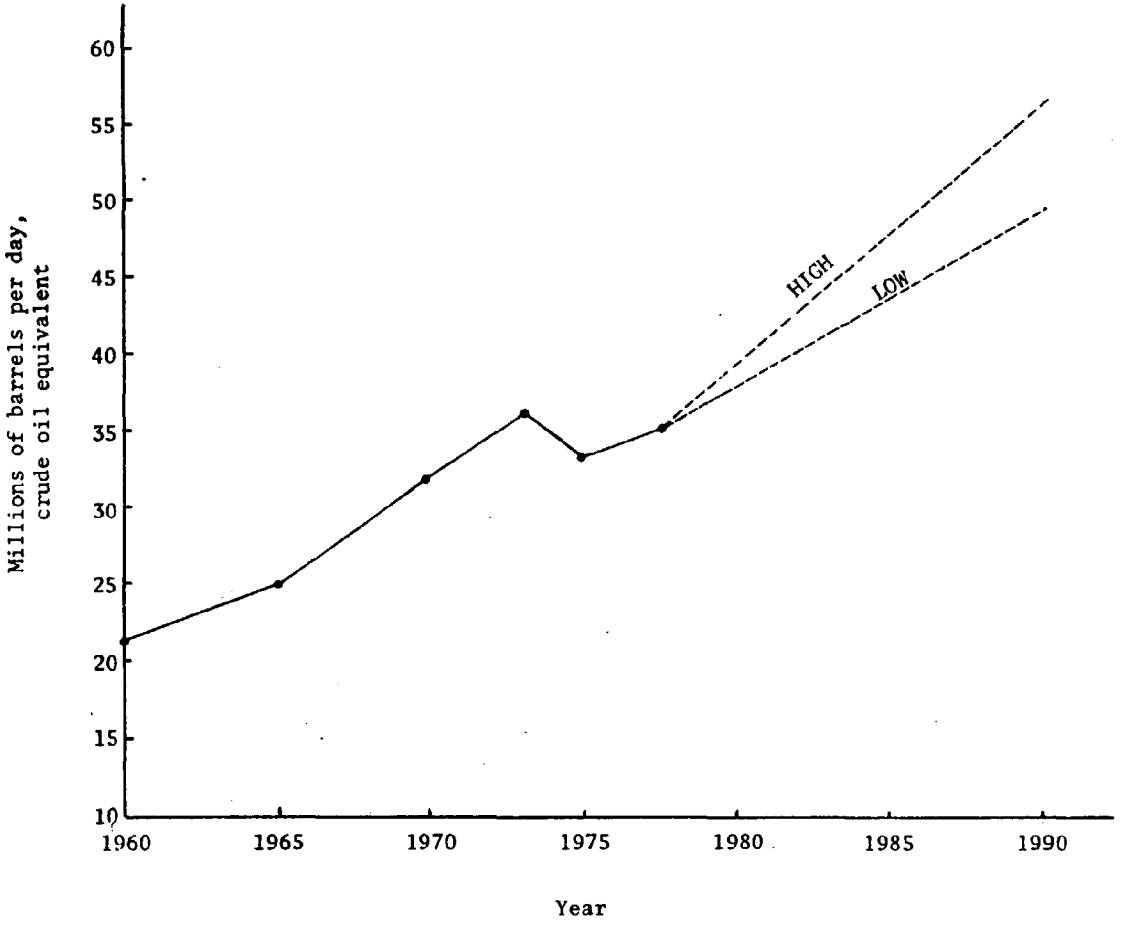
4. The U.S. imports 40% of its petroleum needs; this percentage is likely to increase during the next few years. Nearly all of this imported petroleum travels by tanker; thus, our ports and harbors are vital links in the energy chain.

The following charts and maps further describe the energy situation. If our office can provide you with further information, please let us know.

Sincerely,

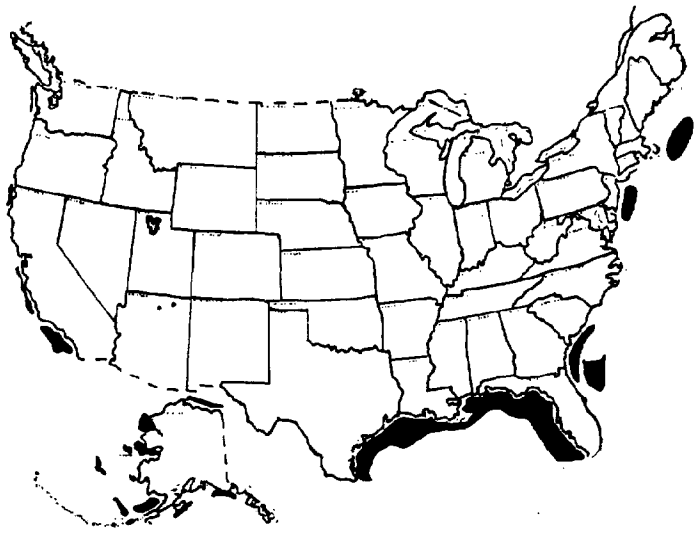
Adam Power
Director, Energy Research Associates

PROJECTED ENERGY DEMAND* FOR U.S.



*Demand is the total amount of oil, coal and other sources of energy that are needed. This chart expresses demand in terms of the number of barrels of oil needed to meet the entire energy demand.

OUTER CONTINENTAL SHELF AREAS UNDER CONSIDERATION FOR LEASING BEGINNING 1976



POSSIBLE IMPACTS OF OUTER CONTINENTAL SHELF OIL DEVELOPMENT ON COASTAL AREAS

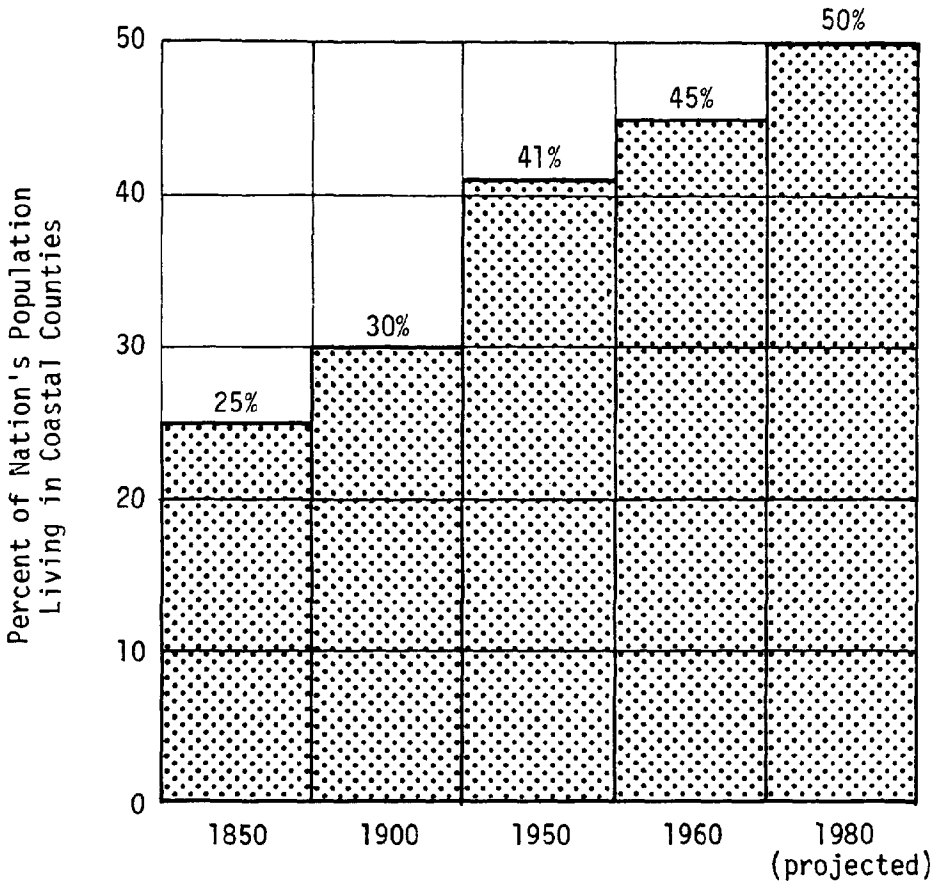
PRIMARY EFFECTS:

1) Construction of refineries
2) Construction of gas processing plants
3) Construction of petrochemical complexes
4) Construction or enlargement of ports and harbors

SECONDARY EFFECTS:

1) Water pollution
2) Shoreline damage
3) Disruption of wetlands
4) Increase in population
5) Increased employment opportunities
6) Increased supply of oil

THE MOVE TO THE COAST



COASTAL ECOLOGY

Human actions and natural events can bring change to the coastal region. Here, even actions and events which seem minor sometimes have far-reaching effects. In order to make wise decisions about coastal development, we need to know how possible actions are likely to affect conditions in the coastal environment. A good deal of the knowledge we need has been discovered by scientists called ecologists.

Ecology studies the interactions of organisms with their non-living environment and with each other. It is a complex science drawing on many other fields of knowledge for its insights. However its basic ideas are fairly simple.

Ecologists study what are called ecosystems. An ecosystem includes all the interactions between plants, animals and physical things within a particular set of boundaries. The area enclosed by the boundaries can vary from quite small to very large. An aquarium, a tidepool, a harbor, an estuary, an island, a cubic mile of ocean, an entire coastal watershed area from the shore to distant mountains -- any of these areas can be regarded as an ecosystem. Whatever the size of the area, the ecologist's task is to trace out the relationships existing between living and non-living things that exist there; to discover the patterns of that particular ecosystem.

All ecosystems have certain characteristics in common. First, all parts in the ecosystem are connected in some way or another. (When you think about it, that is what we really mean by a system.) For example, fine silt washed into an estuary reduces the amount of sunlight penetrating down into the water. This reduces the quantity of single-celled algae that can grow and that, in turn, cuts down the food supply of aquatic animals which feed on the algae. The amount of aquatic life determines many other delicate relationships existing in the estuarine ecosystem.

Secondly, the nature of most ecosystems will remain amazingly constant over a long period of time.

A third characteristic of ecosystems is that there are patterns of events which recur over and over. These patterns are called ecological cycles. Some ecological cycles are long, some are short, but taken together, all work to overcome stresses or restore balances within the ecosystem. Rivers are recharged by cycles of evaporation, rain, and ground water runoff. If predators kill too many of their prey then the predators starve. The prey re-populate, restoring a balance. Ecological cycles renew the ecosystem.

Because the parts are all connected, human actions taken to solve one perceived problem often cause or create new problems elsewhere in the system. Commercial fertilizers and pesticides, for example, will increase agricultural productivity of farmland, but they may also seep into water supplies and contaminate drinking water. Impacts can show up far away. The pesticide DDT, widely used in South America, is now being found in the tissue of Antarctic penquins. Impacts can show up in unexpected ways. The bald eagle is threatened with extinction because DDT has affected its ability to reproduce -- its egg shells have become thinner and crack easily. Fewer eaglets survive.

Coastal ecosystems are particularly vulnerable to disruption, yet human interference with their functioning is constantly increasing. Coastal ecosystems are unusually biologically productive regions. Our knowledge is far from complete, but some ecologists have projected that as much as 60-80% of all life in the sea begins in coastal waters and wetlands. Only in the last decade has there been a significant public awareness of the damage we are doing to our coastal environment.

In the United States, laws now exist which require that environmental impacts be researched, made public, and seriously considered before any new development may begin. Many people call for stronger measures. Others say there is already too much regulation, and that restrictions should be relaxed. As a coastal citizen, you are in the middle of this debate.

The first step toward an intelligent response to the development versus preservation argument is to understand something of coastal ecology. How do coastal ecosystems work? Why are they important to us? How can things we do damage coastal ecosystems? These are the themes of Unit II.

POLLUTANTS IN THE WATERWAY

Pollution comes in many different forms. Salt can be a pollutant; sand can be a pollutant. So can chemicals, pesticides and waste products from industry and homes. Fertilizers from agricultural fields and hot water can pollute. Almost anything we make or use has a byproduct or waste product associated with it. When we discard these wastes, they can often pollute rivers, damage estuaries, foul beaches, kill wildlife, close fishing grounds, or ruin drinking water.

According to the Environmental Protection Agency (the major Federal agency with responsibility for monitoring the environment) there are eight major types of pollutants which enter waterways.

1. Oxygen Demanding Wastes -- When oxygen demanding wastes enter the water, they will use oxygen needed by fish and other wildlife. These wastes come from human sewage, food processing industries, paper mill production, and other manufacturing processes. Adequate sewage treatment removes many oxygen-demanding wastes.

2. Disease Causing Organisms -- These pollutants are infectious organisms which come from sewage and certain kinds of industrial wastes. People or animals contact these disease-causing agents by drinking water or through swimming, fishing, or other activities. According to the World Health Organization, 80% of the world's cases of disease are traceable to unclean water. Modern treatment facilities have greatly reduced the danger from these kinds of pollutants in the United States, but the problem must be constantly watched.

3. Plant Nutrients -- A certain amount of plant nutrients in the water is essential for algae, water weeds, and other plants to grow. Nutrient pollution occurs when an excess of these nutrients overstimulates the growth of water plants, causing unsightly conditions and unpleasant odors. Further, they can choke waterways and interfere with treatment processes. Large amounts of these nutrients come from sewage, certain industrial wastes, and drainage from fertilized lands.

4. Synthetic Organic Chemicals -- Washing dishes may seem innocent enough, but many types of detergents and other industrial and household cleaners contain synthetic organic chemicals. The production of plastics and other petroleum-based products are other sources of synthetic chemicals. Some of these substances are poisonous to aquatic organisms and humans. They cause taste and odor problems, and resist conventional treatment processes.

5. Inorganic Chemicals and Mineral Substances -- Acids, solid matter, and many other chemical compounds are included in this group. Regular waste treatment facilities do not reduce the impact of these pollutants. Inorganic chemicals and mineral substances are discharged from mining and manufacturing processes, oil field operations, agricultural operations and natural sources. Water used in irrigation picks up large amounts of minerals as it filters down through the soil on its way to the nearest stream. These pollutants kill fish and other aquatic life, corrode expensive water treatment equipment, and increase commercial and recreational boat maintenance costs.

6. Sediments -- Sediments are found in all waterways. These particles of soil, sand, and minerals carried along by streams and rivers are produced by the natural process of erosion. Sediments become a serious problem when too great a volume of sand and silt is carried by rivers or deposited in estuaries and bays. This can occur from such things as flooding, construction projects, and from the channelization of waterways. This last practice speeds the flow of water preventing sediments from naturally falling to the river bed. Sediments clog harbors requiring expensive dredging, and fill reservoirs reducing their capacities. Fish and shellfish populations may be damaged. Sediments also decrease the penetration of sunlight into the water, thus reducing plant life.

7. Heat -- Water must contain oxygen to support aquatic life. Heat reduces the capacity of water to hold oxygen. With less oxygen available, water is less capable of supporting the bacteria to decompose oxygen-demanding pollutants. Higher water temperatures can also affect the life cycles of much marine life. Warmer temperatures can cause fish eggs to hatch too early in the spring before the natural food organisms needed by the young fish are available. Salmon may not spawn if the water is too warm. Marine life also uses more oxygen as the water temperature rises, yet as noted above, water holds less oxygen when it is warmer. Heat, or thermal pollution, comes mainly from power plants and industry. They pump water from a river or ocean to use in cooling processes and return it at higher temperatures.

8. Radioactive Substances -- Radioactive pollution results from the mining and processing of radioactive ores, from the use of refined radioactive materials in power reactors, and from fallout following nuclear tests. In the U.S., care has been taken to prevent radioactive substances from entering our water systems. This is important because conventional water treatment plants do not reduce radioactive pollution.

Reading II-3

The Savannah Marshlands: A River That Kills

The Savannah River is a great water system, with an average daily flow of 7 billion gallons. As the river nears its mouth below the city of Savannah, it splits into many channels which wander through the river delta to inundate coastal inlets. Here the line between river and sea is blurred; it changes with the tides. This vast intertidal region forms the Savannah marshlands, one of the great estuarine basins of America.

Until recently, the Savannah River and marshlands area provided something else for delta residents -- a dumping ground. All municipal and industrial wastes from the area went virtually untreated into the main channel of the river. The actions and attitudes of the industries and the township of Savannah were characterized in the phrase: "A house has a garbage can; Savannah has a river."

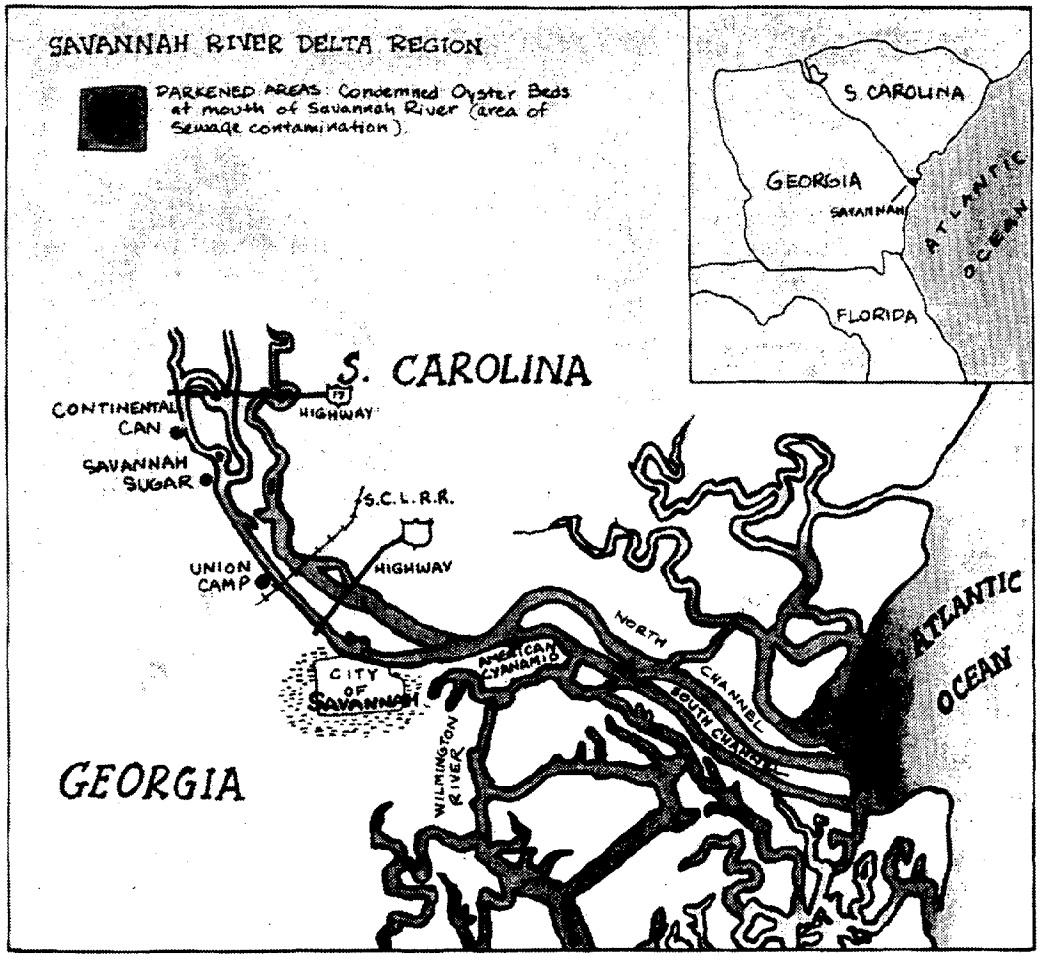
Given the great number of streams and channels, Savannahians did not believe that one polluted channel could make much difference. The marshes, they said, were miles from the factories and city sewage outlets. Concentrating the pollution in the main river channel, they contended, actually protected the marshes and small creeks for fishing, swimming, and wildlife breeding.

This comfortable theory became subject to serious doubt when the Army Corps of Engineers made detailed studies of the river's flow in the early 1960's. The Corps determined that fully 30% of the total river flow fed into the South Channel, which in turn fed into the Wilmington River and the network of small tidal creeks south of Savannah. This study indicated that the marshlands of South Carolina as well as of Georgia were receiving millions of gallons of sewage and factory pollution daily.

Who were the polluters? They were the City of Savannah -- raw, untreated sewage from 120,000 people; the Union Camp paper mill -- 40 million gallons of waste water a day; American Cyanamid -- 700,000 pounds of acid per day. These were the "Big Three." Union Camp was the world's largest paper bag mill. American Cyanamid produced titanium dioxide, a white pigment used to write the m's on M & M candies, among other things. Savannah claimed it couldn't afford to build a sewage treatment plant.

Each polluter maintained the effects of its wastes were tolerable, and no one had hard facts to disprove their arguments.

Reading II-3



Ample circumstantial evidence developed, however, that the marshlands were in serious danger. Ever since the 1940's, many thousands of Savannah's best oyster producing acres had been closed by the Department of Health, as human sewage contaminated the water near the oysters. Nearly 98% of all the commercially important fish on the Georgia coast depended directly on the marshes for survival -- and all of the commercial fish harvests had been declining over many years.

Studies of the river water showed a 17 mile slug of "dead water" from upstream of the large industries to the area past the last sewage outfall. Here the dissolved oxygen level was too low to support aquatic life. Not only were there no local fish left, but the river pollutants were killing those species which swam from the ocean to inland fresh waters to lay their eggs. Union Camp's wastes accounted for 80% of the oxygen-consuming pollutants filling this section of the river.

Reading II-3

Listing the pollutants one by one, it could be and was argued that no one of them was a serious hazard. But the river's natural systems worked a cruel multiplication with the different pollutants. As one pollutant enters a river, it often makes the river organisms more vulnerable to the attacks of other pollutants. There is a "synergistic" effect, which means that the total impact is far greater than the sum of the individual pollutants.

For example, along with its acid, American Cyanamid discharged up to 130 tons of soluble iron compounds daily. The presence of iron affects the ability of marine organisms to tolerate other toxins in their systems. The interaction between iron and acid is particularly toxic. With iron in the water, levels of acid in the water normally tolerated by the fish become lethal.

Synergy was not the only multiplier. Timing was another. Each August, factories were at peak production, and heavy rains washed large amounts of organic oxygen-demanding wastes into the river. The river's water temperature was also up, reducing its capacity to hold oxygen. Thus the level of dissolved oxygen throughout the Savannah delta sank. August was the very month that the marsh's oxygen needs were greatest. For at this time, the marshlands were teeming with all manner of newly hatched organisms.

The danger of unanticipated pollution disasters was always present. On July 17, 1968, a 50 foot section of earthen dike in American Cyanamid's holding pond gave way, releasing 3-1/2 million pounds of raw sulfuric acid into the river. Fish died for miles down the river, not only in the Savannah but also in the Wilmington, which Cyanamid officials insisted their pollution never entered.

Nevertheless, each polluter still claimed its wastes did not constitute a threat to the river system and the estuarine area. Each presented plausible data and arguments, and all used strong political counterpressure to resist effective regulatory action against them. It might be true that the individual actions of each of these polluters alone was not enough to create a disaster. But together, they threatened the vital ecosystem of the marshland.

Reading II-4

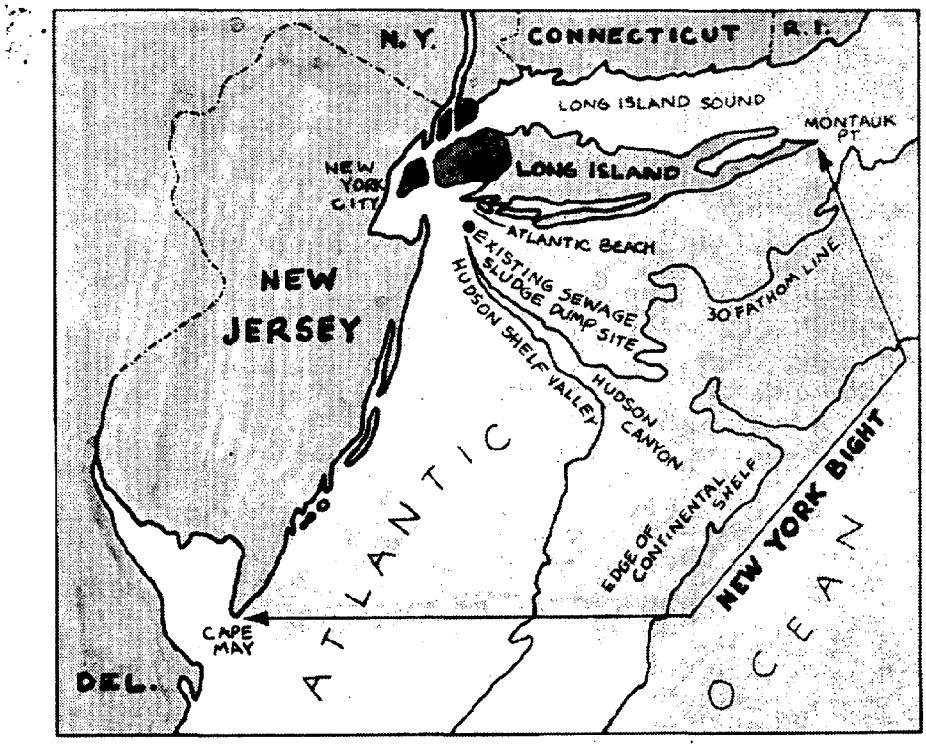
NEW CREATURE FROM THE DEEP: THE SLUDGE

Picture yourself relaxing on your favorite beach. Ah, what bliss! The sun beams delicious warmth, the sky is a cloudless blue..you settle back into a comfortable position on the sand and close your eyes...a wave breaks gently on the shore...and a mass of sticky, black goo laps up around your feet.

Sticky black goo?

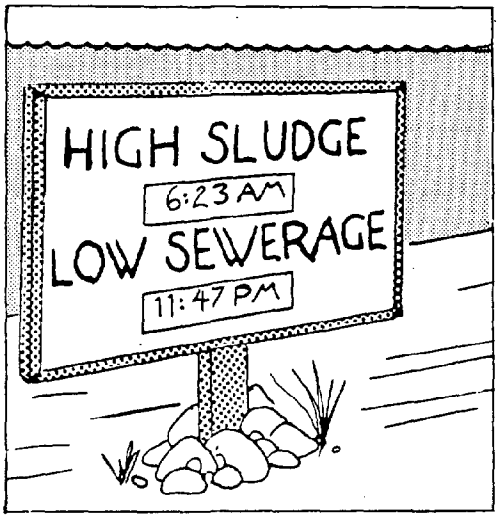
If you react with a resounding "YECCHH!" you're not so different from residents of New York and New Jersey, who have been forced to deal with a similar situation, particularly over the past few years.

What is this awful stuff? Nothing mysterious--it's only sludge, which is a polite name for human waste solids removed by treatment plants from raw



Location of New York Bight, including sewage sludge dumping site and surrounding area.

Reading II-4

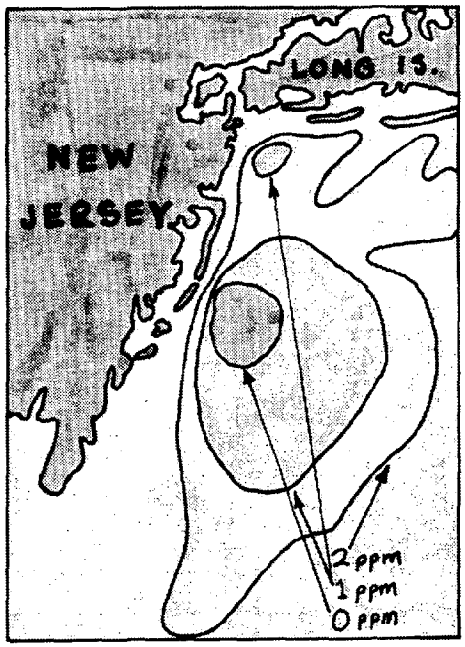


sewage. Other cities, like Los Angeles and Philadelphia, also pipe sludge into the ocean, but New York remains king. Today, over 80 percent of all sewage sludge dumped into the sea takes place in the New York Bight. The Bight, a triangular, bay-like segment of the Atlantic Ocean is bounded on two sides by the New Jersey and Long Island shorelines. It takes in sludge from 13 million people in the metropolitan New York area -- not to mention the daily 250 to 400 million gallons of untreated sewage that flows into the Hudson River and New York Harbor. This practice has been going on for the past 45 years. In 1973, over four million tons of sludge were dumped in the relatively small area of the New York Bight. As if this weren't enough, dredge and construction debris, plus acid and industrial wastes accompany the sludge into the ocean.

The impact on marine life has been enormous. The plight of the coastal ecosystem was demonstrated most dramatically at the end of July 1976, when thousands of dead fish washed ashore at Beach Haven, New Jersey.

While the occurrences on shore seemed shocking enough, the condition off the coastline and under the surface was pathetic. A much larger number of marine organisms had died, and the pollution covered an area of over three thousand square miles.

The presence of sewage encouraged the abnormal growth of bacteria. This resulted in the depletion of oxygen in ocean water, below the level fish need to survive. Specifically, while oxygen/water proportions of two parts per million (ppm) is the minimum required for fish to live, by mid-September 1976, large areas of water had dropped to levels between 0 and 1 ppm.



Oxygen content, normally 5-6 ppm dropped to a level of 0-1 ppm in 1976.

Reading II-4

Slowly (very slowly), the public was awakened to the fact that their waters were unsafe for swimming, for fishing, for almost everything. Reports were published in 1968 and 1969 about the sludge dumping; a New York congressman pointed out that sludge was killing off crabs, lobsters and fish in a 20-square-mile area; and in May 1970, the Food and Drug Administration (FDA) closed an area of the bight 12 miles in diameter to shellfishing. But nothing stopped the dumping.

'...you will one night suffocate in your own waste'

Soon, however, civic groups and political leaders along with some members of the scientific community began to put pressure on the Environmental Protection Agency and other government offices to ban the dumping. The EPA finally announced that no more sludge dumping permits would be issued after 1980.

Why such delays, such reluctance? The alternatives to sludge dumping -- land disposal and incineration -- are not very popular. Land for disposal is hard to come by in an overpopulated area like New York and incineration is expensive. However, other metropolitan areas have found solutions: instead of using Lake Michigan as a cesspool, Chicago now ships its sewage sludge to agricultural sections of Illinois for soil improvement and land reclamation and even to Florida citrus groves to use as compost.

Over a century ago, Chief Sealth, a Duwamish Indian, wrote to President Franklin Pierce:

> *"We know that the white man does not understand our ways..The earth is not his brother but his enemy ...Continue to contaminate your bed and you will one night suffocate in your own waste."*

Today, his words bear a sadly prophetic ring. It will be interesting to see what kind of bed the New York area wakes up in by 1981.

Reading II-5

spills threaten coastal areas

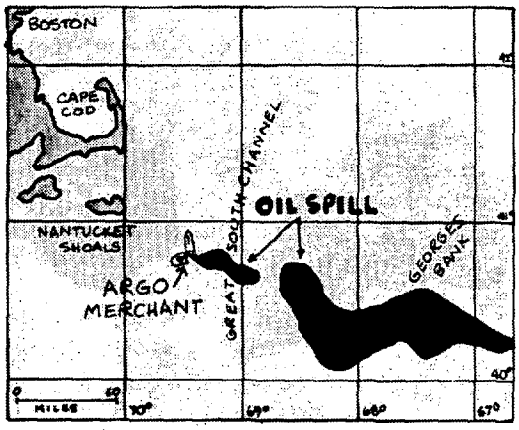
Oil on troubled waters

Oil enters the world's waterways everyday, usually in small quantities from natural fissures in the ocean floor or from the routine cleaning and maintenance of ships. As long as these incidents are not concentrated in too small an area, the natural processes of marine ecosystems can break down these oil "spills" and keep the extent of oil pollution to a minimum.

However, large oil spills, like the Santa Barbara, California, oil platform disaster, and the wrecks of large oil tankers, may severely damage the marine environment.

Moreover oil spills create short-term economic problems for many kinds of shorefront businesses and activities. Tourism, fishing, and recreation interests all may be seriously affected. With the development of larger oil tankers many experts expect the danger to increase.

An example of a major oil spill occurred with the recent wreck of the Argo Merchant. Pursuing a course through clearly charted but stormy seas in the Nantucket Shoals area off Massachusetts, the Argo ran aground. Though the Argo was only a medium sized tanker 640 feet in length, its lack of maneuverability contributed to the accident. By the following week, the disabled ship began to break up, spilling its entire cargo, and placing nearby fishing grounds in danger.



The Argo spill after 12 days.

The oil thickened, forming large floating pancakes (from 50 to 90 feet across and several inches thick). These oil slicks continued to drift east, driving hundreds of sea birds to shore, endangering the humpback whales that migrate through the region and the gray seals that live in the area during the winter.

Local residents were most concerned by the economic losses suffered by the fishing industry. Moreover, the nation's taxpayers were hit with a clean-up bill of over $5 million dollars.

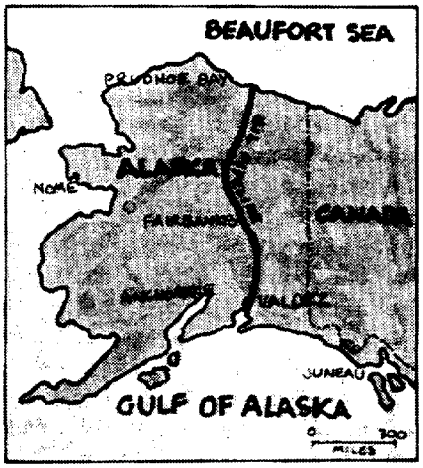
Reading II-5

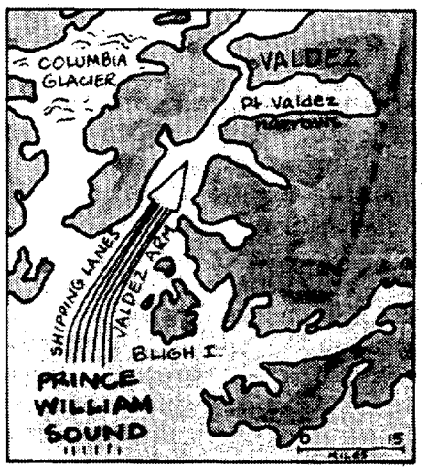
Scientists, ecologists, and other experts are deeply worried. Transportation of petroleum by sea has increased steadily since World War II, and the dimensions of the ships to carry it have grown accordingly. Ships like the 18,743-ton capacity Argo Merchant are dwarfed by the new supertankers. Japan's Globtik Tokyo, for instance, is 1,243 feet long, with a carrying capacity of 476,292 tons. Even this size will be surpassed when several 550,000 ton ships now under construction are completed. On the horizon, the Globtik Tokyo owners have announced plans for a 750,000 ton tanker. Some in the shipping industry are thinking about a supertanker able to hold 1,250,000 tons of oil.

When loaded, a million-ton tanker would be too massive to enter any existing port in the world, or even to come very close to shore. Massive dredging and construction projects will be required to accomodate such vessels.

Spills from today's conventional tankers have killed large numbers of diving birds and marine organisms. Though surviving marine animals can often cleanse themselves of oil, scientists are unsure of their ability to overcome the effects of a supertanker spill. If spilled oil from a supertanker floated into the shoreline areas, the impact could be even worse than that of the Santa Barbara, California oil spill of 1969. Waterfowl and other coastal wildlife, to say nothing of commercial, recreational, and tourist activities would be greatly threatened.

With the recent completion of the Alaskan oil pipeline, concern for oil spills now focuses on the Alaskan shoreline. Port Valdez is the





Although Port Valdez is well-located for oil transport, tanker maneuvering is barred by glaciers, narrows and bad weather.

Reading II-5

southern end of the pipeline, and here, giant tankers will load the oil and begin their journey to world markets. Before the pipeline opened, no tanker had ever sailed into Valdez, and for good reason. Ships must squeeze past the treacherous narrows, avoid icebergs, and frequently navigate through storms and fog. The effect of a supertanker spill on marine life in places like Port Valdez would probably be calamitous.

Even though the great tankers create potential ecological nightmares, it is a fact that only one has yet been involved in a major oil spill. The Amoco Cadiz lost 220,000 tons of crude oil off the French coast in April of 1978.

Supporters of the petroleum industry note that significant spills in the past, like the 1969 Santa Barbara incident and the Argo Merchant, have not caused permanent damage to coastal ecosystems. While immediate damage has been severe, over several years the natural shoreline processes have generally cleaned the polluted waters. Even shore bird and shellfish populations, which suffered immediate losses, have recovered within a few years. Scientists will closely monitor the Amoco Cadiz site to determine the long-term effects of the world's biggest oil spill.

Many people oppose the use of giant oil tankers. In this country, some argue that the environment would be better protected if oil were obtained by expanded offshore production rather than relying on marine transportation. Oil pollution from drilling is less than 5 percent of that by transport.

Offshore drilling operations, however, have been known to produce oil spills. Few ecologists are happy about this option, considering it merely the lesser of two evils. Clearly, though, a choice will have to be made. Within the next few decades, something will suffer: either the economic benefits of supertanker oil transport or the marine environment which it endangers.

CHANGING STATUS OF WETLANDS

PART 1

Waring, George E., Jr. Draining for Profit and Health. (Orange Judd Publishing Company, New York, _____).

Chapter IX: "The Reclaiming of Salt Marshes"

Hundreds of thousands of acres that might be cheaply reclaimed, and made our most valuable land are abandoned to the inroads of the sea. Fruitful only in malaria and mosquitoes, these wetlands are always a dreary waste, and often a grave annoyance.

There exists over our seaboards virgin land, replete with every element of fertilization, capable of producing enough food for the support of millions of human beings. Instead, it is all allowed to remain worse than useless. The poor upland areas near them are teeming with populations whose lives are endangered and whose comfort is sadly interfered with by the insects and the malaria which the marsh produces.

All of its bad effects are produced by the water with which it is constantly soaked or overflowed. Let the waters of the sea be excluded and a proper outlet for rainfall be provided, and this land may become the garden of the continent.

PART 2

Rick, Glenn A. "Tidal Mud Flat Being Transformed to a Spacious Recreational Area," The American City. (December, _____, pp. 100-101.)

Mission Bay is a shallow marsh area in the City of San Diego. Largely unused for centuries, the city is transforming Mission Bay into a multi-purpose project combining a small boat harbor, an aquatic park, and a vast recreational development, with many of its acres retained as wildlife refuge. With the cooperation and assistance of the state and federal government, 3,600,000 cubic yards of sand have been placed in the bay to create 237 acres of new land.

The people of San Diego have given their willing and enthusiastic support to this idea by putting through a $2 million bond issue. Looking ahead to the anticipated return to the city, San Diego is encouraging the lease of areas of land for commercial development, and has already received about 100 applications from firms and individuals planning various business set-ups, ranging from good hotels to boat concessions.

Tourism and recreation are an integral part of life in Southern California. The tourist trade constitutes what amounts to a major industry here, matching the income from agriculture and only slightly below the industrial and Navy payroll. The Mission Bay project will convert acres of the wetland area into recreational facilities for thousands of people. Its economic significance was the determining factor in giving this undertaking a high priority in San Diego's plans.

PART 3

"Where Man-Made Marshes are Taking Hold," U.S. News and World Report. (July 12, _____, p. 36.)

Near New Orleans, Louisiana, were the Mississippi River flows into the Gulf of Mexico, scientists and the U.S. Army Corps of Engineers are experimenting with an idea that could lead to the construction of lush and productive marshlands.

Similar projects are under way elsewhere around the country, but the largest man-made marsh is the one created here last year, which includes 350 acres. Already it is attracting new life. Native grasses have grown quickly, and the new lands have been adopted by muskrats, wading birds, and other waterfowl.

Artificial marshes also have been constructed in Connecticut, Oregon, California, Virginia, Georgia, and Texas. Scientists are planning a man-made marsh near the mouth of the Columbia River between Washington and Oregon that will measure 12,000 feet wide, and 1 mile long. Conservation groups have praised the Corps of Engineers for creating new marsh areas to help replenish the nation's dwindling supply of wetlands.

Reading II-7

ecologists confront developers

wetlands face murky future

Environmentalists moan that the wetlands are disappearing. Big deal. "As far as I'm concerned, we're better off without them, anyway. They're full of snakes, and mosquitos, and blood-sucking leaches. They're no good for swimming, and the marsh grasses choke the motor on your boat. And, on top of it all, they stink. So what if all the wetlands are being filled in? I say, 'good riddance!'"

Whose words are these? No single individual can be credited, but many Americans have a similar attitude.

In the past, people have placed little value on the world's wetlands. Industrial, commercial, and housing interests needed new lands for developments, and since wetlands were considered fairly worthless areas, they were filled in and cemented over for these uses.

In recent years, however, wetlands have been recognized as the chief breeding areas for marine life. Their importance has been linked closely to the fortunes of the fishing industry. Old prejudices against wetlands do not die easily, however. Many people still picture estuaries, marshes, mangrove swamps, and barrier islands as damp, humid, mosquito-ridden and generally unhealthy nuisances.

Despite the growing awareness that wetland areas are unique ecological systems, many of these vitally productive areas still face the threat of destruction from human activities.

ESTUARIES

Where a river flows into the ocean, the area in which the freshwater mixes with the salt is known as an estuary. The resulting combination of nutrients, water temperature, and salinity forms an ideal breeding ground for many marine organisms. In fact, between 60 and 80 percent of all commercial fish species spend at least part of their development period in estuarine areas.

However, estuaries attract humans as well as marine organisms. Of the ten largest cities in the world, seven border estuarine areas: New York, Tokoyo, London, Shanghai, Buenos Aires, Osaka, and Los Angeles. In such areas, estuaries have often become dumping grounds for the gamut of human wastes, including sewage, industrial debris, silt from construction, and heated water from electric generating plants. The San Francisco Bay area and Boca Ciega Bay near St. Petersburg, Florida, have gone through extreme changes in the estuarine environment from

dredging and filling (see Figures 1 and 2). Increasing population has led developers in these and other areas to fill in wetlands so that new housing and businesses can be built.

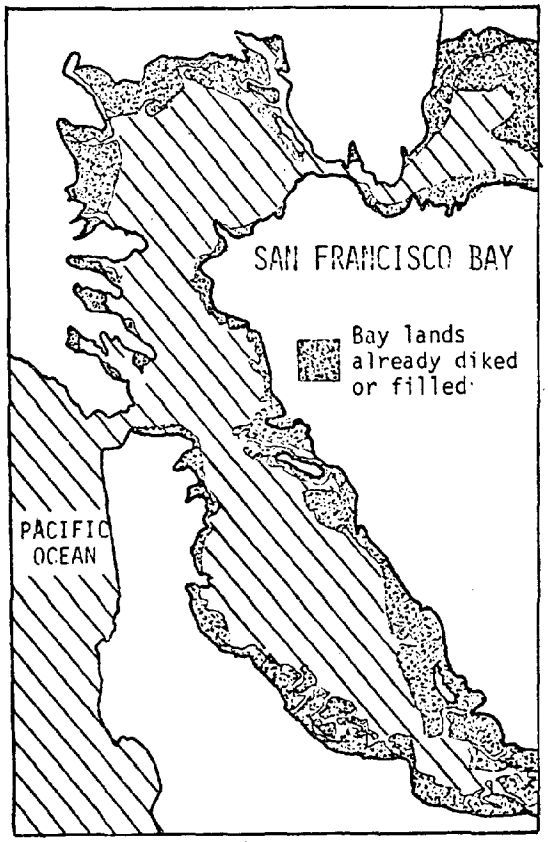


Figure 1. In addition to areas indicated on the map, significant portions of the bay are potentially fillable.

Perhaps the most drastic example of estuarine destruction centers is the East Coast "Megalopolis" region, the heavily populated coastline stretching from Boston to Washington, D.C. Here are concentrated some 35 million people. Estuaries are usually on the receiving end of the accompanying pollution. Spawning areas, oyster and clam beds and other fishing grounds have been destroyed or seriously damaged. In Connecticut, the shellfish industry earned $20 million annually from 1900 to 1920. It now takes in only about $1.5 million each year.

Poisons in human and industrial wastes are killing some fish species; others can't survive the changes in water temperature from electrical generator discharges. When dams are built along rivers, freshwater is prevented from entering the ocean, and the estuarine water becomes too salty for some organisms to live. Excess silt is loosened by construction activities and washed downstream to the estuary where it buries potentially valuable shellfish beds.

BARRIER ISLANDS

When a severe ocean storm strikes along the U.S. coastline -- particularly the section stretching from Maine to Texas -- local residents can thank the barrier islands in their region for protection from the full destructive force of such a storm.

In addition to their role as a shield against the violence of storms, barrier islands provide a shelter behind which wetlands can flourish, and give shelter to birds, as well as

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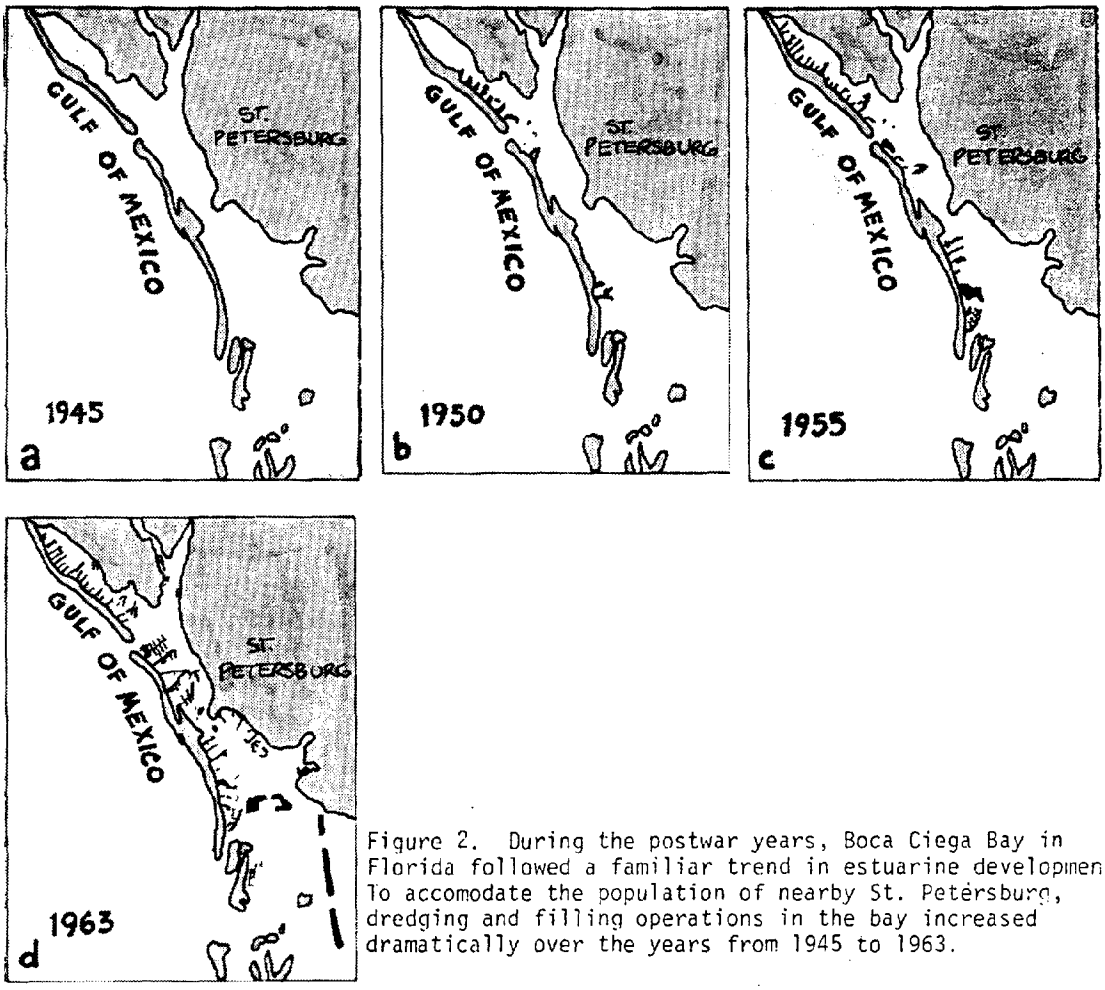

Figure 2. During the postwar years, Boca Ciega Bay in Florida followed a familiar trend in estuarine development. To accomodate the population of nearby St. Petersburg, dredging and filling operations in the bay increased dramatically over the years from 1945 to 1963.

other land and marine life. Figure 3 depicts the elements of a barrier island environment.

Real estate developers think barrier islands are nice places too; the demand for the beachfront property that barrier islands provide has increased dramatically over the past decade. Of the 281 major barrier islands located along the Atlantic and Gulf Coasts, 70 have been at least partially developed.

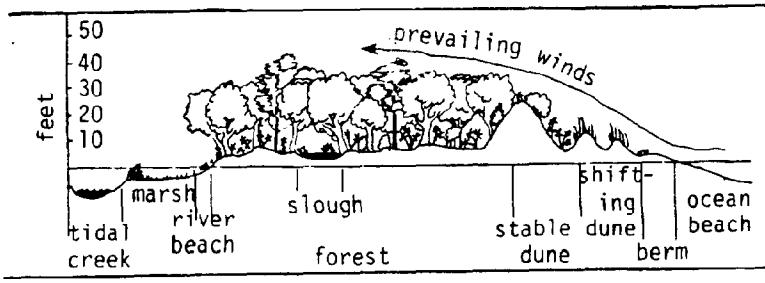

Figure 3. A typical barrier island formation, showing the wide spectrum of ecologies from ocean to tidal creek.

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As in most ecologically fragile environments, when people begin moving onto the barrier islands, wildlife begins moving out.

MARSHES AND MANGROVE SWAMPS

When conditions of tide and temperature are right in estuaries or along barrier islands, lush salt marshes or mangrove swamps frequently develop. Tall grasses characterize the salt marshes, while mangrove trees -- small and leafy with intertwining roots -- flourish in mangrove swamps (see Figures 4 and 5). Both environments attract a spectrum of plant and animal life, and a complex, productive ecosystem results. Herons, cranes, shrimp, worms, crabs, clams, algae, and scores of different fish species all find accomodation in these wetland areas.

Figure 4. Salt marsh vegetation.

Because these wetlands form near the junctures of rivers and oceans (along popular transportation routes) and behind the protection of barrier islands, urban centers frequently compete with the marshes for space. As cities continued to grow, the demand for more land became critical. People also wanted to eliminate disease-carrying mosquitos and other pests from the wetlands. Dredging and filling these marshes and swamps seemed a good cure for these ills. The disappearance of wildlife that followed construction in the wetlands did not concern most residents.

Figure 5. A mangrove swamp, with the characteristic intertwining roots of the mangrove trees.

Dredging and filling operations enjoyed their heyday in the post-war years from the late '40's to the early 60's. One typical transformation took place during this period in the Mission Bay area of San Diego, California. Developers cleared out the mud flat -- and wildlife inhabitants -- to make room for a new recreational/commercial complex. The price tag, even then, exceeded $16 million dollars. However, the demand for the newly created land was so great, that the city soon got its money back. This initial investment was paid off in tourist revenues and in the

leasing of areas for commercial development. Economic successes like the Mission Bay area of San Diego spurred other cities to develop their wetlands areas.

CHANGING TRENDS

Within the past ten years, some states and cities have begun to change their policies, perhaps signalling a new direction in residential, commercial, and industrial planning. New community action groups have sprung up to challenge old practices.

The California State Legislature ordered the San Francisco Bay Conservation and Development Commission to make plans protecting the Suisan Marshes, 40 miles northeast of the city.

The Environmental Defense Fund and other action groups are waging a battle against the construction of a bridge to St. Phillips Island in South Carolina. The island is noted for the variety of its ecosystems: beach, maritime forest, freshwater sloughs, and tidal marshes.

Congress approved Florida's request to halt funding on the Cross-Florida Barge Canal.

Florida conservationists helped halt the construction of a new jetport to be located on the fringe of the Evergaldes.

In Louisiana, Connecticut, Oregon, California, Virginia, Georgia, and Texas, dredgings from ship channels are being converted into man-made marshlands.

Conservationists have won a few battles, but not without heavy opposition from various industrialists and politicians. One major victory came in 1975 when a federal court instructed the U.S. Army Corps of Engineers (a group which regulates construction on rivers, lakes, and coastal waterways) to extend its jurisdiction to cover wetlands and estuaries. The Corps now requires anyone planning a major project calling for dredging or filling -- for recreational, agricultural, or commercial purposes -- to file an environmental impact statement and secure a permit.

However, efforts to conserve estuaries and wetlands face opposition from many directions. Louisiana officials threaten legal action against the Corps, since the new regulation would place more than half of the state under the Corps' regulatory authority.

Business leaders, who would benefit from the filling of marshes and wetlands, protest that the conservation ethic has gone too far. One businessman complained, "This wetland is our home -- we work and live here. Why should the heron and the egret become more important than the human?"

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Ecologists believe one good way to keep development out of valuable areas is to convince the federal government to classify them as protected wildlife habitat. In the past few decades, one-fifth of all wetlands in the United States have received such protection. A little more than one- fourth of the barrier islands along the Atlantic and Gulf coasts have been protected through purchase by public agencies for recreation areas or wildlife preserves.

Not all wetland regions can be protected in this way. Urban centers continue to expand, and land scarcity remains a central problem. Government can hardly turn its back on all commercial or industrial developments that promise to boost the economy. However, politicians are beginning to realize each new development cuts deeper into our dwindling wetlands reserve.

NATURAL HAZARDS IN THE COASTAL REGION

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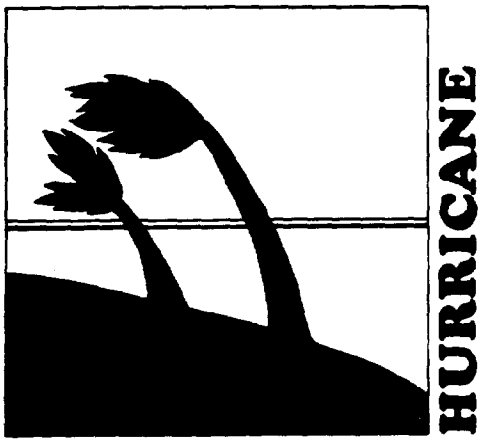
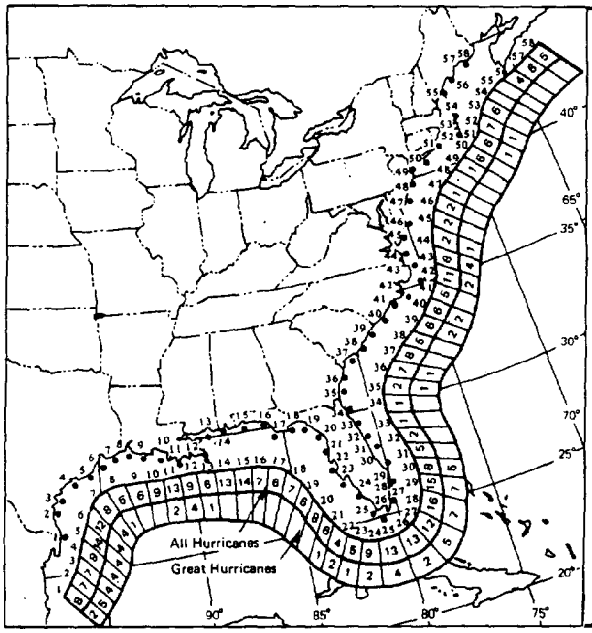


The awesome power developed in hurricanes and the unpredictability of their movement, place them among the most destructive natural hazards in the U.S. Coastal region.

Hurricanes form over the oceans in the tropics as a result of low air pressure. When the air pressure in one area drops below normal levels, air rushes in from surrounding regions of higher pressure, leading to the whirling winds characteritsic of hurricanes. All storms which form in this way may be called hurricanes, but those in the Pacific Ocean are usually called typhoons. High winds that form over land are called cyclones or tornadoes.

At the center of the hurricane is a calm region, called the eye, around which powerful winds of more than 75 miles per hour circulate. These winds are accompanied by cloud masses with heavy rains, as well as enormous waves on the sea surface. In addition, hurricanes sometimes push a wall of water, called a storm surge, toward nearby coastlines. Extensive destruction often results when this storm surge arrives at the same time as a regular high tide.



Hurricane Probability Map

Probability that a hurricane (winds exceeding 75 mph) or great hurricane (winds exceeding 125 mph) will occur in any one year in a 50 mile segment of the United States coastline.

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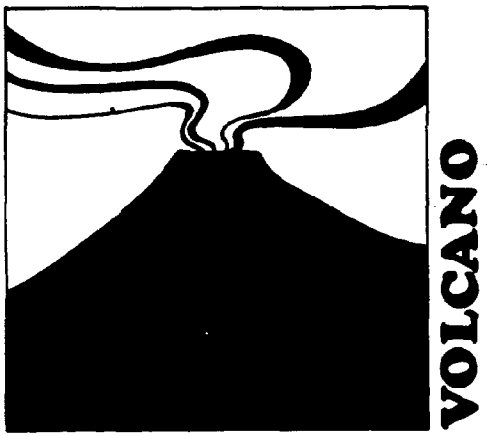
While most hurricanes in the United States commonly occur in September, the hurricane season lasts from June to November. Hurricanes frequent the Western Caribbean early and late in the season, centering near the West Indies. After formation, hurricanes generally move northwest, eventually turning north.

Hurricanes lose their fury as they move across land masses, but not until they cause widespread destruction. Hurricanes moving northward from the Gulf of Mexico may strike land anywhere along the Atlantic coast. New England areas have suffered some of the heaviest damage ever caused by hurricanes.

The number of deaths from hurricanes has dropped since the turn of the century, due largely to improved warning systems. Loss of life can still occur, however, and property damage annually costs millions of dollars.



Volcanoes form when molten material (magma) rises through cracks or fissures to the earth's surface. An important driving force is the expansion of gas trapped in the magma.

Volcanoes differ in the frequency of their eruptions and are often labeled "active" or "dormant". An active volcano is one that has erupted in historic times. (The term "extinct" is less often used since the eruptions of "extinct" volcanoes have proved embarassing to geologists).

Aside from lava flows, which are the most common hazard from volcanic eruptions, several other related dangers exist for man and the environment. These include ash falls ("showers" of fine rock fragments), tsunamis (large waves caused by the vibration of earthquakes that may be associated with an eruption), forest fires, avalanches, and emission of poisonous gases.

Volcanoes are a definite and recurring coastal hazard in Alaska and Hawaii, and potentially so in parts of the Northwest United States. There are approximately 76 active and dormant volcanoes in Alaska, at least 6 in Hawaii (5 are on the Island of Hawaii) and at least 13 in the Cascade Range of California, Oregon, and Washington.

Hawaiian volcanoes have posed little threat to life in modern times. Violent eruptions have been rare. The Hawaiian Volcano Observatory constantly

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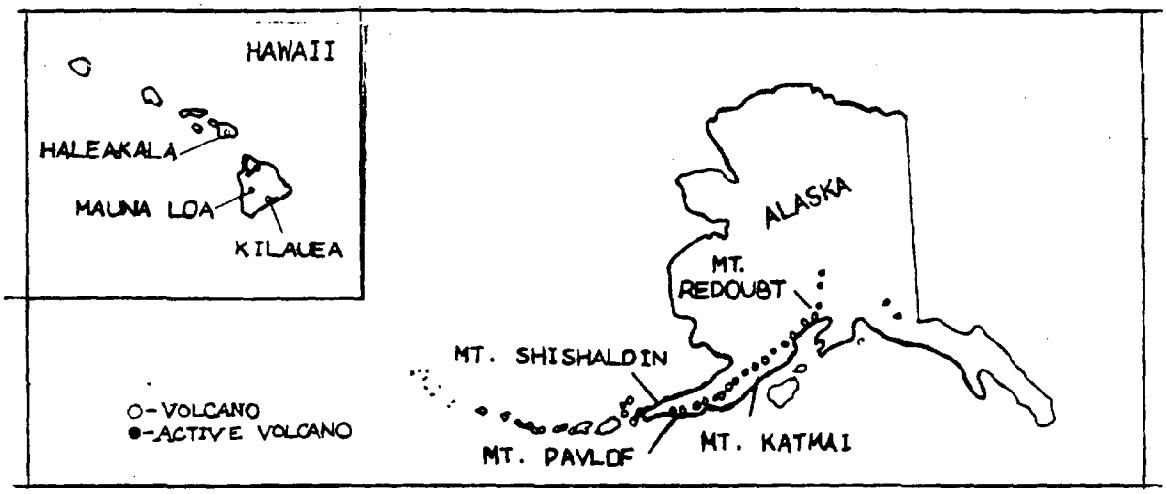
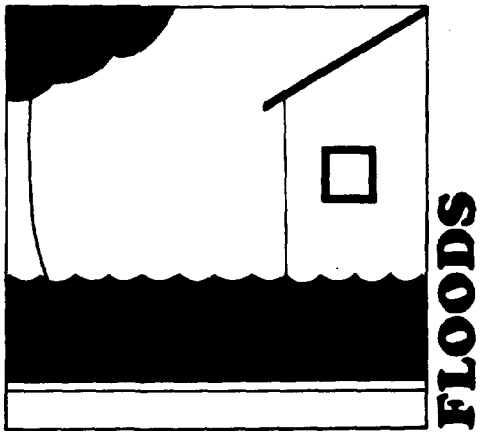
monitors all probable eruption sites and issues warnings when necessary. However, several small villages in Hawaii have been buried by slow moving lava flows.

The Alaskan volcano belt presents a more serious threat to life and property. Volcanic activity there tends to be more violent in nature; large seawaves may form. Surveillance is difficult in Alaska due to the geographical isolation of the volcanoes.





One of the greatest threats to people living along a coast or near major rivers is destruction from floods. Flooding, when it occurs at regular, predictable intervals can be a boon to agriculture as the river spreads rich topsoil over the lowlands. Usually floods strike at unexpected times, often when the residents of an area are least prepared to handle the effects.

The most common type of floods occur along river systems. They are generally produced by extremely heavy rains or by rapid melting snow. Although studying weather patterns can sometimes enable the prediction of floods, an unexpected thunderstorm can produce flood conditions at any time. Nature often provides us protection from river floods. But the channels and tributaries that would normally allow rivers to drain may be dammed or blocked by industrial and residential development, causing the main river to overflow its banks. Other natural controls include grass, trees and other

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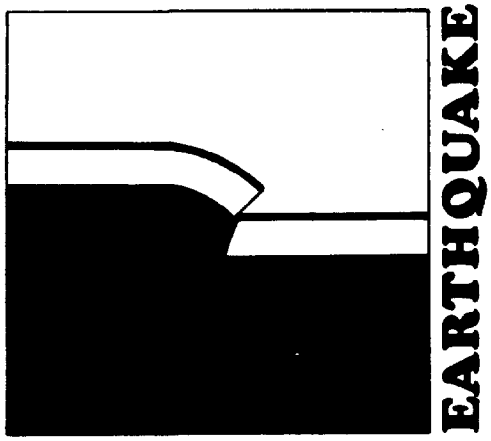
vegetation which can hold excess water long enough for most of it to be absorbed into the earth. When people remove vegetation to clear land they also remove a source of flood protection.

Flooding along the seacoast is generally caused by high-velocity winds that drive large waves onto land. Tidal waves and tsunamis resulting from earthquake action beneath the ocean floor can also bring devastating flooding. Coastline floods occur less frequently than river floods. But since many metropolitan areas are located near the coasts, the costs of coastal flooding may be enormous.

In the United States, floods can occur along any river, but they most frequently occur in the Mississippi and its tributaries. A glance at the population distribution shows the potential for vast property damage.



One of the most dramatic forces in nature is the earthquake. The characteristic vibrations of earthquakes result from movement deep in the earth's crust.

Any part of the earth is subject to these movements and can experience quakes. But the overwhelming majority of earthquakes occur in an area known as the Circumpacific Belt -- a narrow strip along the coastlines of the Pacific Ocean. Generally, earthquakes occur in areas near newly-forming mountains, volcanoes, and along deep sea trenches. The Pacific coastline of California and Alaska has faced the greatest danger in recent years from earthquake damage.

In addition to the destruction resulting from the shaking and cracking of the surface, earthquakes originating beneath the ocean can form huge waves (tsunamis) that threaten population centers along the coasts. Earthquakes can also trigger landslides which can bury whole communities.

Scientists can chart seismic waves, or patterns in the motion of the earth. By monitoring the smaller shocks that often precede a major earthquake, they hope to someday be able to predict quakes.

Recognition of potentially dangerous areas serves as a guideline in planning and development to minimize the effects of such earthquakes.

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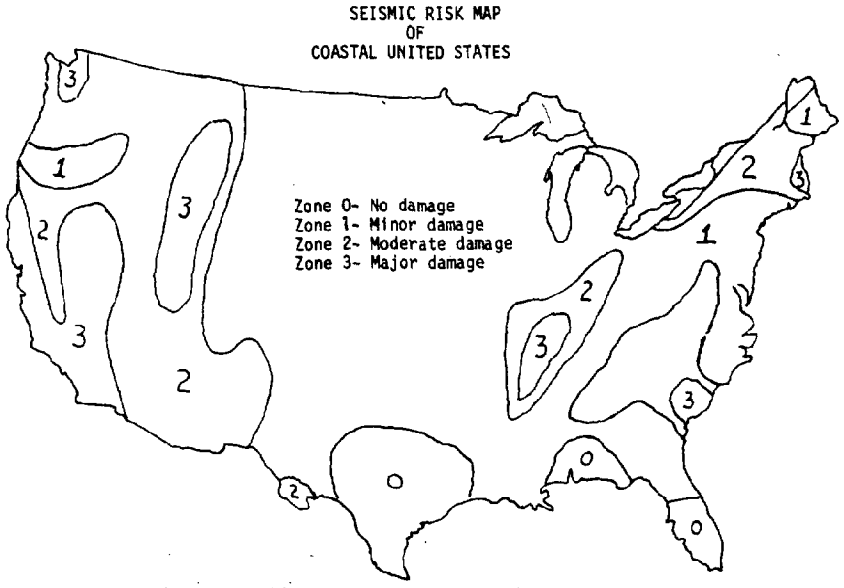
The major protection against earthquakes at the present time is earthquake-resistant structures.



Zones indicate likely extent of damage from earthquake.

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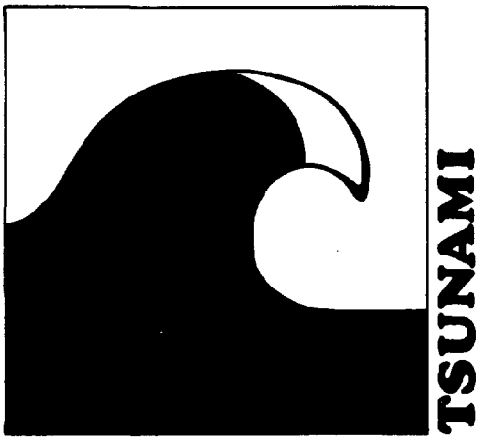
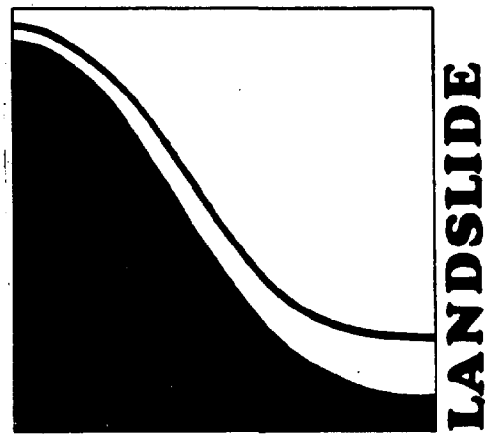


Even though they have nothing to do with the tidal motion of the ocean, tsunamis are often referred to as tidal waves. Actually, tsunamis are caused by earthquakes that occur beneath the ocean floor.

Tsunamis generally consist of more than one wave and travel at speeds ranging from 150 miles per hour in shallow regions to 670 miles per hour in depths of 30,000 feet. Waves may be separated by 100 miles or more. Although the height of the waves remains relatively small in the open sea, the waves rise dramatically as the tsunami approaches shore, particularly when it enters V-shaped bays, where the height may jump to 90 feet.

Tsunamis generally threaten islands and immediate coastal areas, particularly regions near sea level. Scientists studying seismic vibrations can often predict when and where a tsunami will strike, usually giving residents sufficient time to evacuate to higher ground.



Water seeping into the earth, a crack in a layer of rock, or an earthquake can all bring on a landslide, sometimes referred to as an avalanche. Landslides result when a mass of rocks or earth slip down the side of an unstable slope. The factors that bring on the slide include differences in rock structure, degree of slope, or wearing away of the supporting earth mass.

Generally, landslides take one of two forms, rockslides or slumps. Rockslides usually occur when one mass of rock slips over another. This often occurs where there is a great variation in the rock type.

Slumps frequently occur along coasts. Slumps usually involve a weak, easily weatherd rock layer which supports a heavy surface layer. As the weaker rock is eroded by the forces of wind and waves against a coastline, slump landslides often occur. A block of solid rock or earth breaks away from the cliff edge falling vertically.

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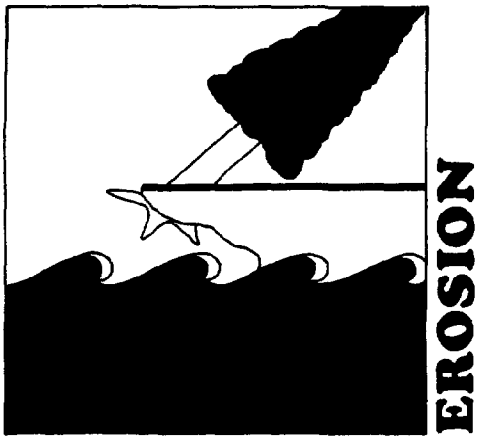
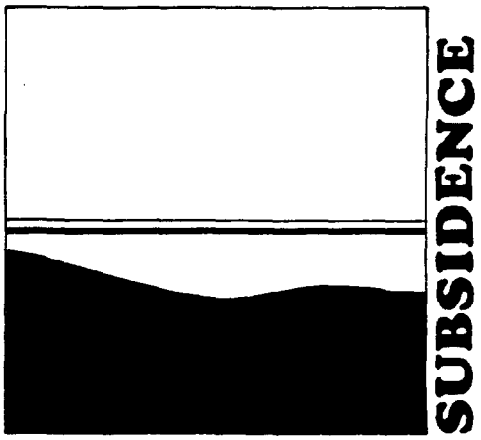


Erosion, or the gradual wearing away of land, is one natural hazard that is often not noticed until it is too late to stop. The major problem lies in the fact that erosion is an ongoing process. Sometimes, the effects can be quite rapid, but usually the effects take years to become noticeable.

The agents producing erosion include temperature changes, gravitational pull, water and wind. Water, in the forms of rain, snow, ice and wave action, produces the most erosion. Wave action continually changes the shape of a coastline, wearing away soil in one location and depositing it in another. A river's scouring action wears away the adjacent banks over a long period of time. Freezing temperatures cause water which has run into rock fissures to solidify and expand, breaking off large boulders. Although normally a slow process, erosion can be accelerated when industrial and residential development strips the land of protective vegetation, enabling flood waters to sweep away valuable topsoil layers.

Erosion also encourages the occurrence of other natural hazards. Wave action against coasts undercuts cliffs, bringing on landslides; erosion can also remove natural coastline protection, increasing the danger of damage from tidal and seacoast storm flooding.



Many large cities depend on water from the ground to fill their demand for fresh water. However, when this groundwater is removed too quickly, the surrounding land may no longer sufficiently be supported and may sink -- a phenomenon known as subsidence. Subsidence may also occur because of the removal of oil, gas, coal, and other minerals.

Subsidence is often overlooked in discussions of natural hazards, but it has been known to cause environmental damage as well as threaten the supply of fresh water. Subsidence most commonly occurs in regions near the mouth of a river, where the flow slows down and the river dumps its sediment particles, forming a delta or

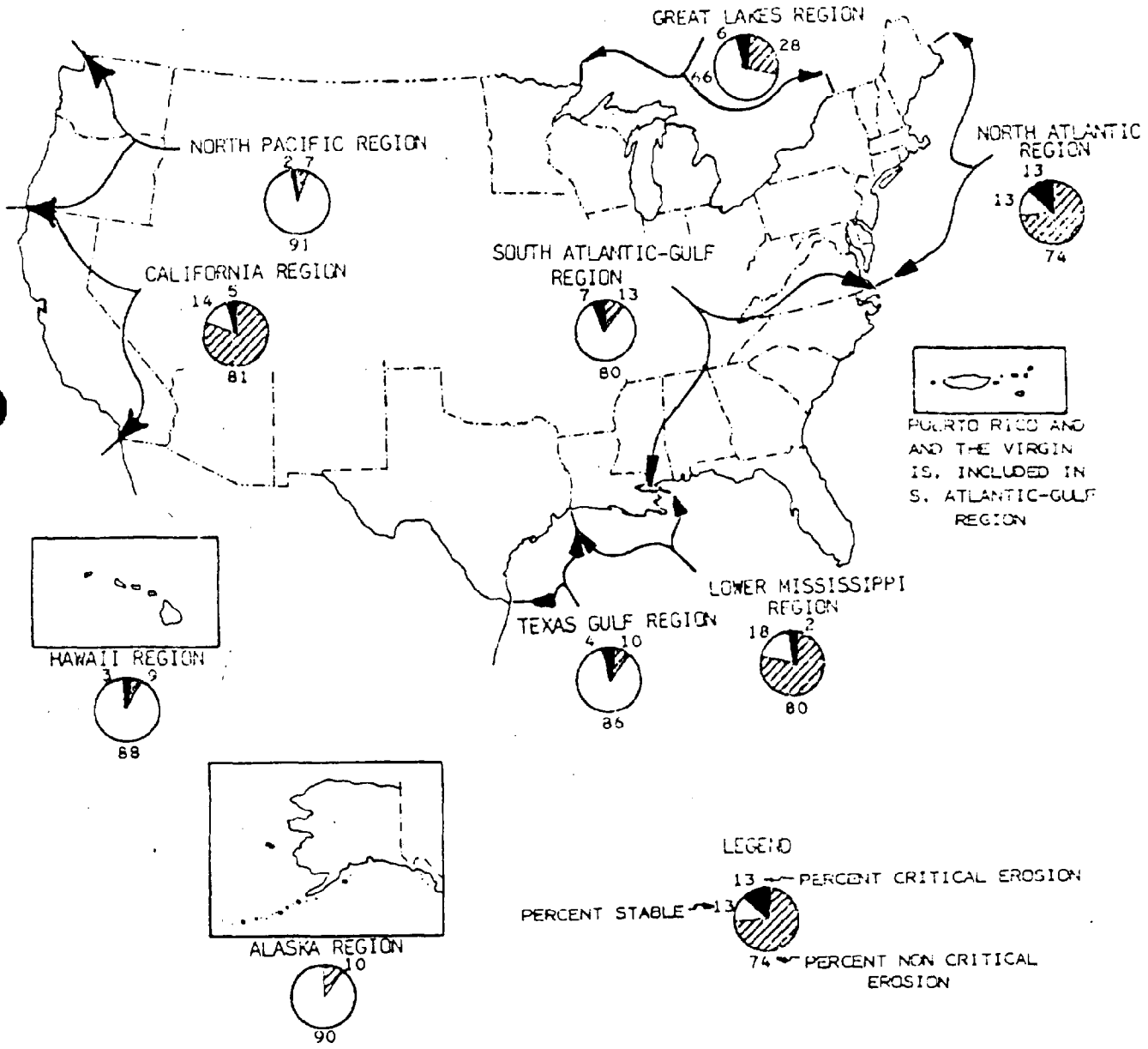
alluvial fan. As the river moves to the sea or large body of water, river water seeps into the loose earth and collects beneath the surface as groundwater. Groundwater may be retrieved by drilling wells.

When too much water is extracted, the soft mud or silt which it supports is particularly likely to sink. In one region of the San Joaquin Valley in California, the groundwater level has fallen over 100 feet, causing the ground to sink approximately 10 feet in 35 years. Further attempts to obtain the groundwater may be hindered by damage to the wells brought about by this subsidence. Groundwater withdrawal near Mexico City has resulted in ground subsidence of over 20 feet.

A drop in ground level may affect foundations of buildings, causing serious structural damage.

Reading II-8

EXTENT OF COASTAL EROSION IN THE UNITED STATES



TALE OF TWO TSUNAMIS

Hawaii -- April 1st, 1946

Untended seismographs in darkened laboratories recorded a major seismic disturbance -- an earthquake in the Aleutian chain. At the same time, unknown to anyone, a massive seismic sea wave began to race across the Pacific. Moving at speeds of up to 490 m.p.h., the tsunami traveled 2400 miles. It reached Hawaiian shores a short five hours later without warning and with devastating force.

On the "Big Island" of Hawaii a group of Laupahoehoe teenagers wandered along the shore. They were on the way to school -- laughing, teasing and playing April Fool's Day pranks. A small wave drew them to the water's edge for a closer look. Then came the roar. A huge wall of water rose from the sea. Too late to run. The wave struck. Within momemts, they were gone. All of them. Fifteen young people swept out to sea.

In Hilo Bay, a fisherman felt his sampan rise -- an unusual swell. He glanced back at the city of Hilo. With horror he watched as the first of what were to be five massive waves smashed into the shoreline. He headed for his only hope -- the safety of the open sea.

On shore -- panic and confusion. It was early. Many people were still asleep. Some who were awake ran to warn family and friends in the shore area. Others tried to remove valuables from their homes and businesses. Boat owners rushed to the docks in a frantic effort to save their vessels. Some arrived to find their boats in splinters or swamped by the high washing waters. Those who could not save their own boats helped others get underway.

No one knew if or when the next wave would come.

Minutes later, the water began to drain from Hilo Bay. Some say the bottom of the bay was visible for more than thirty yards offshore. Then, the water rushed back. It came as a twenty foot wave travelling at incredible speed. Smashing shoreline structues as if they were cardboard, the wave swept beyond Kamehameha Avenue into the heart of Hilo's central business district. Automobiles, boulders, railcars, buildings and people were swept along the bore of the wave as it continued to smash its way inland.

One person observing the wave from a "safety point" was overtaken by the rushing wave. He wrestled with the churning waters as he was carried out to sea.

Another, trapped on top of a coconut tree was swept away as the backwash uprooted the tree.

Between waves, evacuation continued. Roadblocks were set up and rescue operations begun. The cries of those trapped in collapsed buildings could be plainly heard.

Three more times, huge waves struck -- reaching as far as four blocks into downtown Hilo, tearing at everything in the way.

When the last of the waves subsided, the people of Hilo felt both relief and sorrow. It was over. But in this small town of 10,000 people, it was clear that by the time the dead, injured and missing were identified, almost everyone would have a friend or family member on the list.

The toll was high: 97 dead, 151 injured, and $25 million in property damage. Much of the business district of downtown Hilo had been destroyed. Entire city blocks were cleared of buildings. Many were homeless and hundreds were out of work. Shipping operations were disrupted and food was in short supply.

Such disaster could not be permitted to happen again. Data was collected. Studies were made. Three scientists found that although the breakwater was 60% destroyed, it was effective in reducing the height and violence of the waves. They concluded:

> "Loss of property during future tsunamis can be reduced by proper construction, by erection of sea walls and by restricting or prohibiting construction in certain especially dangerous areas. Loss of life can be nearly or entirely eliminated by the establishment of a suitable system for warning of the approach of waves."

Hawaii - May 21, 1960

A clanging alarm roused four sleepy eyed scientists from their beds. They hurried to their underground vault on leeward Oahu. Their instruments indicated an earthquake.

The men were part of a seismic sea wave warning system. Contacting other Pacific stations, they were able to determine the epicenter of the quake within 36 minutes. An earthquake of sizeable force had struck Chile, a long, narrow country on the west coast of South America. They kept a careful watch. Twelve hours later, a second earthquake shook Chile. And a few hours after that, the largest of all, measuring 8.25 on the Richter Scale.

Now came the question: Would there be a wave? There was no way to know until word was received from other stations throughout the Pacific. On May 22, at 11:20 a.m. word came. A tsunami had struck the coast of Chile.

The four men studied their seismic sea wave warning system chart. At 11:30 a.m. Civil Defense Headquarters was alerted and the word went out. A tsunami could strike Hawaii around midnight. Thirteen hours advance warning. Ample time to evacuate tsunami vulnerable areas.

Throughout the day people stayed tuned to their radios and talked of the approaching tsunami. Some shore area residents made plans to evacuate. Others, skeptical because of previous false alarms, waited for more details.

By nightfall, few outside of the Civil Defense Headquarters appeared to be taking the impending tsunami seriously. People were reluctant to leave their homes and businesses unattended. Sightseers sought vantage points close to the shores. Time and time again the governor went on the radio to beg people to stay away from the shore area. Many disregarded the warnings.

At 8:10 p.m. radio stations broadcast that a three foot wave had hit Tahiti. Many listeners thought this meant that the wave action in Hawaii would be light.

At 8:30 p.m. the sirens began to wail in Hilo. Boat owners, remembering the '46 tsunami, prepared to take their craft to the safety of the deep water -- just in case.

Minoru Shimazu headed for the open sea in his sampan, leaving his family safely behind in their home in the Waikea district. He felt secure. His home had escaped even during the devastating waves of '46.

Reports continued to filter in. Only minor wave damage was reported from Samoa. The residents of Hilo relaxed. At 10:58 p.m., a mere one foot rise was reported from the Christmas Islands.

By this time, the Shimazu family had gone to bed, as had other residents of the Waikea area.

A few minutes after 12:00, three-foot waves struck Hilo -- not too much to worry about. Then, when it appeared that the worst was over, a six foot wave smashed into the shoreline. The water quickly receded. Onlookers started to move back. Minutes later, a larger, more forceful wave struck the shore, rushing over Kamehameha Avenue. Again the waters receded. People started to run for higher ground.

The lights of the boats outside Hilo Harbor rose. Then came a roar -- a roar that signalled a massive rush of water. The third and most destructive wave rose 20 to 30 feet in the air. It swept through downtown Hilo as far as Kinoole Street. Again, buildings were picked up and smashed. Automobile-sized boulders were ripped from the bay and dumped into the center of Kamehameha Avenue. People took to the trees. Some of the trees were uprooted and carried out to sea. Power poles and parking meters were sheared off. Huge chunks of pavement were torn from the bayfront road.

An engineer, working on a design for a Hilo seawall, was swept from his vantage point where he hoped to gain first hand information on seismic sea waves. He died.

Eighty-eight year old Saburo Shimazu awoke from his sleep. It was dark. He could hear the house crumbling around him. He was crippled -- unable to check on the others. For a time, he could hear his wife next to him. Then, no more. He clung to his mattress.

When the waves subsided, rescue operations began in earnest. Power was out. It was difficult to see. Rain and mud made the work more difficult. Again there were the screams of those trapped in collapsed buildings. Rescue workers and cleanup crews had a massive job. Much of downtown Hilo was destroyed. City blocks stood, cleared of buildings. The Waikea district was almost totally gone.

At 7:00 a.m., the boatsmen sailed back into the wave battered harbor in what looked to one newspaper reporter like a funeral procession. Minoru Shimazu would soon learn that only his father was alive -- found on the breakwater that morning, more than half a mile from where the house in Waikea once stood. His mother, his brother, his wife, his son Brian, 9, and his daughter Rachel, 6, were all dead.

Again, the alarming statistics: 61 dead on the "Big Island", 282 injured and $50 million in property damage.

How could it have happened? Thirteen hours advance warning should have been enough time to at least prevent the loss of life. Headlines and news stories in the following days reflected the state's shock and disbelief. "C.D. Officials Shocked at Lack of Public's Concern", read one Honolulu paper. "Tidal Wave Deaths: They Needn't Have Happened", stated another. News stories gave accounts of "otherwise sane persons running out onto the reefs to pick up fish between waves", and "sightseers who refused to leave the area".

The Hawaiian Academy of Science interviewed 327 adults in the Hilo area to find out why they had not evacuated. The interviews indicated that some had not understood the warning system or the meaning of the different sirens. Other studies suggested that some had been misled by the radio broadcasts which failed to point out that Tahiti, Samoa and Christmas Island were on the edges and not in the direct line of the tsunami. Others expressed reluctance to leave their homes and businesses unguarded for fear of looting and vandalism. Again, Hilo was determined. This could not happen again...not a third time.

FOUR YEARS AFTER THE WAVE

HILO, Hawaii (AP)-The 30 foot wave that hit Hilo on May 23, 1960, came up from the sea at 12:04 a.m. like an express train, roaring up quiet, darkened streets, leaving death and destruction when it withdrew.

The wave was incredible, but just as incredible is Hilo's recovery from block upon block of jumbled rubble.

Thick, slimy mud covered the street.

Sewage, dumped inside the harbor entrance, was hurled into the face of the city, filling the air with stench.

The toll: 61 dead, 282 injured, $50 million in damage.

More than 220 homes and 308 businesses and public buildings were destroyed or heavily damaged.

In the heart of the business district, virtually everything was obliterated.

How does a city survive such a tragedy and how does it get back on its feet in four short years?

First the scars were removed.

Volunteers, Red Cross, civil defense, military and government agencies moved in to help clear the wreckage and restore normal services.

The Hiloans took a collective vow: it would never happen again.

Seven days after the wave hit, the County Board of Supervisors, meeting in almost continuous sessions for days, created the Hawaii Redevelopment Agency and thus launched the first urban renewal project in Hilo.

The Legislature voted general relief measures and made land available for relocation of the victims.

The Federal Government moved in with loan programs.

Civil Defense officials began re-examining the warning system that had failed.

The Army Corps of Engineers began work anew on a tidal wave barrier, a project that for years had been stymied in debate.

The fruits of the combined efforts are in full flower today, and Hilo has taken on a new face.

Devastated businesses have relocated, many of them on land provided by the State in Kanoelehua Industrial Center, away from the disaster area.

The urban renewal program, a key to Hilo's future, is three-quarters complete in moving businesses and families to new areas.

It's aim is to clear the most vulnerable sections of the bay front, a total of 353 acres.

Most of it is now in lawn. Various uses for this area have been proposed, including a "tidal wave forest" of bamboo or trees to act as a buffer against future waves.

About 40 acres of the disaster area will be built up 20 feet and reclaimed as commercial property.

While relocation of businesses and families has had its problems, H.R.A. Manager Megumi Kon believes it is well worth the effort.

Kon says $12.6 million is being spent on the project. About half will be recovered through resale of the parkway to the State and the built-up area to commercial and government agencies.

Another project is creeping ahead slowly. The Army Corps of Engineers is working on a $27 million breakwater construction program that will reduce danger from waves. The State and County have promised money for the project.*

Meanwhile, civil defense officials took another look at the machinery for warning of sea waves and have come up with what they believe to be an effective warning system.

Myron Isherwood, in charge of the Hawaii Island Civil Defense System, says "the 1960 tidal wave showed us we had no system at all".

Machinery to provide adequate warning hours ahead of a wave has been improved. New sirens and more of them have been installed and are tested frequently.

But an alert is worthless if those in the danger area pay no heed. Thus, civil defense officials have a continuing education program to combat apathy.

Residents have only to look in the front of their telephone books to find out what to do in case of wave alerts.

And civil defense officials point proudly to the last alert after the Alaskan earthquake to show how effectively they've done their jobs.

Hilo's danger zone was evacuated "practically 100 percent", says Isherwood.

Civil defense and law enforcement officials have pushed for ordinances which would put teeth into evacuation procedures during wave alerts.

One, now under consideration, would make it illegal to loiter in any public area subject to wave action.

County Chairman Helene Hale says, "...It's impossible to bring back the hundreds who have died in those terrible forces of nature that have struck Hilo and other coastal areas of our Island.

"But we can, and we must, build a better and safer city to lessen the death toll during the tidal waves which will come in the future.

"This we are doing -- in many ways -- and we will not be caught napping again." **

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* This breakwater plan was eventually scrapped due to increasingly higher financial estimates of construction costs.

** Reprinted from the Honolulu Star-Bulletin, Saturday, May 23, 1964.

THE DAILY SPLASH

Vol. 1 1979 Coastal Newspaper

LACK OF PARKING EMPTIES BEACHES

Frank Mitchell doesn't go to Clearwater Beach anymore. Neither does Jean Guido. And they aren't the only ones. It's not that people like Frank and Jean don't want to go, it's just that they can't get there anymore.

Clearwater Beach used to be one of the favorite swimming and camping beaches in this area. But then came the new subdivision. And, then the new shopping center. The developers put in a public access pathway so that long-time local residents could easily get to the beach. But they forgot one thing. Parking.

There simply isn't any place to park a car within a half-mile of the beach. The road is too narrow and there are no open spaces to use.

City officials admit the parking problem has helped turn this area into what amounts to a private beach for the few nearby residents. One official admits, "Quite frankly, I don't know what we can do about it. Somebody in city government should not have allowed the developers to build along that entire beach front area.

Beach Owners Fight Plan For New State Park

Owners of several undeveloped lots at Castle Beach announced they will fight the state's attempt to buy their land for a new state park.

"We've saved for years to build a nome there," said one beach-front property owner. "If people want a park, let them look somewhere else."

The owners will send a petition to the Governor's office expressing their opposition to the park plan.

PARK DEPARTMENT SURVEY FINDS LACK OF PUBLIC RECREATIONAL SITES

"WELL, YOU CAN'T HAVE EVERYTHING !!"

A recent survey by the County Park Department shows that the amount of recreational beach space easily available to the public is declining. Housing developments, beach-front condominiums and new industrial plants have closed over half of the county's best recreation sites to the public.

One park official complained that long-time popular beach spots are being ringed by "Private Property - Keep Out" signs. "The simple fact is that developers have sold off our beaches."

A state planning spokesman said today that the loss of recreation sites is not unique to this area. "All along the coast, communities are faced with the problem of inadequate recreation space. Last weekend, Point Eagle Seashore Park closed its gates at 10:00 in the morning beacuse they had no more parking space.

Most officials predict the problem will get worse if nothing is done to acquire more park areas. "We've had a 30% increase in population here in the past 15 years," reported one county planner. "All signs indicate the population will keep increasing in the future. Finding the land for beach parks and paying for it will not be easy. If the public wants more beach recreation, taxes will surely have to increase."

New Developments Ruin Beach For Local Resident

Local residents in the North Shore area met yesterday to announce their opposition to further development. Plans for a new condominium and beach-front hotel along the North Shore prompted the resident's opposition.

Several beach owners claimed there were already too many hotels and condominiums in the area. One lifelong resident complained, "The tourists and newcomers are always staring down our necks. It's been a local beach for a long time, but now I just don't feel comfortable coming here."

Another resident said, "It used to be we could go out on the North Shore beaches anytime. But now there's so many people that I can't get into it."

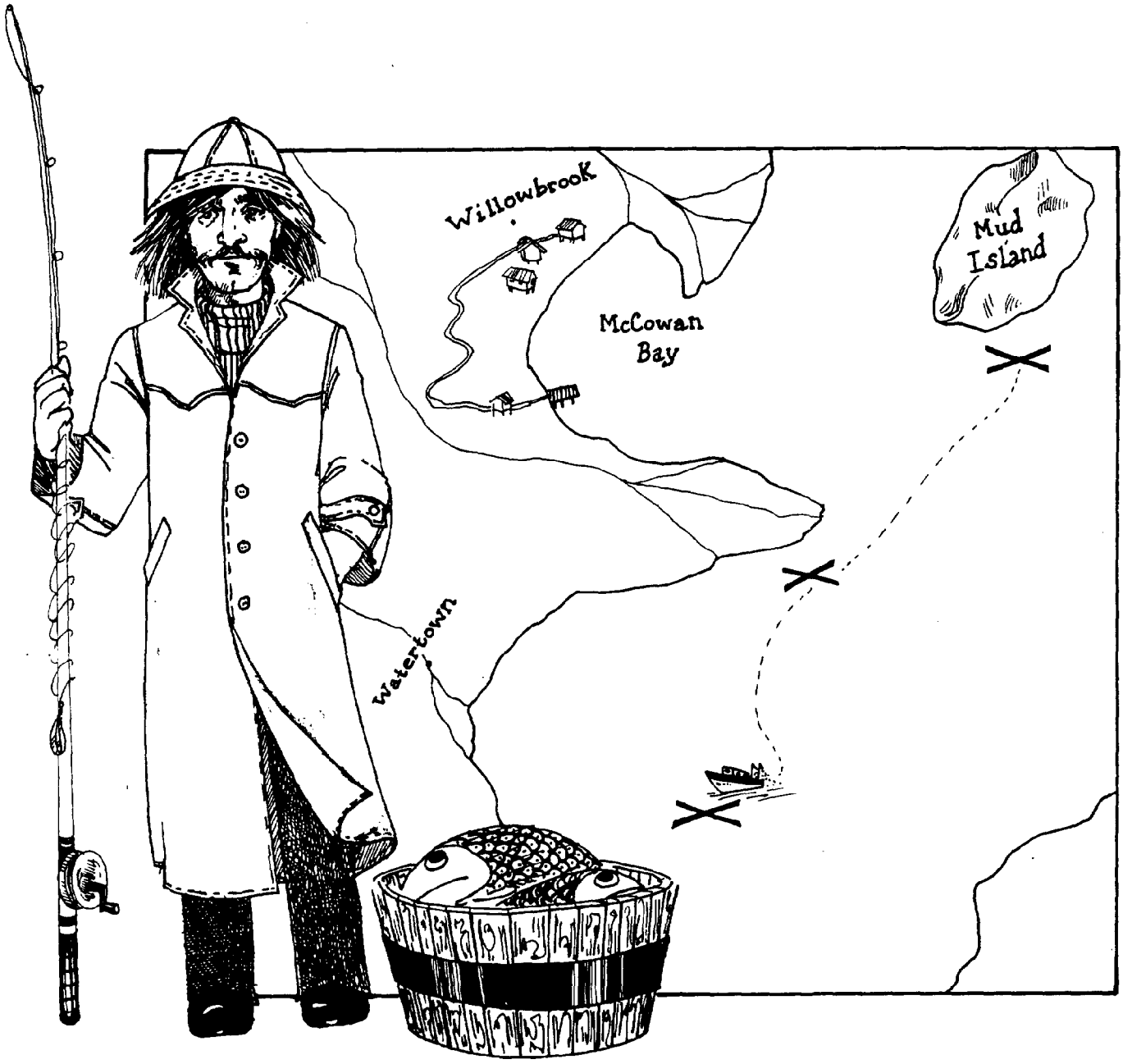
Other North Shore residents, including fishermen, complained that newcomers were taking over the beaches.

Advertisement

A FISH STORY

Section 1

Once upon a time there was a fisherman. He liked to fish in several places along the coast. Usually he could catch enough in one day to last him all week long.



Section 2

The fisherman, being wise in the ways of the sea, soon learned he could catch more fish than he needed for just himself. Even when he gave fish away to his friends and his cat, he still had too many fish.

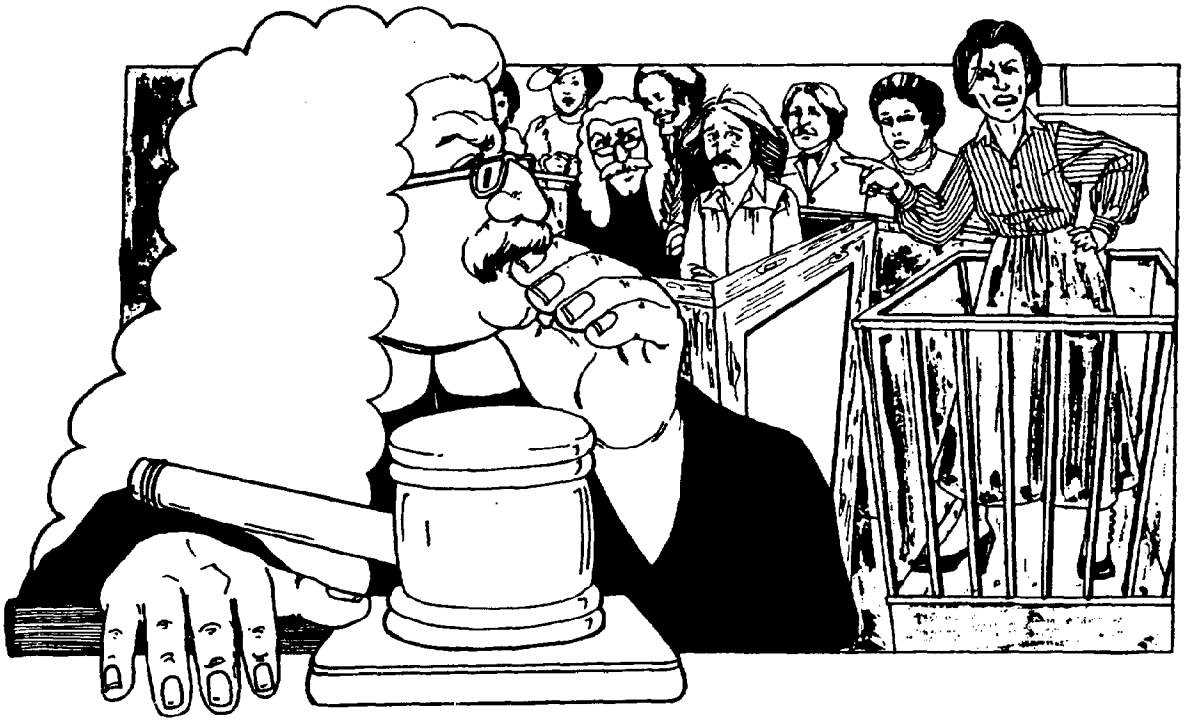
So the fisherman decided he should go into the fishing business. He would catch lots and lots of fish and sell them. He built a little fish stand and soon the public came to his stand to buy his fresh fish. The public thought his were the best fish they had ever eaten and gladly paid the fisherman a good price for his fish. The fisherman took this money and bought new fishing boats and all the best equipment from stores owned by the public.

Section 3

The fisherman continued to fish the rich waters of the ocean. His fish market was very successful. Then one day the fisherman left the fish sitting too long in the sun. The fish rotted. But the fisherman didn't notice that this was happening and the fish were sold to hungry members of the public.

Unfortunately, those who ate the fish got very sick. One member of the public decided to sue the fisherman for damages caused from eating the rotten fish. The court heard the case of Hungry Citizen vs. the Fisherman.

The court decided in favor of the fisherman. It ruled the Hungry Citizen should be alert to what she buys.



Section 4

The Hungry Citizen, after her court encounter, decided that something had to be done. She called some of her friends who had also gotten rotten fish

from the fisherman. They formed a citizens group called ARF, or Against Rotten Fish. ARF tried to get the legislative body to pass a law making it illegal to sell rotten fish.

They wrote lots of letters to their representatives in the legislature. They made phone calls and passed around petitions. They demonstrated in front of the fish stand. Soon, many people were asking their representatives to pass a new Safe Fish Law. The fisherman talked to some other fisherman. They decided that they didn't like the idea of somebody else telling them how to sell their fish. So they formed the Fisherman's Association. The Association wrote letters to their representatives and put pressure on them to vote against the law. Finally, the Safe Fish Law was passed by the legislative body. The fisherman could no longer sell rotten fish to customers. Fishermen all along the coast changed some of their practices. Now they put all of their fish on ice and made sure none of the fish rotted.

Section 5

The fisherman continued to fish. He expanded his business and set up fish stands across the city. He built a packing plant and soon had the biggest fishing business in all the area.

But...people began to notice that many things were not like they used to be. People who liked to fish along the shore noticed that they weren't catching as many of certain kinds of fish. They blamed the fisherman who was now catching fingerlings as well as bigger fish in his nets. This would soon mean that no fish would be left near the shore.

Other people began to notice how crowded and dangerous the bay was becoming. All of the fisherman's boats and nets were getting in the way of people who wanted to sail their own boats, or swim, or surf. And the fisherman was upset because the boats of other fishermen were getting in his way.

Many people who lived along the beach near the fisherman's cannery were upset. The cannery gave off a lot of smoke and fishy smells. This made it hard for the home owners to sit outside and enjoy the beautiful ocean view.

Other people began to complain that the fisherman's new pier was causing problems. Before the pier was built, the sand was pushed down the beach by the currents. But now, the pier blocked the sand and the beaches on the other side of the pier were not getting any new sand. The owners of the houses were very upset with the fisherman.

Anger grew until all of these people (the boat owners, the homeowners, the other fishermen and the fisherman himself were all complaining to their representatives to pass new laws. The law-makers listened but the situation was very complicated. So, they decided to set up special agencies with experts on fishing, the ocean and piers.

They passed a law which set up the Fishing Agency. Its job was to see that fishermen took only their fair share and the proper size of fish. Then the representatives passed another law which established the Boat Agency. This agency was in charge of making sure all boat owners followed new safety rules. Then the representatives passed another law which set up the Pier and Harbor Agency. Its job was to see that better piers and harbors would be built.

Finally, they passed a law for one more agency, the Environmental Quality Pollution Control Agency. It would make sure that all factories (like the fisherman's cannery) would stop the pollution they produced.

All of these new agencies made up new rules and regulations. The boat owners, the home owners, the fisherman, and the other fishermen had to follow these new regulations. Now, when anyone did anything with coastal resources, they had certain laws to obey and certain rules and regulations to follow.

THE CASE OF BLUE NECK BAY *

Blue Neck Bay rests in the upper reaches of the Great Lakes, surrounded by tall evergreens that border the lake's shore. Some vacation homes and several small villages line the bay. During the hot summer months, tourists and summer residents flock to Blue Neck Bay to enjoy swimming, fishing and camping in the quiet wilderness area.

But Blue Neck Bay is not just a vacation playground. The Bay also serves as a transportation link for the coal mining industry in this region. A major coal field lies about 75 miles from Blue Neck Bay. Railroad cars haul the coal from the mines to the town of Pine Grove in the upper portion of the Bay. Here it is loaded on barges and hauled across the lake to several ports on the industrial western shore.

In the mid-1970's the demand for coal greatly increased. Collins Coal Company, which operates the Blue Neck Bay coal field operation, doubled the amount of coal it mined. Employment in the area increased, but Collins Coal, could make even more money if its loading and dock areas in Blue Neck Bay were increased in size. These were too small to handle the growing demand and barges often backed up for several days waiting to be loaded. A new facility would permit more and larger barges to be serviced at the Pine Grove dock.

The Collins Coal Company and its employees would not be the only parties to benefit from new dock and pier facilities. The Northern Bay Railroad, which transports the coal from the mines to the Blue Neck Bay dock also favored dock expansion. This would permit the railroad to haul more coal, and thus make more money.

To enlarge the dock facilities, the railroad company and Collins Coal

* This case is based on an actual incident in the Great Lakes area.

had to get approval from the state agency responsible for construction projects on the lake. Concerns about the environmental impact of such a construction project would likely be raised. But the two companies believed this would not be a problem, because in the past they had been successful in getting permits for construction activities.

For example, the state legislature had passed several environmental laws over the past 20 years. One of these laws created the Lake Construction Agency which was empowered to protect the lake against unnecessary construction projects. But officials of the Collins Coal and the Northern Bay Railroad Company lobbied at the legislature. As a result, these two companies received exemptions from every one of these statutes. A water pollution statue states: "This law shall not apply to coal mining companies." Further, several persons favorably disposed toward Collins Coal Company were ranking members of the Lake Construction Agency (LCA). The LCA had never turned down any previous construction requests from Collins Coal or from the railroad. Environmental protection laws or regulations which might have restricted their business operations, had not been applied to Collins Coal or the railroad. They felt confident that this time would be no different.

Last September, Collins Coal and the Northern Bay Railroad companies asked the LCA for a permit to expand the dock and pier facility at Pine Grove. The LCA said that it would study their request and issue a decision in a few months.

In the past, few citizens of Pine Grove had objected to the activities of the two companies. But a year ago, the town of Pine Grove built a new marina and park about one-half mile from the barge facility. Many residents and visitors in the Pine Grove area felt that the new dock area proposed by the coal and railroad companies would interfere with this recreation area. More important, they feared that the essentially quiet and rural atmosphere of the

town and the upper part of the Bay would be forever changed if expansion were approved.

During the autumn months, several citizens in Pine Grove formed the Respect Our Bay association (ROB). Its primary goal was to halt the expansion of the dock and pier facility.

In January, the state legislature opened its annual season. ROB members got their representatives to introduce a new "Lake Protection Law" which would make it illegal to build large structures out into the lake. If this law were passed, the new dock and pier facility proposed by the railroad and coal companies would not be permitted. Pressure from the coal and railroad officials, however, was more effective and the legislature voted against the new law.

A few weeks later, the Lake Construction Agency (LCA) announced it would hold its last public hearing on the pier and dock facility. If no one brought up serious objections at this meeting, the Agency would immediately issue permits to allow Collins Coal and Northern Bay Railroad to begin construction.

ROB made a long presentation at the hearing, explaining how the noise and "industrial nature" of the enlarged loading-unloading facility would disrupt the quiet character of the bay. Several residents from Pine Grove also testified that the new facility would interfere with the Pine Grove marina. Others argued that the new dock area would seriously pollute the lake environment.

Spokespersons from the coal and railroad companies also made presentations. They argued that their new facility would not disrupt the marina and recreation area, and they said the bay was big enough for all kinds of activities. Outlawing industrial uses would be detrimental to further economic growth in the region.

A week later the LCA announced approval for the construction project. ROB had been defeated twice in its efforts to save the bay. It had one last alternative -- to take legal action through the courts. Three days before construction was to begin, ROB filed a lawsuit against the Lake Construction Agency for failing to adequately study the situation. The court ordered a temporary halt to all construction until LCA could demonstrate it had acted fairly in the granting of the permit. After listening to testimony from both the agency and ROB, the court ruled that LCA had not performed fairly. The court halted all construction.

MAJOR STEPS IN THE CASE OF BLUE NECK BAY

1. Industrial users use the bay as a transportation resource.
2. The public uses the bay as a recreational resource.
3. Both industrial and public users benefit from use of the bay.
4. The state legislature passed laws concerning use of coastal resources. (One of these laws created the LCA)
5. Officials from the coal company and the railroad formed a small group to put pressure on the state legislature to pass certain laws.
6. A concerned group of citizens and recreational users of the bay formed a public interest group called ROB to protest the building of the dock.
7. ROB put pressure on the legislature to pass a new law.
8. Coal and railroad companies put pressure on the legislature to not pass the law. (The legislature failed to pass the law).
9. ROB put pressure on the LCA to deny the permit.
10. Coal and railroad company officials put pressure on the agency to allow the permit.
11. The agency granted the permit to the coal and railroad companies for use of the bay.
12. ROB went to court and filed a lawsuit against the agency.
13. The court made a decision to halt construction. This affected the users of the bay, the LCA, and the general public.

THE FUTURE OF BAYSHORE ISLAND

The island and town of Bayshore sit in the Gulf of Mexico, just a few miles from several large urban areas. Two small bridges, one at each end of the island, connect it to the mainland. About 25,000 people live on the island operating small farms, tourist businesses, fishing boats and light industries. For years, its small resorts and vacation homes have brought in a few regular toursits from the nearby mainland cities. But Bayshore Island has remained fairly quiet and uncrowded and it is this atmosphere that attracts a small number of faithful summer visitors.

However, over the past decade, the resort business on Bayshore has not enjoyed the boom that hit other nearby islands. Older hotels and beach front cottages do not attract as many people as they once did. The economy of Bayshore Island is definitely feeling the results of "not keeping up". More people are out of work, and some residents are moving away from Bayshore to find better chances for employment.

Recently, Cloud Resorts, Inc. announced plans to build a large resort complex on the west shore of the island. The Bayshore city government has to decide whether to allow Cloud Resorts to build the new hotel. The mayor asked the city planning office to consider this question. Following is a portion of their planning discussions:

Planner #1: ...and if we give the go ahead on the resort, it will really be a big help to the economy of the whole island.

Planner #2: Tourism hasn't really flourished here since the war. I think the new complex will mean a real boost. Just exactly what will this mean to the Bayshore economy? Do we have any figures on its economic impact?

Planner #1: Our best estimates suggest that it will employ about 200 people. With our unemployment figures, that would definitely help.

If the hotel runs at the average occupancy rates, it should mean about 2 million tourist dollars a year.

Planner #3: What about other related areas of the economy?

Planner #1: We expect a number of new stores to open all along the West Shore area. Some new fast-food stores, a couple of sporting goods shops, plus some new clothing stores. Three new restaurants are already planned to go in if the hotel is built.

Planner #2: What are the chances that other hotels will go in in that same area?

Planner #1: If the Cloud Resort is successful, we predict two or three more large complexes in the West Shore area. In the long term, if this area catches on, we can expect up to 25,000 additional tourists for the summer season.

Planner #3: What about tax revenues for Bayshore Island?

Planner #1: If the hotel is built, it will represent a 25% gain in tax revenues. Once the other shops and other hotels follow, it is likely that tax revenues will increase almost 100% over what they are now.

Planner #2: That new revenue would mean a lot to the Bayshore city treasury The city council could start to plan some of those improvements that it's been talking about. Probably a new wing for the hospital, upgrading of our fire equipment, plus getting some of those old roads resurfaced. The worn-out shocks on my car testify to the need for better roads around here.

Planner #3: Speaking of highways, you know one thing we must consider, with all these new tourists coming in, that narrow two lane road through the West Shore area will have to be widened. It can't carry all that extra traffic. We'll have major traffic jams. That is one cost to the city when this hotel goes in. The city will have to pay for either new roads, or better police control of the traffic. Are these other costs the city is likely to have?

Planner #1: We'll need extra police protection for the beach area, and we may need to upgrade the waste water treatment facilities to handle the extra volume of water during the tourist season. These are the biggest costs the city will have to think about.

Planner #2: What's this hotel likely to do to the environment on the West Shore? There's a lot of beautiful vegetation along the beach out there.

Planner #1: A lot of that will probably be destroyed. And I suspect that those sand dunes along the north edge of the complex area will have to be leveled. As far as water quality is concerned, the hotel people have assured us that they will provide ade-

quate sewage treatment facilities for the complex itself.

Planner #3: One thing that I'm concerned about is the access problem. There are a lot of local people up in that area who go to that beach frequently. At night you get a lot of fishermen in there. The Mayor's office has gotten a lot of complaints about the hotel being built. With the election coming up soon, the Mayor may be relunctant to take any action to anger people in that area.

Planner #2: Most of these people are worried about losing access. They're afraid the beach will be for hotel guests only. And they are really mad. Listen to this letter:

> Dear Mayor, The fishermen on the West Shore do not want a new hotel to be built here. Thousands of tourists coming to this area will mean no more fishing for us. The tourists will rent gear and boats and crowd us out. The fishing will become poor. There isn't another good fishing spot like this anywhere on the West Shore. Don't ruin it for us!

Planner #3: It is true that the new hotel will change the quality of that area. It's very quiet now. But if that hotel goes in, it's going to change the entire character of the West Shore. It will be more tourist-oriented, more shops, more people, more traffic. The people who have lived in that area for a long time aren't going to like that.

Planner #2: We're likely to get a lot of community opposition on the approval to build. Besides, there has been some talk from West Shore residents about making that beach into a park. You know, there aren't any parks on that side of the island. They have to drive about 12 to 15 miles to get to a park.

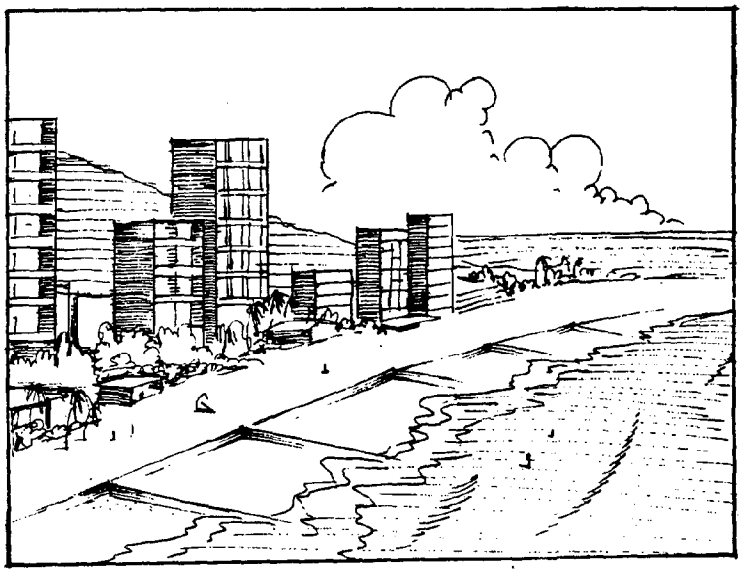
Planner #1: Well, I'm not sure. I think the people over there wouldn't mind the hotel. It will help out the economy of the area. They're smart folks; they know the hotel will mean better business and rising land values. Maybe we'd better get out there and do some interviewing to find out just what the West Shore residents want.

Planner #3: Good idea, but we still have to keep in mind all the economic benefits. Just because they might not want the hotel, well, it doesn't mean we have to penalize everybody just because a few don't want it. This isn't going to be an easy decision.

RESOURCE MANAGEMENT PLANS

Governments often decide to control or influence the use of coastal resources. Governments may have several goals, such as reducing pollution, increasing recreational facilities, or encouraging the growth of business and industry. Establishing these goals is usually one part of a resource management plan. However, once these decisions are made, there still remains the difficult task of determining how these goals will be reached.

A second part of resource management plans suggests ways for governments to control the use of land and water resources. Plans may combine one or more strategies in order to reach the short-term and long-term needs of the area.



Promoting tourism might be one goal of a resource management plan.

Effective resource management plans have several characteristics. First, they must not be too expensive. Any management plan will cost government money to implement and enforce; however, careful planning can keep costs

low and prevent large and unpopular tax increases.

Second, management plans must be legal. Regulations, zoning ordinances, and other policies must be within the law.

Third, the plans must be enforceable and must have the support of the people. Government rules and regulations may look effective on paper, but if they are difficult to enforce, or influential sectors of the public oppose the ideas, the plan will likely fail.

When these problems occur, or where no management plan has been drafted at all, development and growth may evolve with little or no attention paid to many important concerns. Access to beaches can disappear, urban sprawl and traffic congestion may result, pollution often increases, the economic well-being of the community rises or falls with little public guidance.

Strategies which government can use to control development can be described as the "resource manager's tool kit." There will be advantages and disadvantages to the use of each possible strategy, and thus, the right tool must be chosen for the job.

RESOURCE MANAGEMENT: SIX EXAMPLES

Example 1: Agriculture vs. Homes

The Governor of a certain coastal state announced that the state intended to purchase 600 acres of agricultural land near a metropolitian area for $6 million. The fate of this land had become a major public issue when a development firm announced it would purchase the land for a new housing project. The Governor's action followed protests by residents who wanted to maintain the agricultural and rural lifestyle of the area. The Governor's purchase of the land will help insure that the area remains in agricultural use.

Example 2: Oh Say Can You See?

The City Council of a coastal metroploitan area approved an ordinance creating an Historic, Scenic, and Cultural District surrounding a famous coastal landmark. The ordinance set height limits on new construction in the district in order to preserve views of the landmark from all sides. Only certain types of buildings can now be built in the area near the famous site.

Example 3: Shoreline Impacts

Proposed development projects for the beach area and near-shore waters in a certain coastal state must be approved by the Department of Land and Natural Resources. This department reviews projects to insure that the beach environment will not be adversely affected by any new activities. If projects meet specific standards, building permits will be issued and construction can begin.

Example 4: The Domino Effect

The State Legislature in a certain coastal state changed the state's property tax laws to eliminate the requirement that property owners must pay taxes on the "highest and best use" potential of their property, rather than on actual use. This change encourages owners to keep their property in less intensive land uses by making the tax rate increase only if a property is developed.

It was hoped that property owners who had felt economic pressure to replace older structures with high-rise buildings might reconsider and take advantage of this new law.

Before the change in the tax law, owners of land adjacent to or near highly developed areas were pressured to develop their property because their tax rate was the same as that on the developed land. This developed land set the highest and best use standard. The new law countered the "domino effect" of stimulating development by highest and best use taxation.

Example 5: Meeting Recreational Demand

The Outdoor Recreation Plan of a certain coastal state cited "critical deficiencies" in recreation facilities, including picnic sites, informal outdoor areas, ocean recreation areas for fishing, shoreline campsite areas, and walking and jogging trails. In response to this and other surveys, several State offices cooperated on the acquisition, restoration, and/or improvement of thousands of acres of park lands, involving expenditures of millions of dollars. Of 12 new park projects, seven are on the shoreline.

Example 6: A Highway Proposal

The State Department of Transportation in a certain coastal state proposed to build a second highway across a mountain range which separated coastal and inland areas. This new highway would help ease present traffic congestion and encourage further development in the coastal area. Further, the new highway would allow more inland residents use of recreation facilities on the coast.

ANALYZING MANAGEMENT TOOLS

1. ACQUISITION: The public purchase of private land for public use or as a public trust.

Advantages of Use	Disadvantages of Use
Government has complete control over the use of the land purchased	Cost of purchasing land may be high Government must pay maintainance costs if land is used as a park, etc. Loss of tax revenues from the land if it remained in private ownership Purchase of property may be very time-consuming Can be politically unacceptable if people fight eviction

2. ZONING: Control of the type and/or intensity of specific uses allowed in a designated or "zoned" area.

Advantages of Use	Disadvantages of Use
Limits certain kinds of development to certain areas Protects agains public nuisances or other unacceptable uses in the areas zoned Inexpensive to implement compared to other options	New zoning designations do not remove already existing undesireable structures or activities Specific sources of pollution will not be stopped Zoning ordinances are sometimes overturned in court

3. REGULATION AND PERMIT SYSTEM: The review of all land or water uses for conformity to standards set by government.

Advantages of Use	Disadvantages of Use
Can address specific pollution problems Can deny approval to use land if user does not meet standards Can be combined with zoning to create a "mixed effect"	"Red tape" and delays can result, increasing construction and other user costs More personnel are needed for review and enforcement, thus increasing government costs Regulations are sometimes overturned by the courts Setting appropriate level of standards is difficult; strict standards can discourage new business, while loose standards can encourage pollution, etc.

4. TAXATION POLICIES: The offering of tax incentives, credits or penalties to influence the use of land.

Advantages of Use	Disadvantages of Use
Encourages desireable land uses or technologies; discourages undesireable land uses or technologies May be used to attract or discourage business Does not require extensive staff to implement	Does not specifically control sources of pollution or undesireable construction Government will lose some tax revenues if incentives call for reduced taxes May lead to overdevelopment if government reduces taxes to encourage new business

5. IMPROVEMENT OF PUBLIC FACILITIES: The decision whether to improve recreation and other public facilities

Advantages of Use	Disadvantages of Use
Government has direct control over any changes to be made Improvements are often highly visible, and can be directly attributed to political efforts Results may be politically popular Improvements may be only way to make a resource or facility productive again Type and number of improvements can influence the pace of development	High costs are often involved in making improvements High visibility of projects can lead to political problems if project fails, or if opposed by influential community groups

6. PLACEMENT OF PUBLIC FACILITIES: The decision of where to locate public facilities

Advantages of Use	Disadvantages of Use
Proper design and situation of new facilities can direct development into desireable areas and away from less desireable areas Improvements are often highly visible, and can be directly attributed to political efforts Results may be politically popular	Analysis of impacts can sometimes be wrong or incomplete Analyzing impacts can be expensive and time-consuming Political fights can occur over location of facilities

Reading, III-6

GOTHAM TIMES-PICAYUNE

BEACH PARK DECISION BY NEPTUNE BEACH IS WRONG

Yesterday, the Neptune Beach City Council voted down a proposal to open swimming and recreational opportunities for thousands of people in the Gotham City area. The Council refused to lift the long-standing restriction which allows only Neptune Beach residents use of the Neptune Beach Park.

This small village is telling the residents of Gotham City that we cannot enjoy the swimming, boating, picknicking, and sunbathing opportunities that should be fully ours by right.

Gotham City has grown tremendously over the last 20 years. Our people need more and better beach space. The city has worked earnestly to provide adequate beach park facilities, but the demand and population has grown too fast. Our public beaches are now overcrowded. City residents must often travel 50 to 100 miles to find a stretch of beach that is not blanketed by people.

Yet right next door, just eight miles away, is Neptune Beach, one of the most underused beaches in the state. Even on weekends, the beach area is uncrowded. There is simply no justification for Neptune Beach to keep this beach closed to the general public.

This decision is wrong. It is unfair. It is selfish. The people of Gotham City will suffer because of the small-minded action of the people of Neptune Beach. We urge our City Administration to vigorously challenge this decision in the courts.

NEPTUNE BEACH CITY COUNCIL

PUBLIC HEARING

Bosley, City Council Chairperson:

This meeting is now called to order. I want to welcome all those citizens who have come here today to express themselves on this important issue before the Council. I can assure you that all of us sitting here on the City Council will be listening intently to your views, and that we will deliberate carefully on the decision before us, holding the testimony of each of you in mind.

Now the matter before us is the request by our metropolitan neighbor, the city of Gotham, to open for general public use the one-mile segment of sandy beach and adjacent shoreline parking which is now Neptune Beach Municipal Park. This beachpark is now open to Neptune Beach residents only. I would like to ask Mr. Cabrillo who is here to represent the Gotham Planning Department, to explain the Gotham request more fully, before we hear from our local citizens on this.

Cabrillo, Gotham Planning Department:

Thank you Mr./Ms. Chairperson. As you all know, Gotham has experienced a significant population increase in the last decade. At the same time, many traditional recreational areas along our coast have become closed to the public because of new housing developments, a new electric energy plant, the expansion of the Southgate harbor facilities, and the health hazard caused by increased sewage outfall in some areas. I would like to remind the good citizens of Neptune Beach that many of those uses which have eliminated Gotham's beach area, greatly benefit Neptune Beach. For example, the new power plant supplies improved services to you, and the expanded harbor has helped keep the price of many goods low.

The people of Gotham need opportunities for outdoor seashore recreation as much, if not more, than the good folks who live in our coastal towns like Neptune Beach. But we have become "shoreline poor". Beaches are a regional resource for all the people, and we hope you will cooperate with us on this request, for the benefit of all. Thank you.

Bosley

Thank you, Mr. Cabrillo. We have a lengthy list of speakers scheduled, so let's hold off questioning Mr. Cabrillo for a moment. I would like to invite Mrs. Sheila Porter to speak first.

Mrs. Sheila Porter, Resident:

My name is Sheila Porter. I have lived in Neptune Beach for 26 years. I am president of the Neptune Beach Neighborhood Improvement Association. I am speaking both for myself and for that organization today. I want you

to turn down this request. I love this town, and I don't want to see it change because folks up at the state capital and over at Gotham City Hall haven't been doing their job all these years.

Neptune Beach was smart enough to make its shoreline a municipal beach years ago, and it is truly a fine beach. We have protected and preserved it. We have more people now too, and if we open our beach to the city people, it won't be a good beach for us anymore.

Bosley:

Thank you, Mrs. Porter. Our next speaker is Mr. Euclid Haines.

Mr. Euclid Haines, Owner and Proprietor of Haines Drugstore:

I am Euclid Haines, owner and proprietor of Haines Drugstore and Fountain. My business is located one block inland from Neptune Beach Park. My pharmacy serves this community, and my lunch counter is a friendly meeting place for local folks. If we open that beach area to the city, I'll have swarms of young city kids hanging around inside my store and out front. There won't be any place for my regular customers to park. Those kids will try to steal me blind, I know it. I am against this request, and I think I am speaking for most of the small businessmen in Neptune Beach as well.

Bosley:

Thank you, Mr. Haines. I would like to ask Jim Rankin, Neptune Beach's Chief of Police, to speak next.

Chief Jim Rankin:

Uh, you all know who I am. I've been investigating the police aspect of this matter. If we open that beach up, we can expect 10,000 visitors every good weekend from Memorial Day through Labor Day. I'll need a half dozen more officers on duty at those times, and they'll, frankly, all be spending most of their time writing out parking and speeding tickets that will never get paid.

I checked with Chief Izen of Oceanside about the situation there since the state built that new beach park facility in his jurisdiction, and he tells me most folks are just enjoying themselves, but that vandalism is definitely a problem. For example, the garbage cans. Their people put out garbage cans every 100 feet because of the amount of trash. Well, a lot of those cans just disappeared. So they cemented poles in the ground and chained the cans to them. The cans got stomped. Now this didn't happen to all of them, but every smashed can costs $34 to replace. And that beach area has become kind of honky-tonky at night.

Bosley:

Thank you, Chief Rankin. I have to point out that those extra police officers Chief Rankin would need would have to be paid from Neptune Beach funds. Our next speaker will be Ms. Sharon Benitsky.

Ms. Benitsky, Students:

I am a student at Neptune Beach High School. I wanted to say that I and my friends use Neptune Beach Park a lot, and we are worried about what will happen with all those people from the city coming here. Last year, when Neptune Beach played Gotham High for the district football championship, you remember there was kind of a riot after the game. A lot of bus windows were broken and some Neptune Beach kids were hurt. We wonder if those same people who started that riot, or other city people looking for trouble, won't be coming up to us on the beach or the street and hassling us. And, uh, you know, we're afraid too about what might happen to some of us girls, maybe some weirdos will grab somebody.

Bosley:

I'm sure we all share your concern on that point, Sharon. I'd like to let Mr. Alfred Escobedo speak now.

Mr. Escobedo, Fishing Captain:

My name is Al Escobedo, I am captain of a fishing boat, the Sea Scorpion, and I live in Neptune Beach. The fishing is good around here. But what will happen if we open our beach? What're we gonna do with all the sewage these people are gonna make? It's gonna be sent right out to the middle of my fishing grounds. Fish get filth up their gills, they won't hang around. I'm telling you, I'll start catching nothing in my nets, if you let the city people start coming here.

Bosley:

Mr. Escobedo, the Council also wants to address this sewage question fully. I'd like to have Mr. Yarborough, manager of our Neptune Beach sewage treatment facility, give his expert views on what the results of opening the beach park would be.

Mr. Yarborough:

As you know, the Neptune Beach sewage treatment plant is quite adequate for our local needs. However, an influx of an additional 10,000 or more persons at one time would almost certainly mean that a good portion of the

Mr. Yarborough: continued

sewage entering the treatment facility would have to be flushed right on through, untreated. The health effects of such effluent being pumped into the sea cannot be accurately predicted without further study, but I can tell you it will have some effect. We might see the County Department of Health close the beach on occasion because of high pollution levels.

We would need to integrate a second treatment facility with our present one to fully handle the increase in sewage which opening the beach park to the general public would generate. It would be expensive, costing at least $5-$6 million. The state and federal governments would pay a good portion of that, of course, and we would have to seek approval of the project by them. We would also need to construct additional sewer lines and toilet facilities. We'll have to tear up some streets to place those sewer lines. So a new plant, even if we started on it tomorrow, could not be designed, funded, and made operational for three years at least. I expect you would need to vote a substantial user tax onto everyone's local water bill for several years to pay the city's share of the costs for these improvements.

Bosley:

Thank you, Mr. Yarborough. The chair recognizes Mr. Cabrillo.

Mr. Cabrillo:

Mr. Chairman, I have heard here a lot of good reasons for Neptune Beach to deny Gotham request. But the matter still stands that our beaches are a "public trust," and each citizen has as much right to their use as the next. You are saying, "we'll take the best, and our backsides to all the rest." We find this particularly disappointing in light of the fact that many shoreline activities along our beaches, such as the new power plant and harbor facilities, benefit you! Have you no sense of responsibility toward your fellow citizens?

Bosley:

You have put the matter very starkly, Mr. Cabrillo. However, it seems to us here that Gotham is at fault, not the people of Neptune Beach. Good beach areas have been lost right and left over the last 15 years while the city twiddled its thumbs or looked to the almighty dollar.

We still have one more speaker on our list. Will Mr. Ostend please come up to speak.

Mr. Ostend, Architect:

My name is Cal Ostend. I am an architect, and my particular concern is the preservation of the physical character of Neptune Beach. The request to open our beach to Gotham residents will have immediate effects and longrange effects. Soon after the opening of the beach, you can expect the city to widen the highway to Neptune Beach. This will not only bring more people here, but the new setback will require the demolition of many houses and business buildings along the road. We will have more city people buying homes and commuting to the city. This will change the sense of neighborhood we now have.

Franchised food outlets and motels will surely come. There will be increasing pressure on Neptune Beach to accommodate itself to the recreation market. Some people will make a lot of money, but we won't have a community here anymore.

(Loud applause from audience in hearing room.)

Bosley:

Thank you for your eloquent warning, Mr. Ostend. Thank you all for appearing here today. The vote of the Council will take place in private session and be announced soon.

THE DAILY SPLASH

Publisher, President

John Adams

January 18, 1979

More Controversy

A MESSAGE FROM THE EDITOR

A few days ago, our paper printed a letter from Mr. William Eagerton complaining about the lengthy and costly impact government regulations have had on his housing project. Since that letter appeared, we have received several responses to Mr. Eagerton's complaint. Several of these agreed with Mr. Eagerton; others supported the idea of government regulations and permits. In today's editorial page we are reprinting Mr. Eagerton's letter along with six replies.

THERE MUST BE A BETTER WAY

To the Editor:

Four years ago I presented plans to the public and to the appropriate government agencies for building Seaside, a 600 unit planned development along our south-east coast. Homes were to be modestly priced for young, middle-income families. A marina, boat club, private beach, and recreational center were to be provided.

I thought it would take two years and cost me one-half million dollars in architect, lawyer and consultant fees to meet the regulations and get approvals and permits. I can not believe it, but it has taken four years and 2 million dollars in fees to get these approvals. My construction costs will be 24% higher now than they would have been two year ago when I thought I could begin.

There is no way now that I can sell my units for $40,000 as planned.

How did this happen? I had to get permits and approvals from two federal agencies, two state agencies, and five local agencies. Some permits could not be approved until others had been obtained. Some agencies took three to four months each to process papers and make recommendations.

In order to get some approvals, I had to agree to contribute $3 million for a sewage treatment plant and sewer system, $2 million for a main water line, and $2 million towards road construction.

Each agency requested some modifications and changes. Some necessiated new architectural and engineering drawings. Often these changes involved prospective buyers and local community organizations.

Homes in Seaside will now have to be priced 30% higher than originally intended. Lot size will be smaller, some

privacy has been sacrificed. The marina, boat club and recreational center will have to be built later.

Surely there must be a better way to insure quality development. Do three or four levels of government have to be involved? Must there be so many different permits and approvals?

William A. Eagerton,
Assn. of Concerned Developers

LETTERS

Mr. Eagerton:

I can understand, from your point of view why you don't want several levels of government involved in the approval process, but I think all levels do need to be included in this process.

Local officials look at the needs of the local population and the impact of a project on their community.

State officials look at the broader effects on neighboring communities or the state as a whole.

One example of the need for such a broader look comes from your own Seaside project. When plans for sewage disposal were reviewed at the local level, they were approved because there would be no adverse effects to water quality for your community.

When the state reviewed the plans for water quality it quickly became apparent that while the waters of your community would be safe, those of three towns down the coast would be seriously affected.

It must be obvious to any thinking person that without state review, communities could destroy each other.

S.R. Tanson
Office of State Planning

To the Editor:

I agree with Mr. Eagerton that too many levels of government are involved in the approval process. However, I am sure he would agree that some governmental review of development projects is necessary.

Mayor Expresses Concern

We do need to insure that basic health and safety standards are met. This can be best done at the local government level. We have fine officials who are in the best possible position to evaluate a local project right where the project will be built. How can state, county or federal officials know what our needs are? When they make decisions that affect us they are not accountable to our local population for the success or failure of their ideas.

With the Eagerton project, we believed--and experts supported our view--that the proposed housing project would not create environmental damage. Yet the federal agencies said it would. They have been the ones causing the long delays. Because of them, this Seaside project has not yet been built, and several hun-

dred construction workers in our community have not been hired.

The argument that our decisions in a project such as Seaside will be narrow and selfish is untrue. We will look out for our own interests because that is our job; but we will not do it in such a way that it will harm others.

W.O. Fitzsimmons,
Mayor

Testimony Favors Marina

To The Editor:

The importance of the federal government's review can easily be illustrated with Mr. Eagerton's Seaside project.

Eagerton originally proposed to build his marina alongside a major turning basin for commercial ships entering Coos Harbor. Access to the outer harbor for boats moored at his marina would have been through waters of the turning basin, interfering with commercial traffic, and making the area accident prone.

In a public hearing held by the U.S. Engineers, neither state nor local officials were concerned by this problem. Both testified in favor of issuing permits for building the marina near the turning basin.

Surely national and international commerce cannot be put at the mercy of a local community or even a single state. The federal government must be involved in the review process whenever navigable waters are affected.

Col. L.R. Wigginfeld
U.S. Engineers

Total Impact Not Assessed

To The Editor:

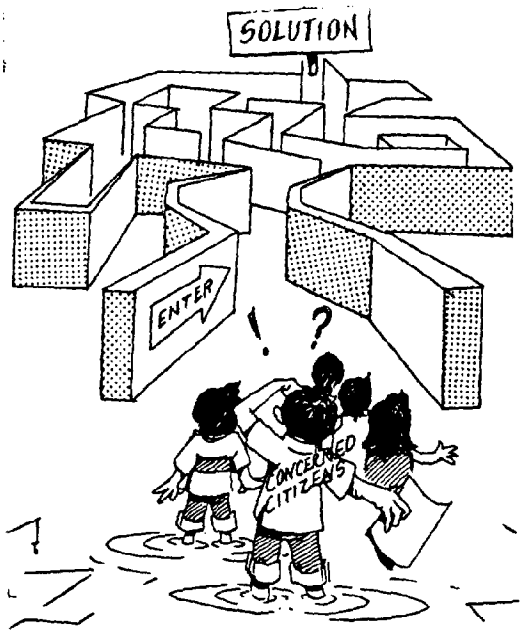
As a marine biologist, I have very strong feelings about the fact that so many agencies are involved in granting approvals for development of construction projects.

On the one hand, all development projects have to be reviewed by environmental experts. We have to have some control over what is built and

how it is built. Otherwise, our shoreline environment will surely be destroyed.

But, two things in particular concern me. One is the narrow view of each agency. All the agency does is look at a little part of the problem. Second, is the fact that no one person or agency is responsible for considering the total impact of a project on the environment.

Let me use Mr. Eagerton's Seaside project as an example. Seaside was reviewed by separate agencies for sewage disposal, grading, and flood control. In each case, the project met minimum standards.



Yet the combined effect of sediment washed into coastal waters during construction, along with sewage disposal and drainage of flood waters, is sufficient to destroy much of the marine life in an area off-shore from the proposed development site.

If we are going to use a permit-approval system to manage our coastal areas, the least we can do it to set up a system that looks comprehensively at all of the interacting elements and considers their combined effect on the marine environment.

N.W. Wainright
Professor, Marine Biology
Hamilton Heights College

To the Editor:

I wish to express my support for Mr. Eagerton, who complained that it takes too long for construction projects to be approved.

Two years ago, the Civic Club applied for permits to build a private dock and small boat harbor to give low-income and handicapped children boating fun. We are one third of the way through the permit process and expect it will take another two to three years before we can start to build.

We have already spend thousands of hours filling out papers for government agencies. Most of the forms asked for the same information, but each agency wants its own forms used.

I can't understand why agencies on the state, county, and local level have to review for the same things--impacts on water quality, land use, and highway systems.

I agree with Eagerton that no one benefits from the time, red-tape, and duplication of efforts involved in obtaining so many approvals.

It is costly to the person seeking permission, and to the taxpayers who support such an unwieldy bureaucracy.

Wallace Wentworth, Pres.
Civic Club

Approval Time Too Lengthy

To The Editor:

As a political science professor, I agree that we need to make some changes in the approval process.

A recent study by graduate students showed that the average length of time required for approvals in our state is 34 months. In the last two years, a minimum of eight approvals were necessary before action could be taken.

When agency heads were asked why so many different approvals were needed, they all replied that if review was to accomplish its purposes, each component had to be evaluated by someone with the necessary technical knowledge.

I'm not sure so many approvals are needed, but even if they are, I am sure there is a way to streamline the process by eliminating duplication and reducing the number of permits required.

Prof. A.N. Smith
Dept. of Political Science
North Uptown University

Review Process Defended

To the Editor:

It is true Mr. Eagerton's costs increases and his construction timetable was delayed as the result of the agency review process. But we ask: Isn't that worth it if the environment and the public are protected?

We find no problems with the process. It worked well in this instance.

Mr. Eagerton is not paying more because agencies are out to get him. He is paying more because he submitted poor plans in the first place. If he had taken the time to develop quality plans and take into consideration a number of important factors he forgot, he wouldn't have had all this trouble.

To often, the agency review process is nothing but a "rubber stamp" for developers. Too often agencies ignore the environment and the public in order to speed development. For once, the agencies gave a project careful review. For once the system worked. We're glad it did.

Gail Carnes, President
Citizens for a
Better Government

Reading III-9

COASTAL LAND USE and THE TAKING ISSUE

Coastal lands are scarce, irreplaceable, and valuable natural resources. Over the years, the importance of regulating their use has become increasingly apparent. Today, a heightened environmental consciousness has spurred an effort in many states to protect coastal land from over-development and the resulting environmental stress.

Yet most coastal land is in the hands of private owners. Traditionally in this country, individuals have a high degree of freedom in what they choose to do with their land. How, then, can the use and development of private land be controlled? One approach is through the exercise of the power of eminent domain, a process by which government acquires private land for public use.

This power has traditionally been held by governments as an inherent power, one necessary for effective government. However, citizens of this and other countries have frequently demanded that government not be given absolute authority in the use of eminent domain. The U.S. Constitution reflects this concern. In the Fifth Ammendment, government's power of eminent domain is restricted. Federal or state governments can take land from private owners only if government meets two conditions. First, land must be taken for public use, and second, the owner must be fairly paid.

However, the process of purchasing land to control development is difficult, time-consuming, and expensive. In addition, it deprives land owners of their land. A more practical approach to controlling land use is through regulation. Through regulation, private owners

may retain title to their land and at the same time the use of coastal resources can be controlled in the public interest and for the public good.

Since the earliest days of our country, the right of the state to regulate private activities to protect the public good has been accepted as a legitimate exercise of authority. This right is commonly known as the police power of the state.

Over time, the definition of the police power has been extended to apply to controls on private uses of land. Early uses of the police power in this regard focused upon regulation of land uses for narrowly defined purposes of protecting the public health, morality, safety and welfare. For example, building codes were passed to make sure buildings met minimum safety standards. Zoning laws were passed which limited certain kinds of activities to specific areas. Also considered to be matters of public welfare were such things as controlling building density, protection of private land values, and promotion of peace and quiet.

At first, many of these regulations were attacked by private land owners. They argued these regulations took away their right to use their land any way they wanted to. Therefore, their land was being "taken" without just compensation. However, the power of the state to control land uses in order to maintain public health, safety, morals and welfare was upheld almost without exception by the courts.

Regulation of private land has become more complex as land has grown more scarce. In our modern industrial society, possible uses of land have multiplied. This is particularly true in coastal

regions. In response, the notion of what is in the public interest and welfare has also changed. Land use regulations today, in addition to protecting public health, safety, and morality, may be intended to preserve or promote other public "goods," including aesthetic, cultural, scenic, environmental and architectural values. The exercise of police power has further expanded.

As a result, many land owners have filed lawsuits against the government, claiming that certain land use regulations are so restrictive that owners no longer have any reasonable uses of their land left. In such instances land owners claim their land has been "taken" without just compensation.

Court decisions in recent years have not shown a consistent pattern in supporting or denying the right of states to expand the police power in regard to land-use regulation. Courts have ruled that if a regulation goes too far, it becomes in effect, a taking. In such a case, the state must provide the land owner with just compensation, or change the regulation.

When courts have ruled in favor of the state, they have asserted that the protection of the environment and the resulting benefit to the community outweighs the limitation on the property owner's right to use land in any way he or she chooses.

In sum, courts have supported the right of the state to exercise the police power through land use regulation, but they are not agreed on the point at which a land use regulation becomes so unfairly restrictive that it violates the constiutional rights of private property owners.

In any case brought before it, the court balances support of the public health, safety and welfare against protection of private property rights. This balancing process is the heart of the "taking issue."

Reading III-10

DOOLEY v. TOWN PLAN AND ZONE COMMISION OF TOWN OF FAIRFIELD

A Mr. Dooley owns a sizable piece of land located approximately one-half mile from Long Island Sound. Originally much of the land was zoned for residential and commercial construction. In fact, Dooley was assessed $11,000 for a sewer on one parcel of land.

The area has been rezoned as flood plain which prohibits the construction of residences and most commercial buildings. The ordinance lists permitted uses in the flood plain zone including parks, playgrounds, wildlife sanctuaries, and graveled surface parking.

Dooley has objected to the ordinance. He feels that it is too restrictive. He feels that this property should not be classified as a flood plain zone because most of his land is on high ground and not subject to flooding. He further feels that the only permitted uses are public oriented. An assessment of the economic value of his land has revealed that the value of his land has depreciated 75% as a result of the ordinance. He has filed suit.

The Town of Fairfield argues that the ordinance does not constitute a taking of property without just compensation. The Town feels that the flood plain ordinance is necessary to prevent commercial or residential uses of the land, and thus protect citizens from property damage or personal injury. By banning these activities the town is legally acting to protect the public's health, safety, and welfare.

Reading III-11

McCARTHY v. CITY OF MANHATTAN BEACH(CALIFORNIA)

McCarthy owns over 1/2 mile of sandy beach approximately 175 feet wide. It is bordered on the west by the Pacific Ocean and on the east by a state park. While never specifically designated as such, the land had been used by the public as a recreational site since 1900.

The city of Manhattan Beach adopted a zoning regulation which places the McCarthy land in a "beach recreation district." The only structures permitted are lifeguard towers, fences and small signs. However, McCarthy is permitted to charge admission fees to users of his land.

McCarthy applied for a zoning re-classification so he could build single-family homes on his land. The city refused his application and McCarthy has filed suit. McCarthy claims that the ordinances reduces the value of his land. Even though he could charge admission fees to his beach, his land would be worth more if he could build homes on it. Thus, McCarthy argues, the city is taking his land without just compensation.

City officials argue that recreation is the most reasonable use of the land, and has been so used for several decades. In addition, the area is subject to flooding and any residences will have to be built on pilings. The safety of these structures is questionable. Further, illicit and immoral activities could take place under the pilings, causing a police problem. City officials conclude that the regulation is reasonable and helps protect the general health, safety and welfare of the community.

Reading III-12

MORRIS COUNTY LAND IMPROVEMENT COMPANY v. PARSIPPANY-TROY HILLS TOWNSHIP

A New Jersey regulation has created a Meadows Development Zone for a section of a 1500 acre swamp lying within the Parsippany-Troy Hills Township. The regulation attempts to provide flood protection and prevent extensive development in the area. Land uses permitted within the zone include various agricultural uses, limited residential uses, outdoor recreational uses, public utility transmission lines, radio or T.V. transmission facilities, township sewage treatment plants, and water supply facilities.

The Morris County Land Company owns 66 acres within the meadows zone. The Company wants to fill the land, but their permit request was denied.

The Company has filed suit claiming that the land has to be properly filled before active uses can even be considered. They also argue that since many of the permitted uses are public, these objectives should have been met through the power of eminent domain. Therefore, they maintain that through land use regulation, the township has taken their land without just compensation.

Township officials disagree. They argue that the area serves as a natural over-flow basin in times of flooding. To allow it to be filled in would increase damage from floods, and therefore harm the public safety and welfare.

Reading III-13

JUST v. MARINETTE COUNTY

In 1961 Kathryn and Ronald Just bought 36 acres of land along a lake in Marinette County, Wisconsin. They planned to keep part of the land for personal use and to sell the remainder of the land. Between 1964 and 1967, the Justs sold five parcels of land. The Justs then planned to haul in sand to fill in the remaining shoreline area.

In 1967 Marinette County adopted a Shoreline Zoning Ordinance designed to protect navigable waters through shoreline regulation. One provision of the regulation requires a permit for filling, draining or dredging wetlands. The intent of this regulation is to protect wetland areas from activities that would seriously alter their natural state.

Six months after the ordinance went into effect, Ronald Just hauled in 1,040 square yards of sand without a permit. He filled an area 20 feet wide along the shore. The Justs were cited for a violation of the Shoreline Zoning Ordinance.

Kathryn and Ronald Just now bring suit charging that regulations prohibiting them from filling their property substantially reduce the value of their land. Without filling, they argue their land is economically worthless. They maintain this constitutes a taking of their land without compensation.

Marinette County officials argue that wetlands in their natural state are valuable resources. They claim that filling of these areas will harm the public welfare and is not a reasonable use of the land.

GROWTH AND THE ENVIRONMENT --

THE CASE OF FLORIDA

FLORIDA 1821-1900

This story begins in 1821 when the United States raised its flag over a new acquisition- the territory of Florida. The federal government's first order of business: rapid settlement by Americans. Blessed with abundant rainfall and a mild climate, Florida offered many enticements to new settlers. On the other hand, Florida offered many discouragements as well.

Large numbers of Seminole Indians inhabited the Florida territory and bands of Caribbean pirates headquartered within the coves along the southern Atlantic coast. The land itself presented obstacles as well. Thick stands of mangroves formed almost impenetrable barriers between land and sea, and salt marshes provided breeding grounds for malaria and yellow fever carrying mosquitos. Vast interior swamps and marshes inhibited travel and communication and were inhabited by poisonous snakes and large alligators. Hurricanes were an ever present threat. How could the U.S. government encourage settlement? Land had to be made available for cultivation, transportation systems developed, communities built. Florida had to be safe from the threat of Indians and pirates.

FIRST THINGS FIRST

Most pressing was the "Indian Problem". Indian land was needed for settlement. In 1823, the Seminoles were pressured to sign a treaty giving up all land claims in return for relocation on a reservation. By 1824, the treaty was ratified.

The next problem was ridding the Florida coast of pirates. After many efforts, Caribbean pirates were wiped out by Commodore David Porter who led his men, armed with rifles and cutlasses, into the swamp areas where the pirates hid.

Now the only problems facing Florida were the problems presented by the land itself. Over the next 150 years, the people of Florida set about the task of overcoming the environment-- only to find, in some cases too late, that they were destroying that which had first attracted them. In the following pages, you will find out something about what happened to Florida, and why.

THE NEW FLORIDIANS

Florida began to attract new residents almost at once. Land was available at little or no cost and with no restrictions on its use. Soils were good for growing cotton and citrus crops. There were rich timber lands and natural harbors. The land could be made productive at minimal cost.

The 1820's and 1830's were key years in establishing the economic base upon which Florida was to develop. Southern planters, looking for rich new soils to replace the exhausted lands they left behind, settled in the area around

Talahassee. Lumbering operations developed in the Pensacola region, making use of large inexpensive tracts of timberland. Oranges were cultivated in the highlands of northern Florida. Apalachiocola developed as the third largest port on the Gulf, serving not only Florida but Georgia and Alabama as well.

Florida grew quickly and by 1837 it had a population of 48,223. In 1845, Florida gained statehood.

MORE AVAILABLE LAND

Five years later, the U.S. government returned to the states all "swamp" and "sovereignty" lands it had held in trust for them. Florida's share was 20.3 million acres, approximately three quarters of present day Florida. Sovereignty lands included coastal shorelines, shores of navigable lakes, and the bottoms of all navigable water bodies.

The new state government declared that wetlands above the mean high water mark were to be made available for sale. Proceeds from their sale would be used to drain and reclaim swamp lands.

To organize and handle the sale and drainage of the lands, the Florida legislature created a managing agency, the Board of Trustees of the Internal Improvement Fund. Their first task was to survey the land. Making their way through swamps filled with mosquitos, alligators and snakes, and wading through coastal marshes covered with thick mangrove growth, surveyors inevitably made mistakes. In many cases, the high water mark was set lower than it should have been. As a result, much coastal land that should have remained public was made available for private purchase. Still, most of the land remained unsold especially in the undesirable swamp areas.

TRANSPORTATION

As Florida continued to grow, the Trustees of the I.I. Fund turned their attention to promoting railroad and canal building as well as drainage, reclamation, and settlement. The Board of Trustees sold bonds to finance construction and offered land grants to transportation companies for every mile of canal or railway track built. Soon miles of track and canal were under construction.

By 1900, population had increased to one-half million but now the people of Florida began to feel a new concern. The railroad companies, large corporations, and a few wealthy individuals had amassed tremendous power. They were gaining control over many of Florida's resources. Many Floridians feared that control over the future of their state was slipping away from them.

FLORIDA 1900-1940

During the years 1900-1940, population quadrupled--increasing from 528,542 in 1900 to 1,897,414 in 1940. Growth occurred in all major areas of the economy-- in agriculture, in citrus production, in the lumber and pulp industries, in mineral extraction and in tourism. The plentiful resource base of Florida and state and local policies encouraging maximum resource use were prime factors in this growth.

Still, at the turn of the century, there was discontent. Too much power was concentrated in the hands of the large railroad conglomerates and the political interests that supported them. The people of Florida wanted a change. In 1901, a liberal reform governor, William S. Jennings, was elected governor.

A PROGRESSIVE PROGRAM FOR FLORIDA

Jennings promoted a progressive program with three goals: 1) to control the railroads, 2) to turn over remaining public lands to the people, and 3) to establish agencies with power to regulate in the interest of the general public. To carry out his public lands program, Jennings proposed to drain the Everglades. Support grew for this plan, and between 1906 and 1929, four hundred and forty miles of drainage canals and levees were built by the state at a cost of 18 million dollars. In addition, a maze of subsystems were built at local initiative and expense.

Within a few short years, the custard apple swamps and moon vines characteristic of the south lakeshore of Lake Okeechobee gave way to sugar cane, winter vegetables, and beets, in a rapidly growing Everglades agricultural area. It appeared that the Everglades drainage project had been a success.

The progressive program also brought the first establishment of state and local agencies to oversee and regulate use of the state's resources. Responsibilities of these agencies included: 1) surveying resources, 2) educating the public about availability and best use, and 3) preventing, through regulation, monopolies on uses and practices detrimental to the availability of these resources for economic and recreational use.

It seemed that these agencies represented a big step forward. There were now procedures for controlling use of the environment. In actuality, while regulations were applied in some instances, the larger effort was devoted to making the resources available for growth and development. Brochures, pamphlets, news releases and field agents encouraged Floridians to develop more enterprising ways to use resources. One of the most enterprising was coastal landfill.

LANDFILL

One day in 1909, a man by the name of Fisher lost his temper when he saw a pile of trash and rotten grapefruit that had collected aroun his dock. He hired a dredge to scoop up a protective point around it. When he saw how inexpensively he had created new shoreland, it triggered his imagination. He decided to focus upon the Miami Beach area, and envisioned an entire city complete with hotels and polo fields. He set about making this dream a reality.

At the time, Miami Beach was a long, narrow strip of land bordered on the Atlantic side by a

ridge of low dunes and on the bay side by a wide belt of tidal flats covered with red mangroves.

To realize his dream, Fisher needed to expand the beach. The state held title to all the bottomlands beyond the mangove shoreline. To carry out dredge and fill, he needed permits from both the state of Florida and the Army Corps of Engineers. Not only did the state grant the permit, it offered to give Fisher all the free fill he wanted. Approval from the Army Corps of Engineers was so certain that contracts were let and dredges sent to Miami a week before the necessary approval papers arrived.

During the Florida land boom of the 1920's, Fisher and his partners made land sales of $23 million in a single year. Their example encouraged other promoters to exploit dredge and fill opportunities. New islands were created in Biscayne Bay and large areas of coast along both the Atlantic Ocean and the Gulf of Mexico were remade. The original landscape was erased as if it had never been and a more saleable one built in its place.

NATURE STRIKES BACK

The reformers sought wider economic opportunities for the people of Florida, more democratic government, and less resource monopoly. They did not believe bigger was better, but they did believe in progress, and that meant continued growth and development. The role of government was to intervene in the market system only when competition needed to be restored. Restoring the "environment" was another matter and the idea of "coastal ecology" was unknown.

The new regulatory agencies responded to problems only as they arose. They had no comprehensive program with periodic review and revision. New laws and regulations were issued to meet new situations and frequently conflicted with previous laws and regulations. Agencies found themselves in the position of being responsible for enforcing numerous laws and regulations which were out-dated, contradictory, and in many cases, in conflict with new research on results of resource use. In short, the agencies were not equipped or able to regulate effectively.

The inadequacy of the reform outlook was revealed tragically in the unhappy aftermath of the great Everglades drainage project. Torrential rains and heavy flooding came in the 1920's, wiping out commercial farm profits and causing severe loss of life. The man-made canals and levees were impressive engineering feats but could not prevent flooding.

New problems came in the 1930's. The canals and levees over-drained in times of drought. Over-drainage became severe and produced swamp fires, soil destruction, and a lowering of the underground water reserve, resulting in the emergence of salt water in fresh water drinking supplies along the Atlantic Coast.

Clearly, something had to be done. Water levels had to be managed better through periods of heavy rainfall and continuing drought. Just what it was that needed to be done was not so certain.

By the 1940's, people began to realize the dangers of growth and development without restriction. Development along coastal shores and in bays polluted coastal waters,destroyed prime fishing grounds and altered circulation and flushing patterns. Destruction

of mangrove areas eliminated a natural barrier against coastal hazards such as hurricanes, destroyed estuarine nursery and breeding grounds and permitted the intrusion of salt into coastal soils, replacing fresh water marshes with salt water zones. Disposal of domestic sewage either directly into nearby water bodies or through septic tanks and the disposal of agricultural and industrial wastes directly into streams, rivers, and coastal waters destroyed fish and caused eutrophication of major water resources.

There were public outcries and demands for new laws and more specific regulations, but resources were still so abundant and unbridled growth so profitable that promises of reform were much more frequent than actual laws and restrictions. Benefits from growth were immediate and real. Environmental concern seemed unimportant compared against jobs and business success. The process of growth, development and consequent enviornmental damage went on.

FLORIDA 1945-PRESENT

Following World War II, a post-war economic boom was felt throughout the United States. Factories were converted back to production of consumer goods, and the American people pressed for new cars, homes, and vacation travel denied them during wartime. This post-war surge of growth and expansion benefited Florida in particular.

TOURISM

With air travel now an accepted mode of transportation, the airline industry used glamour advertising and easy credit terms to make air travel the dream of the American middle class. Florida was an obvious destination. Within a few years, airlines offered night coach flights at reduced rates and Florida hotels offered a summer as well as a winter season. Tourism expanded rapidly.

Overcrowded resorts created a rush to construct large new hotels--as close to the waterfront as possible. At Miami airport, the number of domestic passengers jumped from a little over a half-million people in 1947 to well over a million just four years later.

The rise in automobile ownership, highway construction, and auto travel also fed the tourism boom. As many people began arriving by car as by plane. Motels sprang up throughout Florida and soon outnumbered hotels. From 5 million tourists in 1952, the figure bolted to 25 million by 1972, representing a 500% increase in just 20 years. In Orlando, Disney World alone attracted 22 million visitors in its first two years of operation.

LAND SALES AND POPULATION BOOM

Resident population also grew dramatically, as Florida increasingly became seen as an attractive place to live. Land companies launched major promotional campaigns across the country emphasizing climate, environment, year-round boating, fishing, swimming, and inexpensive living. People responded, purchasing unimproved land, homesites ready for building, and homes in planned communities. Commerce and industry were also enticed, by the prospects of new opportunity, available land for expansion, and low labor and construction costs.

From a state with fewer than two million residents in 1940, Florida's population grew to almost 5 million in only 20 years. With the greatest demand for property along coastal areas and inland lakes and river, land values in these locations skyrocketed. An area known as the Galt Ocean Mile, which had been valued at 1½¢ per ocean-front foot in 1890, was worth $5,000 per front foot in 1968. Today it is worth still more.

The demand for more land grew. The state responded between 1956 and 1967 by selling 28,000 acres of publicly owned submerged land to developers to be dredged and filled for private use. Total land value of Florida rose from $2 billion in 1940 to $51 billion by 1970.

The opening of Disney World attracted thousands of new retired residents, creating a totally new urban belt in central Florida. By 1973, the population had reached 7.8 million, with 6,000 new residents per week moving into Florida.

ECONOMICS AND ENVIRONMENT

The tourist and population booms combined with the availability of comparatively cheap land and labor to accelerate the growth and development of Florida's commercial, industrial and agricultural enterprises. Florida's new prosperity raised the average gross income of the Florida resident from $4,608 in 1955 to $11,115 by 1965. While the people of Florida enjoyed greater material wealth, more leisure time and a higher standard of living, the devastating effects upon the environment were accumulating.

In their eagerness for growth and exploitation of resources, Floridians failed to heed the warnings of conservationists. Permits for site development and construction were issued with inadequate concern for the ecological sensitivity of the land. Hotels were built below the high tide line. Dredge and fill permits were easy to get and were issued with little thought toward future effects. Mangrove swamps and salt marshes were destroyed with apparent unconcern for the consequences. Wildlife was endangered or destroyed. Estuaries were polluted by waste disposal and shorelines were seriously eroded.

Agricultural producers continued to be permitted to alter drainage patterns and deposit agricultural wastes in lakes and coastal waters. Drainage of wetlands caused oxygen levels in lakes to decrease and lowered water tables, leading to more intrusion of salt water into fresh water marshes and wells supplying drinking water. Nutrient runoff from agricultural lands contributed to further degradation of water quality.

Industry added to the pollution. Industrial polluters of waterways were given immunity from the few pollution laws that existed.

Nassau County was declared an "industrial county" in the 1940's. At that time, the state legislature declared that discharge of sewage and industrial wastes was "in the public interest". Paper mill wastes destroyed shrimp beds and pollute the Amelia River. The once beautiful Fenholloway River in Taylor County on the Gulf was declared an industrial sewer for a cellulose factory.

Phosphate wastes did heavy damage to the Peace and the Alapia rivers. Three separate times between 1960 and 1967 earthen dams near the Peace River broke, causing slime stored behind to run into the river, killing all plant and animal life in its path. The emission of gaseous fluoride from the phosphate plant caused air pollution and destroye crops and animals in Polk County.

DEMANDS FOR REFORM

Environmentalist groups increased their pressure for reform. Three concerns were paramount: 1) many communities were making decisions that affected not only their own areas but which had spillover effects into neighboring areas and beyond; 2) development plans needed to be set to guide growth and provide for both the use and the conservation of natural resources and 3) specific practices (such as the sale of submerged lands, issuance of dredge and fill permits without biological/ecological studies, and construction below the mean high water mark) needed to be stopped.

Clearly, a set of guiding

principles was needed which considered more than the interests of each separate locality. Reform did start at the local and county levels, however, in the 1950's. In 1967, the governor and the state legislature cooperated to pass legislation empowering the state to assume responsibility for guiding the further growth and development of Florida.

The governor established a Natural Resources Committee, and the legislature created a Pollution Control Board with the authority to issue or deny permits and to enforce compliance with pollution control standards written into wastewater discharge permits and dredge and fill permits.

Another 1967 law required a biological survey before tidal lands could be filled, altered, or used as a source of fill. The sale of state-owned submerged land was banned except where it could be proved to be clearly in the public interest. Outer limits for waterfront development were established as were criteria for the issuance of waterfront building permits. Though decisions on waterfront development would continue to be made at the local level, they would be subject to State Cabinet review and approval.

These measures were a solid beginning for effective resource management. In 1970, the Florida Legislature established a Coastal Coordinating Council and instructed it to prepare a separate development plan for the coastal areas of the state. In 1972, the legislature enacted a comprehensive land and water management program.

Conscious control of the Florida environment was now taken seriously. Through planning and proper management, Floridians hoped to rescue their environment without ending all growth. Whether these hopes will succeed, only future generations will know.

DO CHEMICALS AND CAROLINA MIX?

In recent years, many European companies have built plants along the Atlantic coast of the United States. Many U.S. markets, including New York, Philadelphia, Boston, Washington D.C. and Atlanta are situated on or near the east coast. Rail and highway transportation to the rest of the country is easily reached. Further, an east coast location provides the shortest sea and air transport lines between the U.S. and Europe.

A West German chemical firm, Badishe-Analin and Soda Fabrik Co.(BASF), recently announced plans to build a large industrial complex somewhere on the Atlantic coast. Three southeastern states particularly interested BASF: Georgia, South Carolina, and North Carolina. BASF needed almost 2,000 acres of land, 5 million gallons of fresh water daily, close proximity to a railroad and a harbor, and an adequate labor supply. These states were interested in BASF because new factories provide more jobs, plus increased tax revenues.

After examining 20 possible sites, BASF decided to purchase land in the Beaufort area of South Carolina. There was enough land available near the Colleton River, and state officials agreed to provide adequate harbor facilities.

Several state and local officials expressed great pleasure that BASF would locate there. Many people in this region were unemployed or had low-paying jobs. However, in the weeks following the Beaufort announcement, several groups declared opposition to the BASF project. They cited environmental problems and threats to nearby fishing and resort industries.

Now a difficult decision had to be made. Should BASF be allowed to locate in the Beaufort area?

FACT SHEET

BADISHE-ANALIN AND SODA FABRIK CO. (BASF): The following information outlines the case from BASF's point of view. The company emphasizes the economic advantages to Beaufort in accepting this proposed complex:

1. Investment in the new plant will be approximately $100 million.

2. The plant will employ 1000 people.

3. It is predicted that the plant will bring in to the community an additional 5000 to 7000 jobs.

4. Long term investments by BASF will involve other installations to follow the first plant (e.g., a $98 million petro-chemical plant will be built in two years.)

5. Two million dollars will be spent in the construction of these plants over the next 6 years; 3000 construction workers will be employed.

6. BASF will treat all wastes. The quality of the Colleton River will not be damaged.

FACT SHEET

GOVERNOR'S DEVELOPMENT COMMITTEE: This information presents reasons why the leading officials in the Governor's office are generally in favor of BASF.

1. South Carolina officials predict a business recession for the next two years. BASF development will help reduce the impact of this recession since it will be located in an area where unemployment is already high.

2. The goal of the South Carolina Development Board is to bring in new industrial developments totally $500 annually. The coming of BASF will substantially help to meet this goal.

3. The state government will construct a 13 mile railroad, a four-land highway, and new docking facilities for BASF. Not only will this help BASF, but will also help promote other new business and industry to the Beaufort area.

4. State government will dredge the Colleton River so that large ships can load and unload near the BASF plant. The Colleton River facility will be available to other industrial companies as well.

5. Some job losses and other economic setbacks may occur in the fishing and resort industries as a result of pollution problems produced by BASF. But, these losses will be more than made up by the larger number of jobs available at the BASF complex. BASF jobs will also pay more than most other jobs in the area.

6. BASF has promised to meet all state guidelines with regards to pollution standards.

FACT SHEET

COMMITTEE FOR THE PROGRESS OF POOR PEOPLE (CPPP), a popular civil rights organization in the Beaufort area favors BASF. It feels that the economic situation is very poor, and without new businesses coming into the area, the situation will not get any better. The following reasons explain this viewpoint:

1. Living conditions in the Beaufort area are very bad for many of its citizens:
   a) Housing conditions are far below the state average. Almost 50% are classified as either "deteriorating" or "dilapidated". In many cases, houses have no doors, broken windows, no indoor toilets, etc.
   b) Over 50% of the people in the Beaufort area earn less than $3,000 a year.

2. Employment opportunities in the Beaufort area are not good:
   a) Farming is not profitable. The soil is of poor quality.
   b) Tree farming and the timber industry have grown in this area, but wages for forest workers and paper mill workers are generally low.
   c) Most of the jobs in the resort business are low income with seasonal variations. Lay-offs are frequent. Most jobs are for maids, cooks, waiters, janitors and groundskeepers. The opportunities for employment fluctuate and wages are low. There is practically no chance for advancement.
   d) There is a serious lack of manufacturing jobs in the area.
   e) Fishing and fish processing do provide jobs in the Beaufort area, but employment in fishing has fallen sharply in the past decade. Moreover, wages in the fishing industry are usually low, and fluctuate widely during the course of the year.

3. The CPPP feels that even though some jobs may be lost in the fishing and resort industries as a result of the pollution, the quality of jobs and the large number of jobs at BASF will make up for these other losses.

Reading IV-3

FACT SHEET

RESORT INDUSTRY ASSOCIATION: The owners of Hilton Head Resort, a very popular and exclusive resort complex, and the owners of other resorts in the Beaufort area are against BASF. The main objections of the association are based on the fact that nearby industry in an established resort area can mar the attractiveness of the region and thus have a negative influence on potential tourist dollars.

1. Employment totals over 1,000 in the resort business.

2. Over 100 business conventions are held on Hilton Head Island each year. Projections are for a considerable increase in convention business over the next few years.

3. Fripp Island, on the northern edge of the Colleton River Estuary, is just now being developed. It will become a prime site for resorts and housing.

4. The effluent from the BASF plant, of 2.5 million gallons a day, will have considerable impact on the Colleton River. Even if it is treated, as BASF says, the threat of pollution is serious. Air pollution may also be a problem.

5. BASF has never presented its final plans and drawings for their proposed sewage control system.

6. BASF plants in West Germany and Belgium have polluted rivers in those countries.

7. Large chemical plants and other kinds of factories located in this area will ruin the quiet, scenic beauty of the area. Fewer people will want to come for vacations.

8. Hilton Head Resort owners strongly believe that the entire resort industry will suffer if BASF is built. Possibilities of air pollution, water pollution and the visual nightmare of industrial blight are very real.

FACT SHEET

REGIONAL MANAGEMENT AGENCY: This information describes the impact of BASF on the Beaufort area. Population, economic and tax factors are presented. Generally, this agency is in favor of the BASF project.

1. Population in Beaufort will increase by 3,600 people.
2. Per capita income will rise $3,000. This means a $3,000 increase, on the average, for all citizens of the Beaufort area.
3. Thirty new retail establishments will be built.
4. A $3,300,00 increase in retail sales throughout the Beaufort area is expected anually.
5. One thousand additional households will be created.
6. An increase of 910 schoolchildren will be added to the community.
7. There will be an increased demand for highways, schools, hospitals, water and sewage facilities, and better police and fire protection.
8. County and municipal government in the Beaufort area will have to raise funds to expand and develop the services listed in #7. More tax dollars will be needed.
9. BASF will receive a 5 year tax exemption granted to all new manufacturing facilities in South Carolina. After this period, taxes paid by BASF will amount to $1 million per year.
10. During the first five years taxes will have to come from other sources. We predict that the taxes from the new homes and businesses built in the next few years will be enough to cover the costs of the new public services.
11. Only a small number of manufacturing jobs are presently available in the Beaufort area.

Reading IV-3

FACT SHEET

ENVIRONMENTALISTS: Some people, including scientists and other concerned citizens, fear that BASF's new plant will seriously damage the environment. Following are several reasons for this opposition:

1. The warm estuarine waters of the Colleton River have long yielded a bountiful supply of oysters, shrimp, crab and other commercial sea food.

2. The Colleton River estuary is one of two unspoiled estuaries remaining on the entire east coast.

3. Sixty-two percent of the state's shellfish are caught in this area.

4. Water temperature changes are likely to affect supply of food and natural enemies of the main organisms in the Colleton River.

5. Dredging the river could damage a) the Beaufort water supply, and b) the oyster beds and shrimp industry.

6. Two and a half million gallons of effluent will be pumped daily into the Colleton River; even if it is treated (as BASF says it will do) this large amount will still have an impact.

7. BASF plants in West Germany and Belgium have polluted rivers there.

HIGH STAKES FOR EAST COAST COMMUNITIES

THE ATLANTIC OIL SWEEPSTAKES

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The continental shelf is the "front porch" of the United States. Stretching away from the shoreline along the Gulf, Atlantic, and Pacific coasts, the water of the shelf is shallow, nutrient-rich, and teeming with fish. Nearly 90% of all the fish we eat are caught in this valuable "front porch."

Beneath the continental shelf lies other kinds of wealth: oil and gas. These resources may possibly provide important new energy sources for a nation sorely in need of additional petroleum supplies.

One oilman says, "The future of the world's oil industry lies under water." The oil industry already pumps over 20% of the world's oil supply from continental shelves. Along the Gulf of Mexico and off the California coast, oil companies have operated oil rigs for many years. Some 160 platforms dot the Gulf, one-third of all those operating in the world.

New areas of the U.S. continental shelf are now being made available for oil exploration. After long court battles, the U.S. Department of Interior, finally gave the go-ahead for drilling in 1977. The Environmental Protection Agency has approved drilling permits for 10 companies. Primary areas for investigation are the Baltimore Canyon(about 100 miles east of Delaware and New Jersey) and the Southeast Georgia Embayment(a similar distance off the Georgia coast). Other new areas likely to see oil exploration are the Georges Bank area off Massachusetts, and new sites in the Gulf of Mexico and off the Pacific coast.

How much oil is in the shelf, and whether the oil companies can extract it are unknowns at this point. But the odds are high enough that companies like Exxon will be betting up to $100,000 a day for the exploration gamble. In the Baltimore Canyon alone, the oil sweepstakes could yield as much as 1.4 billion barrels of oil and 9.4 trillion cubic feet of natural gas.

The possibility of a major oil discovery is enough to make many areas along the east coast take a serious look at the possible impact of this "good fortune." For several communities, the results of the "Atlantic Oil Sweepstakes" may mean more than just plentiful oil and gas. What happens if these drillers strike it rich?

Oil rigs must be fed--with supplies, with people, and with many other important support services. And, in turn, when oil and gas are produced, they must be sent ashore somewhere to be refined, processed, and transported

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"THE FUTURE

OF THE WORLD'S OIL INDUSTRY

LIES UNDERWATER"

---

to eager customers. Where will these activities be located? How will all of this affect the shoreline of many East coast communities? A look at three areas along the Atlantic seaboard gives some idea of the kinds of opportunities and problems they may face if oil comes to town.

RHODE ISLAND

For many communities in this small state, the possible oil bonanza may be the solution to some serious economic problems. The U.S. Navy recently closed down bases in the state; at Davisville, the Navy pulled out leaving behind warehouses, fueling piers, landing strips, a deepwater port, and many unemployed civilians.

Several city and state officials, including the Governor, convinced oil companies to use the Davisville facilities for supply headquarters during the two to three years of exploration.

Over 30 support companies have moved into Davisville; Rhode Island expects $50 million a year from the Davisville business. In addition, major discoveries in the Baltimore Canyon could mean 2,000 more jobs for local people.

CAPE MAY, NEW JERSEY

There is a community slogan that describes Cape May: "The Nation's Oldest Seashore Resort." Six American Presidents, including Lincoln, have vacationed there. Located on the Southern tip of industrial New Jersey, less than three hours from the New York-Philadelphia urban belt, Cape May is a playground-home to some 750,000 tourists and residents in the hot, humid summer months.

The resort industry is responsible for 90% of the economy in Cape May. Says one local official, "Cape May's economic base is inextricably bound to a high quality natural environment.

60 MILES AWAY, OIL DRILLS BITE INTO THE CONTINENTAL SHELF

By virtue of geography, Cape May may also be bound to the oil boom on the East coast. 60 miles away the oil drills bite into the continental shelf; if oil is found it must be transported to the mainland, and the Cape May area is the closest--and thus cheapest--point. Oil companies have already expressed interest in Cape May as a likely location for a deepwater port. New refineries have been considered. Industrial construction and port activities in this region could bring in 30,000 new jobs by 1985.

Planners in Cape May County consider these potential additions to their community: refineries, natural gas processing and treatment plants, temporary and permanent support bases, steel platform fabrication yards, pipelines, tanker and pipeline port facilities, and pipe-coating yards.

Their analysis predicts that such activities will damage the resort industry and seriously alter the marshland environment that makes up one-third of the county shoreline. An official planning study, conducted in 1977, found "clear opposition" to the development of oil related facilities within Cape May County.

As a result of these and other findings, planners for the county

recommended that the only oil support facilities permitted in this area be 1) a helicopter base at an existing airport, and 2) a small, temporary service base in Cape May Harbor.

CAPE CHARLES, VIRGINIA

15,000 people inhabit this quiet coastal town, located near the tip of the Delaware Peninsula. An agricultural community--a "truck farming town" one resident called it--Cape Charles faces a major decision brought on by the Atlantic oil sweepstakes.

Brown and Root, one of the largest oil rig construction firms, purchased 2,000 acres near Cape Charles for a new construction site. If Brown and Root moves in, it is likely that related industries will follow. One firm, El Paso Gas, has already taken an option on an adjacent piece of land for a natural gas port facility.

The County Board of Supervisors must OK zoning changes from "agricultural" to "industrial" before these new facilities can be built. The Mayor supported this change, arguing that the new oil industry will help the prosperity of the county which has never really recovered since the great depression of the 1930s. 2,000 new jobs would result from the Brown and Root complex alone.

IN CAPE CHARLES, THE MAYOR AND MOST CITIZENS FAVOR THE OIL FACILITIES

The majority of the citizens in the area favor the zoning changes. In recent county elections, all candidates who favored Brown and Root won.

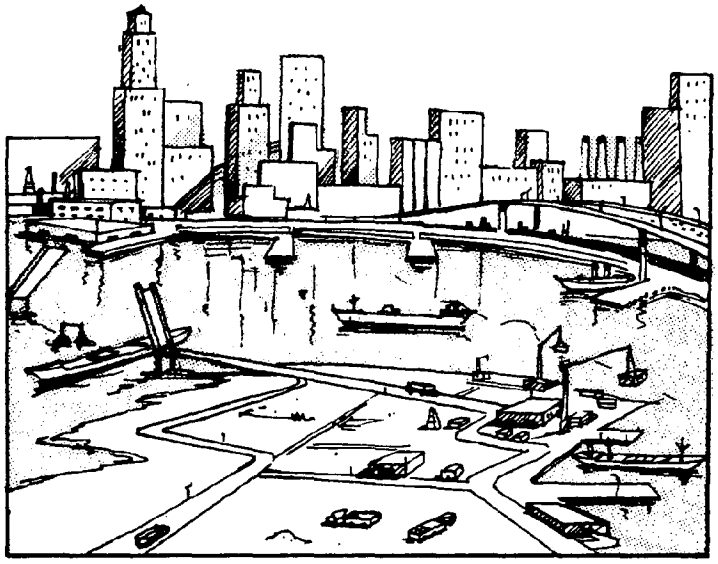
However, there is some criticism of the oil facilities. Opposition to the zoning changes comes from farmers, who are afraid of losing their relatively cheap labor supply to the new, higher-paying industries. Many long-time residents of the area fear the industries will completely end their quiet life style, plus cause a big change in who controls local politics.

Despite the opposition, the zoning change won approval from the county supervisors. A farmers' organization challenged the decision in the court and the Virginia Supreme Court is presently considering the case. In the meantime, the citizens of Cape Charles wait and debate the issue, wondering if oil will be discovered, and how their community will react to the changes.

BOSSTOWN HARBOR

PLANNING CONFERENCE

CONFERENCE PROGRAM



Conference Site: The Classroom Inn

A MESSAGE FROM THE GOVERNOR

Office of the Governor
1776 Freedom Road
Bosstown, Atlanticoastate 12345

Dear Conference Delegates,

I welcome you to this conference on the future of Bosstown Harbor. Let me share with you a few of my thoughts and some facts and information before you begin your work.

Natural harbors are one of the major resources in the coastal region. When developed into seaports, they contribute significantly to the economy of port cities, and surrounding areas as well. Nationally, U.S. seaports handle over one billion tons of cargo a year, and provide jobs for over one million people.

At the same time, however, many pressures are being put on our harbor areas. Technological change is sweeping through the shipping industry, port cities like Bosstown are expanding with land values skyrocketing, inner-city waterfront areas have become prime targets for urban renewal, environmental awareness and concern has increased, and citizens everywhere are demanding improved recreation facilities.

We therefore have to ask ourselves some very important questions. How should port managers respond to the new methods and patterns of shipping? Should run-down waterfront areas be bulldozed and modernized, or restored? Is clean water more important than low tax rates or jobs? These are only some of the questions you will be confronting at this conference.

The recommendations which come from this Bosstown Harbor Planning Conference will have a significant impact on all our futures. Delegates, do your work well.

Sincerely

J.P. Undertowe III
Governor

CONFERENCE PURPOSE

The purpose of this conference is to recommend management policies for governing Bosstown Harbor during the next several years.

CONFERENCE SCHEDULE

SESSION 1	Meet in your separate delegations to discuss your positions on the conference issues.
SESSION 2	Form two Task Force groups composed of representatives from each of the delegations to deal with the major issues surrounding planning for future INNER HARBOR and OUTER HARBOR uses.
SESSION 3	Meet again in your original delegations to produce a conference report and evaluation.

CONFERENCE ISSUES

HARBOR EXPANSION AND MODERNIZATION--Is new port development wise or wanted?

REDEVELOPMENT OF BOSSTOWN WATERFRONT--Should the area be restored, or should it be torn down and rebuilt into a modern business center?

POLLUTION CONTROLS--Are present standards adequate? Can we afford to "clean up" the harbor's waters?

ENERGY DEVELOPMENT--Is a new deep-water port facility for oil tankers and additional oil refineries needed?

PUBLIC RECREATION--Should the harbor's islands become public recreation sites? Can we afford new sewage treatment plants to protect our public beaches for swimming?

ROLE OF FEDERAL GOVERNMENT--Should the federal government step in to require better planning procedures, and to protect national interests in coastal resource use?

CONFERENCE PARTICIPANTS(DELEGATIONS)

BOSSPORT(Bosstown Port Authority)

BOSSPORT manages the Port of Bosstown and Hogan Airport. BOSSPORT has major new proposals for the harbor area, and will present these at the conference.

BURP(Bosstown Urban Renewal Program)

BURP plans and implements urban renewal projects within the city of Bosstown. BURP has recently developed plans for extensive new urban renewal projects in the water-front district.

OFFICE OF THE MAYOR OF BOSSTOWN

The Mayor's office is vitally concerned about the future of Bosstown Harbor. Representatives from the Mayor's office support innovative, but politically sound planning options for Bosstown Harbor.

DNR(State Department of Natural Resources)

The DNR monitors and regulates activities within the state which affect the environment. Conditions in the marine environment and coastal recreational facilities are of concern to DNR at this conference.

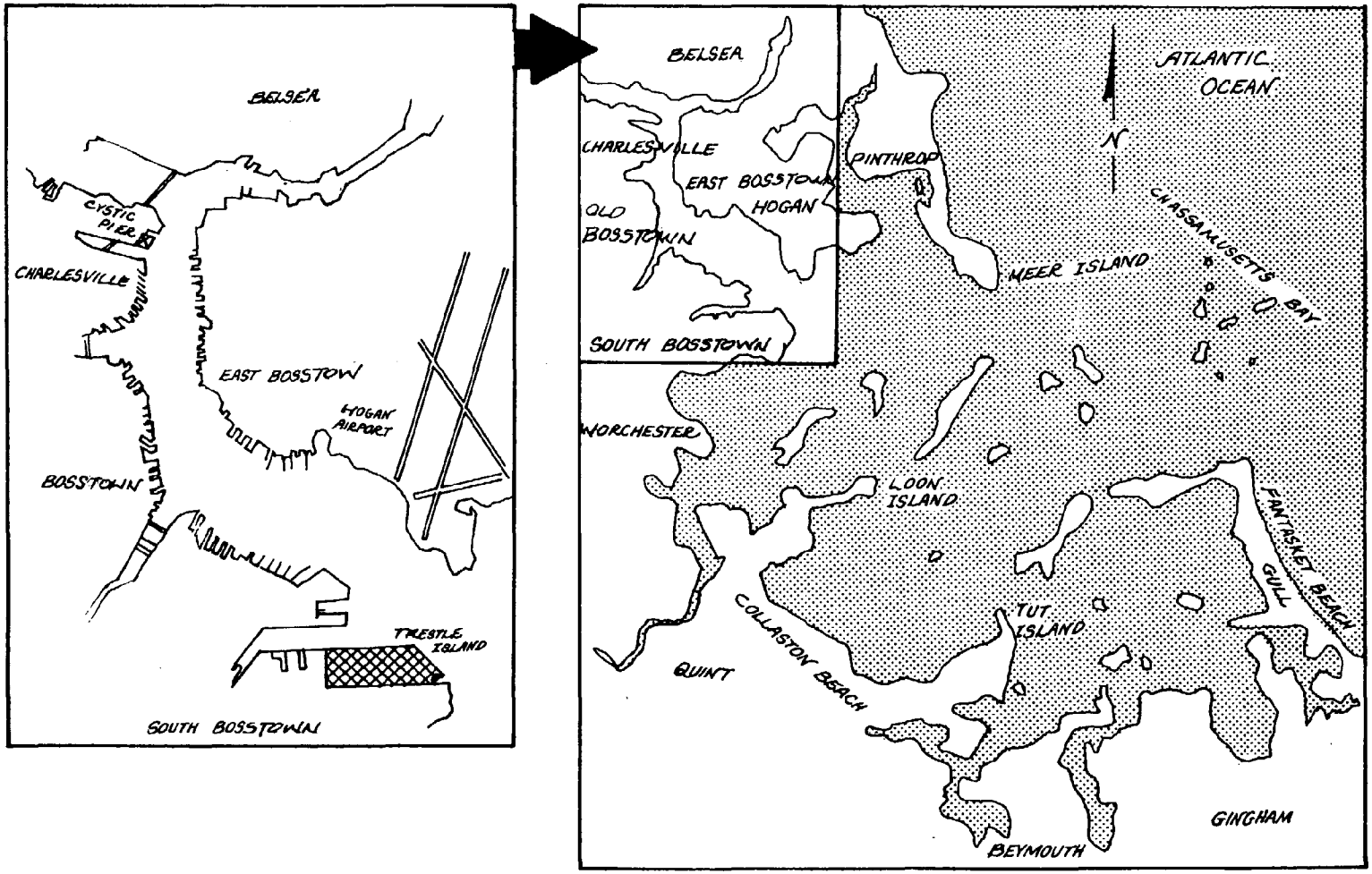
USBA(United States Business Administration)

USBA represents the federal government at this conference, and is concerned about the ability of local and state officials to effectively work together. The federal government sees Bosstown Harbor as a crucial link in the nation's port system.

CLEAN(Citizens League for Effective Action Now)

CLEAN is a public interest group which has been active for some time in preservation of historic neighborhoods and the fight to stop pollution in Bosstown. CLEAN is committed to representing the needs of the public at this conference.

BOSSTOWN HARBOR: Bosstown has a first class natural harbor, encompassing 47 square miles of water, 180 miles of tidal shoreline, and 30 islands. It is also the American port closest to Europe. The section running through Bosstown itself is called the INNER HARBOR, and the rest, the OUTER HARBOR. A large metropolitan area containing over 2.5. million people borders the entire harbor.



INNER HARBOR (ALL COMMERCIAL PORT OPERATIONS IN THIS AREA)

OUTER HARBOR (DARKENED AREA)

"BOSTON HARBOR: THE REAL THING"

INNER HARBOR ISSUES

1. MASSACHUSETTS PORT AUTHORITY (MASSPORT/"BOSSPORT") DEVELOPMENT PLANS

In the face of united and vocal opposition to its plan for container terminals in the historic district, MASSPORT changed its proposed terminal site to the less desirable (from its point of view) South Boston Army Annex. MASSPORT constructed another container terminal at Charlestown ("Charlesville"). This facility has done well commercially and is now operating at full capacity. However, the nearby urban residents suffer in that they have to put up with truck traffic, lights, and noise at all hours.

Overall, the port's container facilities remain inadequate and much trade seems permanently lost to New York.

2. WATERFRONT REDEVELOPMENT

A militant waterfront residents' association and the Boston area Sierra Club filed suit in court to stop the original Boston Redevelopment Agency ("BURP" in the simulation activity) urban renewal plan for the Boston waterfront area. A review committee was appointed by the Boston Redevelopment Agency in 1973, and the renewal plan was modified along the lines proposed by "C.L.E.A.N." in the mock planning conference Task Force meeting.

By 1976, the population in the Boston waterfront district had grown to 3,400, and the well-designed grassy shoreline park which the city calls its "Walkway to the Sea" had become highly popular. A 1976 New York Times news article described the waterfront area "today, Boston's most glittering neighborhood."

3. ENVIRONMENTAL PROTECTION

The state legislature passed an environmental protection law in 1972 requiring submission of an environmental impact statement for all new projects in the state to "all reviewing agencies, and any state agency, department, board, commission, or division or authority which has jurisdiction by law or special expertise with respect to any environmental impact involved." After examining the written comments of all these reviewing bodies, the Secretary of Environmental Affairs then rules on whether or not the Environmental Impact Statement adequately and properly complies with the law.

4. FEDERAL PLANNING OF COASTAL AFFAIRS

The United States Congress passed a Coastal Zone Management Act (CZMA) in 1972 which addresses the concerns raised by the "U.S. Business Administration" proposal presented in each mock planning conference Task Force meeting.

OUTER HARBOR ISSUES

1. DEEPWATER OIL RECEIVING FACILITIES

MASSPORT could get little support for this project and finally shelved the idea. Now it appears that new developments in the shipping of oil by barge will make it possible to continue to supply oil through Boston Harbor for the foreseeable future.

2. PURCHASE OF HARBOR ISLANDS FOR RECREATIONAL USE

The state purchased the islands and they are highly popular recreation sites.

3. POLLUTION CONTROL

No substantial gains have been made. One still dares not swim in the Harbor.

4. FEDERAL PLANNING OF COASTAL AFFAIRS

See (4) under Inner Harbor issues.

RM: GROWTH PAINS

Following is a list of government agencies. What do you think they have in common?

Animal and Plant Health Inspection Service
Public Health Service
Food and Drug Administration

Community Credit Corporation
Bureau of Domestic Commerce
Bureau of International Commerce
Economic Development Administration
Maritime Administration
National Oceanic and Atmospheric Administration
Social and Economic Statistics Administration
Military Sealift Command
Military Traffic Management Command
Corps of Engineers
Community Planning and Management
Community Development
Bureau of Sport Fisheries and Wildlife
Geological Survey

Environmental Protection Agency
Export-Import Bank of the United States
Federal Communications Commission
Federal Maritime Commission
Interstate Commerce Commission
Immigration and Naturalization Service
United States Coast Guard
United States Custom Service

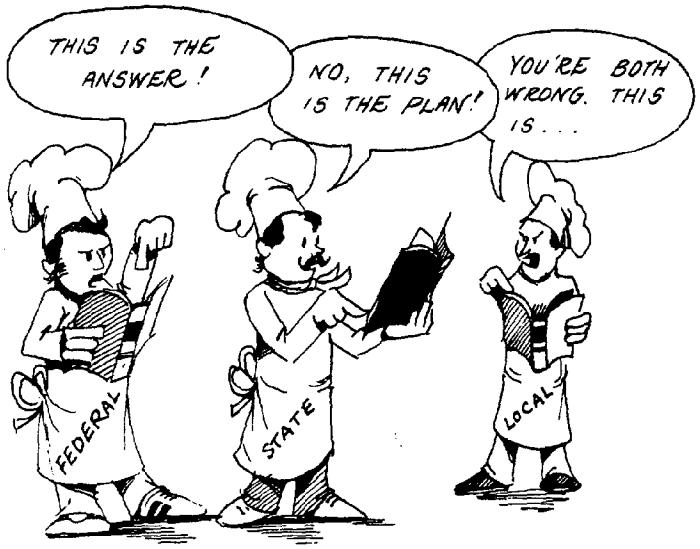
Office of Land Use and Water Planning
Office of Oil and Gas
Law Enforcement Assistance Administration
Labor-Management Services Administration
Employment Standards Administration
Occupational Safety and Health Administration
Secretary of the Department of Transportation
Federal Aviation Administration
Federal Railroad Administration
Urban Mass Transportation Administration
Saint Lawrence Seaway Development Corporation
Council on Environmental Quality
Council on International Economic Policy

Panama Canal Company
United States Tariff Commission
Water Resources Council
National Transportation Safety Board
Occupational Safety and Health Review Commission

These are all federal agencies which make regulations, oversee in some way, or finance the operations and future development plans of U.S. seaport areas. There are over 40 if you dared to count.

Your experience during the mock "Bosstown Harbor Planning Conference" probably showed you that the definition of proper management can vary greatly among decision makers. You can imagine then the "kaleidoscope" of interests and viewpoints that are represented within this list.

Federal agencies, however, are just the beginning. Legislative bodies at all levels of government enter the picture. There are also powerful regional, state, county, and local agencies and boards. Season with myriad public and private interest groups, individual concerned citizens, and a dash of elected officials and you have a recipe for complexity.

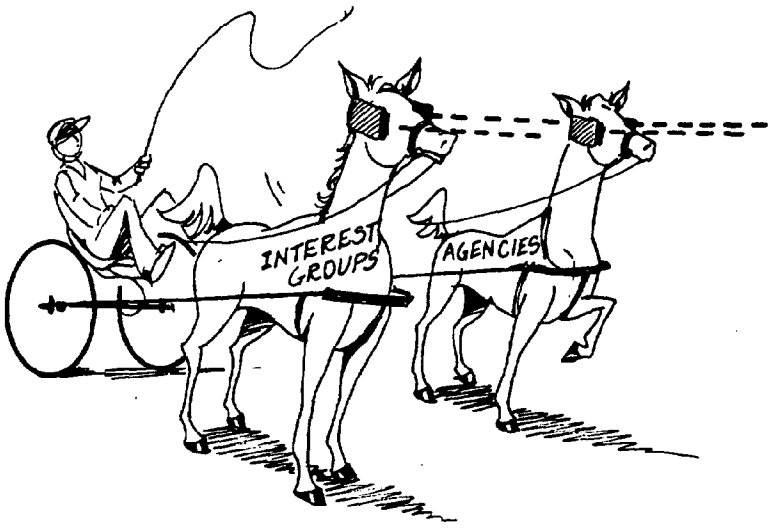


"...a recipe for complexity."

Your "Bosstown Harbor Planning Conference" was a very simplified version of the real situation. What is one unfortunate result of this complexity? Power, responsibility, viewpoints, and decisions on proper coastal resource use tend to <u>fragment</u> among dozens of agencies, advisory groups, legislative

committees, and individuals at all levels of government.

Often, each agency or interest group brings only its own narrow perspective to the coastal use debate. With so many planners and regulators involved in policy fomration and implementation, there usually develops poor communication among the decision-makers. As a result, public agencies frequently work at cross-purposes and the efforts of concerned citizens evaporate in the maze of bureaucratic manuevering.



"Often, each agency or interest group brings only its own narrow perspective to the coastal use debate."

In the late 1960's and early 1970's, environmental and regulatory legislation enacted at the federal, state, and local levels created many new programs and agencies. The desire to deal with immediate environmental problems often blocked percpetion of how important it was to coordinate management actions to create an effective management system.

What happened in the coastal state of Rhode Island is an example. By 1975, 36 state agencies had been created, each involved in some area of environmental protection. Yet according to critics, for all this new

involvement, the state did not have what one could call an environmental management policy. There was no unified, long-range, over-all approach to environmental issues and problems.

The Natural Resources Group, a private Rhode Island citizens organization, described the Rhode Island approach as "fragmented, piecemeal management." The Natural Resource Group criticized the spreading of responsibilities among three dozen agencies, claiming this caused resource management to be both less visible and less effective. This situation, they contended, drained both initiative and follow-through out of each agency, brought a tangle of conflicting laws and regulations, produced competition among agencies for money, and generated conflicts and inefficiency all around. Resource management is still experiencing growing pains.

THE COASTAL ZONE MANAGEMENT ACT OF 1972

The United States Congress endorsed coastal resource management in 1972 with the passage of the Coastal Zone Management Act(CZMA). Congress assigned responsibility for the administration of the CZMA to the Secretary of Commerce. The Secretary in turn designated the National Oceanic and Atmospheric Administration(NOAA) as the agency in the Department of Commerce to manage the program. Within NOAA, this responsibility came to reside in the newly created Office of Coastal Zone Management.

The CZMA expressed three major themes:

1) the need to give high priority to natural ecological systems;
2) the need to take a balanced approach between protection and development; and
3) the need for a coordinated government effort, with the states as the focus of the program.

Congress realized that a single over-all plan for the coast was not possible. In some areas, preservation and environmental protection would be most important. But in other areas, plans would have to support vital industrial and commercial activities.

To account for these differences, Congress knew that the individual states, not the federal government, would best be able to manage the shoreline. However, there would be certain general policies and guidelines each state would have to follow. These policies and guidelines are stated in the three major parts of the CZMA, "Findings," "Declaration of Policy," and "Operational Section."

Quoting the text of the Act, Congressional findings were:

(a) There is a national interest in the effective management, beneficial use, protection, and development of the coastal zone;
(b) The coastal zone is rich in a variety of natural, commercial, recreational, industrial, and esthetic resources of immediate and potential

value to the present and future well-being of the Nation;

(c) The increasing and competing demands upon the lands and waters of our coastal zone occasioned by population growth and economic development, including requirements for industry, commerce, residential development, recreation, extraction of mineral resources and fossil fuels, transportation and navigation, waste disposal, and harvesting of fish, shellfish, and other living marine resources, have resulted in the loss of living marine resources, wildlife, nutrient-rich areas, permanent and adverse changes to ecological systems, decreasing open space for public use, and shoreline erosion;

(d) The coastal zone, and the fish, shellfish, other living marine resources, and wildlife therein, are ecologocially fragile and consequently extremely vulnerable to destruction by man's alterations;

(e) Important ecological, cultural, historic, and esthetic values in the coastal zone which are essential to the well-being of all citizens are being irretrievably damaged or lost;

(f) Special natural and scenic characteristics are being damaged by ill-planned development that threatens these values;

(g) In light of competing demands and the urgent need to protect and to give high priority to natural systems in the coastal zone, present state and local institutional arrangements for planning and regulating land and water uses in such areas are inadequate, and

(h) The key to more effective protection and use of the land and water resources of the coastal zone is to encourage the states to exercise their full authority over the lands and waters in the coastal zone by assisting the states, in cooperation with Federal and local governments and other vitally affected interests, in developing land and water use programs for the coastal zone, including unified policies, criteria, standards, methods, and processes for dealing with land and water use decisions of more than local significance.

The declaration of policy written into the Act stated:

> The Congress finds and declares that it is the national policy (a) to preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations, (b) to encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone giving full consideration to ecological, cultural, historic, and esthetic values as well as to needs for economic development, (c) for all Federal agencies engaged in programs affecting the coastal zone to cooperate and participate with state and local governments and regional agencies in effectuating the purposes of this title, and (d) to encourage the participation of the public, of Federal, state, and local governments and of regional agencies in the development of coastal zone management programs....

The procedures written into the operational section of the CZMA stated how the states could develop their own plans and what guidelines they had

to follow. Congress authorized $9 million for states to use to help prepare their plans. The plans could be suited to the individual needs and characteristics of each state's shoreline. Congress expected the plans to differ, but they would have to achieve the following tasks:

(a) to determine the actual boundaries of the state coastal zone. The CZMA defines the coastal zone as the "coastal waters and adjacent shorelands strongly influenced by each other." The coastal zone should extend inland to the extent necessary to adequately control shorelands whose use by man will have a direct and significant impact on coastal waters.

(b) to define permissible land uses within the coastal zone.

(c) to inventory and designate areas of particular(ecological) concern.

(d) to identify the means by which the state proposes to exert control over the land and water uses permitted, and to list all relevant state constitutional provisions, legislative enactments, regulations, and judicial decisions.

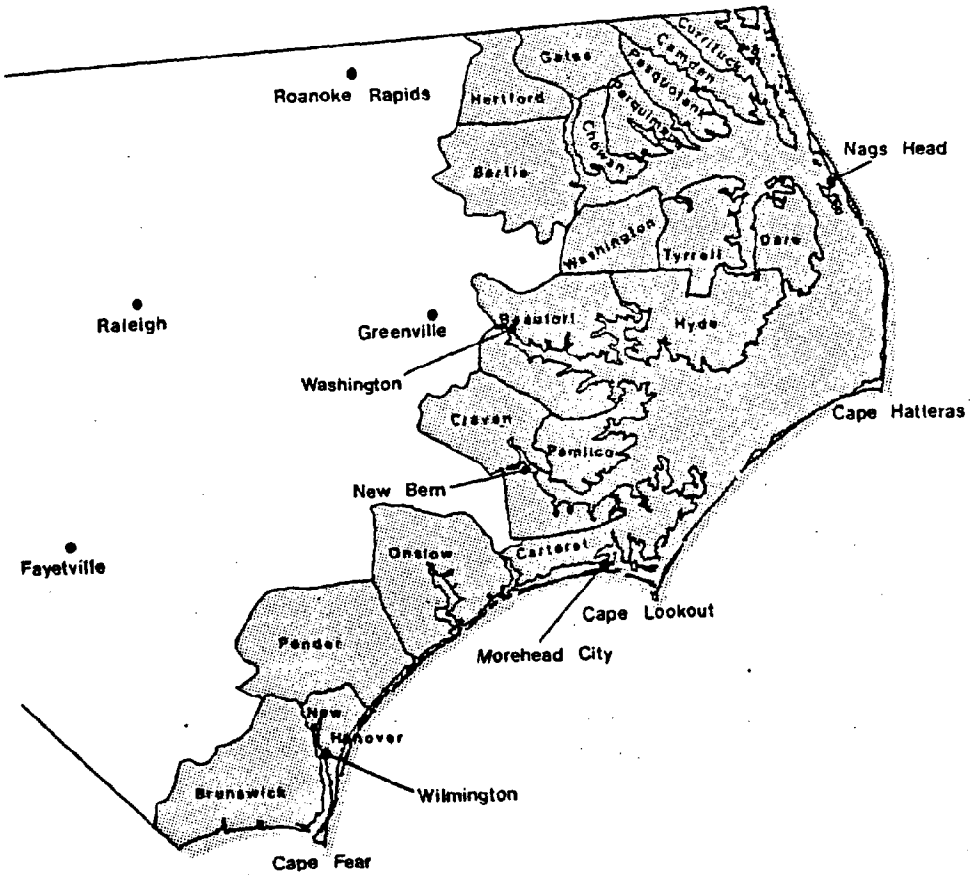
(e) to draw up broad guidelines on priority of uses in particular areas, including specifically those uses of lowest priority.

(f) to propose an effective organizational structure to carry out the management program, and to describe the responsibilities and interrelationships of local, area-wide, state, regional, and inter-state agencies involved in the management process.

At one time, all 30 coastal states had applied for funds to develop coastal management programs. The Office of Coastal Zone Management approved nearly one-half of these plans. Several other states are still in the process of writing and revising their programs. A few states, such as Minnesota and Texas, have decided, for various reasons, to drop their plans for a coastal management program. In some states, lack of public support has killed the plans; other states believe that existing laws and agencies already are doing a satisfactory job.

NORTH CAROLINA SUPPLEMENT

TO COASTAL PROBLEMS AND RESOURCE MANAGEMENT



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Department of Natural Resources and Community Development
Raleigh, North Carolina

NORTH CAROLINA SUPPLEMENT

TO COASTAL PROBLEMS AND RESOURCE MANAGEMENT

Developed by

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Editorial and research assistance was provided by Carol McCord, Curriculum Research and Development Group, University of Hawaii; Elizabeth Lance, Office of Coastal Management, Raleigh, North Carolina; and Lundie Mauldin, University of North Carolina, Sea Grant College Program, Raleigh, North Carolina.

Production assistance from the University of Hawaii was provided by Norine M. Ige, Lisa Luke, and Constance J. McCurdy.

These materials were supported by NOAA grant number 04-158-44094.

This North Carolina Supplement is designed to accompany the course, Coastal Problems and Resource Management, developed by the Curriculum Research and Development Group, University of Hawaii.

A NOTE TO NORTH CAROLINA TEACHERS

The Coastal Problems and Resource Management (CPRM) materials include several case studies and examples of problems in various coastal regions which illustrate the general ideas and concepts in the course. This reliance on case studies provides numerous opportunities to replace or supplement the original materials with examples highlighting a specific coastal region.

This North Carolina Supplement to CPRM contains a variety of case studies and other examples which describe and analyze coastal issues in North Carolina. These local examples, combined with other national studies in CPRM, offer North Carolina students a sense of the broad scope of coastal problems and provide relevant examples familiar to North Carolina residents. Local materials have been developed for the following CPRM lessons:

Unit I: At the Water's Edge

Lesson 1	National Seashore Quiz (North Carolina Seashore Quiz)
Lesson 2	Common Coastal Features (Common Coastal Features of North Carolina)
Lesson 4	Our Local Coastline (A Survey of the North Carolina Coast)

Unit II: Understanding Coastal Ecology

Lesson 1	Coastal Ecology (The Valuable Estuaries of the North Carolina Coast)
Lesson 8	Tsunamis and Hilo, Hawaii (A Case Study of Erosion Control: Shifting Sands Beach)

Unit III: Resource Management: Politics and Planning in the Coastal Region

Lesson 4	Blue Neck Bay (The Coastal Area Management Act Comes to the Coast)
Lesson 6	Management Tools and Strategies (Six Resource Management Examples From North Carolina)
Lesson 7	Local Interests Versus Regional Interests (Raleigh vs. the Coast: Who Pays for Erosion Control?)
Lesson 10	The Taking Issue: Legal Limits to Regulation (A Taking Issue from North Carolina)

Unit IV: Case Studies in Resource Management

Lesson 2	The Economy and the Environment (Off-road Vehicles on the Outer Banks)
Lesson 3	Energy and the Environment (Energy Facilities on the Carolina Coast)

In some instances, the North Carolina materials can replace materials already in the course. At other points, the local adaptations can be used in addition to the basic course materials. Teacher instructions as well as a copy of all student materials and transparency masters are included in this Supplement.

The Office of Coastal Management in the Department of Natural Resources and Community Development granted funds for the writing and production of the North Carolina Supplement. Elizabeth Lance, Public Information Officer of the Office of Coastal Management, and Lundie Mauldin of UNC-Sea Grant College provided invaluable research and editorial support for the project.

Further assistance in the preparation and dissemination of these materials will be provided by the North Carolina Department of Public Instruction (Division of Social Studies), the North Carolina Office of Marine Affairs, the Office of Coastal Management, and UNC-Sea Grant College.

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*North Carolina Supplement Lessons are found in parenthesis.

UNIT I: AT THE WATER'S EDGE

LESSON 1: THE NATIONAL SEASHORE QUIZ

ADDITIONAL NORTH CAROLINA MATERIAL

Worksheet, "North Carolina Seashore Quiz Questions"

OVERVIEW

Students take a short "quiz" about the North Carolina coastal region. The quiz is designed to encourage students to think about the Tar Heel coast. It is not intended to be graded as a test.

PROCEDURE

1. These questions may be used to supplement the "National Shoreline Quiz" provided in the student's workbook.

2. Pass out the worksheet, "North Carolina Seashore Quiz Questions." Students should answer these questions after they have finished the "National Seashore Quiz."

   Be sure to change the "Sea-Q" scale at the end of the "National Seashore Quiz" to reflect the larger number of questions.

3. Answers to the North Carolina questions are:

   1) 20%
   2) Wilmington
   3) 3,375 (North Carolina is fifth in the country in total miles of shoreline)
   4) Cape Fear
   5) Agriculture (Tourism is secong)
   6) An inland water route for shipping that runs along much of the east coast of the United States
   7) Shrimp is usually the leader; flounder, menhaden, and crabs are other leading species.

Student Worksheet

NORTH CAROLINA SEASHORE QUIZ QUESTIONS

1. Approximately what percentage of the total area of North Carolina is in the coastal region?

   1% 5% 20% 50%

2. What is the largest town in the coastal region?

   a) Wilmington
   b) New Bern
   c) Morehead City
   d) Nags Head
   e) Elizabeth City

3. How many miles of total shoreline (including all the land bordering the ocean, sounds, and the mouths of major rivers) does North Carolina have?

   a) 314
   b) 789
   c) 1,930
   d) 3,375

4. Which river is the only one in North Carolina to flow directly into the Atlantic Ocean?

   _____

5. What is the leading economic activity in the coastal region?

   a) mining
   b) tourism
   c) agriculture
   d) fishing
   e) erosion control

6. The Intercoastal Waterway is:

   a) a major recreation area linking Albemarle sound to the Atlantic Ocean
   b) a canal linking North Carolina with the Coastal River
   c) an inland water route for shipping that runs along much of the east coast of the United States
   d) a channel ships follow to avoid the shoals off Cape Hatteras

7. Which of the following species is the most valuable to North Carolina's fishing industry?

   a) flounder b) shrimp c) oysters d) crab e) menhaden

UNIT I: AT THE WATER'S EDGE

LESSON 2: COMMON COASTAL FEATURES

ADDITIONAL NORTH CAROLINA MATERIALS

Reading, "Coastal Terminology - North Carolina Coastal Features"
Worksheet, "Diagram of North Carolina Coastal Features"

OVERVIEW

Students read about several common coastal features of the North Carolina coast. They then identify these features and others on a diagram of the coastal area.

PROCEDURE

1. After students have completed identifying pictures of common coastal features in their workbooks, pass out the reading, "Coastal Terminology - North Carolina Coastal Features." After students have completed this reading, ask if there are any questions. Ask students to give an example on the North Carolina coast of each feature listed in this second reading.

2. Pass out the worksheet, "Diagram of North Carolina Coastal Features." Have students identify as many coastal features as they can. Their list should include features from both Coastal Terminology readings.

3. A completed worksheet follows.

Student Reading

COASTAL TERMINOLOGY - NORTH CAROLINA COASTAL FEATURES

INLETS

Inlets are openings between the barrier islands. The main function of inlets is to provide passages for fresh water from rivers to empty into the sea. Inlets also allow salt water to enter the sounds where it mixes with the fresh water from the rivers to produce the highly productive brackish water of the estuary. Inlets can open, close, and migrate up and down the beach. Slow and steady erosional forces or the sudden forces of storms can drastically alter the shape of an inlet. New inlets can open during storms, often in areas where washovers occur. Tides moving through the inlets help to move sand to the back side of the islands, where it remains. This results in the landward migration of the islands.

MARITIME FOREST

Evergreen forests of salt-tolerant trees and other plants that inhabit the back portions of barrier islands are called maritime forests. These forests generally provide areas conducive to small scale development. The earliest settlements on the Outer Banks were built in the maritime forest because the trees were on high ground and offered protection from temperature extremes and storm damage. Maritime forests are also important to maintaining the fresh water supply on the barrier islands. The thick ground cover retains rain water and helps keep the underground water supply "refilled."

MUD AND SAND FLATS

Mud and sand flats are bottom areas that are uncovered at low tide. The flats are located close to shore and include areas extending out from the permanent shoreline as well as shoals separated from the shore. Flats are home for an abundance of small animal life and attract fish and crabs at high tide and birds at low tide. People, too, are attracted to the flats for fishing, digging clams, and birdwatching.

SHOALS

Shoals are mud or sandy areas that are separated from the shore. They lie just beneath the surface of the water. Sometimes shoals are exposed at low tide. These areas are particularly hazardous to navigation.

SOUNDS

Sounds are the shallow bodies of water located between the barrier islands and the mainland. In North Carolina, the sounds contain a mixture of fresh and salt water, except for Currituck Sound which mainly holds fresh water.

Protected from the storms and rough waters of the ocean by the barrier islands, the sounds are generally calm, highly productive areas which host a wide variety of marine life.

TIDAL CREEKS

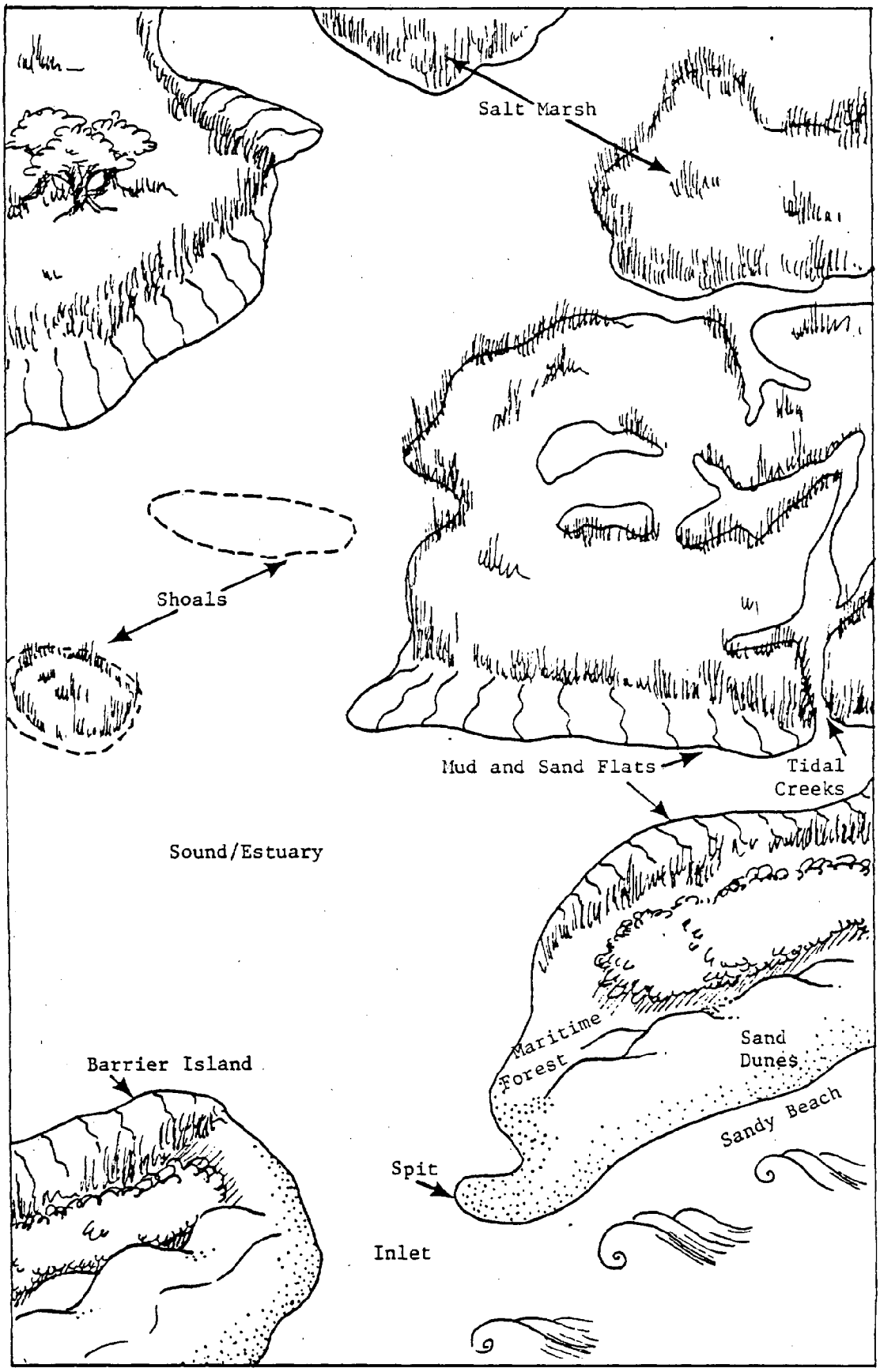
Tidal creeks are the natural "water pipes" of the salt marsh. At high tide, water moves into the low marsh areas through the network of the small tidal creeks. At low tide, the water drains back through the creeks into the estuary or sound. Tidal creeks carry important nutrients from the marshes into the estuaries and are a vital link in the estuary food system.

WASHOVERS

Washovers occur when storm surges, generated by wind and waves, are so great that the ocean breaks through the beach and dune area. The storm pushes massive amounts of water over the beaches beyond the dunes, and sometimes across the islands to the sound side. This process gradually pushes the island closer to the mainland shore. Washovers help counter erosional forces on the sound side by supplying new sand to this area.

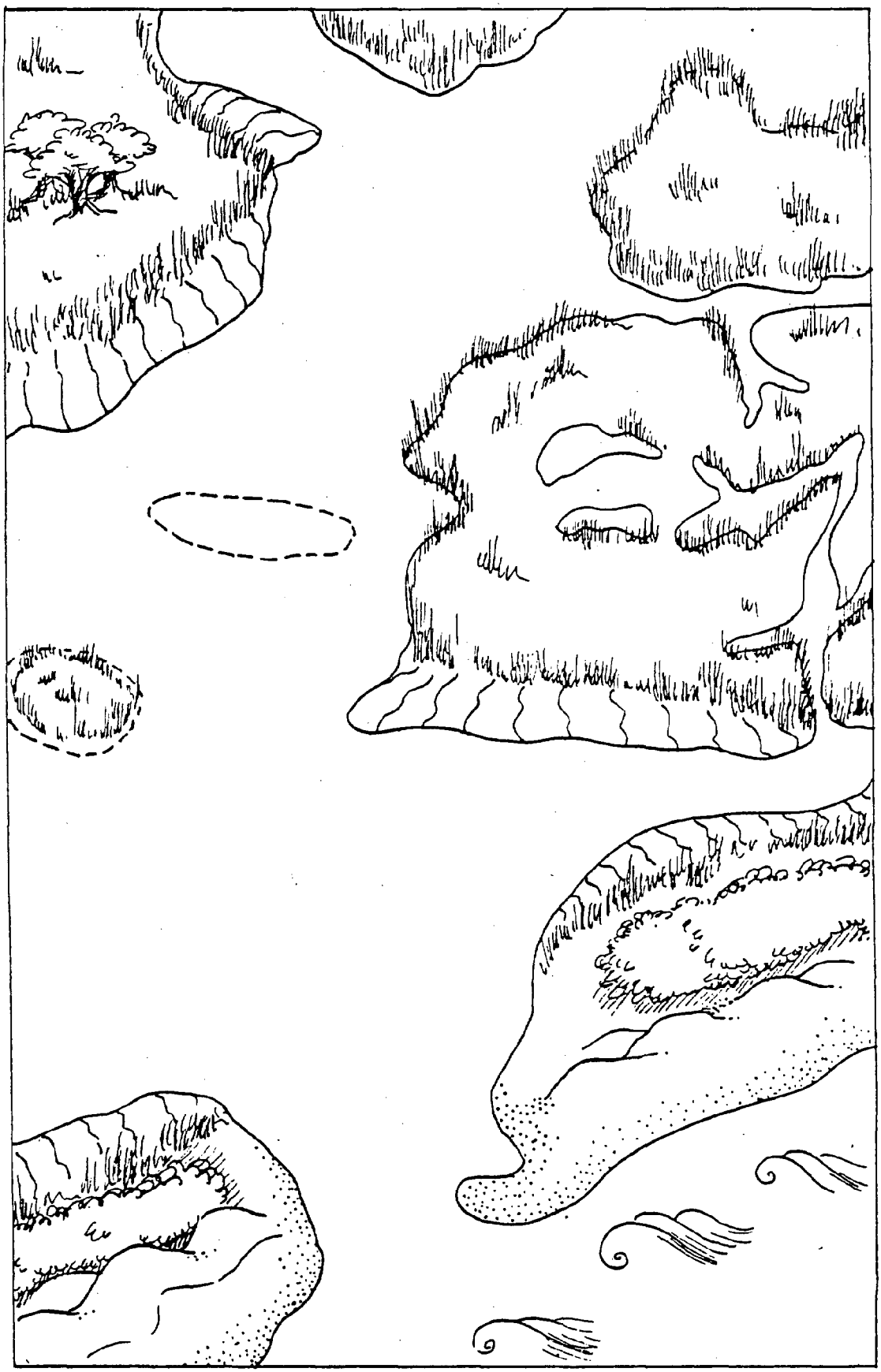
Answer Key

DIAGRAM OF NORTH CAROLINA'S COASTAL REGION



Student Worksheet

COMMON COASTAL FEATURES IN NORTH CAROLINA



UNIT I: AT THE WATER'S EDGE

LESSON 4: OUR LOCAL COASTLINE

ADDITIONAL NORTH CAROLINA MATERIALS

Slides of North Carolina coast (optional)
Worksheet, "North Carolina Shoreline Survey"

OVERVIEW

Students view a series of slides to acquaint them visually with the North Carolina coast. They then complete a self-made map and a worksheet that surveys their knowledge about the coastal area.

PROCEDURE

1. Ask students to take out a blank piece of paper and draw a map of the North Carolina coast. Have them locate a few major cities, sounds, rivers, and famous cultural/historical sites.

   This is a useful way for you to see what kind of "image" or "mental" map of the coast your students have. Misconceptions about the size or location are common. This is a "for fun" activity and probably should not be graded.

   A possible follow-up to this activity is to make transparencies of a couple of maps that greatly differ and show these to the class.

   Finally, if students find this activity harder to do than they thought, tell them to try it out on their parents. It usually is not that easy for anybody!

2. If you have 10 to 15 slides of prominent, well-known areas of the North Carolina coast, show these to the class. Ask students to try to identify the location of each slide. Ask them to explain what evidence they used to identify the location. Encourage debate if students have different answers. (If you do not have slides, you could use a number of color or black and white photographs, mounted on cardboard or another sturdy surface.)

3. Show the slides again, asking students to describe what general features are pictured in each slide. Ask for a short, one or two word description.

   List the responses on the board.

4. When you have finished the slides, ask:

   a. Does the list provide an adequate description of the coast?

   b. Are there features not represented in the slides?

   c. Which slides seemed to you to capture or summarize your feelings about the North Carolina coast?

   d. If you could add a picture, what would it be?

5. Hand out the "North Carolina Shoreline Survey." First, have students compare their maps with the map on the first page of the worksheet. Check major points of agreement and disagreement.

   Then, ask students to fill out the survey. Remind them to read the short note of explanation above the map. They should circle what they think is the best answer for each question.

6. After they have finished, go over the correct answers using the briefing information provided in the key.

7. A possible homework assignment is to have students report on North Carolina's coastal region. They might do this from the perspective of a first-time visitor or a travel agency trying to encourage tourists to visit the North Carolina coast.

Teacher's Key

NORTH CAROLINA SHORELINE SURVEY

1. To what extent are these common coastal features found in North Carolina?

CORAL REEFS

No coral reefs are found in Carolina coastal waters. Only Hawaii and Florida in the U.S. have coral reefs.

BARRIER ISLANDS

Most of the coastline of North Carolina consists of barrier islands. In fact, the Eastern coast of the U.S. south of New Jersey and the Gulf coast are noted for their barrier islands. North Carolina has 21 major islands with 308 miles of ocean shoreline.

SANDY BEACHES

The best answer is "frequently." Sandy beaches dominate North Carolina's Atlantic shoreline. This is not surprising, in that barrier islands almost always have sandy beaches on the ocean side. Certain shorelines along the sound also have sand beaches.

ROCKY BEACHES

The best answer is "seldom." The only natural outcrop is near Ft. Fisher.

WAVE-CUT CLIFFS

Wave-cut cliffs are frequent in some areas of the country, but are not associated with barrier islands, and consequently, are not found in North Carolina. The coast is characterized by a low, gentle slope.

SALT MARSHES

The best answer is "frequently." Along the edge of the sounds, between the barrier islands and the mainland, salt marshes are frequently found. In fact, North Carolina has 150,000 acres of salt marsh.

ESTUARIES

The best answer is "frequently." Only two states, Alaska and Louisiana, have more area of estuarine waters than North Carolina. About 2.2 million acres of water in the sounds, inlets, and mouths of rivers are classified as estuarine. This comprises nearly a quarter of the area of the North Carolina coastal zone.

SOUNDS

Sounds are a common feature of the North Carolina coast. Twelve major sounds form behind the barrier islands, all north of the Cape Fear River. At the southern end of the state, the barrier islands lie so close to the mainland that there is no room for sounds to form.

GROINS & SEAWALLS

The best answer is "seldom," when you consider the entire coastline. Groins and seawalls have been built in a very few areas where dense development has occurred. The best erosion control methods for North Carolina beaches are nonstructural, combined with land-use planning; structural devices, such as groins and seawalls, are very expensive in cost and require continual maintenance.

PORTS AND HARBORS

The best answer is probably "sometimes." There are four ports in the state, two ports at Sunnypoint and Wanchese Harbor and the two state ports of Wilmington and Morehead City. The state ports handle over 12 million tons of cargo annually, but North Carolina does not rank among the leading port states.

2. To what extent do these conditions or features occur along the North Carolina coast?

WATER POLLUTION

"Moderate" is probably the best answer, although it depends on where you live and what you do for a living. For example, at any given time, 20-30% of North Carolina's shellfishing areas are closed due to pollution. Fishermen affected by this may feel there is a "frequent" occurrence of pollution. Pollution in North Carolina waters is mainly due to septic tanks, sewage systems, and agricultural run-off.

POPULATION

The best answer is probably "sometimes." The permanent resident population of the coastal area is fairly low. Slightly over one-half million people, or about 10% of the state population, live in the 20 coastal counties. However, visitors temporarily raise the population of some counties by as much as 90% during summer weekends.

LARGE URBAN AREAS

The best answer is "seldom." The largest city on the coast, Wilmington, has a population of under 50,000. Camp Lejeune, a military installation, has a population of 44,000. Most towns on the seacoast have less than 2,000 people.

GOVERNMENT-OWNED LAND

The best answer is "seldom." Less than 5% of the total coastal land area is government owned. However, on the barrier islands themselves, the Federal Government, through the National Park Service, owns almost one-half of the 308 mile coast. On the coastal mainland, two large federal government tracts are Camp Lejeune and Croatan National Forest.

FOREST

"Frequently" is the best answer, since this is the largest single occurring use of land in the coastal region. Forest comprises about one-half of the coastal land area.

AGRICULTURAL LAND

The best answer is probably "frequently." Approximately 42% of the coastal region is used for agriculture. In 1976, in the 20 coastal counties, 2.5 million acres of 6 million were defined as farm lands.

DEVELOPED SHORELINE (SHORELINE WITH HOMES, HOTELS, HARBORS, ETC.)

Considering the entire shoreline, the best answer is "seldom." North Carolina has 3,375 miles of shoreline, including all the land bordering the ocean, sounds and mouths of major rivers. Commercial development is limited to a few urban areas and beach resorts. Most privately owned shoreline is sparsely developed, typically with homes and farms.

ADEQUATE SEWAGE FACILITIES

In some areas, the answer is "seldom," but taken as a whole, "sometimes" is probably the best answer. Septic tanks are very frequent on the barrier islands, Wrightsville Beach having the only waste water treatment facilities. Thus most of the coast must use less desirable methods, e.g., septic tanks.

EROSION

The best answer is "frequent." Nearly all the barrier island shoreline and much of the sound shoreline as well, is subject to erosion.

HURRICANES

The best answer is probably "frequently" although it has been so long since the last major hurricane that "sometimes" could be a reasonable response. However, records show that North Carolina did have a major hurricane every two or three years until the mid-sixties.

TOURISM

The best answer is "very important." Tourism is the second leading economic activity in the coastal area. For all communities on the Outer Banks, tourism is the leading economic activity.

MANUFACTURING

The best answer is "unimportant." Although New Hanover county (Wilmington) has experienced significant industrial activity, most of the coastal area remains only slightly affected by the impact of industrial development. Some towns on the sounds (e.g. Washington, Edenton and New Bern) are beginning to attract industrial development.

PORTS AND HARBORS

The best answer is "somewhat important." About 33,000 jobs are directly or indirectly related to port activities. Ports will be crucial for future growth of economic activities such as agriculture, especially tobacco; mining, particularly phosphate; and industry.

COMMERCIAL FISHING

The best answer is "somewhat important." The fishing industry has traditionally been an important aspect of North Carolina's coastal economy. The gross annual income from fishing activities in 1976 was approximately $200 million. Recreational fishing brings in even more revenue to the state than commercial fishing.

FORESTRY

The best answer is "very important." Twenty percent of the state's commercial forest land is located in the coastal zone. While of little importance to the economy of the barrier islands, several mainland counties depend heavily on the timber industry.

AGRICULTURE

The best answer is "very important." Tobacco and soy beans are the leading agricultural products in the 20 county coastal area.

OFF-SHORE OIL

The best answer is "unimportant." As of 1979, oil companies had not discovered significant amounts of oil off the North Carolina coast. Off-shore discoveries in other locations along the East Coast are having little impact in North Carolina.

LAND-BASED OIL FACILITIES

The best answer is "unimportant." Only one small petroleum refinery (located near Wilmington) presently exists in North Carolina. However, this is likely to change in the future with oil and natural gas companies looking to North Carolina for potential sites.

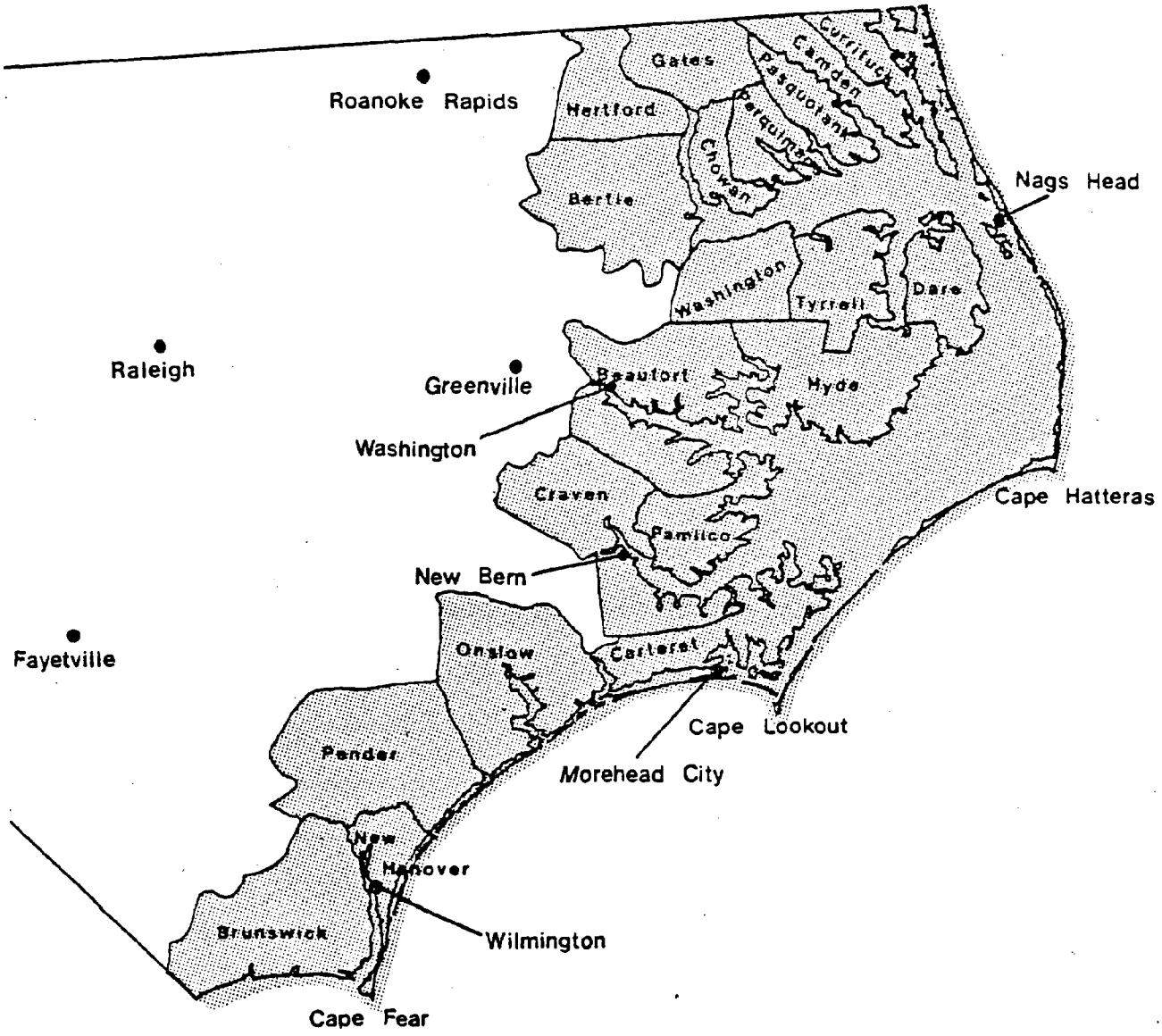
MINING

The best answer is probably "somewhat." Mineral production in the coastal counties amounts to nearly 25% of the state's total production. Portions of the coast contain extensive deposits of limestone and phosphate. The economy of Beaufort County and New Hanover County are both signficantly helped by mineral production. In the future, peat, glass sand, and heavy mineral mining may be developed.

Student Handout

NORTH CAROLINA SHORELINE SURVEY

On the following pages you are to give your opinion about several aspects of the North Carolina shoreline. Remember that the coastal area consists of 20 counties which border the ocean, sounds, and major rivers emptying into North Carolina's coastal waters. This area represents nearly 20% of the area of the state(see the map below). Be sure you consider this entire area as you answer the questions.



NORTH CAROLINA SHORELINE SURVEY

1. To what extent are these common coastal features found in North Carolina? (Circle the best answer.)

CORAL REEFS	Seldom	Sometimes	Frequently
BARRIER ISLANDS	Seldom	Sometimes	Frequently
SANDY BEACHES	Seldom	Sometimes	Frequently
ROCKY BEACHES	Seldom	Sometimes	Frequently
WAVE-CUT CLIFFS	Seldom	Sometimes	Frequently
SALT MARSHES	Seldom	Sometimes	Frequently
ESTUARIES	Seldom	Sometimes	Frequently
SOUNDS	Seldom	Sometimes	Frequently
GROINS & SEAWALLS	Seldom	Sometimes	Frequently
PORTS & HARBORS	Seldom	Sometimes	Frequently

2. To what extent do these conditions or features occur along the North Caroline coast?

WATER POLLUTION	Seldom	Sometimes	Frequently
POPULATION	Seldom	Sometimes	Frequently
LARGE URBAN AREAS	Seldom	Sometimes	Frequently
GOVERNMENT-OWNED LAND	Seldom	Sometimes	Frequently
FOREST	Seldom	Sometimes	Frequently
AGRICULTURAL LAND	Seldom	Sometimes	Frequently
DEVELOPED SHORELINE (AREAS WITH HOMES, HOTELS, HARBORS, ETC.)	Seldom	Sometimes	Frequently
ADEQUATE SEWAGE FACILITIES	Seldom	Sometimes	Frequently

EROSION	Seldom	Sometimes	Frequently
HURRICANES	Seldom	Sometimes	Frequently

3. How important are these activites to the economy of North Carolina's coastal area?

TOURISM	Unimportant	Somewhat Important	Very Important
MANUFACTURING	Unimportant	Somewhat Important	Very Important
PORTS & HARBORS	Unimportant	Somewhat Important	Very Important
COMMERCIAL FISHING	Unimportant	Somewhat Important	Very Important
FORESTRY	Unimportant	Somewhat Important	Very Important
AGRICULTURE	Unimportant	Somewhat Important	Very Important
OFF-SHORE OIL	Unimportant	Somewhat Important	Very Important
LAND-BASED OIL FACILITIES	Unimportant	Somewhat Important	Very Important
MINING	Unimportant	Somewhat Important	Very Important

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 1: COASTAL ECOSYSTEMS

ADDITIONAL NORTH CAROLINA MATERIALS

Reading, "The Valuable Estuaries of the North Carolina Coast"

OVERVIEW

Students read a description of the estuaries of North Carolina related to the ideas and concepts learned in the "Coastal Ecosystems" lesson. Several discussion questions are suggested.

PROCEDURE

1. After the class has completed Lesson 2, "Coastal Ecosystems," assign the reading, "The Valuable Estuaries of the North Carolina Coast." Explain that many of the main ideas in the "Coastal Ecosystem" lesson are used in this reading to describe the estuaries and the problems affecting them.

2. After students have completed the reading ask:

   a. Why did the reading concentrate on estuaries?

      [The estuaries are a rich productive area; they are crucial to North Carolina's fishing industry; North Carolina has the largest estuarine system on the Atlantic Ocean.]

   b. What makes the estuaries such a productive area?

      [The mixing of fresh and salt water creates the right combination of salinity, temperature, and nutrients for plant and animal life. Students may bring out other points mentioned in the reading.]

   c. What three types of pollution problems were described ?

      [Improperly treated waste water, changing the salinity of estuarine areas, and excess sediments in estuarine areas.]

   d. What seems to be the general reason behind all these specific problems?

      [Increased development and more intensive use of the North Carolina Coastal area. Students may offer other explanations, such as lack of concern by the public, weak laws and regulations, etc.]

   e. The reading suggests that tourism, in addition to the fishing industry could suffer from continuing water problems. How?

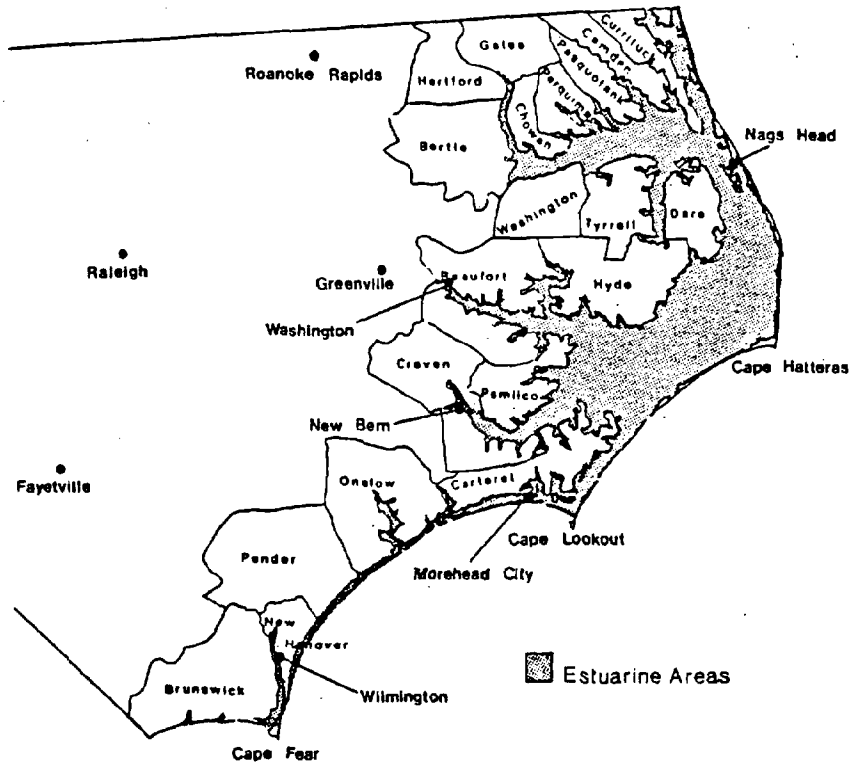
      [Recreational fishing could suffer; fouled areas could become so obnoxious that people would choose to visit other areas; swimming and

boating activities could be restricted; students may think of other possibilities.]

3. As a special project, the class or a group of students could investigate water quality problems in their county. Reports could focus on the source of pollution and the problems it is causing. Interviews with county officials and fishermen could be included.

   Another possibility would be to prepare a map of the county or the state showing where major pollution problems occur. Such information may be available from Sea Grant or the Office of Coastal Management in Raleigh.

The third largest estuarine system in the United States (behind Alaska and Louisiana) stretches from Currituck County in the north to Brunswick County in the south.



THE VALUABLE ESTUARIES OF THE NORTH CAROLINA COAST

THE NATURAL SYSTEM

The coastal region of North Carolina offers a variety of habitats. The freshwater rivers, the brackish estuaries (brackish means a mixture of of fresh and salt water), the barrier islands, and the open ocean all play important roles in the natural ecology of the North Carolina coast. Each of these habitats makes important contributions to the coastal environment, but in this particular reading, we will focus our attention on the estuarine area.

The estuaries of North Carolina include the 12 major sounds, plus miles of marsh, creeks, and rivers. Over two million acres are involved, giving North Carolina the largest estuarine system on the Atlantic coast. The food chain for much marine life begins here. Ninety percent of the commercial fish caught by

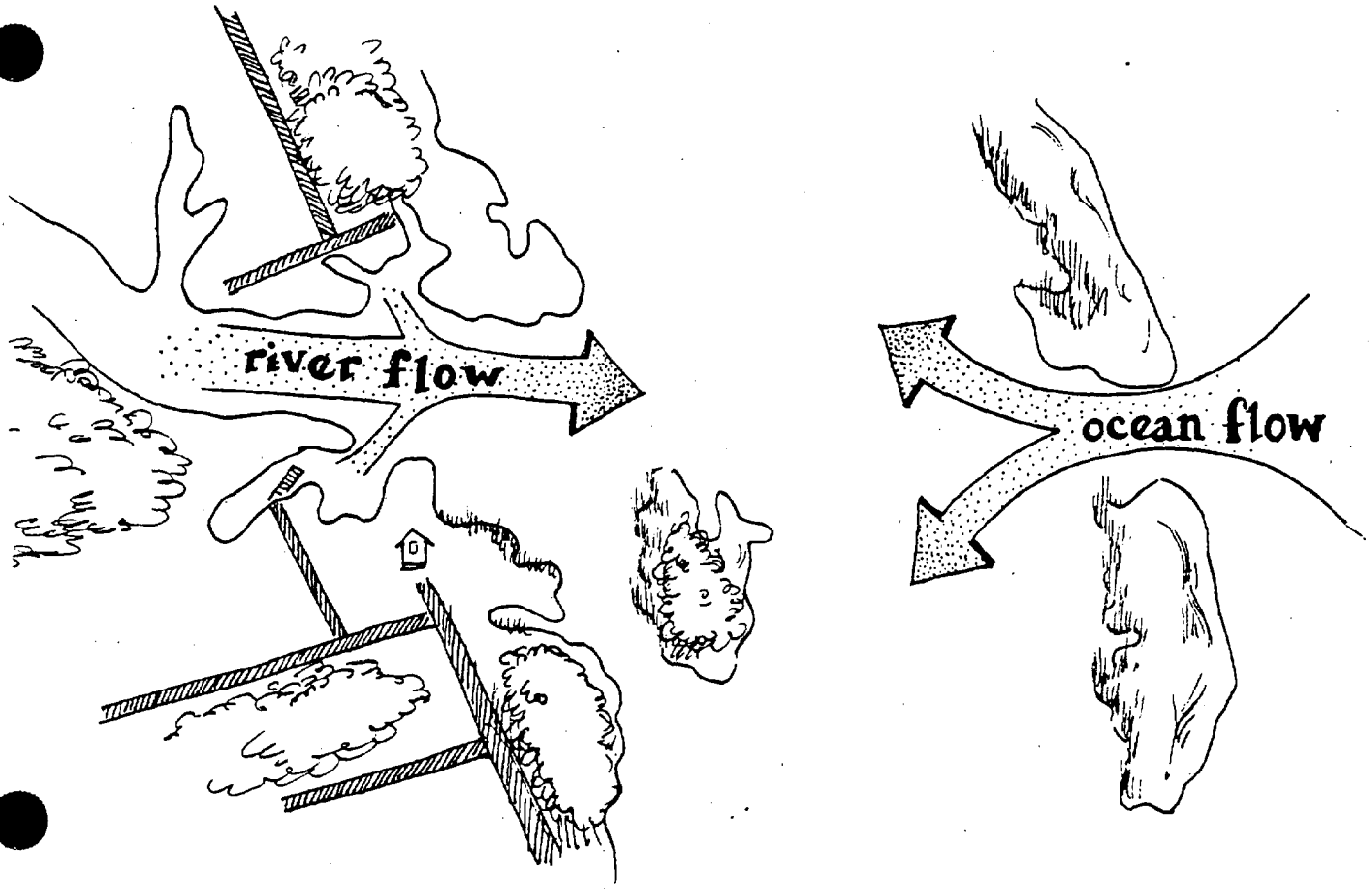
North Carolina fishermen spend all or part of their life cycles in these productive areas.

Estuarine areas are productive in part because the waters are calm, have a relatively mild temperature, and contain nutrients and other substances which help plant life grow. These conditions exist because of the estuary's relationship with the barrier islands, the ocean and the freshwater rivers.

The barrier islands generally form land's outer boundary along the coast. The calm waters of the sounds, for example, exist because the barrier islands act as a "protective shield," cushioning the first impact of the ocean's energy. The white sand beaches first absorb the violent weather caused by storms and the general day-to-day motion of the wind and waves. Many young or particularly fragile animals found in the calm sounds could not survive the rough ocean.

Another feature of the estuaries crucial to their productive nature is the mixing of fresh and salt water. The inlets between the barrier islands allow salt water to pass through the island chain and mix with fresh water coming to the coast from the rivers and streams. The ocean provides these estuarine areas with certain chemicals and sediments. The freshwater brings nutrients, minerals, animal wastes, and other sediments. Tiny bacteria and other decomposers help break down the waste products and sediments to form a "nutrient-rich" area. The marsh grass along the edges of the sounds and estuaries is also an important contributor to the nutrient supply. As the grass dies and decays, decomposers convert it into nutrients which are then carried into the sounds and estuaries through the tidal creeks. The interaction of the sun, the water and these nutrients helps create the bountiful supply of small plant life, which in turn is eaten by many animals.

As mentioned, the inlets are important because they allow ocean water to enter estuarine areas. They also permit the daily "flushing" of these areas to occur. If more waste-products accumulate than can be consumed by bacteria, seri-



The inlets allow salt water from the oceans to pass through the barrier islands and mix with freshwater from the rivers.

ous problems can result. For example, oxygen levels can be lowered to a point where the estuaries and sounds could not support as many fish as they normally do. But as the tide moves in and out through the inlets, the water in the estuaries circulates, preventing wastes from accumulating. Like the filter on a home aquarium, the inlets and the tides help circulate and clean the water of the estuaries.

The salt water entering the estuaries not only provides the right amount of salt content and other minerals, but it also helps keep the water temperature relatively stable. The temperature of the ocean is more constant than that of the freshwater entering the estuaries and sounds. Thus, the ocean water helps keep the estuarine water temperature from reaching extremes. This is an important factor for young fish and shellfish as they cannot tolerate very high or very low

temperatures.

The result of these various ideal conditions is a "oceanic garden" which provides the necessary plant life and nourishment for commercially prized species such as shrimp, oysters, croaker, menhaden and trout. Frequently this food chain culminates on our dinner tables.

INTERFERING WITH THE NATURAL SYSTEM

While the estuaries and sounds provide a rich nursery for marine life, they can also be a dumping ground for many types of pollutants. In some places, the collection of pesticides, industrial wastes, inadequately treated sewage, and other pollutants have seriously altered the natural processes of North Carolina's estuaries. During the past several years, for example, large portions of the state's shellfishing waters have been closed to harvesting due to water quality problems.

The septic tank is one of the major polluters of the estuaries. Septic tanks in themselves are not always a problem, but the conditions of their use near many estuarine areas have caused serious pollution. To work properly, the drainage--or effluent--from septic tanks needs to filter slowly through the soil, allowing bacteria to break down the wastes into harmless matter. By the time the effluent seeps into the streams or sounds, it poses little threat to water quality.

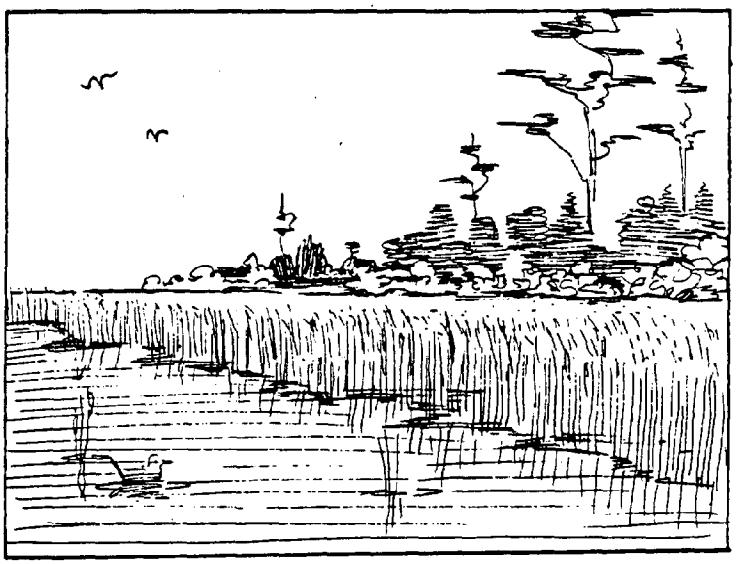
However, the soils along much of the coast are too porous for septic tanks to work effectively. The porous soil allows the waste product to drain through the ground very quickly and reach the estuary or the ocean before it has been made harmless. In addition to this soil problem, much of the coast has a high water table throughout most of the year. Not only does the effluent drain through the soil very quickly, but generally it does not have very far to go before it reaches the underground water system.

In many areas, septic tanks are placed too close together and too near the shoreline. The result is that too much untreated sewage reaches the estuaries and sounds. The harmful pollutants remaining in the effluent contaminate shell-

fish and leave thousands of acres of estuarine areas unsafe for swimming or fishing. Most coastal communities cannot afford modern sewage treatment plants. This means the use of septic tanks will continue and must be monitored closely.

Another water quality problem results from changes in the salinity of the estuaries. Shrimp, oysters, and many other shellfish and fish spawn and live in brackish water. Large and sudden changes in the level of salt in the water can kill huge numbers of fish. The main pollutant in this case is, surprisingly, fresh water. Of course, fresh water naturally comes to the coast in rivers and streams. However, when it flows in too great a quantity into estuarine areas it becomes a pollutant. Where does excess fresh water come from?

In recent years, the low-lying lands near the coast, have been used more and more for agricultural, timber and residential uses. Acres of swamp forests have been buldozed to make room for these new developments. These areas once trapped the fresh water and let it filter slowly to the shore. In addition, miles of ditches have been built to drain water away from homes and prevent flooding on the farms. Now, the freshwater runoff from these areas, particularly after heavy rains, rushes to the coast and seriously alters the salinity of marshes, creeks, and sounds. In their efforts to eliminate water problems for themselves,



Too much freshwater in the brackish marshes can seriously lower the cathes of North Carolina fishermen.

the farmers, loggers and home builders have created water problems downstream. A study of small creeks near Pamlico Sound showed that shrimp catches were closely associated with changes in salinity. Periods of heavy rains in the spring were found to be a particular problem and had the effect of reducing the shrimp population.

Excess silt and sediments also create problems in North Carolina's estuaries. The dredging of waterways and ports to maintain and deepen channels for ships, and the construction of new homes, industries, and recreation sites often increases the amount of sediments in the water. These sediments cover and suffocate bottom-dwelling organisms, particularly oysters and other shellfish. Further, when the sediment is suspended in the water it reduces the amount of sunlight penetrating the water, thus reducing plant life. Since all fish feed on plants (or eat other organisms that feed on plants), loss of plant life can lead to a decline in fish population.

The fishing industry is often the first to be affected by the many pollutants which enter the estuaries in North Carolina. However, other aspects of the state's economy, such as tourism, may also suffer if water quality problems persist. Since the estuaries make-up such a large portion of the North Carolina coastal region, it is not surprising that they are often directly affected by increasing development, nor that damage to them has such a profound affect on those who make the Carolina coast their home, working place, and playground.

UNIT II: UNDERSTANDING COASTAL ECOLOGY

LESSON 8: TSUNAMIS AND HILO, HAWAII

ADDITIONAL NORTH CAROLINA MATERIALS

Reading, "Shifting Sands Beach"
Worksheet, "Five Erosion Control Options, and "Option Rating Card"
Reading, Six Position Statements ("County Officials," "State Officials," "Local Property Owners," "Fishing Groups," "Tourism Groups," "Environmental Representatives")

OVERVIEW

Students read an account of a "composite" North Carolina barrier island community that is experiencing serious erosion problems. Students role-play members of various groups and evaluate five erosion options based on their group's point of view.

PROCEDURE

1. The materials on erosion control in Shifting Sands Beach may replace or follow the Hilo tsunami study. The format of the North Carolina study is very similar to the Hilo lesson. (If you are not going to use the Hilo story, you might summarize the Hilo disasters for the class as a way of introducing the general topic of how communities deal with natural hazards.)

2. Explain to the class that issues similar to those faced by Hilo residents also occur in North Carolina. The following story about erosion control is fictional, but is based on several true incidents.

3. Pass out the reading on "Shifting Sands Beach." After students have finished, explain that they will now serve as members of the Coastal Planning Group.

4. Announce that five different options for controlling erosion in Shifting Sands Beach will be considered by the Coastal Planning Group. Hand out the worksheet on the five erosion control options (including the "Option Rating Card.")

   Review each of the five options with the class. As you finish each option answer any questions.

5. After you complete this summary, divide the class into six equal groups. Announce that each group will represent different interests that have conflicting positions on erosion control.

   Hand out a position statement to each group. Give each group a few minutes to read and discuss their statements. Make sure they generally understand what their position is regarding the kind of erosion control they favor.

6. Ask each group to make a tentative decision about the option(s) they favor. Plans may be combined; that is, a group could favor Option #1 and Option #5.

   The groups should fill in their "Option Rating Card" as they evaluate each option. (These can be collected for evaluation purposes if you wish.)

7. After the groups make a tentative decision, ask one person from each group to briefly summarize the group's position. Each spokesperson should explain which options the group thinks are best, and why the group made this decision. Keep a record of their choices on the board.

8. Explain that while many different points of view have been expressed, the Coastal Planning Group must agree on one plan. Each group will have <u>one</u> vote. Encourage class debate and discussion. Compromise may be necessary. Call for a final vote when the discussion ends.

9. Compare the class decision on Shifting Sands Beach with what has actually happened in places like Long Beach and Cape Hatteras National Seashore.

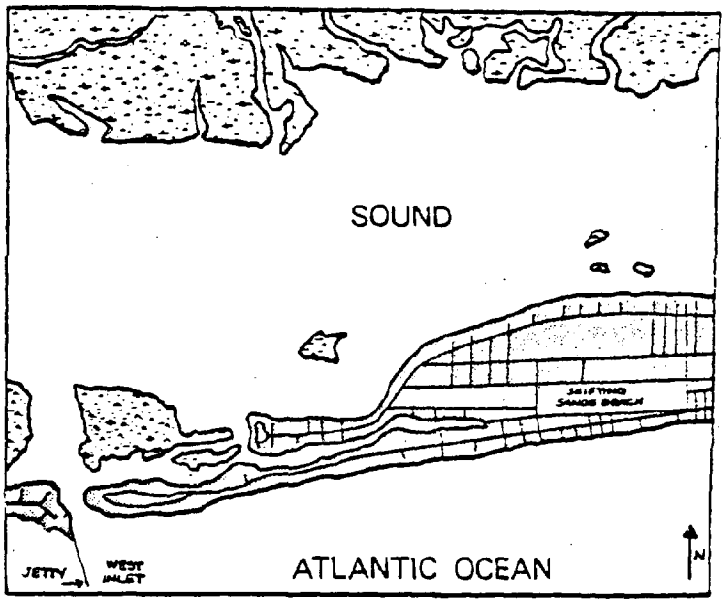
   After a long fight between local citizens and state natural resource officials, Long Beach recently received approval from the state to build a new groin system. However, the state legislature indicated that they would cut back on erosion control projects in the future.

   In Cape Hatteras National Seashore, the Park Service is seriously considering abandoning its erosion control projects. The Park Service believes the millions of dollars it has spent on beach replenishment and groins may not have been worthwhile. Erosion problems still plague several areas of the National Seashore. The Park Service now believes the best plan is to simply let nature take its course, and try to relocate any structures in threatened areas.

Student Reading

SHIFTING SANDS BEACH*

Shifting Sands Beach on the coast of North Carolina is a thriving barrier island community. Vacation cottages, summer homes and small businesses line the ocean. Forty years ago there were only three cottages along the entire three mile beach. Today, a year-round population of 3,000 and a summer weekend population of almost 30,000 occupy Shifting Sands Beach.



The map shows the community of Shifting Sands Beach, West Inlet, and the jetty built to stabilize West Inlet.

The beach is a favorite tourist site; historical and maritime attractions bring thousands of tourists to Shifting Sands Beach each summer. Ocean front rentals can range up to $600 a week. The state is widening the main highway through town and plans to improve bridges in the area to better handle the tourist traffic.

As a result of these improvements, new businesses have opened, more are planned, and many new homes are under construction. All looks prosperous for

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* Although Shifting Sands Beach is a fictional location, this story is based on a collection of actual cases. Towns like Long Beach, Wrightsville Beach, and Emerald Isle have experienced, or are currently experiencing similar problems.

this community. However, there is one major problem. As the residents of Shifting Sands Beach have discovered, the town lives up to its name.

Much of the three-mile beach experiences heavy shoreline erosion. Each year as the seasons change, the beach responds, losing sand in the fall and winter and gaining sand in the spring and summer. But the overall pattern reveals a loss of sand. Old maps and photographs of the ocean shoreline indicate the beach has eroded at an average of three to four feet per year. The records also show that West Inlet, was once very active, opening and closing twice since 1900. Further, the inlet has migrated one-half mile to the east. In 1968, the Army Corps of Engineers stabilized the inlet by building a jetty. Since then the inlet has been stationary, and fishermen have had easy access to the ocean. Some residents of Shifting Sands Beach believe the building of the jetty has robbed the town's beaches of sand and increased erosion.

Providing for the increasing population of Shifting Sands Beach has worsened the erosion problem. By building in areas already prone to erosion, homeowners have placed themselves in the direct "line of fire," and thus created a need for erosion protection. In addition, many builders have bulldozed sand dunes to make room for houses. Since the dune line provided considerable protection against erosion, the removal of the natural barrier has increased the potential for erosion damage.

In 1973, a groin system, financed largely with state funds, was built along a short section of the beach. This project helped slow the rate of erosion, but the groins have been largely washed away. Several homeowners have installed small seawalls and bulkheads (at their own expense), but these have not been any more successful than the groins.

During the past two years, winter storms have been particularly harsh, and erosion rates have increased. The high tide line is moving landward at a rate of several feet per week, creating serious problems for many property owners.

Last fall, two residents were forced to move their cottages far back from the shoreline to save them from the fast-advancing ocean. In a recent, frantic last-minute effort, another homeowner was saved when the National Guard hurriedly erected a temporary sandbag seawall. At present, 12 to 15 homes and a small section of the state highway are seriously threatened.. Town officials predict several homes and businesses, plus public recreation areas will be threatened within two years if present erosion rates continue. New storms could easily accelerate the process.

City officials from Shifting Sands Beach have made two appeals to the state government in Raleigh for financial help to stop shoreline erosion. The State Coastal Planning Group* has agreed to hold a public hearing to discuss various options for protecting the community. The Coastal Planning Group is composed of representatives from coastal counties, state government, environmental groups, the fishing industry, the tourist industry, and ocean-front land owners.

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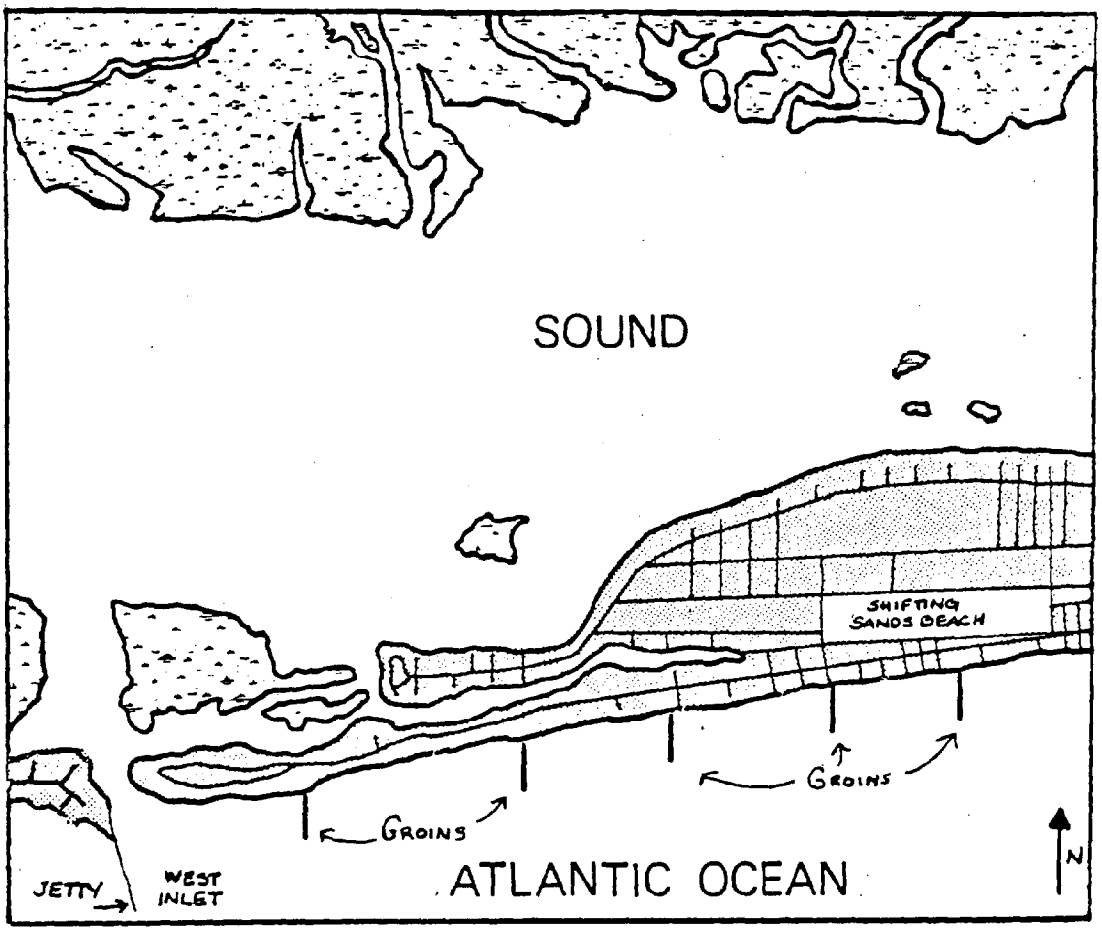
* The State Coastal Planning Group is a ficticious organization.

OPTION #1 GROINS



OPTION: Several groins will be built along Shifting Sands Beach. These walls, built perpendicular to the shoreline will trap sand and prevent the longshore current from carrying sand away.

COST: Fairly low cost ($50-100,000) if a sand bag groin system is used; cost will be split 50-50 between state and local government.

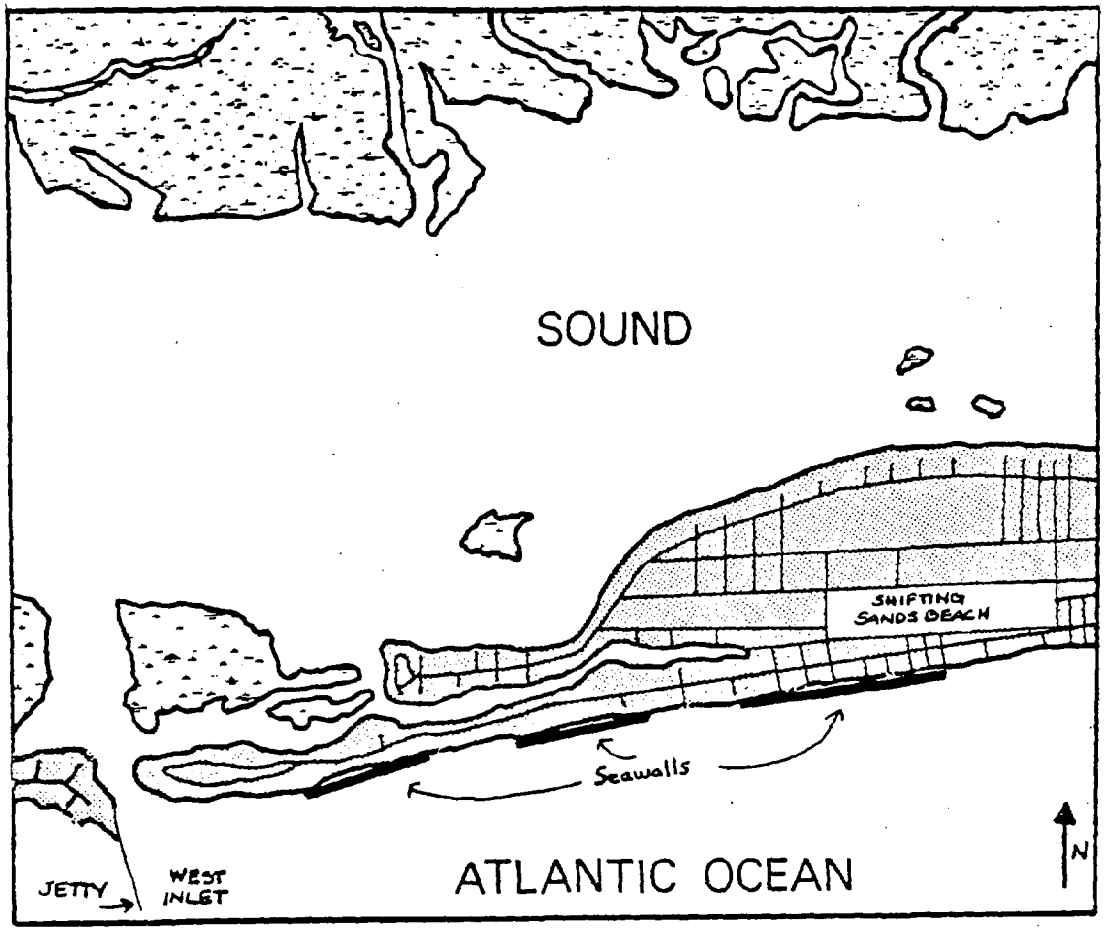
SOME ADVANTAGES:

1. Will likely provide five to fifteen years of protection.
2. Would protect public recreation areas.

SOME DISADVANTAGES:

1. Groins will likely shut off the flow of sand to adjacent areas, causing erosion problems there.
2. Will likely change the shape of the shoreline on both sides of the groin system.
3. Must be maintained on a regular basis.
4. Aesthetically unpleasing.

OPTION #2 SEAWALLS



OPTION: An extensive system of seawalls will be built along the shoreline. The seawalls will be placed a few yards behind the shoreline, or directly in front of buildings.

COST: High cost; cost will be split 50-50 between state and local government.

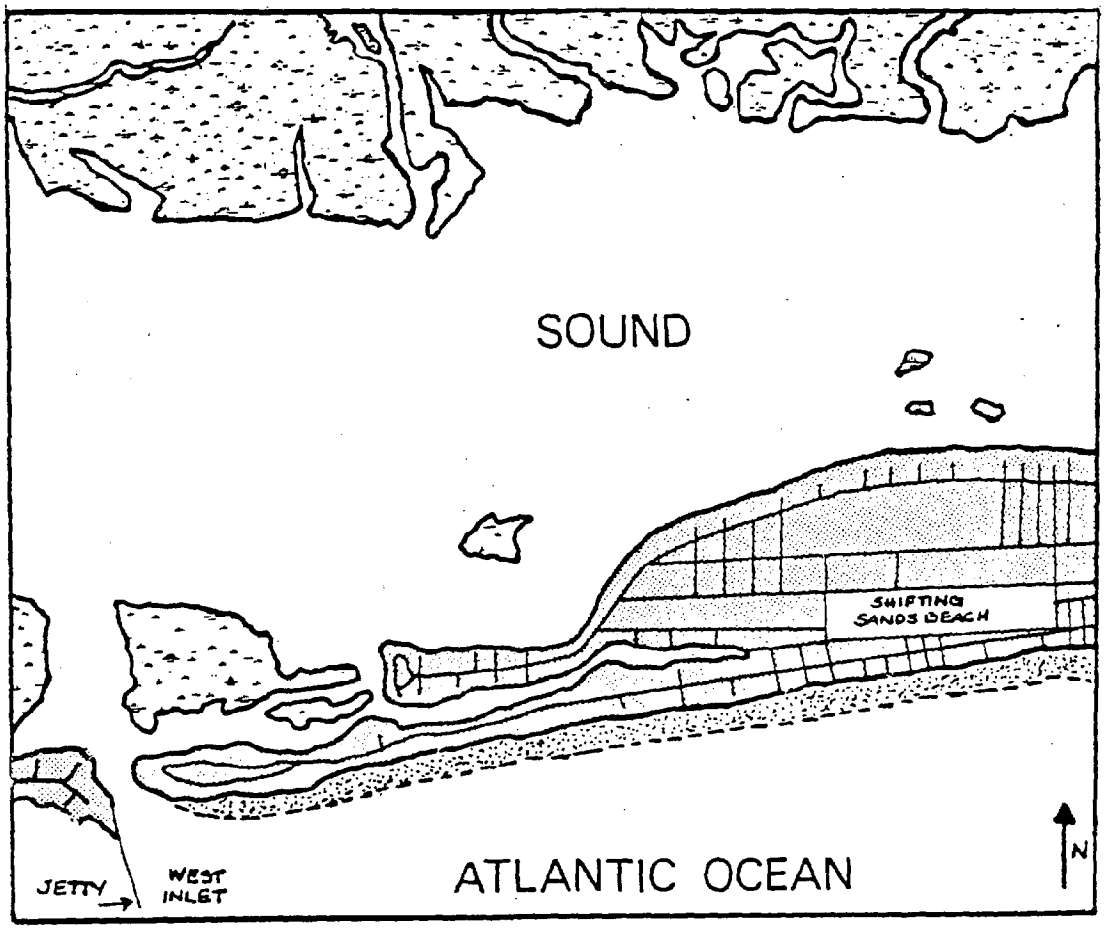
SOME ADVANTAGES:

1. Will likely extend the lives of beachfront structures in normal weather
2. May provide considerable short-term protection
3. Favored by many coastal homeowners.

SOME DISADVANTAGES:

1. Seawalls often lead to the loss of sand in front of the seawalls.
2. Will not protect buildings from high waves, overwash, or storm-surge flooding.
3. Aesthetically unpleasing.
4. Generally ineffective in past.
5. Larger seawalls will likely be needed if these fail to work.

OPTION #3 BEACH REPLENISHMENT (INCLUDING ARTIFICIAL DUNES)



OPTION: Sand will be pumped onto the beach to build up the dunes and the upper beach area. Sand will be pumped from either the sound behind the barrier island, from inland areas on the island, or from the continental shelf.

COST: High cost; cost will be split 50-50 between state government and local government.

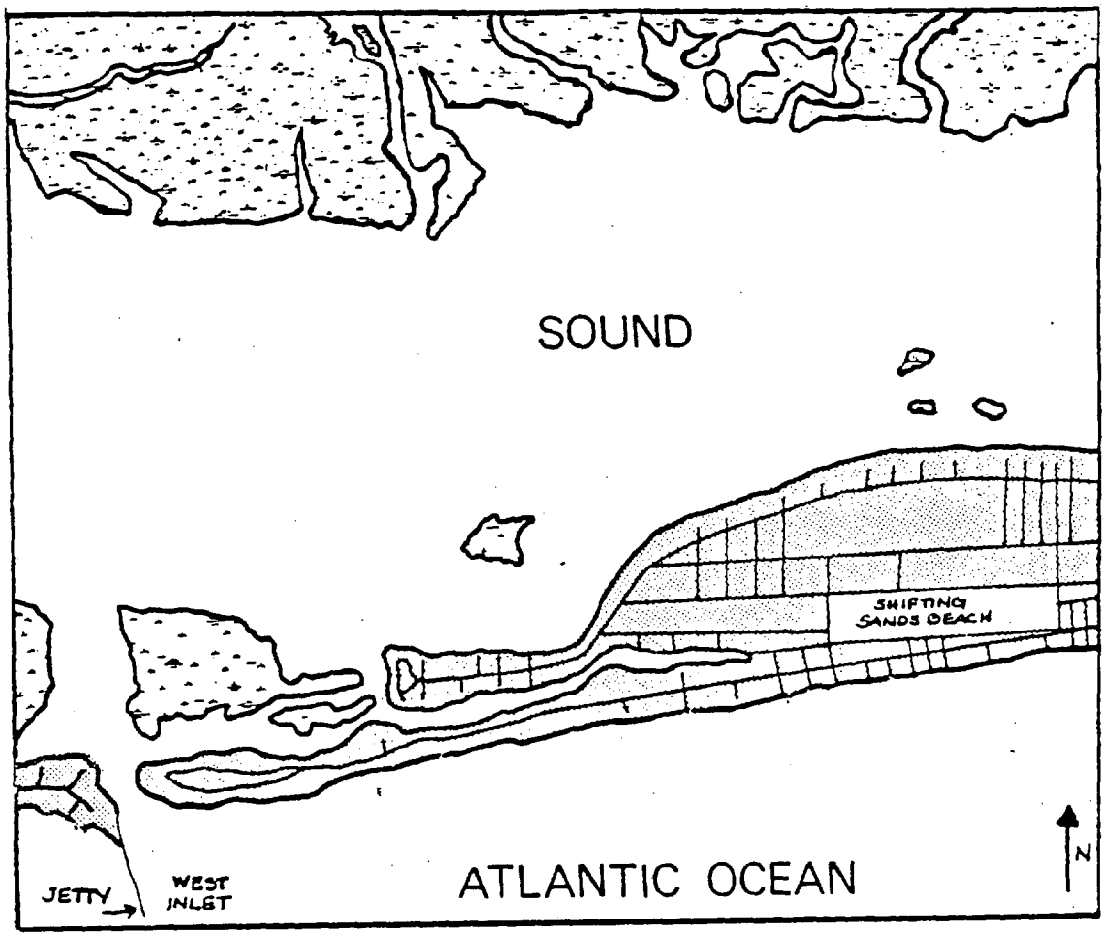
SOME ADVANTAGES:

1. Will likely cause fewer environmental problems than seawalls or groins.
2. Will provide a wider beach area for several years
3. Will protect public recreation areas.
4. No unsightly structures will be built.

SOME DISADVANTAGES:

1. Requires an expensive, long-term commitment.
2. Must have large supply of sand.
3. Artificial dunes can accelerate erosion on sound side by preventing normal overwash processes.

OPTION #4 NO ACTION



OPTION: No protective action will be taken by government. Leave Shifting Sands Beach as is, letting nature take its natural course. Homeowners would be encouraged to move their houses back from the shoreline.

COST: No costs; costs of relocating homes (approximately $6-10,000) will be paid by individual home owners.

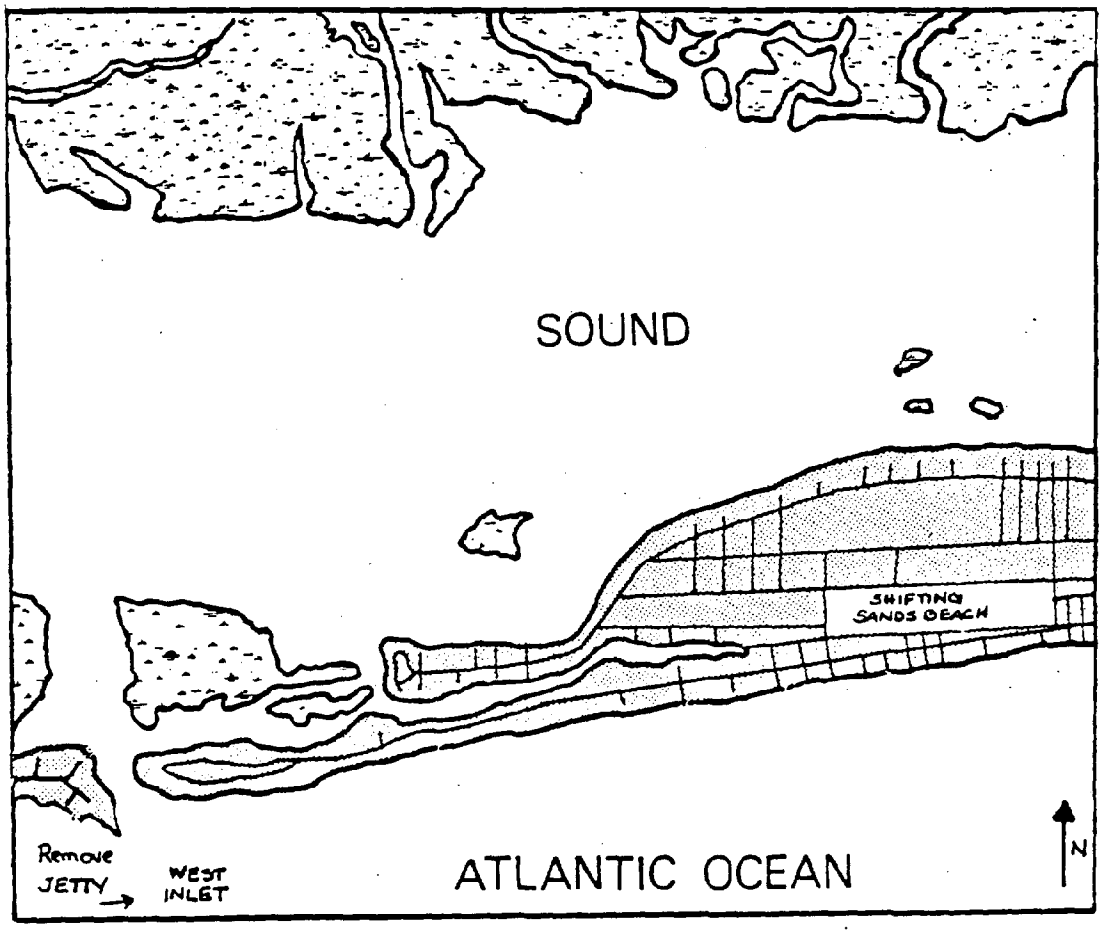
SOME ADVANTAGES:

1. No interference with the environment.
2. No costs.
3. No unsightly structures.

SOME DISADVANTAGES:

1. No direct action is taken to protect property.
2. Potential loss of cultural and historical sites.
3. May be very unpopular choice with coastal residents.

OPTION #5 STOP MAINTAINING WEST INLET



OPTION: Maintaining West Inlet is probably responsible for some erosion along Shifting Sands Beach. The dredging of West Inlet to provide a channel for shrimpers and other fishermen will be stopped. The jetty, which helps prevent the inlet from closing, will be torn down.

COST: Very low cost to tear down jetty; a savings if expensive dredging operations are stopped.

SOME ADVANTAGES:

1. Very low cost; a possible savings.
2. No harm to natural environment.
3. Will remove unsightly jetty.

SOME DISADVANTAGES:

1. Uncertain if this will work; not clear how much of the erosion problem is caused by maintaining West Inlet.
2. Fishing operations and recreational boaters will lose easy, convenient access to ocean.
3. Some fishing operations may close due to extra transportation costs.

Student Handout

COUNTY OFFICIALS

You believe that some type of protection is definitely needed. However, cost is an important consideration. The city does not have enough tax revenues to pay for an expensive project. The state must help pay the bill. You know the state argues that erosion is only a local problem, and therefore the state should not do anything. You disagree. After all, the beach is public property and owned by the state.

You also know that your city receives much tax revenue from tourism. Continuing erosion means fewer tourists and less tax revenues. Your city cannot afford these losses.

Erosion also threatens to increase the potential damage from hurricanes. Because there is less beach and fewer dunes to take the first brunt of a major storm, a hurricane will cause major property damage. You think the state of North Carolina has an obligation to give people more protection from hurricanes by stopping erosion. You would do it yourself, but your county just is not wealthy enough to afford these kinds of projects without some financial help.

Finally, you are against the plan to stop dredging West Inlet and to tear down the jetty. You think the fishing industry is important to your community. If the inlet is not kept open, several fishing operations may close down. You think the erosion problem can be solved without putting a lot of people out of work.

Student Handout

STATE OFFICIALS

You believe there is nothing permanent that can be done about stopping erosion. Nature will ultimately wreck any engineering effort. While it is true that the state government has supported erosion control in the past, these efforts have been generally unsuccessful. The only successful projects have been very, very expensive; in fact, the cost of these projects was more than the value of the property they were trying to protect. One of your major concerns is that once an erosion control project is started, it must be maintained and frequently expanded. Thus, the costs continue indefinitely.

Another problem is that the erosion protection system is installed, builders will think the area is safe, and new development will occur. This just makes the problem worse the next time it comes around.

People were warned about erosion problems when they built homes there. Raleigh cannot be expected to bail people out of trouble every time.

The state is not concerned about the loss of some public beach area. It will always own everything below the mean highwater mark--no matter where it is. The hundreds of thousands of dollars spent on an erosion control project will benefit only local residents. If an erosion program is approved, you believe the cost should be kept low.

Finally, you think the maintenance of West Inlet should probably be stopped. It may be contributing to the erosion problem, and the fishing industry should not be hurt too much by this action.

Student Handout

LOCAL PROPERTY OWNERS

You want protection now! You have considerable money invested in property and if some action is not taken soon your property is going to be washed away. You have already lost hundreds of feet of beach-front property. If people in the state government do not wake up and do something soon, Clinton will be on the coast!

You admit that you are asking government to protect your private property, but the beach in front of your property is public. Everybody uses the beach, not just you. Isn't it fair for the government to pay to protect this public property?

Another problem that seriously affects you is the declining value of your property due to the erosion threat. Even if you wanted to sell your property and move, you could not get very much money for it. If erosion protection is built, though, the value of your property will increase again.

You do not particularly care about cost; any protection is better than none. This is especially true since you can get no personal property insurance to cover losses from erosion.

Further, the idea of relocation seems absurd to you. You saved for years to build your house on the ocean. After all, what is the point of having a beach house that is not on the beach?

Finally, you favor option #5, the ending of the maintenance of West Inlet. Older property owners tell you that erosion has been worse since the jetty was built to help keep the inlet open.

Student Handout

FISHING GROUPS

Your main concern in this issue is to be sure that the dredging of the West Inlet continues and that the jetty is not torn down. If people vote against maintaining West Inlet, it will seriously affect your fishing intersts. West Inlet is the only opening to the sea for several miles. The extra time and expense in traveling the extra miles to another opening will cost your fishing business considerable money. Some fishing outfits will likely be forced to go out of business.

If Option #5 is chosen fishing operations in the area will have to charge more for their products. If people think they will save money be voting for Option #5, they are wrong. They will have to pay for it in terms of higher fish prices. And, they will probably put several people out of work who might then go on welfare.

Further, there is no solid evidence that ending the maintenance of the inlet will lessen erosion along Shifting Sands Beach. If scientists are not sure it will make a difference, why do it?

Student Handout

TOURIST GROUPS

Your major concern about the erosion problem is the loss of the beach area. Most tourists come to Shifting Sands Beach to swim, sunbathe, collect shells and enjoy the wide, smooth beaches. If the beach erodes away--and several hotels in the area have already lost valuable beachfront property--fewer tourists will come to Shifting Sands Beach.

If tourism drops off, it will mean less money for the entire community. Many people will lose their jobs.

You think the idea of doing nothing to control erosion is ridiculous. Groins and beach replenishments projects have worked in other areas. This may be expensive, but you feel that no cost should be spared in saving the beach area. However, you are definitely against the seawall proposal. While seawalls can keep the ocean from damaging property, they often cause the beach in front of the walls to erode faster than they normally would.

Student Handout

ENVIRONMENTAL REPRESENTATIVES

You believe that all erosion control projects are only temporary measures. Nature will win in the end. Sometimes these projects have unforeseen, adverse effects. Seawalls are the worst idea because they cause the beach to erode faster then it normally would. Seawalls may protect property for a short time, but they ruin the beach.

Beach replenishment does not always work either because if the new sand pumped onto the beach is too fine, it quickly blows away.

You also believe that since the general level of the ocean is rising throughout the world due to the ice caps melting, erosion is inevitable. Putting in a few groins or seawalls will not stop a worldwide process.

Finally, you approve of the plan to stop maintaining West Inlet. You believe there is a good chance that erosion along Shifting Sands Beach would lessen if the jetty were removed. As far as you are concerned, this is just another good example of how people have fouled up nature by trying to control it.

You are against spending any tax money on erosion control; if people were foolish enough to build on the beach they should pay the consequences.

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 4: BLUE NECK BAY

ADDITIONAL NORTH CAROLINA MATERIALS

Reading, "CAMA Comes to the Coast"
Transparency, "CAMA Comes to the Coast--Political Process"
Worksheet, "CAMA Comes to the Coast--Political Process"

OVERVIEW

Students read a case study of the passage of the Coastal Area Management Act (CAMA). Using information they learned in the previous "Political Process" lesson, students identify the majoy political actors in the CAMA case and analyze the roles they played.

PROCEDURE

1. The reading, "CAMA Comes to the Coast" can either replace the "Blue Neck Bay" reading or can be used as an additional case study.

2. Use the same procedures outlined in the "Blue Neck Bay" lesson. A complete version of the Student Worksheet is given below. Students may complete their worksheets with some slight deviations from this key. However, major errors should be noted and discussed. (A completed worksheet is included at the end of this lesson.)

3. After students have completed the diagram ask:

   a. What did the environmentalists and other concerned citizens do to try to slow or halt development?

      [They formed public interest groups; they put pressure on the General Assembly to pass CAMA.]

   b. What did the former developers and other coastal representatives do to allow development to continue?

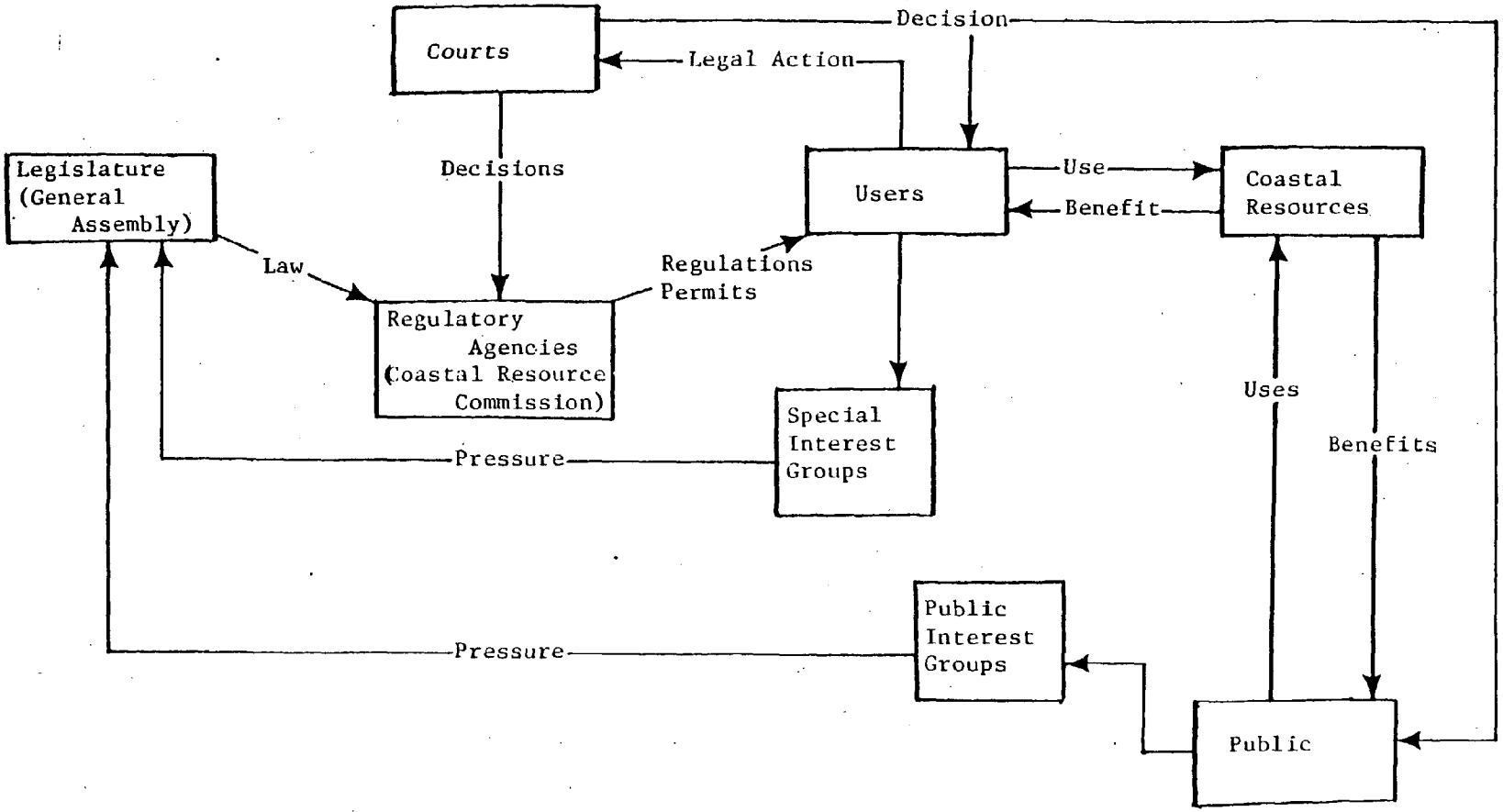
      [They formed special interest groups; they put pressure on the General Assembly to defeat or change CAMA: some property owners eventually filed a lawsuit against CAMA.]

   c. Looking at the diagram, what else might the proper opposing CAMA do in the future?

      [They could go back to the legislature with new proposals to weaken or abolish CAMA; they could continue to challenge the decisions of the regulations agency (the CRC) in court; they could mount a campaign to get public opinion to oppose CAMA, the public would pressure the General Assembly; students may think of other tactics.]

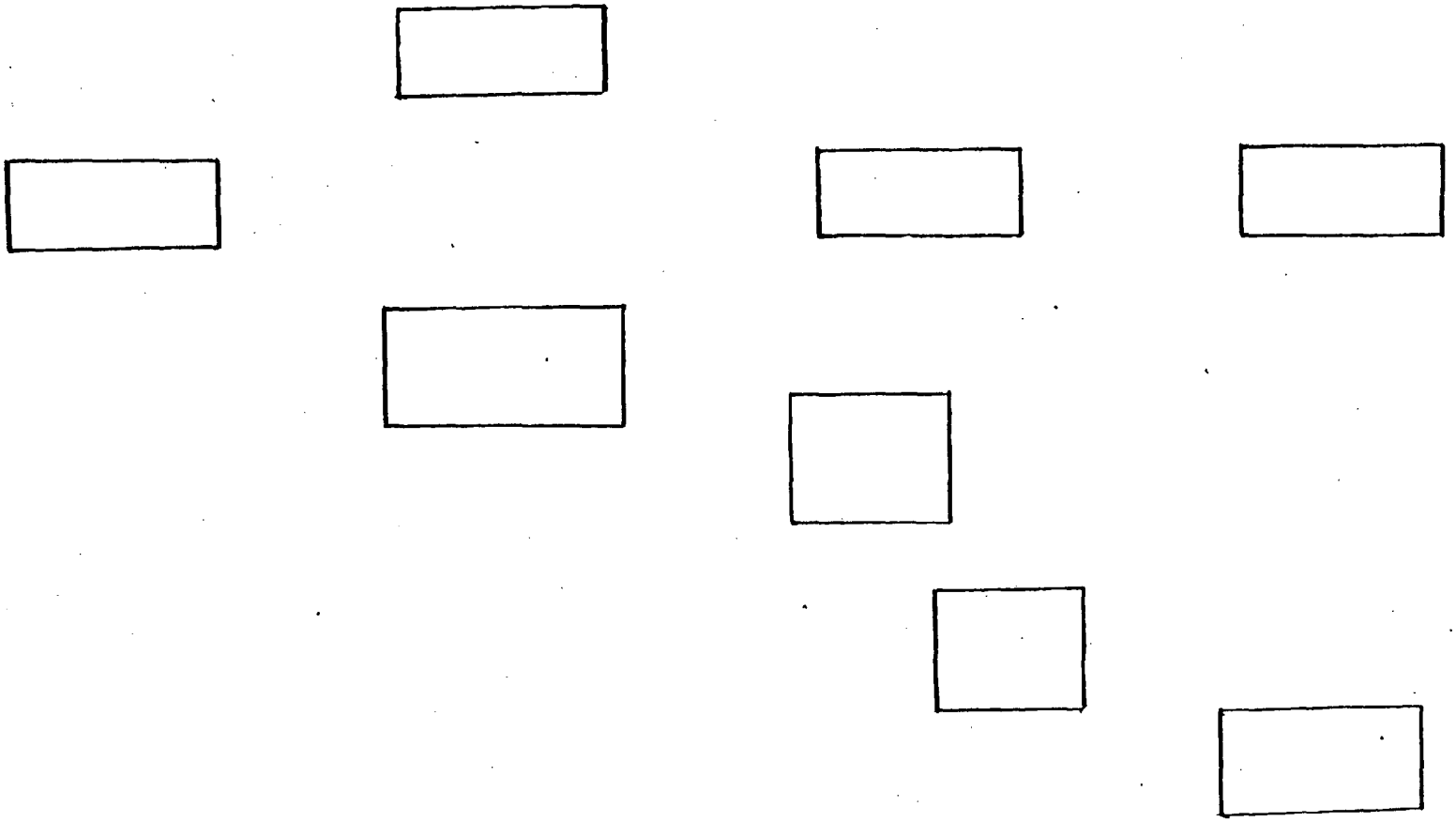
Answer Key

CAMA COMES TO THE COAST—POLITICAL PROCESS



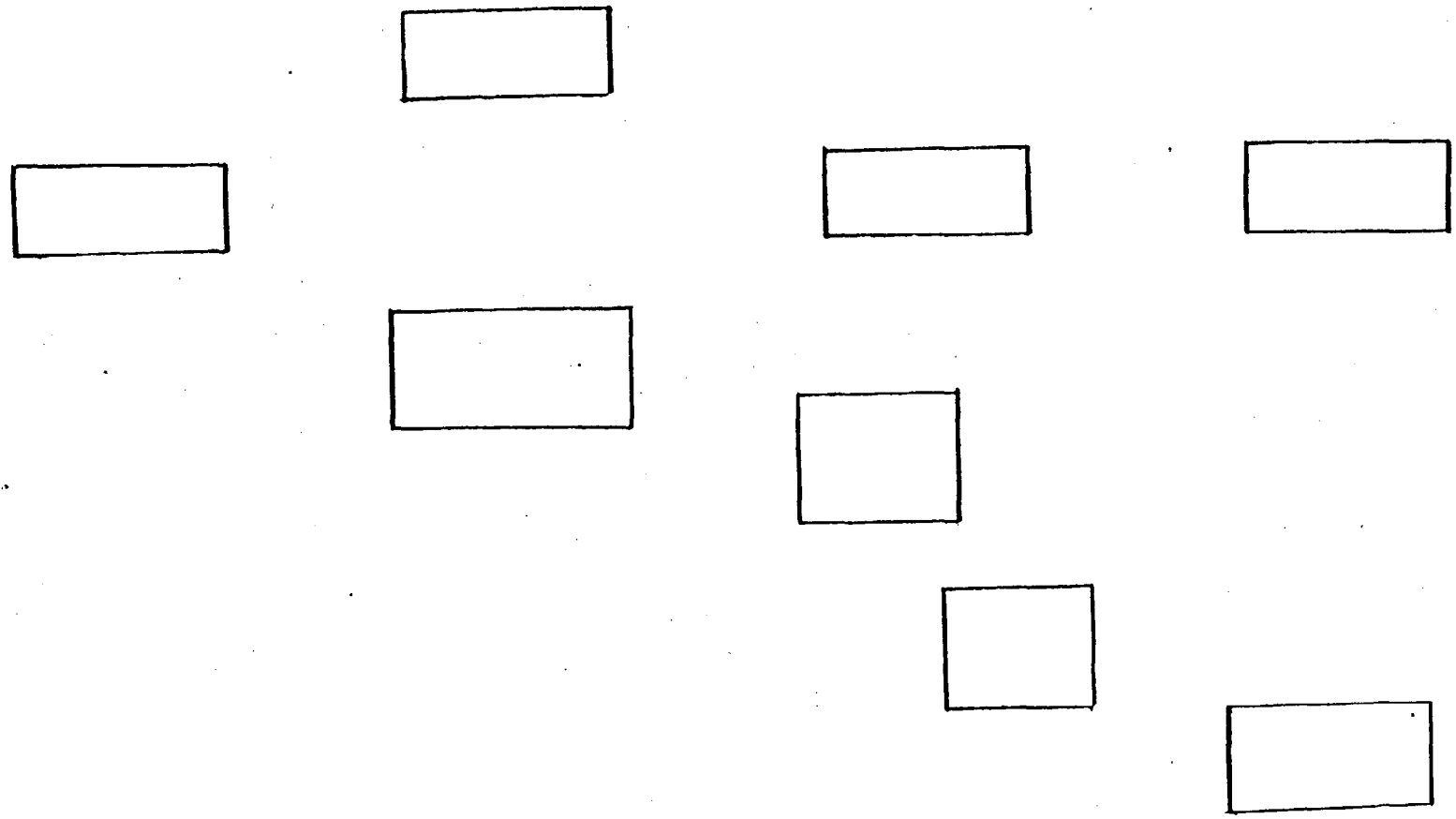
Unit III, Lesson 4
Transparency

CAMA COMES TO THE COAST--POLITICAL PROCESS



Student Worksheet

CAMA COMES TO THE COAST—POLITICAL PROCESS



Student Reading

CAMA COMES TO THE COAST

North Carolina's roots reach back to the coast. The Outer Banks and areas bordering the sounds provided the first home for many early settlers in North Carolina. The early pioneers of Dare and Hyde and Carteret counties grew accustomed to the scorching summer heat, the pesky mosquitoes, and the unpredictable Atlantic.

For many others, however, the barrier islands and the sounds were not attractive. A hundred miles inland the mosquitoes disappeared, the weather was less harsh, and the Atlantic could be forgotten. During the 1800's and the first half of this century the focus of growth moved inland to the inner coastal plain, the piedmont and beyond.

During this time, the coast remained largely untouched by the industrial development of the inland areas. The solitude and relaxed life-style of the coastal region pleased many of its residents, but some began to feel the coast was falling out of step with the rest of the state. Economically, the coastal area was second-rate; the standard of living was generally much lower than the rest of the state.

Coastal development in the 1950's and 1960's helped create a number of environmental problems.

During the prosperous times of the 1950's and 1960's the North Carolina coast experienced significant economic growth. The economy expanded due to rapid increases in the tourism and recreation industries. Summer weekend population of some counties was 50-100% greater than normal. Motels, hotels, vacation cottages, mobile homes, and new recreation areas appeared almost overnight. In addition, agricultural and timber operations expanded. Industry moved into New Hanover County.

While many on the coast welcomed these new activities, serious problems emerged with this increased development. Environmentalists and other concerned citizens warned that this rapid development disturbed the natural beauty of the coast. The fishing industry complained that filling of the marshlands areas for economic development and other pollution problems lowered their catch. But others argued that development was needed, particularly more industry, if the coast was to achieve a standard of living comparable to the rest of the state. As one developer put it, "Many of these people doing the complaining are people who already have built their weekend cottages. Now that they've got their share of the coast, they don't want to share it with anybody else."

This debate touched the North Carolina State Legislature. Some groups argued that North Carolina needed new laws to stop further development. They wanted strict legislation to save the coast from what they saw as the destruction of a beautiful and fragile natural resource. Other groups, including farmers, developers, and business leaders from the coast pressured the General Assembly not to pass any such legislation. Development must continue, they argued, so that the full economic potential of the coast can be realized.

Perhaps the strongest fear of the pro-development forces was that Raleigh would be telling them what to do with their property. Their sense of independence, nurtured by the many years of relative isolation from the rest of the state, would not permit such an arrangement. "We know what is best for us," the coastal

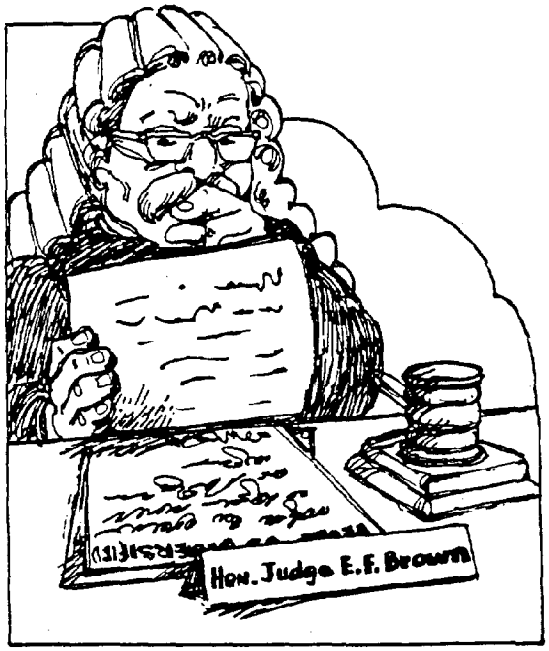
Representatives from many coastal counties opposed the CAMA.

representatives protested. In response to these criticisms, many parts of the proposed legislation were changed so that local officials were given more control in making decisions about the use of their coastal areas.

After two years of intense debate, the General Assembly passed the Coastal Area Management Act (CAMA) in 1974. The law created a new Coastal Resource Commission to protect and guide development in the coastal region. The Commission would develop land use plans and regulate development in the areas of environmental concern. These particularly fragile areas included two to three percent of the wasted land area and all of the water.

Despite the approval of CAMA, many coastal citizens did not give up their opposition to the state's new law. Several landowners in Carteret, Onslow, and Hyde counties filed a lawsuit in 1976 protesting the constitutionality of the law. They argued that the state legislature could not legally approve CAMA because CAMA was not a statewide law. CAMA only affected 20 counties, and therefore was just a "local law." The suit charged that laws like CAMA could only be passed by the counties, not the state. Further they claimed CAMA placed so many

restrictions on what they could co with their land that it made their land nearly worthless. It was not fair, they said, that they could not develop their land the way in which they wanted.



Two court decisions have upheld the CAMA.

The court, however, ruled against the landowners. The court ruled that while CAMA did only directly affect 20 counties, these counties constituted a subsection of the state with unique and urgent environmental problems.

The landowners appealed this decision to the North Carolina Supreme Court, but they failed there also. The court dismissed claims concerning too many restrictions on the use of their land because the CAMA had not had any such effect yet. The court decisions mean that users of the coastal region's resources will still have to follow CAMA's rules and regulations.

MAJOR STEPS IN "CAMA COMES TO THE COAST"

1. Coastal residents use coastal resources in a number of ways.
2. Coastal residents receive numerous benefits from the coast.
3. The public recieves recreational and other benefits from coastal resources.
4. Public interest groups go to the General Assembly to argue that new laws are needed to protect the coast from increasing development.
5. Special interest groups oppose such legislation.
6. The General Assembly passes the Coastal Area Management Act (CAMA) in 1974 creating a new agency to guide coastal development (the Coastal Resources Commission).
7. The Coastal Resource Commission began to write regulations and issue permits to control the uses of coastal resources.
8. Several owners of coastal land filed a lawsuit against CAMA.
9. The court ruled against the lawsuit.
10. The court's decision meant that the Coastal Resources Commission could continue to guide coastal development.

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 6: MANAGEMENT TOOLS

ADDITIONAL NORTH CAROLINA MATERIALS

Reading, "Resource Management: Six Examples from North Carolina"

OVERVIEW

Students read six examples of resource management in North Carolina. They then identify the management tool used in each example and analyze the advantages and disadvantages of each tool.

PROCEDURE

1. The reading, "Resource Management: Six Examples from North Carolina," replaces the six examples provided in the original reading. (If you wish, you can use the original set for review or as a short quiz to test student's ability to identify the six resource management tools.)

2. Pass out the North Carolina reading after students have finished the first section of reading III-5, "Managing Coastal Resources."

3. Have students read the six North Carolina examples. After they finish, ask students to explain what management tool was used in each example.

   a. What resource or activity is the government trying to control?

   b. What management tool is the government using?

   [Example 1: a. The government is trying to maintain public access to the beach.

   b. The management tool is the purchase or acquisition of land. By acquiring ownership to this land, governments can control how the land is used.

   Example 2: a. Government is trying to control where certain kinds of buildings or activities can be located.

   b. Government is using the management tool of zoning.

   Example 3: a. Government wants to control the construction of boathouses and piers in Bogue Sound.

   b. Government is using a regulation and permit system.

   Example 4: a. Government is trying to encourage development in Brunswick County.

   b. Brunswick County has established a low tax rate to attract development. A higher tax rate might discourage development.

Example 5: a. Government is attempting to improve water quality or reduce pollution. Most communities feel they are too small to need zoning and, secondly, many are too poor to implement such a system.

b. Government is reaching this objective by directly improving a sewage treatment facility. This tool is called improvement of public facilities, or capital improvements.

Example 6: a. Goverment is trying to protect certain fragile environmental areas.

b. Government is trying to direct major new developments away from these areas. This strategy may be called the placement of key facilities.]

4. Have students look at the third section of the original reading "Analyzing Management Tools." Follow the procedures outlined in the Teacher's Guide for the remainder of this lesson.

5. You may want to point out to students during the analysis of the various management tools that very vew coastal communities in North Carolina have zoning.

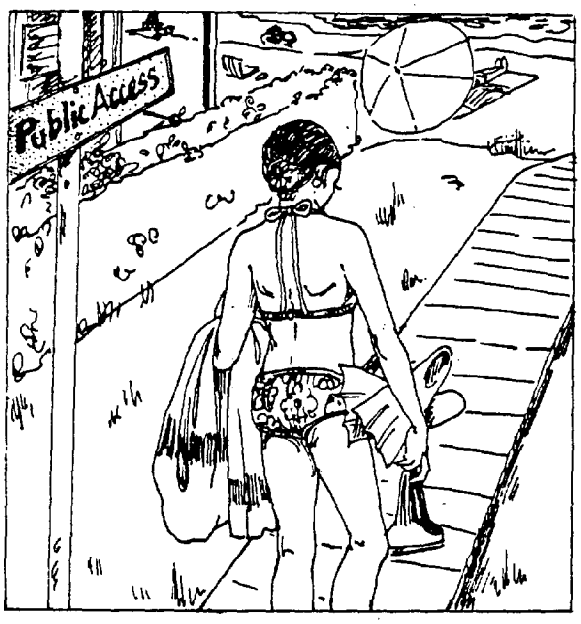
6. As a special project, the class could investigate which of these management tools are used or favored by their community or county.

Student Reading

RESOURCE MANAGEMENT: SIX EXAMPLES FROM NORTH CAROLINA

SHORELINE ACCESS AT LONG BEACH

The town of Long Beach recently purchased a small section of land from private owners in order to assure public access to the shoreline. A walkway was purchased so that the public would continue to have easy access to the beach despite continued development in the area.



The purchase of land by government, for such uses as public walkways is one way government can influence the use of coastal areas.

GUIDING DEVELOPMENT IN THE COASTAL COMMUNITIES

A few large communities on the Carolina Coast, such as Wilmington and Morehead City, have established laws specifying how land may be used. Certain types of buildings such as hotels or factories may only be located in certain areas. Specific activities, such as agriculture, are set aside for other areas. In this way, communities can generally control how land is used and can limit or encourage certain kinds of development in specific locations.

WATERFRONT CONSTRUCTION ON BOGUE SOUND

The Board of Commissioners of Emerald Isle in Carteret County recently passed new rules regarding the building of all boathouses and piers into Bogue

Sound. The major regulation prohibits any pier from extending more than 75 feet into Bogue Sound waters. This regulation was passed because the Commissioners felt large structures ruined the Sound's natural landscape and obstructed shoreline recreation. All construction plans must be submitted for approval before any construction permits will be issued.

DEVELOPMENT IN BRUNSWICK COUNTY

Brunswick County has a low property tax rate, which means owners pay less taxes on their homes, cottages and businesses than they would if they lived in other counties. This low rate attracts builders to Brunswick County and many shorefront buildings line the beaches. This low tax rate policy has resulted in many construction-related jobs and a growing local economy.

SEWAGE TREATMENT IN CARTERET COUNTY

Swansboro presently uses a primary sewage treatment system with no chlorination. The effluent goes north into the White Oak river. Subsequently, acres of water are closed to shellfishing. The town is planning to install a secondary aeration system with chlorination. The effluent will go south into Foster's Creek. This change will eventually allow over 2,500 acres of prime shellfish growing areas to be opened to fishing.

AREAS OF ENVIRONMENTAL CONCERN (AECs) ALONG THE CAROLINA COAST

North Carolina's Coastal Area Management Act (CAMA) designates several parts of the North Carolina coast as "areas of environmental concern. (AECs)." Ocean beaches, frontal dunes, inlets, marshes, and other fragile natural resources are included in the AEC classification. Any development in AECs must proceed cautiously because the environment there may be easily damaged or destroyed by human actions. One result of this identification of AECs is for governments to try to locate major new developments (such as bridges, roads, sewage treatment plants, etc.) in less hazardous areas.

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 7: LOCAL VERSUS REGIONAL CONFLICTS

ADDITIONAL NORTH CAROLINA MATERIALS

Transparency, "Local-Regional Conflicts in North Carolina: Who Pays for Erosion Control?"

OVERVIEW

Students view a transparency and hear a description of local-regional conflicts in North Carolina.

PROCEDURE

1. This transparency is designed to be the last in the series of transparencies on local-regional conflicts. The preceeding transparencies and accompanying description are provided in the original lesson.

2. Show the transparency, "Local-Regional Conflicts in North Carolina: Who Pays for Erosion Control?", after the final transparency on the City of Long Beach, California ordinance.

   Give students the following information:

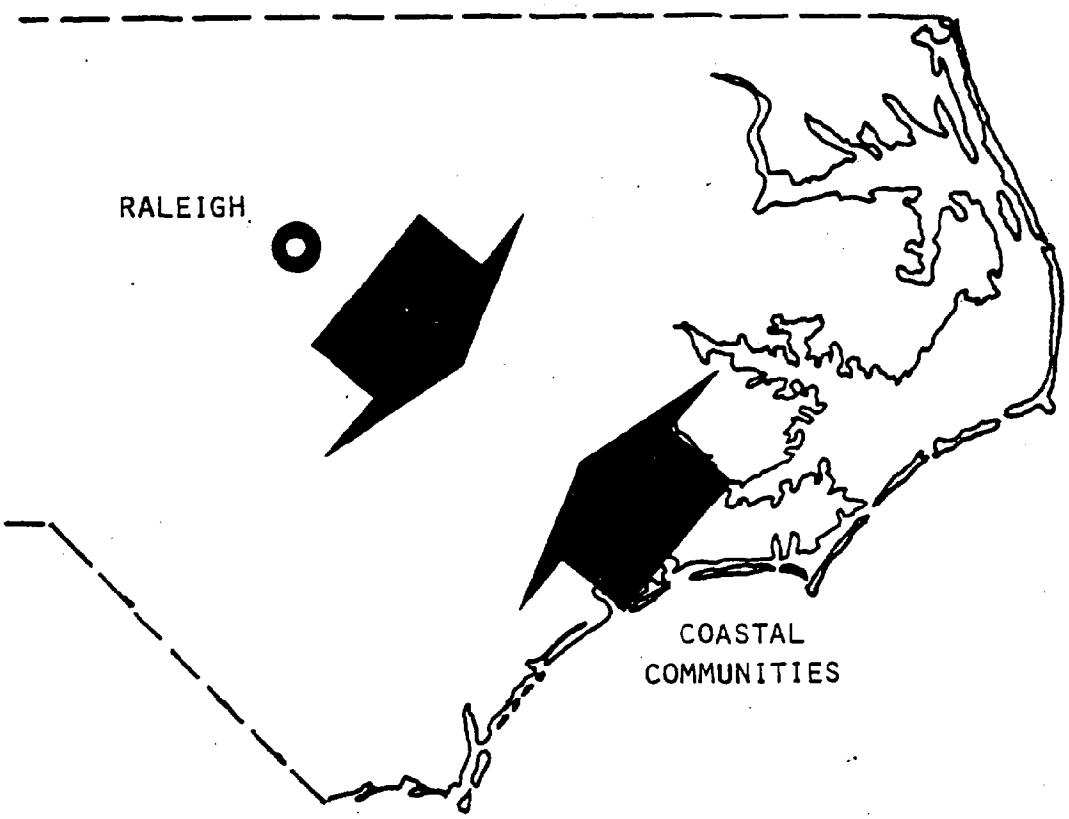
   A good example of local-regional conflicts in North Carolina is represented by the debate over who should pay for erosion control. Shoreline communities, like Long Beach, Topsail Beach, Emerald Isle, and Wrightsville Beach are threatened by erosion. Local officials want to provide protection because it will bring many benefits to their community. Erosion control projects protect homeowners and help keep the beach wide so tourists will continue coming to their area. And, since the state pays 80% of the costs, local officials favor this policy.

   State officials, however, are beginning to wonder if all their money is "going down the ocean drain." Since the early 1960's, the state has spent $1 million on erosion control. While some beaches have been saved, the state believes the general public has received very few benefits from this investment. Most of the benefits seem to be going to a few beachfront property owners. Consequently, the state is considering cutting back on its share of the cost. In the future it would like to pay only 20% of the bill. In this case, state officials are trying to change the funding of erosion control so that the area that receives the most benefits-the local community-also pays most of the bill.

3. Ask the class if they can think of any other local-regional conflicts between the coastal area and the rest of the state.

LOCAL-REGIONAL CONFLICTS IN NORTH CAROLINA:

WHO PAYS FOR EROSION CONTROL?



UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

LESSON 10: THE TAKING ISSUE: LEGAL LIMITS TO REGULATION

ADDITIONAL NORTH CAROLINA MATERIALS

Reading, "The Case of the Shrinking Cottage"

OVERVIEW

Students read an account of a potential "taking issue" case in North Carolina. In a mock courtroom scene, students present each side of the case before the "judge" (the teacher). The actual outcome of the situation is then revealed.

PROCEDURE

1. The reading, "The Case of the Shrinking Cottage" and this short activity are designed to follow the conclusion of Lesson 10, "The Taking Issue: Legal Limits to Regulation."

2. Explain to the class that an interesting example of the conflicts between the rights of private property owners and the power of government to regulate land use has occured recently in Onslow County at West Onslow Beach. Some landowners there have discovered that new land-use regulations designed to protect the public's safety and the environment are seriously limiting what owners can do with their land.

3. Pass out the short reading, "The Case of the Shrinking Cottage," to each student.

4. After they have completed the reading, ask a student to summarize the main points in the reading. Then ask:

   a. What is the basic conflict in this situation?

      [Has the government (the state and the county) gone too far in restricting Mr. Minshew's use of his property?]

   b. Do you think Minshew should go to court? Why?

5. Have the class imagine that Minshew does go to court to sue the county and state. How would they argue his case? How would they defend the county and state?

   Divide the class into two groups. Group 1 represents Mr. Minshew and Group 2 represents the county and state. Announce that you will be render a final decision.

6. Students may work alone or in small groups within their larger groups. Give the class a few minutes to prepare their client's case. Suggest they use the "Balancing Process" worksheets as a guide in organizing their presentation.

Ask one person representing Mr. Minshew to present his case. Allow students from the county and state to respond. Ask for any other relevant information or arguments.

7. As "judge," announce a final decision based on how well each side argued the various aspects of the case. Refer to the relevant criteria described in the "Balancing Process" worksheet (the extent of economic damage, remaining uses of property, necessity of hazard protection, and provisions for a public good or service) in making your decision.

8. Explain to the class that, in reality, this case never made it to the courts (as of Summer, 1979). Minshew did get the county to agree, out of court, to allow him to build within three feet of the road. This gave Minshew the possibility of an 18-foot wide house.

   However, Minshew or another property owner in a similar situation may still decide to take their case to court. All the ingredients for a "taking issue" are certainly involved.

Student Reading

THE CASE OF THE SHRINKING COTTAGE

Mr. Brad Minshew obtained a permit on March 1977 to build a 36x60 foot cottage across a frontal dune on some land he owned at West Onslow Beach. Mr. Minshew's property lies between old U.S. Highway 210 and the ocean. The distance between the road and the dune is 20-30 feet.

In the spring of 1979, Minshew decided to begin construction of his new cottage. The site preparation involved destroying part of the West Onslow Beach dune system. Before he began, however, he discovered that new regulations passed since 1977 reduced the area in which he could build. The state Coastal Area Management Act (CAMA) had passed new regulations prohibiting construction on frontal dunes. Added to that, new Onslow County regulations increased the distance needed between the highway and the nearest building. This open space, called a "setback," was increased from 15 to 20 feet.

These two new regulations have, in effect, squeezed Mr. Minshew's property from both sides. He now has only <u>one</u> foot of property width left on which to legally build. His cottage, originally planned and approved for 36x60 feet would now have to 1x60 feet. Can you imagine a beach cottage just one foot wide??

Both the state and county defended their new regulations. The state said that destruction of frontal dunes often leads to increased erosion. This could hurt Minshew's property as well as others. Also, destruction of dunes eliminates natural protection from storms and increases the possibility of damage to life and property. Onslow County officials claimed their extra setback requirement was necessary to protect motorists and increase highway safety.

Despite these arguments, Minshew is still left with only one foot of allowable building space. His property was valued at $21,500. Minshew has said, "$21,500 is a very sizeable investment. The loss could destroy a family."

UNIT IV: CASE STUDIES IN RESOURCE MANAGEMENT

LESSON 2: THE ECONOMY AND THE ENVIRONMENT

ADDITIONAL NORTH CAROLINA MATERIALS

Reading, "Whose Beach Is It, Anyway? Cape Hatteras National Seashore and Off-road Vehicles"
Worksheet, "Planning Worksheet"

OVERVIEW

Students read a description of the problem of off-road vehicles (ORVs) on the Outer Banks. They then fill out a "Planning Worksheet" which lists the economic, environmental, and political/social implications of the proposed restrictions on ORVs.

PROCEDURE

1. The reading, "Whose Beach Is It, Anyway?" may replace or be used in addition to the BASF case.

2. Hand out the reading, "Whose Beach Is It, Anyway?" to the class. After they have finished, have them complete the "Planning Worksheet." This worksheet is similar to the one they have completed in Unit III, Lesson 5.

3. When students have completed their worksheets, go over their answers to see if they have covered all the major points in the reading. Ask:

   a. Is there any other information you would like to have before you make a decision on this case?

   b. What decision would you make? Why?

   c. What decision do you think the Park Service will make? Why?

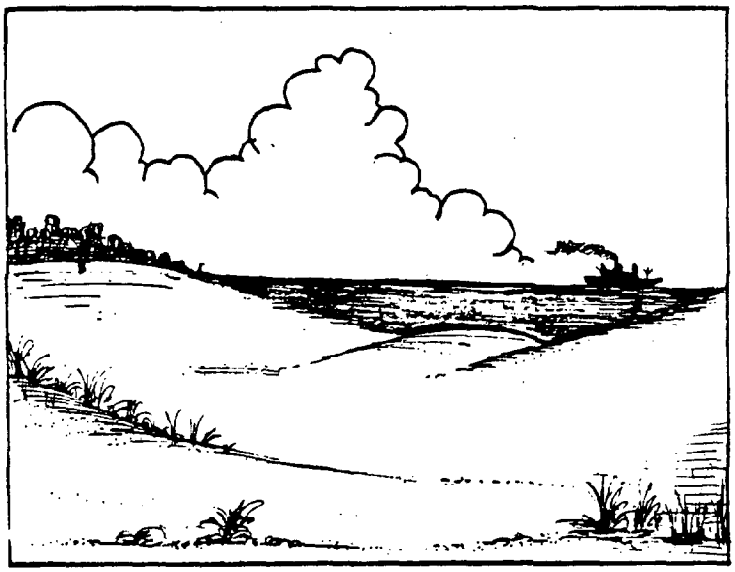
   d. What facts seem most important in helping you reach your decision?

Student Reading

WHOSE BEACH IS IT, ANYWAY?

CAPE HATTERAS NATIONAL SEASHORE AND OFF-ROAD VEHICLES

A hurricane of protest and debate has hit the Outer Banks recently concerning the use of off-road vehicles (ORVs). In the eye of the storm is the National Park Service's proposal to close about one-half of the Cape Hatteras National Seashore to ORVs. The Park Service claims the move is necessary to protect the fragile ecology of the barrier islands, and to provide room for others who also have a right to use the beach.



Park officials want to protect the dune areas from overuse.

The use of beach buggies, the most common ORVs on the seashore, has increased significantly in the past years. One-quarter of all vehicles now entering the National Seashore are 4-wheel drive vehicles. The increase in environmental damage and complaints from other users, (e.g., walkers, campers) has grown along with the use of ORVs, according to the Park Service.

The Park Service proposal will completely close one-half of the seashore to ORVs, and restrict their use on another one-quarter of the beach to a seasonal basis. Only 25 miles of the 73 mile long National Seashore will be open year-

round to ORVs.

The ORVs restrictions might not be quite so controversial if it were not for the fact that many of the people affected are surf fishermen. The Hatteras lifestyle is meshed with surf-fishing. Fishermen say they need the ORVs to get to the ocean to folow the migrating fish up and down coast. (There are no roads in many areas of the National Seashore.) Banning ORVs will not only adversely affect their catch, but will threaten a way of life these people have enjoyed for years.

Fishing is best in early spring and from September to December. Any restrictions on vehicular traffic during this time would result in a serious economic setback. One fisherman said as he placed his hands on hips and stared out at the ocean, "This is really going to hurt us, no question about it. But what a lot of people forget is this area gets a lot of recreational fishermen too. The tourist economy is also going to suffer." The owner of a tackle shop agrees: "There are a lot of us who have financial commitments that depend on the use of off-road vehicles on a year-round basis."

County officials fear that the loss in tourism and fishing could cost Dare and Hyde counties up to $13 million. This doesn't include a potential decline in the sale of 4-wheel drive vehicles. Car dealers as far away as Norfolk, Virginia predict significant losses in sales if the Park Service proposal is approved.

While it is relatively easy to put a price tag on the loss to the economy, it is very hard to estimate the value of the ORVs restriction to the environment. Nonetheless, park officials and environmental groups are certain the ORVs ban is needed. They argue that sand roads and tire tracks cut deeply into the shore area and lead to the destruction of vegetation. Since dunes are stabilized by the growth of vegetation, ORVs vehicles can help cause dunes to migrate.

Tire tracks and roads also act as a magnet for storm waves. High water,

which would normally fan out over the beach, is sometimes channeled into these ruts and creates a temporary "river" that can badly erode inland areas.

Running vehicles on the beach also bothers shorebirds and other organisms that depend on the shoreline for their existence. Park officials have discovered that areas with heavy ORVs traffic have practically no nesting shorebirds.

Damage to the natural environment is not the only reason for the Park Service plan. Seashore visitors who want to swim, take quiet walks along the beach, or sunbathe on the warm sands, often find themselves dodging ORVs rather than enjoying the natural scenery. "I like to camp and I'm a beachcomber," says one frequent visitor. "People like me shouldn't be threatened by Beach Buggies. There has to be room for everyone."

When local residents of the Outer Banks hear these kinds of complaints, they point the finger at a small minority who abuse and neglect the seashore environment. Local fishermen claim they are not the ones mainly responsible for environmental problems or are the people creating a hazard to other beach users. But, they do agree that beach traffic could be restricted in the summer-fun months of June, July, and August. Fishermen feel this alternative plan would not seriously affect their catch and would clear the beach of ORVs during the crowded vacation period.

Other plans have also been suggested by those who feel the Park Service proposal is too stiff. The final decision will be a difficult, and probably an unpopular one. The goal of "room for everyone" is not easy to reach along the National Seashore.

Answer Key

PLANNING WORKSHEET

QUESTION: Should the use of off-road vehicles in Cape Hatteras National Seashore be restricted?

ECONOMY

ADVANTAGES	DISADVANTAGES
	Lower income for Hatteras fishermen Loss of income for tourism and from recreational fishing (Up to $13 million in Dare and Hyde counties) ORV dealers will lose income

ENVIRONMENT

ADVANTAGES	DISADVANTAGES
Restriction will help protect dunes Erosion will be reduced Vegetation and shorebirds will be protected	

POLITICAL/SOCIAL

ADVANTAGES	DISADVANTAGES
Will help create a more natural and peaceful beach area (better for sunbathers and beachcombers)	Could alter life-styles of Hatteras fishermen Recreational fishermen will lose fishing opportunities

Are there any other advantages or disadvantages to restricting off-road vehicles in the National Seashore that should be considered, but do not fit into these three categories?

Student Worksheet

PLANNING WORKSHEET

QUESTION: Should the use of off-road vehicles in Cape Hatteras National Seashore be restricted?

ECONOMY

ADVANTAGES

DISADVANTAGES

ENVIRONMENT

ADVANTAGES

DISADVANTAGES

POLITICAL/SOCIAL

ADVANTAGES

DISADVANTAGES

Are there any other advantages or disadvantages to restricting off-road vehicles in the National Seashore that should be considered, but do not fit into these three categories?

UNIT IV: CASE STUDIES IN SHORELINE MANAGEMENT

LESSON 3: ENERGY AND THE ENVIRONMENT: THE NORTHEAST ATLANTIC

ADDITIONAL NORTH CAROLINA MATERIALS

Transparency, "Oil Refineries in North Carolina"

OVERVIEW

Students view a transparency and consider other information regarding the location of petroleum-related facilities in North Carolina. The transparency locates existing and proposed refineries; discussion questions focus on the costs and benefits of locating such facilities on the North Carolina coast.

PROCEDURE

1. After students have completed Lesson 3, "Energy and the Environment: The Northeast Atlantic," explain that off-shore oil exploration in the Atlantic is not expected to take place off the North Carolina coast for some time. However, offshore areas to the north and south have already been leased to oil companies. The North Carolina coast may soon experience some indirect impacts if oil and/or gas is discovered in these nearby areas. New harbor facilities, refineries and/or petrochemical plants may be located on the Carolina coast.

   Explain that as of Summer, 1979, strikes of undetermined size have been made in the Baltimore Canyon area. However no verified major discoveries have been made along the East Coast. Nonetheless, with the uncertainty of Arab oil and its own growing industrial needs, North Carolina is beginning to feel the increasing demand for petroleum products.

2. Display the transparency, "Oil Refineries in North Carolina." Explain to the class that one small refinery already exists near Wilmington and two others are proposed. One is in Morehead City and the other in Brunswick County on the Cape Fear River.

   Since the proposed refinery in Brunswick County would be a large-scale operation, there is considerable controversy surrounding its potential impact. The refinery would be located on a 1,900 acre tract in an undeveloped area containing forests and old, marshy rice fields overgrown with wild rice. The refinery would be capable of producing up to 150,000 barrels of refined petroleum products per day.

   Ask the class the following questions to help them consider the pros and cons of this case, and to encourage them to develop a point of view regarding the establishment of oil facilities on the coast:

   a. What do you think some of the arguments would be in favor of the refinery?

[Increased oil supplies would be available to the state, especially the southern part; the nation needs the additional oil supplies; construction of the refinery would employ several people--in fact, 2,000 to 3,000 people would be employed in construction for about 2 years; the refinery would provide jobs--in fact, 200 to 300 people would be employed permanently; tax revenues will increase--in fact, Brunswick County is projected to receive an additional $750 million in taxes annually; students may find other reasonable arguments.]

b. What do you think some of the arguments would be against the refinery?

[The marsh area would be destroyed; pollution in Cape Fear River is likely; wildlife may suffer; students may develop other arguments.]

c. What other kinds of information would you like to have before you make a decision on this issue? Where could you find such information?

d. What decision would you make concerning the proposed refinery in Brunswick County?

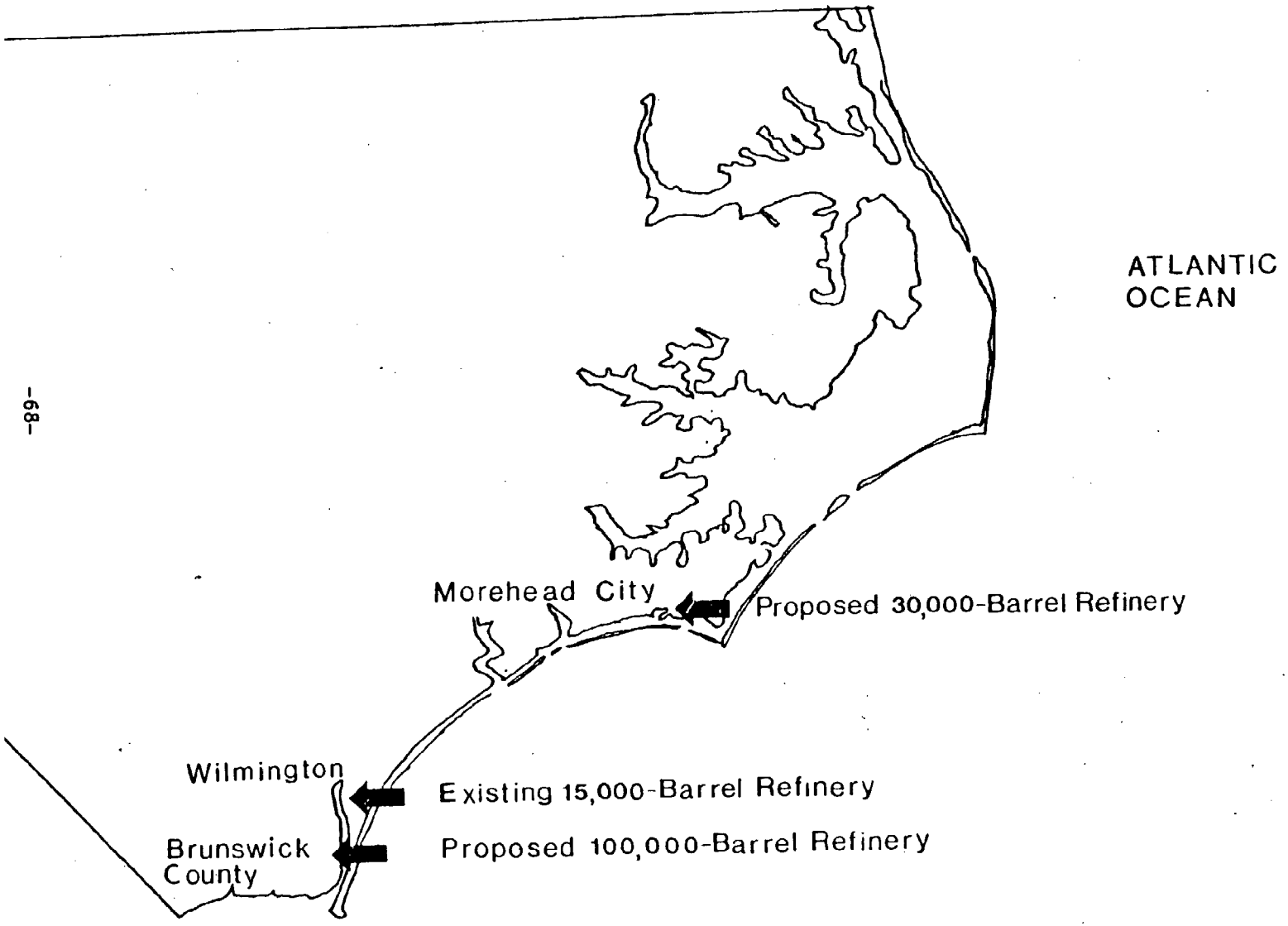
e. If you feel strongly about your opinion, how might you get involved in the political process to further your goal?

f. Generally speaking, what do you think the policy of the state should be toward the construction of oil refineries and other petroleum-related facilities on the coast?

[After students give their opinion on this issue, explain that the state, at present, is generally encouraging the location of petroleum-related facilities on the coast. The state currently supports the Brunswick County refinery, and supported the development of a liquid propane gas terminal on Radio Island at Beaufort. The gas terminal proposal was scrapped after environmentalists and Beaufort area residents opposed the project.

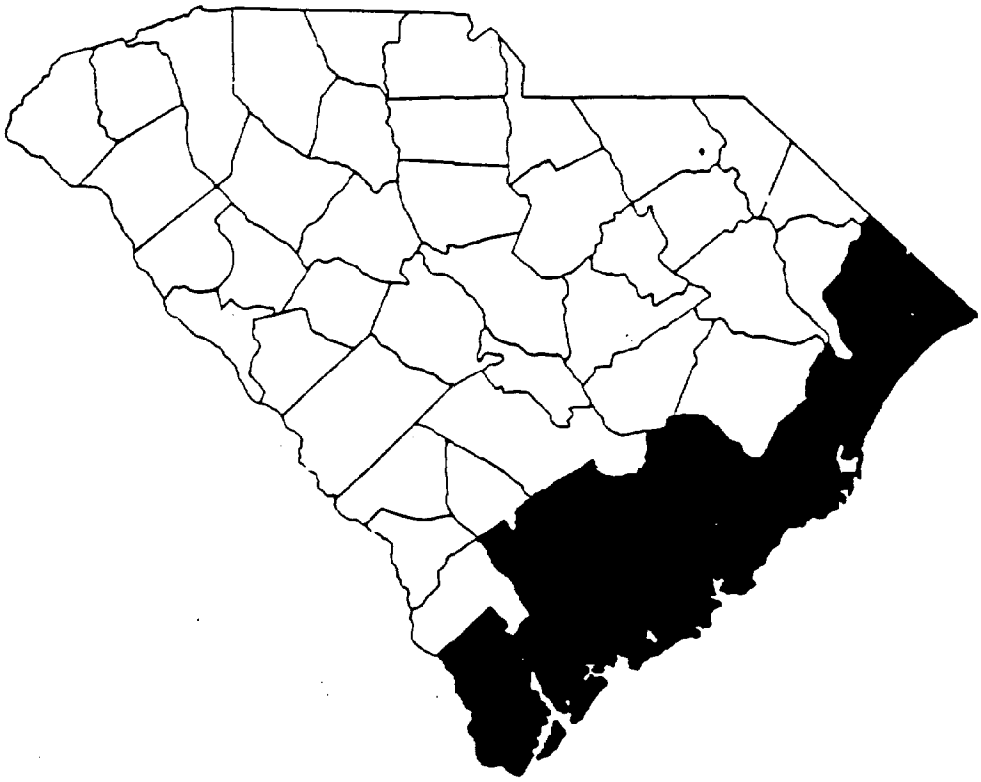
One regulatory agency of the state very concerned with this problem is the Office of Coastal Management (created by the Coastal Area Management--CAMA). The policy of this agency is that energy-related facilities, including oil refineries, are necessary to the continued development of the coastal region and of the state. The major problem, then, is not *if* such facilities should be allowed on the coast, but *where* should they be located so negative impacts are held to a minimum.]

Unit IV Lesson 3
Transparency
"Oil Refineries in North Carolina"



SC SUPPLEMENT

SOUTH CAROLINA SUPPLEMENT TO COASTAL PROBLEMS AND RESOURCE MANAGEMENT



A Publication of
the South Carolina Dept. of Education, Columbia,
and the South Carolina Coastal Council, Charleston,
South Carolina
1980

SOUTH CAROLINA SUPPLEMENT TO COASTAL PROBLEMS AND RESOURCE MANAGEMENT

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Production assistance from the University of Hawaii was provided by Sharon Dongug and Diane Kita.

This South Carolina Supplement is designed to accompany the course, Coastal Problems and Resource Management, developed by the Curriculum Research and Development Group, University of Hawaii.

A NOTE TO SOUTH CAROLINA TEACHERS

The Coastal Problems and Resource Management (CPRM) materials include several case studies and examples of problems in various coastal regions which illustrate the general ideas and concepts in the course. This reliance on case studies provides numerous opportunities to replace or supplement the original materials with examples highlighting a specific coastal region.

This South Carolina Supplement to CPRM contains a variety of case studies and other examples which describe and analyze coastal issues in South Carolina. These local examples, combined with other national studies in CPRM, offer South Carolina students a sense of the broad scope of coastal problems and provide relevant examples familiar to South Carolina residents. Local materials have been developed for the following CPRM lessons (South Carolina titles are in parentheses):

UNIT I: AT THE WATER'S EDGE

Lesson 1: The National Seashore Quiz (South Carolina Seashore Quiz)
Lesson 2: Coastal Features (Coastal Features of South Carolina)
Lesson 3: Our Local Coastline (A Survey of the South Carolina Coast)
Lesson 9: Coastal News Report (South Carolina Coastal News)

UNIT II: UNDERSTANDING COASTAL ECOLOGY

Lesson 1: Coastal Ecosystems (The Santee-Cooper Canals)
Lesson 3: Pollution: What Is It? (Savannah River Update)
Lesson 6: Wetlands and Marshes: Problem or Resource (The Valuable Marshes of the Low Country)
Lesson 8: Tsunamis and Hilo, Hawaii (Shifting Sands Beach)

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

Lesson 2: Gaining Access (Beach Access Problems in South Carolina)
Lesson 4: The Case of Blue Neck Bay (The Wando River Case Study)
Lesson 6: Management Tools and Strategies (Management Tools in South Carolina)
Lesson 7: Local Interests versus Regional Interests (Who Pays For Erosion Control?)
Lesson 8: Jurisdictional Problems (Georgia vs. South Carolina)
Lesson 10: The Taking Issue: Legal Limits to Regulation (A Taking Issue in South Carolina)

UNIT IV: CASE STUDIES IN SHORELINE MANAGEMENT

Lesson 2: The Economy and the Environment (Recent Cases From South Carolina)
Lesson 3: Energy and the Environment (Oil and the South Carolina Coast)
Lesson 6: Shoreline Management: State Initiatives (The South Carolina Coastal Council)

In some instances, the South Carolina materials can replace materials already in the course. At other points, the local adaptations can be used in addition to the basic course materials. Teacher instructions as well as a copy of all student materials and transparencies are included in this supplement.

Student materials should be reproduced for use in the classroom. Student worksheets and handouts are identified at the top of the page. The first page of each student reading carries a small "logo" of a shrimp boat superimposed over a map of the state.

The South Carolina Coastal Council and the State Department of Education provided funds for the research, writing, production, and dissemination of the South Carolina Supplement.

UNIT I: AT THE WATER'S EDGE

Lesson 1: THE NATIONAL SEASHORE QUIZ (SOUTH CAROLINA SEASHORE QUIZ)

ADDITIONAL SOUTH CAROLINA MATERIAL

Worksheet, "South Carolina Seashore Quiz"

OVERVIEW

Students take a short quiz about the South Carolina coastal region. The quiz is designed to encourage students to think about the low country. It is not intended to be graded as a test.

PROCEDURE

1. These questions may be used to supplement the "National Shoreline Quiz" questions provided in the student workbook.

2. Pass out the worksheet, "South Carolina Seashore Quiz." Students should answer these questions after they have finished the "National Seashore Quiz."

   Be sure to change the "Sea-Q" scale at the end of the "National Seashore Quiz" to reflect the larger number of questions.

3. Answers to the South Carolina questions are:

   1. Eight. The counties are Jasper, Beaufort, Colleton, Dorchester, Charleston, Berkeley, Georgetown, and Horry.

   2. The ocean-front shoreline is approximately 200 miles long. (If you measure around all the islands, up the streams and creeks to where the saltwater influence ends, the total South Carolina coastline is many, many miles longer.)

   3. "C" South Carolina was first settled on the coast. The coastal area is rich in historical and cultural sites.

   4. Horry County.

   5. Charleston, Georgetown, and Port Royal.

   6. True. After marsh grass dies, the products of its decomposition form a rich source of nutrition for small fishes and shellfish.

   7. "B" Even though the amount caught is lower following very cold winters, shrimp remain the most valuable catch over all the other fisheries.

   8. "D" In addition to areas set aside as either wildlife refuges or parks, are lands on which state agency and federal government agency facilities

are located.

9. "C" Along the shoreline, there are more miles of beach and marsh than forest land, but when you consider the eight-county area as a whole, forest land dominates.

10. "D"

Student Worksheet

SOUTH CAROLINA SEASHORE QUIZ

1. According to the Coastal Zone Management Act of the state of South Carolina, how many counties are included in the state's coastal zone?

   _____

2. What is the approximate length of South Carolina's ocean-front shoreline?

   _____

3. Which of the following cities was settled first?

   a) Greenville
   b) Columbia
   c) Charleston

4. Which county leads the coastal zone in tourism?

   _____

5. Name South Carolina's three ports.

   _____
   _____
   _____

6. TRUE or FALSE Dead marsh grass is very valuable.

7. Which of the following brings in the greatest amount of income to the South Carolina fishing industry?

   a) Blue Crabs
   b) Shrimp
   c) Oysters
   d) Clams
   e) All fin fish

8. What percentage of South Carolina's ocean-front shoreline is owned by the State and Federal governments?

   a) 1%
   b) 15%
   c) 25%
   d) 33%

9. More than one-half of the land area of the South Carolina coastal zone is:

   a) marsh
   b) cropland
   c) forest
   d) urban

UNIT I: AT THE WATER'S EDGE

Lesson 2: COMMON COASTAL FEATURES (COASTAL FEATURES OF SOUTH CAROLINA)

ADDITIONAL SOUTH CAROLINA MATERIALS

Reading, "Coastal Terminology - South Carolina Coastal Features"
Worksheet, "Diagram of South Carolina Coastal Features"

OVERVIEW

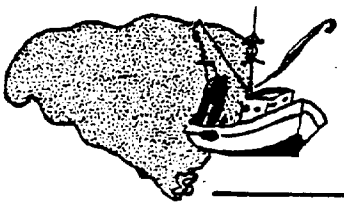
Students read about several common coastal features of the South Carolina coast. They then identify these features and others on a diagram of the coastal area.

PROCEDURE

1. After students have completed identifying pictures of common coastal features in their workbooks, pass out the reading "Coastal Terminology - South Carolina Coastal Features." After Students have completed this reading, ask if there are any questions. Ask students to give an example from the South Carolina coast of each feature listed in this second reading.

2. Pass out the worksheet, "Diagram of South Carolina Coastal Features." Have students identify as many coastal features as they can. Their list should include features from both Coastal Terminology readings.

3. A completed worksheet follows.



COASTAL IMPOUNDMENTS

Unique to South Carolina and several other South Atlantic coastal states are rice field impoundments dating back to times when rice culture was a source of great fortune to low country planters. Thousands of acres of tidal freshwater marsh (beyond the saltwater reach of high tide, but influenced by the ebbing and flooding of the tide) were diked by digging canals or ditches along the edges of the rivers and creeks and using the excavated mud to make an enclosing bank.

The majority of impoundments in existence today are managed to attract waterfowl for hunting. Because creation of impoundments destroys acreages of productive, natural marsh and converts the impounded areas into artificially managed environments, it is a questionable practice which must be approached with great care.

INLETS

Inlets are openings between the barrier islands. The main function of inlets is to provide passages for freshwater from the rivers to empty into the sea. Inlets also allow salt water to enter the sounds where it mixes with the freshwater from the rivers to produce the highly productive brackish water of the estuary. Inlets can open, close, and migrate up and down the beach. Slow and steady erosional forces or the sudden forces of storms can drastically alter the shape of an inlet. New inlets can open during storms, often in areas where washovers occur. Tides moving through the inlets help to move sand to the back side of the islands, where it remains. This results in the landward migration of the islands.

MARITIME FOREST

The evergreen forest of salt-tolerant trees and other plants that inhabit the back portions of barrier islands is called the maritime forest. Common trees of the forest include live oak, palmetto, laurel oak, loblolly pine, magnolia, Red bay, and yaupon holly. While providing habitat for animals such as the alligator, fox squirrel, bobcat, raccoon, and white-tailed deer, the maritime forest also helps maintain the freshwater supply on the barrier islands. The thick ground cover retains rainwater and keeps the underground water supply "refilled."

MUD AND SAND FLATS

Long, flat stretches of soft, dark silt (mud) and sand are called mud and sand flats. These areas, found within the saltwater rivers and creeks, are covered during high tide and become exposed when the tide is low. Mud and sand flats form in the following manner. As currents slow down, the heavier

sand particles drop to the bottom of creeks and rivers to form sand flats, leaving the lighter clay and silt sediments in suspension. When the currents become very slow the clay and silt settle out to form mud flats. Permanent residents include worms, crustaceans, clams, and snails as well as microscopic bacteria, diatoms, and blue-green algae. Mud and sand flats teem with life.

As the tide comes in and covers the flats, animals such as blue crabs and various species of fish arrive to feed on the worms, clams, snails, and crustaceans. With the rhythmic change of the tide, the flats become exposed once more, and a new group of predators arrives-creatures such as shore birds, ducks, otters, and raccoons. People, too, are attracted to the flats for fishing, digging clams, and birdwatching.

OYSTER REEFS (oyster bars, oyster beds)

Clusters of oysters, called reefs, bars, or oyster beds are found in many sections of coastal rivers and creeks. Oyster reefs form over a period of time as oyster larvae, carried by tidal currents, find and attach themselves to a suitable base. The animals then become sessile or immobile and mature into adults. As thousands of other oyster larvae continue to attach themselves to the base or to the sessile adults, the oyster reef increases in height, width, and length. Other organisms such as algae, sponges, bryozoans, barnacles, mussels, and worms live on the reef surfaces, and still other animals find shelter in crevices formed by the reef growth. In time an entire balanced community of plants and animals evolves.

SHOALS

Shoals are mud or sandy areas that are separated from the shore. They lie just beneath the surface of the water. Sometimes shoals are exposed at low tide. These areas are particularly hazardous to navigation.

SOUNDS

Sounds are the shallow bodies of water located between the barrier islands and the mainland. Protected from the storms and rough waters of the ocean by the barrier islands, the sounds are generally calm, highly productive areas which host a wide variety of marine life.

TIDAL CREEKS

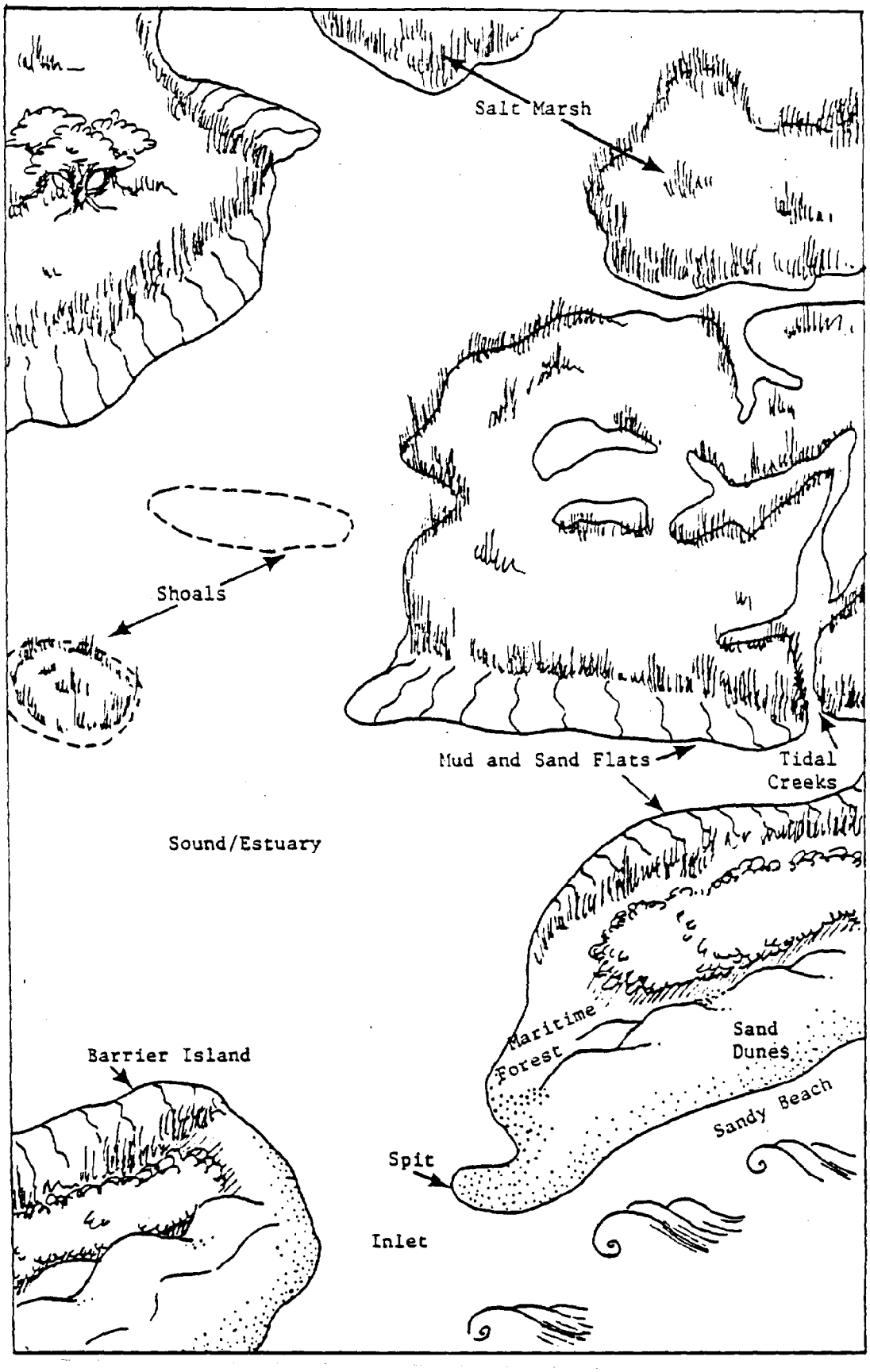
Tidal creeks are the natural "water pipes" of the salt marsh. At high tide, water moves into the low marsh areas through the network of small tidal creeks. At low tide, the water drains back through the creeks into the estuary or sound. Tidal creeks carry important nutrients from the marshes into the estuaries and are a vital link in the estuary food system.

WASHOVERS

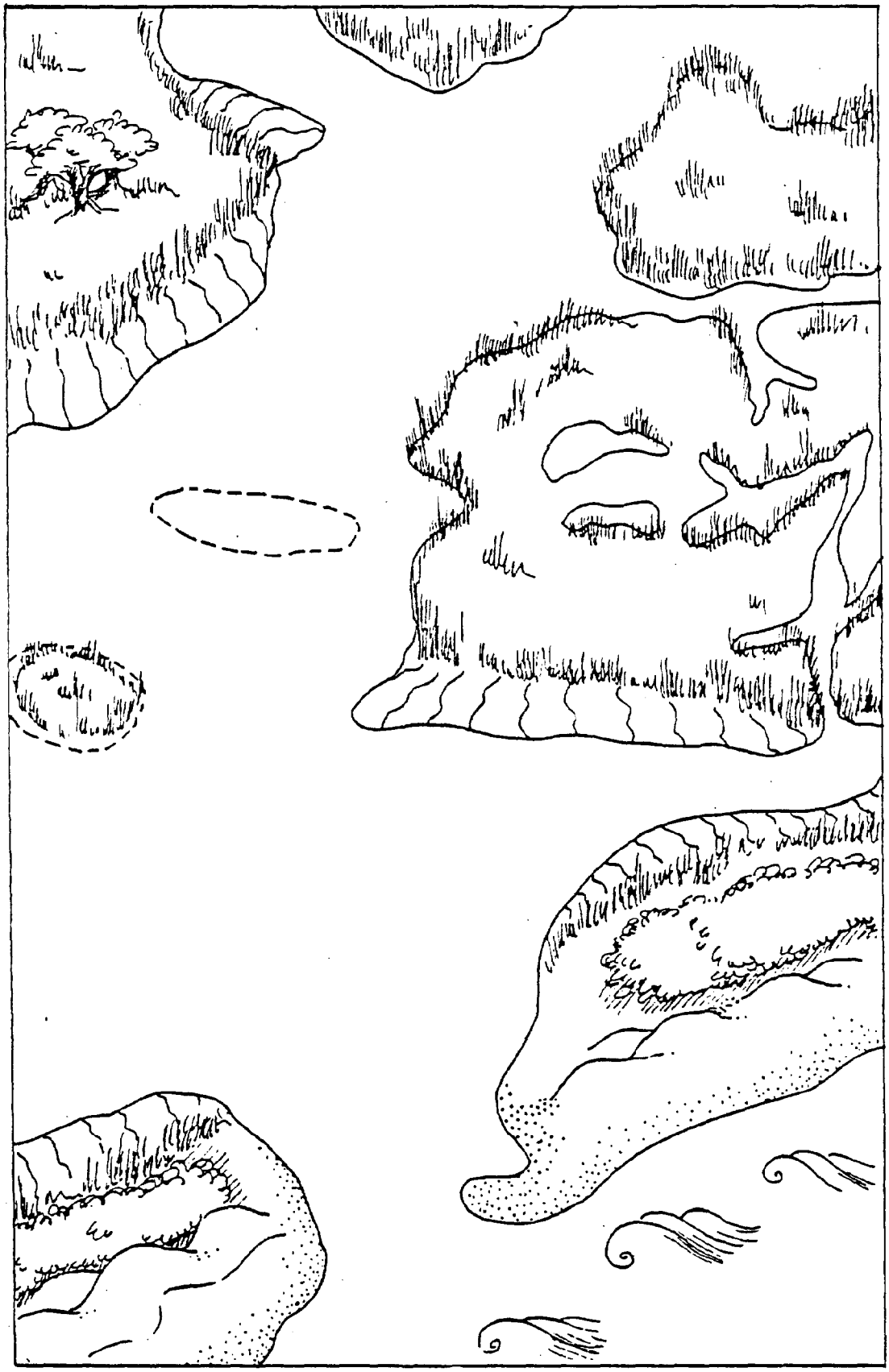
Washovers occur when storm surges, generated by wind and waves, are so great that the ocean breaks through the beach and dune area. The storm pushes massive amounts of water over the beaches beyond the dunes, and sometimes across the islands to the sound side. This process gradually pushes the island closer to the mainland shore. Washovers help counter erosional forces on the sound side by supplying new sand to this area.

Answer Key

COMMON COASTAL FEATURES IN SOUTH CAROLINA



COMMON COASTAL FEATURES IN SOUTH CAROLINA



UNIT I: AT THE WATER'S EDGE

Lesson 3: OUR LOCAL COASTLINE (A SURVEY OF THE SOUTH CAROLINA COAST)

ADDITIONAL SOUTH CAROLINA MATERIALS

Slides of South Carolina coast (optional)
Worksheet, "South Carolina Shoreline Survey"

OVERVIEW

Students first draw a map of the South Carolina coast and locate several important features on it. They then view a series of slides to acquaint them visually with the coast. Finally, they complete a worksheet that surveys their knowledge about the coastal area.

PROCEDURE

1. Ask students to take out a blank piece of paper and draw a map of the South Carolina coast. Have them locate a few major cities, parks, rivers, and famous cultural/historical sites.

   This is a useful way for you to see what kind of "image" or "mental" map of the coast your students have. Misconceptions about the shape of the coast or the location of key places are common. This is a "for fun" activity and probably should not be graded.

   A possible follow-up to this activity is to make transparencies of a couple of maps that greatly differ and show these to the class.

   Finally, if students find this activity harder to do than they thought, tell them to try it out on their parents. It usually is not that easy for anybody!

2. If you have several slides of prominent, well-known areas of the South Carolina coast, show these to the class. Slides can also be obtained from the South Carolina Coastal Council. Ask students to try to identify the location of each slide. Ask them to explain what evidence they used to identify the location. Encourage debate if students have different answers. (If you do not have slides, you could use a number of color or black and white photographs, mounted on cardboard or another sturdy surface.

3. Show the slides again, asking students to describe what general features are pictured in each slide. Ask for a short, one- or two-word description.

   List the responses on the board.

4. When you have finished the slides, ask:

   a. Does the list provide an adequate description of the coast?

   b. Are there features not represented in the slides?

c. Which slides seemed to you to capture or summarize your feelings about the South Carolina coast?

d. If you could add a picture, what would it be?

5. Hand out the "South Carolina Shoreline Survey." First, have students compare their maps with the map on the first page of the worksheet. Check major points of agreement and disagreement.

   Then, ask students to fill out the survey. Remind them to read the short note of explanation above the map. They should circle what they think is the best answer for each question.

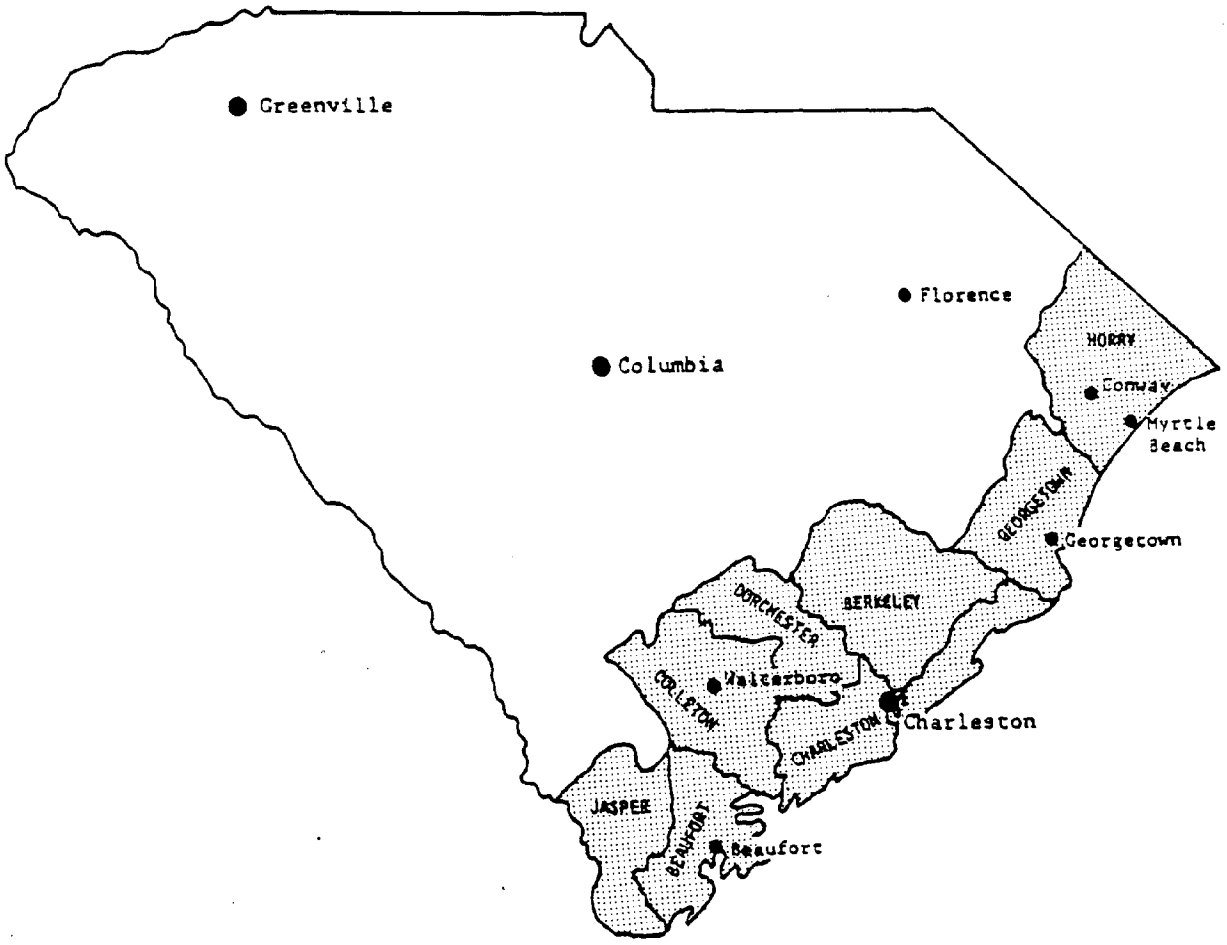
6. After they have finished, go over the correct answers using the debriefing information provided in the survey answer key.

7. A possible homework assignment is to have students report on South Carolina's coastal region. They might do this from the perspective of a first-time visitor or a travel agency trying to encourage tourists to visit the South Carolina coast.

Student Worksheet

SOUTH CAROLINA SHORELINE SURVEY

On the following pages you are to give your opinion about several aspects of the South Carolina shoreline. Remember that the coastal area consists of eight counties which border the ocean, sounds, and major rivers emptying into South Carolina's coastal waters. This area represents nearly 23 percent of the area of the state (see map below). Be sure you consider this entire area as you answer the questions.



Student Worksheet

SOUTH CAROLINA SHORELINE SURVEY

1. To what extent are these common coastal features found in South Carolina? (Circle the best answer.)

CORAL REEFS	Seldom	Sometimes	Frequently
BARRIER ISLANDS	Seldom	Sometimes	Frequently
SANDY BEACHES	Seldom	Sometimes	Frequently
ROCKY BEACHES	Seldom	Sometimes	Frequently
WAVE-CUT CLIFFS	Seldom	Sometimes	Frequently
SALT MARSHES	Seldom	Sometimes	Frequently
ESTUARIES	Seldom	Sometimes	Frequently
SOUNDS	Seldom	Sometimes	Frequently
GROINS AND SEAWALLS	Seldom	Sometimes	Frequently
PORTS AND HARBORS	Seldom	Sometimes	Frequently

2. To what extent do these conditions or features occur along the South Carolina coast?

WATER POLLUTION	Seldom	Sometimes	Frequently
POPULATION	Seldom	Sometimes	Frequently
LARGE URBAN AREAS	Seldom	Sometimes	Frequently
GOVERNMENT-OWNED LAND	Seldom	Sometimes	Frequently
FOREST	Seldom	Sometimes	Frequently
AGRICULTURAL LAND	Seldom	Sometimes	Frequently
DEVELOPED SHORELINE (AREAS WITH HOMES, HOTELS, HARBORS, ETC.)	Seldom	Sometimes	Frequently
ADEQUATE SEWAGE FACILITIES	Seldom	Sometimes	Frequently
EROSION	Seldom	Sometimes	Frequently
HURRICANES	Seldom	Sometimes	Frequently

3. How important are these activities to the economy of South Carolina's coastal area?

TOURISM	Unimportant	Somewhat Important	Very Important
MANUFACTURING	Unimportant	Somewhat Important	Very Important
PORTS AND HARBORS	Unimportant	Somewhat Important	Very Important
COMMERCIAL FISHING	Unimportant	Somewhat Important	Very Important
FORESTRY	Unimportant	Somewhat Important	Very Important
AGRICULTURE	Unimportant	Somewhat Important	Very Important
OFFSHORE OIL	Unimportant	Somewhat Important	Very Important
LAND-BASED OIL FACILITIES	Unimportant	Somewhat Important	Very Important
MINING	Unimportant	Somewhat Important	Very Important
DEFENSE FACILITIES	Unimportant	Somewhat Important	Very Important

Answer Key

SOUTH CAROLINA SHORELINE SURVEY

1. To what extent are these common coastal features found in South Carolina?

CORAL REEFS

The best answer is "seldom." In fact, no coral reefs are found in South Carolina coastal waters. Only Hawaii and Florida in the U.S. have coral reefs.

BARRIER ISLANDS

The best answer is "frequently." Much of the coastline of South Carolina is formed by barrier islands. In fact, the Eastern coast of the U.S., south of New Jersey, and the Gulf coast are noted for their barrier islands. South Carolina has a total of forty barrier islands with some 200 miles of ocean shoreline.

SANDY BEACHES

The best answer is "frequently." Sandy beaches dominate South Carolina's Atlantic shoreline. This is not surprising, in that barrier islands almost always have sandy beaches on the ocean side.

ROCKY BEACHES

The best answer is "seldom." No rocky beaches are found along the South Carolina coast with the exception of a small outcrop of coquina at Myrtle Beach's Hurl Rock Park where erosion has lowered the beach surface and exposed the rock to view.

WAVE-CUT CLIFFS

The best answer is "seldom." Wave-cut cliffs are frequent in some areas of the country, but are not associated with barrier islands, and consequently, are not found in South Carolina. The coast is characterized by a low, gentle slope.

SALT MARSHES

The best answer is "frequently." Between the barrier islands and the mainland and along the edges of the saltwater creeks and rivers, salt marshes are abundant. In fact, South Carolina has 334,501 acres of salt marsh.

ESTUARIES

The best answer is "frequently." A total of seventeen (17) estuarine systems, including 504,445 acres of coastal marshlands, are found within South Carolina's

coastal zone. This figure includes both fresh and saltwater marshes.

SOUND

The best answer is "sometimes" when comparing South Carolina to a state such as North Carolina which has a total of 12 major sounds. South Carolina has six major sounds (i.e., long inlets or arms of the sea): Calibogue Sound, Port Royal Sound, St. Helena Sound, the North Edisto River, Charleston Harbor and Winyah Bay.

GROINS AND SEAWALLS

The best answer is "frequently." The majority of South Carolina's developed beaches, particularly those along the southern half of the coastline where erosion is prevalent, have groins and/or seawalls.

PORTS AND HARBORS

The best answer is "sometimes." There are three ports in South Carolina's coastal zone-Port Royal, Charleston, and Georgetown.

2. To what extent do these conditions or features occur along the South Carolina coast?

WATER POLLUTION

The best answer is "sometimes." Pollution in South Carolina waters is due to septic tanks, sewage systems, agricultural runoff, and industrial wastes. Many of South Carolina's coastal creeks, rivers, inlets, and sounds are free of pollution, and when compared with most other coastal zone states, South Carolina waters, in general, are clean.

POPULATION

The best answer is "sometimes." About 20% of the state's population lives in the eight coastal counties, and this coastal zone area is characterized by a very uneven distribution of population. During the tourist season a dramatic rise in population occurs in some areas, most especially in the Myrtle Beach area.

LARGE URBAN AREAS

The best answer is "seldom." The Charleston metropolitan area is the only area of significance with reference to size of population.

GOVERNMENT-OWNED LAND

The best answer is "frequently." Approximately one-third of the State's ocean-front shoreline is owned by the State and Federal governments and is set aside as either wildlife refuges or parks. In addition to these areas are lands on which state agency and federal government agency facilities are

located, for example, the Marine Resources Center, the Charleston and Myrtle Beach Air Force bases, the College of Charleston, the Marine Corps Recruiting Depot on Parris Island, etc.

FOREST

The best answer is "frequently." Much of the State's coastal zone is forested land. The eight coastal zone counties contain a total land area of some 4,392,960 acres. The 1978 U.S. Forest Service statistics show that of this total land area, 2,961,876 acres are forested land.

AGRICULTURAL LAND

The best answer is "sometimes." A 1967 land-use survey identified 11.9 percent of the land in the coastal zone as cropland and 2.5 percent as pasture. The coastal zone's most valuable crop is tobacco with vegetable crops a close second. In 1975 the coastal zone's share of crops and livestock was 18.3 percent of the State total.

DEVELOPED SHORELINE (AREAS WITH HOMES, HOTELS, HARBORS, ETC.)

The best answer is "sometimes." Much of the South Carolina shoreline is undeveloped due in part to the pact that one third of the shoreline is government owned.

ADEQUATE SEWAGE FACILITIES

The best answer is "sometimes." Sewage treatment facilities are not adequate in some areas where population growth has been very rapid. In a number of areas septic tanks or inadequate or malfunctioning sewage treatment facilities have caused pollution in coastal rivers and creeks and have resulted in the closing of shellfish grounds.

EROSION

The best answer is "frequently." Erosion is a very serious problem along the South Carolina coast, particularly along the southern half of the coast in areas such as Folly Beach and Hilton Head Island.

HURRICANES

The best answer is "sometimes." The South Carolina coast has experienced a number of hurricanes, some of them very severe, since the time of the first European settlements.

3. How important are these activities to the economy of South Carolina's coastal area?

TOURISM

The best answer is "very important." Tourism is the second leading economic

activity in parts of the coastal area. For Myrtle Beach, tourism is the leading activity.

MANUFACTURING

The best answer is "somewhat important." Most of the coastal zone's industry is located in the Charleston and Georgetown areas; however, the majority of the coastal area remains only slightly affected by the impact of industrial development. The city of Beaufort is beginning to attract industrial development.

PORTS AND HARBORS

The best answer is "very important." Ports are crucial in that future growth of economic activities depends on adequate harbor facilities. Charleston Harbor, for example, is the nation's 12th leading port, and directly and indirectly supports 35,000 jobs in the state.

COMMERCIAL FISHING

The best answer is "very important." The fishing industry has traditionally been an important aspect of South Carolina's coastal economy. However, recreational fishing brings in a higher state revenue than does commercial fishing. The total economic impact of commercial and recreational fisheries in the coastal region of South Carolina is conservatively estimated to be $130,000,000 annually. Nearly $100,000,000 of this total comes from recreational fishing. This includes all money spent on fishing gear, lodges and restaurants, camping facilities, and other fishing-related expenses.

FORESTRY

The best answer is "very important." 19.2 percent of the state's forest land is located in the coastal zone. In 1975 the delivered value of coastal zone forest products was $52.1 million or 26.7 percent of the $195.1 million value for the whole state.

AGRICULTURE

The best answer is "very important." Agriculture, e.g., tobacco, soy beans and truck, is the leading economic activity in the majority of the eight coastal counties.

OFFSHORE OIL

The best answer is "unimportant." As of 1979, oil companies had not discovered oil off the South Carolina coast. Offshore discoveries in other locations along the East coast are having little impact on South Carolina.

LAND-BASED OIL FACILITIES

The best answer is "unimportant." No petroleum refineries presently exist in South Carolina. However, this may change in the future with oil and natural

gas companies looking to South Carolina for potential sites. A 30,000 barrel per day oil refinery is proposed for the Georgetown area.

MINING

The best answer is "somewhat." Minerals which are found in South Carolina's coastal zone include sand, gravel, shell, salt, and phosphates. Small mining operations for the retrieval of sand and gravel exist in areas throughout the coastal zone.

DEFENSE FACILITIES

The best answer is "very important." The military makes a large contribution to the local economy.

UNIT I: AT THE WATER'S EDGE

Lesson 9: COASTAL NEWS REPORT 1 (SOUTH CAROLINA COASTAL NEWS)

ADDITIONAL SOUTH CAROLINA MATERIALS

Teacher notes only.

OVERVIEW

Students are presented with a source for updated news reports on coastal issues.

PROCEDURE

1. To assist students in preparing for their Coastal News Report, give them the following address for updated newspaper clippings on coastal problems and issues:

   Louis Hern
   Information Specialist
   Suite 802, Summerall Center
   19 Hagood Avenue
   Charleston, SC 29403
   (803) 792-5808

UNIT II: UNDERSTANDING COASTAL ECOLOGY

Lesson 1: COASTAL ECOSYSTEMS (THE SANTEE-COOPER CANALS)

ADDITIONAL SOUTH CAROLINA MATERIALS

Reading, "Rollin' Down To The Sea: The Cooper River Rediversion Project"

OVERVIEW

Students read a description of the Cooper River Rediversion Project which demonstrates how one change in the environment can bring about many others. Some discussion questions are suggested.

PROCEDURE

1. After the class has completed Lesson 1, "Coastal Ecosystems," assign the reading, "Rollin' Down To The Sea: The Cooper River Rediversion Project." Explain that many of the main ideas discussed in the "Coastal Ecosystems" lesson are used in this reading. In particular, problems of salinity and sedimentation play a big role.

2. Ask the class what they know about the Cooper River Rediversion Project. Except for question "a," don't push for correct answers at this point. Answers to these questions will be found in the reading.

   a. Does anybody know what diversion means? What rediversion means?

      (Diversion means to turn aside, or to turn in another direction. Rediversion means to turn aside for the second time.)

   b. Why is the Cooper River being rediverted?

   c. Where will the water from the Cooper River go?

   d. Does anybody know what some of the consequences of the Rediversion Project might be?

   e. What might some of the consequences be, based on what you learned in the Coastal Ecosystems lesson?

   List the answers to the last two questions on the board. Tell students to look for confirmation of their predictions in the reading, and to make note of any other impacts they have not listed.

3. After students have completed the reading, ask:

   a. Why was the original diversion project undertaken?

   (To provide additional electricity for the Santee-Cooper area.)

b. What were some of the important consequences of that original project?

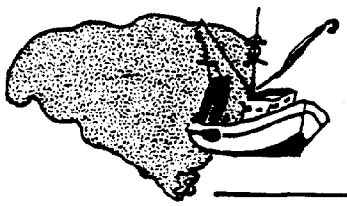
(An increase in the sedimentation of Charleston Harbor; a change in the salinity of both Charleston Harbor and the Santee River Delta; a change in the marsh ecosystems of both rivers; the ability to use Bushy Park Reservoir as a freshwater source; the creation of productive clamming and shrimp areas in the Santee and Cooper Rivers; and the growth of a multi-million dollar tourist and recreation industry in the Lake Marion-Moultrie area.)

c. Why is a new canal being built?

(To reduce the amount of silt and sediment in the Harbor so that expensive dredging practices can be cut back.)

d. What are some of the possible impacts of the new project?

(Saltwater intrusion into Bushy Park Reservoir; a change in the salinity of both Charleston Harbor and the Santee River Delta; a change in the marsh ecology of both rivers; a loss of shrimp and clam sites; flooding along the Santee River Valley; a reduction in the striped bass population in the Lake Marion-Moultrie area and the resulting loss of tourism business.)



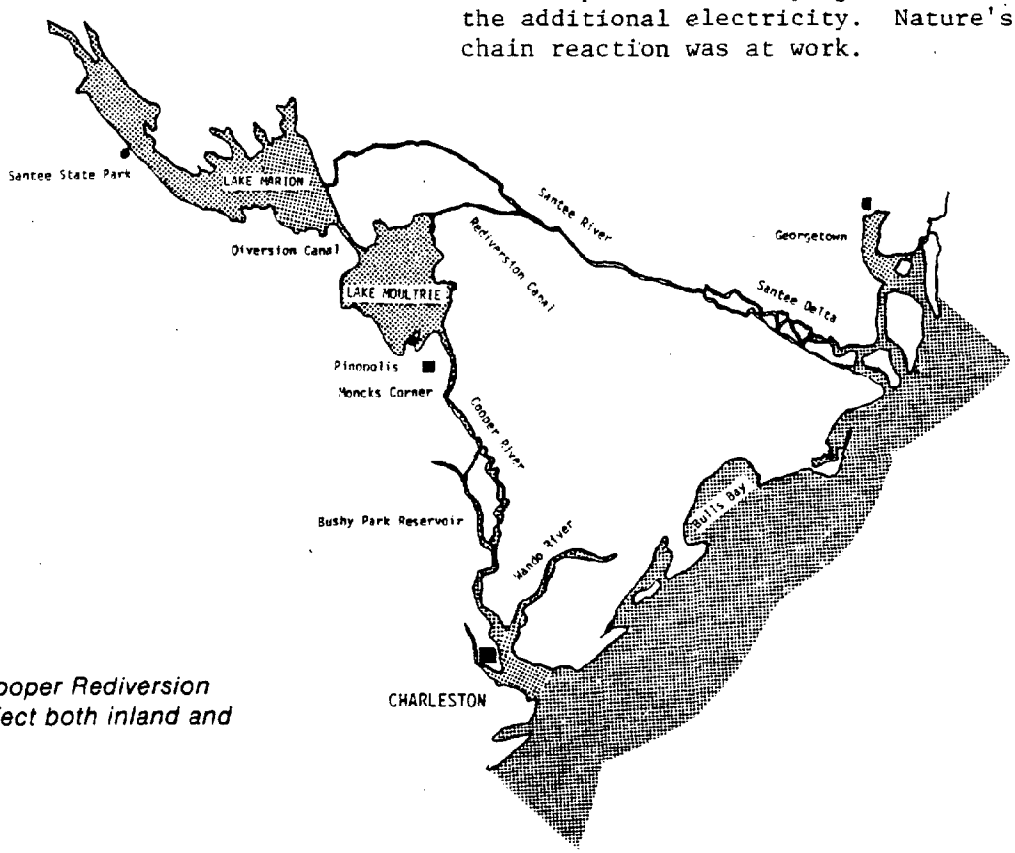
ROLLIN' DOWN TO THE SEA: THE COOPER RIVER REDIVERSION PROJECT

Changing nature is like triggering a chain reaction. One of the important lessons the study of ecology teaches is that all things in nature are connected in some way. Changes in one place will cause a reaction somewhere else. Nearly 40 years ago in South Carolina, people pulled the trigger that started one of nature's chain reactions. The impacts and consequences of decisions made then still affect us today, and will continue for years to come.

This story involves the Cooper and the Santee Rivers and connects three areas of the low country: Charleston Harbor; the Santee River Delta, about 40 miles north of Charleston; and the Lake Marion-Lake Moultrie region, some 50 miles inland.

The story begins in 1942 when the Santee-Cooper Diversion Project was completed. This project diverted much of the water from the Santee River to the Cooper. This was done to increase the flow of water in the Cooper for the purpose of generating more electricity for the Santee-Cooper area. To accomplish this goal, two large lakes, Lake Marion and Lake Moultrie were created, as well as the seven-mile diversion canal. A hydroelectric plant was built at Pinopolis Dam just below Lake Moultrie and began to generate significant amounts of electricity for the area.

The Santee-Cooper Diversion project was considered a success. However, in the years following 1942, low country residents began to notice other impacts of this project besides the additional electricity. Nature's chain reaction was at work.



The Santee-Cooper Rediversion Project will affect both inland and coastal areas.

CHANGES ALONG THE SANTEE

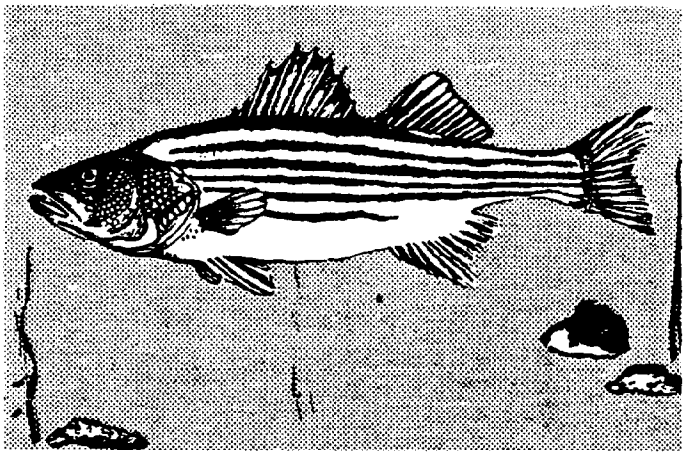
The Santee, which originally carried a tremendous volume of water to the sea, had long been accumulating silt and sediment at its mouth. The result was the Santee River Delta, one of the largest delta regions on the East Coast. The flow of freshwater also held back the influence of the tides, and salt water did not intrude very far up the Santee. Consequently, a large complex of freshwater marshes had evolved in the Delta region.

The diversion project changed the entire ecology of the river. The Santee now carried less water and fewer sediments. The delta stopped growing and began to erode. The tides could now extend their reach far up the Santee. Salt water began killing the fresh water plants and animals. Salt marshes slowly replaced many of the freshwater marshes.

While freshwater life suffered as the result of these changes in the salinity of the Delta region, saltwater inhabitants flourished in the new environment. Clams, in particular, moved into the area and fishermen soon followed. During the past 30 years or so, a sizeable clam harvest has yielded up to $300,000 a year.

CHANGES IN THE LAKE MARION-LAKE MOULTRIE AREA

Thousands of acres of agricultural and timber land were cleared and flooded for the new lakes, eliminating large areas from their former use. Some wildlife habitats were also destroyed. But several areas near the two lakes were designated as wildlife preserves, and the lakes were stocked with fish, including the striped bass. Small marinas were built at several locations for fishing boats and other pleasure craft. The result of these programs has helped create a multi-million dollar recreation industry in the Lake Marion-Moultrie region. Sports fishing provides the major source of income and the striped bass is prized as a major game fish.



The striped bass, one of the state's most prized gamefish, could find its home threatened in Lake Marion and Lake Moultrie.

CHANGES ALONG THE COOPER AND IN CHARLESTON HARBOR

Before the diversion project, the Cooper, which empties into Charleston Harbor, was a relatively small river. Tidal influence in the harbor was significant since the tides did not meet much resistance from the river. Salt water and brackish marshes were common along the Cooper.

After 1942, however, much of this changed. Millions of gallons of additional freshwater entered the harbor each day. The upper reaches of the Cooper changed drastically as the salinity dropped. The salt marshes there disappeared and were replaced

by fresh and brackish water plants and animals, just the opposite of what was happening in the Santee River Delta.

The range of salt water decreased to the point that a new freshwater reservoir was built just a few miles up the Cooper from Charleston. This could not have happened under the old conditions when the Cooper was a much smaller river. Bushy Park Reservoir now provides the city of Charleston with drinking water and is the site of five major industries, including DuPont and a South Carolina Electric and Gas Company plant. Each industry uses water from the reservoir for essential production operations, such as cooling and machine maintenance.

But of all the changes, both good and bad, created by the 1942 diversion project, none was more significant than the problem of sediment in Charleston Harbor. For the Cooper not only received water from the Santee, but also thousands of tons of sand, silt, and mud.

All this material, which prior to 1942 went down the Santee, now found its way into Charleston Harbor where it settled to the bottom and clogged shipping channels. Dredging of the harbor, needed occasionally before 1942, now became a year-round job. Dredges worked Charleston Harbor nearly continously, piling up the dredged spoil on diked disposal sites around the harbor. Each year enough material is removed from the harbor (material, remember, that should be resting in the Santee Delta) to fill a football field one mile high!

Removing this material would not be so critical if it were anywhere else but in the middle of one of the nation's leading harbors. Charleston is the largest port in the Southeast, and the 12th largest in the country. It is of vital importance to South Carolina. Over 1,500 businesses in the state depend upon the harbor for importing and exporting goods. The harbor channels must remain open for shipping.

In a few years, the U.S. Army Corps of Engineers, which is responsible for harbor dredging in the United States, may be faced with an extremely difficult problem. The Corps will eventually run out of diked wetlands on which to put the dredged spoil. Since passage of the State's Coastal Zone Management Act in 1977, it is no longer permissible to fill wetlands, and the expense of acquiring highland fill sites is very great. Another alternative, dumping the spoil into the ocean, is a possibility, but will require additional study to determine its potential impact on marine life.

A NEW CANAL

In the mid-1970's, the Corps began construction on a new project that it claimed would solve the sedimentation problem in Charleston Harbor. A new canal from Lake Moultrie to the Santee River would be built to redivert the water from the Cooper River back to the Santee. The sediments, or most of them, would once again flow down the Santee to the Delta region. Since this change would also reduce the amount of electricity generated at the Pinopolis Power Station, the Corps agreed to build a second plant along the new canal. The entire project is scheduled for completion in 1984.

While the project is likely to solve the sedimentation problem in Charleston Harbor, people are wondering what kinds of impacts this major new change will have on the environment. Diverting the flow of the river 40

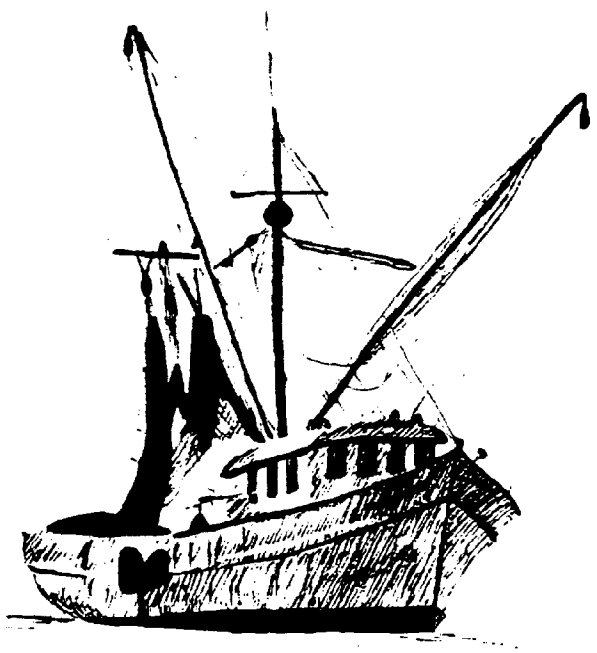
years ago brought many unforseen consequences, both harmful and beneficial. Where will nature's chain reaction lead this time?

LIKELY IMPACTS ALONG THE COOPER RIVER

The major changes occurring in the Cooper will result from the decreased flow of the river. Salt water will once again extend its range far upstream, and may reach as far as Bushy Park Reservoir. That could make the water unsafe for industrial use and undrinkable for people. Even small quantities of salt in the reservoir could damage sensitive industrial machinery. The plants would have to shut down or spend millions of dollars on new equipment. In the case of the South Carolina Electric and Gas Company power plant, new equipment would cost three to four million dollars and the costs would be passed on to consumers.

During a three-week period in 1979 when the Cooper was naturally running at a very low level, salt water did reach Bushy Park Reservoir, although not in sufficient quantities to cause problems. Industry officials were quite worried, however, and have asked the Corps for guarantees that salt water will not enter the reservoir after the canal is built. The Corps said it will do this by regulating the flow of water at Pinopolis Dam.

Other serious problems along the Cooper involve changes in Charleston Harbor. The harbor is now one of the most productive South Carolina Estuaries for white shrimp. The changes in salinity caused by the new canal would probably reduce this population considerably. How much effect this will have on the one million dollars a year shrimp catch near the harbor is unknown.



Shrimp boats may not be such a familiar sight in Charleston Harbor after the new canal is built.

Salinity is also expected to increase along the Wando River which could pose a serious threat to valuable oyster beds. Oyster predators that survive only in higher concentrations of salt water, will likely enter the river and damage oyster beds in Beresford Creek and the lower Wando.

LIKELY IMPACTS ALONG THE SANTEE

The increased flow of water down the Santee will mean that the Delta region will return to more of a freshwater environment. This means trouble for the clam industry that has developed in the past 40 years. The increased freshwater flow will also damage oyster seed beds in the Santee.

Upstream, the "new" Santee will be more likely to flood, spreading out over a wider area than it has since

UNIT II: UNDERSTANDING COASTAL ECOLOGY

Lesson 6: WETLANDS AND MARSHES: PROBLEM OR RESOURCE? (THE VALUABLE MARSHES OF THE LOW COUNTRY)

ADDITIONAL SOUTH CAROLINA MATERIALS

Student Reading, "The Valuable Marshes of the Low Country"

OVERVIEW

After students have discussed the status of wetlands and marshes across the nation, they then read an account of marshes in South Carolina. Review questions and some suggestions for further activities are also provided.

PROCEDURE

1. The reading, "The Valuable Marshes of the Low Country," should be assigned after students have read "Wetlands Face Murky Future" in the student book.

2. After you have discussed the "Wetlands" reading (using the questions suggested on pages 98-99 in the Teachers Guide) ask the students:

   a. Are the marshes and wetlands in South Carolina protected?

   b. Have marshes and wetlands in this state been filled in for development? Do you know of any specific examples?

   Don't provide the answers at this time, but encourage discussion. Then explain that the answers will be found in the reading, "The Valuable Marshes of the Low Country." Assign the reading as an in-class or homework activity. The follow-up questions listed in procedure #3 below can be assigned as written work or can be used for in-class discussion.

3. After students have completed the reading, use the following questions for review:

   a. According to this reading, why have the marshes of the low country been filled?

      (For residential, agricultural, industrial, and tourism developments)

   b. Which groups have been hurt the most by the continued filling and development of wetland areas?

      (Commercial and recreational fishermen, and many species of wildlife)

   c. What is meant by the statement, "The marsh is a nursery"?

      (Marshes provide both food and shelter for many species of fish and shellfish, especially in their larval stages.)

UNIT II: UNDERSTANDING COASTAL ECOLOGY

Lesson 3: POLLUTION: WHAT IS IT? (SAVANNAH RIVER UPDATE)

ADDITIONAL SOUTH CAROLINA MATERIALS

Teacher notes only.

OVERVIEW

Students are presented with recent information on the conditions of the Savannah River.

PROCEDURES

1. The following information replaces the paragraph included in step #5 of the "Pollution: What Is It?" lesson:

   In 1965 and again in 1969, federal and state authorities imposed deadlines for serious pollution abatement by each of the 'Big Three' polluters. By 1971, none of the three had as yet met the deadlines and were technically in violation of the law, though none was prosecuted or fined. Since then, the situation has improved. Many pollution abatement projects have been completed-the City of Savannah now has a waste treatment plant for domestic sewage; American Cyanamid is neutralizing its acid wastes; the Union Camp mill has constructed a large oxidation pond which reduces the oxygen demand of its effluent; and, smaller industries have begun complying with environmental protection laws.

2. More detailed information on the Savannah River can be obtained by writing or calling:

   J. Leonard Ledbetter, Director
   Environmental Protection Division
   Dept. of Natural Resources
   Atlanta, Georgia
   (404) 656-4713

   Harold Reheis, Water Quality Control Section
   Environmental Protection Divison
   Dept. of Natural Resources
   Atlanta, Georgia
   (404) 656-4708

1942. Many homes and buildings constructed since that time will now be in a flood zone. Agricultural lands and wildlife habitats may also be threatened.

LIKELY IMPACTS ON THE LAKE MARION-MOULTRIE AREA

At first look, this area would not appear to be affected by the new canal. But scientists fear that the reduced flow in the Cooper will indirectly affect the striped bass population. The small fish the bass feed on--the blueback herring--presently enter Lake Moultrie and then Lake Marion from the Cooper River. The fish naturally swim upstream in rivers against strong currents; when the current is reduced in the Cooper, the herring may stop coming. That could affect the striped bass, which in turn could have a devastating impact on the recreation and tourism industry.

THE NEXT 40 YEARS?

Forty years ago the first diversion canal was completed, bringing additional electricity to the Santee-Cooper area. However, it brought more than just electricity. It changed the ecology of the Santee and Cooper Rivers and triggered a number of far-reaching consequences. One of these consequences--the sedimentation in Charleston Harbor--was so serious that now a new canal is being built. Will the next 40 years require yet a third canal?

What will happen as the result of this major new ecological change is difficult to predict, but it is safe to say that a number of important changes will occur. We may be able to predict and control some of them, but if we have learned anything from the first canal project, it is that there will be some surprises waiting.

d. Why is the marsh grass so valuable?

(When the grass dies, it is decomposed by bacteria. The resulting nutrients help create a "rich soup" called detritus which serves as the base of the marsh food chain. While still alive, the marsh grass provides shelter for many different species.)

e. Identify four ways that marsh areas have value in their natural state.

(Marshes act as a nursery, providing food and shelter for marine life, as well as birds and land mammals; marshes serve as a buffer between the ocean and upland areas, absorbing the energy of the tides; marshes act as a filter, removing harmful pollutants from the water; marshes have value as a scenic, peaceful place for bird-watching and fishing.)

f. If all the marshes in South Carolina were destroyed, what kinds of problems would likely occur?

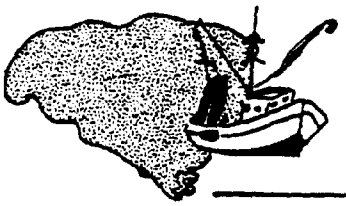
(The amount of fish and shellfish would drastically decline; commercial and recreational fishermen--and all the businesses that depend upon them--would lose millions of dollars each year; increased flooding and erosion would result; pollution would be a more serious problem, since the marsh's function as a filter would be lost; students may think of other reasonable outcomes.)

g. Why couldn't Charleston be built today?

(Much of Charleston is built on marsh. New laws recently passed by the state legislature, and administered by the South Carolina Coastal Council, prohibit marshland from being filled.

4. Return to procedure # 4 in the Teachers Guide on page 99. For an extra assignment, have students prepare a report on one of the activities suggested there. The significant amounts of filling that have occurred in the low country should make this information easy to find.

In addition, have students investigate the other side of this issue. Invite a local developer to speak to the class about the impacts of the new state laws on his or her business. Ask local business leaders if they believe the new restrictions are good or bad for the economy of your area.



THE VALUABLE MARSHES OF THE LOW COUNTRY

The debate over the worth of the nation's wetlands has affected many states, but none so significantly as South Carolina. Containing over one-half million acres, stretching from the Little River in the north to the Savannah River in the south, South Carolina's marshlands make up a significant part of the coastal region. What happens to these wetlands will play an important role in the future of the low country.

Historically, much of the coastal economy has depended upon the coastal rivers and wetlands. Fishermen have worked the creeks, mudflats and the edges of the marsh for centuries, harvesting shrimp, clams, oysters, and crabs. For others, the marsh had to be drastically altered before it became valuable. In Charleston, for example, much of the downtown, historic section, including some of the prominent landmarks, were once natural marsh areas.

Further inland, freshwater marshes, influenced by the tidal flow, played an important part in agricultural activities. In times past, these wetlands (as well as cyprus swamps) along the rivers were cleared, enclosed with earthern banks, called dikes, and planted with rice. Openings in the dikes (i.e., trunks with manually controlled floodgates) allowed freshwater from the river to enter and flood the crop. Flooding the rice greatly promoted its growth and killed the weeds and grass which formerly had to be cleared by hoeing. Rice quickly became the dominant crop in South Carolina and reached its peak just prior to the Civil War. Without the use of freshwater wetlands, rice would not have become so successful.

In the 20th century, coastal South Carolina has experienced a significant growth in population, and acres of marsh have been consumed for housing, recreation, and industry. All these developments, however, began to concern those groups who could only benefit from the wetlands if they remained undisturbed. Commercial fishermen began to notice a decline in their harvest. The favorite fishing spots of many recreational anglers gradually disappeared. Conservationists warned that the filling of marshes threatened many species of wildlife. Scientific studies in South Carolina and other states showed that the marsh was a valuable natural resource and its continued destruction would cause many serious problems.

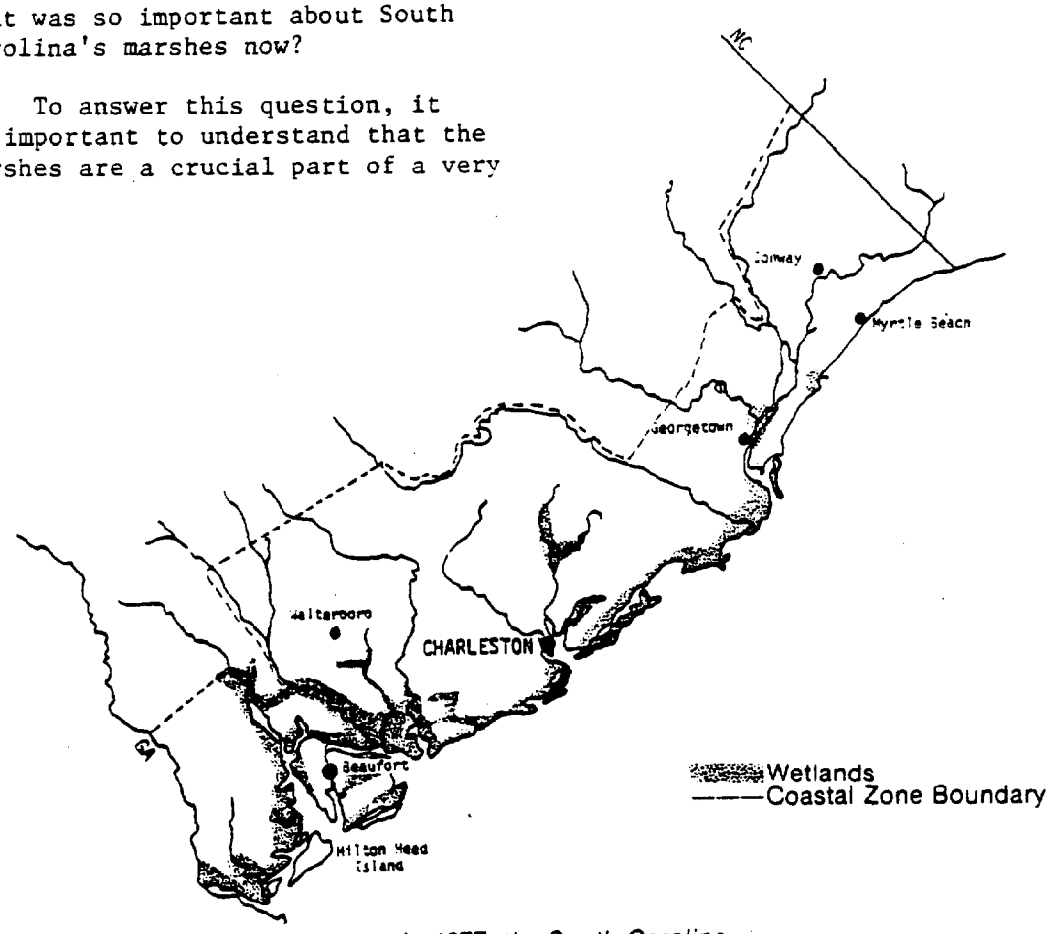
Development in the Charleston area and other population centers has reduced marsh acreage.

During the 1960's and 1970's, conservation groups and a number of politicians in South Carolina pushed hard for new laws that would protect the marshes of the low country. After

nearly a ten-year battle in the state legislature, a coastal zone management bill was approved and the resulting South Carolina Coastal Council began to strictly control the filling of marsh. The tough new regulations do not allow developers to fill marsh for any projects. If these same restrictions had been in force the past 300 years, much of Charleston and other areas could never have been built!

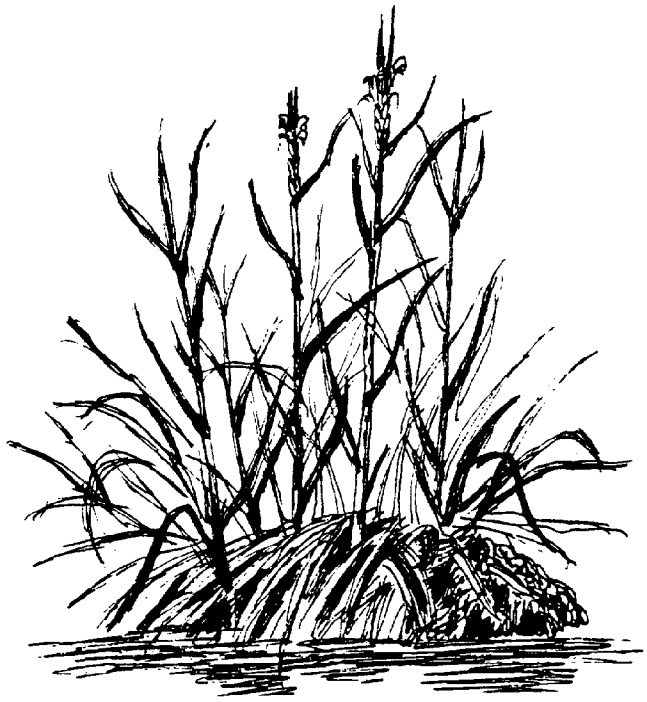
Why were such tough new regulations passed? For centuries, people had been allowed to build in the marsh. What was so important about South Carolina's marshes now?

To answer this question, it is important to understand that the marshes are a crucial part of a very valuable, yet highly fragile environment. Beginning with the ocean beaches, moving inland through the calm waters of the estuaries, and reaching up the many rivers and creeks, the coastal environment of the low country is a delicately balanced system that provides many benefits to the Palmetto state. By tampering with one part of this system--the marshes--people were running the risk of forever changing and possibly destroying the ecology of the coast.



In 1977, the South Carolina Coastal Council became the state's chief agency for the control of development in the wetland areas.

The marshes make three important contributions to the coastal environment. First, the marshes are a "nursery," providing food and shelter for most species of marine life found in South Carolina. The abundant smooth cordgrass of the marsh (Spartina alterniflora) sits at the base of the food chain. Surprisingly, it is more valuable dead than alive! Each fall the grass dies and is decomposed by bacteria. This mixture of dead grass and bacteria is called detritus (de-tri'tus), and has been referred to as a "rich soup" because it serves as a major source of food for many of the higher organisms in the salt marsh ecosystem.



***Spartina alterniflora**, the marsh cordgrass that is "wanted—dead or alive."*

Detritus provides nourishment not only for the larval stages but for adult clams, mussels, oysters, crabs, shrimp, and certain fish. All these creatures serve in turn as food for other fish as well as countless shorebirds, such as gulls, terns, egrets, skimmers, and oystercatchers. Frequently, the food chain ends on our dinner table. Like all the animals of the marsh ecosystem, we too are dependent upon the marsh grass for a part of our food supply.

The smooth cordgrass is not only a food source, but also a shelter. Its long roots make a perfect home for many species, including shrimp, the state's most valuable catch. Without the shelter provided by the maze of the root system, the larval stages of shrimp, crabs, oysters, clams, and other fish and shellfish would not be able to survive long enough to reach adulthood.

Many mammals also find shelter and food in the salt marsh and estuaries. The familiar raccoon satisfies its appetite at the marsh's edge. The bottlenose dolphin, a marine mammal commonly referred to as the porpoise by South Carolina residents, enters the estuaries and salt water rivers to feed on fish which are thought to be the dolphin's main source of food. Several species of birds feed and nest in the marsh; seaturtles, diamondback terrapins, and even alligators are found in this complex ecosystem.

A second important function of the marsh occurs when it absorbs the ocean's tides, thus preventing floods and erosion. The continuous energy of the ocean is partly absorbed by the beaches which take the full impact of the waves. But it is marsh that absorbs the energy of the tides, sending the water through the maze of tidal creeks until nearly all the marsh is flooded. Hours later the tides move back out through these

same creeks. The upland areas are thus spared the battle with this daily phenomenon.

A third service performed by the salt marsh is that of a filter. Pesticides and other pollutants from farms, timber areas, and industry often enter streams and rivers and then flow toward the ocean. But, as they pass through the marsh, the harmful pollutants are broken down into forms less dangerous to the environment. Thus, the marsh serves as a natural "sewage treatment plant" for the coastal ecosystem.

In addition to these three important functions, many people add a fourth: the marsh's scenic, natural beauty. Although not as spectacular as the ocean, low country residents and visitors alike have often sought this quiet, peaceful atmosphere, listening to the soft wind-swept rustle of the cordgrass or watching shore birds searching for a meal.

As more and more was learned about the marsh and its importance to the low country, the more citizens from all across the state worked to save it. Although some people were against the proposed restrictions on filling marsh, the weight of public opinion and the threat of what the coast might be like if nothing was done, finally led to the establishment of the new law. Where once the marsh was valued only as a place to "fill in," today the wetlands of the low country are recognized as an important natural resource for the state of South Carolina.

UNIT II: UNDERSTANDING COASTAL ECOLOGY

Lesson 8: TSUNAMIS AND HILO, HAWAII (SHIFTING SANDS BEACH)

ADDITIONAL SOUTH CAROLINA MATERIALS

Reading, "Shifting Sands Beach"
Worksheet, "Five Erosion Control Options" and "Option Rating Card"
Reading, Six Position Statements ("County Officials," State Officials," "Local Property Owners," "Fishing Groups," "Tourism Groups," "Environmental Representatives")

OVERVIEW

Students read an account of a "composite" South Carolina barrier island community that is experiencing serious erosion problems. Students role-play members of various groups and evaluate five erosion options based on their group's point of view.

PROCEDURE

1. The materials on erosion control in Shifting Sands Beach may replace or follow the Hilo Tsunami study. The format of the South Carolina study is very similar to the Hilo lesson. (If you are not going to use the Hilo story, you might summarize the Hilo disasters for the class as a way of introducing the general topic of how communities deal with natural hazards.)

2. Explain to the class that issues similar to those faced by Hilo residents also occur in South Carolina. The following story about erosion control is fictional, but is based on several true incidents.

3. Pass out the reading on "Shifting Sands Beach." After students have finished reading, explain that they will now serve as representatives of various interest groups at the public hearing.

4. Announce that five different options for controlling erosion in Shifting Sands Beach will be considered. Hand out the worksheet on the five erosion control options (including the "Option Rating Card").

   Review each of the five options with the class. As you finish each option answer any questions.

5. After you complete this summary, divide the class into six equal groups. Announce that each group will represent different interests that have conflicting positions on erosion control.

   Hand out a position statement to each group. Give each group a few minutes to read and discuss their statements. Make sure they generally understand what their position is regarding the kind of erosion control

they favor.

6. Ask each group to make a tentative decision about the option(s) they favor. Plans may be combined; that is, a group could favor Option #1 and Option #5.

   The groups should fill in their "Option Rating Card" as they evaluate each option. (These can be collected for evaluation purposes if you wish.)

7. After each group makes a tentative decision, ask one person from a group to briefly summarize their position. Each spokesperson should explain which options the group thinks are best, and why the group made this decision. Keep a record of their choices on the board.

8. Explain that while many different points of view have been expressed, the groups must decide on one plan. Each group will have <u>one</u> vote. Encourage class debate and discussion. Compromise may be necessary. Call for a final vote when the discussion ends.

9. At the conclusion of the final vote inform students that in reality, the South Carolina Coastal Council is the state agency responsible for making erosion control decisions. When an area, such as Hilton Head Island or Edisto Beach wishes to take some action concerning erosion, the Coastal Council sends staff members to investigate the situation and evaluate alternative plans. Public hearings are a regular part of the decision-making process.

10. Compare the class decision on Shifting Sands Beach with what the Coastal Council actually decided in places like Folly Beach, Edisto Beach, and Hilton Head Island.

<u>Folly Beach</u>

While many residents place the blame for erosion at Folly on the Charleston jetties, erosion is known to have plagued Folly Beach for at least 100 years. The houses presently on the front row, due to the continuous loss of sand, were, only several decades ago, situated on the third row back from the ocean. The constant eroding of the beach has resulted in the construction of many unsightly groins, seawalls, and revetments.

After months of searching for the most feasible erosion control methods for Folly, including input from nationally known experts and close coordination with S. C. Coastal Council staff, Folly Beach officials applied for and were granted (May 1980) two permits from the Coastal Council-one for repair of existing groins and one for construction of dunes at public access ways. Sand fences are to be placed on the dunes and appropriate grasses are to be planted to help with stabilization. Walkovers will be built to protect the dunes and provide public access to the beach.

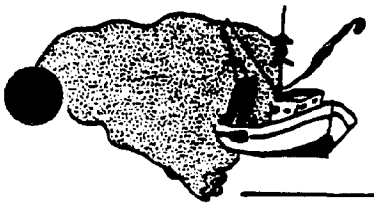
Following approval of the two applications, the Council voted to approve $320,000 of state erosion control bond monies to support the two erosion control projects. The Town of Folly Beach is considering applying for a general permit which will enable private individuals to build dunes in front of their property. The expense of this work will be borne by the individual property owners.

Hilton Head Island

Parts of Hilton Head Island, particularly the Forest Beach Subdivision, are experiencing a serious erosion problem. In June 1979 the S. C. Coastal Council granted to the Broad Creek Public Service District a permit to close the mouth of the Folly Creek on Hilton Head in an attempt to alleviate part of the erosion problem. It was believed by some experts that the deposition of sand at the mouth of Folly Creek was inhibiting the littoral currents and preventing migration of sand to areas south of the creek. The permit was granted with very strict provisions, two of them being that should any environmental damage occur from the closing of the Folly or should the project fail to alleviate erosion, the earthen structure across the mouth of the creek must be removed.

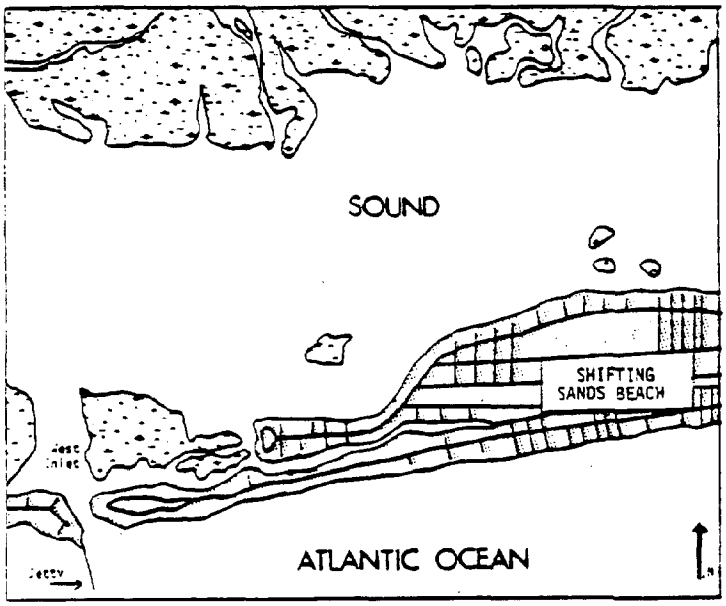
Edisto Beach

The Town of Edisto Beach is experiencing a rather severe erosion problem, although it is less critical in most instances than that of Folly Beach. A series of groins was built in the past by the S. C. Dept. of Highways and Public Transportation. Three of the groins on the south end of the island, while helping areas immediately to their north, caused severe problems for areas immediately to their south. After study of the situation by S. C. Coastal Council staff, the decision was made by the Council to try an innovative approach to the problem. Rather than removing the groins, the Council had the structures modified in the following manner-the groins were lowered and the seaward ends were curved in towards the shoreline. These modifications allowed for sufficient accretion of sand to the north of the groins while enabling the washing over of sand to the areas south of the groins, areas which previously had been starved of sand renourishment. This experiment, while not solving the entire problem, has proved to be a successful method of dealing with erosion at Edisto Beach.



SHIFTING SANDS BEACH*

Shifting Sands Beach on the coast of South Carolina is a thriving barrier island community. Vacation cottages, summer homes, and small businesses line the ocean. Forty years ago there were only three cottages along the entire three-mile beach. Today, a year-round population of 3,000 and a summer weekend population of almost 30,000 occupy Shifting Sands Beach.



The map shows the community of Shifting Sands Beach, West Inlet, and the jetty built to stabilize West Inlet.

The beach is a favorite recreation site; historical and maritime attractions also attract thousands of tourists to Shifting Sands Beach each summer. Ocean-front rentals can range up to $600 a week. The state is widening the main highway through town and plans to improve bridges in the area to better handle the tourist traffic.

As a result of these improvements, new businesses have opened, more are planned, and many new homes are under construction. All looks prosperous for this community. However, there is one major problem. As the residents of Shifting Sands Beach have discovered, the town lives up to its name.

Much of the three-mile beach experiences heavy shoreline erosion. Each year as the seasons change, the beach responds, losing sand in the fall and winter and gaining sand in the spring and summer. But the overall pattern reveals a loss of sand. Old maps and photographs of the ocean shoreline indicate the beach has eroded at an average of three to four feet per year. The records also show that West Inlet was once very active, opening and closing twice since 1900. Further, the inlet has migrated one-half mile to the east. In 1968, the Army Corps of Engineers stabilized the inlet by building a jetty. Since then the inlet has been stationary, and fishermen have had easy access to the ocean. Some residents of Shifting Sands Beach

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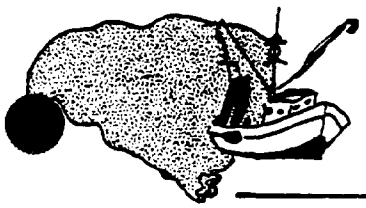

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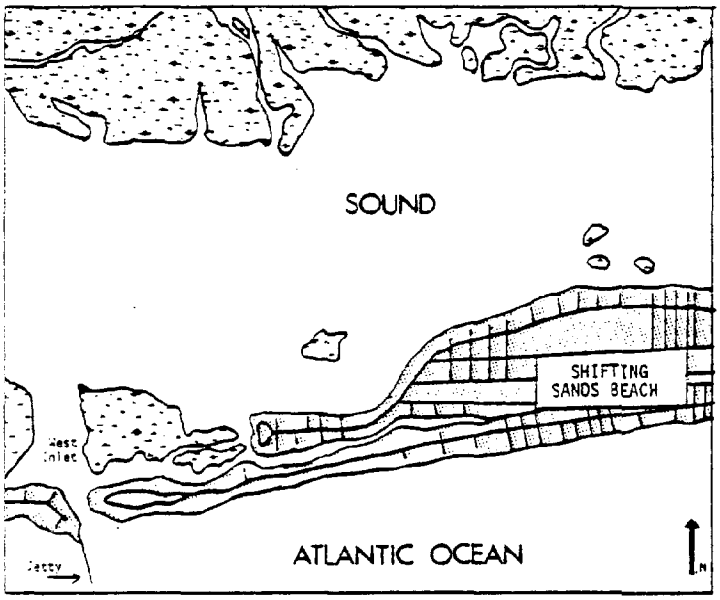

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believe the building of the jetty has robbed the town's beaches of sand and increased erosion.

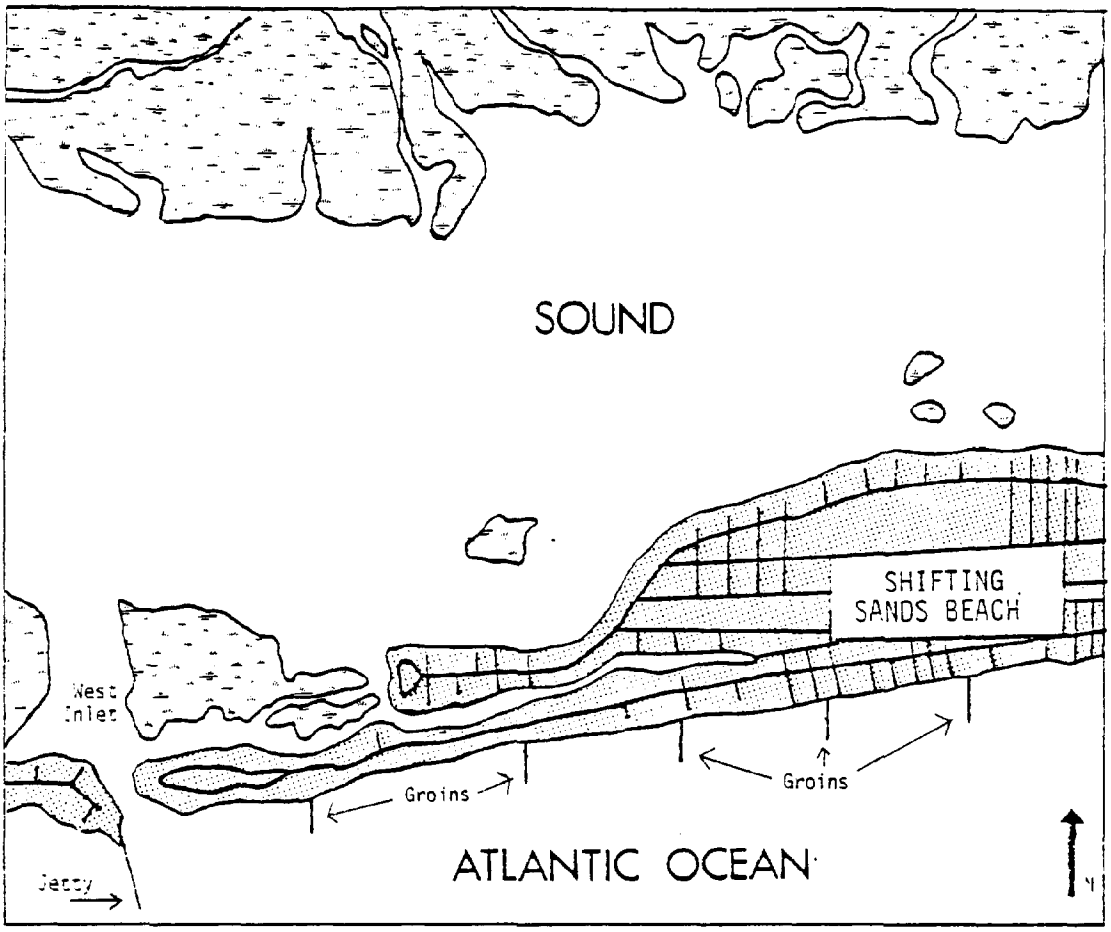
Providing for the increasing population of Shifting Sands Beach has worsened the erosion problem. By building in areas already prone to erosion, homeowners have placed themselves in the direct "line of fire," and thus created a need for erosion protection. In addition, many builders have bulldozed sand dunes to make room for houses. Since the dune line provided considerable protection against erosion, the removal of the natural barrier has increased the potential for erosion damage.

In 1973, a groin system, financed largely with state funds, was built along a short section of the beach. This project helped slow the rate of erosion, but the groins soon washed away. Several homeowners then installed small seawalls and bulkheads (at their own expense), but these have been no more successful than the groins.

During the past two years, heavy winter storms lashed the coast, and erosion rates increased. The high tide line moved landward at a rate of several feet per week, creating serious problems for many property owners. Last fall, two residents were forced to move their cottages far back from the shoreline to save them from the fast-advancing ocean. In a recent, frantic last-minute effort, another home was saved when the National Guard hurriedly erected a temporary sandbag seawall. At present, 12 to 15 homes and a small section of the state highway are seriously threatened. Town officials predict several other homes and businesses, plus public recreation areas may be destroyed within two years if present erosion rates continue. New storms could easily accelerate the process.

City officials from Shifting Sands Beach have made two appeals to the General Assembly for financial help to stop shoreline erosion. The South Carolina Coastal Council has agreed to hold a public hearing to gather input from various interest groups as to their opinions concerning the problem. Representatives from coastal counties, state government, environmental groups, the fishing industry, the tourist industry, the ocean-front land owners will make statements at the public hearing.

OPTION #1 GROINS



OPTION: Several groins will be built along Shifting Sands Beach. These walls, built perpendicular to the shoreline will trap sand and prevent the longshore current from carrying sand away.

COST: Fairly low cost ($50-100,000) if a sandbag groin system is used; cost will be split 50-50 between state and local government.

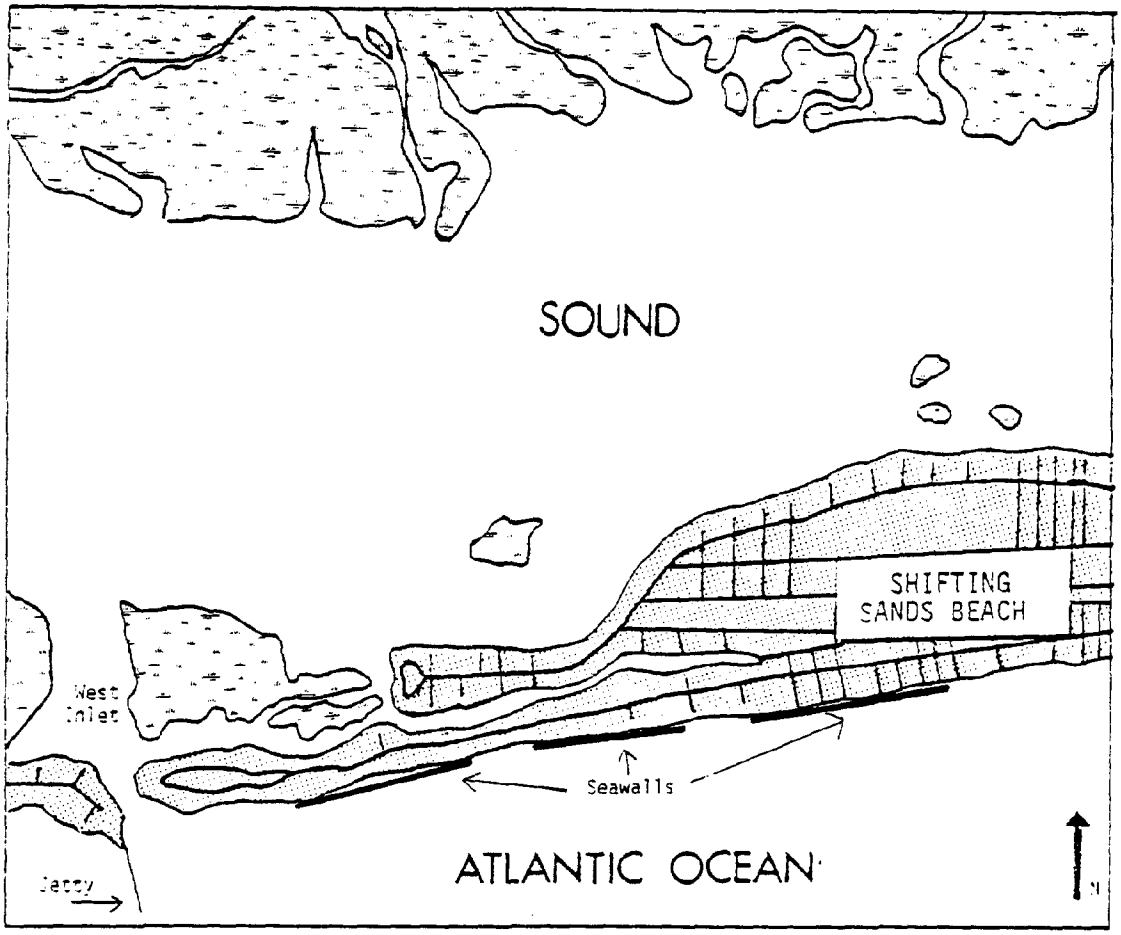
SOME ADVANTAGES:

1. Will likely provide five to fifteen years of protection.
2. Would protect public recreation areas.

SOME DISADVANTAGES:

1. Groins will likely shut off the flow of sand to adjacent areas, causing erosion problems there.
2. Will likely change the shape of the shoreline on both sides of the groin system.
3. Must be maintained on a regular basis.
4. Aesthetically unpleasing.

OPTION #2 SEAWALLS



OPTION: An extensive system of seawalls will be built along the shoreline. The seawalls will be placed a few yards behind the shoreline, or directly in front of buildings.

COST: High cost; cost will be split 50-50 between state and local government.

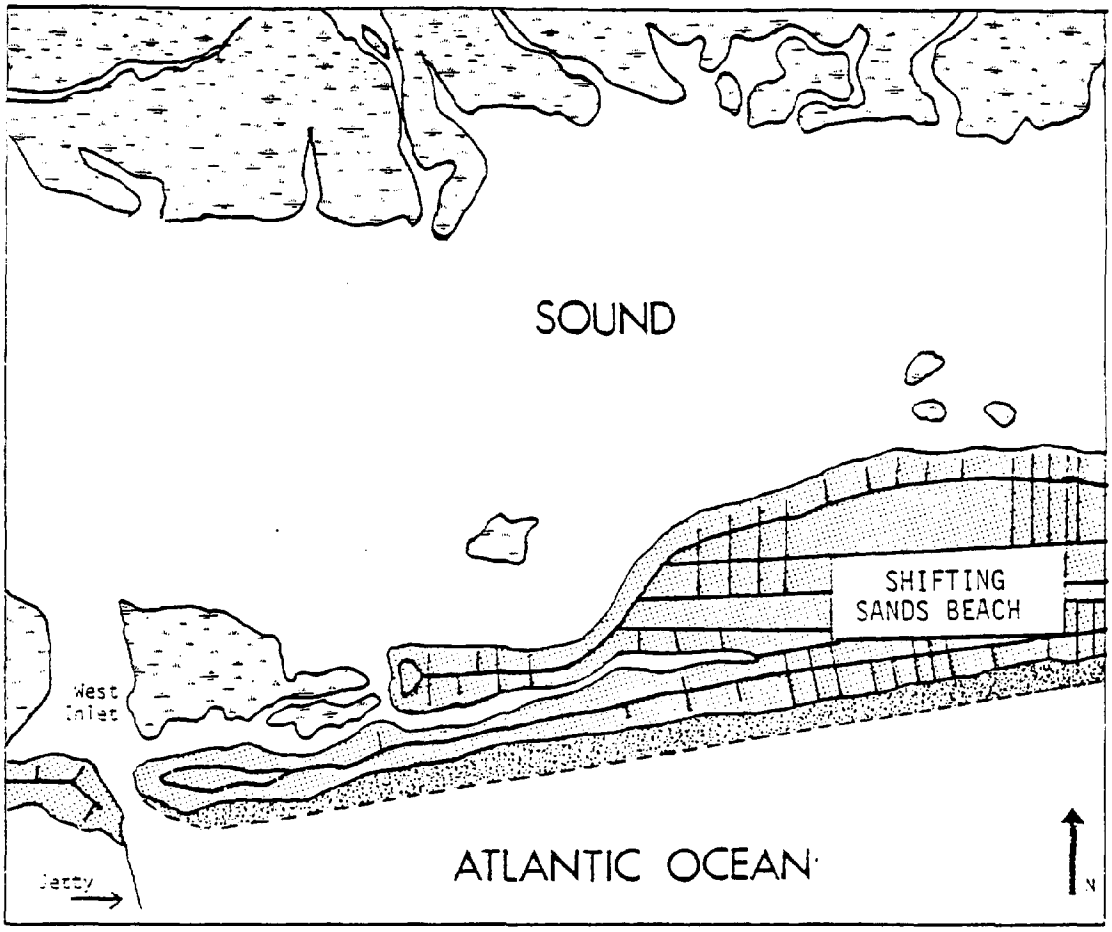
SOME ADVANTAGES:

1. Will likely extend the lives of beachfront structures in normal weather.
2. May provide considerable short-term protection.
3. Favored by many coastal homeowners.

SOME DISADVANTAGES:

1. Seawalls often lead to the loss of sand in front of the seawalls.
2. Will not protect buildings from high waves, overwash, or storm-surge flooding.
3. Aesthetically unpleasing.
4. Generally ineffective in past.
5. Larger seawalls will likely be needed if these fail to work.

OPTION #3 BEACH REPLENISHMENT (INCLUDING ARTIFICIAL DUNES)



OPTION: Sand will be pumped onto the beach to build up the dunes and the upper beach area. Sand will be pumped from either the sound behind the barrier island, from inland areas on the island, or from the continental shelf.

COST: High cost; cost will be split 50-50 between state government and local government.

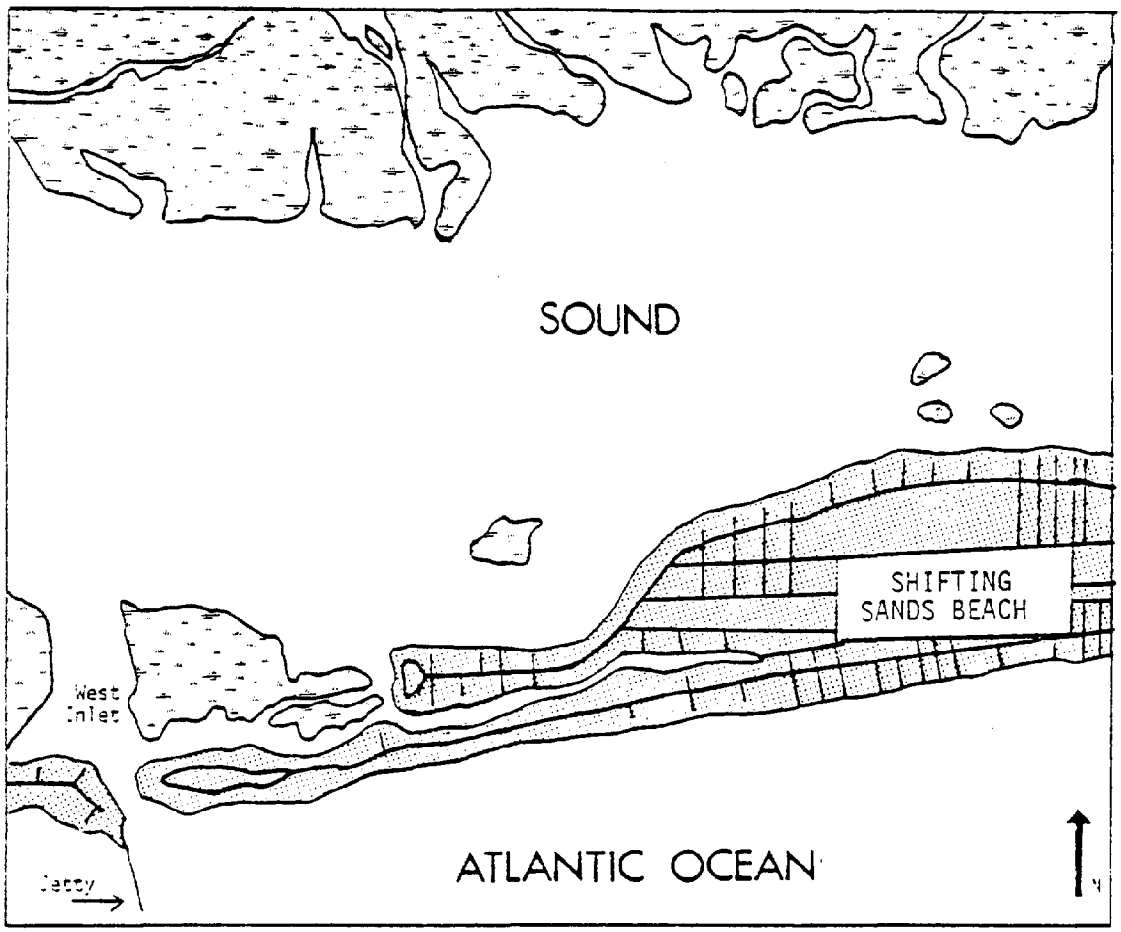
SOME ADVANTAGES:

1. Will likely cause fewer environmental problems than seawalls or groins.
2. Will provide a wider beach area for several years.
3. Will protect public recreation areas.
4. No unsightly structures will be built.

SOME DISADVANTAGES:

1. Requires an expensive, long-term commitment.
2. Must have large supply of sand.
3. Artificial dunes can accelerate erosion on sound side by preventing normal overwash processes.

OPTION #4: NO ACTION



OPTION: No protective action will be taken by government. Leave Shifting Sands Beach as is, letting nature take its natural course. Homeowners would be encouraged to move their houses back from the shoreline.

COST: No costs; costs of relocating homes (approximately $6-10,000) will be paid by individual homeowners.

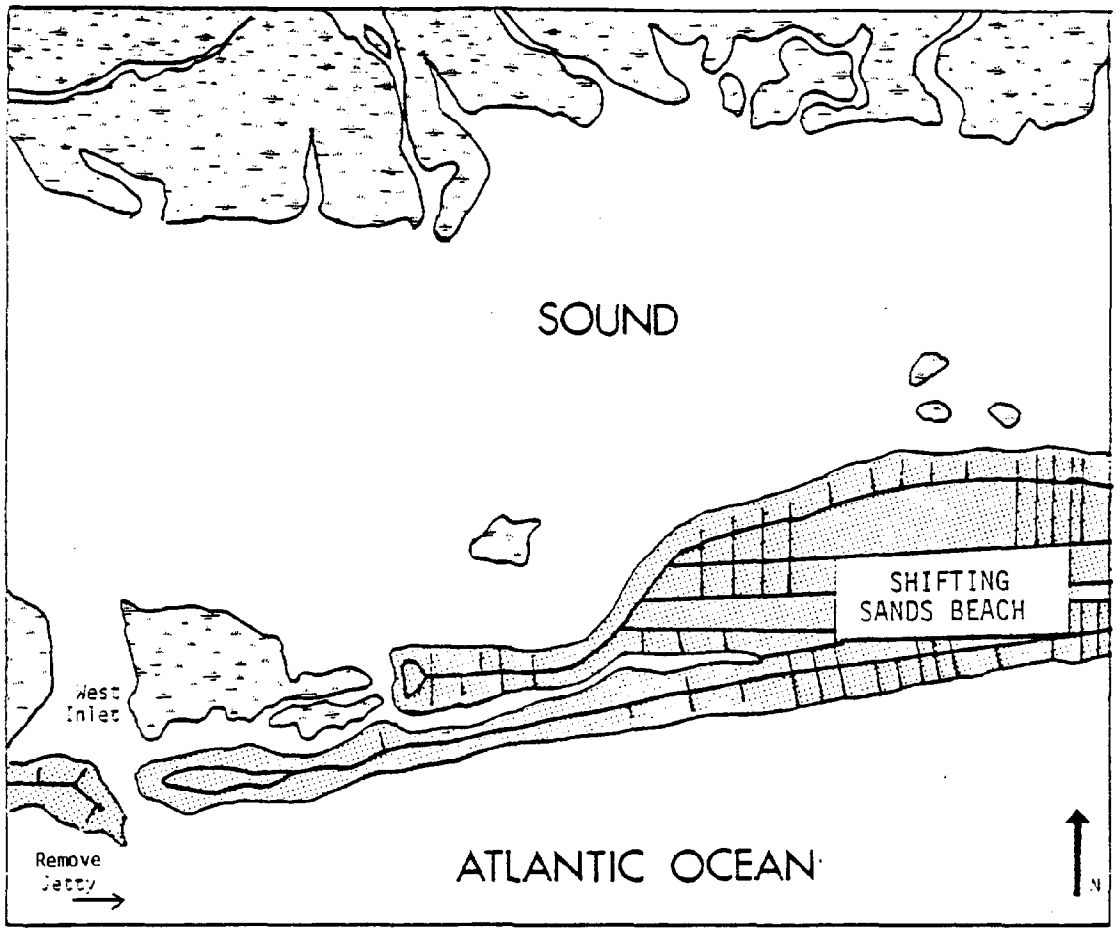
SOME ADVANTAGES:

1. No interference with the environment.
2. No costs.
3. No unsightly structures.

SOME DISADVANTAGES:

1. No direct action is taken to protect property.
2. Potential loss of cultural and historical sites.
3. May be very unpopular choice with coastal residents.

OPTION #5 STOP MAINTAINING WEST INLET



OPTION: Maintaining West Inlet is probably responsible for some erosion along Shifting Sands Beach. The dredging of West Inlet to provide a channel for shrimpers and other fishermen will be stopped. The jetty, which helps prevent the inlet from closing, will be torn down.

COST: Very low cost to tear down jetty; a savings if expensive dredging operations are stopped.

SOME ADVANTAGES:

1. Very low cost; a possible savings.
2. No harm to natural environment.
3. Will remove unsightly jetty.

SOME DISADVANTAGES:

1. Uncertain if this will work; not clear how much of the erosion problem is caused by maintaining West Inlet.
2. Fishing operations and recreational boaters will lose easy, convenient access to ocean.
3. Some fishing operations may close due to extra transportation costs.

Student Worksheet

OPTION RATING CARD

	Highly Desirable	Desirable	Undesirable	Comments
OPTION #1 GROINS				
OPTION #2 SEAWALLS				
OPTION #3 BEACH REPLENISHMENT				
OPTION #4 NO ACTION				
OPTION #5, STOP MAINTAINING WEST INLET				

COUNTY OFFICIALS

You believe that some type of protection is definitely needed. However, cost is an important consideration. The county does not have enough tax revenues to pay for an expensive project. The state must help pay the bill. You know the state argues that erosion is only a local problem, and therefore the state should not do anything. You disagree. After all, the beach is public property and owned by the state.

You also know that your county receives tax revenues from tourism. Continuing erosion means fewer tourists and less tax dollars. Your city cannot afford these losses.

Erosion also threatens to increase the potential danger from hurricanes. Because there is less beach and fewer dunes to take the first brunt of a major storm, a hurricane will cause major property damage. You think the state of South Carolina has an obligation to give people more protection from hurricanes by stopping erosion. You would do it yourself, but your county just is not wealthy enough to afford these kinds of projects without some financial help.

Finally, you are against the plan to stop dredging West Inlet and to tear down the jetty. You think the fishing industry is important to the area. If the inlet is not kept open, several fishing operations may close down. You think the erosion problem can be solved without putting a lot people out of work.

Student Handout

STATE OFFICIALS

You believe there is nothing permanent that can be done about stopping erosion. Nature will ultimately wreck any engineering effort. While it is true that the state government has supported erosion control in the past, these efforts have been generally unsuccessful. The only successful projects have been very, very expensive; in fact, the cost of these projects was more than the value of the property they were trying to protect. One of your major concerns is that once an erosion control project is started, it must be maintained and frequently expanded. Thus, the costs continue indefinitely.

Another problem is that when the erosion protection system is installed, builders will think the area is safe, and new development will occur. This just makes the problem worse the next time it comes around.

People were warned about erosion problems when they built homes at Shifting Sands Beach. Columbia cannot be expected to bail people out of trouble every time.

The state is not concerned about the loss of some public beach area. It will always own everything below the mean highwater mark--no matter where it is. The hundreds of thousands of dollars spent on an erosion control project will benefit only local residents. If any erosion program is approved, you believe the cost should be kept low.

Finally, you think the maintenance of West Inlet should probably be stopped. It may be contributing to the erosion problem, and the fishing industry should not be hurt too much by this action.

Student Handout

LOCAL PROPERTY OWNERS

You want protection now! You have considerable money invested in property and if some action is not taken soon your property is going to be washed away. You have already lost hundreds of feet of beach-front property. If the people in the state government do not wake up and do something soon, Walterboro will be on the coast!

You admit that you are asking government to protect your private property, but the beach in front of your property is public. Everybody uses the beach, not just you. Isn't it fair for the government to pay to protect this public property?

Another problem that seriously affects you is the declining value of your property due to the erosion threat. Even if you wanted to sell your property and move, you could not get very much money for it. If erosion protection is built, though, the value of your property will increase again.

You do not particularly care about cost; any protection is better than none. This is especially true since you can get no personal property insurance to cover losses from erosion.

Further, the idea of relocation seems absurd to you. You saved for years to build your house on the ocean. After all, what is the point of having a beach house that is not on the beach?

Finally, you favor option #5, the ending of the maintenance of West Inlet. Older property owners tell you that erosion has been worse since the jetty was built to help keep the inlet open.

Student Handout

FISHING GROUPS

Your main concern in this issue is to be sure that the dredging of the West inlet continues and that the jetty is not torn down. If people vote against maintaining West Inlet, it will seriously affect your fishing interests. West Inlet is the only opening to the sea for several miles. The added time and expense in traveling the extra miles to another opening will cost your fishing business considerable money. Some fishing outfits will likely be forced to go out of business.

If Option #5 is chosen, fishing operations in the area will have to charge more for their products. If people think they will save money by voting for Option #5, they are wrong. They will have to pay for it in terms of higher fish and shrimp prices. And, this option will probably put several people out of work who might then go on welfare.

Further, there is no solid evidence that ending the maintenance of the inlet will lessen erosion along Shifting Sands Beach. If scientists are not sure it will make a difference, why do it?

Student Handout

TOURIST GROUPS

Your major concern about the erosion problem is the loss of the beach area. Most tourists come to Shifting Sands Beach to swim, sunbathe, collect shells and enjoy the wide, smooth beaches. If the beach erodes away--and several hotels in the area have already lost valuable beachfront property--fewer tourists will come to Shifting Sands Beach.

If tourism drops off, it will mean less money for the entire community. Many people will lose their jobs.

You think the idea of doing nothing to control erosion is ridiculous. Groins and beach replenishment projects have worked in other areas. This may be expensive, but you feel that no cost should be spared in saving the beach area. However, you are definitely against the seawall proposal. While seawalls can keep the ocean from damaging property, they often cause the beach in front of the walls to erode faster than they normally would.

ENVIRONMENTAL REPRESENTATIVE

You believe that all erosion control projects are only temporary measures. Nature will win in the end. Sometimes these projects have unforeseen, adverse effects. Seawalls are the worst idea because they cause the beach to erode faster than it normally would. Seawalls may protect property for a short time, but they ruin the beach.

Beach replenishment does not always work either because if the new sand pumped onto the beach is too fine, it quickly blows away.

You also believe that erosion is inevitable; the general level of the ocean is rising throughout the world due to the slow melting of the polar ice caps. Putting in a few groins or seawalls will not stop a worldwide process.

Finally, you approve of the plan to stop maintaining West Inlet. You believe there is a good chance that erosion along Shifting Sands Beach would lessen if the jetty were removed. As far as you are concerned, this is just another good example of how people have fouled up nature by trying to control it.

You are against spending any tax money on erosion control; if people were foolish enough to build on the beach, they should pay the consequences.

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

Lesson 2: GAINING ACCESS (BEACH ACCESS PROBLEMS IN SOUTH CAROLINA)

ADDITIONAL SOUTH CAROLINA MATERIALS

Teacher notes only.

OVERVIEW

Students hear a brief overview of recreational access problems along the South Carolina coast. Suggestions for research projects are given.

PROCEDURE

1. The following information and questions should follow the discussion of the "Daily Splash" reading on beach access. Use the following in place of Part II in the Teachers Guide, page 121.

2. Ask students:

   a. Do you know of any areas along the South Carolina coast where beach access is a problem?

   b. What factors have led to these problems? Lack of parking? Private development? Overcrowded conditions?

3. Provide students with the following overview of access problems along the coast:

   a. Hilton Head Island has no public beach area. Visitors must pay $2 to enter Harbortown.

   b. Private development on Seabrook and Fripp Islands has generally blocked off public access.

   c. Dubordieu Beach, south of the Grand Strand, is an exclusive private club.

   d. Dewees Island has been developed for private use.

   e. Isle of Palms, near Charleston, has greatly restricted public access.

4. Ask students:

   a. Who owns the beach in South Carolina?

      (Below the mean high tide line, the beach belongs to the public.)

   b. If the public owns the beach, how have these access problems developed?

      (Private developers do not have to provide access points to the beach. Long stretches of private development can, in effect, turn an area into a private beach.)

c. Is anything being done about this problem?

(The South Carolina Coastal Council, the state agency responsible for controlling development in critical areas [coastal waters, wetlands, beaches, and primary ocean-front sand dunes] of the coastal zone, will not grant permits for erosion control projects unless public access is protected.)

5. For a special project, have students investigate access problems in their town or county. Some questions to consider are:

   a. How serious is the beach access problem in this area?

   b. Is there sufficient parking? Do park facilities need improvement?

   c. Do population trends for your area indicate a greater demand for parks in the future?

   d. Are there plans to build new parks, or expand existing ones?

   e. Could new laws be passed to require public rights-of-way to the beach?

6. In addition to the general information about access problems presented in procedure 3 above, a complete listing of beach access problems for the entire South Carolina coast follows. This information is reprinted from the State of South Carolina Coastal Management Program's Final Environmental Impact Statement (pp. IV-71 to IV-73).

TABLE 1

SOUTH CAROLINA BEACH SURVEY

Beach Area	Length (Miles)	Approximate width above mean high tide (feet)	(Adjacent Land) Ownership	Public Access	Comments
Waites Island	2.3	93	Private	None	Only undeveloped maritime forest/dune area in Horry County.
North Myrtle Beach	9.3	125	Private	Excellent	Densely developed; good public access but limited parking; fishing pier.
Atlantic Beach	0.3	125	Private	Moderate	Limited parking facilities; fishing pier.
Myrtle Beach	15.7	70	Private	Moderate	Densely developed; active; active tourist economy, including numerous hotels, restaurants, attractions and 29 golf courses in the area; fishing pier.
Myrtle Beach State Park	1.2	100	State	Excellent	Camping, day use area, swimming pool and fishing pier, interpretive area.
Surfside Beach	2.1	50	Private	Moderate	Limited parking; beach access-ways not marked, some blocked by private structures. Community plans to improve situation in near future.
Garden City Beach	4.0	50	Private	Limited	Highly developed; fishing pier.
Huntington Beach State Park	3.0	70	State	Excellent	Camping, nature observation, playground, arts center.
North Litchfield Beach	1.5	75	Private	Limited	Limited access obscured by unmarked easements and prominent "No Parking" sign at entrance to island.
Litchfield by the Sea	1.0	-	Private	None	International Paper co. developing a private residential community.
Litchfield Beach	1.5	75	Private	None	8 access-ways but only 1 visible and that is prominently marked "Private".
Pawleys Island	2.5	50	Private	Limited	No public parking except some on-street, only 8 ocean access-ways.
Dubordieu Beach	2.2	50	Private	None	Controlled by a major land holder; private development on portion fronting beach, remainder undeveloped at present.
Bell Baruch Beach	11,000 ft.	50	Private	None	Private foundation, with State cooperation and research facilities.
North Island	8.0	50	State	Supervised boat only	Wildlife preserve.
South Island	1.0	100	State	Supervised boat only	Wildlife preserve.
Cedar Island	2.5	50	State	Boat only	Part of Santee Coastal Reserve.
Murphy Island	4.2	50	State	Boat only	Part of Santee Coastal Reserve.
Cape Romain Wildlife Refuge			Federal	Boat only	One of the nation's most outstanding wildlife sanctuaries; some areas designated wilderness.
Cape Island	6.0	166			
Lighthouse Island	1.5	180			
Raccoon Key	6.0	150			
Bull Island	5.7	100		Boat only	
Capers Island	1.8	50	State	Boat only	Incorporated into Heritage Trust Program. Public access is encouraged.
Dewees Island	1.8	50	Private	None	Privately owned, but State holds a scenic easement over the island.

TABLE 1 (Continued)

Beach Area	Length (Miles)	Approximate width above mean high tide (feet)	(Adjacent Land) Ownership	Public Access	Comments
Isle of Palms	6.2	100	Private	Moderate	Municipal parking lot, some on-street parking, no formally dedicated easements, fishing pier.
Sullivans Island	2.6	138	Private	Excellent	On-street parking in certain areas; good easement provisions.
Folly Island	5.2	88	Private	Moderate	Severe erosion problems; very limited public parking; fishing pier.
Kiawah Island	8.0	150	Private	Limited but good facilities	Private resort - restricted entry beyond designated public access area, fee charged.
Seabrook Island	1.8	50	Private	None	Restricted access resort.
Eddingsville Island	2.0	120	Private	None	
Botany Island	1.5	150	Private	None	
Botany Bay Island	2.5	150	Private	None	
Edisto Beach	3.0	80	Private	Moderate	Limited parking, mostly on-street; fishing pier.
Edisto Beach State Park	1.5	80	State	Excellent	One of State's most popular parks; playground, picnicing, hiking and environmental observation areas.
Pine Island	1.5	25	Private	None	
Otter Island	2.0	75	Private	None	
Harbor Island	1.5	150	Private	None	
Hunting Island State Park	3.8	70	State	Excellent	Camping, boating facilities, wildlife observation areas, etc.
Fripp Island	2.3	75	Private	None	Restricted access resort.
Pritchards Island	2.5	75	Private	None	Undeveloped.
St. Phillips Island	1.0	75	Private	None	Undeveloped.
Hilton Head Island	11.4	150	Private	Extremely limited	Moderately developed, most areas restricted to residents or guests.
Daufuskie Island	2.0	-	Private	Boat only	Access to island at public boat launch, but access across island is limited to the few public roads.
Turtle Island	-	-	State	Boat only	Wildlife Management, very poor sand beach.

SOURCE: **Public Beach Access and Recreation in South Carolina**, 1976, Hartzog, Laders & Richards. Council staff update.

TABLE 2

AVAILABLE BEACH ACCESS IN SOUTH CAROLINA

Beach	Access Points
North Myrtle Beach	36 public streets end at beach; walkways clearly marked. 117 pedestrian easements, most of which are dedicated to city or recorded on plats.
Atlantic Beach	4 beach access-ways at street endings between 29th Avenue South and 32nd Avenue South.
Myrtle Beach	Access at some street endings, limited day-visitor parking.
Myrtle Beach State Park	Freely accessible, ample parking (400 spaces for day-visitors, space for each camp-site).
Surfside Beach	34 public access-ways, but none marked as public, none dedicated as easements.
Garden City Beach	
Huntington Beach State Park	Freely accessible; paved parking for 275 cars.
North Litchfield Beach	Although 6 streets and 10 footpaths end at the beach, none are marked or even clearly visible. Entrance to the island marked by "Warning: No public parking on North Litchfield".
Litchfield Beach	7 walkways and one path are shown on a plat of the community; however only 1 accessway is readily visible, and it is marked "private". No designated public parking.
Pawleys Island	Eight ocean access-ways. Public parking limited to the shoulder of the main road.
Note: State-owned North, South, Cedar, Murphy, and Capers islands are accessible by private boat only with restrictions. Federally-owned beaches are "Federally excluded lands" for purposes of coastal management.	
Isle of Palms	Relatively unrestricted access, although easements have never been formally dedicated except at pier where public parking is available for approximately 600 cars.
Sullivans Island	Access at the end of almost every block, public parking allowed on all streets.
Folly Island	Relatively unrestricted access. Parking in four privately owned lots and at metered spaces for approximately 275 vehicles.
Kiawah Island	Public access provided in designated area of the island only. Bath house facilities and parking for 160 cars available.
Edisto Island	Access between every 3 to 5 lots via unmarked footpaths. On-street parking available.
Edisto Beach State Park	Readily accessible. Parking facilities for 250 vehicles.
Hunting Island State Park	Readily accessible. Parking facilities for approximately 400 vehicles.
Hilton Head Island	Limited public access at some street ends.

SOURCE: **Public Beach Access and Recreation in South Carolina**, 1976, Hartzog, Lader and Richards.

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

Lesson 4: BLUE NECK BAY (THE WANDO RIVER CASE STUDY)

ADDITIONAL SOUTH CAROLINA MATERIALS

Reading, "The Wando River Controversy"
Transparency, "The Wando River Controversy: Political Process"
Worksheet, "The Wando River Controversy: Political Process"

OVERVIEW

Students read a case study about the decision to build the Wando River facility. Using information they learned in the previous "Political Process" lesson, students identify the major political actors in the Wando case and analyze the roles they played.

PROCEDURE

1. The "Wando River Controversy" reading can either replace the "Blue Neck Bay" reading or can be used as an additional case study.

2. Use the same procedures outlined in the "Blue Neck Bay" lesson. Students should read the case study and fill out their worksheets, using the last page of the reading ("Major Steps in the Wando River Case") as a guide.

   A complete version of the Student Worksheet follows. Students may complete their worksheets with some slight deviations from this key. However, major errors should be noted and discussed.

   One area of dispute may arise over where to place the State Ports Authority (S.P.A.). Some students may put it in the "agency" box rather than in the "user" box. While this would not be incorrect, explain that since the S.P.A. is the major user of the coastal resource (the harbor), it should fit in the "user" category.

   This story provides an interesting example of how one government agency has to go to other agencies to get a permit. Usually we think of only private citizens or businesses having to get permits, but government offices are also subject to these same regulations.

3. After students have completed the diagram, ask:

   a. <u>What did the environmentalists and other concerned citizens do to try to slow or halt development</u>?

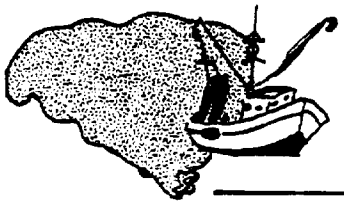
   (They formed public interest groups; they put pressure on the General Assemby; they testified at meetings; they lobbied government agencies.)

   b. <u>What did the S.P.A. and its supporters do to win approval of the</u>

Wando terminal plan?

(They put pressure on the General Assembly to fund the project; they lobbied members of government agencies; they testified at meetings; they filed a lawsuit against the Coastal Council.)

4. Encourage students to look for newspaper stories about recent controversies that involve coastal projects. Have them identify what elements of the political process are involved.

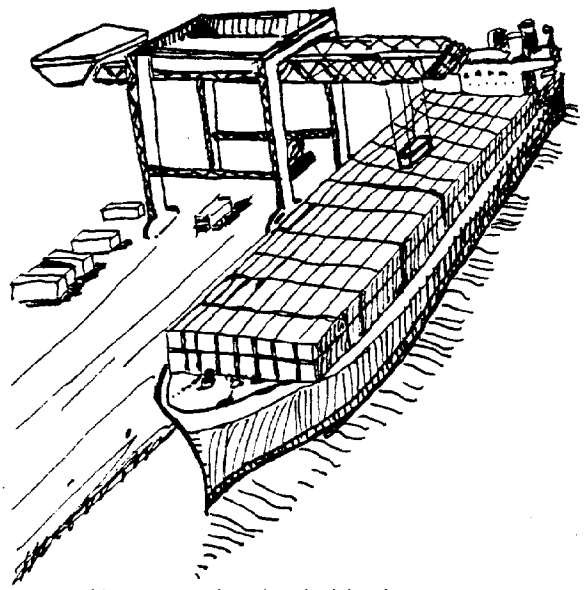


THE WANDO RIVER CONTROVERSY

Charleston Harbor is one of the coast's most important resources. The 12th leading port in the United States, the harbor is vital to the economy of South Carolina. Directly and indirectly, the harbor generates 35,000 jobs for the State, and 1,500 business firms use it for import and export of goods.

The harbor also makes millions of dollars each year for its owner, the State of South Carolina. The agency responsible for the management of the harbor is the State Ports Authority (SPA).

Because of the economic importance of the harbor, new proposals by the SPA to improve its facilities are normally supported by leading politicians and business leaders. Such was the case in 1973 when the SPA announced plans to expand Charleston Harbor. The SPA proposed to build four new berths by 1982 and three additional berths by 1990. Many of these new berths would be designed to handle containerized cargo, a method of shipping very popular in the industry. The new facility would help keep Charleston Harbor competitive with other harbors on the east coast.



New containerized shipping facilities would keep Charleston Harbor competitive with other East coast ports.

Immediately after announcing these plans, the SPA purchased several acres of undeveloped land on the Wando River. It favored this area because land costs were low and the river was wide enough at this point to allow ships to turn around.

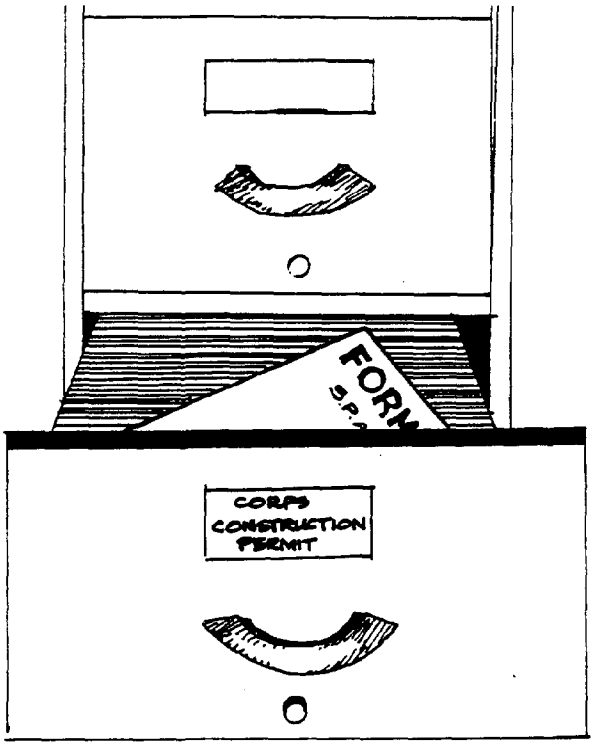
The Trident Chamber of Commerce, plus South Carolina's two U.S. Senators supported the SPA's proposal. Other business leaders joined in favor of the new plan.

The plans for the Wando site had barely been announced, however, when several environmental groups stated opposition to this area. The Wando site was on the quiet, undeveloped side of the river across from high income residential areas. Recreational boaters, fishermen, and sightseers often visited this spot. The opponents of the plan feared that other businesses and support facilities for the new terminal would soon locate in this area as well. Many acres of marsh near the Wando site, as well as valuable upland wildlife habitats would eventually be harmed or destroyed. A number of citizens quickly formed the Save the Wando Association (SWA) to oppose the SPA.

The SPA could not begin construction on the new facility until it had received permits from both the state and federal governments. In South Carolina, the State Budget and Control Board reviewed the plans and issued a permit in 1976, despite the objections of the SWA.

The fight then moved to the General Assembly. The legislative body had to approve the funding of the Wando project. SWA members lobbied hard for their position, as did supporters of the SPA. The General Assembly finally voted to fund the harbor expansion.

At the national level, the SPA filed for a permit from the U.S. Army Corps of Engineers. The Corps has jurisdiction over all navigable waterways in the U.S. Before the Corps issued the SPA a permit, however, another national agency, the Environmental Protection Agency announced it would review the Wando River terminal plans to make sure that water quality standards would be met.



The U.S. Army Corps of Engineers had to approve the harbor expansion plans.

The Save the Wando Association began writing letters to the Environmental Protection Agency and the Corps to protest the Wando site. Members traveled to Washington to testify at meetings and lobby agency officials. SPA supporters, such as Senators Thurmond and Hollings also appeared at meetings to speak in behalf of the new facility.

Finally, in December, 1977, after months of studies and meetings, the Environmental Protection Agency withdrew its objections to the plan. The Corps of Engineers granted a construction permit a few days later.

While the SPA was winning at the Federal level, another agency at the State level was creating problems for the SPA. The South Carolina Coastal Council (SCCC), created in May, 1977 by the General Assembly to manage coastal development, told the SPA that it must apply for a Coastal Council permit. The SPA refused to do so, claiming that the SCCC had no right to review a case that was already approved before the SCCC was created. "It seems to me to be an absurd action for us to have to go through another review by another state agency," complained one SPA official.

In November, 1977, the SPA filed a lawsuit in Circuit Court asking that the SCCC be prevented from reviewing harbor plans. A month later the Judge ruled in favor of the SPA. The Coastal Council then appealed the decision to

Representatives from both sides of the issue traveled to Washington D.C. to lobby government officials.

the Supreme Court of South Carolina, but it upheld the lower court's ruling.

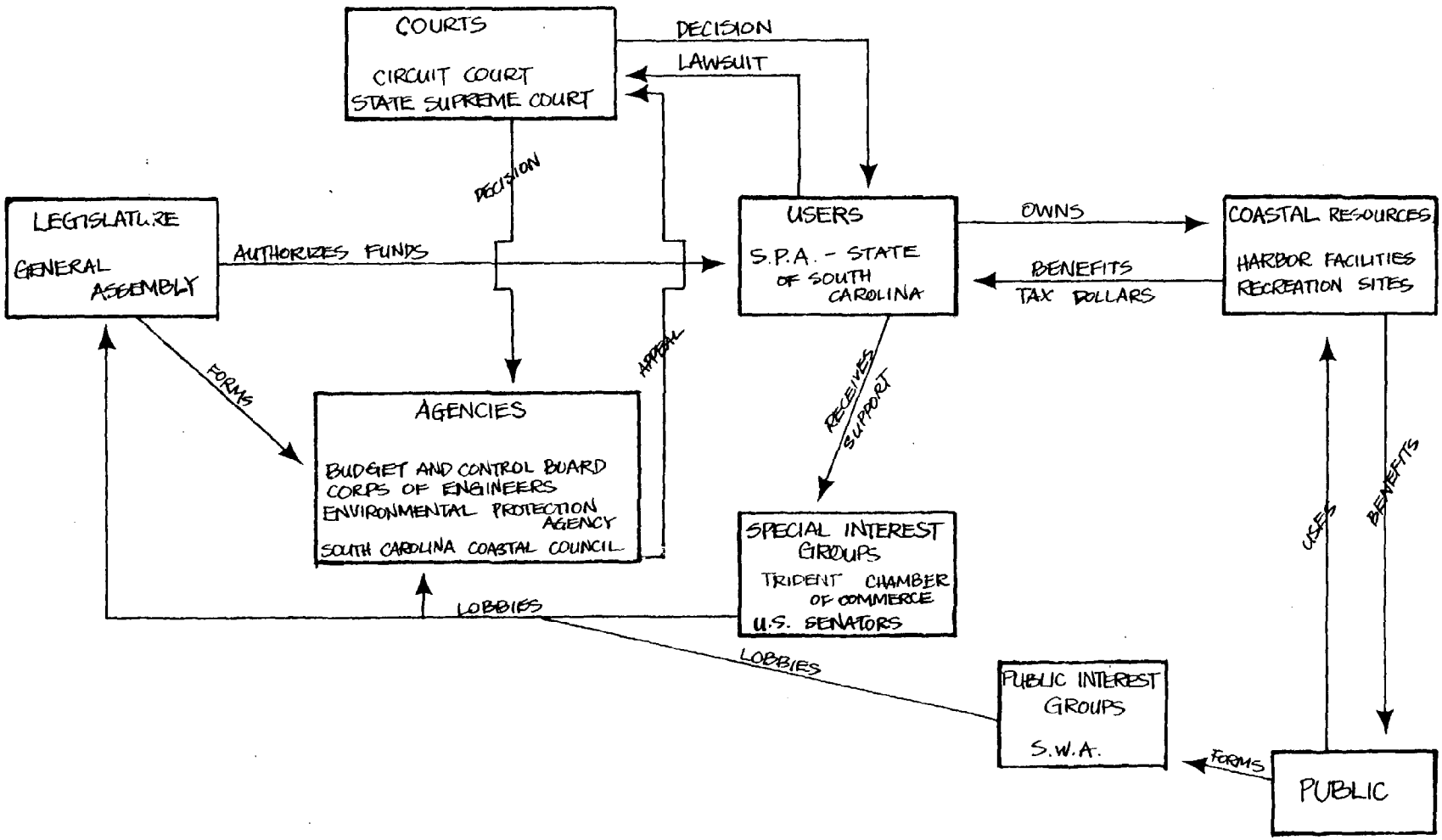
Despite the continued objections of some politicians, agencies, and groups like the SWA, the SPA had cleared all the legal hurdles. After a five-year battle, construction on the Wando site began in 1978.

MAJOR STEPS IN THE WANDO RIVER CASE

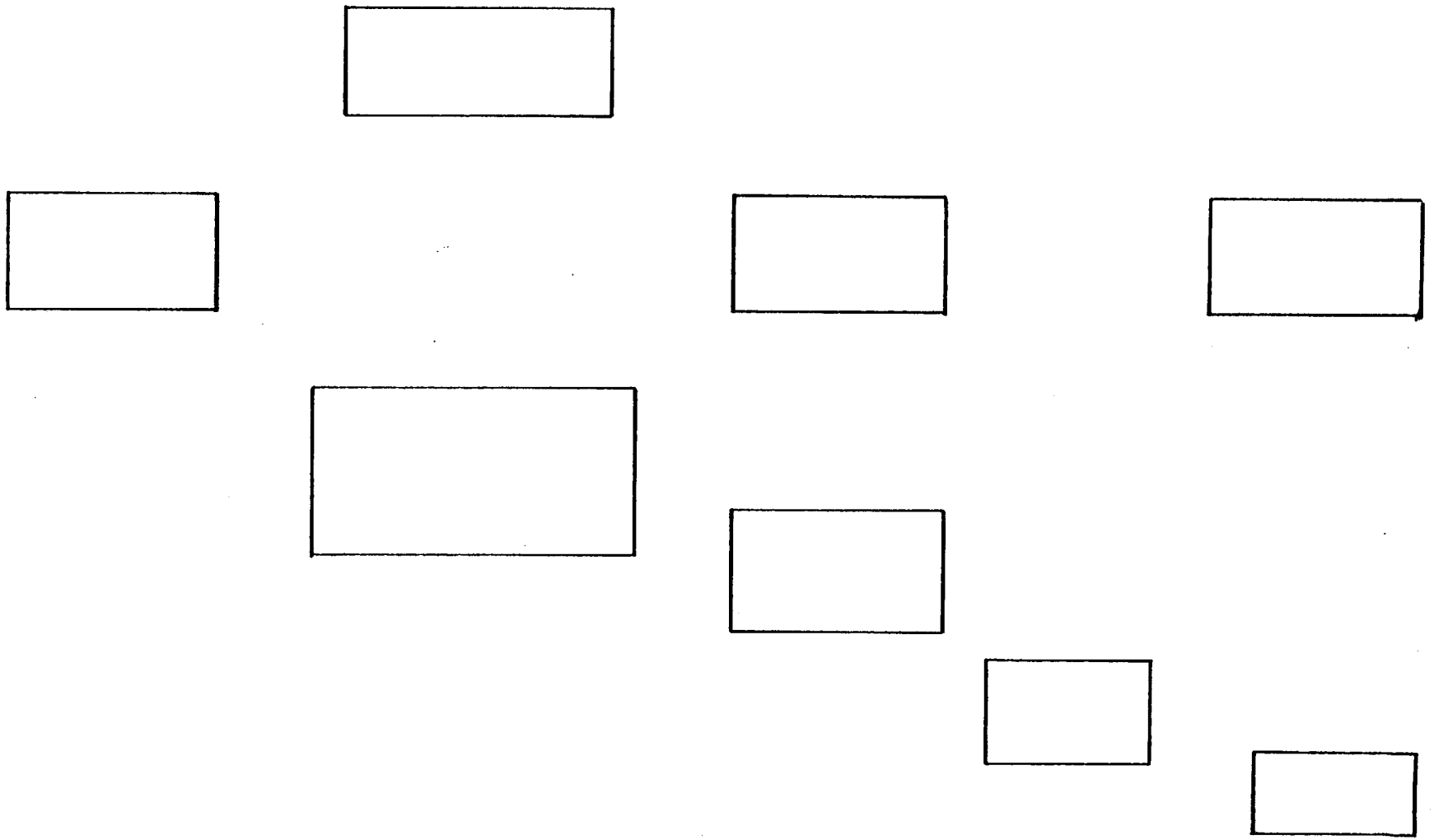
1. *The State of South Carolina, through the SPA, owns and operates the harbor, and receives millions of dollars in taxes from it.*
2. *Many people and businesses in South Carolina use Charleston Harbor and benefit from its facilities.*
3. *The SPA announced plans to expand the harbor; it sought permits from State and Federal agencies.*
4. *Groups such as the Trident Chamber of Commerce and influential people, such as Senators Thurmond and Hollings, supported the project.*
5. *Groups such as the Save the Wando Association (SWA) announced opposition to the project.*
6. *The State Budget and Control Board granted approval for the project.*
7. *The General Assembly voted approval for funding of the project, despite the lobbying of the SWA.*
8. *Supporters and opponents of the plan lobbied agencies in Washington, D.C.*
9. *The Army Corps of Engineers granted a permit for the project.*
10. *The SPA filed a lawsuit against the SCCC.*
11. *The Court ruled in favor of the SPA.*
12. *The SCCC appealed the decision to the South Carolina Supreme Court, but lost the appeal.*
13. *Construction finally began on the Wando River site.*

Worksheet
Answer Key

THE WANDO RIVER CONTROVERSY—POLITICAL PROCESS

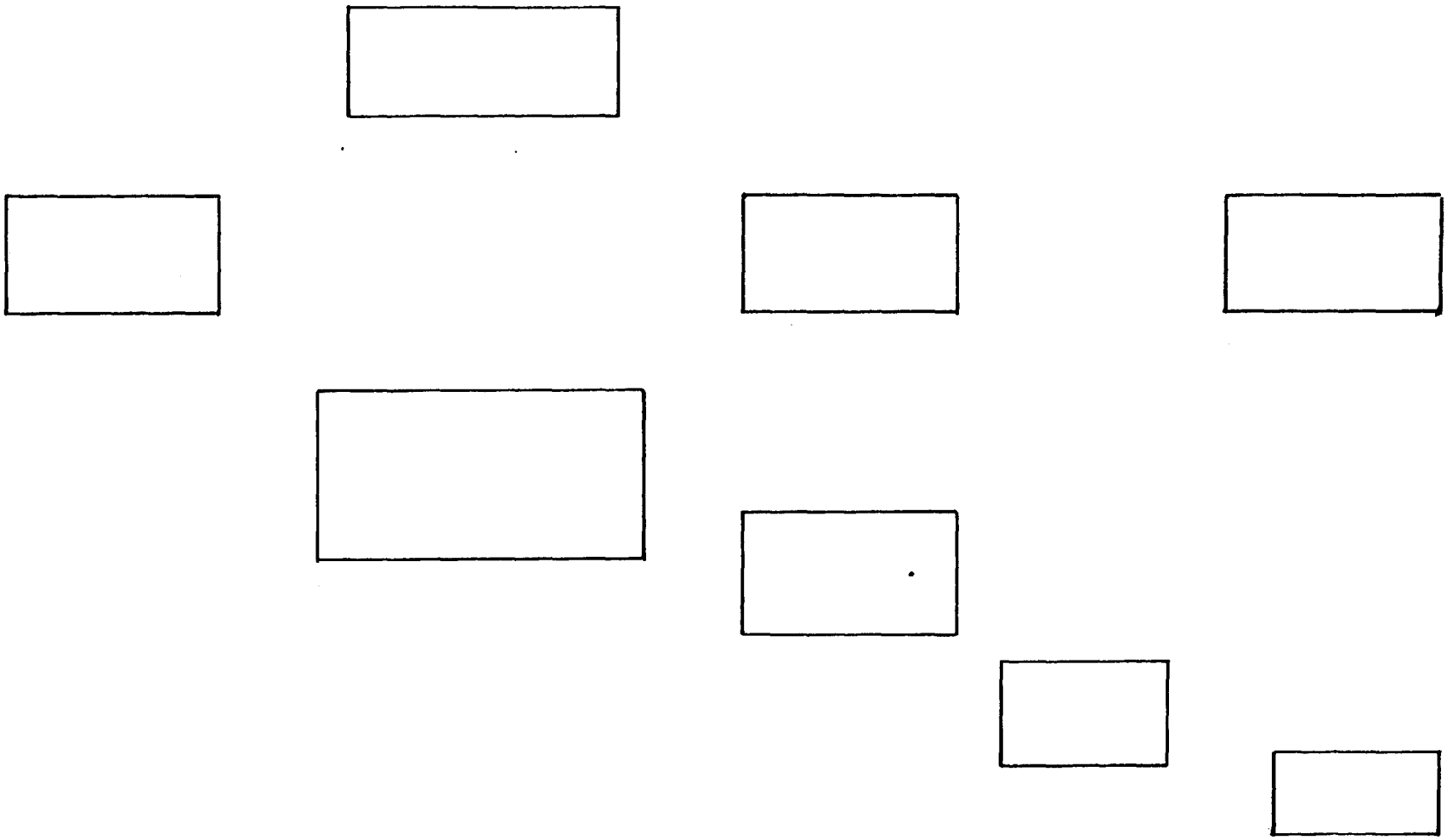


THE WANDO RIVER CONTROVERSY—POLITICAL PROCESS



Student Worksheet

THE WANDO RIVER CONTROVERSY—POLITICAL PROCESS



UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

Lesson 6: MANAGEMENT TOOLS (MANAGEMENT TOOLS IN SOUTH CAROLINA)

ADDITIONAL SOUTH CAROLINA MATERIALS

Reading, "Six Resource Management Examples In South Carolina"

OVERVIEW

Students read six examples of resource management in South Carolina. They then identify the management tool used in each example and analyze the advantages and disadvantages of each tool.

PROCEDURE

1. The reading, "Six Resource Management Examples In South Carolina," replaces the six examples provided in the original reading. (If you wish, you can use the original set for review or as a short quiz to test students' ability to identify the six resource management tools.)

2. Pass out the South Carolina reading after students have finished the first section of reading III-5, "Managing Coastal Resources," and answer the review questions (pages 139-140 in the Teachers Guide).

3. Have the class read the first of the six South Carolina examples, "Permanent Homes for Wildlife." After they finish, ask students the following questions:

   a. What resource or activity is the government trying to control?

   b. What management tool is government using to reach its goal?

   After they answer correctly, move to example two, "Wetlands," and again ask these two questions. Complete all six examples in this manner. Below are the answers for each example.

   (Example 1: a. The government is trying to protect wildlife.

   b. The management tool is the purchase or acquisition of land. By acquiring ownership, government can control how the land is used.

   Example 2: a. Government is trying to protect wetland areas.

   b. Government is using the management tool of zoning to prevent development in these areas.

   Example 3: a. Government wants to protect beach areas, wetlands, primary ocean-front sand dunes and coastal waters from over-development and degradation.

b. Government is using a permit and regulation system. The South Carolina Coastal Council is an agency established to oversee development activities in the low country.

Example 4:

a. Local governments are trying to encourage development in their areas.

b. Several cities have established a low tax rate to attract development. A higher tax rate might discourage development.

Example 5:

a. Government is attempting to improve beach access and protect the dunes.

b. Government is reaching this goal by improving or building public facilities. This tool is called improvement of public facilities, or capital improvements.

Example 6:

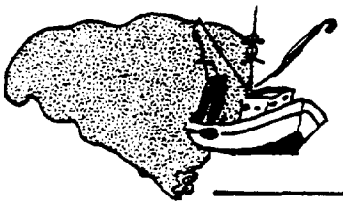
a. Government is trying to protect undeveloped barrier islands.

b. The state will discourage the expenditure of tax dollars for new public facilites in these areas. This strategy may be called the placement of key public facilities.)

4. Have students look at the third section of the original reading, "Analyzing Management Tools." Follow the procedures outlined in the Teacher's Guide for the remainder of this lesson.

5. One additional resource management strategy which is frequently used in South Carolina (and other states) involve business and government negotiation. In some instances, business has tried to lessen some of its negative impacts by agreeing to revise its original plans. For example, local or state government could negotiate with industry to provide training for local labor forces if the industry receives approval to locate in the area.

6. As a special project, the class could investigate which management tools are used or favored by their community or county. Specific examples of each management tool could be identified.



PERMANENT HOMES FOR WILDLIFE

The South Carolina Wildlife and Marine Resources Department has the right to acquire land for purposes of establishing specific wildlife sanctuaries. This action helps protect many species of wildlife, including birds and fishes. One example of a state wildlife preserve is Turtle Island in Jasper County which is owned and managed by the state.

WETLANDS

Several cities in the low country have designated wetland areas as conservation districts. Development in these areas is prohibited and the wetlands, including marshes, mudflats, and shoals are protected.

THE SOUTH CAROLINA COASTAL COUNCIL

The South Carolina Coastal Council helps protect coastal areas by establishing standards for land and water use. Anyone wanting to alter beaches, wetlands, primary ocean-front sand dunes, or coastal waters must submit a plan that meets the standards of the Coastal Council. If the Council approves the plan, the person will receive a permit. No construction can occur until the Council grants this approval. In areas outside its direct permitting jurisdiction, the Council exerts an indirect authority whereby it reviews and certifies or noncertifies permits of other state and federal agencies. Without its certification, other agency permits are invalid.

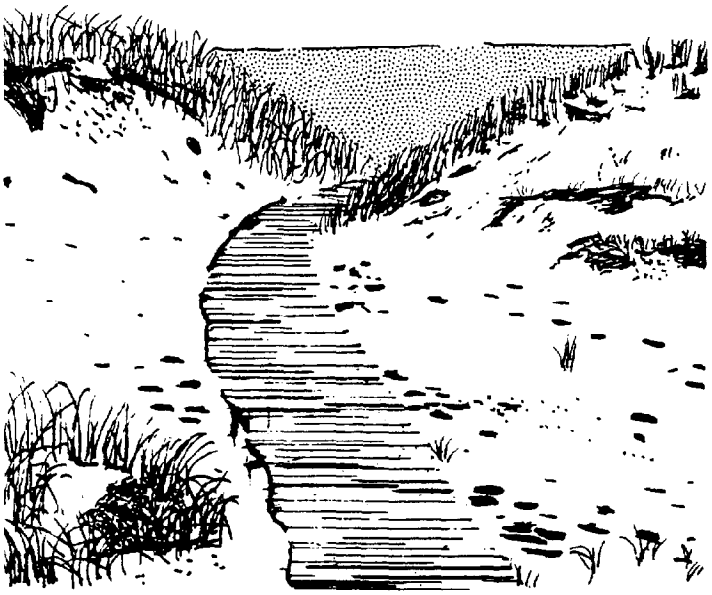
BRINGING IN THE BUSINESS

In order to attract more jobs and income to their communities, many coastal

towns have set low tax rates for business and industry. This policy encourages businesses to build new plants or expand existing facilities in these communities rather than locating in other areas.

WALKWAYS TO THE BEACH

The South Carolina Coastal Council recently voted to fund the building of new walkways over the sand dunes in Myrtle Beach and North Myrtle Beach. This action helps protect the fragile dunes from people walking on them and allows many visitors and residents to get to the beach more easily.



The state placed new walkways, such as the one shown here, at Myrtle Beach and North Myrtle Beach.

BARRIER ISLANDS

A policy of the South Carolina Coastal Management Program administered by the Coastal Council, is to protect undeveloped barrier islands. In order to meet this objective, program policies strongly discourage the location of public facilities such as bridges, highways, and sewer systems in these undeveloped areas. This helps limit the amount of private development since most developers cannot afford to provide these expensive services.

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

Lesson 7: LOCAL VERSUS REGIONAL CONFLICTS (WHO PAYS FOR EROSION CONTROL?)

ADDITIONAL SOUTH CAROLINA MATERIALS

Transparency, "Local-Regional Conflicts in South Carolina: Who Pays for Erosion Control?"

OVERVIEW

Students view a transparency and hear an account of a local-regional conflict in South Carolina.

PROCEDURE

1. This transparency is designed to be the last in the series of transparencies on local-regional conflicts. The preceding transparencies and accompanying description are provided in the original lesson (pages 146-148 in the Teachers Guide).

2. Show the transparency, "Local-Regional Conflicts in South Carolina: Who Pays For Erosion Control?" after the final transparency on the City of Long Beach, California ordinance (page 149 in the Teachers Guide).

   Give the students the following information:

   A good example of local-regional conflicts in South Carolina is represented by the debate over who sould pay for erosion control. Shoreline areas such as Folly Beach, Forest Beach on Hilton Head Island, Hunting Island, Edisto Island, and sections of Myrtle Beach are all threatened by erosion. Local officials want to provide protection against further erosion damage because it will bring many benefits to their communities. Erosion control protects homeowners and helps keep the beach wide so tourists will continue to come to their area.

   Because erosion control projects are expensive, however, local communities usually need financial help from the state and federal governments. In the past, the State of South Carolina has tended to provide funds. But State officials are beginning to wonder if all their money is "going down the ocean's drain." While some projects have been successful, many more have not. Further, in many places only a few private property owners have benefitted and not the general public.

   Consequently, the State and Federal Government are generally cutting back on the amount of funds they provide for erosion control. But, if the beach has public access easily available, the Federal government will pay a higher part of the erosion bill. By instituting this policy, government officials are trying to change the funding of erosion control

so that the general public receives more of the benefits. South Carolina's Coastal Management Act and Coastal Management Program require that public erosion control money be spent only in areas which provide full and complete access to the public.

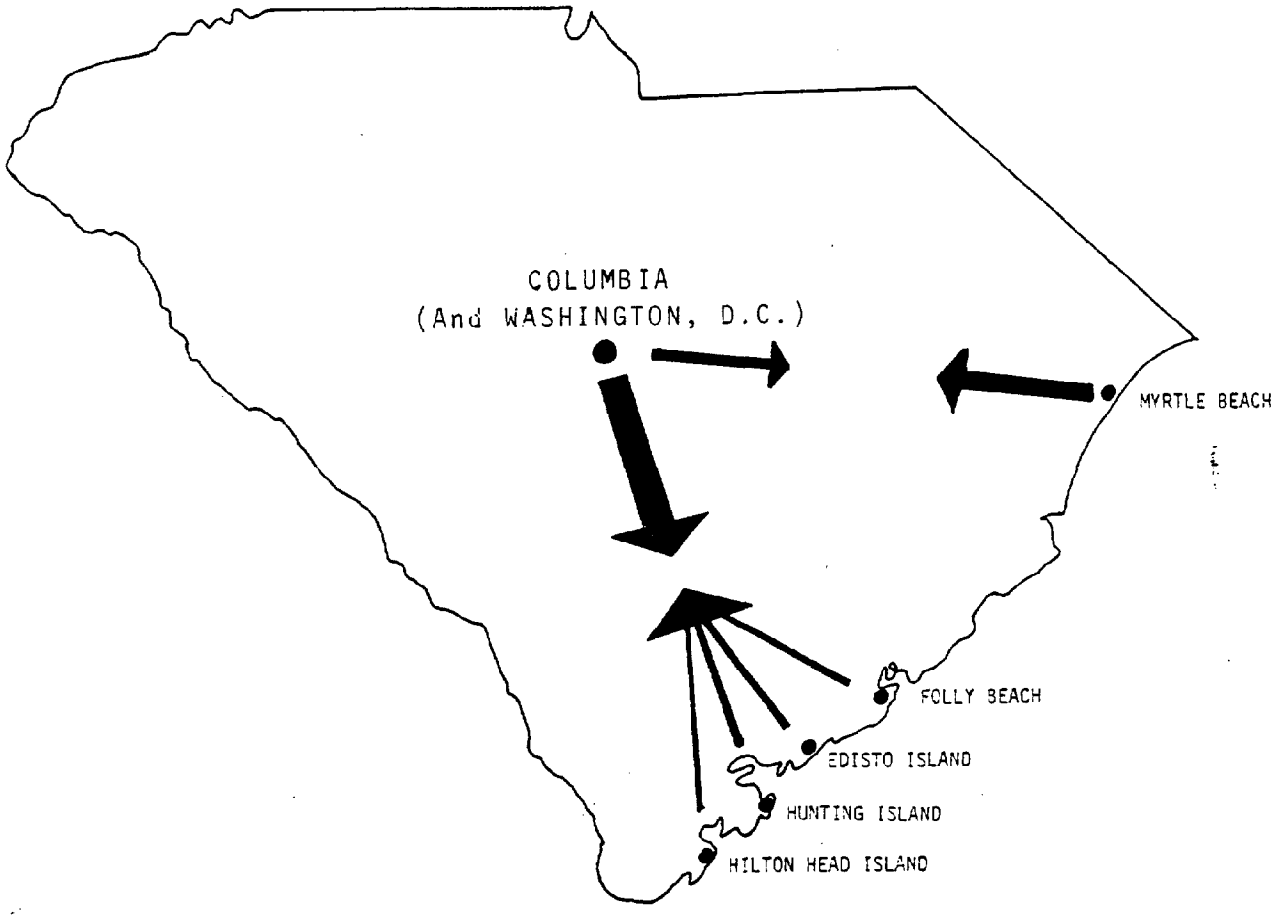
3. To review, ask:

   a. Why is the state government questioning the policy of paying for erosion control?

   b. Why is this a good example of local vs. regional conflicts?

Transparency

LOCAL-REGIONAL CONFLICTS IN SOUTH CAROLINA
WHO PAYS FOR EROSION CONTROL?



UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

Lesson 8: JURISDICTION PROBLEMS (GEORGIA vs. SOUTH CAROLINA)

ADDITIONAL SOUTH CAROLINA MATERIALS

Teacher's notes only.

OVERVIEW

Students hear an account of a jurisdiction problem that affects the coastal area of South Carolina.

PROCEDURE

1. After you have completed Lesson 8, give students the following information about a jurisdictional problem affecting the low country:

   As the lesson discussed, jurisdictional problems can occur when the events outside your control, or jurisdiction, affect you. Often there is little that can be done. A good example of this is Daufuskie Island, a few miles north of the Georgia-South Carolina border. Daufuskie Island was once the site of a small community that made a living harvesting shellfish in the area. Today, however, few shellfish are found that can be harvested. Pollution has ruined the shellfish grounds. The economy of the island has suffered; few jobs exist. Most of the residents are now on welfare.

   The State of South Carolina could do little to save this community from this pollution problem, however, because a major source of the pollution was in Georgia. Several industries and the Savannah sewage treatment plant dumped their wastes into the Savannah River. When the wastes entered the ocean, the currents pushed them north into the South Carolina low country. Water quality dropped, shellfish sites disappeared, and small fishing communities like Daufuskie Island suffered severe economic hardships.

   At the other end of the state's coast, northerly currents create similar problems for North Carolina residents living just the other side of the state boundary. Sewage from the Myrtle Beach and North Myrtle Beach area is dumped into the Intracoastal Waterway and floats north into North Carolina.

2. Ask students if they can think of other jurisdictional problems in their town or county.

UNIT III: RESOURCE MANAGEMENT: POLITICS AND PLANNING IN THE COASTAL REGION

Lesson 10: THE TAKING ISSUE: LEGAL LIMITS TO REGULATION (A TAKING ISSUE IN SOUTH CAROLINA)

ADDITIONAL SOUTH CAROLINA MATERIALS

Reading, "Tisdale vs. The South Carolina Coastal Council"

OVERVIEW

Students read an account of a "taking issue" case in South Carolina. In a mock courtroom scene, students present each side of the case before a "jury." The actual outcome of this case is then revealed.

PROCEDURE

1. The reading, "Tisdale vs. The South Carolina Coastal Council," and this short activity are designed to follow the conclusion of Lesson 10, "The Taking Issue: Legal Limits to Regulation."

2. Explain to the class that an interesting example of the conflicts between the rights of private property owners and the power of government to regulate land use occurred recently on Pawleys Island near Georgetown. A property owner there discovered that the rules and regulations of the South Carolina Coastal Council conflicted with plans she had to build a new beach cottage.

   Pass out the short reading, "Tisdale vs. The South Carolina Coastal Council" to each student.

3. After they have completed the reading, ask a student to summarize the main points in the reading. Then ask:

   a. <u>What is the basic conflict in this situation</u>?

      (Has the government [the Coastal Council] gone too far in restricting Mrs. Tisdale's use of her property?)

4. Divide the class into three groups. Group 1 will represent Mrs. Tisdale and Group 2 will represent the South Carolina Coastal Council. Group 3, consisting of only three to five students, will be the jury and will render a decision in the case.

5. Give the students in Groups 1 and 2 10 minutes to prepare their client's case. They may work alone or in small groups within their larger groups. Suggest they use the "Balancing Process" worksheet as a guide in organizing their work.

   At the end of the preparation time, ask one person representing Mrs. Tisdale to present her case. Allow students from the Coastal Council

to respond. Ask for any other relevant information or arguments. Give the jury a few minutes to deliberate. Have them conduct their deliberations in front of the class, and then announce their decision.

6. After the jury has announced its verdict, read the class the actual decision of the circuit court:

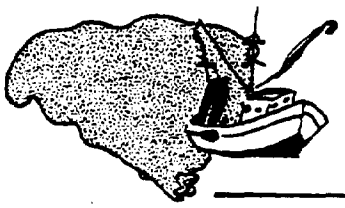
   The 15th Circuit Court of South Carolina, meeting in Georgetown, ruled against Mrs. Tisdale. Judge R.K. Anderson said the Coastal Council's decision was legitimate exercise of the police power and did not constitute a taking. The Judge ruled that the policy of the Council to protect marshland is legitimate because it does not seek to <u>create</u> new public benefits, but only to <u>maintain</u> what already exists.

   If the Council had been trying to create new public benefits it should have used the power of eminent domain.

   The court also held that Mrs. Tisdale did have some reasonable remaining uses of her land left. Although Mrs. Tisdale argued that she was deprived of the only existing practical use, the Judge disagreed. He wrote, "I do not believe that the term 'existing practical use'. . . was intended to refer to the most economically advantageous use." While the use of the property for a dock or a parking lot might not be what Mrs. Tisdale wanted, such uses are still permitted and are reasonable. Thus, the court ruled against Mrs. Tisdale.

   Point out that the reasoning used in this case closely followed the arguments used in <u>Just vs. Marinette County</u>. In both cases, the court held that a property owner did not have the right to alter the natural condition of wetlands strictly for private gain.

7. Explain to the class that Mrs. Tisdale has appealed this ruling to the Supreme Court of South Carolina. A final ruling is not expected until 1981.



TISDALE vs. THE SOUTH CAROLINA COASTAL COUNCIL

In 1969, Mrs. Margaret Tisdale of Andrews, South Carolina, purchased three lots of marshland on the south end of Pawleys Island. Mrs. Tisdale planned to use one of the lots, 63 feet by 40 feet, to build a small beach cottage after she retired from public school teaching. Before she could begin construction, however, she first had to receive the approval of the South Carolina Coastal Council.

The Coastal Council was created in 1977 to control development in "critical areas" of the coast. Marsh was included in this category and any proposed construction first had to receive a permit from the Coastal Council.

In November, 1977, Mrs. Tisdale requested a permit from the Council to fill a portion of her marsh lot. The Council denied Mrs. Tisdale a permit. The Council told Mrs. Tisdale that the marsh was a valuable natural resource that benefits all the citizens of the state. To allow her to create a residential lot strictly for private gain would remove the public's right to continue to benefit from this area. Further, the Council argued, filling in this lot could cause erosion damage for nearby property owners. Finally, the Council noted that this land had other uses which would be permitted. A dock and pierhead could be built; a 30-foot strip of her property which bordered the road could be cleared for parking of cars and recreational vehicles.

Mrs. Tisdale brought suit against the Coastal Council claiming that the decision so restricted her use of the land that it represented a "taking" of her property. Mrs. Tisdale said the property would only be of value if filling took place. She also argued that she was filling in such a small amount of the total marsh area on Pawleys Island that her project would not affect the benefits the public received from the marshlands. Mrs. Tisdale asked that the Council pay her the sum of $35,000 for "taking" her property.

UNIT IV: CASE STUDIES IN SHORELINE MANAGEMENT

Lesson 2: THE ECONOMY AND THE ENVIRONMENT: SOUTH CAROLINA (RECENT CASES FROM SOUTH CAROLINA)

ADDITIONAL SOUTH CAROLINA MATERIAL

Worksheet, "Planning Worksheet"

OVERVIEW

Students hear two examples of current conflicts between the economy and the environment in South Carolina. Suggestions for student projects are given.

PROCEDURE

1. Since the case study for this lesson in the regular set of student materials, "Do Chemicals and Carolina Mix?", already involves a South Carolina case, additional student readings are not included here. However, since the BASF case is several years old, students should be reminded that the economy-environment debate is still relevant in many instances.

2. Two examples of recent cases involve a condominium proposal for Folly Beach and a new marina for Murrells Inlet. Newspaper clippings on both issues are attached for your reference. You may wish to summarize the main issues, pro and con, for students by reviewing the articles, or by preparing a transparency of the stories and showing the articles to the students.

   A "Planning Worksheet" is included so that students can record the advantages and disadvantages of the two proposed developments as you review them in class. Have them write in the issue at the top after the word "Question."

   For up-to-date information on these two projects, check the newspaper file at your local library or contact Louis Hern at the South Carolina Coastal Coucil, Suite 802, Summerall Center, 19 Hagood Ave., Charleston, SC, 29403, phone: (803) 792-5808.

3. As a research assignment, some students may wish to identify a new project proposed or scheduled for construction in their community. Students can collect evidence about the project, using the "Planning Worksheet" as a guide, and then report back to the class on what they have found.

S.C. Coastal Council Hearing On Proposed Marina Thursday

MURRELLS INLET (AP) — The construction of a commercial fishing marina would create a small — and probably prosperous — industry for Murrells Inlet, according to its supporters.

But opponents of the marina say the water, air and noise pollution it would bring to the peaceful resort village make it not worthwhile to bring in the new industry.

The argument is going on while the man who wants to develop the marina, Ralph F. Triska, a Washington real estate developer, is applying for a permit to construct the facility.

The decision must be made by the South Carolina Coastal Council, which is holding a hearing on the proposal on Thursday. The council's deputy director, Duncan Newkirk, says the decision will be a "landmark," setting a precedent for permitting or barring water-bound commerce in the little community.

According to some accounts, Murrells Inlet failed to develop as a commercial center because ocean access was unpredictable.

In a study of the inlet, the U.S. Army Corps of Engineers said it was afflicted by "shifting sands that drastically affect its depth and caused the mouth to migrate from year to year.".

In 1977, the Corps of Engineers began constructing a $17 million jetties and channel navigation project designed to end the shoaling.

This summer, Triska began his plans for the marina, saying the jetties "will breed this kind of development."

Georgetown County Councilman Leon Bellamy says the marina would help diversify the community's economy and create year-round jobs.

Triska says he also hopes to build a fish packaging house and retail seafood store, a seafood restaurant, a tackle shop and ticket office.

The proposed marina would serve up to 20 commercial fishing boats, eight charter boats and three party boats.

"The Grand Strand is the largest seafood market in the Southeast," he said. "But most restaurants on the Grand Strand buy the fish they serve from New York, the Chesapeake Bay or the Gulf of Mexico. It's ridiculous, but there is no adequate distribution system" to get local seafood to local buyers.

There are more than a score of restaurants, but only two serve local fresh fish, he said. "The supply is too unpredictable."

He said he hopes his packing house could move local seafood to local buyers. "We hope to develop the local market and not ship to New York and other markets," he said.

At the height of the fishing season boats are forced to anchor in Murrells Inlet channels because of inadequate dock space, he said.

When the jetties are completed, it will "change fishing here drastically," Triska adds.

But there is fear the changes will not be confined to fishing.

"Our family has had a summer home in Murrells Inlet for 65 years," said James M. Carmichael III of Roanoke, Va. "We're concerned about the damage the project will wreak on this section of Murrells Inlet."

The site for the proposed marina is adjacent to Sunnyside, "one of the largest, oldest and nicest residential communities left in Murrells Inlet," said Hall M. Johnston, a Charlotte, N.C., realty agent.

"To sacrifice all of this to noise pollution, air pollution, loss of sea life (due to water pollution) and traffic congestion is unthinkable," he said.

Cynthia Nance, proprietor of Nance's Creekside Restaurant, Oyster Roast and Crab Bar, said her business depends on high water quality in the inlet. The restaurant serves oysters and other seafood caught in Parsonage Creek outside the restaurant's back door.

"Five years from now, when the marina is going strong, will there be so much pollution that the oyster grounds will be closed?" she asks.

The State
Columbia, SC

Tuesday, September 4, 1979
Page One

Folly Condominium Proposal Draws Fire

The News & Courier
Charleston, SC

November 13, 1979

By WILLIAM MATTHEWS
Staff Reporter

Building 540 condominiums on Bird Key would be "the biggest thing that has happened to Folly Beach in the past 25 years," said William A. Lee.

"This project will either pick this island up and set it on the move, or it will be a complete disaster," he said. Lee is chairman of the Folly Beach Planning Board, which must determine whether the $18.5 million condominium project will be a boon or a bust for Folly Beach.

Many Folly Beach residents have been convinced that the project, proposed early last summer by Columbia Development Corp. of Columbia, would give the island an economic boost it has needed for years.

Among them are Mayor Regas M. Kennedy and a number of other Folly Beach officials.

"It will be good for the beach," Kennedy said. "It will provide us with sewer lines and improve our water service." It also will nearly double the city's tax base, he said.

The installation of sewer lines to the island "will be the turning point for Folly Beach," said city manager Robert Grooms. Sewer service will attract development, and development is what Folly Beach has wanted for many years, he said.

The presence of 540 $55,000 condominiums also is expected to raise the value of property on Folly Beach.

But according to opponents, the project may create more problems than it solves.

The Bird Key end of Folly Island should remain undeveloped, said Diane Dunn of the U.S. Fish and Wildlife Service.

"The area is not stable," she said. Bird Key is subject to rapid erosion, it is mostly marsh and sand dunes, and it is highly vulnerable to damage by hurricanes and other storms, she added.

Development on Bird Key could become a taxpayers' burden, she said. Federally subsidized insurance will protect the condominium owners from losses due to storm damage, but their protection will be at the expense of the public, she said.

Although Bird Key now suffers from erosion, it is not a prime target for erosion control. If the condominiums are built, however, "there is no question" that the Army Corps of Engineers would be obliged to begin a costly erosion control project to protect them, she said.

Money for erosion control will come from federal, state and city taxes, she noted.

According to Donald Tomlin, president of Columbia Development Corp., a "careful study and evaluation" of the history of erosion at Bird Key has indicated that erosion would not pose a threat to the condominiums. "There is serious erosion at the north end of Folly Beach, but if you go down to Bird Key at low tide, I think you'll see where all the sand (from the north end) is going."

A Fish and Wildlife evaluation of Bird Key indicated it would be best used as a park, Ms. Dunn said. Bird Key represents a natural ecosystem of a barrier island — sand dunes, maritime shrubs and marsh. Due to erosion, it is too unstable for development, she said.

"It is a really beautiful piece of land," Tomlin commented. If properly developed it could begin a real estate boom on Folly Beach, he said. "Charleston is a dynamic (real estate) market, but Folly has been totally overlooked." Property values on Folly Beach "have eroded in the past," but the condominium project could reverse that trend, he said.

> *'This project will either pick this island up and set it on the move, or it will be a complete disaster.'*
>
> *—William A. Lee, Chairman, Folly Beach Planning Board*

The South Carolina Coastal Council and the Army Corps of Engineers have determined that about 52 of about 200 acres on Bird Key are "high ground" and can be developed without state or federal permits.

The Fish and Wildlife Service has said that only 20 acres can be developed without permits. Reducing the developable area to 20 acres would kill the project, Tomlin said.

The Fish and Wildlife Service determination that only 20 acres was high ground came after a handful of project opponents called upon "every conceivable state and federal agency" to hinder the project, Tomlin claimed.

But Steven Gilbert of the Charleston office of the Fish and Wildlife Service said the service is concerned because Bird Key may be too "unstable" for a development as large as the condominium project. "A storm could wipe the whole thing out," he said.

According to Tomlin, the condominium units would be built to withstand 140-mph winds and would be above storm wave heights.

The environmental impact of the project on Bird Key may not be as important as its impact on the city of Folly Beach, according to Lee.

"This project could be just what Folly Beach has needed for a long time. We have needed something to help us develop. But we don't need any more problems." The project "deserves an in-depth analysis" before the city decides to grant Tomlin a building permit, he said.

The 540 condominiums will nearly double the number of permanent residences on Folly Beach, Lee said. They will add a tremendous burden to the city's fire and police departments. They may also create problems in traffic, waste disposal, garbage removal, water service and erosion control, he said.

Student Worksheet

PLANNING WORKSHEET

QUESTION:

Economy

ADVANTAGES	DISADVANTAGES

Environment

ADVANTAGES	DISADVANTAGES

Political/Social

ADVANTAGES	DISADVANTAGES

Are there any other advantages or disadvantages to this proposal that should be included, but do not fit into these categories?

UNIT IV: CASE STUDIES IN SHORELINE MANAGEMENT

Lesson 3: ENERGY AND THE ENVIRONMENT: THE NORTHEAST ATLANTIC (OIL AND THE SOUTH CAROLINA COAST)

ADDITIONAL SOUTH CAROLINA MATERIALS

Reading, "Oil and Carolina"
Transparency, "South Carolina's Oil Future?"

OVERVIEW

Students read a review of the status of oil exploration and production in South Carolina and discuss possible impacts of such activity on the coastal area. A transparency helps highlight the location of possible offshore exploration areas and the long-term impacts of oil production.

PROCEDURE

1. The reading and transparency on the exploration and production of oil in South Carolina may be used as a follow-up to the activities contained in the lesson, "Energy and the Environment." In this way, the South Carolina materials serve as a summary and an in-depth example of the more general problems introduced by the transparencies IV-2 (Pacific Coast) and IV-3 (Atlantic Coast) and the reading, "The Atlantic Oil Sweepstakes."

   Begin the "Energy and the Environment" lesson by explaining to students that the exploration and production of oil is a crucial issue facing many coastal communities throughout the country. The first part of the lesson will introduce the problem and then additional materials will provide an in-depth account of how oil-related activities could affect the South Carolina coastal region.

   Lead the class through procedures 1-3 in the Teacher's Guide (pp. 192-194) and then begin with the procedures listed below.

2. Ask students the following questions about the impact of oil exploration and production on the coast of South Carolina. The class may not know the answers to all the questions. Do not provide answers at this point. Explain that many of the answers will be found in the next reading.

   a. Have the oil companies begun to explore for oil off the coast of South Carolina?

   b. Have the companies made any important discoveries?

   c. At present, are there any oil refineries or other onshore activities located on the Carolina coast?

   d. Based on your reading and discussion, what might be some possible impacts on the coast if oil is discovered in large quantities?

e. Are South Carolina communites generally in favor of oil exploration and production? What is the position of the state government?

3. After the class has considered these questions, pass out the reading, "Oil and Carolina." Have students look for the answers to any questions they were unable to answer.

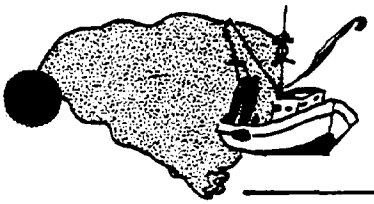
4. After students have completed the reading, review the questions (listed in procedure #2) to make sure the important points in the reading are understood.

   Use the transparency, "South Carolina's Oil Future?" to help review the reading. Point out the location of the offshore exploration areas and the proposed Georgetown refinery.

   Students will find that the answer to the final question in procedure #2 is not clearly answered in the reading. Ask the students how they could find out the answer to this question. Possible sources of information would be newspaper articles or government reports.

   In addition, the class could investigate what the position of their own local community is concerning the location of oil-related activities. Would their community favor or oppose such activities?

   Have students contact government offices, business leaders, and civic groups to determine the answer.



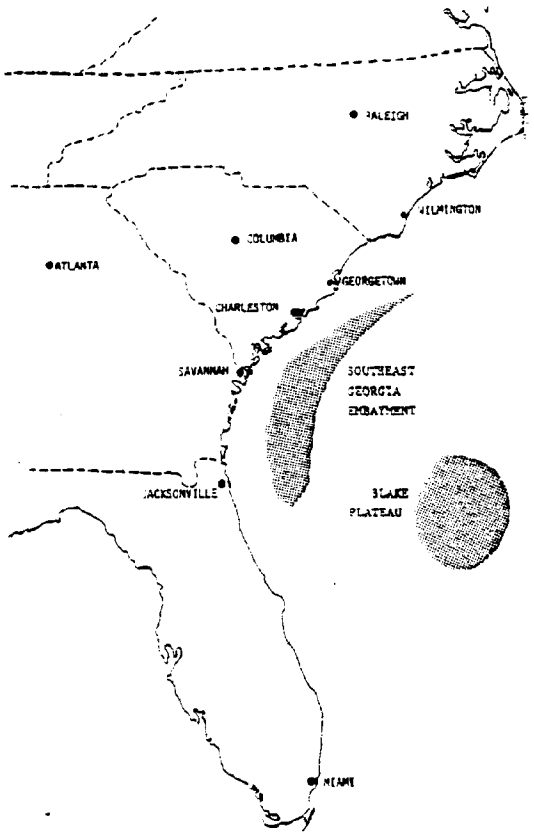
OIL AND CAROLINA

The future of the Carolina coast may be significantly shaped by what takes place some 25 to 150 miles offshore under the continental shelf. Two areas, the "Southeast Georgia Embayment" and the "Blake Plateau" may contain oil, and if major discoveries are made, the consequences for the Carolina coast could be enormous.

Currently, South Carolina's contact with oil is strictly as a consumer. No oil production facilities, including oil wells or refineries, exist in the state. In fact, there are few such facilities anywhere along the southeast Atlantic seaboard.

If major discoveries occur offshore, however, the situation will dramatically change. New industries will develop to provide support for the exploration of the sites and for the construction of new equipment. Temporary and permanent service bases, pipeline and platform facilities, repair and maintenance yards, and warehouse and office buildings will be built. The local construction industry will boom. New housing will be needed for the oil-related workforce. One estimate for the Charleston area predicts that a major discovery could double Charleston's population in ten years and add 37,000 new dwellings. The odds are, however, that most new development would take place in rural rather than existing urban areas. Oil companies favor rural sites because they need large tracts of undeveloped waterfront land and because land and labor are cheaper in these areas.

At the present time, the oil companies have not shown much interest in the S.E. Georgia Embayment, the only area off South Carolina to be opened for oil exploration. In 1978 the U.S. Government announced that certain tracts in this area would be opened for exploration (in what is known as a "lease sale"). The oil companies did not make any bids to lease the areas off South Carolina. Low bid prices or no bids at all by the oil producers often mean their own research of the ocean floor shows little chance of finding significant amounts of oil.



Two potential oil-bearing sites are near South Carolina.

However, this does not necessarily mean that the oil companies will not lease these areas in the future. They may believe that large amounts of oil are located there, but certain factors, such as the depth of water or the composition of the ocean floor, make it too expensive for them to drill at this time. But as the technology for oil drilling improves and oil prices rise, certain areas in the S.E. Georgia Embayment may become economically feasible for future exploration. Thus, areas off South Carolina that the oil companies turned down in 1978 may be explored after 1981, the date of the next lease sale.

The other area of possible oil deposits off South Carolina, the Blake Plateau, may hold more oil than the S.E. Georgia Embayment. However, it is in deeper water and further from shore, thus increasing the costs to the oil companies. Areas in the Blake Plateau will be leased in 1984.

Even if the two lease areas near South Carolina do not yield significant finds, coastal communities may still feel the pressure of oil-related developments. Facilities needed to support offshore, explorations in other states or to process oil from foreign countries may be located in South Carolina. The currently proposed oil refinery near Georgetown provides a good example. The new plant, to be located on the Sampit River above Winyah Bay, would refine products from Venezuelan crude oil. The proposed refinery is a relatively small one, yet will produce 30,000 barrels per day.

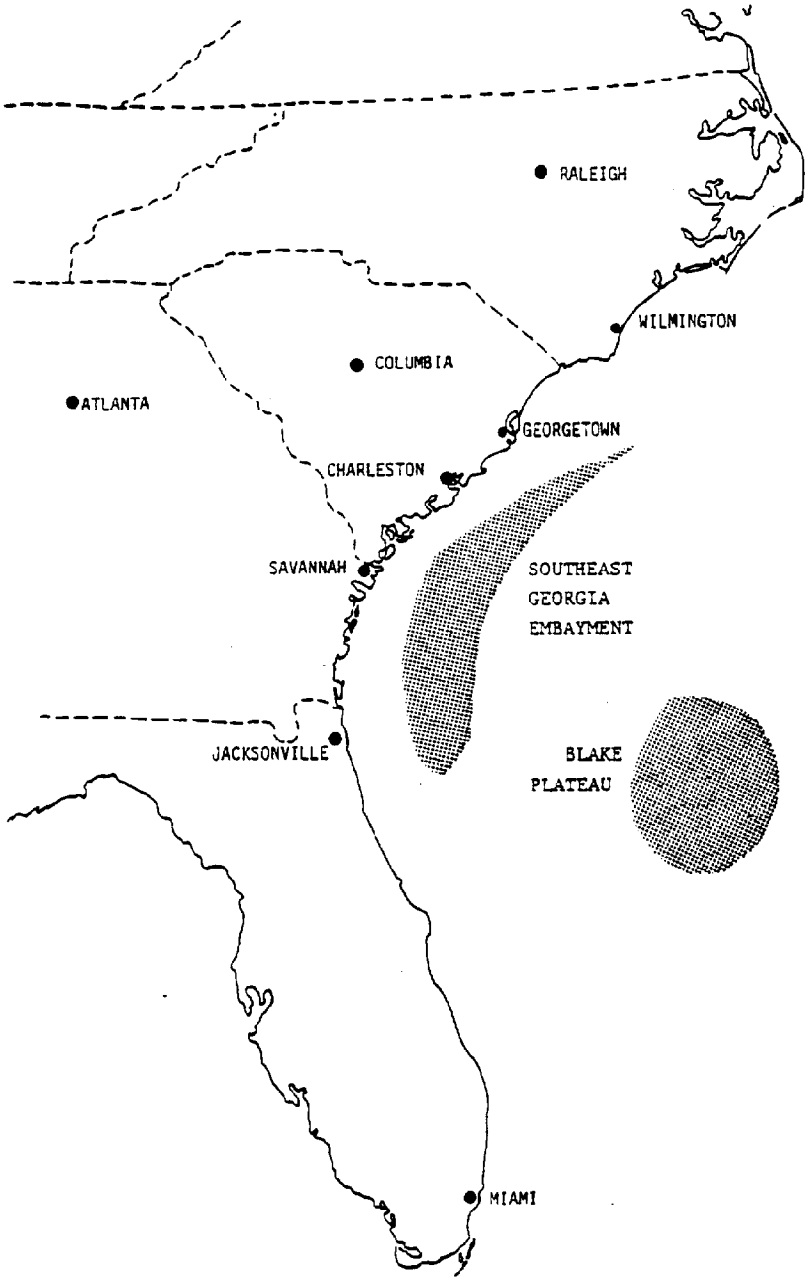
In addition, a 3.3 mile pipeline, connecting the Georgetown harbor area with the refinery is also proposed. Two pipelines will be buried six feet below the surface and cross under the Sampit River. Supporters of the refinery point out that a number of new jobs in the Georgetown area will result from both the construction of the refinery and its ongoing operations. Finally, oil industry officials note that no new refineries have been built on the East coast in several years, and that additional facilities, like the Georgetown plant, are badly needed.

Several state and federal agencies are currently reviewing the plans to see if the new plant will meet existing regulations. Questions about air and water pollution, especially the possibilities of oil spills, must be answered before permits for construction will be issued.

While the Georgetown facility is the only oil-related facility currently proposed for South Carolina, state officials expect more will follow. The demand for new refineries on the East coast is likely to increase, and if major oil or gas deposits are found offshore, land-based facilities may be proposed for several communities. How should South Carolina react to these proposals? Should oil companies be encouraged to locate facilities along the Carolina coast? These are difficult yet unavoidable questions for the citizens of South Carolina. Decisions made now and in the next few years could influence the future of the coast for decades to come.

Transparency

SOUTH CAROLINA'S OIL FUTURE?



UNIT IV: CASE STUDIES IN SHORELINE MANAGEMENT

Lesson 6: SHORELINE MANAGEMENT: STATE INITIATIVES (THE SOUTH CAROLINA COASTAL COUNCIL)

ADDITIONAL SOUTH CAROLINA MATERIALS

Reading, "Caught in the Middle: The South Carolina Coastal Council"

OVERVIEW

Students may prepare a research report on the South Carolina Coastal Council using the suggestions for research in the Teachers Guide or in the Supplement. An optional reading on the Coastal Council is also included accompanied by some discussion questions.

PROCEDURE

1. The materials in the Teachers Guide for this lesson suggest students investigate and report on their state's coastal zone management program. In South Carolina, this program is administered by the South Carolina Coastal Council. The Coastal Council has materials available which explain the goals and objectives of their program and describe how the Council makes decisions about the use of coastal resources.

   These materials may be obtained by writing:

   Louis Hern
   Information Specialist
   Suite 802, Summerall Center
   19 Hagood Avenue
   Charleston, S.C. 29403
   (803) 792-5808

   Speakers and audio-visual materials are also available. Newspaper clippings from your local paper on the activities of the Council will be an additional source of information.

   All this material could be used by students in preparing a report on the Coastal Council.

2. If you do not want to assign research reports on this topic, have students read, "Caught in the Middle: The South Carolina Coastal Council."

   Before students begin, however, hold a brief discussion with them to see how much they remember about the Council. Many of these questions have been answered in previous lessons:

   a. Why was the Coastal Council formed?

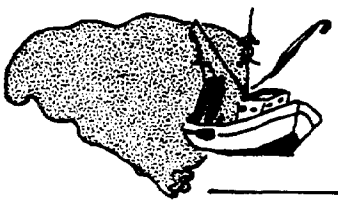
   b. What are its main fuctions?

   c. When was it formed?

d. Who supported the formation of the Coastal Council? Who opposed it?

e. Do you think the Coastal Council is needed? Does it have too much or too little authority?

3. After you finish the reading, review these same questions to make sure students understand some of the "politics" behind the passage of the original legislation, and some of the Council's important functions.



CAUGHT IN THE MIDDLE: THE SOUTH CAROLINA COASTAL COUNCIL

The environmental movement of the 1960's and 1970's spawned two events which helped lay the groundwork for the South Carolina Coastal Council, the state agency that now manages development in the state's coastal zone. At the state level, the environmental movement raised the issue of marshland protection. Marshes were recognized as valuable resources that provided a variety of important functions. (The worth of the wetlands was further discussed in the reading, "The Valuable Marshes of the Low Country"). Yet, there was no legislation protecting the marshes. In 1973, the first coastal zone management bill, providing for the preservation of the coastal wetlands, was introduced in the General Assembly, but it failed to win much support.

At the national level, one of the Nixon Administration's responses to the environmental movement was to support the Coastal Zone Management Act. Congress passed this legislation in 1972. The act declared the policy of the United States would be to "preserve, protect, develop, and where possible, to store or enhance, the resources of the nation's coastal zone . . ." Each coastal state would receive money from the Federal Government to begin planning its own coastal zone management program. (Further details about the national program are included in the reading, "The Coastal Zone Management Act of 1972," page 137 in the Student Readings.)

In 1973, Governor West created, by executive order, a Coastal Council and charged it with writing coastal zone management legislation for the State of South Carolina as well as developing a management plan for the coast. The Council set to work writing a new law which it hoped would pass the General Assembly and then be signed by the Governor. The Council was given a three-year "life" through the executive order, new legislation would have to be written and passed in that time.

Protecting the marsh area of the low country was a major goal of the proposed legislation.

Supporters of earlier coastal management legislation were supportive of the Council's work, but wanted new laws passed immediately. Additional bills were introduced in the State Senate in 1974, 1975, and 1976, but all failed. Two bills passed the General Assembly, but were vetoed by a new Governor, Governor Edwards.

The Coastal Council's first piece of legislation, under the leadership of its chairman, State Senator James M. Waddell, Jr., from Beaufort fared no better. It was voted down in 1975. With the defeat of all the proposed legislation, the future of coastal zone management in South Carolina looked dim.

Opposition to the legislation was generally caused by these reasons:

1) *People feared the legislation was a government take-over. There was strong resistance to allowing the government to tell people what to do with their private property.*

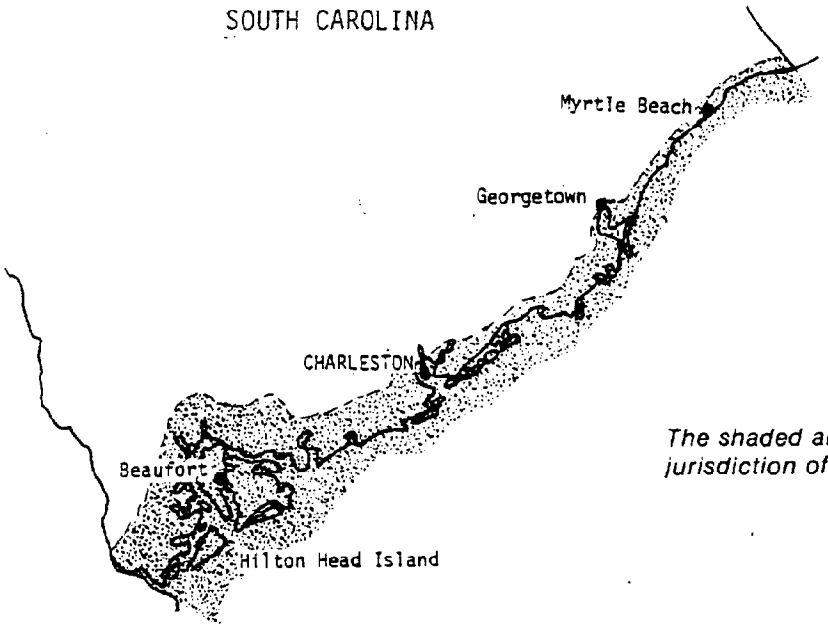
2) *Many land developers and business leaders saw the legislation as an attempt to halt development along the coast.*

3) *Many people feared that the new law would cause them to lose title to marshlands they owned. The new bills typically said that all land below the mean high water mark belonged to the state. Many land owners claimed title to this land. This was one of the main reasons Governor Edwards vetoed the two bills.*

4) *There was a general feeling among many citizens that there was no real need for the new legislation. Most of the low country remained undeveloped; there were miles of unspoiled beaches, and vast stretches of marshland. Why all this fuss about saving the coast?*

By 1976, the Coastal Council had not succeeded in getting new legislation passed. The three-year funding period was about to expire when Governor Edwards announced he would extend the life of the Council. Although the Governor had vetoed two earlier bills, he still believed that some type of coastal management program was needed.

In 1977, the second Council, began drafting a new bill. Portions of this bill and two others were combined in the Senate's Fish, Game, and Forestry Committee. This bill, 5280, was given approval by the State Senate. Supporters of this new bill were able to convince opponents that the legislation would



The shaded area is within the jurisdiction of the Coastal Council.

not prohibit building along the coast, but encourage "orderly development." Coastal land owners who had opposed previous bills dropped their opposition to the new bill since it contained a provision allowing citizens to bring suit against the State in order to settle ownership disputes. While the new bill still declared that all land below the mean high water mark belonged to the State, the provision for owners to bring suit against the State won over the opponents.

In May, 1977 the new bill was approved by the General Assembly, and Governor Edwards signed it into law.

The bill contained the following goals: to promote the economic and social improvement of South Carolina citizens, and to protect sensitive and fragile areas of the coast. The bill established a permanent Coastal Council which would be responsible for granting or denying permits for activities in "critical areas" of the coastal zone. Any development in coastal waters, tidelands, beaches and primary ocean-front sand dunes would have to be approved by the Coastal Council. The other responsibility given the Council was that of developing and administering a coastal management program with policies providing protection for all lands and waters throughout the coastal zone. This would be accomplished through review and certification of permits of other government agencies.

During the first years of its existence, the Council has tried to steer a middle path between conservation and development. But Council members have learned the wisdom in the old saying, "You can't please all the people all the time." Business leaders have often criticized the Council for being "anti-development," yet environmentalists have complained that on some issues the Council has "sold-out" to developers.

Reactions like these, however, make the Coastal Council members think they are doing a good job. Trying to promote both conservation and orderly growth should not please all the groups all the time. As one Council member said, "If nobody yelled at us, we wouldn't be doing a good job!"

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