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EXTINCTION IS NOT A SUSTAINABLE WATER POLICY: THE BAY-DELTA CRISIS AND THE IMPLICATIONS FOR CALIFORNIA WATER MANAGEMENT

OVERSIGHT FIELD HEARING

BEFORE THE

SUBCOMMITTEE ON WATER AND POWER

OF THE

COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

Monday, July 2, 2007, in Vallejo, California

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OVERSIGHT FIELD HEARING ON "EXTINCTION IS NOT A SUSTAINABLE WATER POLICY: THE BAY-DELTA CRISIS AND THE IMPLICATIONS FOR CALIFORNIA WATER MANAGEMENT"

Monday, July 2, 2007
U.S. House of Representatives
Subcommittee on Water and Power
Committee on Natural Resources
Vallejo, California

The Subcommittee met, pursuant to call, at 9:00 a.m., in Vallejo City Council Chambers, Vallejo City Hall, 555 Santa Clara Street, Vallejo, California, Hon. Grace F. Napolitano, [Chairwoman of the Subcommittee] presiding.

Present: Representatives Napolitano, Costa, and Miller

Also Present: Representatives Tauscher and Thompson

STATEMENT OF THE HONORABLE GRACE F. NAPOLITANO, CHAIRWOMAN, SUBCOMMITTEE ON WATER AND POWER

Mrs. NAPOLITANO. Thank you, ladies and gentlemen and good morning. I'm Congresswoman Grace Napolitano from Southern California, Chair of the Subcommittee on Water and Power.

This meeting of the Subcommittee will now come to order.

The purpose of this meeting is to conduct an oversight field hearing regarding the current crisis in California's Bay-Delta estuary, the largest estuary on the West Coast and the water supply for more than 25 million people. The population of the Delta smelt, once the most abundant species in the Delta, has reached critically low levels. The numbers of the small fish officially listed as threatened for the past 14 years under the Endangered Species Act have decreased to such dangerously low levels in recent years that they may be at risk of extinction in the very near future.

The Federal state pumping facilities that export water out from the Delta may play a significant role in reducing the Delta smelt population abundance and their inability to recover. Other possible affecting factors—excuse me. Am I not recorded? It's down. It was on. Logistics. Thank you.

The other possible affecting factors include invasive species and pesticides. And we trust we will be able to learn more about various studies and conclusions this morning.

The fact remains that the State and Federal courts are now involved and in effect, we have the courts directing water policy decisions for Californians. What little is left of California water policy is in disarray. And the officially threatened Delta smelt continue to die at the State and Federal pumping plants as they are, especially now, almost at full pumping capacity.

This hearing, aptly entitled "Extinction Is Not a Sustainable Water Policy: The Bay-Delta Crisis and the Implications for California Water Management," will consider essential questions that go beyond our immediate concern for the Delta smelt. Other witnesses will address the difficult challenge of managing the Delta in a sustainable way that complies with the law without placing California's economy at risk.

Let me begin by welcoming our members on the dais. First Members of Congress, the Subcommittee, our friends and California colleagues. Representative Jim Costa from Fresno and Representative George Miller. Thank you, gentlemen, for being here.

And I'd also extend a great welcome to other Members of Congress who are guests today. Congresswoman Ellen Tauscher of Alamo, Congressman Mike Thompson of Saint Helena in Napa, and State Assemblywoman Lois Wolk, Chairwoman of the California State Assembly Committee on Water, Parks, and Wildlife. I'll get it yet, Lois.

Congressman McNerney unfortunately could not be with us this morning. And I ask unanimous consent that his statement be included for the recorded.

Thank you everybody for coming, especially to the witnesses who are here today, and the audience who is here to learn as we are. I am very glad to see this level of participation. And I know that you and your constituency are concerned with the future of the Delta. And it is important that you have not shied away from this controversial topic.

Please let me take this moment to point out that our colleagues from the Minority are not here, despite my personal calls to several Members. And in fact, they are unhappy about this hearing. And I say that wholeheartedly because I've spoken to them and we were hoping they would be able to join us and work with us on this issue.

I would like to recognize the Minority staff. Kiel, where are you? Kiel? In the back. And you're welcome to join us up here, Kiel.

I ask unanimous consent that Representatives Ellen Tauscher, Mike Thompson and State Representative Lois Wolk be allowed to sit on the dais with the Subcommittee this morning to participate in Subcommittee proceedings. And hearing no objection, so ordered.

I will begin the hearing with a brief statement. I then will recognize the Members of the Subcommittee for any statement they may have. Any Member of Congress who desires to be heard will be heard. And, of course, additional material may be submitted for the record within ten days.

Since we have a full schedule of witnesses today, I will request that Members please keep their remarks brief. The five minute rule with our timer will be enforced.

Then I would like to thank, of course, Congressman Miller as being the most gracious host, and his staff from the Concord office. Thanks, George.

I also want to thank the City Council, the City Manager and their staff for working so cooperatively with our staff and for allowing us to use these Council chambers. They're very impressive, and I congratulate them.

On behalf of myself and Congressman Nick Rahall, Chairman of the House Committee on Natural Resources, thank you for your hospitality.

This hearing was requested by eight members of your North California delegation, Congressmen and women, Miller, Tauscher, Thompson, Woolsey, Honda, Lantos and McNerney. I'm here at their request.

The Delta smelt is referred to as an indicator species for the health of the Delta. The population of the Delta smelt has literally crashed in the last five years and they are now below their effective population size. If the Delta smelt becomes extinct, there are no winners. If anyone here thinks the challenges facing the Delta will just go away if the smelt completely disappear, you are mistaken.

There is scientific uncertainty about the cause of the smelt decline. Uncertainty seems to be the theme of many of the agency documents and decisions related to the smelt. The Delta is a complex system; I don't have to tell you that and it has many interacting factors. But there has been clear evidence that the decline of the smelt and other fish species is correlated to our water management practices. So much so that the Federal courts have had to step in. Was this neglect on the part of the Federal agencies or manipulation?

If the courts start managing our water, nobody wins. The courts will not give users or the smelt, for that matter, more certainty about their future. Managing from crisis to crisis will not be effective and it will not work. There is one fundamental question we must ask ourselves: Can we get to the bottom of why there has been no real action on the part of the Federal or state agencies to address the overall health of the Delta, of which the smelt is just one indicator?

This basic question touches on so many related water issues. Why is it that we have become so dependent on the Delta that our entire economy is at risk if water exports are stopped to protect fish? What's our backup?

Shouldn't we have already started developing some more alternative water supplies for California through water recycling and conservation? Should we not be looking for more groundwater storage and banking?

Broadly stated, we are here today to learn and to explore what we have done to the Delta, what we have neglected to do and to explore ways to restore and manage the Delta in a sustainable manner. Our cities, our farms, our economy and the future of California depends on it.

I trust today's hearing will yield cooperation that will lead to solution with very real ideas. And with that, I yield to my friend and colleague The Honorable Jim Costa for any statement he may have.

[The prepared statement of Mrs. Napolitano follows:]

Statement of The Honorable Grace F. Napolitano, Chairwoman, Subcommittee on Water and Power

First, I would like to thank Congressman George Miller and his staff from the Concord District Office. You all have been gracious hosts. I would also like to thank the city manager's office of Vallejo for allowing us to use the Vallejo City Council Chambers. On behalf of myself and Congressman Nick Rahall, Chairman of the House Committee on Natural Resources, I thank you for your hospitality.

The delta smelt is referred to as an "indicator species" for the health of the delta. The population of the delta smelt has literally crashed in the last 5 years, and they are now below their effective population size. If the delta smelt becomes extinct, there will be no winners. And if anyone here thinks the challenges facing the delta will just go away if the smelt completely disappear, you are mistaken.

I understand there is scientific uncertainty about the causes of the smelt decline. Uncertainty seems to be the theme of many of the agency documents and decisions related to the smelt. Yes, the delta is a complex system with many interacting factors, but there has been clear evidence that the decline of the smelt and other fish species is correlated to our water management practices. So much so, that the federal courts have had to step in. Was this neglect on the part of federal agencies, or manipulation?

If the courts start managing our water, nobody wins. The courts will not give water users, or the smelt for that matter, more certainty about their future. Managing from crisis to crisis will not work. I have one fundamental question I want to get to the bottom of:

- Why has there been no real action on the part of federal or state agencies to address the overall health of the delta, of which the smelt are just one indication?

This basic question touches on so many interrelated water issues. Why is it that we have become so dependent on the Delta that our entire economy is at risk if water exports are stopped to protect fish? Where is our backup? Shouldn't we start developing more alternative water supplies for California through water recycling? Shouldn't we be looking more to groundwater storage and banking?

Broadly stated, we are here today to explore what we have done to the delta, what we have neglected to do, and to explore ways to restore and manage the delta in a sustainable manner. Our cities and our farms and the future of California depends on it. I hope today's hearing yields real ideas.

And with that I yield to my friend and colleague, The Honorable Jim Costa for any statement he may have.

STATEMENT OF THE HONORABLE JIM COSTA, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. COSTA. Thank you very much, Madam Chairman, for your hard work and your focus and your tenaciousness toward trying to not only work on water issues throughout the country and the west in particular, but here in California. And your leadership and your passion and your desire to help us solve those problems I think are highly commendable. And I enjoy serving with you, as I know our colleagues look for your leadership and your work and your efforts in this area.

I have a couple of points I want to make as it relates to my statement, and both as it relates to the impacts facing the Delta and as it relates to historical perspective. Because some like our colleagues Mr. Thompson and Mr. Miller and with our arctic blonde and Mr. Isenberg detect in terms of our age the fact that we have been associated with many of these issues for many decades. And I think that historical perspective is important to note.

Climate change and global warming, I believe, are occurring. And they will have ramifications throughout the world as well as throughout our country. In California it could result in the next 50

years with an increase of sea level from one to two to three feet. Increasing three feet of sea level in the Delta will have dramatic impacts as it relates to the Delta—not only the ecosystem, but also as a linchpin as our plumbing system for water purposes for the rest of the State.

In addition, we have other natural factors that could cause great change. Earthquakes. The Midland Fault lies throughout the Delta and is cross-sected by the San Andreas and the Hayward Fault lines.

Let me give you a scenario. It's July 4, 2008, 1:30 in the afternoon. Americans are celebrating Independence Day. People in California are with their families and at their homes.

1:37 in the afternoon a 7.0 earthquake goes through the Midland Fault dramatically impacting the Delta. Suddenly the earth begins to shake. Within seconds levees and dikes melt away. Within a minute a wall of water from the Bay sweeps across the Delta taking out the remainder of the earth and structures that had survived the initial catastrophe rocked by the 7.0 earthquake by the Midland Fault.

The loss of lives could never be replaced and the impacts to those who were directly at the earthquake at ground zero. But the water upon which 25 million of our citizens depend upon would no longer exist. It takes a while to realize the loss of drinking water, irrigation water is a greater catastrophe than the value of the lost physical facilities; buildings and infrastructures that would be impacted by such a quake.

This is not a scenario that any of us hope or wish we will experience. But the odds that such an event will occur in the next 50 years are significant. Just as the odds are significant that climate change will raise the water level in the next 50 years.

As that vision or nightmare illustrates, the health of the Bay-Delta and the regional implications to the rest of California is what we are really talking about here today. The social, the economic, the environmental consequences cannot be overstated.

Congressman George Miller, our good friend, has done a good job in both increasing the water supply and improving the water quality for his district. In the early 1990s the Water District, along with others, constructed the Reservoir to improve the supply and improve the water quality by moving the intake to the Old River and the Delta. And this area has benefitted from his good work and others.

The rest of California must increase its water supplies and restore the Delta ecosystem by doing the same. Unfortunately, we have not had the same success. And let me give a perspective.

We know, as the Congresswoman stated in her opening statement, our Chairperson today, that exports have affected the Delta fishery. But I do not believe they can account for the current decline in the smelt.

We also know that invasive species, including the Striped Bass that were introduced in the 1930s as a game fish, and Asian clams that have been brought in here by shipping, have had an impact, and we cannot measure it and we have not been able to figure out how to solve that. And there are 1,800 unscreened diversions with-

in the Delta that take the same amount of water comparable in size to the Federal pumps each year, and we don't talk about that.

In addition, urban and agricultural pesticide use in the Delta and around it are significant factors and may have been the chief culprit in this year's drastic decline in the smelt population.

And one other thing we do not ever talk about, and that is the urbanization that has occurred in the last 25 years in the Delta. Dramatic growth has taken place.

Now let me give a little historical perspective since many of us in this room have been involved with these issues for the last 25 years.

In 1982, Governor Brown made an unsuccessful effort to build the controversial peripheral canal.

In 1984, the Kesterson drain that comes from my area that eventually was to come to the Delta was closed because of high selenium concentrations that deformed wildlife, as it should have been. As a matter of fact, both Congressmen Miller and I were there at that hearing in Los Banos in 1982.

In addition to that, Governor Deukmejian in 1988 tried a limited version of the peripheral canal using much of the existing channels. That later became known as Duke's Ditch, as my colleague Assemblymember Isenberg and others called it.

Mrs. NAPOLITANO. Sorry, Mr. Costa. You are 45 second over.

Mr. COSTA. Well, I know. But Madam Chairman, you went ten minutes. Let me close.

Mrs. NAPOLITANO. Five minutes. I'm the Chair, sir.

Mr. COSTA. I understand, but can I close?

Mrs. NAPOLITANO. Yes, sir.

Mr. COSTA. Thank you.

In 1992 there was a reauthorization of the Central Valley Project by our good friend George Miller. It reallocated 800,000 acre-feet of water to improve water quality in the Delta and water supply, 400,000 additional acre-feet went for wildlife refuges. All this occurred, 1.2 million acre-feet of reallocation, during the drought that we experienced.

In closing, let me just try to say that all of these efforts with Assemblymember Jones and myself, we put together a coalition of environmentalists, urban and agricultural water users that said we would all get better together. That resulted in this funding. And it is important to note as I close that in 1996, Prop 204 passed and $995 million dollars was provided. In 2000, Prop 13, which I authored, provided $1.97 billion. Prop 50, in 2002, $2.6 billion was for water-related issues. Finally, Proposition 84 passed $5.4 billion just last year. All of this is important to note because in the last ten years the State has provided $8 billion, and there has been hundreds of millions of Federal dollars that have been applied to try to improve the Delta. That does not talk about Governor Davis' successful negotiation of the CALFED effort.

And on water conservation effort in closing, we've done a lot. Today the Metropolitan Water District of Southern California conserves more water each year than the entire city of San Francisco uses. California agriculture, which I in part represent, is trying to keep up with its urban brother. California farms produced 67 percent more crops using less water than they did in 1970. From 1990

to 2000 we have doubled the amount of drip irrigation and we're doing a whole lot of other things as well.

So let me say that I am looking forward to hearing the statements by you and others in today's hearing. We have Assemblymember Isenberg's Task Force. And as I listen to the hearing today, I ask myself—what are we as Federal elected officials doing to help our State partners? Will we figure that out today?

Continuing regional fighting and polarization that has existed over the last 30 years will not solve the problem. Nor, should we be looking at this hearing from the same old paradigm of you are wasting water, because we are not.

[The prepared statement of Mr. Costa follows:]

Statement of The Honorable Jim Costa, a Representative in Congress from the State of California

It is the Fourth of July and families across California are in the parks, yards or watching parades to celebrate our independence. Suddenly, in the Delta the earth begins to shake. Within seconds, the levees and dikes melt away. Within a minute, a wall of water from the Bay sweeps across the delta, taking out the remainder of earthen structures that had survived the initial catastrophic damage wrought by a 7.0 earthquake. The water on which 25 million of our citizens depend no longer exists. It takes a while to realize that the loss of the drinking and irrigation water is a greater catastrophe than the value of the loss of physical facilities, buildings and infrastructure sustained by the quake.....

This is not a scenario I ever want to experience, but the odds are such an event may very well occur in the next 50 years.

As that vision, or nightmare, illustrates, the health of the Bay-Delta and the regional implications to the rest of California is what we are really talking about here today. The social, economic and environmental consequences cannot be overstated.

Congressman Miller's area has done a good job of both increasing water supply and improving water quality for his district. In the early 1990s Contra Costa Water District constructed Los Vaqueros Reservoir and a new intake on Old River in the Delta to fill it with better quality water.

The rest of California must increase its water supplies and restore the Delta ecosystem by doing the same. Unfortunately we have not yet had the same success.

I. The causes of the decline in the health of the Delta are numerous:

- Exports affect the Delta fishery, but cannot account for the current decline
- Invasive species, including striped bass and Asian clams, clearly have an impact
- 1,800 unscreened diversions, which taken together are comparable to the size of the CVP's pumps must be acknowledged
- Urban and agricultural pesticide use in and around the Delta are significant factors and may have been the chief culprit in this year's drastic decline in the Smelt population.
- The impacts of urbanization in the last 25 years is also a factor

II. As we look at today's conditions and to future solutions, it is absolutely critical that we examine what we have already done.

- 1982 Governor Brown made an unsuccessful effort to build a peripheral canal
- 1984 Kersterson was closed because of high selenium concentrations that deformed wildlife
- 1988 Governor Deukmejian's tried a limited version of a peripheral canal using much of the Delta existing channels in what became know as "Duke's Ditch"
- 1992 CVPIA, authored by our colleague, George Miller, reallocated 1.2 million AF from farms south of the Delta.
- 800,000 AF is now used each year to restore the Delta fishery.
- 400,000 AF is used for wildlife refuges.

The last 3 actions were taken during one of the worst droughts up to that time,

- 1995 Governor Wilson tried to combine the state and federal water projects for increased effectiveness and improved water utilization
- 1995 I began an effort with Assemblyman Bill Jones and Sunne McPeak and a large coalition of environmentalists, urban and agricultural water users to

fund a new approach that would allow the Delta's many uses to all "get better together."
  - That effort resulted in broad, bipartisan water propositions:
    - Prop 204 (1996) $995 million;
    - Prop 13 (2000) $1.97 billion;
    - Prop 50 (2002) $3.4 billion of which $2.6 billion was for water-related projects including the Delta ecosystem;

III. Prop 84 (2006) $5.4 billion of which $3.3 billion was for water-related projects including the Delta ecosystem.

- We have spent as much as $8 billion in state money over 10 years. And at the federal level hundreds of millions of dollars have been provided through CaIFED.
- In 2000, Governor Davis successfully negotiated the CALFED ROD with two primary goals:
  - Assimilating state and federal efforts
  - Spending state and federal; money to restore the Delta environment, increase water supplies, upgrade the Delta levee system, and improve Delta water quality

Throughout this time California's water conservation ethic exploded:

- Today the Metropolitan Water District of Southern California conserves more water than the entire city of San Francisco uses in a year.
- And California agriculture is keeping up with its urban brother. California farms produce 67% more crops using less water than they did in 1970.
- From 1990 to 200 alone the number of acres that converted to using water saving drip irrigation systems doubled.

IV. Despite the many problems in the Delta, and the many attempts we have made to solve them, we are more focused on solutions than ever.

- In 2006, the out of court settlement of the San Joaquin River restoration suit will result in 160,000 AF to be devoted to improving water quality and the salmon fisheries on the San Joaquin River.
- The U.S. Bureau of Reclamation is developing a new and very innovative proposal to solve the Westside drainage problem that would clean-up the current drainage problem, relieve the federal government of a multibillion dollar liability and equitably compensate the farms that take on that obligation.

As we move into 2007, we must also give Governor Schwarzenegger and the Legislature credit their efforts to fund new water storage and conveyance facilities to solve the Delta crisis. The Delta's challenges not new, but OLD.

It is significant to have former Assemblyman Isenberg chair the Delta Vision Blue Ribbon Task Force to make recommendations that will restore the Delta and California's water supply. So as we begin this hearing, I ask myself, "What are we, as federal elected officials, doing to help our state as partners?" Hopefully we will figure that out today, but in my mind that does NOT include:

- Continuing the regional fighting and polarization of over 30 years
- Nor should we be looking at this from the same old paradigm of "You're wasting water, we're not."

So I ask my colleagues and the witnesses that will testify today: "What is the key for building the consensus we need to solve California's water problems in the 21st Century, knowing that our state is growing and time is running out?".

Mrs. NAPOLITANO. Thank you.

Mr. COSTA. So I ask my colleagues and witnesses to testify what is the key to building the consensus we need to solve California's water problems in this 21st century. We know two things. Our State is growing——

Mrs. NAPOLITANO. Thank you.

Mr. COSTA.—and we are running out of time.

Mrs. NAPOLITANO. Thank you, Mr. Costa. And we need to listen to the witnesses and your statement will be entered into the record.

Mr. COSTA. Thank you.

Mrs. NAPOLITANO. Thank you.

Mr. Miller?

STATEMENT OF THE HONORABLE GEORGE MILLER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. MILLER OF CALIFORNIA. Thank you, Madam Chairman. And thank you so much for taking time out of your schedule to chair this hearing in the 7th District.

And I want to welcome the other member of the Committee, Mr. Costa. And I want to welcome our colleagues Ellen Tauscher and Mike Thompson and Lois Wolk for taking their time also to be here.

I believe they are here because we all recognize that one of the great and last remaining delta systems in the world is in serious, serious trouble. It is in serious threat of collapse. And it is in serious threat of failing to meet its historic needs, not only to Northern California but also to Southern California.

And we have heard the history of actions taken with respect to the Delta, but the fact of the matter is we continue to see year after year the Delta go into decline.

It is rather interesting. As the laws continue to be passed to strengthen and protect the Delta, the Delta continues to go into decline because of a series of decisions that we have made every year, year after year, and which we now see as a result of lawsuits that have been filed where the laws have been evaded, ignored and in fact violated that were designed to protect the Delta. And I think that is unfortunate.

I think we have come to a point, Madam Chairman, where we have to make some fundamental decisions. There is no question that the Delta must continue to function as a multipurpose entity in terms of its complexity, both locally and statewide. But it cannot continue to give and give and give and not suffer the detriments of that. And that is why we are here today. We are at a point where the State has been put on notice with the temporary shutting down of the pumps. The temporary closing of the pumps was done in accordance with the law because the law was not adhered to. And the government is, in fact, engaged in activities and a take that was not authorized. We are continuing to watch that litigation, but I think it is also clear that the years of processed discussions have not taken us much closer. In fact, I think it has diverted our attention from the kind of Delta protection that is necessary for this region of our State.

It is clear that the Delta is stressed, and that stress can lead to serious economic consequences in the rest of the State. I think we now have to once again consider the idea that perhaps not all water is equal in the State of California. That there is water that is being used in large quantities that provides very little economic return to the State, and water that could be better used in other parts of the State and the economy. Those are difficult and tough decisions. But just as energy forces us to look to new technologies, new uses and new values on that policy, so does water and its scarcity require us to do that.

My colleague, Mr. Costa, mentioned climate change. We have all seen studies and discussions of what will happen in the future to California—where our snowpack will be, where it will not, who will

be the beneficiaries. And I think those all have to be taken into consideration.

Unfortunately, Madam Chairman, I think this is probably the first in a series of hearings on this complex problem. But the leadership you have provided and the Committee has been fantastic for our State. Your absolutely unparalleled leadership in the recycling of water and just passing out of the Committee this week major authorizations for recycling projects in our State, I think, is key to getting ahead of the curve so that we can also be a contributor to lessening the pressure and the threat to the Delta.

I look forward to hearing from the witnesses. And I want to thank all of them for agreeing to be here today and to testify, and to answer questions.

Thank you very much.

Mrs. NAPOLITANO. Thank you, Congressman, for being pretty much on time. And thank you for your leadership.

For all of you that do not know this, this is only my ninth year. I have learned from this man. And so when he tells me that we are doing a good job, I feel very good. Because water is critical to the State.

So with that, I would like to introduce Congresswoman Ellen Tauscher.

STATEMENT OF THE HONORABLE ELLEN TAUSCHER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Ms. TAUSCHER. Thank you very much Chairwoman Napolitano for the opportunity to appear today and welcoming me as a temporary member of the Water and Power Subcommittee.

I would also like to thank the City of Vallejo, and my colleagues for being here. And especially my friend Chairman Wolk from the Assembly.

I think that what is really important is that Chairwoman Napolitano needs to be thanked for the quickness for which she responded to Bay area Members of Congress who asked for today's hearing.

I am grateful that you share our concern for the future of the Bay-Delta as well as the long-term management and quality of California's water supply.

Today's hearing is about righting what can only described as a floundering ship. We can all agree the Bay-Delta is in crisis. It faces challenges that if unmet will cause the continued degradation of its ecosystem and threaten the water supply Californians throughout the State depend on. It would be a terrible injustice to all Californians if today's hearing devolves into the typical and tired blame game, fish versus farmers and then Delta water versus Southern California. And whether you believe the Delta smelt are the proverbial canary in the coal mine or not, these recent actions have highlighted the need for a foresighted plan to deal with all the issues we face in the Delta; water quality, habitat restoration, water exports, levee stability and invasive species.

I applaud the recent work being done by the State to lay out the plan. The Delta Vision process, I hope, will bring us some clarity about our long-term options. And I am pleased that the Chair of

the Governor's Delta Vision Blue Ribbon Task Force Phil Isenberg is here today.

Additionally, I hope the Bay-Delta conservation plan process will help us address the issues surrounding compliance with the Endangered Species Act. I have seen in eastern Contra Costa County and my district how the habitat conservation planning process has worked, and I hope that it can be emulated in the Delta. But these are long-term efforts and the Delta needs help now. So today I am looking for answers about what we can do right now. We need to know that there is an action plan being developed to stop the decline of the Delta smelt, ensure reasonable and regular exports, protect and enhance water quality and deal with the loss of habitat. It is time to make some near term decisions that will save this vital ecosystem and preserve California's water delivery system.

Additionally, I want to know from Federal regulators and the people they are meant to work with that they are the type of partners that are helping in this process. The Federal Government has a lot at stake in this process, and I want to know that the Federal Government is an active and willing partner in all aspects of the Delta.

Madam Chairwoman, again, thank you for holding this hearing. And I look forward to hearing from today's witnesses.

And I yield back the balance of my time.

[The prepared statement of Ms. Tauscher follows:]

Statement of The Honorable Ellen Tauscher, a Representative in Congress from the State of California

Chairman Napolitano, thank you for the opportunity to speak this morning and thank you for welcoming me as a temporary Member of the Water and Power Subcommittee.

Let me also thank you for the quickness with which you responded to our request for today's hearing.

I am grateful that you share our concern for the future of the Bay-Delta as well as the long-term management and quality of California's water supply.

Today's hearing is about righting what can only be described as a foundering ship.

We can all agree "

The Bay-Delta is in crisis—it faces challenges that if unmet, will cause the continued degradation of its ecosystem and threaten the water supply Californians throughout the state depend on.

It would be a terrible injustice to all Californians if today's hearing devolves into the typical and tired blame game—fish versus farmers and in-Delta water users versus Southern California.

The issues we face are too complex and too important to be bogged down in another California water war, especially one created by bureaucrats who are unwilling to follow the law.

Today's hearing is about controlling our own destiny.

Recent events have made clear that state and federal judges are willing to step in and manage California's water systems because federal and state regulators won't.

This is a terrible proposition for all of us.

The judiciary was never meant to manage water.

But we're here now because federal and state regulators have repeatedly neglected their responsibility to operate the systems within the law.

Our goal here today is to prod these same regulators into action.

I bring a unique perspective to today's hearings.

Depending on where they live in my district, families get their water through the Delta or through the State Water Project.

In Livermore, the Zone Seven Water Agency gets eighty percent of its water from the State Water Project, while in places like Antioch, the Contra Costa Water District takes water directly from the Delta.

Some would say this puts me on opposite sides of the fence, between protection of the Delta and its water quality and continued robust exports out of the Delta.

I disagree.

Instead, it amplifies the urgent need for federal and state regulators to immediately comply with the letter and spirit of the law and provide regularity and predictability within the system.

When the regulators fall out of compliance, it hurts all of us, because we begin to lose our ability to self-determine the future of water in our own state.

No doubt, we're here in large part because of the alarming decline in the Delta smelt population and Judge Wanger's ruling that the Biological Opinion used to operate the state and federal pumps is "legally flawed."

In the near term, it's clear that these legal decisions make it imperative for the State Water Project and the Central Valley Project to be brought into compliance and address their impacts on the smelt populations.

I agree with those who say the pumps aren't the only reason why the smelt population is crashing—that other factors also affect these fish.

However, I disagree with the argument that because we haven't done enough to improve water quality, combat invasive species and reduce runoff into the Delta that it is reasonable to continue to kill smelt through the pumps.

That argument is both illogical and, as the judge pointed out, holds no legal merit.

Whether you believe the Delta smelt are the proverbial "canary in the coal mine," or not, these recent actions have highlighted the need for a foresighted plan to deal with all the issues we face in the Delta—water quality, habitat restoration, water exports, levee stability, and invasive species.

I applaud the recent work being done by the state to lay out that plan.

The Delta Vision process, I hope, will bring us some clarity about our long-term options, and I'm pleased that the Chair of the Governor's Delta Vision Blue Ribbon Task Force, Phil Isenberg, is here today.

Additionally, I hope the Bay Delta Conservation Plan process will help us address the issues surrounding compliance with the Endangered Species Act.

I have seen in Eastern Contra Costa County how the habitat conservation planning process has worked, and I hope that can be emulated in the Delta.

But these are long-term effort, and the Delta needs help now.

So today I'm looking for answers about what we can do right now. We need to know that there is action being taken to stop the decline of the Delta smelt, ensure reasonable and regular exports, protect and enhance water quality, and deal with the loss of habitat.

It's time to make some near-term decisions that will save this vital ecosystem and preserve California's water delivery system.

Additionally, I want to know from federal regulators and the people they are meant to work with what type of partners they have been in this process.

Just attending meetings and working groups is not enough.

The federal government has a lot at stake in this process and I want to know that the federal government is an active and willing partner in all aspects of the Delta.

Madam Chairman, again, thank you for holding this timely hearing.

I look forward to hearing from today's witnesses and I yield back the balance of my time.

Mrs. NAPOLITANO. Thank you, Ms. Tauscher. That is much appreciated.

And I will go to Mike Thompson.

STATEMENT OF THE HONORABLE MIKE THOMPSON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. THOMPSON OF CALIFORNIA. Well, thank you, Madam Chair. I appreciate you being here and taking up this issue. And I second all that has been said about your leadership on not only this issue but water issues in California in general. And I think today's hearing points out the importance that this has, not only on the Bay-Delta region, but the entire State of California and our economy. It is important to fisheries, to wetlands, to flood protection, drink-

ing water and to agriculture. And this, I believe, is just one example of an overtapped water system that we have in California.

So it is a prime example, and one that we really need to do a better job. And the State and Federal Government really need to double down our efforts to do everything that we need to do to provide the incentives that will allow us to get the most out of every drop of water that we have in our great State. And we cannot wait for a crisis to take place in order to respond to that. We have done just a marvelous job in waiting for crises to come along and then jump on them. But we need to be out in front of this.

And the other caution that I want to put on the table is that this is not something that can—or I guess it can, but it should not be managed politically. We have seen too many examples of what a catastrophe that can lead to. And you do not have to look any further to the worst case scenario in California history for this, and that was the politicalization of the Klamath Basin. And for those of you who do not understand that there's a nexus, the Klamath is linked very closely to the Delta through the Trinity River. And as we all know, during the drought of 2001 there was a political decision made to divert more water than should have been diverted and it led to the death of 80,000 spawning salmon. And we have been paying the price for that ever since. We have been paying the price in regard to closed salmon fishing; loss of revenue. Last year, folks on this panel were very instrumental in getting the help for the fishers and related businesses that suffered. But it was a $60.5 million hit related to that inappropriate fish kill that has proven to be illegal in three different courts.

So we need to make sure that we do a better job. We cannot run this stuff politically, and we should not acquiesce to the courts to deal with our water policy in the State. If we do not get ahead of this in the Delta, that is exactly what we are going to be doing. We are going to be doing water policy by court mandate and that, I do not believe, is appropriate.

So, Madam Chair, thank you. I hope that the outcome of this hearing is that we will have better management of our very limited water resources in the State.

I also want to thank the City of Vallejo for making the facility open. The last time I was in this room was 15 years ago. I just won a special election and then Mayor and now Mayor Tony Intintoli swore me in. And it is great to be back. It is a great city.

You are lucky to represent it.

Mrs. NAPOLITANO. Thank you, Congressman. And thank you for holding your statements within the time frame.

And I move on to now Assemblywoman Wolk.

STATEMENT OF THE HONORABLE LOIS WOLK, AN ASSEMBLYWOMAN FROM THE STATE OF CALIFORNIA

Ms. WOLK. Thank you, Madam Chair.

Good morning. I want to thank the Chair for her energy and commitment to California water issues and for inviting me to participate here this morning.

We are united here in our belief that the Delta is the heart and soul of California's water system. And it is in jeopardy. It is not sustainable in its current direction.

We are also here, I believe, to convey a sense of urgency of action. We would like to see a plan, and we would like to see action result from that plan.

The issues have been laid out by my colleagues beautifully; climate change, water quality both from the agricultural and urban runoff sectors; invasives, increasing urbanization, the 19th century piles of dirt that we call levees are crumbling and the species are in crisis.

I would like to focus on one issue that has not been mentioned, and that is the issue of governance. There is no steward for the Delta. There is no one responsible for the Delta. No one entity is in charge. And that is a problem because there are hard decisions that need to be made about the future of the Delta.

I applaud my colleagues for being here this morning, for their commitment and energy on California water issues. And I look forward to the hearing.

Thank you, Madam Chair.

Mrs. NAPOLITANO. Thank you, Assemblywoman.

Just to let the audience know that this hearing was put together in 3 1/2 weeks after the request came to my Subcommittee. And the plea was made that we change and bring the hearing here to deal with this very important issue. So thank you for bringing it to our attention. I believe you are so right.

The statements of my colleagues and Ms. Wolk, if you wish, will be entered in the record. So if you will submit it to staff, we will ensure that they get into the record.

We will proceed to hear from our witnesses. We have three panels today. And I'll introduce each one of them before they testify. And at the conclusion of their testimony, the Members will proceed with a line of questioning.

And your prepared statement, panel, as I said will go into the record.

I would ask that you summarize and highlight your points, panel. Like I said, your testimony will be in the record. So for expediency to be able to hit the major points that you want to make to this Committee would be very much appreciated.

Please limit your remarks to five minutes. I have no problem using this little old gavel. The fact is that we have a long morning and I would like to ensure that everybody gets an opportunity to talk.

This rule will also apply for the questions, ladies and gentlemen. Five minutes from each Member. If there are additional questions, we may go to a second round if possible, if the time permits.

For our first panel, I would like to introduce an old friend, a colleague of the State Assembly, The Honorable Phil Isenberg, partner in the firm Isenberg/O'Haren. Mr. Jim Crettol, a farmer, from Shafter. Welcome, sir, and Mr. Chris Martin, Principal of AC Martin Partners, Inc. of Los Angeles.

Our thanks for responding promptly and agreeing to serve as panelists in such a short time. Thank you.

And if you will proceed, Mr. Isenberg, your testimony will be welcome.

STATEMENT OF PHIL ISENBERG, PARTNER, ISENBERG/O'HAREN

Mr. ISENBERG. Thank you. Chair, Members, Ms. Tauscher, Ms. Wolk and to my three aging water warriors of the battles in California, it is——

Mrs. NAPOLITANO. All right. Phil.

Mr. ISENBERG. It is an honor to be here.

Chair, I will in fact do the shortest summary possible. Attached to my statement are three charts that tell you how much water comes from California on a regular basis, how it is used in very gross and general terms, how it impacts the Delta, how much goes through the Delta and where it kind of goes, and then more importantly is a fast historic look from about 1923 to the current time on Delta diversions.

Mrs. NAPOLITANO. Mr. Isenberg, may I suggest the next time you make the print a little larger for these aging members.

Mr. ISENBERG. Well, what can I tell you. And I should say, all of this documentation is taken either from the State Water Plan, which is updated every five years by the Department of Water Resources or from a book. And I think we have copies that are here. And they are slightly more legible in that, Chair Napolitano.

The Department of Water Resources and now almost all of us who play in the field talk about three kinds of years in California for water; wet years, average years, dry years. So just remember this: In any year in California that is wet, the Department of Water Resources says "Well, there is about 331 million acre-feet of water that comes into the State through rainfall, through snowfall and imports." Much of that, of course, is not captured by anyone because it is absorbed by the earth. It does not flow off into rivers. In an average year about 200 million acre-feet is available. And in a dry year about 160 million acre-feet is available.

The Delta receives a relatively modest proportion of the water that totally comes into the State of California. Fifteen percent in a wet year flows through into the Delta. About 13 percent in an average year. And about eight or nine percent in a dry year. And, yes, there are years which are dramatically different. 1983 was a whole lot wetter and 1977 was a whole lot drier. But on average, that is a pretty good way to measure it.

When water flows into the Delta, if you ask yourself the question, where does it go and what happens to it? And this chart points it out.

The in-Delta users, and that is largely the 1,000 entrance points and pumps that Mr. Costa talks about, take about 1,700,000 acre-feet of water in a wet year, an average year and a dry year. They are, after all, in the center of all this water so they get their straws in there and they suck out that amount of water.

The thing that is astonishing to a lot of people who do not pay attention to it, however, is that historically in these figures when water is exported from the Delta for urban uses, people and for businesses and industry, it remains relatively the same in a wet, average and dry year. Now, yes, there are variations. You can see in a dry year only about 80 percent of the water seems to be available to urban uses.

Agricultural uses in a year like this are, in fact, slightly increased compared. It ranges from 27 million acre-feet to about 34 million acre-feet.

And then there is one of the old arguments about water. What's left? And the old style was well anything that goes into the ocean is waste, and therefore it should be used and so on and so forth. And the fact of the matter is now people are starting to talk about, although it is controversial, that the rest of that water is sort of environmental water. And I say sort of because the science cannot tell you with great clarity what is around.

Now, the Delta environmental water, whatever is left over that flows through the Delta and then out the Bay, that is the one source of water which has decreased substantially as you go from a wet year to a dry year to an average year.

The second chart talks about the Delta water balance. It explains where it comes from. It's in support of the last chart, and in my final 36 seconds, is a terrific one from the Status and Trends report. It's an illustration of what happened from 1923 to the current time. And essentially if you step back and look at this as a historian, not all but much of the growth of water usage in California since World War II has been attributable to growing Delta exports. Sure, they fluctuate from year-to-year. But average it out, the Delta has been a primary source of the growth.

So, what does all that mean as you try to figure out what smelt mean and agency responsibility and so on. And I will just give you my own kind of fast summary.

The first is as you do water policy the most important thing to remember is the Delta is important, but it is not the only part of the water supply in California. In public policy we always argue an issue as if there was nothing else on the table when in fact there is much else on the table.

Number two, water is in limited supply in California. If we do not get it from other states, and they seem increasingly reluctant to give it to us or sell it to us, if we do not have a miracle breakthrough on desalinization or something like it, we are all of us, Northern, Central and Southern California going to have to live with less water. I mean, it is inescapable as population grows.

Third, we have to get over the mindset that says everybody is entitled to keep what they have now even if the supplies are not available. This is like so much as a state, or I presume, Federal budget discussion where you have entitlements and you just do not have the money to pay for them, what do you do? Well, you go borrow money.

OK. Madam Chair, I will stop.

[The prepared statement of Mr. Isenberg follows:]

Statement of Phillip L. Isenberg, Chair,
Delta Vision Blue Ribbon Task Force

Good morning Chair and Members of the Subcommittee. My name is Phil Isenberg, and I currently chair the Governor's Delta Vision Blue Ribbon Task Force. You asked me to discuss the general history of water disputes in California, and the role of the Bay-Delta in those battles. It is a pleasure to be here.

The Sacramento Bay-Delta is a key focal point for any discussion of California water policy. Although the Delta is a unique place, with unique problems, it is the demands placed on the Delta by the rest of California—for water and for environmental protection—that drives your hearing today. While your current focus is on

the falling number of Delta smelt, a protected species, battles in and about water and the Delta are nothing new.

A Brief History of Water Development in California: Mining for gold, flood control, agricultural levees and water exported for use elsewhere.

When California became a state in 1850, our small population was mostly concentrated in San Francisco and the Sacramento region. Discovery of gold near Sacramento fueled the first of our population spurts, and one of the most important of our water battles.

By the mid-1860s, thousands of miles of privately-developed canals and water ditches had been constructed to assist in the mining of gold. At the same time, residents in Sacramento discovered to their dismay that living at the confluence of the Sacramento and American rivers was a prescription for being flooded. As miners built canals, residents along the Sacramento River started to build levees to protect against floods.

It takes no genius to figure out that building a levee to protect one small community might move the flood threat across the river, or downstream to another, less protected community. The battle of small towns, and individual farmers and property owners to protect their own land, continued for many years.

At the same time mining debris was pouring out of the foothills, and appearing on the board plains of the Sacramento Valley. This debris started to fill parts of the river system, increasing flood threats, and irritating downstream residents.

Add the use of large hydraulic mining equipment to the equation, and you see the parameters of the first major struggle over water in the northern part of California. State government intervention soon occurred, as did the start of federal intervention

To complicate things, individual farmers in and near the Delta began to build their own system of levees, allowing the development of agriculture in the Delta. The legacy of this activity remains today, with many Delta islands far below water level and their levees out of compliance with current safety requirements. Some critics note that government aid to restore breached levees and flooded islands costs more money than the value of the land being protected.

If mining debris, flood threats, and the growth of Delta agriculture was not enough, as early as the 1870's, Californians contemplated plans to move water from the Sacramento River to the San Joaquin Valley. In the early 1900's, several reports and investigations culminated in the first State Water Plan.

You know the history of what would become the Central Valley Project. In 1933 the California Legislature approved the project, but the Great Depression made it impossible to be financed by the state alone. The federal government provided the funds through the Emergency Relief Appropriation Act—the first of many controversies surrounding this project.

The Central Valley Project provided much needed jobs in the Depression Era, and the water it eventually delivered helped to maintain California's status as a prime agricultural producer. Likewise, the State Water Project provides agriculture and urban areas with a significant proportion of their water. The bulk of the urban population that depends on Delta water supplies are in just nine of the State's 58 counties—but they are the most populous counties—representing 25 million of the 36 million people who live here. These counties get anywhere from approximately 20 percent to 50 percent of their water supply from the Delta.

Two other historic battles over water should be noted. The effort of the City of Los Angeles to move water from the Owens Valley has become legend. Most notable, this dispute has festered for almost 100 years, and led to an impressive modern effort to save Mono Lake (in the Owens Valley), limit the amount of water taken by Los Angeles, and ratify the legal principal that environmental protection is one of the foundations of water policy in California.

Another hoary political battle was the effort of the City and County of San Francisco to dam Hetch Hetchy, and transfer much of the water directly to the San Francisco Bay Area. John Muir, America's preeminent symbol of environmental protection, led and lost the battle to save Hetch Hetchy (located near Yosemite, and often called equal in beauty and environmental values).

I mentioned these two regional battles only because they tend to color the water debates in California to this day, and their history is often cited by one interest or another to illustrate various alleged sins and the imperfect solutions that followed.

The dream of endless water supplies meets the reality of environmental protection.

California battles about water have, over many years, led to an array of statutes, both federal and state, and endless court decisions that compose what the California Water Atlas called "Legal Constraints" (see pp 64-66) on water use. Equal in impor-

tance to the physical construction of the Central Valley Project and the State Water Project has been the growth of environmental protection as one mark of modern California society.

A simple listing of some of the major environmental laws or court decisions affecting water is instructive:

- Article X, section 2 of the California Constitution of 1878 (requires that all uses of water in California be reasonable and beneficial [1928 amendment])
- Public Trust Doctrine (dates back to ancient Rome; not specifically in statute but recognized by tradition and court cases)
- Area of Origin Laws (in various sections of the California Water Code dating back to 1927)
- Migratory Bird Treaty Act of 1918
- Wild and Scenic Rivers Act of 1968 (federal)
- National Environmental Policy Act of 1969
- Porter-Cologne Water Quality Act of 1969
- California Environmental Water Quality Act of 1970
- California Wild and Scenic Rivers Act (1972)
- Endangered Species Act of 1973 (federal)
- Safe Drinking Water Act of 1974 (amended in 1986 and 1996)
- California Endangered Species Act (1984)
- Natural Community Conservation Planning Act (state) (1991)
- Central Valley Project Improvement Act (1992)
- Delta Protection Act of 1952 and the Delta Projection Act of 1992
- National Audubon Society et. al. vs. Superior Court of Alpine County/Department of Water and Power of the City of Los Angeles (Mono Lake Decision [1983])
- United States vs. State Water Resources Control Board (Racanelli Decision [1986])
- Natural Resources Defense Council vs. Rogers, et. al. (The San Joaquin River Decision regarding Friant Dam [2006])
- State Water Resources Control Board Cases(relates to State Water Resources Control Board's Decision 1641 regarding Delta water quality [2006])

There are several pending lawsuits in the courts today that may also have a profound impact on water supply and delivery in the State, including a challenge to the State Water Project's ability to continue pumping water because it may not have permits to legally take fish at the pumps.

As a practical matter, the desire of the American and California public to "protect the environment" inevitably means that water use may be limited or restricted to achieve that goal.

A Question of Supply and Demand: Limited quantities of water; unlimited demands.

For much of our history, California's assumed that water was available in unlimited supply of water, if we could just move it from one place in the state to another. Something about this is ironic, since California is classified as an arid region of the world, and shortage of water is nothing new. Let me outline a few of the basic facts of our water supply.

Our available water supply and the proportion going through the Delta

In California, our major supply of water is from rain and snow that falls north of the Delta, and a relatively small amount is imported from other states. The major demand for water is south of the Delta.

Please remember these numbers: 330, 200 and 145.

These figures represent the total water available in the State in wet, average and dry water years. These are millions of acre feet of water.

The 2005 California Water Plan, our state's ongoing water strategy document, likes to talk about water supply in three categories: wet years (1998 is the example), an average water year (2000 is the example) and a dry water year (2001 was selected).

In a wet year, about 330 million acre-feet of water pours into California from snow, rain and imports from other states and about 15 percent of that amount eventually flows through the Delta.

In an average water year, about 200 million acre-feet comes into California, and roughly 13 percent of that flows through the Delta.

In a dry water year, about 145 million acre-feet of water comes into the State and about 9 percent of that flows through the Delta.

When we discuss the Bay-Delta it is useful to remember the relatively small proportion of total state water that flows into the Delta: 15 percent in a wet year, 13 percent in an average year and 9 percent in a dry year.

The Delta is an important part of the State water supply, but it is not the total amount of the state's total water supply. It is important, especially in a time of crisis, not to overemphasize an aspect of the situation if we are to make wise and useful choices.

For detailed figures see the charts on pages 18 and 19 of the Status and Trends of Delta-Suisun Services (2007), published by the Department of Water Resources.

Where does the water that flows to the Delta actually go?

Whether it is a wet, average or dry water year, the water use in the Delta remains remarkably the same: about 1.7 million acre-feet.

Astonishing to some, even in average or dry water years, the amount of water exported from the Delta increases over what is exported during wet years. In wet years, about 4.8 million acre-feet of water is exported from the Delta; in average and dry years, water exports are about 6.3 million and 5.1 million, respectively.

After water that comes to the Delta is taken by in-Delta users, or exported to urban and agricultural water interests, some always flows to the San Francisco Bay and the ocean. In wet years that amounts to about 43.4 million acre-feet, in an average year about 18.1 million acre-feet and in a dry year, about 6.9 million acre-feet.

How is water exported from the Delta used?

The simple answer is that we all do, in one form or another. The typical distinction is between urban water uses, agricultural water uses, and environmental water uses. At the present time I can find no current, published data that breaks down how exported water from the Delta is used, but we can look at statewide water use for some insight.

Statewide urban water uses change little regardless of rainfall or snow melt. Urban users receive an average of 7.8 million acre-feet in wet years, 8.9 million acre-feet in average water years and 8.6 million acre-feet in dry years.

Statewide agriculture uses are significantly higher than total urban use. In a wet year, agricultural use is about 27.3 million acre-feet; in an average year it is 34.2 million acre-feet and in a dry year, it is 33.7 million acre-feet. Again, there is relative stability of exported agricultural water in wet, average and dry years.

Statewide environmental water, if you accept the much disputed position that everything left over is for the environment, does not appear to be protection against reductions. Add together instream flows, wild and scenic river flows, Delta outflow and managed wetlands water use and you find the following: In a wet year, the environmental use is 59.4 million acre-feet. In an average year, it is 39.4 million acre-feet; and in a dry year it is 22.5 million acre-feet.

Attached to this presentation is Table 1-1 from the California Water Plan Update, 2005, illustrating these facts. One conclusion seems inescapable: we have developed a water transfer system that fundamentally protects urban and agricultural users in dry years. It is a serious question—and the Delta smelt dispute illustrates this point—whether this can continue to occur.

If we don't build dams and water facilities, how do new people and businesses get their water?

California has developed all the best hydrologic resources. There is a dam in almost every location where it is feasible to build one. The sites left for building dams are ones that have very high environmental impacts (like Auburn Dam), or have a very high cost (like off-stream reservoirs). Therefore, in recent years, there have been few major dams or water projects constructed in California. Whatever the cause of not building new water projects, an interesting trend has developed in Southern California. Water interests there say that they have increased their population by 3 million over the past 15 years, but are still using the same amount of exported water from the Delta. Although figures differ, many suggest that conservation, local sources, and water system efficiencies have made this possible.

The Delta Vision. The Governor's Delta Vision Initiative involves far more than our own Delta Vision Task Force. I have attached to this statement a copy of his Executive Order, a list of the members of the Task Force, and our charging document from Resources Secretary Mike Chrisman, and finally, a flow chart of our work, and that of about 14 other entities working on Delta-related issues.

The Task Force is charged to give their independent views regarding a vision for the Delta and we intend to do that. We have two work products: in November of this year we must present a vision—a Delta vision—that takes a long perspective of the Delta and not simply a vision of the operational details. Once the vision proposal is presented to the Delta Vision Committee, chaired by Secretary Chrisman,

they present it to the Governor and he will do what he chooses with it. By the end of 2008, the Task Force will develop a strategic plan to implement the vision; after that the Task Force will be out of business.

To accomplish this, the Task Force is working with a 43 member Stakeholder Coordination Group, appointed by Secretary Chrisman, who advises and makes recommendations to us. Our focus is to look at the major subject areas of the Delta:

- the environment, including aquatic and terrestrial functions and biodiversity;
- land use and land use patterns, including agriculture, urbanization, and housing
- transportation, including streets, roads, highways, waterways, and ship channels
- utilities, including aqueducts, pipelines, and gas/electric transmission corridors
- water supply and quality, municipal/industrial discharges and urban and agricultural runoff
- recreation and tourism, including boating, fishing and hunting
- flood risk management, including levee maintenance
- emergency response, and local and state economies

In the short period of time we have been working a few themes are coming into sharper focus.

First, the Delta is an important part of the water puzzle of the State; it is not the entire puzzle. How could it be when less than 20 percent of all the water available to us in any given year flows through the Delta?

Second, water is in limited supply and short of a miracle, or some unanticipated advance of science, that is unlikely to change. Which means that all of us have to live with limits on our use of water.

Third, California seems to view a promise to deliver water as a magically enforceable contract—even if the water is not available. Reality seems to be catching up with this notion.

Fourth, the Delta is a mess. The ecosystem is deteriorating, and nothing in the past 30 years has given much hope of rapid improvement.

Fifth, if you add up all the federal and state statutes, water contracts, lawsuits and settlements, you rapidly see that every section of society has been promised or guaranteed whatever they want. Since environment protection has also received protected status, it does not take a genius to figure out that all of these promises for endless supplies of water—cheap water—cannot be kept.

The Task Force has been told by every interest that the Delta is in trouble, and there is a growing risk of catastrophic failure to the Delta, whether by earthquake (the most likely threat), global warming, continuing levee failures and land subsidence or urban encroachment. The lessons learned from Hurricane Katrina, and other research, suggests that catastrophic failure would not be good for the Delta ecosystem, the State's economy, or the water exported either.

If we should not continue to promise everything to everyone, then some tough choices have to be made about water use and the Delta. What are the most important statewide interests in the Delta? Can they be identified? And can we avoid the current practice of pretending to honor the "want list" of every interest group, geographic region and economic group?

Finally, a major problem with the status quo is the almost total lack of trust that all the aging water warriors have with each other. There is nothing new about the lack of trust—the North doesn't trust the South, the South doesn't trust San Diego—and on and on. The absence of trust means it is almost impossible to take an area like the Delta and manage it in a coherent way that tries to answer—whatever the priorities are—the issues or solve the problems because we cannot delegate authority to anyone to do that.

The America tradition of having divided government, and allowing every level of society to "have a piece of the action", means that as far as the Delta is concerned, everyone is involved; no on is in charge.

The choices that we need to make over the course of this year, next year and the coming decades, are difficult. Many of those choices will be unpopular, and challenge deeply-held convictions about how the world ought to be. If we do not make these difficult choices, then extinction—whether of a species or a way of life—may be the water policy of California.

Thank you again for inviting me to speak today.

Selected Sources of Information about the Delta and California Water:

Battling the Inland Sea: Am3erican Political Culture, Public Policy & the Sacramento Valley, 1850-1986 (1989) Robert Kelley, University of California Press, Berkeley, CA

The California Water Atlas (1978) Department of Water Resources.

The California Water Plan Update (2005), Department of Water Resources. Available online at: http://www.waterplan.water.ca.gov/
Delta Vision: http://www.deltavision.ca.gov/
The Great Thirst: Californians and Water, 1770s-1990s (1992) Norris Hundley, Jr., University of California Press, Berkeley, C A.
Status and Trends of Delta and Suisun Services (2007), Department of Water Resources. Available online at: http://www.deltavision.ca.gov/DeltaVisionStatusTrends.shtml

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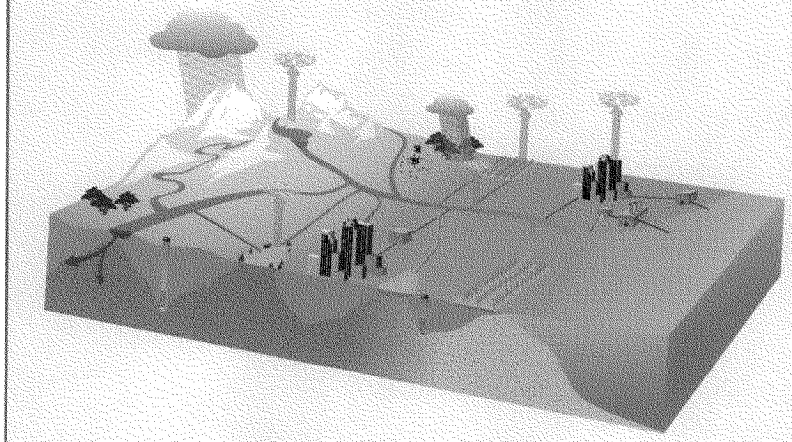
Table 1-1 California water summary - MAF

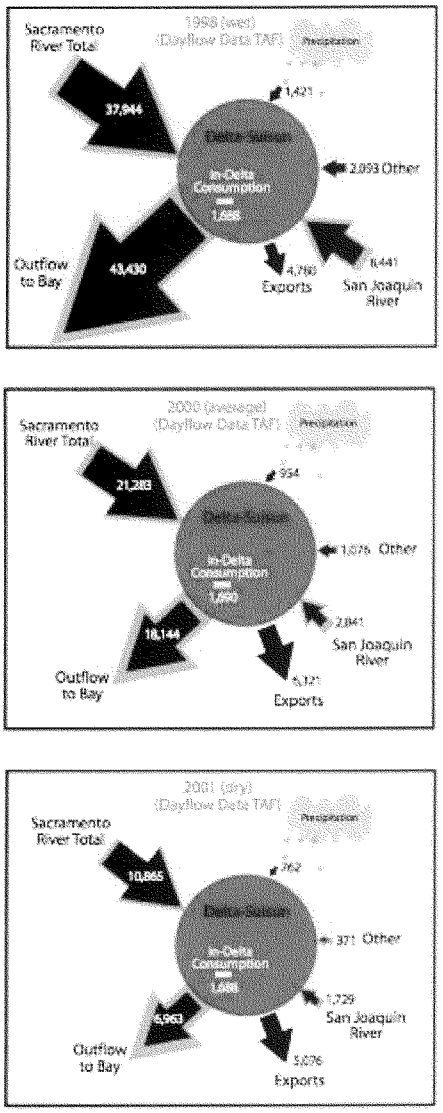
	1998 (171% of normal)[a]		2000 (97% of normal)[a]		2001 (72% of normal)[a]	
Total supply (precipitation & imports)	336.9		194.7		145.5	
Total uses, outflows, & evaporation	331.5		200.4		159.9	
Net storage changes in state	5.5		-5.7		-14.3	
Distribution of dedicated supply (includes reuse) to various applied water uses						
Urban uses	7.8	(8%)	8.9	(11%)	8.6	(13%)
Agricultural uses	27.3	(29%)	34.2	(41%)	33.7	(52%)
Environmental water[b]	59.4	(63%)	39.4	(48%)	22.5	(35%)
Total dedicated supply	**94.5**		**82.5**		**64.8**	

maf = million acre-feet
a. Percent of normal precipitation. Water year 1998 represents a wet year; 2000, average water year; 2001, drier water year.
b. Environmental water includes instream flows, wild and scenic flows, required Delta outflow, and managed wetlands water use. Some environmental water is reused by agricultural and urban water users.



Key components of the illustrated flow diagram are shown as characteristic elements of the hydrologic cycle. This volume has flow diagrams for statewide water summary in this chapter and for regional water summaries in their respective chapters.

Figure from *California Water Plan Update, 2005;*
California Department of Water Resources
http://www.waterplan.water.ca.gov/docs/cwpu2005/vol3/v3ch01.pdf

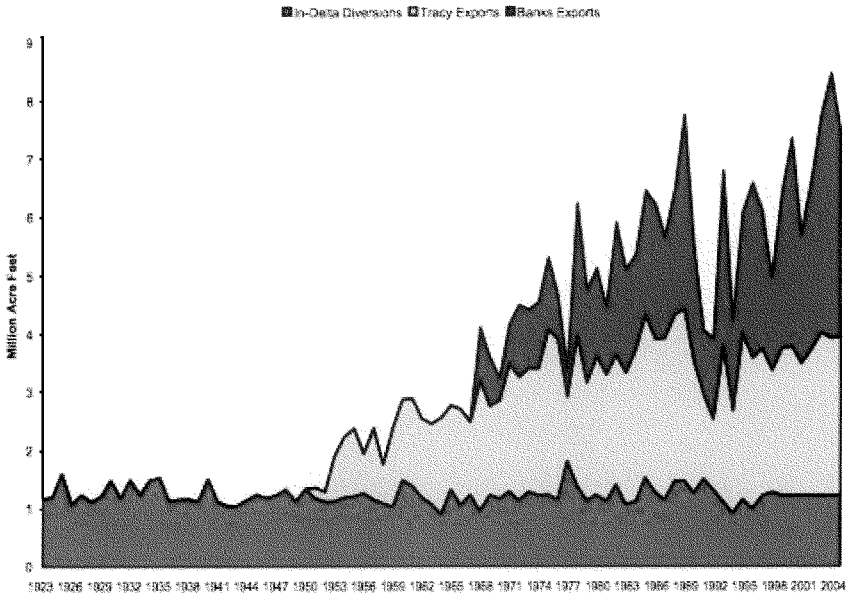


Unimpaired Flow without upstream dams or diversions

Delta Water Balance

Flows vary significantly from year to year

Figure from Status and Trends of Delta-Suisun Services, Department of Water Resources (2007)



In Delta Diversions and Exports *Delta diversions/exports have grown over time*

Figure from Status and Trends of Delta-Suisun Services, Department of Water Resources (2007)

Mrs. NAPOLITANO. Thank you, Mr. Isenberg.

I was hoping you would be able to wrap it up in the last minute.

I would like to move on to Jim Crettol from Shafter. Sir?

STATEMENT OF JIM CRETTOL, FARMER, SHAFTER, CALIFORNIA, AND SEMITROPIC WATER STORAGE DISTRICT

Mr. CRETTOL. Madam Chairman, thank you for inviting me to be here today.

I am part of a family farmer operation in the Shafter area with my father and brother. And my grandfather immigrated in 1914 and started farming in 1920. We have been farming continuously since then.

We grow a variety of crops on our 2,000 acres. We utilize flood, furrow, sprinkler and drip irrigation to irrigate our different crops.

I'm also here representing the Semitropic Water Storage District. Congressman Miller and Congresswoman Tauscher have had presentations. And Jim Costa is my Congressman. He knows thoroughly what goes on in Semitropic. We provide water to farmers and we also provide storage for our groundwater banking partners throughout the State.

Our banking involves in-lieu banking as well as direct recharge. Our initial program was a 1 million acre-foot groundwater banking program. Our partners are the Metropolitan Water District of Southern California, Santa Clara, Alameda, Zone 7 up in this area. And we have capacity of storing 1 million acre-feet in the initial

program. As of the beginning of this year, we had 800,000 acre-feet in storage. We are being requested from our banking partners to have a maximum withdrawal this year of 160,000 acre-feet of water. We intend to honor that commitment.

In addition to our initial program we have what's called our stored water recovery unit. It is a 650,000 acre-foot groundwater storage program that is under construction as we speak. We just finished completing a seven mile ten foot diameter pipeline to move water in and out of our district in large volumes. Our initial program can return water at 90,000 acre-feet per year. Under the new program with the large pipeline we can enhance that by an additional 200,000 acre-feet. We're operating like a very large reservoir.

The impacts of the Delta smelt on the pumps this year on our farming operation resulted in our having to move from taking surface water to pumping from the underground, which we did not want to do but it was necessary, so we did. Because of the shortage of water that was forecast with potential cut offs at the pumps, we are holding wells in reserve. We're not planting 80 acres of carrots. We are not going to plant 160 acres of corn silage.

We had a couple of employees that terminated employment with us. One of them chose a job somewhere else and another one retired. We have seven permanent employees—we have five now. We are not going to be replacing those two with the uncertainties in the water situation going on. We are just to hire temporary workers as needed.

The maximum request of 160,000 acre-feet, we are going to return 90,000 acre-feet through direct pumping later on in the year to our banking partners and 70,000 acre-feet will be what is done through what is called in-lieu exchange. We let our banking partners have our entitlement from the State Water Project and we pump from the underground to replace that. And we totally intend to do that.

Our program was designed to return water over a ten month period. And with emergency shutdowns in the Delta due to smelt populations and takes, or whatever, it totally wreaks havoc. Water that was designed to be returned over a long period of time is being sucked out prematurely so that in drought years the water that was there will no longer be there. So it is impacting things off in the future.

Our farming operation is not necessarily idling land and, you know, having our crops go by the wayside. But I know in Westland's Water District crops are being devoid of water. I know of cotton crops that are just going idle to save water for permanent crops. So there is a fairly large amount of land that is going idle as a result of the takes in the Delta.

Immediate solutions could include screening in Delta diversions, preventing toxic events from occurring, start a fish breeding program. I do not know that much about the fish in the Delta, but it seems plausible.

As an intermediate solution there is a program called the Eco-Crescent of installing a siphon at Old River at Clifton Court Forebay to connect the forebay to Middle River. It sounds like a good intermediate solution. But in the long term if take at the

pumps is causing problems in the Delta and moving water south, build a canal to route water around it.

If levee failure due to earthquakes, as Congressman Costa alluded, is a problem, build a canal to help enforce our water supply.

If continuing declining water quality is a problem at risk in the Delta, a canal is needed in addition to the potential for global warming and the increase in sea level, which could entirely inundate the Delta.

Do not jeopardize long-term solutions with only intermediate fixes. Commit to long-term solutions in the Delta. That is very critical.

Where is the money going to come from? From the State. Recently the Governor voiced his support of conveyance facilities through the Delta—also from the Federal Government and all the agencies, we hope. From then Delta water users, from exporters south of the Delta and Kern County and the Semitropic Water District. We are committed and we are ready and willing and able to pay our fair share of facilities through the Delta.

With that, we the municipal and agricultural water users of California need your help. We totally bought in to prop 13, prop 50, prop 204, me and along with Congressman Costa. Well, I helped him out whenever I could making phone calls and participating and giving money toward restoration in the Delta. We put up a lot of money. But we need better results for ourselves and for the general population and municipal interests that are our banking partners here in California.

Thank you.

[The prepared statement of Mr. Crettol follows:]

Statement of James A. Crettol

I. Background

My name is Jim Crettol. I am a third generation California farmer, born, raised and live in Wasco, California. I appear here today representing my family, Crettol Farms, which I am a partner of, and the Semitropic Water Storage District, for which I serve as a Board member and Secretary.

We appreciate the subcommittee holding this hearing in California on the very important and much misunderstood topic. I appreciate the opportunity to provide this testimony.

Despite the best efforts of the various federal and state agencies, and the efforts of water agencies throughout the State, I am here today to inform you what you already know—the Delta is in Crisis.

My family primarily grows almonds, carrots, cotton, and wine grapes. Our farm is located in the Semitropic Water Storage District and the Shafter-Wasco Irrigation District (a Friant Division CVP contractor). I have been involved in various agriculturally related organizations and from 2000 to 2004 was a board member of the California Workforce Investment Board.

Semitropic is the second largest member unit of the Kern County Water Agency (KCWA), contracting for a portion of its contracted water supply with the California Department of Water Resources (DWR). In addition to its long standing program to import water form the State Water Project (SWP) and thereby attempt to stabilize groundwater conditions, Semitropic has developed what I believe is the largest water banking project in the State, and probably the world, in conjunction with various "Banking Partners" throughout the State. These urban and agricultural partners have recognized the benefits of banking available water supplies, generally in wet years, in Semitropic, and in turn having access to banked water returned from Semitropic, generally in dryer years. This program has also provided benefits to Semitropic farmers. We long ago recognized the benefits of working with partners to improve water management throughout the State.

KCWA is the second largest SWP contractor. KCWA contracted with the DWR for delivery of approximately 1 million acre-feet of SWP water. KCWA contracts with thirteen local water districts, including Semitropic, which provide water for domestic purposes and approximately 675,000 acres of irrigated farm land in Kern County. On June 13, KCWA declared a water supply emergency because of concerns about likely impacts to the Kern County economy if pumping at the State Water Projects' Banks Pumping Plant was shutdown. KCWA staff, working with its local water districts, estimated the economic impact of a 30-day shut down of Banks Pumping Plant could be over $400 million.

II. Impacts on operations of the SWP

On May 31, DWR voluntarily stopped pumping water at the Banks Pumping Plant and immediately began using water that had been previously stored within the SWP storage facilities to meet delivery requests of the SWP contractors. By June 13, when KCWA declared a water supply emergency for Kern County, DWR was struggling to meet all of the SWP contractors' delivery requests. Both the CVP and SWP were withdrawing water from San Luis Reservoir (San Luis) at an alarming rate. In fact, the amount of water that could be released from San Luis had to be curtailed to ensure continued safe operation of the reservoir. DWR was so concerned with the drawdown rate that they informed KCWA that they would not be able to meet all of its contractors' water needs. These "shortage allocations" would have resulted in a significant reduction of water to Kern County. KCWA staff estimated the shortage to be about 1,000 cubic feet per second (cfs), or one-third of KCWA's total demand.

III. Potential impacts to Kern County

Following, I will describe the potential impacts in Kern County of shut downs of the Banks Pumping Plant. This information is provided only to illustrate the problem—other water agencies throughout the State have and would be suffering similar or even more severe consequences. Probably the areas most significantly impacted are (1) CVP agricultural contractors South of the Delta, which for the most part have little groundwater resources and unlike Semitropic and Kern County, generally have limited access to water banks, and (2) CVP and SWP urban contractors located north of San Luis Reservoir, including the greater Bay Area, where storage is limited.

KCWA staff analyzed the potential impacts to Kern County that would result from a 30-day shut down at Banks Pumping Plant. The analysis was based on information provided by Kern County farmers and DWR of impacts in Kern County overall. These impacts would primarily occur on the Westside of Kern County where groundwater is not available and where significant portions of irrigated lands are planted to permanent crops. Areas such as Semitropic, with groundwater resources, would be less impacted, but as discussed below, our ability to meet the needs of our banking partners will be curtailed. From the analysis, KCWA concluded the following:

- A 30-day shut down of Banks Pumping Plant in July would reduce delivery of water to KCWA, and its local water districts including Semitropic. By the start of July, releases from San Luis would be limited to about 15,000 acre-feet (af) per day due to the drawdown criterion which limit the amount of water that can be taken out of the reservoir to a drawdown rate of 2 feet per day. By the middle of July, drawdown would be limited to about 11,000 af per day. Assuming that 11,000 af per day would ultimately be the average San Luis Reservoir release rate for July, and understanding that DWR would prorate deliveries to the SWP contractors based upon their individual contractual rights, KCWA would receive less than 1,600 af of SWP water per day for delivery to Kern County during the height of the irrigation season. The amount of this shortage was reduced by supplementing the water supply with groundwater withdrawals from our groundwater banking programs. However, even with those extraordinary efforts KCWA staff estimates the shortage in deliveries to KCWA would be about 3,000 af per day.
- These severe shortages would result in immediate crop loss in Kern County. KCWA staff worked closely with its local water districts to determine how a reduction in SWP deliveries would impact local crop yields. Based on the water supply analysis, KCWA concluded that water deliveries to local water districts would immediately be reduced by about 25%. A reduction of this magnitude at the height of the irrigation season would impact permanent crop yields by about 10%. The 10% reduction in crop yield would have varying economic impacts based upon the type of crop and how the quality of each crop would be affected. For example, grapes would suffer about a 75% loss in the first 30 days while

almonds would suffer about 10% loss. KCWA staff also looked at how crops would be impacted next year if a similar interruption in irrigation deliveries occurs. For example, while the current year economic impact to almonds would not be as great as that realized from grapes, almonds would also suffer a similar loss next year.

- As noted above, Kern County and Semitropic are well known as groundwater banking regions. Semitropic and other Kern County districts have groundwater banking programs with other water districts from the San Francisco Bay Area to Los Angeles. These groundwater banking projects were developed in part to protect their regions from drought. As a result, groundwater banking projects are designed to store water in wet years and withdraw it in dry years. During those dry years water can be withdrawn over a period of eight to ten months and the withdrawal capabilities are designed for a rate of withdrawal that can last for up to 12 months. However, groundwater banking programs are not designed to withdraw very large amounts of water over a short period of time. While our groundwater banks were invaluable to us during the recent pumping shutdown, they are not designed for emergency shutdowns such as what occurred this year because it is not possible to withdraw enough water fast enough to meet the shortages. This is compared to a surface reservoir where larger quantities can be withdrawn quickly.
- Additionally, groundwater banking projects are managed conjunctively with diversions from the Delta; therefore, their utility to local water districts and out-of-county banking partners may be limited when such diversions from the Delta are limited. This is certainly true for Semitropic which has banking partners stretched from the Bay Area to Southern California. The Semitropic Banking Program is an in-lieu and direct recharge program whereby banking partners deliver their SWP water for use in Semitropic. This allows farmers within the district to use surface water and reduce their reliance upon groundwater. During dry years when the banking partners desire to get some or all of their water out of Semitropic, the District will make water available to them in two ways. First, Semitropic can "return" banked water by delivering its SWP water back to the banking partners and relying upon the water that was left in the ground to meet local irrigation demands. To the extent SWP water allocations to KCWA and Semitropic are curtailed, the ability to return banked water is curtailed. The second way that water is "returned" to banking partners is for Semitropic to physically pump water from the ground and convey it to the California Aqueduct. Once again, the ability to use groundwater wells within the district to return water to banking partners is limited by the amount of water needed for irrigation purposes within Semitropic and the amount of SWP water that has been allocated to the district. Regardless of the method for returning banked water, the Bay Area banking partners (which include Alameda County, Zone 7 and Santa Clara), are particularly vulnerable to curtailment of pumping in the Delta because they have no other means for receiving their water other than by exchange through the California Aqueduct.
- Emergency shutdowns are also a very poor way to manage precious water supplies. Kern County's groundwater banking programs were developed to protect the region from a drought caused by dry hydrologic conditions. When water agencies use water from their groundwater banks to make up for shortages that result from regulatory shutdowns it significantly reduces the amount of water that will be available during an actual drought. Using groundwater supplies to cover shortages from emergency shutdowns leave our region and the rest of the State at much greater risk during droughts.

IV. Solving the problem—The State of California cannot continue to operate on such an uncertain water supply any more than the Delta environment can thrive on a continued diet of marginal actions. The State, with its federal partner, must take actions on three different levels to restore the Delta ecosystem while providing California's families, farms and businesses with a clean, safe, reliable water supply that meets our State's growing demand.

Immediate actions—The State can no longer afford to look at pumping reductions as the only way to improve the Delta fishery. For decades the answer to any ecosystem problem in the Delta has been to reduce pumping. This strategy has resulted in a declining Delta fishery and increasing economic impacts from Tracy to San Diego. Such a status-quo-on-steroids approach will neither restore the Delta nor provide the water supply the state needs.

Other factors that stress the Delta species must be addressed. Programs must be developed to reduce the effect of invasive species on the Delta ecosystem. Invasive species have a dramatic effect on native species. The loss of the macro-invertebrate

eurytemora, the Delta smelt's preferred food is a direct result of the Asian clam, brought to the Delta in the early 1980's and which is now one of the most pervasive species in the Delta ecosystem.

The Asian clam is only one example of an invasive species that negatively affects the Delta. The striped bass was introduced to the Delta ecosystem by humans in the early 1900s to provide a sport fishery. Now the Delta is one of the premier striped bass fisheries in the world, but it was developed at the expense of the Delta's native species. Striped bass eat both juvenile salmon and the Delta smelt. In spite of this direct conflict between striped bass and native protected species, the State of California continues to foster the striped bass fishery. The sport fishing industry is important in California, but its contributions to the declining Delta ecosystem must also be weighed.

During the past year it has become apparent that toxic runoff from urban and agricultural areas in and around the Delta play a significant role in the declining Delta ecosystem. Earlier this year a series of toxic events occurred in the north Delta in areas where the Delta smelt are known to spawn and rear. Those events occurred at a critical time in the development of the smelt. While it appears likely that the toxic events had a significant role in this year's severe population decline, it is difficult to verify this because of a lack of scientific data. Because we have little factual data about the toxics involved in this year's events, officials are unable to quickly develop strategies to mitigate the impacts of those events and haven't been able to develop strategies to ensure that they don't happen again next year. The State must re-double its efforts to understand and respond to the significant effect toxics have on the Delta ecosystem.

Other Delta water diversions also affect the Delta ecosystem. There are more than 1,800 water diversions in the Delta that provide water to the Delta urban and agricultural water users. The vast majority of these diversions are small, but in total they are estimated to be comparable to the 4,600 cubic foot per second capacity of the Jones Pumping Plant, and virtually all of them are unscreened. Few if any studies have been done on these diversions to determine if they draw in the Delta smelt when they are operating. But it is easy to understand that Delta smelt larvae and juveniles are just as likely to be sucked into the in-Delta diversions as they are the larger State and federal pumps. The State must examine the effects that in-Delta pumping has on the Delta ecosystem and develop actions to reduce the effect in-Delta pumps have on the Delta ecosystem.

Interim Actions—The State must develop a long-term solution to the conflict between water supply and the Delta ecosystem. But it is likely that such a solution will require ten or more years to implement. In the interim the State must develop a strategy for maintaining California's water supply while helping to recover the Delta smelt. A variety of options are possible but developing these actions must start now. One of these ideas being discussed is construction of a small siphon under Old River at Clifton Court Forebay that would connect the Forebay to Middle River. When paired with rock barriers at strategic locations in the Delta the siphon allows the State and federal pumps to draw water from the Sacramento River more efficiently without drawing in smelt located at the western edge of the Delta. Attached is a map (Figure 1) showing in concept how such an interim plan would be implemented. It is estimated that this idea, sometimes referred to as the "Eco-crescent", could be designed and constructed in a relatively short period of time, perhaps as quickly as two years, at a relatively modest cost estimated to be between $20 million to $40 million. There is still a lot of work that needs to be done to analyze this idea, but that work must begin now and must be a priority for all of the State and federal agencies that would be involved.

Long-term Actions—The State has made an admirable effort to develop a series of processes that if successful will result in a decision on a long-term fix for the Delta. Unfortunately the current water supply and ecosystem crisis in the Delta do not give us two years simply to make a decision. The State must accelerate its decision making process and move out of the bureaucratic decision-making mode and into a leadership role that makes decisions on the information at hand and follows though by implementing those decisions.

I believe that the State can no longer afford to focus on modifying how the State and federal pumps are operated and hope that the ecosystem gets better and the economy stays healthy. It is time to act based on what we know. If "take" at the pumps is causing a problem for the Delta smelt then we need to construct a canal and move pumping intakes to an area that is less ecologically sensitive and that can be constructed using the newest screening technology. If levee failure due to earthquakes is a risk then we need to separate the state's water supply from those risks by constructing a canal that moves the state water supply around the Delta rather than through it. If continually declining water quality is a risk for the State's

urban water suppliers then we need to construct a canal to move a more healthful water supply to the State's urban areas from Silicon Valley to San Diego.

What we cannot afford to do is wait. Constructing a canal around the Delta will take years to plan and design and several years to construct. There are interim actions the State can take to maintain the Delta ecosystem and the State's water supply, but none of them provide a long-term solution for the Delta smelt or the State's 25 million people that depend on the Delta for some or all of their water supply. The time to act to protect the Delta smelt and the State's water supply is now.

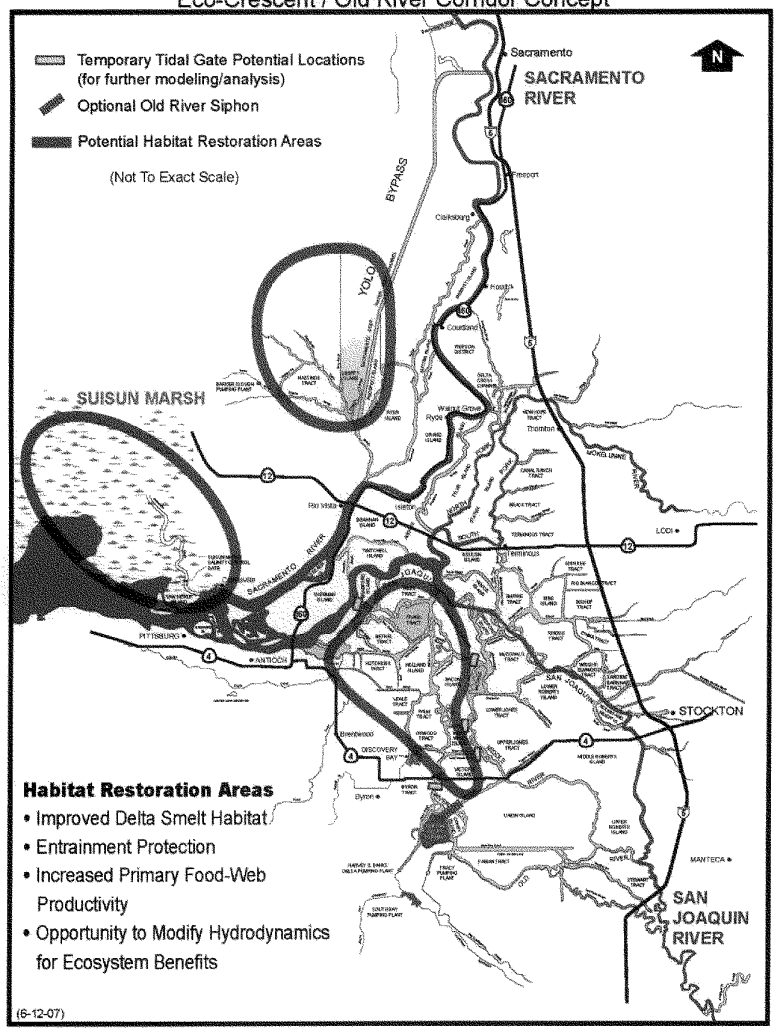
I encourage you and other representatives of the Federal government to work with the State and water agencies to promptly address the crisis in the Delta in a manner that restores the Delta ecosystem and provides necessary water supplies for the growing demands of California's families, farms and businesses.

Thank you for your time and consideration.

Figure 1

Immediate / Reversible Delta Smelt Protection Actions

Eco-Crescent / Old River Corridor Concept



Mrs. NAPOLITANO. Thank you, Mr. Crettol.

Mr. Martin? You have five minutes, sir.

STATEMENT OF CHRIS MARTIN, PRINCIPAL, AC MARTIN PARTNERS, INC. OF LOS ANGELES

Mr. MARTIN. Thank you, Chairman Napolitano and Members of the Subcommittee. Thank you for this opportunity to testify regarding the Bay-Delta crisis and the implications of water supply reliability.

My name is Chris Martin. I am the immediate past chairman of the Los Angeles Area Chamber of Commerce.

Our families immigrated to California in the late 1840s. And I'm a fifth generation Californian. Been around here thinking about water for a while.

The Southern California economy relies on many things, but most importantly it relies upon its water supplies. That water supply comes to us in two ways. Locally from rainfall and groundwater and through imports delivered primarily by the Metropolitan Water District. Metropolitan delivers its imports from two major sources. From Northern California via the State Water Project and from the Colorado River. All of these water supplies are in peril.

Metropolitan's ability to deliver water through the Colorado River Aqueduct has been severely impacted by the lack of surplus water on the Colorado River. The Colorado River Basin is entering its eighth year of drought and we are seeing some of the driest years ever recorded on the Colorado River.

Southern California rainfall has been scarce this year. In fact, Los Angeles has experienced the driest year on record and other parts of the region are recording their lowest rainfalls ever.

Now add to this the stress being placed on Northern California water supplies that feed the State Water Project. The Sierra Nevada snow pack is 29 percent of normal, the lowest amount of snowfall we've seen in nearly 30 years.

What is comforting to people like me is that our water agencies plan for dry conditions. Metropolitan and its member agencies have developed plans, built up their reserves and taken other conservation measures all designed to cope with dry times. But what is unaccounted for is the kind of current crisis we now face with the state water system. The infrastructure is broken.

The State Water Project requires conveyance of drinking water supplies to pass through the Bay-Delta, where these supplies come in contact with endangered fish species and pollutants. The process not only derates the quality of water, but also puts the entire project in conflict. It is a conflict that frequently forces the choice between water for people and water for fish.

Right now because of dwindling populations of the Delta smelt, State and Federal courts are curtailing water deliveries under the parameters of the California and the Federal Endangered Species Act.

There are upcoming hearings in Federal court over the summer as to decide whether the future water deliveries to many parts of California should be reduced because of the Delta smelt. These potential reductions would have dramatic impacts on the South and

East Bay Area, Southern California and our Central Valley agricultural industry.

Having a judge decide how much water should be delivered in this State is akin to the scenario that faced the California prison system. In that instance, our Federal courts were forced to run our prisons because the system was in disrepair.

Having a court decide when our pumps should be turned on or off is neither an effective or an efficient way to run the system. Now with our pumps being turned on and off, the judges deciding on limitations, we can expect to experience rolling water blackouts, if there is such a thing, in California.

Our economy cannot be subjected to this. Water agencies cannot plan for meeting the needs of our robust economy if there are water shortages in California's future. And we cannot be impacted by this kind of uncertainty.

We have a crisis and long-term fixes are needed. We need solutions we can rely upon.

First, we need to protect the Delta. The ecosystem needs comprehensive protections. And further actions are needed to protect the Delta smelt.

It is becoming increasingly clear that water exports from the Delta are just one of many factors affecting the smelt.

Second, we need to fix the water supply infrastructure. We need an isolated facility that can separate drinking waters from the Delta. We need to protect the supplies that serve two of every three Californians so these supplies can remain reliable to one of the world's largest and most important economies.

Finally, we need long-term planning and action to address the impacts of climate change, specifically the potential permanent reductions in California's snowpack and rising sea water levels. This means we need to address flood control and shortage.

But today, right now, the immediate need is to fix the crisis in the Delta. We need immediate action to address the ecosystem and to ensure a stable water supply of California.

Thank you.

[The prepared statement of Mr. Martin follows:]

Statement of Christopher C. Martin, Immediate Past Chair, Los Angeles Area Chamber of Commerce, CEO, AC Martin Partners

Chairman Napolitano and Members of the Subcommittee, thank you for this opportunity to testify regarding the Bay-Delta crisis and the implications of water supply reliability. My name is Chris Martin, and I am the immediate past chair of the Los Angeles Area Chamber of Commerce and the third-generation leader of AC Martin Partners, one of Southern California's oldest planning, architecture and engineering firms. We celebrated our 100th anniversary in 2005.

As a business owner, I work in a state that has a $1.2 trillion economy, the 6th largest in the world. California's urban coastal plain represents 60 percent of that economy with Southern California generating more than $800 billion annually. Our architectural firm has contributed to the economic vitality of the Los Angeles area and throughout the state.

The Southern California economy relies on many things, but most importantly it relies on water. That water comes to us in two ways—locally from rainfall and through imports delivered primarily by the Metropolitan Water District of Southern California. Metropolitan derives its water supplies from two major sources—from northern California via the State Water Project and from the Colorado River.

But all of these water supplies are in peril.

Metropolitan's ability to deliver water through the Colorado River Aqueduct has been severely impacted by the lack of surplus water on the Colorado River. The Col-

orado River Basin is entering its eighth year of drought. We're seeing some of the driest years ever recorded on the Colorado River.

Southern California rainfall has been scarce this year. In fact, Los Angeles has experienced the driest year on record and other parts of the region are recording their lowest rainfalls ever.

Now add to this the stress being placed on Northern California water supplies that feed the State Water Project. The Sierra Nevada snow pack is 29 percent of normal, the lowest amount of snowfall we've seen in nearly 30 years.

What is comforting to people like me—as both a business owner and a resident of Southern California—is that water agencies plan for dry conditions. Metropolitan and its member agencies have developed plans, built up their reserves and have taken other measures all designed to cope with dry times.

But what is unaccounted for is the kind of current crisis we now face with the state water system. The infrastructure is not working.

The State Water Project requires conveyance of drinking water supplies to pass through the Bay Delta, where these supplies come in contact with endangered fish and pollutants.

This process not only degrades the quality of the water, but also puts the entire project in conflict. It is a conflict that frequently forces a choice between water for people and water for fish.

Right now, because of dwindling populations of the Delta smelt, state and federal courts and curtailing water deliveries under the parameters of the California and federal endangered species acts.

There are upcoming hearings in federal court over this summer as to whether future water deliveries to many parts of California should be reduced because of the Delta smelt.

These potential reductions would have dramatic impacts on the South and East Bay Area, Southern California and our Central Valley agricultural industry.

Having a judge decide how much water should be delivered in the state is akin to the scenario that faced California's prison system. In that instance, our federal courts were forced to run our prisons because the system was in disrepair.

Having a court decide when our pumps should be turned on and off is neither an effective, nor efficient way to run the state's water system.

You will recall the state's energy crisis of 2001, where California suffered massive rolling electricity blackouts.

Now, with our pumps being turned on and off and judges deciding on pumping limitations—we can expect to experience rolling water blackouts in California.

Our economy can't be subject to rolling water blackouts. Water agencies can't plan for meeting the needs of our robust economy if there are water blackouts. California's future can't be impacted by this kind of uncertainty.

We have a crisis and long-term fixes are needed. We need solutions we can rely on.

First, we need to protect the Delta. The ecosystem needs comprehensive protections. Further actions are needed to protect the Delta smelt, to restore the habitat and to make the Delta healthy again.

It is becoming increasingly clear that water exports from the Delta are just one of many factors affecting the smelt. To give the fish a chance, we must address all the issues. These include:

- Increased toxic contamination in the Delta, from sewage outflows and pesticide runoff from agriculture.
- Increased presence of invasive species throughout the Delta
- Impacts on oxygen levels in the rivers leading to the Delta because of deep channels for shipping
- Other water diversions and pumping patterns within the Delta itself.

Second, we need to fix the water supply infrastructure. We need an isolated facility that can separate drinking water supplies from the Delta. We need to protect the supplies that serve two out of every three Californians so these supplies can remain reliable to one of the world's largest and most important economies.

Finally, we need long-term planning and actions to address the impacts of global warming, specifically the potential permanent reduction in California's snow pack. This means we need to address flood control and storage.

But today, right now, the immediate need is to fix the crisis in the Delta. We need immediate action to address the ecosystem and to ensure a stable water supply for California.

California cannot survive with rolling water blackouts.

Mrs. NAPOLITANO. Thank you so very much to our panel. And I would like to begin the questioning series.

And, Mr. Martin, I could not agree with you more that Southern California has built up storage through the dam, conserved and recycled. And I was hoping eight years ago when I started on this Subcommittee that a lot of the other communities would begin to understand the need to be able to prepare for the future. You talk about rolling water blackouts. We had them after the last drought, so we are hoping not to go there again. And with the help of everybody concerned, I think we can be able to manage being able to address that before it gets to a critical point.

But thank you so very much to all of you.

Mr. Isenberg, you played an instrumental role in drafting legislation that would help restore Owen's Valley and Mono Lake. What are the lessons learned there that you think might help us address the current situation?

Mr. ISENBERG. The battle to save Mono Lake moved into the 1960s, 1970s, and 1980s. It was preceded by the very important California Supreme Court decision that essentially said the Public Trust Doctrine, a notion that water supplies in California are a public trust, they are not simply an item of private ownership, that the Public Trust Doctrine applied to water transfers. And accordingly after almost a 100 years of battling with the City of Los Angeles, the settlement was reached to guarantee a set of lake level, a water level in the lake in the Mono Basin.

I played a relatively small part of that puzzle. Because at the time there was a bill floating through the legislature that was going to pump some money into Delta levees and, coincidentally, forgive the nonpayment of interest from state water contractors which had been outstanding for about 25 years. Since nobody paid any attention to that and the contract did not say what the percent rate of interest was or that payment was required on a date certain, it was all kind of tidy and all the interests were dividing it up.

To make a long story short, we essentially held all of that up and the end result was a $60 million pot of money that was used to help pay for conservation efforts in the Los Angeles City Department of Water and Power as a way of helping them deal with the reduction of transfers that came out of the valley. That was successful, and you know, some of our friends, one of whom is sitting here, yelled at me once, "That is just paying people money to do the right thing."

But whatever your analyses of the situation, it is very clear to me that as you make changes in uses of water, whether they are driven by catastrophic failures of the Delta or global warming, or anything at all, you are probably going to have to cushion the impact. That is what we do. But the end result was a plausible situation.

I think Southern California can collectively take some legitimate credit for meeting the growth of population down there in the last ten or 15 years, primarily through conservation, reuse and so on. Up North, we like to be smug about it, but we are not that good and we should be.

Having said that, it does not really matter because the supply is still limited, but the demand seems to be growing. And the question really is can we make allocations between uses that are as intelligent, sensitive to the interests and so on but are forward looking.

Ms. Wolk registered, as others of you did, one of the main problems. In the water world nobody trusts anybody except themselves, and they are all in favor of changes of governance as long as they are given the power to do whatever is done. Everybody says that.

Mrs. NAPOLITANO. Thank you. The sad part is when it goes to litigation the only ones that benefit are the attorneys.

Mr. Costa?

Mr. COSTA. Thank you, Madam Chairperson.

Mrs. NAPOLITANO. Chairwoman.

Mr. COSTA. Chairwoman. And thank you for all the good work you do.

Mr. Isenberg, you and I have worked together for a long time and I want to follow up on the Chairwoman's question to you. We have done a lot, and that is why I wanted to go through some of the history. Some of it has been successful, some of it has not. CALFED over the last seven years we hoped would—or many of us hoped through the record of decision would have been more successful in addressing the Delta problems. We have also applied it, depending upon how you want to split the difference, between $5 and $8 billion in State money and not to mention a lot of other hundreds of millions of Federal dollars. What is different today over the last 25 years that is going to allow your blue ribbon commission to give us the holy grail, so to speak?

Mr. ISENBERG. You mean what gives us some wiggle room?

Well, first, compare this to the peripheral canal battle where a number of us were involved on that issue, myself included. Apart from the absolute regional joy of Northern Californians batting around Southern California the fact is we all argued that if water continued to flow through the Delta before being exported, that the Delta would itself as a system be protected. One thing that's startlingly different: No one today argues the Delta is better. It is a mess. And it is a mess for a variety of reasons. And I find that to be different.

Number two: The threat of catastrophic failure was probably generated by the example of Katrina more than anything else, but blended with the fact that the Delta is quite near prominent earthquake faults——

Mr. COSTA. You could have the perfect storm?

Mr. ISENBERG. Yes, you could. And I think that is a second realization. You might say well it's odd, it is not as if the earthquake faults were unknown 20 years ago. But, you know, it takes a long time for society to recognize problems. I think that's the second thing that is notable.

Now reading tea leaves beyond that it was not without note, it was either late '05 or early 2006, MET issued a policy paper on the Delta, which I didn't bring today but you'll have to take a look at it. Much like trying to figure out where the Chinese Communist Party is moving when you look at who sits at the dais, it was notable and people commented that the policy position paper did not re-

quest additional water supplies from the Delta. Now I know enough about the internal workings of MET to know that there is vast differences of opinion, but the fact of the matter is the success, as Mr. Martin indicated, over the last 15 years of accommodating Southern California's growth from a mixed water supply with efficiencies has allowed them to do that.

Mr. COSTA. Yes. I want to get to that question there, but my time is running out as the Chairwoman reminds me. So let me ask Mr. Crettol a question. You talked extensively about the success of Semitropic's groundwater banking effort. But I want to understand, and I think it is important for us to understand that this only works in a conjunctive use fashion. I think that if you are able to store water during the above average rainfall years that Mr. Isenberg spoke of, can you make the program work over a long term. Do you want to give any more sense of what your time lines are with your own groundwater banking facility with high and dry years? Or wet years and dry years, excuse me.

Mr. CRETTOL. Yes. In wet years we saw that we need a much larger capability of bringing water in the district. That is why I alluded to the stored water recovery unit and the ten foot diameter pipeline that we have just now put in place. We are able to take water into the district at seven hundred second feet at max flows during wet years.

So, as a for instance, in a real heavy rainfall year, your Februaries and Marches when there is flooding in the Delta and whatever, we can take huge gulps of water, bring it in, store it. Storage is one of the principal reasons we are doing that.

I want to comment just briefly on what was brought up earlier, the term of trust in the Delta. Our whole groundwater banking program and the reason it works so well is because there is trust amongst all our other water banking partners and water districts in the area. But while we do trust, we verify. It is all through contractual arrangements and whatever——

Mr. COSTA. Right. I have heard that before.

Mr. CRETTOL. You have to verify.

Mr. COSTA. Yes.

I got 30 seconds left. Gentleman from Metropolitan Water District, could you give a breakdown of your water management tools on the conservation that currently met——

Mr. MARTIN. I am not Metropolitan Water District.

Mr. COSTA. I am sorry.

Mr. MARTIN. I am in the architecture and engineering business.

Mr. COSTA. Yes. OK.

Mr. MARTIN. I cannot answer that.

Mr. COSTA. All right. I will pass on that question then.

Thank you very much, Madam Chairperson.

Mrs. NAPOLITANO. Thank you, Mr. Costa.

And I can tell you the MET has developed that dam, so we have a water supply. We have gone into extensive water recycling for many of our communities. They've found extra storage to be able to capture rainfall so that we can bank for future use. Those were just three of the things that I know the MET has done.

Mr. COSTA. Well, I do, too. I just wanted to get the percentages for the record. Actually, we helped finance a lot of that.

Mrs. NAPOLITANO. Thank you very much.

And just as an aside, Mr. Isenberg, when you talk about the quake and the intrusion of seawater in Katrina over in Louisiana, I visited, some of us did after it happened. I can tell you it is a horrendous sight, especially to the residents that live right near where the levee broke. When I see what California has done in allowing development below some of those levees, it is astounding to me that those elected officials allow that development and put people at risk. Because they will come back to the Federal Government requiring and requesting assistance in being able to ameliorate the damage and yet whose fault is it going to be?

Mr. ISENBERG. Assemblywoman Wolk is carrying legislation, as she has for many years, on this subject. As a matter of fact, a couple of bills to try to mitigate that problem.

Mr. MILLER OF CALIFORNIA. Thank you, Madam Chairwoman.

Phil, thank you very much for your testimony and even more for taking up the cause here in trying to figure this out with the commission.

I want to focus a little bit on one of the last things you said in your written testimony. You say that if we should not continue to promise everything to everyone, then some choices have to be made about water use and the Delta on the theory that we have been operating on the idea that everybody gets everything they ever had. That, obviously, seems to me to be inconsistent with what I think would be one of the goals that we would have sufficient water and sufficient flexibility to use that water to enhance the economic growth of the State in the future. As economies change and go in different directions we want to be able to respond to that for the people of the State. But it seems to me, you know, we have many old policies that impact the situation we are in now. We have the continuation of contracts that were written in the 1950s when California was a very, very different place. We see parties seeking to extend those contracts for another 50 years. So far we do not know that any suggestion of reallocation of those contracts or diminishment of those contracts or changes in those contracts have been made for the most part. Most of them have been seeking a simple renewal of those.

We take water and we subsidize the delivery of that water and we put it forth to crops that are also subsidized, that the government buys back and sells back at a reduced price at a loss.

So we have this kind of financial incentive to misuse water, if you will, if you were looking at the marketplace.

We have the idea that the Delta is going to continue to yield additional water. That somehow there is an ability to squeeze additional water through the pumps or even if you look at through Delta facility, the idea is that would deliver more water out of the Delta. I assume some of that is on the theory that the water remaining would be more passive and that might work somewhat more for the fish, although we do not know that.

And I would just like you to comment on that construct. But at the same time I want to say that California as it has done with energy since the 1970s has been the leader in the efficient use of water in the various sectors of the economy, whether it is in manu-

facturing or farming, or what have you. But we have these sort of old constraints that are still on our ability to redesign this policy.

Mr. ISENBERG. Well, Congressman, we are not a European country with thousands of years of history, but we are 150 plus years old. We carry on the ship of state the legal barnacles of statutes and contracts and constitutional provisions and all of it that get imposed at a time when the politics and the public mood expressed one opinion. The legacy stays for a very, very, very long time.

The hardest thing, of course, is that somebody's very old self-interest protection is somebody else's fundamental right. As I wander around talking about water now these days everybody says to me "Well, you know as long as you protect our end Delta users, the area of origin protection, the American River Basin. You know, as long as you start from where I am, it's OK to change."

As a matter of fact, Chair, if you would permit me, I'm going to give you a great quotation by an American historian Van Wyck Brooks——

Mrs. NAPOLITANO. Go ahead.

Mr. ISENBERG. Oh, good. "It is a principle that shines impartially on the just and the unjust that once you have a point of view, all history will back you up." And water is classically that way. All of us have a point of view. We want research that supports the conclusions we have already reached.

And so one of the challenges I have been making in this Delta Task Force to all of the people, environmentalists I've been friends with for a very long time and all the other interests, I said look, the deal has to be that you have to articulate a position that recognizes the legitimate statewide interests that are expressed in the Delta. You cannot simply walk in, whether you're valley agriculture, Southern California or the environmental movement and the Northern California Delta region, you can't just walk in and say here's what I want and that's the end of it.

In some sense if we are not all responsible for water the fundamental issues, and by the way the statutes do not declare fundamental interests. They pile preferences and priorities one on top of the other and the Governor has given us 11 things to look at. I suspect about seven or eight of those are all kind of undifferentiated priorities for someone.

Maybe the most important thing we could do is if we try to identify the smallest number possible of truly statewide interest. The problem with that, of course, is some people who have spent their lives and careers dealing with this issue might not like the list.

Mr. MILLER OF CALIFORNIA. Thank you.

Well, a comment. I think the two examples that have been brought up here, one is the courts and the law found you didn't get to sacrifice Mono Lake. You do not get to create a statewide sacrifice area, if you will. The other one is that we have seen large projects, central Arizona projects, central Utah project and even to some extent the Garrison project; huge projects that were designed in the '40s and the '50s, came on line and then the economies and the populations of those states changed and they reconstituted themselves out of huge subsidized agricultural programs into an urban program designed for the growth and the change in the states. I'm not suggesting anything that radical.

Mr. ISENBERG. Right.

Mr. MILLER OF CALIFORNIA. But there was a questioning of the priorities and the use. A dramatic action, in fact, taken——

Mr. ISENBERG. And that time is coming. If I had to guess what the next stage in California would be, Mr. Costa would say this is my typical cynical nature, it just seems to me the legal status of the environmental protections is such that we are starting to see a far more elaborate minimum flow guarantee in the Delta. Just inevitable. Five, ten years you are going to have all the complicated minimum flows. But ironically it is——

Mrs. NAPOLITANO. Time is up.

Mr. MILLER OF CALIFORNIA. So if you can just complete the thought, Madam Chair.

Mrs. NAPOLITANO. OK. Your thought, sir?

Mr. ISENBERG. Ironically you cannot just guarantee high minimum flows for environmental protection and assume you can continue every other flow for every other use for every other person. You know, I started with a limited water supply for a reason; that is all there is. You cannot get anymore. It is nuts, it is psychiatrically insane for us to act as a government as if we can dictate and guarantee to everyone everything when we are sitting on a finite source of water.

Mrs. NAPOLITANO. Good point. Thank you.

Ms. Tauscher?

Ms. TAUSCHER. Thank you, Madam Chairwoman.

As I said earlier in my statement, I appreciate you coming so quickly after we asked you to, but part of my problem is that I already had some meetings scheduled in my district. So I will be leaving shortly to go attend to business in my district. But thank you again for being here.

I thank the panelists for your great information.

And I would like to talk to Mr. Isenberg in your role as Chair of the Delta Vision Blue Ribbon Task Force. I guess from my point of view, not sitting on the committee, I wanted to understand whether the Federal regulators can be working more toward a lasting Delta solution? I am very impressed by your most recent comments. I wish I could hear more of them. The idea that we look at this as a holistic issue. That we look at the difficulty in calibrating and dividing up with vastly changing circumstances over time, how do you squeeze the last drop out of the last drop? And I know it is a challenge, but from my point of view I would like to understand the Federal regulating role and if there is enough cooperation and if we are doing all we can toward delivering a lasting solution?

Mr. ISENBERG. Yes, no I do not know.

Yes, the feds are involved as are about 140 other governmental agencies.

And, yes, as Ms. Wolk pointed out, nobody is in charge.

And, yes, it is very clear nobody wants anybody else to be in charge. They are not also enthusiastic about assuming any financial risk or financial liability by stepping up and saying "Hey, I will take over everything." I mean, the flood control battle with the State, now the deep pocket for flood control in spite of independent legal flood control districts not doing their jobs is classic.

So how do you make sense of that? I wish I could offer you a real solution.

The fact of the matter is we are an older society and we are tightening up on the water supply. Everyone is tightening up. And, you know, it is not all bad. It means that we have to be more honest and direct in our public conversations about water. It is going to be hard because people are going to have to get out of the trenches of the warfare of the past and get a little mobile and move around and do things differently.

I will say to the Governor's credit in his charging document, his Executive Order of last year, he added some things that have not previously been on the agenda of water policy for state officials. Mr. Costa mentioned one, urban land use.

Now I understand there are a lot of local elected officials in here who believe that sound urban land use is important and no one should interfere with their ability to decide whatever needs to be done as to who lives where and what gets built where, certainly not an evil state agency or an even worse Federal agency. However, there is no doubt about the fact that urban land patterns have a direct and tangible impact on water quality, and to a certain extent on water supply. They limit the ability to manage the system. How do you protect a Delta ecosystem if it is surrounded by reasonably significant growth? Ironically, that is something where the big three warriors of the battle, Southern California interests, the Valley ag interest and the environmental community all kind of privately at least say yes, something ought to be done about that.

As you might imagine, within this Delta community they have a slightly different view. It's trying to resolve that. There is no miracle on this one. No miracle at all.

Ms. TAUSCHER. Thank you, Mr. Isenberg.

Madam Chairman, on a limited basis, may I ask unanimous consent to have some of my questions for the other panels submitted for the record.

Mrs. NAPOLITANO. So ordered.

Ms. TAUSCHER. Thank you.

I yield back my time.

Mrs. NAPOLITANO. Thank you. We will have those questions for the record. In fact, we may not be able to go to a second round because we have three more panels to go. Any questions you might not get to will be requested of them in writing.

Thank you.

Mr. Thompson?

Mr. THOMPSON OF CALIFORNIA. Thank you, Madam Chair. I will be brief in my questions.

Mr. Crettol, there has been a lot of discussion prompted by the issue that Mr. Isenberg raised, and that's how folks, everyone wants to start with what they have and not wanting to give anything up. As a farmer do you think that we as policymakers should be in the business of choosing agricultural winners and losers when it comes to the distribution of water?

Mr. CRETTOL. In our particular district we take water in large quantities and we are looking to do that more often. How we do that is we do it in heavy flow years. The issue of us being able to

have an adequate water supply for ourselves is not assured, like anyone else.

Mr. THOMPSON OF CALIFORNIA. Well, my question is more specific than that.

Mr. CRETTOL. You mean as a farmer?

Mr. THOMPSON OF CALIFORNIA. Should there be some sort of policy decision made that would distribute water based on what, for instance, crops you grow? You think we should get that much into the weeds?

Mr. CRETTOL. No, I do not think so. So if folks—we grow crops based on market demand. If there is no demand and there is no need for the crop——

Mr. THOMPSON OF CALIFORNIA. Well, Mr. Miller kind of talked about that in his opening statement regarding the whole issue of some of the subsidies. So there might be——

Mr. CRETTOL. The issue of subsidies is a very good one. I will be very brief.

When we go to America supermarkets and we look up and down the shelves, you have some of the best quality, the biggest variety. I have been in many countries in the world. I have been in supermarkets all over the world. We have absolutely the most quality at the cheapest price. Americans are getting——

Mr. THOMPSON OF CALIFORNIA. I am not disputing any of that. I am just interested in it from a farmer's——

Mr. CRETTOL. Particularly in our operation——

Mr. THOMPSON OF CALIFORNIA. Looking at what crops use water more or less than other crops, and we should take any of that into consideration——

Mr. CRETTOL. If you want to be crop specific, like people do not grow alfalfa because it uses five acre-feet per acre as opposed to wheat which maybe uses 2 acre-feet. Well, cows need alfalfa and people need milk and, you know.

Mr. THOMPSON OF CALIFORNIA. OK. Thank you.

Mr. Martin, one of the issues that I did not hear anybody mention, and that is the option of reducing water to the area that you are concerned with, the Southern California area. Do you see that as a real option or are we going to have a continued grow and demand for more and more water?

Mr. MARTIN. I think Southern California has been very diversified in its way of developing its water resources. I am particularly pleased in the way we have increased our ground water capacity through salt water barriers and other things. Decreasing water supply, it could happen. I mean, it is certainly something that is on the table.

Mr. THOMPSON OF CALIFORNIA. So is that an option through Delta water——

Mr. MARTIN. I think we all have to be reasonable about water supply. I would not want to sit here and say no we are not going to reduce Southern California's demand. I think we are going to learn to be conservative in our use of water. If it is our part of the bargain to take some reduction of water supply, then let us do it equitably. It does not stop us from being more conservative in the way we utilize our water supplies.

Mr. THOMPSON OF CALIFORNIA. I am hoping that we are able to get more specific on different ways to better reduce our use of water in the subsequent panels.

Mr. Isenberg, Ms. Wolk mentioned the lack of governance. Is there anything that you think that could—and I understand the difficulties and you articulated them well—is there anything that you can think of that may help? Should we try and help create a Delta conservancy, for instance?

Mr. ISENBERG. That is one of the many ideas floating around. I think that may serve a lot of purposes. I doubt that governance per se, particularly governance of complex water issues and environmental protection, is totally solved by a conservancy in the classic sense of the Santa Monica Mountain Conservancy or even the Coastal Conservancy, which is another prototype. That is a much more comparable governance illustration.

I should tell you I deliberately thought about that and then decided I do not want to get lost in that issue. It is altogether too easy for me, an ex-government type, to think that you should spend all your time on governance. I think that follows some very important policy decisions.

The history in California is because we do not want to acknowledge there is a limit to water, we do not want to choose between parties who use water, we always do endless studies and talk about a new governance structure as if the decisions become easier if you study the hell out of them and let somebody else be in charge. The fact is you have to make choices, and the choices are difficult, painful generational choices.

Mr. THOMPSON OF CALIFORNIA. Should we create agricultural winners and losers in regard to distribution of water?

Mr. ISENBERG. I will be direct on this. I have thought about it a lot.

This is the point that Mr. Martin was making, I think everybody in the whole state has a duty and an obligation to be prudent in the use of water. It is not simply Southern California and agriculture. It is all of us, and you know, I plead guilty. I come from Sacramento. We had to have shoved down our throats the notion of water meters in the state, which is as close to indefensible as anything I can think about. When I was Mayor I actually put the first residential water meter in at Ron Roby's house when he was Director of the Department of Water Resources at his request. We did it in the dark of night, and it was against the law, but he just wanted to see in the middle of one of the droughts how much water he was using.

We have to pull up our pants and work to help solve the problems of the State of California.

I guess if there is any message I have is we are all in this state together. There are choices to be made and, yes, there is going to be a lot of change and change can be disruptive, but we either make it together where collectively, particularly in the area of conservation, collectively we make the commitments.

In some ironic sense, the savings in Northern California and the limitation of diverted water may be one of the most significant sources of fresh water for the Delta, whether it is a through Delta situation on exports as it is now, whether it is around the Delta.

I mean, where else is fresh water going to come from? Because you know one thing you've learned on an ecosystem, unless you decide you want an inland salt water sea, which as best I can tell nobody does, you are talking about a mixture.

So all of those things mean tough choices. Governance is part of it. I think that ought to come to the end. Although if you wish to create the situation where the Federal courts appoint a receiver of the State of California's water and environmental system in the Delta, it sounds like one hell of an interesting job.

Mr. THOMPSON OF CALIFORNIA. Thank you.

Mrs. NAPOLITANO. Thank you. Thank you.

We move on to Assemblywoman Wolk.

Ms. WOLK. Very briefly, Madam Chair.

Mr. Isenberg, I was a little disturbed to hear you say you did not want to get lost in the issue of governance. But then I heard you say at the end of the process, so I am going to hold you to that second part of your statement.

Mr. ISENBERG. Ms. Wolk, all of us on the task force sat there and we met at our first couple of meetings. We read the Governor's Executive Order and the charging document, and we said well for God's sake, all these people have been fighting for 150 years on exactly the same kinds of things. Ecosystem and environmental protection is the newest issue. How are we going to decide it? Let us go talk about what a governance structure should look like. Everybody was just about to go run off there to the exclusion of the stuff we are supposed to do, which is develop a vision of the Delta by the end of this year and a strategic plan to implement it by the end of '08. It is part of it, but I do not want to get lost there first. It is too easy, too attractive and too conventional.

Ms. WOLK. Interesting, and I would say the most difficult. We always tend to——

Mr. ISENBERG. In many ways, the most difficult.

Ms. WOLK.—work toward the most difficult choices in this area.

Mr. ISENBERG. Yes.

Ms. WOLK. But briefly I am glad you raised the issue of land use control. We have been struggling with that in the legislature. The State General Fund is entirely responsible for flood protection and losses. But the local communities, as you know, guard jealously and constitutionally their ability to plan and locate houses where they choose.

One of the opportunities we do have, Mr. Isenberg, I would like to comment on this is the fact that the voters did pass bonds, $5 billion of which—close to 4 of that will be focused on the Delta. That gives us an opportunity to set priorities and not do business as usual and make good policy change. What kinds of policy change do you think should accompany this kind of money——

Mr. ISENBERG. Specifically on flood control issues?

Ms. WOLK. Yes.

Mr. ISENBERG. One of the members of our task force, a very smart engineer named Ray Seed who teaches at Berkeley and was involved in the post-Katrina engineers review of their flood safety. His Dad is a giant name in the field, and he was talking to us about catastrophic failure, the threat of it, flood control and all of that and the question of how can people live in the middle of land

that is 20 to 25 feet below sea level, particularly in Sacramento, parts of Stockton. He was saying we'll do this, do that. I said come on, Ray, just explain to me. Think of some illustrations of what you could do that would convince normal people that they have a risk and they must pay attention to the risk. To my astonishment he says "Mmm, how about this? Every house built in the flood plain has to be at least two stories tall?"

Ms. WOLK. Yes.

Mr. ISENBERG. Well, that is not the conventional thing you would think. You know, we look for multibillion dollar programs and land use regulations. I said, "Oh, that is kind of interesting and has a trap door so you can get to the roof, right?" "Right."

Ms. WOLK. And a boat.

Mr. ISENBERG. And then I said "Well, what else?" And he came up with one of the most interesting ideas around. He said "Everybody who lives in a floodplain has to own a boat." You know, there is something remarkably intriguing about trying to think of a public policy problem and societal awareness in a way that is simply not another gigantic multibillion dollar spending program with impenetrable acronyms and details.

And the conventional thing is the warning in your title document has to be 20 point type that you live in a flood zone, you may die, you know it is kind of like all of that.

There is something about thinking of this to me, yes, I think you ought to start in the state legislature imposing strings, terms, conditions, policy terms on the spending of money. I think that is something that is legitimate for Congress to consider, too. Particularly to guarantee that flood control money is not the horn of the cornucopia endlessly rolling out from governmental agencies to reward imprudence. That seems to me to make no sense.

What those terms are, what the conditions are, what the restrictions are I do not know. But it ought to be done. The State is in a gigantic mess because the State is legally obligated now for the flood damage, even if the local entities did not do a good job.

Ms. WOLK. That is correct. That cost us a half a billion dollars right out of the general fund last year.

Mr. ISENBERG. Yes, it did.

Ms. WOLK. Yes. For a relatively small, though certainly not small to the people involved or the property owners, amount of damage.

Mr. ISENBERG. Yes. Yes.

Ms. WOLK. Thank you, Madam Chair.

Mrs. NAPOLITANO. Thank you, Members. With that, we will suggest that any other questions be submitted for the record, Members.

And panel, thank you very much.

Mr. Isenberg, just this little last footnote on the flood plain issue.

Mr. ISENBERG. Yes, ma'am.

Mrs. NAPOLITANO. The concern I have on a personal level is that the Army Corps of Engineers may not be allowing for the insurance companies to be able to cover those individuals. So they may not have insurance to get any recovery should anything happen.

Mr. ISENBERG. I do not want to prejudge the testimony to come, but one of the great gains for all who live in a floodplain is that there is a magic 100-year flood protection that sounds so long that,

you know, I will be dead by the time of the flood comes. The fact of the matter is——

Mrs. NAPOLITANO. You may be in the 99th year.

Mr. ISENBERG. Look, we have people who live in national forests that are subject to fires. We have people in Southern California who build houses on hills that get mud slides and burn up, too. I mean, that is just the way human beings seem to be. The question is can you temper the impropriety of the judgment and get some semi-rational activity out of this? And it is important for the Delta particularly on flood control because we all know that if there are more opportunities for flood plains, we get slightly better water quality and we help and assist, whether it is environmental protection or the quality of water being exported, being served by that approach.

Anyway, thank you, Madam Chair.

Mrs. NAPOLITANO. Thank you panel. You are now dismissed. I appreciated all your testimony.

We will call forward the next panel. Mr. Steve Thompson, Manager, U.S. Fish and Wildlife Service, California and Nevada Operation in Sacramento accompanied by John Davis, Deputy Regional Director, Mid-Pacific Region Office of the Bureau of Reclamation. Mr. L. Ryan Broddrick, Director, California Department of Fish and Game, Sacramento accompanied by Gerald Johns, Deputy Director, California Department of Water Resources and Dr. Peter Moyle, Associate Director, Department of Wildlife, Fish, and Conservation Biology and Center for Watershed Sciences at UC Davis, Davis, California.

Welcome. Gentlemen take your seats and we will begin the next round of testimony.

We have taken an hour and a half in the first panel. I hope to be able to move this a little more expeditiously because we still have two more panels.

As we begin, and before I move forward, I would like to thank the three individuals in the back of the room who are holding up signs for being very unobtrusive, and thankfully you are here, you are part of this and welcome. I appreciate that you're not distracting. You are really welcome to this hearing.

Now, Mr. Thompson, I would start with you. I have many questions. I probably will have to submit some of them in writing simply because my list is too long. Oh, I'm sorry. Yes. We start with testimony.

And Mr. Thompson, you are on, please.

STATEMENT OF STEVE THOMPSON, MANAGER, CALIFORNIA AND NEVADA OPERATION OFFICE, U.S. FISH AND WILDLIFE SERVICE, SACRAMENTO, ACCOMPANIED BY JOHN DAVIS, DEPUTY REGIONAL DIRECTOR, MID-PACIFIC REGION OFFICE, BUREAU OF RECLAMATION, AND RON MILLIGAN, BUREAU OF RECLAMATION

Mr. THOMPSON. OK. Thank you.

Good morning, Madam Chair and Members of the Subcommittee. My name is Steve Thompson and I am the Manager for the U.S. Fish and Wildlife Service for the California, Nevada and the Klamath Falls area in both Oregon and California.

Accompanying me today are John Davis and Ron Milligan, both from the Bureau of Reclamation. And they're with the Central Valley Operations Office.

I have submitted my written testimony for the record. I am going to briefly summarize those comments, so we can get back on time here.

Delta pelagic species or the open water species in whole are in decline. Not just Delta smelt. Smelt are indicators of overall reduced health of the Delta. While export pumping is often cited as the reason for the decline of the species, the research and what we have heard earlier today of scientists strongly suggest that there are a number of factors. Those factors including nonnative invasive species such as invertebrates, plants and other fish, contaminants and changes in the food supply.

Because it is a listed species, the Delta smelt have been the focus of the U.S. Fish and Wildlife Service. However, I must remind everyone that single species management of the Delta is not a viable long-term strategy. Any long-term solution must take into account both the upland and the wetland habitat.

The second point in the testimony is that the adaptive management process that both the State and the Federal Government have put in place over the last several years is working, has worked and has helped us handle the challenges of the last two months as they were intended to do.

Using scientific information the Service works closely with our partners and agencies to make real time management decisions consistent with our adaptive management approach to water operations and for the benefit of stakeholders and for wildlife.

The third point is recovery of the Delta smelt and the improving of the overall health of the Delta continues to be a high priority for the U.S. Fish and Wildlife Service. We have formed a recovery team to update the 1996 Delta Native Fish Recovery Plan. We are going to include the new scientific information that is a result of the extensive studies now underway and other new information.

We are updating both the recovery criteria and implementation strategies for covered species. This plan will help guide future recovery actions and will also, hopefully, ameliorate the downward trend for Delta smelt. Our current schedule calls for the completion of the revised recovery plan the summer of 2008.

I am also encouraged by the growing number of people who are discussing new ways of meeting California water and wildlife needs other than the current through Delta transportation system.

In addition, the Bay-Delta Conservation Plan, the Delta Vision as Phil was talking about and other conservation strategies hold tremendous promise for the future.

Madam Chair, that concludes my oral statement, and I am happy to answer any questions that you or the other Subcommittee Members might have.

[The prepared statement of Mr. Thompson follows:]

Statement of Steve Thompson, Manager, California-Nevada Operations Office, Fish and Wildlife Service, U.S. Department of the Interior

Good Morning Madam Chair and Members of the Subcommittee. My name is Steve Thompson, and I am the Manager of the California-Nevada Operations Office of the U.S. Fish and Wildlife Service. I am pleased to be here today on behalf of

the Department of the Interior to discuss the current health of the Upper San Francisco Bay-Delta ecosystem and its native fishes, and how the Service is responding to declines in the Delta smelt, a pelagic, or open water, fish that is a key indicator of the health of the Delta ecosystem.

I will focus my testimony on three areas—first, an overview of the status of the Delta and its species; second, a description of how the Service and its partner agencies are working together to meet the estuary's scientific, resource, and managerial needs; and finally, the extent of challenges the Service faces in restoring the health of this ecosystem.

Status of the Delta and Delta Species

The Delta is California's major collection point for water, serving two-thirds of our State's population and providing irrigation water for millions of acres of farm land. The region supports wetland and riparian habitats, as well as numerous fish and wildlife species. However, these wetland habitats, as well as the hydrology of the Delta itself, have been greatly altered by over 150 years of settlement and development. In recent years, dramatic and unexpected population declines have occurred in the delta smelt and several other pelagic fish, including juvenile striped bass and longfin smelt. Compounding the problem is a decline in the minute aquatic organisms, such as zooplankton and copepods, which make up much of the food supply for these small fish.

The delta smelt is one of several pelagic fish species in decline in the Delta. The species was listed as threatened under the Endangered Species Act (ESA) in 1993. The delta smelt is a key indicator of the Delta ecosystem's health, and the Service believes its current decline is an indicator that the Delta's health is in crisis. The environmental and physical conditions of the Delta are extremely complex and not fully understood.

The Service is actively involved in efforts to identify environmental risks and possible corrective actions to recover the delta smelt. Although the effects of water project operations may result in adverse impacts to delta smelt, it is apparent that other factors may play a role in limiting the potential for recovery, including competition and predation from exotic aquatic invasive species, contaminants, changes in habitat quality and availability, and changes in food supply. We are also working to better understand the changing climate and to predict and adapt to its effects on the natural environment. The only thing we know with certainty is that there are no simple solutions to the problems facing the Delta.

Indices from surveys conducted since 2000 demonstrate a downward trend for delta smelt. The indices are the products of four different sampling surveys conducted in the Delta in different seasons of the water year. Each of these surveys indicates a pattern of decline in delta smelt over the past several decades. However, it is important to remember that the surveys provide only snapshots from similar vantage points over time. Although they provide a good trend analysis, the surveys generate an entirely different type of data from that developed from the continuous monitoring done at the major pumping plants.

The most recent data from the spring survey of juvenile delta smelt that ended on June 9, 2007, found only 37 juvenile delta smelt (20 mm or greater in length). This recent population figure is far below the 884 found in the 2006 survey conducted during the same season, and much fewer than the next worst year of 2002 when 455 juvenile smelt had been identified through the same period. The Service is very concerned about the data and, although we do not completely understand the reasons for the decline, we are working closely with our partners to understand what the data means for the delta smelt and we are working to reverse these declines.

How the Regulatory Process is Working

In response to these declines, the Pelagic Organism Decline (POD) work team was formed in 2005 to conduct focused and in-depth research to investigate causes of the unexpected decline in pelagic organisms. This team brought the best scientific expertise together to work on this problem, and it is generating a tremendous amount of new and potentially useful information. However, it is also essential to recognize that the POD work team does not make either decisions or recommendations. Instead, it provides scientific information that informs a special working group, discussed in detail below, which makes the decisions.

An adaptive management approach is used to rapidly assess new information and apply measures intended to address the decline. Created pursuant to the Service's 1995 biological opinion on operations of the federal and state water projects, the Delta Smelt Working Group analyzes the most current data available on delta smelt and physical conditions in the Delta and provides real-time recommendations to the

Service regarding modifications of project operations. The working group was specifically set up to review all available information and advise the Service on implementation of actions that can be taken to minimize effects on the species of pumping water out of the Delta. The working group uses information from many sources, including the California Resources Agency's 2006 Pelagic Fish Action Plan, which describes a suite of possible actions intended to improve habitat and minimize entrainment, or the drawing of fish into the pump flow. This suite of possible actions includes project modifications to better protect adult delta smelt in winter before spawning as well as spring modifications to better protect juveniles.

The Service, and others, assisted the California Departments of Water Resources and Fish and Game in preparing the 2005 Delta Smelt Action Plan which specifically addresses actions that have been or could be taken by resource agencies to further research needs and reduce population declines, including restoration projects for the Delta, Suisun Marsh, and San Pablo Bay that are intended to improve habitat conditions for the delta smelt and other State, federally-listed, and candidate species.

Information from the working group is reviewed by the Water Operations Management Team (WOMT), which is comprised of management level representatives from the Service, the Bureau of Reclamation, the National Marine Fisheries Service, the California Department of Water Resources, and the California Department of Fish and Game. This team has several adaptive water management tools that can be used to help protect delta smelt including, but not limited to, water available through sections (b)(2) and (b)(3) of the Central Valley Project Improvement Act and the Environmental Water Account. WOMT's responsibility also involves balancing habitat needs for multiple species, including other listed species. WOMT is careful to consider the effect of water management operations on these species so that actions taken to benefit delta smelt in the spring/summer do not result in unintended adverse effects later in the year.

Under the current adaptive management process for water project operations, decisions regarding operation of the pumps in the Delta must consider many factors, including public safety, water supply reliability, and cost, as well as fish health and status requirements. The first step is data collection, including the continued collection of hydrologic data by the California Department of Water Resources, the Bureau of Reclamation, and the U.S. Geological Survey. The POD work team also provides input to the water operations decision-making process through regular updates. Using this data, the working group can recommend a change in Project operations, which is then forwarded to the WOMT.

The agencies also inform and advise stakeholders who may be affected when the agencies make a particularly challenging decision about project operations. The WOMT considers recommendations and seeks consensus on potential actions, and may adopt or modify a recommendation and direct that the Environmental Water Account and water available under the Central Valley Project Improvement Act be used to implement a reduction in the export of water. For particularly controversial recommendations, State and federal agency leaders also may engage in the decision-making process. Decisions regarding changes to Project operations often must be made quickly if they are to be effective.

The Bureau of Reclamation and California Department of Water Resources then implement the reduction in water through the pumps. Implementation can occur within three hours of a decision, if necessary. If the WOMT does not fully implement the working group recommendations, the WOMT must document the rationale for its decision; it must also notify the Service if it is not fully implementing the working group's recommendations.

This process, developed over time, is an effective method of collecting information, analyzing that information, and making rapid decisions about how to help the delta smelt under different conditions. The recent management of flows and export facilities to minimize impacts on delta smelt has been collaborative and effective. The collaborative process among the federal and State agencies is working as intended. However, there are still questions and concerns about the long-term impacts to the delta smelt.

Addressing the Long-Term Challenges Facing the Ecosystem

The Pelagic Organism Decline work team, discussed above, is generating a significant amount of new information, and the policy and regulatory entities ultimately will use that information to make decisions about what actions should be taken to protect the species.

Recently, the Service formed a Recovery Team to update the 1996 Delta Native Fishes Recovery Plan to include new scientific information that is the result of the extensive studies now underway and other new information developed since the ap-

proval of the current recovery plan in 1996. The team is updating both the recovery criteria and implementation strategies for the covered species. This plan will help guide future recovery actions that will hopefully ameliorate the downward trend for delta smelt. The current schedule calls for completion of the revised Recovery Plan in summer of 2008.

In addition, the Service is participating in the development of the Bay-Delta Conservation Plan, an effort by the major Delta water users that began in 2006. Completion of the plan is scheduled for late 2009. The plan is based on the concept of an ESA Habitat Conservation Plan and is intended to meet the requirements of the ESA, the California Endangered Species Act, and, potentially, the California Natural Community Conservation Planning Act. The plan should provide certainty for water users, who will, in exchange, commit to a specific set of mitigation activities for the benefit of the delta smelt and other species.

Further, the Service is revising the existing biological opinion for Delta operations. In May 2007 the Federal District Court for the Eastern District of California found the biological opinion's "no jeopardy" finding arbitrary, capricious, and contrary to law for several reasons, among them a failure to adequately consider impacts to critical habitat and a failure, when setting take limits, to consider take in the context of most recent overall species abundance and jeopardy. However, the 2005 biological opinion will remain in effect until a solution can be reached in the remedies phase of the trial. A hearing on this phase is scheduled for Aug. 21, 2007. In the meantime, the Service reinitiated consultation on federal and state water projects under the 2005 biological opinion last year and is proceeding with that effort, even while it awaits further direction from the court.

The Service is also continuing to develop habitat that will help the Delta species, and we are in the early stages of investigating other possible helpful activities. Finally, we continue to actively participate in the processes begun under the CALFED Bay-Delta Program.

Conclusion

Recovery of the delta smelt continues to be a high priority for the Service. Our knowledge of this species and its needs continues to increase. The Service is working closely with partner agencies to make real-time management decisions consistent with our adaptive management approach to water operations, and we are updating and implementing recovery strategies as quickly as the science becomes available.

Madam Chair, this concludes my remarks. Thank you for the opportunity to appear before you today, and I will be happy to answer any questions that you or the Members of the Subcommittee may have on this important subject.

Mrs. NAPOLITANO. Thank you, sir.

Mr. Broddrick?

STATEMENT OF RYAN BRODDRICK, DIRECTOR, CALIFORNIA DEPARTMENT OF FISH AND GAME, SACRAMENTO, ACCOMPANIED BY GERALD JOHNS, DEPUTY DIRECTOR, CALIFORNIA DEPARTMENT OF WATER RESOURCES

Mr. BRODDRICK. Madam Chair and Members, I am Ryan Broddrick, Director of the Department of Fish and Game public trust responsibilities for both inland terrestrial and 1100 miles of coastline. The responsibilities of the Department include threatened and endangered species, management of endangered species and general wildlife in this State.

I have been involved in the water management issues since 1995. Had the pleasure of being with many of your members in the discussion, including Post-Bay/Delta Accord, August 2000 record decision on CALFED. I was subsequently appointed Director of Department of Fish and Game.

I think it is important to highlight, there is great testimony that is available here. I submitted seven pages and six charts and tables that kind of give you a reflection of the decline. I think a key to note is that we saw and had agreement that there is a step decline

in Delta smelt. A step decline is just a statistical analysis, but that statistical decline that was agreed to in 2004 and brought to the attention of the Bay-Delta Authority and the Klamath agencies resulted in unprecedented investment in the pelagic organism decline.

Pelagic organism decline for the first time looked at the general ecological health of the Delta, not just individual fish species. Instead of counting fish with respect to the relative history over 40 years, we started looking at and correlating and synthesizing what was happening with the entire water column.

As Mr. Thompson identified, there are more stressors in the ecosystem than the pumps. Having said that, this year in particular showed lowest record declines in populations both in our survey work, understanding that our survey work is a trend over time so it is relative, but we took the information and, to the unprecedented notice of the Department of Water Resources as well as 300 Delta ag diverters, wrote a letter that we were concerned and to suspend and reduce pumping and retainment wherever possible. This was not pointing a gun at individuals. This was an issue of us stating that at this point given the low numbers in Delta smelt that each of those Delta smelt we believed, instead of looking at it from a population dynamic, were important to preserve and conserve as a repository for stock recruitment next year. So you had a 12 day secession of State Water Project pumping which followed what is referred to as the ban period where there was dramatic but significant reductions in pumping south.

So when you take those two periods together, I think we have taken fairly significant, I would not say unprecedented, but nearly unprecedented reductions in pumping.

I failed to introduce Deputy Director Gerry Johns to my right, who is with the Department of Water Resources who sets on the Water Operations Management team.

But the role between U.S. Fish and Wildlife Service, Fish and Game, the Bureau of Reclamation, NOAA and DWR is done on a real time basis given the information we do have. Try to optimize the protection of the resource while considering the demands for deliveries. This summer has been difficult.

From a historical perspective, we have been blessed since the Bay-Delta Accords. We have come close to being pushed against the wall on supply. We have been close to being pushed against the wall on the endangered species conflict and, literally, in every case Mother Nature bailed out the governance. So we have made some tough decisions and we have been able to defer some tough decisions.

I think it is important, especially for Madam Chair, the Federal Government, and Congressman Miller to know that the CVPIA and the investments in integrated water management and the development of groundwater banking and the fish screening are all critical. We have done some exceptional things in California. We have put, just to the Wildlife Conservation Board that is set in, in over $1.5 billion in the restoration of fish and wildlife resources.

So I look forward to your questions. I look forward to the challenge of reconciling the needs and demand. I think it can be done. I think California has done an exceptional job in investing with

bond monies, especially over the last ten years. I look forward to Federal participation to complete some of the tasks that we identified as planning document but are not yet implemented.

Thank you for your time.

[The prepared statement of Mr. Broddrick follows:]

Statement of Ryan Broddrick, Director, California Department of Fish and Game

I appreciate the opportunity to provide input to this Subcommittee on the important and urgent matter of declining fishery resources in the San Francisco Bay/San Joaquin Delta Estuary. Of particular concern to us is the recent serious and unexpected decline (approximately 90%) in young Delta smelt produced this season. As alarming as the reduced numbers are, this decline is part of a more generally observed decline in other important fish and aquatic resources in the estuary. Anadromous fish (steelhead and salmon), sport fish (striped bass), other native fishes, and some important fish food organisms (invertebrates) of the Delta are in serious trouble and have been receiving our attention in planning and regulatory activities. The California Department of Fish and Game is actively involved in efforts to determine causes, implement response measures within our authorities, and develop a long-term strategy for Delta sustainability. The Federal Government's involvement is crucial to developing a comprehensive and long-term solution to fix the "broken Delta".

There are many causes for the fish and invertebrate declines and our understanding of these causes is limited. Our cooperative efforts to determine the causes of the decline have pointed towards invasive species, toxics, predation and water diversions as having primary roles in the declining health of the Delta. We continue to monitor, evaluate and explore these issues in order to make further scientifically justified determinations as to the role of each factor and how issues may be addressed in order to ensure future Delta health.

Governor Schwarzenegger has initiated a comprehensive Delta Vision effort to rethink what the Delta should look like in the future. A Blue Ribbon task force has begun meetings designed to lead towards recommendations for actions by the legislature and Governor. In addition, many state and federal agencies, along with a growing number of environmental groups, signed a formal Planning Agreement in September 2006 and are developing the Bay Delta Conservation Plan (BDCP) for at-risk fish species under the provisions of the State Natural Community Conservation Planning Act (NCCPA) and Section 10 of the federal Endangered Species Act. These efforts will provide a framework, plan, and commitment for future action.

Background - The Pelagic Organism Decline

The Interagency Ecological Program (IEP), a multi-agency state and federal group, has monitored and studied biological and hydrological resources in the Estuary for almost 40 years. The data set generated by the IEP is one of the most complete data sets documenting relationships between fish and aquatic resources and water development projects in the world. The information developed during this time has provided the foundation for our understanding of the ecological implications of water resources management in this system. In early 2005, scientists from our IEP first observed serious declines in Delta smelt and certain other pelagic fish species (see Figure 1). In response, directors of the state and federal water and fish agencies directed approximately $2.5 million for establishment of a Pelagic Organism Decline (POD) team to investigate the reasons for the decline. The POD team developed a study plan that identified three likely hypotheses responsible for the observed declines and embarked upon an aggressive and comprehensive effort to identify and address all likely causes for this decline. The three most likely stressors, possibly acting in concert, were identified as water diversions, invasive species/food chain changes, and toxics.

One year after the POD studies began, the team presented their first Synthesis Report and developed two scenarios among other possible causes: winter exports and bad environmental conditions in Suisun Bay. Data from the State and Federal water project facilities showed that water exports had increased during the winter months of November-March during the years of the pelagic organism decline (See Figure 2). Salvage data also showed that increased numbers of those fish showing the decline (Delta smelt, threadfin shad, striped bass and longfin smelt—see Figures 3 and 4) had also been taken in increasing numbers during that time. The second most likely hypothesis called the "Bad Suisun Bay Hypothesis", suggested that conditions in the Suisun Bay area, a prime nursery area for young fish, had changed

in some way to reduce its capability to sustain fish populations. The report suggested that some undefined combination of food production, invertebrate grazing rates, salinity regime changes, and introduced exotic species may be responsible for the declines. At that time toxics were not implicated as a major influence in the observed declines.

During the end of the first year of the POD investigations, researchers were beginning to develop information that could be helpful in understanding the declines and also for managing conditions to potentially reduce impacts. In the fall of 2006, the CALFED Program hosted the Science Conference and two significant findings were presented. First, a University of California researcher (Dr. Bill Bennett) suggested that the delta smelt females that reproduced early in the spawning season seemed to be most important in contributing to the next generation of smelt. This became known as the "Big Momma Hypothesis". This suggested that more attention needed to be paid to water management earlier in the year than had been done heretofore. The second finding, by a USGS researcher (Dr. Pete Smith) suggested that there was a significant relationship between flows moving UPSTREAM toward the state and federal pumping plants in Old and Middle Rivers and fish caught later in the trawls surveys. In other words when flows upstream were greater, the negative impacts on smelt populations were greater. Both of these findings would play a significant role in how fish and water agencies would manage the water projects in 2007.

During the 2006 water year, conditions were better and greater outflows moved the smelt further downstream in the estuary and away from the influence of the pumps. The abundance indices reflected a positive response and the numbers of Delta smelt increased slightly from the previous year. Things were looking slightly better for smelt.

2007 Activities

Water Diversions-Armed with new scientific findings, the fishery and water management agencies began to manage the water projects to facilitate protection of delta smelt and other aquatic resources in the estuary. The life cycle of Delta smelt (Figure5) was constantly considered in this process. Clearly water diversions from the Delta can cause direct and indirect mortality of Delta smelt and other aquatic organisms. For this reason, the Delta diversions of the State Water Project (SWP) and the Central Valley Project (CVP) are some of the most carefully regulated and monitored water diversions anywhere. Early in January 2007, a team of agency managers (Water Operations Management Team - WOMT) began operation of the state and federal pumping plants by trying to reduce upstream flows in Old and Middle rivers so that the important early reproducing smelt ("Big Mommas") would not be drawn upstream toward the pumps and potentially removed from the estuary. Pumping rates were reduced using assets from the Environmental Water Account (EWA). By late May, the WOMT used over 300 thousand acre feet of Environmental Water Account water to implement fish protection actions, primarily protecting the spawning females during January, February and March. During winter and early spring the projects reduced net upstream flow in Old and Middle Rivers and no delta smelt were observed at the State Water Project and only a few at the Federal facility. Conditions looked good and the new management tools (reducing Old and Middle river flows to protect spawning females) seemed to be providing the desired impact avoidance. Field surveys showed the spawning smelt still securely distributed in Cache Slough and the Sacramento Ship Channel—out of the influence of the pumping plants.

On about May 15, field surveys (the 20 mm survey) carried out to monitor the relative abundance of juvenile smelt produced in the system produced alarming results. Numbers of young smelt were about 90 % below our previous year's estimates (See Figure 6). More alarming was the fact that the young smelt were located in an area influenced by the pumps—the lower San Joaquin River! The WOMT immediately took action and reduced pumping significantly at the pumping plants. Diversions from the SWP facilities were reduced to 350 cubic feet per second (cfs), a 90 percent reduction from customary seasonal pumping levels, as a precaution. The federal CVP reduced pumping rates to 850 cfs. Additionally, WOMT ordered the Head of Old River Barrier culverts opened and maintained flows in the Stanislaus River so that flows would remain higher in the San Joaquin River to help keep the young smelt from the pumps.

When greater smelt take occurred at the SWP intake facility in late May, DWR and the DFG jointly announced further curtailment of SWP Delta diversions and asked for voluntary curtailments by other Delta diverters. DWR stopped SWP Delta diversions entirely on May 31, 2007 for 12 days with future protective actions continuing to be guided by the best science and adaptive management. Other water di-

versions from the Delta are not monitored or regulated as carefully. Nevertheless, on June 1, 2007, DFG wrote to over 300 water diverters in the Delta asking them to "voluntarily cease or substantially reduce your diversions from the south delta channels..." DFG also restricted all non-essential scientific studies and fish sampling/monitoring that may incidentally take Delta smelt. Concurrently, the CVP reduced Delta diversions to the operation of a single pump, drawing about 850 cfs. After taking no smelt for two weeks, the CVP increased pumping to 2500 cfs on June 13, 2007. Nine hours later several smelt were taken at the Federal pumps, a clear indication that young smelt were still in the south delta area and caution regarding increased pumping should be used.

On June 17, 2007, the SWP and CVP increased pumping but still far below seasonal normal rates. Agency Directors became directly involved and daily operational decisions were made to reduce take of smelt at the facilities. As smelt grew and began to move downstream out of the influence of the pumps and temperatures approached the lethal limits of young smelt, pumping rates were allowed to increase to meet demands for water use in the state. As of June 27 some young smelt continued to be taken at the SWP.

Agency biologists studying the population dynamics of smelt now believe that the abundance of smelt in the estuary has reached such a low level that numbers are now being affected by the "stock recruitment relationship". In other words, the most important factor affecting smelt numbers is the number of juveniles produced by the adult females. During other times when populations are higher, this relationship is not as significant and other factors contribute to the regulation of abundance (these are discussed below). Therefore, it is DFG's position that actions must be taken to protect as many individual smelt as can be through manipulation of the water projects. Each reproducing organism is important to the survival of the species.

Invasive Species-The San Francisco Estuary has been called the most invaded estuary on earth. Among the hundreds of introduced species, many cause competition, predation, or habitat modification that are detrimental to Delta smelt and other pelagic fishes. Collectively all of these species are profoundly affecting the ecological functioning of the estuary. For example, the Asian clam Corbula, which became established in Suisun Bay in the 1980s is a filter feeder so effective and numerous that it can filter the entire volume of Suisun Bay in less than a day. This has had a devastating effect on the primary production of Suisun Bay. Further upstream the freshwater Asiatic clam, Corbicula, can have a similar effect. In the late 1990s a new zooplankton Limnoithona invaded the estuary. This new zooplankton may not be a good food source for many important pelagic fish like Delta smelt and has replaced the smelt's preferred food source. Limnoithona is now the most abundant zooplankton in the estuary. This shift at the base of the food web may prove to be a major factor affecting Delta smelt. The toxic blue green algae Microcystis has increased in abundance in the past several years in the interior Delta causing concerns with both fish and human toxicity although none has been documented in this system. Other introduced species such as striped bass and black bass prey upon smelt directly. The Brazilian water weed Egeria, has also proliferated in recent years. This aquatic plant not only clogs water ways for boating but slows water velocity and allows suspended sediment to settle out. It is hypothesized that increased water clarity may reduce Delta smelt feeding success and increase predation upon them. Although eradication is impossible, DWR and the Department of Boating and Waterways are partnering to implement a control program for Egeria budgeted at $3 million per year.

DFG and DWR are working aggressively to prevent new invasions. The two agencies responded swiftly when the quagga mussel Dreissena was discovered in Lake Mead and the Colorado River. If this prolific filter feeder were to invade the estuary it would likely cause further alteration in the food web. Much more effort needs to be exerted in order to deal with the problem of introduced species.

Toxics-Since 2005, scientists have been conducting toxicity screening of the waters in the Delta and Suisun Bay as part of the IEP Pelagic Organism Decline (POD) studies. Studies in 2005 and 2006 focused on the summer months when juvenile smelt are present in the Delta. To better characterize toxicity during the smelt spawning period, bi-weekly sampling and aquatic toxicity testing was initiated in January 2007. Preliminary evidence indicates potential toxicity in the Delta this winter and spring. The most troubling fact about these detections is that they occurred in the spawning grounds for Delta smelt this year when both adults and their young were present. Even though the number of adult Delta smelt this year was a little larger than last, the number of young smelt collected this year was about 90 percent less than last year (see above discussion). Although there is no evidence of direct toxicity to the Delta smelt, Delta toxicity could affect smelt directly or affect food availability for the species.

Researchers have initiated toxicity testing using cultured Delta smelt and are collecting samples upstream of the toxic sites in an attempt to identify the source and cause of the toxicity. The State Water Resources Control Board (State Water Board) and the Central Valley Regional Water Quality Control Board are actively evaluating all of this year's information to identify any necessary actions to prevent this type of toxic effect on endangered species from happening again next year.

Other new research provides an anecdotal suggestion that episodic toxicity could play a role in smelt survival. A study tracking tagged salmon in the south Delta collected apparent evidence in May of extensive salmon smolt mortality in a single area. This kind of event, if proven to be related to toxics, has the potential to seriously affect a species such as the Delta smelt and warrants further investigation.

The State Water Board held a workshop on June 19, 2007 to receive recommendations, and information to support these recommendations, on immediate, short term actions it should consider to slow or stop the decline of smelt and to improve fishery resources. The State Water Board is looking for information on both water quality and flow-related actions. Any increased involvement on the part of the federal government in these efforts would be welcome.

Current Restoration Efforts

In addition to near-real time management of the Estuary through processes discussed above, DFG is also involved in larger scale ecosystem planning to enhance the estuary. Early implementation of the Ecosystem Restoration Program (ERP) began three years prior to the signing of the CALFED ROD in August 2000 in recognition that ecological systems take time to show change. In the first nine years of implementation, ERP has made significant progress in improving the natural system. ERP has awarded more than $615 million to 493 projects. To date, 276 projects or about 56 percent have been completed. Grant recipients reported approximately $285 million in matching funds, which resulted in a combined total of about $825 million spent on habitat and species associated with the Bay-Delta and its watersheds. Many ERP actions addressed priority Multi-Species Conservation Strategy (MSCS) species listed in the milestones. Restoration planning for the Suisun Marsh through the Suisun Charter process will result in the restoration and protection of 7,000 acres of wetlands in San Pablo Bay and Suisun Marsh, exceeding the Stage 1 target for tidal marsh restoration in San Pablo Bay. Restoration of tidal action to restore brackish marsh ecosystems within the next two years on the Blacklock property and Meins Landing will aid in the recovery of several listed and special status terrestrial and aquatic species. Restoration of tidal action and associated wetlands habitat on the 1,166 acre Dutch Slough Tidal Restoration Project will improve our understanding of ecological processes and how ecosystems function at different spatial scales.

The ERP has funded 82 fish screen projects to reduce mortality of salmonids. The ERP has also implemented channel and floodplain restoration projects to improve spawning and rearing habitat for salmonids including projects on key tributaries to the Sacramento and San Joaquin rivers. Removal of impediments to fish passage on Butte Creek, Clear Creek, and other Sacramento River tributaries has contributed to the rebounding of spring-run and fall run Chinook salmon populations observed in recent years. The Battle Creek Salmon and Steelhead Restoration Project is an exceptional conservation opportunity to reestablish 42 miles of prime and uniquely reliable salmon and steelhead habitat on Battle Creek and its tributaries. Successful implementation of this project will help restore populations of winter-run Chinook salmon, spring run Chinook salmon and steelhead, all of which are in danger or threatened with extinction as defined by the federal Endangered Species Act (FESA). Battle Creek offers this unique restoration opportunity because of its geology, hydrology, habitat suitability for several anadromous species, historical water allocation, and land use compatible with a restored stream environment. Of these qualities, the area's unique hydrology is perhaps the most important Battle Creek feature supporting its restoration potential. The Lower Yuba River Accord EIR/EIS was released for public review on June 26th. The purpose of the Yuba Accord is to resolve instream flow issues associated with the operation of the Yuba River Development Project in a way that protects and enhances lower Yuba River fisheries, maintains local water-supply reliability and protects Sacramento-San Joaquin Delta fisheries. The ERP this year also funded the Narrows 2 bypass project on the Yuba River to protect habitat for the wild salmon and steelhead on the lower Yuba River.

Summary

This brief discussion of stressors, management actions, and organism responses is intended to convey our understanding that the pelagic organism decline, including the recent sharp drop in Delta smelt abundance, is an extremely complex phe-

nomenon. We do not expect that the solution to such a complex problem lies in just one category of action. We will continue to be guided by the best science and adaptive management as our scientists work to understand the situation and our agencies seek solutions to Bay Delta problems both in the near-term and for the future.

Whatever actions we may take, we must include interests of all parties. As you know, there are no independent actions that can be taken in this complex system. Fishery agencies constantly balance needs of various listed species, and important non-listed species. Actions that affect the water projects also can potentially affect other users of water in the State including state and federal wildlife refuges. Before any actions are implemented careful consideration of associated fish and wildlife impacts is needed.

DFG is supportive of the federal government taking actions necessary to protect and restore the pelagic species and in particular the Delta smelt. We will work with you and others to accomplish this important result.

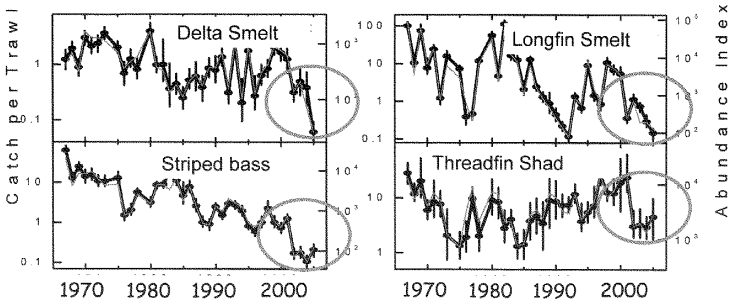


Figure 1. Annual abundance trends of four POD fishes based on Fall Midwater Trawl Survey data. Annual mean catch per trawl (black line) and annual abundance index (red line) are depicted.

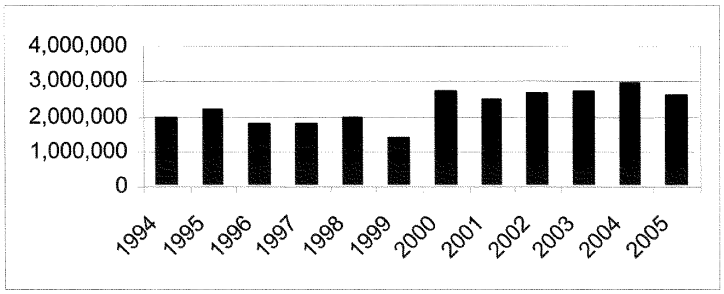


Figure 2. Total combined State Water Project and Central Valley Water Project winter exports (sum November through March) in acre feet plotted on year beginning in January.

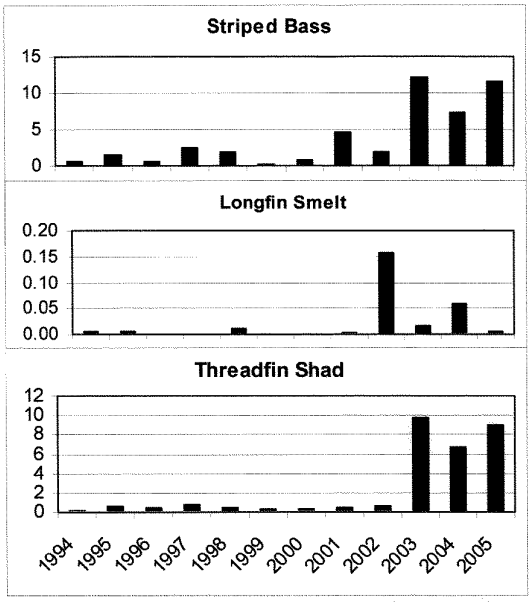


Figure 3. Winter salvage density (#/acre ft pumped) of three POD fishes scaled (divided) by the previous Fall Midwater Trawl abundance indices.

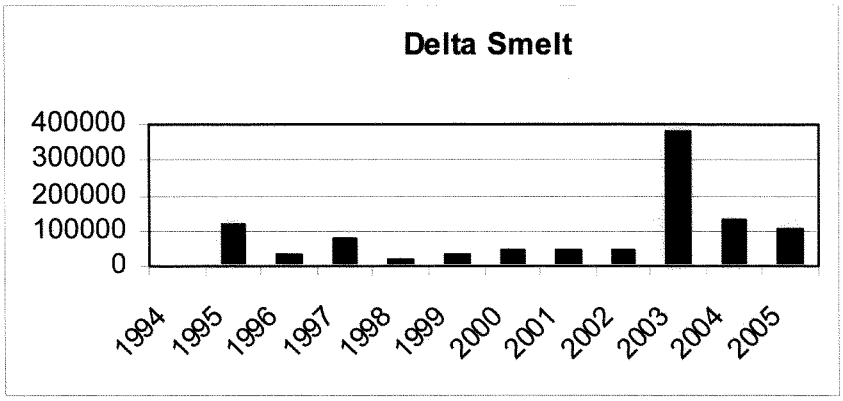


Figure 4. Winter salvage density (#/acre ft pumped) of delta smelt scaled (divided) by the previous Fall Midwater Trawl abundance indices.

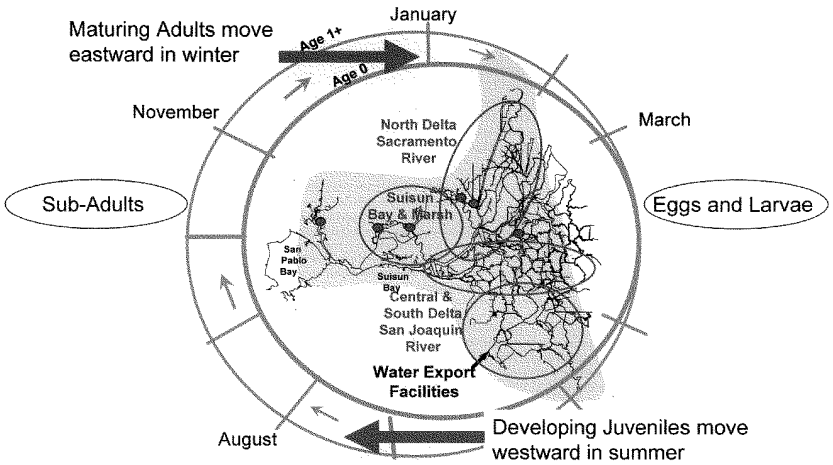
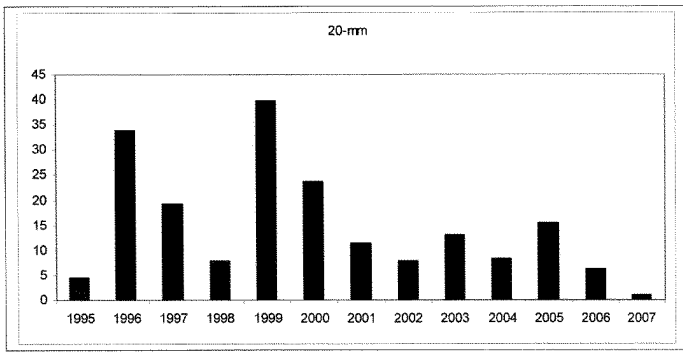


Figure 5. Delta smelt life history and general migration patterns: in winter and spring, maturing smelt move from the river confluence, Suisun Bay and Marsh eastward preparing to spawn, and become more vulnerable to entrainment by south delta export facilities. Subsequent progeny also remain vulnerable until they are able to swim and warm water temperatures drive them westward from the south delta.



Year	Index
1995	4.4
1996	33.9
1997	19.3
1998	7.7
1999	39.7
2000	23.8
2001	11.3
2002	7.7
2003	13.1
2004	8.2
2005	15.5
2006	6.2
2007	1.0

Figure 6. The 20mm survey delta smelt index by year, 1995-2007. Data processing for 2007 is not yet complete; data should be treated as preliminary and subject to revision.

Mrs. NAPOLITANO. Thank you, sir.

Next we have Dr. Peter Moyle

STATEMENT OF DR. PETER MOYLE, ASSOCIATE DIRECTOR, DEPARTMENT OF WILDLIFE, FISH, AND CONSERVATION BIOLOGY, AND CENTER FOR WATERSHED SCIENCES AT UC DAVIS, DAVIS, CALIFORNIA

Dr. MOYLE. Thank you, Madam Chair.

I want to start by emphasizing that the decline of these fishes in the Bay-Delta system is the result in the long term of management focusing and minimizing immediate damage to populations

rather than really trying to take steps to actually improve conditions. Even the idea of minimizing damage, it may have been thrown out the window recently if you look at the fact we are still killing smelt at the pumps as they work today. It suggests that our management structure is not working very well. If present trends continue, we are going to be faced with extinctions of native species, more endangered species listings and the disappearance of important fisheries. Unfortunately in the near future I think these conditions are going to get worse before they get better. Because the estuary, as Mr. Costa pointed out, is faced with catastrophic structural and ecological changes, especially in the Delta and Suisun Marsh.

But what I want to comment on and what my written testimony is mostly about is to emphasize that taking actions to regulate ecological change before the disaster could actually improve conditions in the system for desirable species while being highly compatible with delivering the services the Delta provides, such as water supply.

These comments reflect a study I was part of that came out a few months ago. It's the Envisioning Futures for the Sacramento San Joaquin Delta written by five faculty at the University of California at Davis and Ellen Hammack of the Public Policy Institute of California where we had the advantage of being independent of many funding sources or whatnot, so we could pretty much say what we thought. I think this document has been widely read, in part because of that independence.

We present nine scenarios in that document for a future Delta and Suisun Marsh, five of which we regard as feasible, and I should point out that the five feasible alternatives do not include the status quo, the business as usual. Four of the five protect water supply while allowing some portion of the Delta to remain as habitat for native fish and other desirable organisms. The five options provide suggestions for significantly improving habitat in the Delta and Suisun Marsh provided action is taken before a large scale levee collapse occurs. I think that is important to note.

The options we present are only a tiny fraction of the hundreds of permutations and combinations of actions that could be taken. They are really designed to represent examples of alternatives possible and to provide visualization of the management options.

We have some really good graphs in that report if you are interested.

Rather than get into any of the details of specific options, what I would like to do is just emphasize some of the areas where we really think that you can do specific things that will broadly benefit the system in relative short time periods. That is less than 25 years.

First off, is fixing Suisun Marsh. That is going anyway because of levee collapse. It is right at sea level. There is enormous potential at Suisun Marsh as a refuge for native fishes and other critters.

The Cache Slough region, which is in the northeast Delta, is a region which has tremendous potential to connect to the Yolo Bypass. A lot of its natural drainage patterns are still there. This is an area we think we can restore fairly readily. It is also one of the

most important spawning areas for Delta smelt today. The Yolo Bypass itself, which is this gigantic flood plain that protects Sacramento, is partly in the Delta. About half of it is in the Delta. Changing the operation of the bypass and installing a gate on one of the weirs has a tremendous potential. Having the floodplain bypass in the San Joaquin River in the upper Delta has a lot of interesting possibilities for improving conditions for fish.

Then getting down to the individual Delta islands, managing islands in the Delta, Central Delta for fish and ecological purposes could be done in various ways. These include, of course, taking a lot of the islands out of production and turning them into aquatic systems. That is going to happen. Nature is going to do it to us anyway. We should get ahead of the curve and create islands that actually have beneficial characteristics to the fish in the Delta.

So thank you.

[The prepared statement of Dr. Moyle follows:]

Statement of Peter B. Moyle, Professor of Fish Biology, Center for Watershed Sciences and Department of Wildlife, Fish, and Conservation Biology, University of California, Davis, California

Summary. The San Francisco Estuary supports a diverse fish fauna in which key species are in severe decline. The estuary is faced with catastrophic structural and ecological changes, especially in the Delta and Suisun Marsh, as the result of anticipated levee failure caused by the combination of earthquakes, land subsidence, sea level rise, and increased high outflows events (from climate change). The resulting flooding of Delta islands and Suisun Marsh is predicted to disrupt California's water supply system and, consequently, the state's economy. From a fish perspective, the changes are likely to create conditions in which desirable species can persist at least at present low levels, after a period of possible high mortality created by the initial flooding events. Taking actions to regulate ecological changes in the estuary before the disaster could actually improve conditions for desirable fishes while being highly compatible with delivering services the Delta provides, especially water supply. Specific actions include improving habitat for fish in Suisun Marsh, Cache Slough, the Yolo Bypass, and the San Joaquin River, while creating islands in which flooding can be managed. The key is increasing habitat heterogeneity over present and now-likely future conditions. No matter what actions are taken there will be a high degree of uncertainty as to their ecological benefits but the present situation in estuary represents an unprecedented opportunity to reverse the impacts of over 150 years of negative ecological change.

Introduction

The San Francisco Estuary (SFE) is the largest estuary on the west coast of North America and one of the most altered (Nichols et al. 1986). It is highly urbanized but contains extensively diked agricultural lands and marsh habitats. It is also highly invaded by alien species, especially the aquatic habitats. Not surprisingly, the native species of plants and animals have declined in abundance; several are extinct and others are listed as threatened or endangered under state and federal laws (Herbold et al. 1992). Human caused changes to the SFE are still taking place at an accelerated rate and there are strong indications that major, catastrophic changes to the SFE are imminent (Mount and Twiss 2005; Lund et al. 2007). The changes are likely to be most dramatic in the upper part of the estuary, the Sacramento-San Joaquin Delta (the Delta), where large-scale levee failure can seriously disrupt local, regional, and state economies. A principal concern is disruption of California's water distribution system. Much of the fresh water used by San Joaquin Valley farms and the vast urban areas of southern California originates (directly or indirectly) from the estuary's inflowing rivers. This water is pumped from the Delta by the State Water Project and the federal Central Valley Project. Additional water is removed to supply aqueducts to cities around San Francisco Bay and to water farms in the Delta. Large scale flooding could also eliminate farming in thousands of acres of island land, threaten urban areas, and disrupt railroads, pipelines, and other infrastructure (Lund et al. 2007, available on line at PPIC.org). Likewise, a sudden catastrophic change to the Delta and SFE will affect already declining native species and encourage the further spread of alien species.

A major question being asked by management agencies and regional stakeholders is "how can we prevent large-scale change from taking place in the SFE, especially the Delta?" Answering precursors to this question (mainly, how do we protect endangered fish and fisheries?) was one of the reasons for the establishment of CALFED in 1996, a massive joint state-federal management and research effort (http://calwater.ca.gov/) which has been criticized for not quickly solving the problems of the SFE (Little Hoover Commission 2006). A report produced by the University of California, Davis and the Public Policy Institute of California (Lund et al. 2007) turned the original question on its head, asking instead "How can the Delta be managed to accommodate large-scale change before undesirable changes are forced by catastrophic events?" In this essay, key findings of Lund et al. (2007) are summarized in relation to aquatic organisms, especially fish. I first describe the SFE, provide a brief introduction to the fish fauna, and then discuss the major drivers of change. I then describe what is likely to happen to key fish species if present management trends continue, followed by suggestions for major actions that could be taken to improve the SFE for fishes even in the face of large-scale change.

The San Francisco Estuary

The SFE is the outlet of the Sacramento and San Joaquin Rivers, which in turn drain much of central California. A primary source of the water for the rivers is the Sierra Nevada, which intercept moisture-laden clouds coming off the Pacific Ocean. The estuary has three distinct segments, San Francisco Bay (including San Pablo Bay), Suisun Bay and Marsh, and the Sacramento-San Joaquin Delta (Figure 1). Each segment has a confined outlet through which the tides surge back and forth, creating complex hydrodynamics: the Golden Gate (San Francisco Bay), the Carquinez Straits (Suisun Bay), and the river confluence at Sherman Island (Delta), respectively. These narrows have allowed the three regions to have distinct identities, emphasized by human modifications to them. The Delta is perceived as region where fresh water from the rivers tidally sloshes back and forth in leveed channels, flowing between islands of agricultural fields. The islands are highly subsided (many are 5+ m below sea level), surrounded by 1800 km of fragile levees made of local materials, often peat. Historically, the Delta was a vast marshland that was flooded annually by undammed rivers (Lund et al. 2007).

Suisun Bay, in contrast was, and still is, a large area of open water that is transitional between the fresh waters of the Delta and the salt waters of San Francisco Bay; it is a shallow region of wind-stirred, brackish water, lined with tidal marshes. The largest of these marshes, in fact nearly as large as Suisun Bay itself, is Suisun Marsh. This 30,000+ ha marsh is largely managed today as freshwater marsh, mostly for duck hunting in both private duck clubs and public wildlife areas. The key for maintaining its freshwater character is inflow from the Sacramento River via Montezuma Slough. Montezuma Slough has large tidal gates on its upper end which control salinity in the marsh by allowing fresh water to flow in but prevent the tides from pushing it back out again. Over 360 km of levees separate the marsh islands from the tidal channels, in which water is still seasonally brackish. The channels are highly productive of fish, however, which are a mixture of freshwater and marine species (Matern et al. 2002).

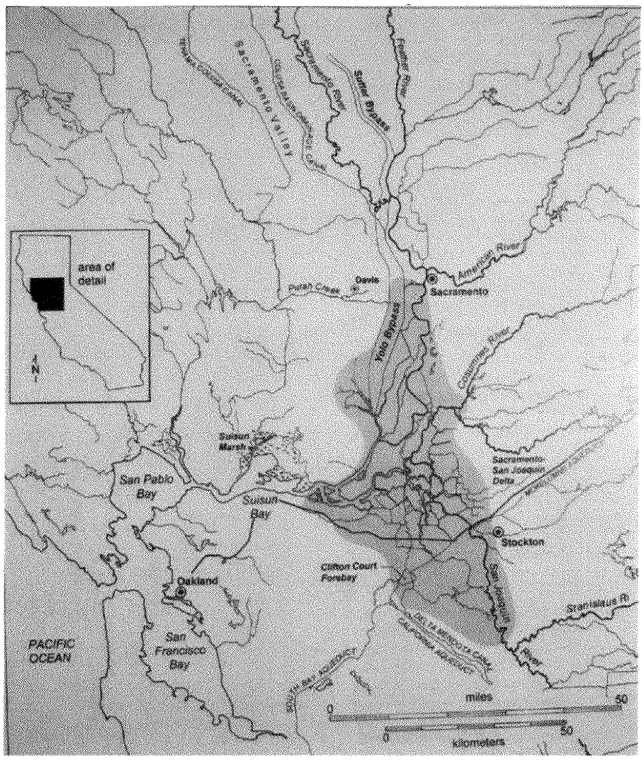


Figure 1. The San Francisco Estuary, showing the extent of the legal Delta and other key features. From Moyle (2002).

The marine species in Suisun Marsh come from San Francisco Bay, which is largely a saltwater system, with variable but high salinities; the actual salinity value depends on location and season. San Francisco Bay is ringed by cities and its fringe marshes are fragments of its original tidal marsh system.

All three parts of the SFE were once more variable in their salinities and river-driven hydrodynamics than they have been for the past 50-60 years (Bay Institute 1998). During wet years, the spring snow-melt from the Sierra Nevada could temporarily make fresh the surface waters of San Francisco Bay, while during late summer of drought years ocean salt could be detected at the upper ends of the Delta (DWR 1993), especially once agriculture diverted large amounts of water. The advent of the federal Central Valley Project and the State Water Project, however, allowed the system to stabilize, so that, for the purposes of policy and public perception, the Delta and Suisun Marsh became permanent freshwater systems, Suisun Bay became a brackish water system, and San Francisco Bay became an exclusively marine system. The two water projects (and other related projects) constructed huge dams on the Sacramento and San Joaquin rivers and all their major tributaries in the 1930s-1960s, with such perverse consequences as increasing the summer flows of the Sacramento River and drying up the San Joaquin River. The dams allowed for the regulation of salinity in the upper SFE. By releasing large quantities of water, especially in the summer, the dam operators could both keep salt water out of the Delta and Suisun Marsh and permit the pumping of the water, from the southern edge of the Delta, for agricultural and urban use.

For further information on the environmental and ecological history of the SFE see Herbold et al. (1992), Hollibaugh (1996), Bay Institute (1998), and Lund et al.. (2007) or see http://www.deltavision.ca.gov. The rest of this essay will focus primarily on the Delta and Suisun Bay and Marsh, because the lowermost part of the SF Estuary, San Francisco Bay, has a whole additional set of problems related to its intense urbanization.

The Fishes

SFE has a high diversity of fishes, representing marine, freshwater, anadromous, and estuarine species, as well as native and alien species (Matern et al. 2002, Moyle 2002). About 75 species, largely marine, are known from SF Bay in recent years, of which only 5 are alien species. In Suisun Marsh and Bay, 53 species are known, a mixture of marine, freshwater, and anadromous (sea-run) species. They represent 28 native species and 25 aliens (Matern et al. 2002). In the Delta, there are about 46 regularly occurring species, a mixture of freshwater and anadromous fishes, of which 27 are aliens. The total fish fauna consists of about 120 species that can be found in one environment or another on a fairly regular basis, of which about 30 (25%) are aliens, mostly in fresh and brackish water. The invasion of alien species has accompanied past large-scale environmental change and has been a driver of declines of native species, including extinctions of native species such as thicktail chub and Sacramento perch (Moyle 2002, Marchetti and Light 2007). Changes over the past 50 years, since the advent of the major water projects, have led to severe declines of most native species, including four runs of Chinook salmon and the delta smelt. This result has been that five fishes, including delta smelt and two runs of Chinook salmon, are currently listed as threatened or endangered by state and federal governments (Moyle 2002). In more recent years, declines in fisheries have also been of major concern, especially of fall-run Chinook salmon, white sturgeon, and alien striped bass. Some of the fishes most likely to affected by future large scale changes to the SFE and also likely to drive policy decisions are listed in Table 1.

Species	Native?	Why important (status)	comments
Delta smelt *Hypomesus transpacificus*	yes	T&E species, endemic	Open water pelagic, near extinction
Longfin smelt *Spirinchus thaleichthys*	yes	Special concern species	Open water pelagic, in severe decline
Splittail *Pogonichthys microlepidotus*	yes	Special concern species, endemic	Spawns on floodplains, rears in brackish water
Tule perch *Hysterocarpus traski*	yes	Native, declining	Represents complex of native fishes
Sacramento perch *Archoplites interruptus*	yes	Extirpated	Reintroduction program proposed
Striped bass *Morone saxatilis*	no	Estuarine sport fish. declining	Pelagic, uses entire estuary
White sturgeon *Acipenser transmontanus*	yes	Sport fish, declining	Anadromous, rears in estuary
Southern Green sturgeon *A. medirostris*	yes	Endemic, threatened	Anadromous, rears in ocean
Chinook salmon *Oncorhynchus tshawytscha*	yes	Four runs, all in decline	Anadromous
Chinook salmon, spring run	yes	threatened	Appears in estuary mainly as smolts
Chinook salmon winter run	yes	endangered	Appears in estuary mainly as smolts
Chinook salmon fall run	yes	Sport and commercial fisheries, hatchery driven	Large numbers of fry in estuary but survival low
Largemouth bass *Micropterus salmoides*	no	Alien predator, game fish, Increasing in abundance	Represents complex of alien pond fishes in Delta
Threadfin shad *Dorosoma petenense*	no	Locally abundanct but in decline	Regarded as part of Pelagic Organism Decline

Table 1. Fish species that of major importance for management in the San Francisco Estuary. Information from Moyle (2002).

Drivers of Change

The major drivers of change in the SFE that are together or individually likely to result in major shifts in environmental conditions, including catastrophic shifts are: earthquakes, island subsidence, sea level rise, climate change, and invasions of new alien species (Lund et al. 2007). Human land and water use could arguably be listed as another driver of change but these uses are strongly affected by the first five drivers (i.e., are the reason the first five are of concern) so will not be treated further as drivers here. The major catastrophic consequence of the five major drivers is extensive levee failure in the Delta and Suisun Marsh. From an ecological perspective, the consequence is sudden change of in the hydrodynamics of the two regions as the islands fill with water, creating new habitat conditions, followed by invasions of undesirable species into the new habitat space.

Earthquakes. There are at least five faults in the Delta region but there have been no major earthquakes in the region since the great 1906 San Francisco Earthquake. This means that pressure is building up on the faults, steadily increasing the probability that one will move as time goes by (Mount and Twiss 2005). The major impact likely from earthquakes is collapse of levees in the Delta and Suisun Marsh because of their poor foundation soils and weak construction.

Island subsidence. The islands of the Delta were originally marshlands on a thick base of peaty soils. Over 182,000 ha of islands were diked and drained for farming in the 19th century and soils were typically burned annually to release nutrients from the peat, causing the interiors of the islands to subside rapidly. Even after burning stopped subsidence continued through oxidation of plowed soils and dust carried off by the frequent winds. As a result, all islands with peat soils used for farming have subsided, with subsidence greatest (3-7 m below sea level) in west and central Delta (Figure 2). Subsidence continues as long as farming continues. The effect of subsidence is to create a series of depressions surrounded by water, which will pour in if given the chance to break through the levees.

Sea level rise. Sea level is rising in the SFE and has been for at least thousands of years. Because of global warming, the rate of rise is accelerating. There is scientific debate about how rapidly and how much sea level will continue to rise, but a 30-50 cm rise in the next 50 years is plausible. The higher mean sea levels result in much higher high tide levels, increasing the probability that levees in the Delta and Suisun Marsh will overtop and then collapse, especially if combined with flood flows coming down the rivers.

Climate change. The climate of California is becoming significantly warmer, a trend that is likely to continue for some time (Dettinger 2005). While average precipitation is not expected to change much, more will fall as rain and less as snow in the high mountains. Year to year variability in rainfall is also expected to increase, as will the frequency of extended droughts and big floods. Once result of this change is increased hydrostatic pressure on levees during storms and floods and increased likelihood of failure.

Invasive species. The SFE has the reputation of being the most invaded estuary in the world and new invasions continue at a high rate of frequency (Cohen and Carlton 1998). Recent invaders (e.g.,overbite clam, Brazilian waterweed) have already had major impacts on ecosystem structure and function. New invaders or expanding populations of existing invaders are likely to take advantage of the new habitats created by large-scale levee failure (Marchetti and Light 2007), further exacerbating the effects of levee failure and increasing the difficulty of protecting native species.

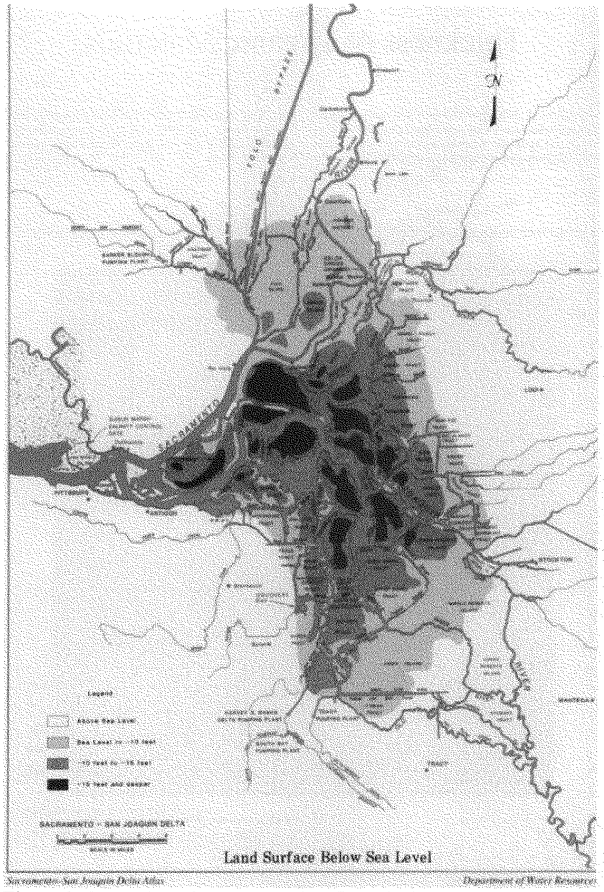


Figure 2. Map of the Sacramento-San Joaquin Delta showing land subsidence. From DWR (1993). Recent surveys indicate that subsidence in most areas is 1-5 ft greater than shown (DWR, unpublished data).

Ecological effects of large-scale change

The likelihood is high that two or more of the above drivers of change will act together to create catastrophic levee failure and other changes within the next 50 years (Mount and Twiss 2005; Lund et al. 2007), assuming the SFE continues to be managed as it is today. The probability of such an event is high enough so that it is presumably more a matter of "when" and "how much" rather than "if." In recognition of this, the Delta Risk Management Strategy (DRMS) team of the California Department of Water Resources has modeled the effects of up to 50 simultaneous levee breaches on Delta islands (http://www.drms.water.ca.gov). Other signs of high levels of interest include (1) the appointment by Governor Arnold Schwarzenegger in February 2007 of the Delta Vision Committee with a Blue Ribbon Task Force to find ways to prevent or reduce the impacts of the impending disaster, (2) the recent passage of bond issues to fix levees and other infrastructure affecting urban areas,(3) the establishment of a Bay-Delta Conservation Plan process and (4) numerous other actions and processes by agencies at all levels of government. The scenario of most concern is simultaneous and cascading failures of levees throughout the Delta because of the impact of such failures on southern California's water supply, on agriculture and other uses of Delta islands, and on urban areas in and around the Delta (Lund et al. 2007). Here, however, we discuss mainly the impacts on the ecosystems of the Delta and Suisun Marsh, especially with respect to fish.

Delta. For the central and western Delta, the basic "disaster" scenario is that following multiple levee failures, water would rush in, filling as much as 2.5 billion cubic meters of space in the island basins. If the levee collapses occurred as the result of the combination of high outflows and high tides, the islands would likely fill mostly with fresh water. If the levee collapses occurred as the result of an earthquake during a low-flow period, much of the water filling the islands would be drawn up from Suisun Bay and even San Francisco Bay creating lagoons with varying degrees of salinity

The open-water habitat thus created would be up to 10 m deep and subject to strong tidal currents, as well as mixing from frequent winds. The hydrodynamic and salinity regimes of each flooded island would depend on the number and location of levee breaches, closeness of the area to Suisun Bay (source of salt water) and to inflowing rivers, and relationship to infrastructure such as the ship canal that goes through the system. As levees continued to erode, many of the flooded islands would presumably come to resemble Frank's Tract, a large island in the central Delta that flooded in the 1930s and was left that way. It is currently freshwater lagoon with complex hydrodynamics that is dominated in summer by dense growths of Brazilian waterweed, Egeria densa.

Presumably, the flood water would initially be highly turbid from the disturbance of peat and sediment on the islands (DWR 2007) but once the suspended material had settled there would be massive blooms of algae because of the release of nutrients from the soils and the increased water transparency. Depending on the species making up the algal blooms (diatoms vs green algae vs cyanobacteria), a bloom of zooplankton should quickly follow. Within a year, island lagoons with brackish water lagoons would be heavily colonized by the overbite clam, an alien species which currently dominates the benthos of Suisun Bay. Presumably, the clams would then consume much of primary production and carbon of the new lagoons, as they do in Suisun Bay, reducing zooplankton populations. Island lagoons that contain fresh or low salinity water, would likely be colonized in 1-2 years with the species that dominate similar areas in the Delta: Brazilian waterweed and, in areas with sufficient flow, Asian clams. The combination would result in lagoons choked with weeds, with low zooplankton populations (like Frank's Tract today). It is possible that flooded islands located close to both sources of freshwater inflow (Sacramento River) and tidal sources of salt water could maintain a pool of water that would fluctuate enough in salinity on either an annual or interannual basis to keep either the overbite clam or Brazilian waterweed-Asian clam from becoming dominant. Biomass production in such lagoons would be concentrated in a pelagic system of phytoplankton, zooplankton, shrimp, and fish, such as was the case of Suisun Bay before the invasion of overbite clam in the 1980s. Obviously, these scenarios can all be strongly affected by local conditions of wind, tide, and river, as well as the diverse configurations of the lagoons (which will change constantly as levees deteriorate after the initial breeches).

Suisun Marsh. Suisun Marsh, for the most part, is not subsided as much as the Delta, although much of it is 0-2.3 m below sea level (which is rising) and some (ca. 16%) is more than 2.3 m below sea level (C. Enright, DWR, pers. comm.). Before European settlement it was high marsh, mostly flooding on high tides and high river flows. A scenario of wide-scale levee failure in the Delta is likely to include Van Sickle Island, located at the entrance to Montezuma Slough, the main artery of the Marsh. Van Sickle Island is already subject to frequent levee failures, although failures are quickly repaired. The rapid repair response (by public agencies) occurs in good part because if the island floods, the entire freshwater distribution system of the central Marsh (Roaring River Slough) ceases to work efficiently and the southern third of the Marsh (between Montezuma Slough and Suisun Bay) becomes tidal and brackish. Future failure will likely make much of the central Marsh tidally brackish. Less dramatically, increasingly high tides (from sea level rise) and increasingly large flood events (from climate change) are likely to cause levee overtopping and failures within the Marsh at increasing rates. Thus the ultimate fate of much of Suisun Marsh is to be inundated with tidal waters and to become a tidal brackish-water marsh, with seasonally higher salinities in many areas than were historically present. Much of it is likely to be permanently inundated. How the future marsh will actually look will depend on the interactions of a number of factors: (1) the rapidity and extent of sea level rise, (2) the depth of tidal and other flooding, (3) the residence time of the water in different areas i.e. the relationship between the flooded areas and the deeper channels/sloughs that drain them, (4) response of the natural vegetation to the inundation and salinity gradients, and (5) the influence of existing artificial dikes and channels, including railroad and road beds. This future Marsh, however, will certainly have a mosaic of habitats including, most importantly, extensive tidal brackish water marsh areas. These areas will be drained

by channels that should gradually recover their historic dendritic nature and be kept open by strong tidal action.

Effects on fishes of large-scale change

In the broadest sense, the creation of more aquatic habitat in the Delta and Suisun Marsh will be good for fish, resulting in a net increase in numbers and biomass, once the initial flooding period is past. The important question is what will happen to the species that people care most about (Table 1). These are native species that are listed as threatened or endangered or are in severe decline or fishes that support fisheries. The effects suggested in the following accounts are highly speculative, but based on extensive knowledge of the fishes, which are well studied (Moyle 2002, see also recent review papers by various authors in the on-line journal San Francisco Estuary and Watershed Science).

Delta smelt. The single most important species from the viewpoint of affecting management of water in the Delta is the delta smelt, which is listed as threatened by both state and federal governments and is on the verge of extinction (Bennett 2005). It has a one-year life cycle, is a pelagic planktivore, and is endemic to the SFE, spawning in the Delta and rearing in Suisun Bay and Marsh (Moyle 2002, Bennett 2005). It is highly likely that most delta smelt will be sucked into the rapidly filling islands under multiple levee breach scenarios, whether they were upstream spawning in the upper Delta, downstream rearing in Suisun Bay, or moving between the habitats. A few smelt might be able to avoid the displacement if they were located in the distant peripheral habitats such as the mouth of the Napa River, Montezuma Slough, or Cache Slough in the north Delta. The DRMS study (DWR 2007) predicts that many, if not most, fish sucked into the flooding islands will die of stress, especially that created by particulate matter in the water abrading gills and creating high turbidity. The delta smelt, as a small (< 9 cm TL) delicate, mid-water, visual feeder, would seem especially vulnerable to these conditions. Unfortunately, data is lacking to support the high turbidity mortality hypothesis. Previous levee breaches on single islands have not been accompanied by reports of fish kills, but no one was looking in the haste to repair the levees and pump out the islands. It seems unlikely, however, that a complete fish kill would result from filling process, given the volumes of water involved and the nature of the matter (organic matter, mainly peat particles) most likely to be suspended. The filling would be most disastrous for Delta smelt if they were spawning because it would suck them away from suitable spawning areas and would likely create hydrodynamic conditions (diminished tidal range in channels) that would make return difficult. Likewise, surviving larval smelt would likely find unfavorable conditions for feeding in the newly filled islands and could starve before large populations of microzooplankton (especially rotifers) developed.

Assuming massive blooms of toxic algae (e.g., Microcystis) do not occur, a month or so after island filling and hydrodynamic stabilization, conditions for plankton feeding fish such as smelt should start becoming favorable with the development of blooms of one or more species of small food organisms. Delta smelt that survived up to this period in the islands should then find conditions extremely favorable for growth and survival, especially in islands that maintained salinities of < 2 mg/l and temperatures of <20°C. Thus impact of a large-scale levee breach event on delta smelt depends in good part on the timing of the event. Presumably, a higher proportion of the population would be able to survive an event in July-November, than in December-June.

In the long run, however, permanently flooded islands in the right place could increase the amount of favorable habitat for delta smelt. If a flooded island had conditions (mainly fluctuating salinity) that excluded dominant invasive benthic species, it would likely become highly productive pelagic habitat, habitat which is apparently in short supply for smelt at times today (Bennett 2005, Hobbs et al. 2006, 2007). Delta smelt would presumably also benefit from a flooded Suisun Marsh as rearing habitat, if flooding increased productivity of intersecting channels, especially Montezuma and Suisun sloughs, and salinity fluctuations reduced the impacts of invasive species.

One indirect positive effect for smelt of large-scale island flooding would be that the large pumps of the State Water Project and the federal Central Valley Project in the South Delta would be shut down for long periods of time because of salty water at their intakes. Because in some years pumping from the two plants can negatively affect delta smelt populations through entrainment and other effects (Bennett 2005), shutting down the pumps will remove one potential major source of mortality, perhaps compensating for some of the flooding mortality.

Longfin smelt. Longfin smelt have a 2-3 year life cycle, much of which is spent in San Francisco Bay and/or the Gulf of the Farallons, outside the Golden Gate

(Moyle 2002, J. Rosenfield, unpublished analysis). They spawn in the western Delta in winter and often spend the first year of their life in Suisun Bay and Marsh. Being anadromous and iteroparous with multiple age classes, they are less vulnerable to extirpation by a large-scale event than are delta smelt. Like delta smelt and other planktivores, however, longfin smelt have suffered a large decline in their population in recent years. Thus large scale levee collapse in the Delta could initially harm longfin smelt, as indicated above for delta smelt, although a least a portion of the longfin smelt population would have reduced vulnerability because of distance from the flooded islands. For over half the year (May-November), most of adult smelt would be beyond the likely reach of a flooding event.

Permanently flooded islands in the western Delta could ultimately become important rearing habitat for larval and juvenile longfin smelt, depending on whether or not large zooplankton populations developed. Increased productivity of sloughs/channels in Suisun Marsh would presumably also benefit these smelt.

Striped bass. With high fecundity, interoparity, large size, and a life span of 40+ years, non-native striped bass have a high capacity to survive environmental disasters. Nevertheless, they have suffered a long-term decline in the SFE, although they still support a valuable fishery (Moyle 2002). In the SFE, striped bass migrate 125-200 km upstream to spawn in the Sacramento River in late April-early June. The embryos drift downstream and hatch about the time they reach Suisun Bay, where the larvae rear at low salinities. Juveniles rear throughout the estuary but seem to be most abundant in Suisun Marsh and Bay, where they feed on zooplankton. By the time they are 10 cm TL, they have largely switched to feeding on small fish. Adult striped bass are largely piscivorous and a major prey in the SFE is small striped bass. Adults will spend their entire life in the SFE, especially in San Francisco Bay, but when ocean conditions are right, some will go out into the ocean as well (Moyle 2002).

Overall, striped bass seem relatively immune to long-term effects of large-scale levee breaching. If the breaching occurred in early summer, then large numbers of larvae and juveniles could die, but in following years they could benefit from increased pelagic habitat, especially if portions of it were highly productive of zooplankton and small fish. Larger juveniles and adults are strong swimmers and could presumably quickly leave a submerged island after the initial event, assuming they survived the flooding event itself.

Sacramento splittail. Splittail are largely confined today to the SFE, where they rear in Suisun Marsh and other places with fresh to brackish water sloughs (Moyle et al. 2004). A separate population lives in the Petaluma River estuary, tributary to San Pablo Bay. Adults, which live up to 9 years, migrate up river to spawn (mostly) on floodplains in or just above the Delta (Moyle et al. 2004). Timing of spawning depends on timing of natural flooding, sometime between January and May. Juvenile splittail rear on the floodplain for a month or so and then migrate rapidly downstream to rearing areas, where they feed on benthos.

During a major island flooding event, many splittail are likely to be drawn in, although it is also likely that many others would remain in place because of living in small sloughs distant from the event and also being strong swimmers. If the levee breaching occurs in conjunction with natural high flows in January-May, large number of migrating adult or juvenile splittail could be captured. Although sudden entrainment on the flooded islands could result in high mortality, the high tolerance of splittail for poor quality (low dissolved oxygen, high turbidity, variable salinities, etc.) suggest adults and large juveniles are likely to survive the experience. The flooded islands are not likely to be great habitat for splittail until significant benthic fauna develops, especially amphipods and mysid shrimp. However, permanently flooded islands that remain brackish enough to exclude Brazilian waterweed should ultimately become suitable habitat for splittail, especially shallower areas.

Chinook salmon. Four runs of Chinook salmon pass through the SFE on their way upstream to spawn in the Sacramento River: fall run, late-fall run, winter run, and spring run (Moyle 2002). All runs are depleted from historic numbers and the winter and spring runs are listed as endangered and threatened species, respectively. The fall run is supported in good part by hatchery production and occurs in tributaries to the lower San Joaquin River, as well as the Sacramento River. Fry and smolts of the salmon are found seasonally in the estuary, on their way downstream to the ocean. When the Delta was a giant tidal marsh, it was likely a major rearing area for fry before they moved out to sea as smolts. At the present time, rearing habitat for fry in the SFE is minimal and fry survival is low; higher returns of adults from hatchery fry generally occurs when the fry are planted in the SFE below the Delta (Brandes and McClain 2001, Williams 2006). Highest survival of fry and smolts in the SFE occurs in years of high outflow in both the Sacramento and San Joaquin rivers, suggesting that it pays the fish to move through the Delta rapidly.

Survival of fry and smolts is also highest when the fish are largely confined to the main river channels and do not get moved into the Central Delta (Brandes and McClain 2001). Although juvenile salmon can be captured in SFE at almost any time of year, most movement is in December through April.

As with other fish, the immediate effect of a major levee failure in the Delta depends on the time of year in which it occurs, with the greatest impact likely to be in February "April, assuming migrating juvenile salmon, especially fry, sucked into the flooded islands would mostly die. The effect would be greater for San Joaquin River salmon than for Sacramento River fish because there would more likely be a continuous river channel for the fish to follow on the Sacramento side, due to location and greater flows. Once the island lagoons had become established, they would generally be unfavorable habitat for juvenile salmonids because they would contain little of the shallow water edge habitat preferred by juvenile salmon. Instead, they would be open water or weed-choked and contain fairly high densities of predators such as striped bass or largemouth bass. The effect would be determined in large part by how easily it would be for juvenile salmon to be carried into the lagoons from the rivers and how easy it would be escape from them. High outflows down both rivers should minimize the effects of the lagoons, while low outflows should increase the likelihood that juvenile salmon would wind up in them, especially on the San Joaquin side of the Delta. It is possible that Suisun Marsh will be heavily used by juvenile salmon once it floods, because much of it will be productive shallow water habitat, if saline.

Effects on adult salmon would presumably be small because of their focus on swimming upstream through the Delta, although there would no doubt be some mortality if the breaches occurred during a period of significant migration.

Largemouth bass. Largemouth bass are introduced piscivores that have greatly expanded their populations in the Delta following the invasion of Brazilian waterweed. The waterweed provides habitat for the bass by creating cover for juvenile and adult bass, reducing flow rates through channels, and causing sediment to settle from the water, resulting in clearer water. It is only the most visible species of a complex of alien "pond" species that thrive in waterweed dominated freshwater sloughs, including redear sunfish, bluegill, white catfish, black bullhead, and common carp. By and large these are the same species that are dominant in upstream reservoirs (Moyle 2002).

Largemouth bass and associated species would expand their populations further in flooded freshwater islands, once the Brazilian waterweed became established. While these species can survive in brackish water habitat, most of them avoid it and will probably be present in only low numbers in brackish lagoons without dense beds of waterweed.

Marine fish. San Francisco Bay supports a diverse fauna of marine fishes that includes most of the common species found along the central California coast. The abundances of different species fluctuate both in response to ocean conditions and to freshwater flows into the Bay. Not surprisingly, some of the most abundant species are species that can tolerate moderately low salinities (euryhaline), such as Pacific herring, northern anchovy, staghorn sculpin, yellowfin goby, and starry flounder. Juvenile of these forms frequently appear in the upper estuary, especially in Suisun Bay and Marsh, usually during periods of low river flows. Thus, the expanded brackish water habitat in the upper estuary is likely to increase habitat space for euryhaline marine species, especially during dry years.

Overall fish responses. It should be evident from the above descriptions that responses of fish species to large-scale island flooding will be highly variable, a reflection of the complex habitat and the complex fish fauna. Unanticipated responses are also likely to the changed conditions. For example, inland silverside are now abundant in the shallow flooded areas of Sherman Island in the western Delta (W. A. Bennett, pers. comm.) and it is possible that it could colonize some of the newly flooded areas, depressing other fishes through predation and competition (Bennett and Moyle 1996). In addition, new alien invaders could cause major shifts in abundance of established species. For example, two piscivores are poised to invade the SFE: northern pike and white bass (Moyle 2002, Lund et al. 2007). However, the general patterns of fish response to sudden large scale flooding would roughly be the following:

1. Fishes within the suction zone of Delta levee breaks (which could be a large area, given the capacity of the islands to accept large volumes of water) would be sucked into the island with some mortality from sediment in the water column, sudden changes in water quality (salinity, temperature, etc.), and other factors associated with the sudden movement of large volumes of water. The species affected would depend on time of year of flooding and the location of the flooded islands.

2. Once the waters had settled down, there would be an initial period of low plankton densities, followed by blooms first of phytoplankton, then zooplankton, perhaps within a period of 1-3 months.

3. In the longer term (1-5 years), the new lagoons would assume the character of areas in the SFE with similar depths, flows, and salinities. Thus, those in the more eastern and central parts of the Delta would likely become dominated by Brazilian waterweed and a variable assemblage of alien freshwater fishes. Lagoons in the western Delta that maintained low (2-10 mg/l) salinities most of the time would have conditions similar to those in Suisun Bay. Planktonic productivity is greatly reduced in Suisun Bay by the filter-feeding overbite clam, but it still serves as an important rearing area for pelagic fishes, at least in some areas (Hobbs et al. 2006). These areas would provide expanded habitat for species such as striped bass, longfin smelt, and delta smelt, as well as additional feeding areas for sturgeon, splittail, and other benthic feeders that can consume clams and their associated faunas. A few lagoons that were created in intermediate locations, where salinities and other conditions would become highly variable among years and seasons because of the combination of river inflow and tidal exchange, could be highly productive systems that would support dense populations of plankton and planktivores, including delta smelt and striped bass. Such areas could become a source for enhanced populations of euryhaline fishes.

4. Over a longer term (5+ years), conditions in the lagoons would change further as levees continued wash away, parts of the lagoons filled in with sediment, and islands not flooded previously gave way to new hydraulic forces created by the lagoons (waves, changed current patterns, etc.), assuming most levees were not repaired. Essentially, much of the Central and South Delta could become one large embayment, similar to Suisun Bay, but fresher on its upper end. By size alone, this area would increase the amount of habitat for fishes. Presumably, the increased habitat would increase populations of some of the desirable open-water species although much of it would be dominated by waterweed and alien pond fishes or by relatively low productivity habitat dominated by overbite clam. In this period, Suisun Marsh would also have become at least partially flooded, with the potential for large increases in tidal brackish water habitat, favorable (depending on salinity regime) to desirable species such as longfin smelt, delta smelt, spittail, striped bass, and possibly juvenile Chinook salmon.

Thus the overall effect of massive flooding would likely to be to increase the populations of at least some desirable species while greatly increasing the abundances of less desirable aliens, such as largemouth bass and common carp. While there are fisheries for such species, they are deemed less desirable because the fish are nonnative and have large populations outside the SFE, unlike the species deemed desirable.

Improving the estuary for fish

The above speculative discussion is based on the scenario that California will continue on its present track of managing the Delta environment through a combination of applying band-aid levee repairs, poorly regulating invasive species, removing large quantities of fresh water, managing Suisun Marsh as freshwater marsh, and monitoring desirable species as they decline. In short, the status quo consists of continuing business as usual until large-scale levee collapse forces large-scale action, much of it likely to be poorly planned and futile in the long run (Lund et al. 2007). As indicated above, the massive collapse of levees in the Delta and Suisun Marsh would not be a long-term disaster for fish and fisheries and could even be a slight benefit. The collapse could be a disaster for the California economy, however, mainly because it would disrupt the state's water supply system and other infrastructure (Lund et al. 2007). Thus a movement to actually "fix" the Delta and Suisun Marsh before the inevitable disaster is highly desirable and several processes are underway at the state level to determine options. Lund et al. (2007) present nine scenarios for a future Delta and Suisun Marsh, five of which they regard as feasible. The four of the five protect water supply while allowing some portion of the Delta to remain as habitat for native fish and other desirable organisms. The five options provide suggestions for significantly improving the habitat in the Delta and Suisun Marsh for desirable species, provided action is taken before large-scale levee collapse occurs. The options of Lund et al. (2007) are only a tiny fraction of the hundreds of permutations and combinations of actions that could be taken; they are designed to represent examples of the reasonable alternatives possible to provide a visualization of management options.

Here I will not go through the alternatives but instead discuss actions that will allow fish-friendly habitat to develop while not necessarily reducing most of the services to humans that the SFE provides. These actions could be part of any

scheme that seeks to modify the Delta to improve or protect its water supply functions as well its ecological functions. The general approach towards creating an environment in the SFE that is more friendly to desirable fish species (and other biota) presented here is to increase habitat heterogeneity. The basic concept is as follows: as much area as possible should support conditions resembling those of the historic SFE, especially in the Delta and Suisun Marsh, because these are the conditions to which the native fishes are adapted. However, the improved habitats are likely to be in different locations than they were historically because of changed elevations due to subsidence and sea level rise. Thus habitats once present in the deeply subsided center Delta will have to be located in the less-subsided peripheries.

A key part of a habitat creation program will be to have as much area as possible that fluctuates in salinity enough so freshwater and brackish water benthic invaders are discouraged while desirable (mainly native) pelagic species are favored. The exact extent, frequency, and range of salinity fluctuation needs to be determined by further studies of key organisms (both desirable and undesirable species), but present distributional limits of the organisms suggest that fluctuations required are likely to be in the range of 0 to 12 mg/l over 1-2 years, with high and low values sustained for 4-5 months at a time.

The following are some general, large-scale actions that could improve habitat heterogeneity and create areas with desirable conditions of water quality, including fluctuating salinity. This list is neither complete nor inclusive (Lund et al. 2007).

1. Suisun Marsh. This region of the SFE is headed inexorably to becoming brackish tidal marsh, unless huge amounts of money are spent on raising levees; such action may not even be possible as a permanent solution, given the compressibility of the marsh soils underlying the levees. Most of Suisun Marsh is currently intensely managed in diked sections, principally as freshwater habitat for waterfowl. Even under these conditions the intervening sloughs, especially in the few undiked areas, provide good, often brackish, habitat for desirable fish (Matern et al. 2002, R. E. Schroeter, unpublished data). Improving the Marsh for fish will require systematically breaching or removing levees, initially in the areas most vulnerable to flooding and preferably after reconstruction of the original marsh drainage system and removal of infrastructure. Models for the creation of the new tidal (and subtidal) marsh areas can be found in the currently undiked section of marsh (Rush Ranch) that is part of the San Francisco Bay National Estuarine Research Reserve (http://rtc.sfsu.edu/nerr/sf_bay_reserve) and by an on-going experimental levee breach at Blacklock (http://www.iep.water.ca.gov/suisun/restoration). Even after radical restructuring of the Marsh, it may be desirable to continue to operate the large salinity control gates at the upstream end of the Montezuma Slough. This slough and Suisun Slough are the deep (2-6 m) main arteries of the Marsh and are the principal habitats of pelagic fishes such as delta smelt and longfin smelt, so it may be possible to operate the gates to increase the ranges of salinity that favor these species and discourage undesirable alien species.

2. Cache Slough. Cache Slough and adjoining areas make up essentially the northwest corner of the Delta. The region is of high restoration potential as tidal freshwater marsh and slough because (1) island subsidence is low compare to other parts of the Delta, (2) it maintains much of its original drainage pattern, even though most of the channels are leveed and artificial cross channels exist, (3) it is a major spawning and rearing region for delta smelt, (4) it has strong tidal currents that move water from the Sacramento River in and out of its channels, (5) it drains the lower end of the Yolo Bypass (next section), and (6) it contains the large recently (1998) flooded Liberty Island that is being used as an example of a "passive" restoration project (http://www.delta.dfg.ca.gov/jfmp/libertyisland.asp). The region can be relatively easily converted into an expanded version of the favorable tidal habitat for desirable fishes (as well as waterfowl and other biota) through levee breaches, elimination of cross channels, and other projects that improve circulation. It is also a region where it should be possible to create favorable habitats for delta smelt, mainly spawning beaches and productive rearing areas for larvae, that also discourage their egg and larval predators, especially inland silverside.

3. Yolo Bypass. To keep Sacramento from flooding, an artificial floodplain, the Yolo Bypass, was constructed in the 1930s. Essentially, when the Sacramento River reaches a certain stage of flow, it spills over two low barriers (Fremont Weir, Sacramento Weir) and into the 24,000 ha, 64 km long bypass (Sommer at al.2001a, b). The flood waters flow down the bypass and re-enter the Sacramento River via Cache Slough. The principal permanent water in the Yolo Bypass is the Toe Drain, which runs along the levee on eastern edge. About half the bypass is in the Delta; the Toe Drain in this region is essentially a leveed tidal slough, a branch of Cache Slough. The land in the bypass is a mixture of farmland and wildlife areas but when it floods it is high quality rearing habitat for Chinook salmon fry and splittail, as well

as other fishes. The flood waters may also mobilize nutrients from the bypass, helping to support Delta food webs. From an ecological perspective, a problem with the Yolo Bypass is that is does not flood, even partially, every year. Construction of a gate on the Freemont Weir would permit limited controlled flooding from the Toe Drain every year, improving growth and survival of salmon and splittail and improving flows through Cache Slough to benefit delta smelt.

4. San Joaquin floodplain. The channel of the San Joaquin River above and through the Delta is highly channelized, and provides little favorable habitat for desirable fishes: the water tends to be deep and polluted in places (e.g., Stockton Ship Channel) and dominated by invasive aquatic plants and invertebrates in others. One way to improve the habitat for fish is to create one or more bypasses like the Yolo Bypass. This would involve removing or breaching levees from islands (e.g., Stewart Tract) that border the river to promote annual flooding. Such floodplain habitat is likely to be especially beneficial as rearing habitat for juvenile salmon coming from the San Joaquin River basin. An example of the benefits of restored floodplain in the Delta is provided by the small restored floodplain along the lower Cosumnes River, on the eastern fringe of the Delta, which has proved to be beneficial to several native fishes and provides experience in methods of modifying agricultural lands into fish-friendly floodplains (Moyle et al. 2007).

5. Managed Delta islands. The previous four actions have focused on areas at the edges of the upper estuary because of assumption that the subsided islands of the Delta will fill with water and together will become a large open-water system over which little control can be exerted, aside from regulating freshwater inflow under some conditions (Lund et al. 2007). However, with some foresight, it may be possible to retain the levee integrity of some islands, by making them into islands of regulated aquatic habitat. Essentially this concept follows the lead of Delta Wetlands, a private group that has sought to use Delta islands for water storage and wildlife habitat (http://www.deltawetlands.com/). The levees of habitat islands would be reinforced on the inside by having gradual slopes towards the interior, which would be planted with native vegetation to stabilize the soils. Gates on the upper and lower ends of the islands would be used to regulate water quality on the islands, including salinity. This concept would be especially useful for islands (e.g., Twitchell Island) in the western Delta located close the Sacramento River so that salinity could be manipulated by trapping either river or tidal water in the island as needed (as is currently done with tidal gates in Suisun Marsh). The islands of water could then be managed as nursery areas for desirable fishes. Ideally, the gates would also allow an island to be dried out completely on occasion to control undesirable alien species.

Invasive species

A major uncontrolled (for now) factor that can negatively affect efforts to create a more desirable, diverse (heterogeneous) ecosystem in the Delta is the invasion of new alien species that become agents of ecosystem change, such as the overbite clam or Brazilian waterweed have in the past. There is an identified queue of harmful invaders that are likely to arrive in the near future (Lund et al. 2007). Thus part of any program of ecosystem creation must include vigorous efforts to exclude new invaders from all sources, including the shipping, horticultural, pet, and aquaculture industries. There should also be in place a mechanism that allows quick action to eradicate a new invader before it spreads from the site of an invasion.

Conclusions

The San Francisco Estuary, especially the Delta and Suisun Marsh, is predicted to undergo drastic change in the next 50 years, with the probability of a major "disaster" increasing through time, just on the basis of earthquakes and land subsidence alone (Mount and Twiss 2005). When sea level rise and increased frequency of flooding due to climate change are factored in, major change in this period seems inevitable. The disaster scenario, however, is mainly for human goods and services, especially water supply to urban and agricultural areas. From a fish perspective, the ecological changes resulting from flooding of numerous Delta islands and Suisun Marsh are likely to create conditions that should be at least as favorable for desirable species as present conditions, after a period of possible high mortality created by the initial flooding events. Potentially more favorable habitat will result from a disaster scenario simply because there will be increased area of open water and tidal marsh, some of it with enough fluctuation in salinity to be especially favorable to delta smelt, striped bass, and other pelagic species now in decline. There is much uncertainty, however, about how much favorable habitat will be created under disaster scenarios because of the tendency of alien invaders to quickly dominate so many habitats. Thus, making efforts to control the way the habitat changes, as suggested above and in Lund et al. (2007), could have major benefits while being highly

compatible with changing the ways in which services the Delta provides are delivered, especially water supply. The principal basis for action is to increase habitat heterogeneity over present and likely future conditions, as well as to increase the total amount of aquatic habitat. No matter what actions are taken there will be a high degree of uncertainty in the ecological benefits but the present situation in the estuary represents an unprecedented opportunity to reverse the impacts of over 150 years of negative ecological change.

Acknowledgements

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Supplementary testimony of Peter B. Moyle,
University of California, Davis

1. In their testimony before the Subcommittee, Mr Steve Thompson (US Fish and Wildlife Service) and Mr. L. Ryan Broddrick (California Department of Fish and Game) indicated that their agencies had done everything in their power to protect the delta smelt, through adaptive management and other means. I respectfully disagree. As I indicated in my verbal testimony, most steps taken to protect the smelt were made only to minimize damage to the population rather than to actually improve conditions (as would seem to be necessary for recovery). Even actions to limit damage seemed to currently be in abeyance given the extremely low numbers of smelt taken in sampling programs and the numbers of smelt taken by the state and federal export pumps. As the result of increasing export of water from the SWP pumps at Tracy, in the two days before the hearing 390 and 258 smelt (data presented by Mr. Johns at the hearing), respectively, were entrained (killed) at the pumps. On the day of the hearing, 311 delta smelt were entrained. Since May 10 of this year nearly 2500 delta smelt have been taken at the pumps. Numbers are certainly higher because only smelt greater than 20 mm long are counted. Actions that could have been taken to protect the smelt this year, but were largely not performed were recommended in two letters by myself and Dr. Christina Swanson that were sent to the five agencies directly involved with smelt management on March 14 and June 1, 2007. These recommendations were not original with us but stemmed from recommendations by the agencies' own biologists.

2. Mr. Thompson and Mr. Broderick indicated that changing the status of the delta smelt from Threatened to Endangered, as requested in an emergency petition filed over a year ago (March 8, 2006), would not have affected management of the species. Again, I respectfully disagree. Endangered listing would be dramatic acknowledgement of the critical state of the smelt population, with the potential to mobilize additional resources for protection of the smelt, as well as public support for actions taken. If the smelt was listed as endangered under the federal Endangered Species Act, it is highly likely that the continued mortality of smelt at the SWP pumps not would be allowed to continue.

3. Mr. B. J. Miller presented testimony in which he stated that there is no linear relationship between the amount of exports and delta smelt numbers. He further stated that because of the lack of a relationship, agency and other biologists never show graphs relating exports to smelt numbers even though they claim a relationship exists (i.e., are in denial about the lack of a relationship). There is evidence to the contrary. Attached to this submittal is a graph showing a negative relationship between exports and smelt numbers that was part of the emergency listing petition submitted in 2006. The relationship is weak but present. In any case, a direct relationship is not needed to show that the pumps in the south Delta can impact smelt populations. In a recently published, peer-reviewed paper (unlike Mr. Miller's analysis), Dr. William Bennett has provided some strong indications that the increase in early season pumping has impacted smelt because it kills the biggest, most fecund smelt (and probably their offspring), which contribute the most to future gen-

erations. This is the "big mama" hypothesis mentioned at the hearing. Exports from the Delta are clearly not the only cause of smelt decline but there is every reason to thing they are an important contributing factor, especially when populations are as low as they are today.

4. It is not at all certain that the delta smelt will make it though another year. If it does survive, it will be again in record low numbers. This crisis emphasizes the need not only to take actions to improve conditions for delta smelt as much as possible but to start taking large-scale actions to make sure smelt habitat is present in the future, as suggested in the UCD-PPIC report and indicated in my previous written testimony.

From: Emergency petition to list the delta smelt (Hypomesus transpacificus) as an endangered species under the endangered species act, submitted to the U.S. Fish and Wildlife Service by the Center for Biological Diversity, The Bay Institute, and the Natural Resources Defense Council, March 8, 2006

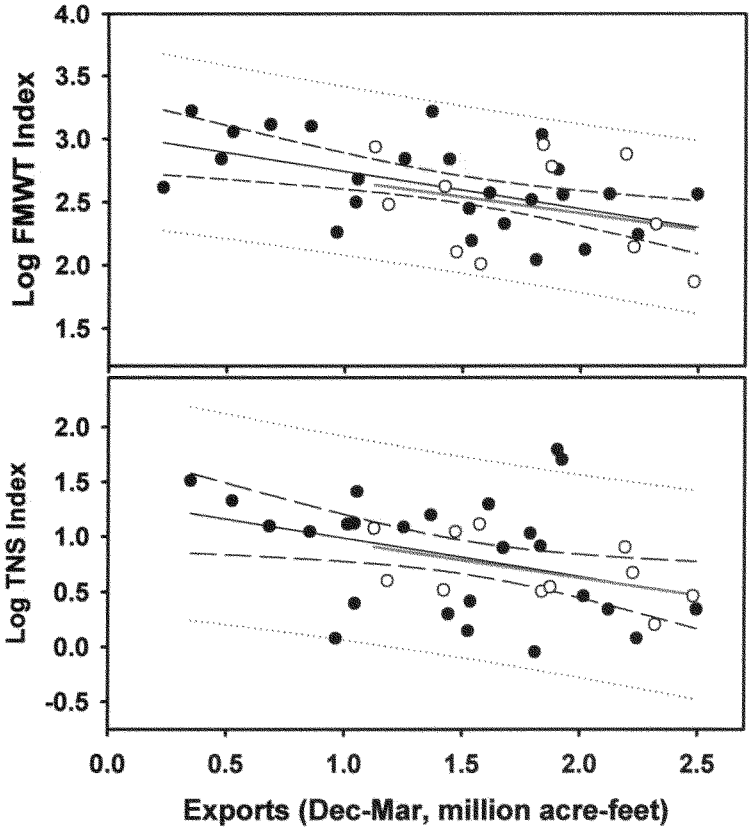


Figure 6. The relationship between winter (December-March) export amounts and subsequent abundance of delta smelt. a) sub-adult and adult delta smelt as measured by the FMWT Index (using data from 1967-2004); and b) juvenile delta smelt as measured by the TNS Index (using data from 1969-2004). For each graph, the regression, 95% confidence limits and the prediction limits are shown calculated for the entire datasets. The open symbols and the dark gray regression line highlight the years since the delta smelt was listed under the ESA (1994-2004). Data Sources: California Department of Fish and Game, California Department of Water Resources, Dayflow.

Large scale ecological changes have occurred in the Delta during the past 30 years, such as the establishment of the invasive clam Corbula amurensis and its impacts on the planktonic food web, but they do not strongly affect the results of these

types of correlation and regression analyses. For example, the significant relationship between winter exports and the subsequent population abundance of adult delta smelt was apparent in the 20 years prior to the clam's invasion (1967-1985, Equation 5).

Adult delta smelt (1967-1986):

Log FMWT = 3.109—0.353(Dec-Mar exports, MAF) (Equation 5)

n=18; p=0.013; r^2=0.0329, SEE=0.308

Linear regression using smaller subsets of more recent years (e.g., post-Corbula invasion, 1987-2004 or 2005; post-ESA listing, 1994-2004 or 2005) were not statistically significant but both the slopes and intercepts of the relationships were very similar to those generated using the entire dataset (e.g., 1994-2004(5): open symbols and grey regression line in Figure 6). The significant relationship between winter exports and abundance was not "driven" by the low abundances measured during the past three or four years. For example, after excluding the three most recent years for the FMWT abundance indices (2002-2004) from the dataset, the regression was still significant (p=0.02) and the slope and intercept were similar to those generated with the entire dataset. Given that the significant relationship between winter exports and adult abundance was detectable by 2002 (and before), this indicates that the low abundances measured during the past three years, a period during which winter exports were at near record high levels, were predictable as early as three years ago.

The abundance of juvenile delta smelt was also significantly affected by spring-summer exports (March-July). The linear regression for this relationship is:

Log TNS = 1.429—0.369(Mar-July exports, MAF) (Equation 6)

N=36; p=0.047; r^2=0.111; SEE=0.462

In 1993, the USFWS (1993) identified 21 major federal, state, local or private organization proposals for increased exports. Since that time, Delta water exports and corresponding impacts on delta smelt have increased and they are projected to continue to increase in the future. The recent 5-year review (USFWS 2004b) noted that the potential threat of increased demands on surface water resources in the Central Valley and Delta was growing, citing planned or proposed new water diversion projects such as the Freeport Regional Water Project, increases in pumping capacity at the SWP pumping plant as part of the South Delta Improvement Project, the California Aqueduct/Delta-Mendota Canal inter-tie to allow increased pumping at the CVP pumping plant, Empire Tract on the San Joaquin River; and potential expanded water storage capacity projects at Los Vaqueros, north of the Delta off-stream storage, Shasta Reservoir, in-Delta storage, and south of the Delta surface and groundwater storage projects. The USFWS (2004b) concluded that the increased storage and diversion capacity would likely result in lower freshwater outflows to the estuary, higher water exports from the Delta, and greater entrainment of delta smelt.

Mrs. NAPOLITANO. Thank you, sir. We will start off with the questions and each Member has five minutes. Hopefully, we will be able to move forward.

Mr. Thompson, one of the things that I have been noticing in reading a lot of the background information is that the fish was listed as threatened back in March '06 and then again in March '07 there was a request to upgrade it. That has not been done. Why?

Mr. THOMPSON. Well, there is actually very little difference in the protection between the status of threatened or endangered. We have very limited resources in both staff. We spend a great deal of time in courts right now. We spend a great deal less time than we should on recovery and in initiatives.

The actual status change will do absolutely nothing as far as the political or biological or legal consequences to the Delta smelt.

Mrs. NAPOLITANO. It does with this Committee, sir.

Mr. THOMPSON. Yes.

Mrs. NAPOLITANO. I do not think that we want to use it as a cop-out to be able to have the true status of that endangered species be not listed as endangered. So we will talk to you about that later.

Then I have a couple of other questions. I am trying to keep mine to a minimum because we will put it in writing. But the current biological opinion you are operating under allows you to take what? Am I right in understanding that in his May 24th decision U.S. District Court Judge Wanger deemed that the 2005 biological opinion was unlawful and inadequate? Am I further correct that he specifically cited that your approach to take limits fails to consider the most recent overall species abundance in jeopardy? Then third have you changed your operation to address this criticism in the biological opinion?

Mr. THOMPSON. We are currently under consultation with the Bureau of Reclamation to address Judge Wanger's concerns. We were doing that ahead of the court case already also. We are in constant communication with DWR and the Bureau of Reclamation and California Fish and Game and NOAA Fisheries attempting to balance the water demands for smelt, salmon and all the other uses that are out there. So we are in constant dialogue and conversation.

Mrs. NAPOLITANO. Well, that is not very reassuring to me. I tell you why. Back when I first started in this Subcommittee there was a request for a survey paid for by several of the Southern California agencies on water that took almost 12 years to render to those parties, and only after constant haranguing by me to the Department did we finally get a draft. Then the draft was changed after the final came out. So I have very little, I am sorry, support for that kind of an attitude or an answer.

I certainly hope that this will be a much faster, since that was just a report on the status of Southern California water, this; we are talking about a crisis. We need to ensure if you need the help, to ask this Committee or at least some of its Members to be able to advocate and try to get you support, whether it is increasing the budget or being able to take steps to help address the issue. California depends on it, sir.

Mr. THOMPSON. Yes, ma'am.

Mrs. NAPOLITANO. Now one of the other questions that I have, and I only have a small amount of time and then we will pass it on. I read with interest and having worked at the State level and the Federal level, do the agencies talk to each other about working collaboration?

Mr. THOMPSON. Yes, they do, ma'am. There are phone calls going back and forth between Ryan, Lester, the Bureau of Reclamation and myself. Then there is at the WOP, the Water Operations Team talk to each other all the time.

Mr. NAPOLITANO. That is what brought it to mind. I was reading the report.

Mr. THOMPSON. Then we also get advice from the Delta technical folks that are scientists that give us advice.

There is constant communication both daily and weekly.

There are conflicting laws and statutes and obligations and contracts that force us to deal with the situation and balance it the best we can.

Mrs. NAPOLITANO. I can understand that. But unfortunately talking about it and taking action are two different things. Now if talking over the phone means you are getting things done, I could

accept that. But if it means that all you are doing it and discussing it and not really sitting together and working out a solution that is going to be able to address the issue. That is my concern.

Mr. THOMPSON. Yes, ma'am, we do. We not only talk, we also take actions on an either hourly, daily or weekly basis.

Mrs. NAPOLITANO. Do you have the ability to tell this Committee whether any of that indicates of what the outcome has been to be able to address this crisis?

Mr. THOMPSON. Yes, we can. But it would take much longer than the time. I guess all of us could——

Mrs. NAPOLITANO. No, I would like to have that in writing, if you would. We will share it with the rest of the Members.

Mr. THOMPSON. OK.

Mrs. NAPOLITANO. I will now stop and hand it over to Mr. Costa.

Mr. COSTA. Thank you very much, Madam Chairwoman.

I spoke in my opening comments about the efforts in 2000 with the CALFED agreement and it speaks to the heart of what the Chairwoman and her last question—and disappointment. I do not think I am giving my own perception, but I think there has been a disappointment throughout the environmental community, urban water users as well as agricultural water users, that by this time we have not made more progress, especially after the record of decision had been signed and the efforts to implement it.

I would like to ask all of you, and there is not a lot of time so I would like a succinct statement in less than a minute, of why you think over the last five years we have not been able to implement the record of decision. I understand there is not different statutes, state and Federal statutes. I understand that there are differences on the science, but we have provided a whole lot of money.

Who wants to start off first? Mr. Moyle? Less than a minute response.

Dr. MOYLE. That is a difficult question. There is so much going on. I think the knowledge base is there now to make decisions.

Mr. COSTA. People just do not want to make tough decisions?

Dr. MOYLE. I think that is a part of it, yes.

Mr. COSTA. OK.

Dr. MOYLE. It is difficult to make those tough decisions, especially when you are choosing between what seems to be water and fish. I personally think there are lots of ways to make these things work. But——

Mr. COSTA. Well, maybe we ought to change the paradigm, as I said in my opening statement.

Mr. Johns, you want to comment?

Mr. JOHNS. Yes. Actually, I would take some exceptions. I think CALFED did work. I think part of the CALFED was a seven year experiment to see if through Delta could actually be made to work effectively. I think what we are seeing now is that the Delta is not sustainable.

Mr. COSTA. Under the current uses?

Mr. JOHNS. Right. Exactly. But the assumption in CALFED was that the Delta would stay about the way we see it now. I think what we are seeing, as you alluded in your testimony, that——

Mr. COSTA. Almost $8 billion in water for fish, and it has not worked.

Mr. JOHNS. You have a Delta that probably does not meet the kind of tests that were assumed in the CALFED days.

Mr. COSTA. Mr. Broddrick, you want a try at this?

Mr. BRODDRICK. The CALFED process was blessed with a lot of bond money following your initiation of 206 and CVPIA. There was an incredible amount of information developed. The science got galvanized, I believe, two years ago when folks took the individual parts and said we need to synthesize. Now the head focus of that was $2.5 million put into the pelagic organism decline.

I think we accomplished a lot in CALFED. We did not meet some of the objectives with respect to water supply, obviously, levees. We did come to the conclusion that I think we had to come to post-record decision in August of 2000. Before we went to that record decision, we met with the Secretary of Interior in a transition of Governors between Pete Wilson and Davis. They have challenges put to the biologists. We said, very briefly, the biologists will figure out how to take care of the Delta smelt and the fishes of the Delta.

Mr. COSTA. So have you and your partner next to you with U.S. Fish and Wildlife Service figured out what the answer is?

Mr. BRODDRICK. The response at the time was with all due respect, Mr. Secretary, the biologists told you that the simple issue with respect to Delta smelt and their entrainment is that you need not convey so much out of the South Delta. We are at that point now. I wish that was not the case.

Mr. COSTA. You would concur, Mr. Thompson?

Mr. THOMPSON. Yes.

Mr. COSTA. You want to elaborate at all?

Mr. THOMPSON. No. I think the only thing I might add was that, you know, we have converted a historical tidal wetland to what we have today.

Mr. COSTA. You have converted a what?

Mr. THOMPSON. A tidal wetland.

Mr. COSTA. I see.

Mr. THOMPSON. To what we have today. We are convinced that this will——

Mr. COSTA. Yes. I am glad you made that statement. Because people talk about historic nature of the Delta, and it is any given person's chosen time in history that they want to choose historic. But you are referencing the real history is a tidal wetland?

Mr. THOMPSON. Yes. With wide fluctuations in both fresh water and salt water. That's what the native species adapted to and that——

Mr. COSTA. Before people ever came here?

Mr. THOMPSON. Before we came here.

Mr. COSTA. There were Native Americans here, of course.

Mr. THOMPSON. Yes, and before Europeans.

Mr. COSTA. Mr. Davis, you care to comment at all? Only because of time, I am sorry, Mr. Thompson.

Mr. DAVIS. Yes, sir, I would. I think that CALFED has worked. I agree with the statements made by my colleagues here. I think there has been some achievements and there has been some disappointments.

I think CVPIA has worked. There again has been some achievements and disappointments. It is a lot harder than people thought.

Mr. COSTA. That was the most historic reallocation of water in the history of the State?

Mr. DAVIS. Exactly, between going from Delta 1485 to 1641 and then CVPIA has been significant changes.

Mr. COSTA. My time has expired. But, Madam Chairwoman, I would like to submit a question that they can answer in a written statement and that is, where do you think we as Federal partners in this process need to go next to help the State in its efforts as we address not only the Delta but the other regional impacts that will exist? I will submit that as a written question.

Mrs. NAPOLITANO. Thank you, Congressman Costa. So without objection we will accept them, as I stated in the beginning.

I am sorry, CALFED was supposed to be a help in getting solution to some of these problems. Apparently it is not.

I would like to now turn to Mr. Miller.

Mr. MILLER OF CALIFORNIA. Thank you, Madam Chairman.

Thank you all for your testimony.

I find it rather interesting that the suggestion is here that we have gone through the CALFED process and that tells us that the through Delta operation no longer works and we have to jump to, I guess, around the Delta facility of peripheral canal or some similar operation, probably renamed and rebranded, but in any case. But I also find it interesting that at that same time that this was taking place both the state legislature and the courts decided that this operation was not attending to the law with respect to Endangered Species Act and the fact that the science that was being built upon was in fact flawed. We had political people walking through the agency on some of these decisions affecting the Delta changing the outcome of science.

So I do not quite get how we arrived at what appears to be a very confident decision that we have exhausted the CALFED process. This is not a plea for the CALFED process. But if the end result is that somehow now there is really no option to entraining the Delta smelt or other species, therefore we have to go elsewhere when in fact the basic law that was there to provide for the protection of these species was ignored in that process? That is kind of what you are doing in court now is sorting that out, is that not right? Mr. Thompson?

Mr. THOMPSON. I was hoping you were going to Ryan there.

Well, we are going through that process right now with the biological assessment from the Bureau of Reclamation and the coverage for Department of Water Resources on the Delta smelt portion in the Federal court with Judge Wanger. We are also in the consultation process right now actively with everybody trying to figure out the complex answers to the biological assessment and what the biological opinion would be.

Mr. MILLER OF CALIFORNIA. Well, I find it kind of interesting because we have been put on notice now for several years with drastic decline in the Delta. Now we have decided that there are multiple reasons for that, and that may in fact turn out to be valid, but because there are so many reasons, there is sort of no reason. So at this time we have the State engaging in discretionary pumping of water. We acknowledge surplus water and then we pump

that water out of the Delta, last year in the spring, this year again, in light of this information.

That very same period of time we did not introduce invasive species. When you say all this has some discretionary invasive species thrown into the system. You know, we did not do that. But what we did do is continue to export water out of the Delta at a time when we may have been able to see if we reduced those water flows, if you did not have that surplus water leaving the Delta, maybe it would have changed.

So I do not understand how we arrive at this conclusion all of a sudden that that is it folks, we have to abandon the Delta.

Mr. THOMPSON. Well, I do not think we are saying that. I think we are saying that that is one of the important things is the Delta pumps and how they affect the Delta. That is certainly important. There are many, many other factors there.

The invasives you talk about are increasing and some are taking hold and some are—you know, they go up and down in the Delta system.

We have a contaminant situation that we did not have before, and we cannot quite figure out exactly what that is. But it seems to be an important situation on toxins.

So I do not think it is any one, Congressman. I think it is a combination of things that are in the Delta.

We are struggling as a group of agencies to figure out how to balance solutions the best we can.

Mr. MILLER OF CALIFORNIA. But, again, you were looking at all this while not meeting the basic law for the protection of the species and the condition of the Delta, the Endangered Species Act.

Mr. THOMPSON. The Endangered Species Act only has so much influence and power that it can do in the Delta situation. We are applying the biological——

Mr. MILLER OF CALIFORNIA. But if you ignore it, how will you know what that is?

Mr. THOMPSON. We are not ignoring it. We are doing the biological——

Mr. MILLER OF CALIFORNIA. Well what are you telling the judge?

Mr. THOMPSON. We are telling the judge the same thing I am telling you. We are doing a biological assessment. We will do a biological opinion based on all the best scientific information we get together to determine whether the species is in jeopardy or not.

Mr. MILLER OF CALIFORNIA. That is the State's position also?

Mr. BRODDRICK. Congressman Miller, maybe I gave you the wrong impression when I gave the answer with respect to August of 2000. I did not expect isolated conveyance or peripheral canal or whatever term of art is being as the immediate response. But the response was the entrainment on the Delta fishes as it relates to State Water Project is if you remember the CALFED objectives, there was also water supply objectives and there were Delta levee and water quality objectives.

On the simple issue of the difficulty of reducing entrainment on fishes the Delta is just a bad geographical location. It is very difficult to get the fish out of the system. Tides can overwhelm inflow from the San Joaquin. So——

Mr. MILLER OF CALIFORNIA. How many are we entraining now?

Mr. BRODDRICK. Pardon?

Mr. MILLER OF CALIFORNIA. How many are we entraining now since you turned the pumps back on?

Mr. BRODDRICK. As of yesterday afternoon, I cannot give you the actual numbers, but this weekend there was entrainment of Delta smelt. That was after——

Mr. MILLER OF CALIFORNIA. How close of an actual number can you give me?

Mr. BRODDRICK. Exact. Gerry's got them written down. I have them partially in my mind, but my mind is not that accurate.

Mr. JOHNS. Some good news if there is good news here, is that the level of fish per acre-foot that we take has dropped. But on Saturday——

Mr. MILLER OF CALIFORNIA. You give up the per acre-foot with all the respect of the pumping?

Mrs. NAPOLITANO. Just get to the numbers, please.

Mr. JOHNS. OK. But in terms of the numbers, on Saturday it was 390 and on Sunday it was 246 Delta smelt.

Mr. MILLER OF CALIFORNIA. So this illegal take sort of continues?

Mr. JOHNS. I would not characterize illegal take. The court has said—both the state and the Federal courts—that these are within the take authorizations currently in place. They have not removed our take authorizations.

Mr. MILLER OF CALIFORNIA. They have not. But the take authorizations were based upon the science that is in question, correct?

Mr. JOHNS. We are working with the agency to try to work out different standards, different take numbers to reflect the better science.

Mrs. NAPOLITANO. Are we going to wait until——

Mr. MILLER OF CALIFORNIA. Well, I would just say, Madam Chair, that it is incredible that we are basing a series of decisions based upon science that apparently was flawed, maybe even intentionally, at the beginning of this process. Again, the species that is in question here is continuing to be taken in this process. So we have ramped the pumps back up to their historic levels, is that correct?

Mr. JOHNS. Not historic levels, but levels that we would expect at this time of this year.

Mr. MILLER OF CALIFORNIA. I meant I guess I should say your ordinary operating procedures, what you're allowed to take?

Mr. JOHNS. For this year that is correct, yes.

One point if I may, the temperature conditions in the Delta are such that we think that those fish in the South Delta are probably at risk in any event.

Second, we think that the data would indicate that most of these fish if not all these fish are in the forebay already and probably will not survive that experience this summer.

Mrs. NAPOLITANO. Thank you.

Mr. MILLER OF CALIFORNIA. It does not sound like the protection level envisioned for that threatened species which we were told earlier is the same as an endangered species when answering the Chairwoman's question.

Mrs. NAPOLITANO. Thank you, Mr. Miller.

Mr. JOHNS. Thank you.

Mrs. NAPOLITANO. Point very well taken.

Yes, Mr. Thompson?

Mr. THOMPSON OF CALIFORNIA. Thank you, Madam Chair.

I, too, am pretty troubled by what seems to be or what sounds sitting up here to be a foregone conclusion that none of this stuff is working, therefore we need to go back to peripheral canal discussions.

Mr. Miller mentioned that—or somebody has mentioned there are multiple reasons and Mr. Miller suggested that equated to the same as no reason. I would just for the record state that there is one reason for sure that things are not improving, and that is not because we are getting too much water going into the Delta. The idea of moving it around the outside I find troubling in this discussion.

I want to focus a little bit on the whole issue of the science and how we got to where we are and how we did not get to where we should be. In my opening comments I talked a little bit about the problem upriver, the Klamath problem and how the science was intentionally altered in order to provide a water decision that was in line with what this Administration's Federal Administration wanted to see. So I guess my question is to you, Mr. Thompson. Have there been any—and I want to limit it to Vice President Cheney and Karl Rove as what has happened up in the Klamath but I want to be a little broader. I do not want you to answer based on those two individuals and maybe not tell me something I want to know. But have there been any communications between the White House and Interior on the issue of science in the Delta and water flows?

Mr. THOMPSON. Between the White House and Interior? Not that I am aware of.

Mr. THOMPSON OF CALIFORNIA. You know, that sounds like you are trying to split hairs.

Has there been some political influence that has been focused toward you folks and what we should be doing there?

Mr. THOMPSON. I get political influence from everyone. If you are asking me——

Mr. THOMPSON OF CALIFORNIA. Steve, we go back a long time.

Mr. THOMPSON. Yes.

Mr. THOMPSON OF CALIFORNIA. OK. You know what I am getting at and you know what happened in the Klamath. You know the direct influence that the White House exerted in order to get their water policy put in place. Has there been anything similar to that in regard to the Delta?

Mr. THOMPSON. Not similar to Klamath, but we have had interest from the Assistant Secretary's office on a regular basis on Delta smelt.

Mr. THOMPSON OF CALIFORNIA. What sort of influence is that? Has there been a direction that they want, an outcome that they want to see and are they hoping to influence scientific decisions or even not just scientific, maybe avoidance of the laws that pertains to the Endangered Species Act?

Mr. THOMPSON. That currently is under an active IG investigation. I feel it would be inappropriate to talk about at this time.

Mr. MILLER OF CALIFORNIA. If the gentleman would yield?

Mr. THOMPSON OF CALIFORNIA. I yield to Mr. Miller.

Mr. MILLER OF CALIFORNIA. The Assistant Secretary there, you are referring to whom?

Mr. THOMPSON. Deputy Assistant Secretary that is no longer there would be Julie MacDonald.

Mr. THOMPSON OF CALIFORNIA. Mr. Davis, could you tell me does the Bureau intend to approve any interim water contracts south of the Delta or extend contracts in the next year?

Mr. DAVIS. We will be approving interim contracts under the Central Valley Project Improvement Act of 1992. We were directed, the law says that when contracts expired the first interim renewal contract is for three years—up to three years. Subsequent contracts will be up to two years. It was the intention of the law at the time that this process be in place until all appropriate environmental documentation.

Mr. THOMPSON OF CALIFORNIA. So there will be new contracts?

Mr. DAVIS. There will not be new contracts.

Mr. THOMPSON OF CALIFORNIA. Just extended contracts?

Mr. DAVIS. Well, there will be existing contractors whose long-term contracts expire. We will enter into an interim renewal contract similar to the contracts that we have started in the mid-1990s.

Mr. THOMPSON OF CALIFORNIA. So is it safe to say that all expiring contracts will be renewed, interim or otherwise?

Mr. DAVIS. Under the statute they will be renewed on an interim basis. And then——

Mr. THOMPSON OF CALIFORNIA. My time is running out. But I would like to get an idea of how many of these contracts, how big they are and you will comply with all of the laws and rules, including NEPA, ESA and the CVPIA requirements in extending those interim contracts?

Mr. DAVIS. We do NEPA and ESA and both with the National Marine Fisheries Service and with the U.S. Fish and Wildlife Service.

Mr. THOMPSON OF CALIFORNIA. If you could put that together with an inventory of those contracts and the amount of water that we are talking about?

Mr. DAVIS. Absolutely.

Mr. MILLER OF CALIFORNIA. I guess under the rules here, the gentleman's time has expired.

Mr. THOMPSON OF CALIFORNIA. I was going to keep going.

Mr. MILLER OF CALIFORNIA. It has expired. I was going to let you keep going.

Mr. MILLER OF CALIFORNIA. Assemblywoman Wolk.

Ms. WOLK. Now is our chance.

Mr. Thompson and Mr. Broddrick——

Mr. MILLER OF CALIFORNIA. May I just assume that the answer to the question is you will compile the information?

Mr. DAVIS. Yes, sir.

Mr. MILLER OF CALIFORNIA. Congressman Thompson will submit that to you in writing. Thank you.

Mr. DAVIS. For the record, yes, we will.

Mr. MILLER OF CALIFORNIA. Thank you.

Assemblywoman Wolk?

Ms. WOLK. Mr. Thompson and Mr. Broddrick, you need to help me here. Millions of acre-feet of water are in an average year in the Delta. You get a report, it says there are 37 smelt. Could they fit in here? Maybe two cups.

Dr. MOYLE. Maybe two cups.

Ms. WOLK. To me this is a crisis. To me this conveys a sense of urgency. Mr. Thompson, Mr. Broddrick, and I will quote from you, Mr. Thompson, you state that the adaptive management strategies that were agreed to are somehow working. Mr. Broddrick, there is a declaration that we can continue the pumping, that there is surplus water and therefore continue the pumping. I do not understand how the process among Federal and state agencies involving the recent management of flows is working as intended. I need your help with that. People in my district do not understand that.

Mr. BRODDRICK. Assemblywoman Wolk, Ryan Broddrick. I will start off.

First of all, a lot of what we do on a day-to-day operation, it is perspective based on the information that we have and comparing it against 40 years of history. Unfortunately, it seems like each day creates a new history point for us.

When we on the adaptive management this year, a lot of the work that came out as a result of the CALFED and pelagic organism declined science was to look at natural dispositive flows or less than negative flows on the Old Middle River. It also shifted the focus, I think, toward fish that were—the big—I hate to use the term. It is not mine. It was actually developed I think by Dr. Moyle. The big mama theory. That was to protect a component of fish that in the past we had not focused on with the pumping that occurred November through March.

So we made those adjustments. The fish continued this year to spawn in the area in that was up in the deep water ship channel, something that was very unusual for a large pod fish, at least the one that we identified. Then we had a very high mortality, as best we could establish, of the juveniles that were essentially all the eggs in that basket.

So, yes, we adaptively manage. We try to use a temperature criteria and we try to look at the flows. As you and I have discussed, I am concerned about Steelhead and I am concerned about spring run salmon and fall run salmon, and I am interested and concerned about the other 295 threatened and endangered species that exist north and south of the Delta that rely on water supply. So we make our best management and sometimes we fail. But it is an honest judgment.

With that, I will be quiet.

Ms. WOLK. Mr. Thompson?

Mr. THOMPSON. We are also very concerned about the Delta smelt and the condition of the smelt. In this job you find yourself with over 300 endangered species in the State of California. Some species, like California condor, sea otter, others have been very, very low.

The one thing I know is that people working together saves species. The part I was talking about what is working is the heads of each of the agencies. All the way up and down through their staff are working as hard as we know how to find solutions and try to

balance the endangered species issues with all the other legal and other requirements we have. So that is the part I meant about what is working.

Ms. WOLK. I just have one more question. And that is about CALFED. I have attended several meetings of CALFED and was a strong supporter at its genesis. I thought that it was essential and it was in fact a dramatic step forward in partnership between the Federal, state and local entities.

I think it has done all it can do that is not controversial. It has been successful in the areas where there is consensus. The difficult decisions are the ones that have to be made, and they cannot be made in CALFED the way CALFED is currently structured.

I am curious as to whether you agree with that statement or not.

Mr. THOMPSON. I think maybe the question in my mind is where we would be if we did not have CALFED, and it has done remarkable things. There are things that worked very, very well.

As we sent through a Little Hoover Commission, and I testified at that also, there were serious challenges. Things that did not work very well. So to me it is a mixed blessing.

The part, again, that is working, the fallout of that was that agency heads and their staff are all working together to try to solve this problem.

The litigation has not been helpful. There is a continuous litigation that takes time, valuable time from our staff who are always going to court.

So parts of it worked very well. Other parts need help.

Ms. WOLK. Thank you.

Thank you, Mr. Chair.

Mr. MILLER OF CALIFORNIA. Excuse me. I have been elevated to Chair.

Assemblywoman Wolk, on CALFED I think just very briefly, the Bay-Delta Authority and the governance and what they had available for governance, I think we will come back to your question later as it is yet to be resolved.

The CALFED process, I think it is very important to remember that it was a framework that we structured a lot of bonds, state bonds in particular and integration with CVPIA and integration with Federal funding. That was a very good thing. We have also accomplished some dramatic things for the environment, for the public and for California.

We also committed in the process to a lot of planning documents. Those planning documents are now documents that are ready for implementation that do go to improving water quality, that do go to diversifying water supply, that do go to conjunctive water use. I think it is very important that we not throw away those two and three and four years worth of work and community consensus and ground up grassroots integrated regional water management plans, for example, with the general CALFED inability to take care of Delta smelt. I think that would be a mistake.

Ms. WOLK. Madam Chair, could I just make a comment?

Many of my colleagues up here were and remain leaders and were leaders at that time. There was also leadership at the highest levels. We are talking about the President and the Governor. That is something that we need again because the challenges and the

issues that have to be decided, the decisions are difficult and it is time once again I think for that kind of leadership, which we do not have. Congressman Miller and Congressman Thompson have highlighted the political issue of the biological opinion and conflicts of interests and how these decision—the basic information that we are relying on is suspect— perhaps worse—and that is a terrible, terrible situation we have to do something about.

Mrs. NAPOLITANO. Thank you. We are running a little bit behind. We still have two more panels, which I am combining into one panel. But if you will, make a real question.

Mr. Costa, you have a real question? Then we will move on.

Mr. COSTA. Yes. I just want to put in context, because we were talking about the current challenge with the below average water year.

The last two years if I do remember correctly, were above average and the third year was average. So I am wondering if you will answer in the context of how you try to manage all of the species including the Delta smelt, why did we not see improvement when we had the above average rainfall in which we had during the key months during the entrainment issues and such a lot of water on average and yet we did not see a noticeable change?

Mr. JOHNS. Last year, as you know, was a really wet year. Classically, Delta smelt do not do real well in wet years. They do pretty well in moderate years.

Last year we took as combined between the State and the Federal projects, a little less than 400 fish the entire year. We have not taken any Delta smelt from April of 2007 to May of this year. So in terms of project impacts on Delta smelt, you would think that it would be an all time low. If it was truly a driver, you would see increases, dramatic increases. But we did not see huge increases. As I recall the numbers of adult smelt were about the same this year as last. As Dr. Broddrick talked about, we did have this tenfold decrease or basically about a 90 percent drop in the number of young smelt that we expected this year, likely due to a toxic event in the Sacramento Cache Slough area. Because we have talked there are a lot of things going here in the system. We keep turning the one knob, the project knob because we have it, we can turn it. But there are other things we need to be addressing here and we are not addressing those based on the science we have. It is improving, and we need additional resources and knowledge to do those more effectively.

Mr. COSTA. Thank you. I think that is a good answer.

Mrs. NAPOLITANO. Thank you much.

Mr. Miller?

Mr. MILLER OF CALIFORNIA. Thank you.

I just want to go back, because I think it is critical. Congressman Thompson has referred to the intervention of the Vice President that was painstakingly documented this last week and the catastrophic situation that his intervention set up, not only the loss of the salmon but it turned out we spent $60 million of taxpayer monies and people lost their businesses, some people lost their boats, their livelihoods and others all because they made a political decision to intervene and to whip out the science that would not have allowed that to happen.

We now have the situation where, what is she, Assistant Secretary? Mr. Thompson, what's the title?

Mr. THOMPSON. Her last title was a Deputy Assistant Secretary.

Mr. MILLER OF CALIFORNIA. Her last title is going to be convict, but as Deputy Assistant Secretary was wandering around in the science changing these reports, changing language to the opposite of whatever the finding was, and in dealing with the species that is absolutely key to how we try to figure out the operation of the Delta. What assurances can you give this Committee that those scientists whose work was overridden, if they are still with the agency, and the other scientists will be immune from this kind of activity as we now respond to the court decision that these biological opinions are flawed? You know, we have contract negotiations going on based upon science. We have all of these other decisions based upon science. Now we find out that people were wandering around there with no scientific background, but with a political agenda. How do we now know that we are going to get the free thinking and the best thinking of those scientists without that political interference.

Mr. THOMPSON. Well, I think that is a great question, Congressman. We met with our, what I will call our project leaders, the people that run our field offices and ecology series and endangered species around the middle of May. I had Dale Hall, our Director, come out. We asked our project leaders to review all the decisions since I have been here in 2001, asking them some key questions about the science and the biology and did they feel that the Deputy Assistant Secretary interfered with any of their decisions as we found out new information through the press and everything else. So that evaluation I just signed on Friday——

Mr. MILLER OF CALIFORNIA. The Secretary told these people that they will be allowed to do their jobs without political interference.

Mr. THOMPSON. The Secretary has not talked to them. No. But Director Dale Hall and I have talked to them.

Mr. MILLER OF CALIFORNIA. You have told them exactly that?

Mr. THOMPSON. Yes.

Mr. MILLER OF CALIFORNIA. That they will be free to pursue the evidence where it takes them?

Mr. THOMPSON. I told them exactly that. I also asked them for an evaluation of any decisions that have been made in the past since I have been here that they felt were interfered with or the science was manipulated to come to a different decision than they would have come up with.

Mr. MILLER OF CALIFORNIA. We simply cannot proceed with trying to solve what we all agree is a very complex problem if, in fact, we have this kind of intervention and we in fact have science that is invalid and tainted by those activities. As we know, this is a layering effect. You start to build upon what you know and what you have learned to try to make other decisions. If the fundamental decisions are being undermined and the information is being undermined, there is no chance for success at the preservation of the Delta system.

Mr. THOMPSON. I agree.

Mr. MILLER OF CALIFORNIA. Thank you.

Mrs. NAPOLITANO. Mr. Thompson?

Mr. THOMPSON OF CALIFORNIA. Thank you, Madam Chair.

I appreciate Mr. Miller's last question and statement. I would hope, Madam Chair, that maybe we could do something as the Members in attendance of this Committee and a letter to the Secretary wanting this information out, and the fact that it is going to take the Secretary coming forward to make a statement to these different professionals who have not been allowed to do their work.

Mrs. NAPOLITANO. We will so entertain it.

Mr. THOMPSON OF CALIFORNIA. Thank you.

The question I had to Mr. Thompson and Mr. Davis, I believe it is related but it is a shift from where we were. On the San Luis drainage proposal, and I am assuming that you folks were at the table or at least would have been in the discussion on this. I am very concerned as to how that is handled and the impact that is going to have on the record of decision on the Trinity River. I would like to hear some comment from you as to how we can be assured on the Trinity, again going back to the link, that is the direct flow into this Delta system. I also want to make sure that our restoration efforts and the much time and many dollars that we spent up there are not wasted. That is a critical component of bringing back the fish in the Klamath. Can you comment on that briefly?

Mr. THOMPSON. Well the first thing on the Trinity part, as you know and you are well aware we have made tremendous progress on the bridge removal and habitat restoration——

Mr. THOMPSON OF CALIFORNIA. Notwithstanding that, I am concerned about the specific San Luis drainage proposal and the Westlands interest in their trying to get additional or I guess permanent water rights and what the potential impact that may have on the ROD on the Trinity?

Mr. DAVIS. Well, Congressman, the answer there is that the Trinity water is staying on the Trinity side and it will be used for the flows.

We are negotiating——

Mr. THOMPSON OF CALIFORNIA.—the water comes from, that they get what they want of the drainage——

Mr. DAVIS. In the drainage proposal, and again it is still in discussions and the details have not been worked out, environmental documents have not been worked out. But in theory we are talking appropriated——

Mr. THOMPSON OF CALIFORNIA. Details notwithstanding, we have heard testimony ad nauseam as to the zero sum game they are working with, where there is only so much water. We are not making anymore. In drought years it is worse than nondrought years, obviously. But to suggest that we are going to increase and make permanent someone's water right it is going to have to be at the expense of someone else.

Mr. DAVIS. Well, what we are doing is taking one of the water rights, in theory they have not been finalized yet, taking one of the water rights for San Luis, which is a direct diverse right in the Delta and then subject it to the water that is available in the Delta. If the water is not there, they are not going to be able to appropriate it.

Mr. THOMPSON. Well, how do we make sure that the Trinity water and the provisions of the ROD are protected in that area?

Mr. DAVIS. Well, the Trinity water is Central Valley Project Water. We are going to protect that, the United States is protecting that.

What we are doing is we are slicing off one of——

Mr. THOMPSON OF CALIFORNIA. And one point. A lot of the Trinity water was Central Valley Project water.

Mr. DAVIS. Absolutely. Absolutely.

Mr. THOMPSON OF CALIFORNIA. What finally grew back into where the science, among other things, dictate we need to be.

Mr. DAVIS. Yes. Absolutely. Most of that water now is staying on the Trinity side. Might even be coming over to be considered party of the CVP yield. It is being reserved for the Trinity flows in the restoration. So there is the difference. It is just going to be a direct diversion right in the Delta that we are talking about transferring.

Mr. THOMPSON OF CALIFORNIA. Well, I am very concerned that we have protections, appropriate protection in place for the Trinity. Before anything further happens south that may obligate other water to other places, I think we need to have that.

I'd like, Steve, for you to work with my office to figure out how we can guarantee that protection is in place.

Mr. DAVIS. Well, we are working with Senator Feinstein and congressional members right now. We will be sure to add your office on that notification.

Mr. THOMPSON OF CALIFORNIA. Well, I am talking about one very, very specific sliver. That is the protection, broad protection——

Mr. DAVIS. The Trinity? Yes.

Mr. THOMPSON OF CALIFORNIA. Thank you.

I yield back.

Mr. MILLER OF CALIFORNIA. Would the gentleman yield for a second?

Mr. THOMPSON OF CALIFORNIA. I yield, Mr. Miller.

Mr. MILLER OF CALIFORNIA. We have a divergence of interest here, obviously, because we come from different parts of the State. But it seems to me we have a full blown crisis going in the Delta. I was just wondering how much manpower or person power you are diverting to this question of Westlands draining as opposed to working the Delta issue? I mean, Senator Feinstein's office I think there was discussion about the allocation of resources here. You have one place that is a three alarm fire going on and we are trying to sort it out; and the other one, with all due respect, is manageable for a foreseeable period of time.

Mr. DAVIS. Congressman, that is correct. We have resources, we have a lot of balls in the air. We have the drainage issue. We have the ESA issue here. We have the salmon issues we are dealing with. We have Klamath we are dealing with.

We have separate teams working on this and we are looking at a workload. In some lower priority work, we are not going to do anymore. That is just a natural evolution of things.

We are working on—well, Steve talked about Klamath. We have resources working on the Truckee. We are participating in the CALFED storage issues.

Mr. MILLER OF CALIFORNIA. And we got the green sturgeon.

Mr. DAVIS. Green sturgeon. We are waiting for National Marine Fishery Service to give us the proposed 4D rule on that. We have notified the National Marine Fishery Service we want to consult.

Mr. NAPOLITANO. Go ahead, finish your thought.

Mr. DAVIS. We want to consult with them on that.

Mrs. NAPOLITANO. Thank you much. I think we need to move on. We have another panel, we are already at 11:30.

Any questions, please submit them in writing, and I am sure that we will get them to you, and would request that you answer them expeditiously, if you will.

The statement, and I did not get a chance to speak on this, is maybe the CALFED that was created 13 years ago, the expectations might have been a little too high. It has done well in the ecosystem restoration, but less of a success in the framework of the Delta. Is that because CALFED was never intended as a regulatory program and do we need more regulation of the activities that impact the Delta or do we seem to need better leadership to guide us into a sustainable Delta? Those are questions that I am going to be asking of you and would appreciate your coming back with an answer.

For the record, all testimonies submitted are going to be posted on my website on www.house.gov/Napolitano. So if you are wanting to go and read some of this, you can access through the website.

Ms. Wolk, do you have another question real quickly?

Thank you very much.

Panel, thank you very much for your presence and your testimony. Again, I would request that you reply to us as fast as you can once you get the questions. Thank you for taking the time.

I would like to move on to—yes, please take your jackets off. If you have noticed, I am fanning up here. It is warm.

I would like to call the two panels. David Nawi, attorney, Environmental Mediation, Sacramento; Heather Cooley, Senior Associate, Pacific Institute of Oakland; William Stelle, Partner, K&L Gates in Seattle, Washington.

On panel 4, B.J. Miller, Consulting Engineer in Berkeley and The Honorable Phil Larson, Fresno County Supervisor in Fresno.

Thank you for being here.

We will proceed with Mr. Nawi. Mr. Nawi, your testimony, please?

STATEMENT OF DAVID NAWI, ATTORNEY, ENVIRONMENTAL MEDIATION, SACRAMENTO

Mr. NAWI. Thank you very much, Madam Chair, Members of the Committee. Thank you for the opportunity to appear before you today.

As you have recognized the issues you are dealing with regarding the Bay-Delta are at a critical stage. The crisis is reflected in the decline of the Delta smelt and in litigation based on the State and Federal Endangered Species Acts that has the potential to directly affect the operations of the Central Valley Project and the State Water Project.

It is deeply disappointing that despite the tremendous efforts of so many people, I was one of them up until 2001, that has gone

into the creation and implementation of the CALFED program, and despite the enactment in 1992 of the Central Valley Project Improvement Act authored by Congressman Miller we are now at such a critical stage.

Institutionally we are at a point, as we have been in the past, where litigation has ousted collaboration as the dominant means of addressing water issues in California and especially the Bay-Delta. As a consequence, the courts are on the verge of becoming directly involved in overseeing, if not dictating the operations of the projects. Because the Bay-Delta is a uniquely valuable ecological resource that at the same time serves as the heart of the State's water supply and delivery infrastructure, it is perhaps inevitable that the factors affecting the Bay-Delta would be a source of conflict.

There has long been a recognition that long-term solutions must be developed to comprehensively address the numerous and complex factors that address the Bay-Delta and the totality of the State's water supply and delivery system. Among other things, a comprehensive approach must assure compliance with the Federal Endangered Species Act, California Endangered Species Act, water quality requirements and State water law. In recognition of the need for a comprehensive long-term approach, the Governor and the Legislature have established Delta Vision to address the full array of issues to achieve a sustainable Delta. However, any long-term solutions will take time to develop, fund and implement and action cannot be prudently be delayed.

In the early 1990s we were faced with a situation that has many features in common with what we are facing today. Fish species were in sharp decline and ESA requirements caused unpredicted reductions in project pumping and consequent uncertainty and cutbacks in water supply for agricultural and municipal and industrial uses south of the Delta. Actions of the State and Federal agencies were not coordinated and often were at cross purposes.

To remedy this situation the leadership at very high levels of the State and Federal Governments became actively and intensely engaged and took a series of actions to create a sound coordinated and collaborative approach to moving forward. From Club FED through the 1994 Framework Agreement and the December 1994 Bay-Delta Accord to the August 2000 CALFED record of decision substantial and tangible progress was made toward a less adversarial and more collaborative science-based approach that fully involved stakeholders.

The enactment in 1992 of the CVPIA was also intended to help ensure the health of the Delta and the species dependent on it. Unfortunately, despite the implementation of CVPIA, despite the benefits of the collaborative process established by CALFED and despite the Environmental Water Account and other achievements of CALFED, an indicator species listed by the State and Federal Governments is now in grave peril, and once again conflict and litigation have come to dominate Bay-Delta issues. In the absence of a sound collaborative scientifically based process for operating the projects in a manner that provides needed water supply and at the same time maintains clear compliance with statutory mandates

that are unforgiving, and deliberately so, litigation and an increased roll of the courts is likely if not inevitable.

Courts have not been created with the intent that they operate water projects, and they are not well-equipped to make the scientific and biological judgments involved in assuring consistency between project operations and the requirements of the State and Federal ESAs. But if they find that environmental statutes have not been complied with, they will have little choice but to order such compliance. There is no small potential that courts will have to make their own determination of the actions needed for compliance.

No one wants the Delta smelt or other species dependent on the Delta to become extinct. No one wants the massive disruptions and hardships that drastic reductions in water supply would cause. Critical decisions that will affect project operations are now before the courts in the context of adversarial litigation. The only alternative to the courts making these decisions will be agency actions that will assure compliance with statutory mandates and especially the mandate of both the Federal and State ESAs to avoid jeopardy, and even more critically from preventing species from becoming extinct.

The agencies must take effective actions to this end and their actions must be comprehensive and must be based on collaboration, balance and transparent and scientifically based decision making. Based on recent history, this will occur only if the political leadership of both California and the Federal Government take an active role and provide strong support and clear and unambiguous direction to the agencies to assure statutory compliance.

That concludes my statement. Thank you very much.

[The prepared statement of Mr. Nawi follows:]

Statement of David Nawi

Madame Chair, Members of the Subcommittee. Thank you very much for providing me this opportunity to appear before you today.

As you have recognized [and heard from previous witnesses today] the issues you are dealing with regarding the Bay-Delta are of vital importance and are at a critical stage. Federal and state court judges have found of violations of both the federal and California Endangered Species Acts, and current information indicates that the federal and state listed Delta smelt may be on the verge of extinction. Depending on the outcome of appeals and further rulings, the courts may be in the position of determining how the Central Valley Project (CVP) and the State Water Project (SWP) will be operated.

I will briefly describe relevant legal provisions at issue in current litigation and regulatory proceedings and then offer some thoughts on the possible future course of events.

The Federal Endangered Species Act

I will begin with the federal Endangered Species Act (ESA). 15 U.S.C. §§ 1531 et seq. Section 9 of the ESA prohibits any person from "taking" a species listed as threatened or endangered. 15 U.S.C. § 1538. The statute defines "take" to mean, among other things, to harass, harm, wound or kill a species. Section 3(18), 15 U.S.C. § 1532(18). Section 10 of the Act provides that take of a species may be permitted if it is incidental to an otherwise lawful activity and is authorized pursuant to an approved conservation plan, known as a habitat conservation plan, or HCP. Of relevance to the CVP and SWP, take may also be authorized by an incidental take statement included in a biological opinion issued pursuant to section 7 of the Act.

Section 7(a)(1) directs all federal agencies to utilize their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of listed species. 15 U.S.C. § 1536(a)(1). Section 7(a)(2) directs any federal agency pro-

posing to carry out an action authorized, funded or carried out by the agency to insure that that the action is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. 15 U.S.C. § 1536(a)(2).

The directive in Section 7(a)(2) to avoid jeopardizing the continued existence of a species was the basis of the seminal Supreme Court case of TVA v. Hill (1978) 437 U.S. 153, a 1978 decision that enjoined a federal agency from constructing a dam that would have eradicated a tiny fish, the snail darter. Referring to the statutory directive in Section 7(a)(2), the court wrote, "This language admits of no exception." 437 U.S. 153, 173. (Shortly after the decision in TVA v. Hill, supra, Congress amended the ESA to allow the so called "God Squad" to exempt federal actions from Section 7(a)(2). Section 7(h), 15 U.S.C. § 1536(h). This exemption process has rarely been used.)

Section 7 also specifies the procedure pursuant to which federal agencies must consult with either the Fish and Wildlife Service (FWS), in the Department of the Interior, or the National Marine Fisheries Service (NMFS), in the Department of Commerce, to assure that covered actions comply with Section 7(a)(2). (Administration of the ESA is the responsibility of the Secretary of Commerce and the Secretary of the Interior, depending on the species. Section 3(14), 15 U.S.C. § 1532(14).) The statute provides for a biological opinion to be issued on a finding that the agency action will not violate section 7(a)(2), i.e., not result in jeopardy or adverse modification of critical habitat, and that sets forth the impacts of the taking, reasonable and prudent measures to minimize the impacts, and mandatory terms and conditions that must be complied with by the federal agency.

Section 7(d) prohibits a federal agency, after the initiation of consultation, from making any irreversible or irretrievable commitment of resources with respect to the action that would foreclose the formulation or implementation of reasonable and prudent alternative measures that would not violate section 7(a)(2). 15 U.S.C. § 1536(d). Section 7(o) exempts from the take prohibition of Section 9 take that is in compliance with the terms and conditions of a biological opinion. 15 U.S.C. § 1536(o). Pursuant to his provision, biological opinions generally contain an incidental take statement that has the effect of authorizing take.

In addition to provisions for civil and criminal penalties, the ESA contains a provision allowing suits by citizens to enjoin violations of the Act or implementing regulations. Section 11(g), 15 U.S.C. § 1540. Courts have held that a biological opinion may be challenged under the Administrative Procedure Act (APA) on the grounds, among others, that it is arbitrary, capricious or an abuse of discretion. 5 U.S.C. § 706(2)(A). Bennett v. Spear (1997) 520 U.S. 154.

The Fish and Wildlife Service and NMFS issued separate biological opinions under ESA Section 7 regarding the Bureau of Reclamation's 2004 Operating Criteria and Plan (OCAP), a document that describes the coordinated operations of the CVP and SWP. Both biological opinions have been challenged in court. In Natural Resources Defense Council v. Kempthorne, E. D, Cal. No. 1:05-CV01207 OWW (TAG), Judge Oliver Wanger issued an order on May 25 finding the 2005 FWS OCAP biological opinion to be in violation of the APA and unlawful. The court has requested that the parties submit briefs on the question of remedy and has scheduled a hearing on the issue in late August. Presumably the court will consider and rule on the manner in which the projects may operate pending the completion of a new biological opinion, expected some time in 2008.

A second case before Judge Wanger challenges the NMFS biological opinion. Pacific Coast Federation of Fishermen's Associations v. Gutierrez, E.D. Cal. No C-06-0245. While the court in this case issued a ruling in June dismissing claims under the National Environmental Policy Act, the ESA claims have yet to be briefed or considered by the court.

The California Endangered Species Act

I will briefly turn next to the California Endangered Species Act, or CESA. CESA prohibits the taking of state-listed threatened or endangered species. Cal. Fish and Game Code ("FGC") § 2080. CESA contains provisions that allow the take of listed species through various mechanisms.

Take is allowed if a person has obtained an incidental take permit or incidental take statement allowing take of the species under the federal ESA, and the incidental take permit or statement is determined by the Director of the Department of Fish and Game to be consistent with the relevant provisions of the Fish and Game Code. FGC § 2080.1. The Department may issue an incidental take permit if certain criteria are met, including minimization and full mitigation of the impacts of the authorized take. FGC § 2081. Take is also allowed if it was authorized

through a plan or agreement entered into by the Department of Fish and Game in a specified time period, a so-called "grandfather" provision. FGC § 2181.1

A lawsuit recently decided at the trial level claimed that pumping by the SWP was taking state-listed species (Winter Run Chinook Salmon, Spring Run Chinook Salon and Delta smelt) without incidental take authorization from the Department of Fish and Game and therefore in violation of CESA. Watershed Enforcers v. Department of Water Resources, Alameda County Superior Court No. RG06292124. In ruling for the petitioners, the trial court rejected the claim by the DWR that a series of five documents served to bring DWR's take of the species within the coverage of the grandfathering provisions of section 2181.1 The court issued a judgment on April 17 of this year ordering that DWR cease pumping within sixty days unless DWR had received authorization from the Department of Fish and Game for the incidental take of the three species. DWR has appealed the ruling, and it is currently stayed pending appeal.

California Water Law

In addition to the federal and state ESAs, both projects are subject to the regulatory authority of the Sate Water Resources Control Board (State Board). Under the state's Porter-Cologne Water Quality Act (Water Code §§ 13000 et seq.), the State Board is charged with adopting water quality control plans, including a plan for the Bay-Delta, to meet the requirements of section 303 of the federal Clean Water Act. (Federal Water Pollution Control Act, 33 U.S. C. § 1313). Section 303 provides the water quality control plan must meet specified requirements and is subject to approval by the federal Environmental Protection Agency. Water quality control plans are not self-implementing and do not contain regulatory requirements applicable to water rights holders, whose diversions are subject to water rights permits issued by the State Board.

Both the state and federal projects are required to obtain and comply with the water right permit requirements of state law. The applicability of these requirements to the CVP was the subject of the 1978 decision of the U.S. Supreme Court in California v. U.S., 438 U.S. 645, which held that under section 8 of the Reclamation Act of 1902, 43 U.S.C. § 383, a federal project must comply with state requirements that are not inconsistent with clear congressional directives regarding the project.

The State Board has broad authority and responsibility in administering water rights permits. If the Board finds a violation or threatened violation of any term or condition of a permit, it may issue a cease and desist order. Water Code § 1831. The Board also has the authority, and in fact is directed, to take action to prevent waste, unreasonable use, or unreasonable method of use of water. Water Code § 275; Cal. Constitution Article X, section 2. Water rights permits are also subject to review and modification pursuant to the public trust doctrine. National Audubon Society v. Superior Court, (1983) 33 Cal.3d 419.

The State Board held a workshop on June 19 to receive recommendations on short term actions it should consider to improve fishery resources, including actions to slow or stop the decline of Delta smelt, improve water quality conditions, and reduce impacts resulting from water diversion and use in the Bay-Delta. The workshop notice stated that the Board sought formation on, among other things, reducing diversions, for export or in-Delta use, from Delta channels; requiring releases from upstream storage; requiring waste dischargers to provide monitoring reports; and requiring measures to ease potential dry year conditions to ensure reasonable protection of water quality and beneficial uses in the Delta. Following the workshop, the State Board has not indicated what actions it is considering.

Looking to the Future

What can we say about the future? For the long term, it is apparent that solutions must be developed that comprehensively address the numerous and complex factors that affect the Bay-Delta and the totality of the state's water supply and delivery system. Among other things, a comprehensive approach must assure compliance with the statutory regimes discussed above—the federal ESA, the California ESA, and state water law, including provisions to comply with the federal Clean Water Act. In recognition of the need for a comprehensive long-term approach, California's Delta Vision has been established to address the full array of issues to achieve a sustainable Delta.

However, any long-term solutions will take time to develop, fund, and implement, and at least until there is a long-term solution, litigation almost certainly will continue to be a way of life for water issues in California and especially the Bay-Delta. The Bay-Delta is a uniquely valuable ecological resource that at the same time

serves as the heart of the state's water supply and delivery infrastructure. These two functions seem inevitably to lead to conflict.

In the early 1990s we were faced with a situation that had many features in common with what we are facing today. Fish species were in sharp decline, and Endangered Species Act requirements caused unpredicted shut-downs of the project pumps and consequent uncertainty and cut-backs in water supply for agricultural and municipal and industrial water users south of the Delta. Actions of state and federal agencies were not coordinated and often in conflict.

To remedy this situation, the leadership of state and federal governments became actively engaged and took a series of actions to create a sound, coordinated and collaborative approach to moving forward. From Club FED (the Federal Ecosystem Directorate), through the July 1994 Framework Agreement, and the December 1994 Bay-Delta Accord ("Principles for Agreement on Bay-Delta Standards between the State of California and the Federal Government"), to the August 2000 Record of Decision (ROD) on the CALFED Bay-Delta Program, substantial and tangible progress was made toward a less adversarial and more collaborative science based approach that fully involved stakeholders. The enactment in 1992 of the Central Valley Project Improvement Act, Pub. L. No. 102-575, Title XXXIV (CVPIA), was also intended to help assure the health of the Delta and the species dependent on it.

Unfortunately, despite implementation of the CVPIA, the benefits of the collaborative process CALFED created, and the Environmental Water Account other substantive achievements of CALFED, an indicator species is in grave peril, and once again conflict and litigation have come to dominate Bay-Delta issues. In the absence of a sound, collaborative, scientifically based process for operating the projects in a manner that provides needed water supply and at the same time maintains clear compliance with unforgiving statutory mandates, litigation and an increased role of the courts is likely if not inevitable.

Courts have not been created with the intent that they operate water projects, and they are not well-equipped to make the scientific and biological judgments involved in assuring consistency between project operations and the requirements of the state and federal ESAs. But if they find that environmental statutes have not been complied with, they will have little choice but to order such compliance, and there is no small potential that courts will have to make their own determinations of the actions needed for compliance.

No one wants the Delta smelt or other species dependent on the Delta to go extinct. Avoidance of species extinction is the most essential goal of the state and federal ESAs, the primary purpose for which they were enacted. And no one wants to see the massive disruptions that drastic reductions in water supply would cause. Critical decisions regarding these goals are now being made by the courts in the context of adversarial litigation. The only alternative to the current situation will be coordinated and effective agency action to comply with statutory mandates based on collaboration, balance, and transparent and scientifically based decision-making. And this will occur only as a result of strong, positive and far-sighted political leadership of both California and the federal government.

Thank you again for this to opportunity to appear before you. I would be glad to answer any questions you may have.

Mrs. NAPOLITANO. Thank you, sir.

We now have Heather Cooley.

Ms. Cooley?

STATEMENT OF HEATHER COOLEY, SENIOR ASSOCIATE, PACIFIC INSTITUTE OF OAKLAND

Ms. COOLEY. Thank you for the opportunity to testify today. I have submitted more detailed comments and will touch on the major points here.

We have heard much today about the many problems plaguing the Delta. While there is no single solution, reducing water exports from the Delta must be a fundamental element of any sustainable water management strategy. We know that the physical barriers and the huge pumps that move water south directly kill fish and also radically alter flows in the Delta, thus altering water quality, water temperatures and access to habitat vital for fish survival.

Yet the economic and political pressures to maintain water exports remains high. In part, because water planners assume that economic and population growth will lead to increases in water demands and that to meet this demand we must build more infrastructure to extract more water.

These assumptions are false. I have submitted—I would like to draw your attention to Figure 1 that I submitted. A total water use in California is less than it was in 1975. Today is less than it was. I repeat that. Many people do not believe that, but despite population growth and growth in the economy, water use is less today.

Forty years ago we used nearly 2,000 gallons of water per person per day. We are now down to half that amount. This has been achieved in part by transitions in our economy from a manufacturing base to a more service oriented sector. But it has also been driven by conservation and efficiency improvements.

In many of the discussions today, I have heard conservation and efficiency come up. It is quite heartening. However, we have made improvements in the past, current water use still remains wasteful.

Studies indicate that installing water efficient appliances and figures could reduce urban use by an additional 30 percent. These numbers have also been adopted by the State, incidentally.

Savings from the agricultural sector are also possible. Inefficient sprinkler and flood systems are still used on 65 percent of the crops irrigated in California. Given that agriculture consumes 80 percent of the water in California, even small improvements can yield big savings.

In addition, many conservation and efficiency studies we have done at the Pacific Institute indicate that conservation and efficiency improvements can help meet demands for decades to come. Installing efficient technologies, including drip irrigation, can reduce total demand by 20 percent with a growing population and economy by the year 2030.

In addition to conservation and efficiency a number of other options are available to augment existing local supplies, including recycling and reuse, better management of our ground water resources and desalination.

Today's Delta crisis is unfortunate, but it provides an opportunity to work toward a more sustainable path that includes more efficient use of our existing resources. Waiting another five to ten years will make solving these challenges more difficult and expensive.

Thank you.

[The prepared statement of Ms. Cooley follows:]

Statement of Heather S. Cooley, Senior Research Associate at the Pacific Institute, Oakland, California

Summary

Scientific evidence indicates that the health of the Sacramento-San Joaquin Delta is unstable and rapidly deteriorating. While there is no single solution to the problems that plague the Delta, reducing Delta water exports must be a fundamental element of any sustainable management strategy. The economic and political pressures to maintain water exports to urban and agricultural users remain high, and exports from the Delta continue to increase. Yet research shows that our current water use is wasteful. Conservation and efficiency improvements can provide substantial water savings and allow us to reduce Delta exports. Furthermore, local resources, such as recycled water and more effective groundwater management, can

provide a reliable new supply of water. It is critical that we move toward a more sustainable management strategy today; waiting another five to ten years will make solving California's complex water challenges more difficult and expensive.

Current State of the Delta

The Sacramento-San Joaquin Delta provides a number of key services to California, including drinking water for 18 million Californians, water for agricultural uses, recreational opportunities, and habitat for 500 species. The Delta also serves as a hub for electricity and gas transmission and numerous transportation lines.

Scientific evidence indicates that the health of the Delta is unstable and rapidly deteriorating. The recent collapse of the Delta smelt is of particular concern because it is an indicator species whose survival is a reflection of ecosystem health. Instead of pursuing an effective management strategy, state and federal agencies apply a Band-Aid and simply wait for the next crisis. This pattern of crisis management is proving to be both expensive and largely ineffective.

While there is no single solution to the problems that plague the Delta, reducing Delta water exports must be a fundamental element of any sustainable management strategy. Scientific evidence shows a clear relationship between increasing water exports from the Delta and its declining ecosystem health. We know that the physical barriers and huge pumps in the delta that permit massive exports of water to farms and cities in the south kill fish directly and radically change flows in the delta, affecting water quality, water temperatures, and access to habitat vital for fish survival.

The economic and political pressures to maintain water exports to urban and agricultural users remain high, and exports from the Delta continue to increase. In addition, some members of the water community are calling for increased surface storage and conveyance to meet growth-related needs and address potential impacts associated with climate change. This approach is merely a continuation of traditional water planning, which has brought tremendous benefits to California in the past, but has also wrought unanticipated social, economic, and environmental costs, as evidenced by the current status of the Delta. Strategic planning and management can help California reduce Delta withdrawals without the need for additional surface storage.

Traditional Water Planning Assumptions are Incorrect

Water planning, as practiced in the 20th century, is based on two assumptions:

- First, that the economy, population, and water use are inextricably linked such that economic and population growth will result in increases in water demand and any reductions in water availability will hurt the economy.
- Second, that meeting the needs of a growing population requires building more physical infrastructure to take water from rivers, lakes, and groundwater aquifers.

Today, these assumptions are outdated and inaccurate.

Over the past 30 years, the economy and population have grown while water use has declined. Figure 1 shows California's gross state product, population, and water use between 1975 and 2001. Total water use in California was less in 2001 than it was in 1975, yet population increased by 60% and gross state product increased 2.5 times. In 1975, we produced only $3 in goods and services for every 100 gallons of water we used. Today we produce $9 for every 100 gallons used, in constant dollars (Figure 2). Forty years ago we used nearly 2000 gallons for every person in the state every day. Today we use half that amount (Figure 3). We can break, and in fact, have broken the link between growing water use, population, and economic well-being. This has been achieved in part by improvements in conservation and efficiency, as well as the changing nature of our economy.

Conservation and Efficiency Can Meet California's Water Needs

Although Californians have improved efficiency of our water use over the past 25 years, current water use is still wasteful. The Pacific Institute's 2003 report, "Waste Not, Want Not," provides a comprehensive statewide analysis of the conservation potential in California's urban sector. This study finds that **existing, cost-effective technologies and policies can reduce current (2000) urban demand by more than 30 percent.**

Substantial savings are available from the agricultural sector as well. More than 65% of all crops in California are still grown with inefficient flood or sprinkler irrigation systems. Studies have shown that installing efficient irrigation technologies, such as drip system, can reduce water use and increase agricultural yield. Given that the agricultural sector uses 80% of California's water supply, or about 34 million acre-feet per year, even small efficiency improvements can produce tremendous water savings. Additional water savings are possible if farmers continue the trend

of moving away from water-intensive crops like cotton, pasture, rice, and alfalfa in favor of more valuable low-water crops like vegetables, fruits, and nuts.

Conservation and efficiency can meet our needs for decades to come. In the 2005 report "California Water 2030: An Efficient Future," the Pacific Institute presents a vision of California in which improvements in water-use efficiency are considered the primary tools for reducing human pressures on the state's water resources. This study finds that California's total water use in 2030 **could be 20% below current levels while still satisfying a growing population, maintaining a healthy agricultural sector, and supporting a vibrant economy.** Some of the water saved could be rededicated to agricultural production elsewhere in the state; support new urban and industrial activities and jobs; and restore California's stressed rivers, groundwater aquifers, and wetlands—including the Sacramento-San Joaquin Delta.

Research shows that significant water savings can be found for much less than the cost of building new supply or expanding our current supply. These savings are real and represent a tremendous amount of untapped potential in California's urban and agricultural sectors. This suggests that improved efficiency and conservation are the cheapest, easiest, and least destructive ways to meet California's water supply needs.

Water conservation and efficiency has the additional benefit of producing significant energy savings. Capturing, treating, transporting, and using water require a tremendous amount of energy. This is particularly true in California, where water supplies and population centers are separated by hundreds of miles, requiring a tremendous amount of infrastructure to move water from where it is available to where it is needed. As a result, **California's water-related energy consumption accounts for roughly 19% of all electricity used in California, approximately 32% of all natural gas, and 88 million gallons of diesel fuel.** Thus improving statewide water conservation and efficiency can achieve substantial energy savings.

Additional Water Supply Options Are Available

In addition to conservation, communities throughout California have a number of other options available to augment their existing supplies. These options include:

Recycled Water: Reclamation can augment water supplies, as well as provide a means to treat wastewater and reduce environmental discharge. Water agencies in California currently produce about 500,000 acre-feet of recycled water, the majority of which is used for agricultural and landscape irrigation. Expanding current efforts could produce a substantial amount of new water. For example, the Irvine Ranch Water District, in Southern California, meets nearly 20% of its total demand with recycled water. A new residential community in Ventura County, California has decided to use recycled water for all of its landscaping needs at an estimated cost of $200 per acre-foot, far below the cost of new surface storage. This suggests that significant opportunities exist to increase recycling and reuse throughout the state, effectively lessening the need to identify and develop new water supplies.

Conjunctive Use: Surface water and groundwater are hydrologically linked. Conjunctive use takes advantage of this connection by storing excess surface water, including stormwater, in groundwater basins for later use. This option can improve supply reliability and flexibility, reduce land subsidence, and minimize the impacts of urban runoff on local steams and the marine environment.

Desalination: Appropriately designed and sustainably managed desalination (both seawater and groundwater) can provide a reliable, high-quality water supply that is independent of weather conditions.

Conclusions

Today's Delta crisis is unfortunate, but it provides an opportunity to work towards a new path. Smart management and efficiency improvements can enable us to meet current and future water needs more sustainably. Waiting another five to ten years will make solving California's complex water challenges more difficult and expensive.

Supporting Figures for the Testimony of Heather S. Cooley
Senior Research Associate, Pacific Institute, Oakland, California

For the House Subcommittee on Water and Power

July 2, 2007

California Economy, Population, and Water Use

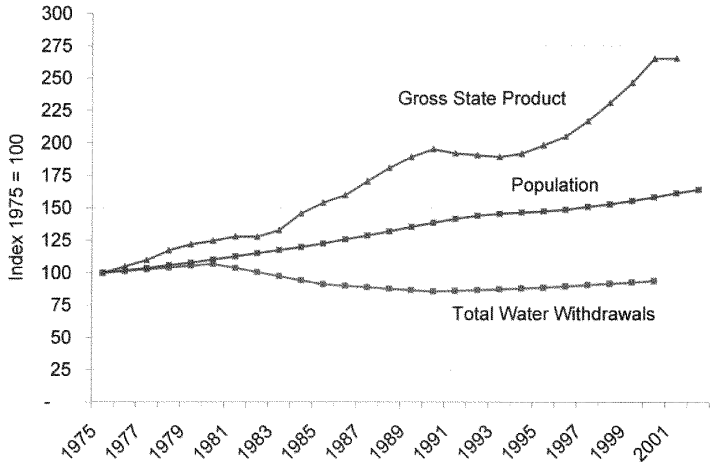


Figure 1. California's water use (green line), population (red line), and gross state product (blue line) between 1975 and 2001. Data are indexed to 1975. Note that GSP has gone up more than 2.5 times, while water use has actually declined. Water use from the U.S. Geological Survey. Analysis by the Pacific Institute.

California's Economic Productivity of Water

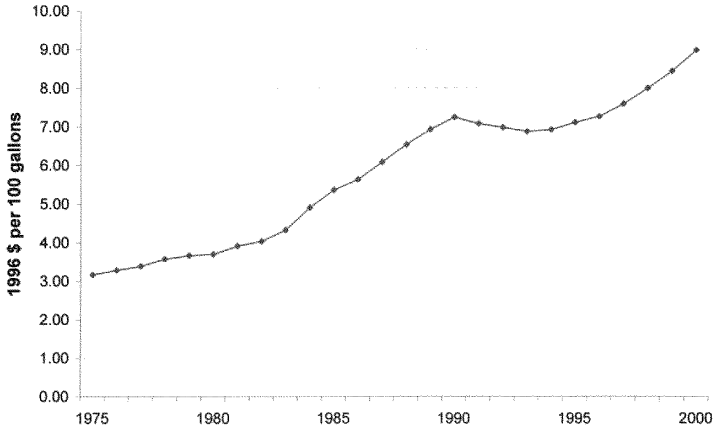


Figure 2. California's "economic productivity of water" showing that the state now produces nearly $9 of goods and services for every 100 gallons of water used, compared to $3 per 100 gallons in 1975 (in constant dollars). Analysis from the Pacific Institute.

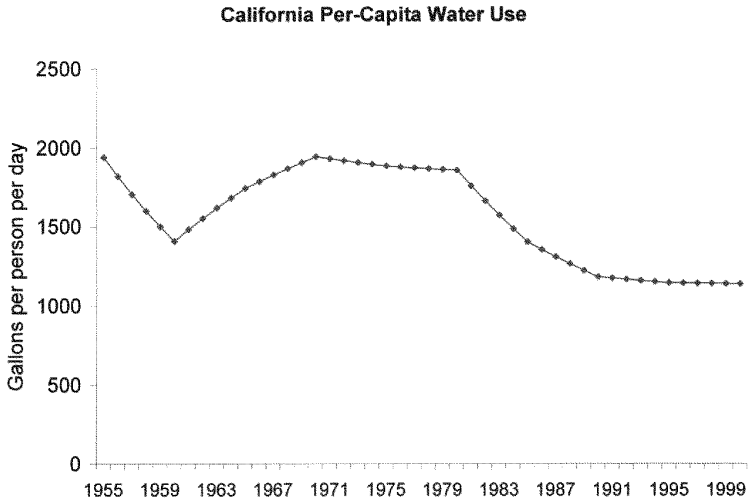


Figure 3. Water use per person in California. Note that water use per person has dropped by nearly 50% over the past forty years as conservation and efficiency, and changes in California's economy, have improved productivity.

Mr. NAPOLITANO. Thank you, ma'am.

And moving on to our next witness Mr. Stelle.

STATEMENT OF WILLIAM STELLE, PARTNER, K&L GATES, SEATTLE, WASHINGTON

Mr. STELLE. Thank you, Madam Chairwoman and Members of the Subcommittee. My name is William Stelle. I am here representing the California Resources Agency.

I have a written testimony which I have submitted to you, and I will summarize it.

Madam Chairwoman, you run a tight ship. That's is well understood.

By way of a little background, I have been either privileged or cursed to be involved in Endangered Species Act issues for over two decades, plus both on the legislative side and on the Executive Branch side.

I was the original Administrator for the National Marine Fishery Service during the Clinton Administration up in the Pacific Northwest where I did all the salmonic listings under the Endangered Species Act. Prior to that I worked for Secretary Babbitt to do the Northwest Forest Plan that was itself quite difficult. Before that I worked as Chief Counsel of the Fish and Wildlife Subcommittee for then Congressman Gerry Studds. So I come at this with a lot of cherished scar tissue.

Much of what I have heard today is very familiar to me. Some of it is unique to the Delta, some of it is not.

Let me describe for you, before getting into the heart of my testimony which is the Bay-Delta Conservation planning effort that is underway now. Let me just describe to you some of the complexity of what is going on. Because there is a lot going on.

We have litigation and we have the Federal and State water operators and fish and game agencies in Federal court over the course of this summer talking about what to do over the next period of time and how to operate over the next period of time to try to mitigate some of the risks in the system as it is currently configured. That is the inner circle.

Next concentric circle out is an anticipated completion of the consultation process that Ryan and John described to you earlier in response to the invalidation of the earlier biological opinions by the Federal court. That should be completed by sometime Spring 2008. That should lay out our sort of interim strategy of, say, three to five years. Again, how to operate, what kind of an early initiatives can be put into place.

The next concentric circle is the Bay-Delta Conservation Planning effort, of which I am affiliated. It is intended to answer the longer term question of what biologically should we be doing to provide for or contribute to the conservation of listed species and their habitats in the Bay-Delta region in order to secure legally defensible and scientifically sound incidental take authorizations for the long term. That is what California Bay-Delta effort is all about.

The fourth concentric circle out is the Delta Visioning process. It is absolutely part and parcel, of which the conservation planning effort must be a part. But that is intended to articulate a longer term social vision for what, you, the State of California and your people should be doing with the Bay-Delta over the long term.

So, again, it is quite difficult to understand how these individual pieces of the puzzle fit together. It is vital that they fit together. They have to be mutually reenforcing because if they will not, they will fail.

Turning now toward the issue of Bay-Delta conservation planning. What is it and what is different now, to get to Congressman Costa's question, between 1995 and 2000?

Fundamentally in my view what is different now is the risk meters have been turned up. The biological risk meters, the political risk meters, the legal risk meters and the economic risk meters for everybody are way up there. They are kind of in an untenable circumstance. Because of that, there is a convergence of perspective of all of the principal parties that it is not working and we need to do something different. That convergence has led the parties, a broad coalition of water users, State and Federal water agencies, State and Federal fish and game agencies and the NGO community to enter into a planning agreement last fall that said we are going to try to figure out to do something better over the long term in a way that is scientifically sound and legally defensible because if it is neither, it is a waste of time. That is the California Bay-Delta Conservation Plan led by the Resources Agency and a Steering Committee comprised of all of those different communities. Again, they are not there because they love each other. They are there because there is mutual shared substantial risk. In the face of that risk, they have a choice. They can choose to develop a plan that will be defensible and that they will support or they can choose not to. What will they choose? I do not know. We will see.

But we have a very aggressive planning schedule. This Subcommittee will be able to see, and so will everybody else, how they

make those choices through the course of 2008. Because our objective is to complete a legally defensible conservation plan under both Federal and State laws by the end of 2009. That will be the longer term reliable plan.

One quick observation, and that is——

Mrs. NAPOLITANO. You are 50 seconds over, sir.

Mr. STELLE. We need to be comprehensive to be successful. To be comprehensive, we need the Feds and we need solution people to come to that table, not problem people. That covers the field of sector.

Thank you. I look forward to your questions.

[The prepared statement of Mr. Stelle follows:]

Statement of William W. Stelle, Jr., Assistant to the Chairwoman, Bay Delta Conservation Plan Steering Committee

Good morning, Madame Chairwoman and members of the Subcommittee. I want to thank you for being afforded an opportunity to appear before you today on behalf of the California Resources Agency on this important topic.

Before I begin my testimony, I would like to also express the appreciation of California Secretary for Resources Mike Chrisman for the time you have afforded us. Both he and the Resources Undersecretary Karen Scarborough regret that scheduling conflicts prohibited their ability to appear here today.

My comments will summarize the current Resources Agency efforts and those of other participants to develop a long-term, sustainable conservation plan for California's Bay Delta. We believe that this kind of effort, if successful, will hold substantial long-term benefits from both an ecological and water supply perspective. I hope today to not only explain the basis for this fundamental conclusion, but to encourage the support of this Subcommittee in helping us succeed.

A good and instructive starting point is today. You have heard this morning of the deepening problems associated with current approaches to Delta conservation and restoration and of the fisheries and other species which are Delta dependent. These problems are by no means new, and the many participants in the Delta have been wrestling with them for decades in many different forms and phases, spanning a full spectrum from consensus-based approaches to hard-ball litigation. Despite these good efforts and well-meaning intentions, we are not succeeding, and the risks of catastrophic failure from a biological, water supply and economic perspective are increasing. Put simply, the Delta is in crisis.

This view is shared by a wide variety of interests, and it is precisely that confluence, of a Delta in crisis, which has led the parties to take a fresh start, searching for a new way, even amid the tumult of the day-to-day activities.

Perhaps a thorough and authoritative way to understand the context is to refer you and the Subcommittee members to the report of the California Public Policy Institute entitled "Envisioning Futures for the Sacramento San Joaquin Delta", which was released in February of this year. It may be found at www.ppic.org. It is an elegant analysis of how the current model of how the Delta operates is not working, and how we all might envision a new future that embraces an altogether different approach. Its message is quite straightforward: we can capture success only if we are bold enough to think big and think differently: the ingredients for success do not lie in merely incremental turns in the knobs of the current system.

On October 6, 2006, after several months of deliberation, a broad Delta constituency came together and entered into a planning agreement to develop a roadmap to that new future. Entitled "Planning Agreement regarding the Bay Delta Conservation Plan", it is signed by state and federal water and fishery agencies; the major water suppliers for agricultural and municipal interests, and a wide array of conservation organizations—in short, all the interests that have been dueling about the Delta for decades.

I will submit to the Subcommittee this Planning Agreement since it is the best and most concise statement of what the Bay Delta Conservation Plan is all about. The Agreement describes the intentions of the parties to develop a conservation plan over the next three years. It is intended to serve as a scientifically sound and legally defensible strategy for the ecological restoration of the Bay Delta and it will provide for the long-term conservation of at risk species and their habitats. It is also intended, from a legal perspective, to lead to the issuance of incidental take authorizations for listed species associated with the water supply, habitat restoration and

other activities covered by the plan under the Federal and state engendered species statutes. Thus, it is intended to answer the question of what we need to do to address the challenge of the Delta's biological needs. More broadly framed, it is intended by the parties to serve as a reliable strategy to get us from the turmoil of the present to a more scientifically robust future that will provide a far higher degree of reliability and stability for both biological and water supply objectives.

There are several attributes of the Bay Delta Conservation Plan that deserve mention. First, it is a voluntary, collaborative effort among an impressive breadth of Delta players, reflecting a common vision noted above. Second, it is extremely open and transparent, with all of the materials and meetings open and available for all to review, apprise, and critique. Third, it will be informed by an independent scientific panel that is, as we speak, being convened to provide independent scientific advice to the parties on the plan and its components.

Organizationally, it is led by a Steering Committee in which all of the plan participants are represented. The Steering Committee is chaired by California Resources Undersecretary Karen Scarborough. The group meets regularly and works by consensus.

The Steering Committee, in turn, has commissioned several workgroups that carry out the day to day tasks for the planning effort and forward their work products to the Steering Committee for approval.

The planning process envisioned by the Steering Committee entailed a phased, tiered approach. Through the course of 2007 will are examining a wide range of conservation strategy options focused around alternative water conveyance designs since the choice of which conveyance option to pursue is so central to the overall conservation strategy. The Steering Committee is currently winnowing down those options from an initial ten to four, and through the summer and fall it will further narrow the field. In the late fall of this year, the Committee intends to select one or two conveyance options to pursue in far greater detail in the planning process itself. The idea will be to use these options as a centerpiece around which a broader, more comprehensive conservation strategy for the Delta will be constructed. It will be a strategy that will embrace all of the main limiting factors for restoring the ecological productivity of the Delta.

The Steering Committee anticipates that this broader conservation strategy will and must address a number of fundamentals to be successful: water conveyance strategies; habitat protection and restoration strategies; water management and water quality strategies; invasive species strategies; strategies to address toxic stressors in the system, and very importantly, disciplined science and adaptive management strategies to enable us to stay smart and nimble as we learn.

The schedule is both ambitious and essential because we have an unacceptable status quo. By years end the Steering Committee will have winnowed down the initial choices of conveyance options to at most two. It will then devote 2008 to the construction of the components of a broader conservation strategy around these one or two options that will then constitute its proposed plan. That plan, in turn, will be submitted to state and federal fishery agencies and other relevant authorities for their approval. As part of that approval process, it will be analyzed under both state and federal environmental statutes over the course of 2008 and 2009 to evaluate its effect and to provide open and continual opportunities for broad public review and participation. It will also undergo a focused evaluation of its ability to contribute to the conservation of listed species under federal and state endangered species acts. The Steering Committee intends that this entire planning process will result in a scientifically sound and legally defensible plan for the Delta by the end of 2009, leading immediately to aggressive implementation.

The Steering Committee is comprised of people who are experienced and sophisticated. They undertake this effort well informed about its challenges and risks, but also disciplined by the turmoil which abounds. Yes, this is a tall order, but this path may well be the best of several roads the Delta could travel. Fundamentally, the Bay Delta Conservation Plan represents a collective judgment of the parties to seek a new way out of our current crisis, and to fashion that new way to resolve Delta issues in an affirmative manner.

Do the parties have the enormous discipline to stay focused and on track? Time will tell. The State of California is itself deeply committed to the success of this effort, believing a Delta in crisis is simply not acceptable from an ecological, water supply, and economic perspective.

In closing, I would like to offer several observations to the Subcommittee.

The parties recognize that we have a collective problem and avoidance is not a winning strategy. But this is also very hard.

We need the federal government to help. We need the Bureau of Reclamation and the Fish and Wildlife Service in particular, to dedicate their best and brightest peo-

ple to this effort. If it is business as usual at the usual pace, we will not succeed. We must be comprehensive to be successful, and to be comprehensive we must have firm, active and reliable federal participation.

We need experienced agency people who recognize and understand the problems and figure out how to solve them. We need people to have a sober assessment of what the real issues are and how to deal with them. We need solution people.

We need a focus on the Delta and solutions, and not avoid hard choices. We need each other; we need to work together for the Bay Delta Conservation Plan to work.

Fundamentally, we need trust. This is the most important criterion for success. Anything that this Subcommittee can do to improve the prospects that we have with these essential ingredients would be most welcome and encouraged. These difficult decisions are not made in a random way, but rather with an iron will to succeed.

That concludes my testimony. I again appreciate the privilege of appearing here this morning, and I welcome your questions.

Attachment: BDCP Planning Agreement

[NOTE: The attachment, "Planning Agreement regarding the Bay Delta Conservation Plan," dated October 6, 2006, has been retained in the Committee's official files.]

Mrs. NAPOLITANO. Thank you, sir.

Mr. Miller?

STATEMENT OF B.J. MILLER, CONSULTING ENGINEER, SAN LUIS AND DELTA-MENDOTA WATER AUTHORITY, BERKELEY, CALIFORNIA

Mr. MILLER. Madam Chair, Members of the Committee, my name is B.J. Miller. I am a consulting engineer. I am here today on behalf of the San Luis and Delta-Mendota Water Authority, which is an organization of about 30 public agencies that export water from the Delta. It is a Federal pumping plant. Includes the Westlands Water District and the Santa Clara Valley Water District that serves much of Silicon Valley.

I have a written testimony I have submitted and I will just briefly summarize that.

I want to direct your attention first to the third page that shows a graph abundance. I will be focusing on Delta smelt, and I want to point out a couple of things about this graph.

First, I want to point out the decline. This is the most official abundance index. It is sub-adults just before they migrate upstream to spawn in the winter. There are a number of other indexes of abundance, but this is the most official one. You can see it reached an all-time low in 2005 and in 2006 stayed there at the very low level. So one thing to note about the graph is the decline.

The second thing to note is that since 1996 the average abundance of Delta smelt has changed about 60 percent a year up or, unfortunately in recent years, down. So if we are looking for something that affects Delta smelt, we need to look for something that is changing at about 60 percent a year that is capable of causing that sort of effect.

This is a data rich estuary as estuaries go. We have a lot of data on everything. If somebody comes to you and says A affects B, I am sure of it, they should be able to produce some sort of analysis that shows a relationship between A and B.

In this case, A is exports and B is Delta smelt abundance. A lot of people are so sure about that that we are spending $50 to $100 million a year based on the assumption that exports is the key to Delta smelt. The data do not support that assumption.

The most definitive analysis of this was done by Dr. Brian Manley, the author of seven books, and one of the world's foremost statistical ecologists. I will read what Brian Manley said. "I can sum up my conclusions from the analysis I have done over the past few years by saying that so far it appears that river flows and exports cannot account for most of the downward trend in Delta smelt numbers in recent years. Some other change to the system seems to have happened in about 1999 that caused the decline."

That is a very important analysis because Manley found an effect. If he had not found an effect, you could conclude that he had not done the right analysis. But he found an effect. It was statistically significant. It was just so small that he concluded that in another email that he sent on this, he concluded it was wiggles on the trend line. Something else is dominating Delta smelt abundance.

I was concerned that Manley and the others, he did that for the pelagic organism design studies that there was a mistake in that analysis that Delta smelt migrate upstream to spawn and some years they migrate close to the pumps and some years they do not. So maybe there was only an effect in the years when they were close to the pumps. So I did an analysis that Manley confirmed only looking at it for export effects in years they were close to the pumps, we found nothing.

So I am pretty sure that exports are not the cause of the Delta smelt decline. Managing exports is not the way to save the Delta smelt, or to prevent their extinction for that matter.

What is causing the decline in Delta smelt? What happened to them? Well, we listened to what the biologists said. They had autopsied some smelt and found that they were severely food limited in the summer and possibly in the spring. So my associates and I set about with this wealth of data to see if we could find some connection between food availability and Delta smelt abundance. Delta smelt eat zooplankton, which are little small floating animals about three levels up on the food chain. Almost all of the ones they eat, incidentally, are aliens, not natives that were probably introduced from ballast water of ships that have sailed up into the Delta.

We found two excellent relationships, one in the summer, one in the spring. The second to last page shows a graph that—I did this graph—and I have to say I think it is remarkable, modest as I usually am.

The only Delta smelt abundance number on this graph is the water trial abundance of 1996. All of the rest of these values on the gray line were predicted using only two factors. Where the smelt were, not how many, where they were in their habitat and what the density of their favorite food was in that habitat in late April. With those two things alone, you predict Delta smelt abundance. You predict the decline that we have seen.

So my conclusion from the data, actually, is that this is not exports. This is all about food.

Now what has caused the food decline? That is another mystery.

Mrs. NAPOLITANO. Wrap it up.

Mr. MILLER. I will wrap it up.

As to how this could possibly have happened, I mean this hearing is based on the assumption that the exports are controlling Delta smelt abundance, I will just point on the report on the second to last page from the review panel of outside exports. "This program relies too heavily on local perspectives and resources for problem analyses, research and solutions. This can give rise to a culture of common assumptions that impeded alternative possibilities."

Well, if that is not a story of the Delta smelt problem in the Delta, I do not know what is.

Thank you.

[The prepared statement of Mr. Miller follows:]

Statement of William J. (BJ) Miller, Ph.D., Consulting Engineer, San Luis & Delta-Mendota Water Authority

Introduction

Madam Chairman and members of the Subcommittee, my name is BJ Miller, and I am a consulting engineer working on behalf of the San Luis & Delta-Mendota Water Authority. I appreciate the opportunity to testify today regarding "Extinction is not a Sustainable Water Policy: The Bay-Delta Crisis and the Implications for California Water Management."

For the past 26 years I have been a consulting engineer focusing on California water problems. Prior to becoming a consulting engineer I was a member of the California State Water Resources Control Board from 1978 to 1980. For many years I have taught a one-day course, "The Management of Water in California" for the UC Berkeley Engineering Extension and elsewhere on request. My primary focus has been on the Sacramento-San Joaquin Delta because of its importance for California water management.

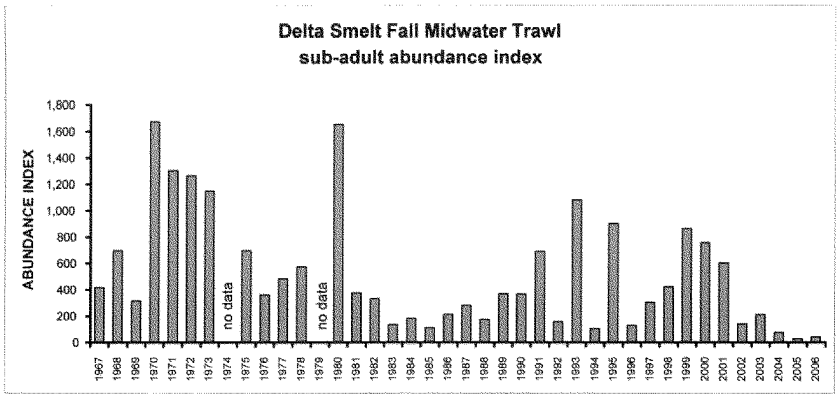
Since approximately 1992 I have worked primarily on issues related Delta fisheries because of the relationship between actions to protect Delta fisheries and operations of the State Water Project ("SWP") and Central Valley Project ("CVP") operations. With my colleague, Thomas Mongan, Ph.D., a licensed civil engineer with a doctorate in physics, and others, including Bryan Manly, Ph.D., one of the world's foremost statistical ecologists, I have conducted numerous analyses of factors affecting fish in the Delta. Most of our efforts have focused on delta smelt, the small, native fish listed as threatened under both the State and Federal endangered species acts.

Summary

To date, virtually the entire effort to recover the delta smelt has been focused on operations of the SWP and CVP. However, there are no valid statistical analyses showing that exports from the Sacramento-San Joaquin Delta or entrainment of delta smelt at the export pumps have important effects on abundance trends of delta smelt. Several analyses show a strong relationship between the decline in delta smelt abundance and significant declines in the densities of the zooplankton (small floating animals) delta smelt prey upon, especially in spring. Reliable analyses indicate routine management of Delta exports to minimize entrainment ("take") of delta smelt is a futile attempt to prevent extinction or achieve recovery. Certainly exports should be managed to prevent the rare, unusually high incidences of take. Beyond that, the key to saving the delta smelt is to find out what affects their food supply and, if possible, do something to address those limiting factors.

Decline of the delta smelt

As you know, the abundance of delta smelt has declined sharply in recent years. The graph below shows the key measurement of smelt abundance, the Fall Midwater Trawl index. This index measures abundance of sub-adult delta smelt. I compared this index to the population index for spawning adults in winter, derived from the highly efficient Kodiak trawls that began in 2002. There is an excellent relationship, indicating the FMWT index is not only useful because of its length of record (since 1967), but also because it appears to be a good indicator of the following winter's spawning adult population.



The hearing today is largely because of this graph, so I would like to point out a couple of things about it. First, there has obviously been a decline in delta smelt abundance. It began in 1999 and was especially sharp after 2001. The 2005 index was the lowest of record. The 2006 index was higher, but still very low. Second, note the variation from year to year. Since 1996, the average change (up or down) in this index has been about 60%. So, if we want to figure out what happened to delta smelt, and possibly a few other pelagic fish whose abundance has declined, we should look for factors capable of causing a change of about 60% per year. We should also look for factors that changed at about the same time as delta smelt abundance did, that is, factors that changed for the good from 1996 to 1999, and for the bad thereafter.

It is possible that factors with subtle, long-term effects control delta smelt abundance in complicated ways. However, most (about 95%) delta smelt live for only one year. For a fish with a one-year life cycle, the most likely factors controlling abundance are those with important effects each year.

This is a data-rich estuary, so we have long-term data on many factors that might affect delta smelt. For example, we have long-term data on exports from the southern Delta, daily flows into and through the Delta, salvage of delta smelt at the export pumps, distribution and abundance of delta smelt throughout their one-year life, densities and location of delta smelt prey, and turbidity, salinity, and temperature of Delta water. We also have data on the prey found in the guts of delta smelt. We have long-term data on the zooplankton (small floating animals) on which delta smelt feed, as well as on the phytoplankton (small, floating plants) consumed by zooplankton. That is not to say we have all the data we need, but as estuaries and fish problems go, we have lots of data.

Searching for export effects

Numerous analysts have worked for years to determine if there is a relationship between delta smelt abundance and operation of the SWP and CVP export facilities. I'll summarize the analyses most relevant to the delta smelt question.

- Dr. Bryan Manly (independent consultant) and Dr. Mike Chotkowski (Bureau of Reclamation) searched for river flow and export effects on delta smelt abundance. They found a statistically significant relationship between rates of exports and delta smelt abundance, but they concluded that this relationship could account for a very small percentage in the variation of smelt abundance. In other words, the effect was small and unimportant relative to the trend in delta smelt abundance. Dr. Manly summarized the relationship as follows: "I can sum up my conclusions from the analyses that I have done over the past few years by saying that so far it appears that river flows and exports cannot account for most of the downward trend in delta smelt numbers in recent years. Some other change to the system seems to have happened in about 1999 to cause the decline. What is therefore needed now is further work to better understand the system and to identify any important variables that are not currently being considered to account for the decline." This finding is important for two reasons: First, an effect of exports was found. This indicates the analyses were capable of finding such effects. If no effect at all were found, one might wonder if the proper analysis had been carried out. We would expect some effect of exports. After all, delta smelt are entrained at the export pumps, and because of

the fragile nature of this fish (unlike salmon and striped bass), few of those salvaged can be returned to the Delta. Second, the effects turn out to be unimportant relative to the changes in abundance of delta smelt. Manly characterizes the effects as one percent or so per year.

- Subsequently, I analyzed whether export effects were not found because exports only affect delta smelt abundance in some years but not in others. If this were the case, analyzing data from all years could obscure effects only occurring in some years. Delta smelt spend most of the year near the confluence of the Sacramento and San Joaquin Rivers, 30+ river miles from the export pumps. Smelt migrate upstream to spawn in winter. Sometimes a significant fraction of their population migrates toward the export pumps, and sometimes they do not. So, I searched for export effects only in years when delta smelt were closer to the export pumps. I (and Manly) found no such effects.
- Pelagic Organism Decline (POD) studies noted that salvage of delta smelt was high in the years of the decline. They assumed this coincidence (high salvage, low delta smelt abundance) indicated entrainment of delta smelt at the export pumps could be an important cause of declining delta smelt abundance. However, finally, POD analysts checked for statistically significant relationships between any measure of salvage and the subsequent FMWT. They found no statistically significant effect. I conclude from this that high salvage and low delta smelt abundance were coincidences, rather than indication of a cause and effect relationship. This conclusion is reinforced by the importance of food limitation to delta smelt abundance, described below.
- Drs. Wim Kimmerer (SF State University), Pete Smith (USGS), Mongan and I all independently estimated the percent of the total population of delta smelt entrained each year at the export pumps. All of us estimated percentages in the range of 30-40% in one year. However, no one has been able to find statistically significant relationships between annual estimates of percent entrainment and subsequent FMWT index or annual changes in the index. These analyses suggest two conclusions: First, the estimates may not be correct. There are uncertainties inherent in each of them. Second, because they might be correct, it would be prudent to assume high entrainment events, although unusual, can occur and should be prevented.
- Several representatives from environmental organizations and state and federal resource agencies have presented analyses purporting to show a relationship between exports and the subsequent FMWT abundance index. All of these correlations are spurious for the same reason: They do not consider the important effect of "regime changes" affecting delta smelt abundance. These correlations result from stretching the analysis over all years, both before and after the delta smelt decline that occurred in 1981. Such analyses violate a fundamental assumption in regression analysis. The fundamental assumption necessary to draw reliable conclusions from regression analyses is that the models considered include all of the important variables in the system, with no important hidden variables. If there is a change in the system at some point in time due to unknown causes, the effects of known variables can be analyzed either by fitting separate models before and after the change, or by including terms for changes in the mean level of the response variable and changes in regression coefficients. Clear change points can be detected from patterns in regression residuals. Failure to allow for change points can lead to spurious conclusions about the effects of variables. In other words, if delta smelt abundance underwent a step decline in 1981, for reasons having little or nothing to do with exports, and if this step change is not accounted for in the regression analysis, any factor that tended to be high (or low) before the step change and low (or high) after the step change may show a correlation with delta smelt abundance, even if this factor had little or nothing to do with abundance of delta smelt. Exports were generally low before 1981 and generally higher after 1981. Hence, the spurious correlations.
- Dr. Bill Bennett (UCD) proposed a "Big Mama" theory hypothesizing that high exports before mid-April entrain early hatching delta smelt larvae that, if not entrained, would grow into larger spawners the next winter. Larger female delta smelt produce more and better eggs. This theory has been popular among those who believe exports must have important effects on delta smelt abundance. However, the theory has two problems. First, long-term data on delta smelt size in December show a step decrease in size that has no relationship with the recent decline in delta smelt abundance. It occurred around 1990; the smelt decline began in 1999, when the December size was level. Second, the theory does not account for the demonstrated importance of food limitation in determining the size of spawning delta smelt. Put another way, there are two

ways to become a Big Mama: hatch early and grow for a longer time or eat well after you hatch. Well-fed delta smelt at the delta smelt culture facility grow so fast that they spawn in October rather than waiting until March. So, besides the evidence of food limitation discussed below, we know from actual data on delta smelt that food is important to spawning size.

- Dr. Ted Sommer, and associates (Department of Water Resources), in a study conducted for the Pelagic Organism Decline effort, looked for declines in residence time of water in the Delta during the period of the recent decline in delta smelt abundance. Residence time could be affected by exports. They did not find evidence of a major shift in residence time. In fact, they observed that residence times may have increased slightly in the San Joaquin River.

Implications for managing exports

Taken together, these analyses indicate the following principles for managing exports with regard to delta smelt:

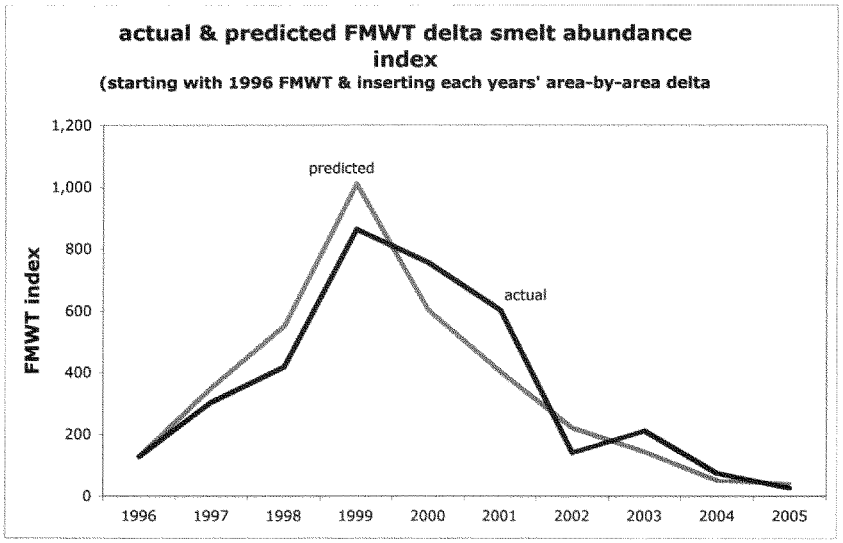
1. No rigorous scientific analysis indicates entrainment of delta smelt at the export pumps caused the recent decline in delta smelt abundance. Moreover, there is no scientific analysis that demonstrates that controlling exports will contribute to the prevention of extinction or achievement of recovery of the species. Therefore, routine management of exports or river flows to minimize entrainment (or take) of delta smelt as a means of preventing extinction or achieving recovery is futile.
2. Because analyses indicate that unusually high entrainment events have occurred in the past, exports and other water project operations should be managed to prevent such occurrences in the future. This should be done by real-time monitoring of the distribution of sub-adult, spawning adult, and larval-juvenile delta smelt, coupled with judicious use of mathematical Particle Tracking Models and close monitoring of river flows and turbidity related to entrainment.

The importance of food

If exports or entrainment did not cause the decline in delta smelt abundance, what did? I summarize below recent analyses related to this question.

- Dr. Bill Bennett "autopsied" 100+ delta smelt and found most of them were food limited in the summer.
- Mongan and I, keying on Bennett's finding, analyzed the co-occurrence of delta smelt and their primary prey (the two alien zooplankton, Eurytemora affinis and Pseudodiaptomus forbesi) in July. We found a good correlation for the period 1981-2006 between, on the one hand, July co-occurrence of delta smelt and density of the two zooplankton and, on the other hand, the subsequent FMWT abundance index. This was the first correlation with an obvious explanation (delta smelt must feed to survive) ever found between any factors and the subsequent FMWT.
- Dr. Anke Mueller-Solger, Department of Water Resources, noted that after 1996, the FMWT index depends solely on July delta smelt abundance. That is, the co-occurrence with prey was not necessary in recent years. She concluded from this and other analyses that food limitation was not the problem. However, this conclusion rests on the questionable assumption that delta smelt feed equally well on yet another recently introduced alien zooplankton, Limnoithona tetraspina, as they do on their established favored prey, Eurytemora and Pseudodiaptomus. Without this assumption, there is a clear drop in prey densities. Limnoithona now occur at extraordinarily high densities in July in delta smelt habitat. However, Limnoithona were not found in the guts of delta smelt examined in 2005, when Limnoithona levels were merely high, but were found in 2006 when they were extraordinarily high. Individual Limnoithona are much smaller than both Eurytemora and Pseudodiaptomus, so more energy is required by delta smelt to capture Limnoithona. It is possible that, rather than being a good source of food for delta smelt, Limnoithona are starvation rations that may interfere with survival by being so numerous and requiring so much more energy to capture.
- We attempted to find out what determined delta smelt abundance in July. We discovered an even better correlation between late-April co-occurrence of delta smelt and their primary springtime prey, Eurytemora, and the subsequent FMWT abundance index for 1997-2005. This is the period when July abundance determines the FMWT index. As mentioned above, the FMWT index is closely related to subsequent winter spawning abundance. Using the relationship developed for 1997-2005, we can predict the FMWT abundance index from the previous year's index and the co-occurrence of delta smelt and Eurytemora in

late April. Predicted and actual FMWT index values are shown below. The predicted line uses only one estimate of delta smelt abundance, the FMWT index of 1996. From that index and annual late-April densities of Eurytemora and distribution of delta smelt (not their abundance), the next nine years of FMWT indices can be predicted. Exports and entrainment of delta smelt at the export pumps is not a factor in this prediction. It is solely determined by Eurytemora densities in areas where delta smelt are in late April. I conclude from these analyses that the problem with delta smelt is a significant drop in the densities of their prey, initially in the summer and, in recent years, in the spring. Why this drop occurred is a mystery. If it were caused by exports, exports would show up as an important factor affecting delta smelt abundance, but the data do not support that possibility. Something else must be affecting the zooplankton that delta smelt prey on. If we could identify those factors and do something about them, we might be able to save the delta smelt. No reliable, statistically significant analyses suggest we can save delta smelt or cause their recovery by managing exports or entrainment.



Conclusion

One might reasonably ask how it is possible that so much emphasis is put on exports as the cause of the delta smelt abundance decline if there are no reliable analyses supporting this belief and several analyses indicating that food is the problem. An answer can be found in the report of outside experts, the Review Panel for the Pelagic Organism Decline Program. These panelists are listed below.

Mark D. Bertness, Brown University
Stephen M. Bollens, Washington State University Vancouver
James H. Cowan, Louisiana State University
Ronald T. Knelb, University of Georgia Marine Institute
Parker MacCready, University of Washington
Russell A. Moll, California Sea Grant College Program
Paul E. Smith, Scripps Institution of Oceanography
Andrew R. Solow, Woods Hole Oceanographic Institution
Robert B. Spies, Applied Marine Sciences

Their first conclusion concerning "weaknesses" of the Pelagic Organism Decline Program in their December 2005 report is as follows:

> "The program relies too heavily on local perspectives and resources for problem analysis, research and solutions. This can give rise to a culture of common assumptions that impedes alternative possibilities."

I agree with this conclusion. The belief that exports have important effects on delta smelt and other fish has been a fundamental tenet of Delta water project management for years. It has proven to be an unfounded belief for striped bass and salmon, and many analyses of the wealth of data in this estuary indicate it is also

unfounded for delta smelt. Nevertheless, as evidenced by the title of this hearing, it remains a powerful paradigm, contrary to the science, and to the detriment of delta smelt.

[NOTE: A letter dated July 16, 2007, submitted for the record by Mr. Miller has been retained in the Committee's official files.]

Mrs. NAPOLITANO. Thank you, sir.

Mr. Larson?

STATEMENT OF THE HONORABLE PHIL LARSON, FRESNO COUNTY SUPERVISOR, FRESNO, CALIFORNIA

Mr. LARSON. Madam Chairman and Members of the Committee, my name is Phil Larson. I am a member of the Board of Supervisors of Fresno County, and I really appreciate being here today with my neighbor and friend, Mr. Jim Costa, and again to testify before Mr. Miller, to whom I testified before in 1992 on the Committee he chaired—so strongly chaired, I should say.

I speak with unanimous support of my colleagues on the Fresno County Board of Supervisors. This crisis is commonly seen as a very costly and damaging collision between the environment and the water management system. It is key to the future of California's rural or urban economies.

Indeed, the future of our way of life is at stake. This crisis should be viewed as first of many conflicts in the Delta where the dream that is California hangs in the balance.

I was elected to represent District of Fresno County in November of 2002 and was reelected in June 2006. The District 1 included a rich and productive farmland in the western portion of Fresno County on the way to the San Benito County line. As a lifelong farmer and former president of the Fresno County Farm Bureau, I continue to fight for safe and secure water supplies in our region because I know without additional water supplies the social, cultural and economic impacts to our region could be devastating.

Fresno County is blessed in having rich soils and the climate ideal for irrigated agriculture. The hard work of the farmers who come to Fresno County from all over the world has made the county the richest and most productive agricultural county in America.

The county leads the Nation in the number of farms, 6592 farms with sale to 100,000 or more, 2,320 in harvested crop land of 1.16 million acres.

Water in western Fresno County is delivered through the Westlands Water District via the Central Valley Project. Westlands encompasses more than 600,000 acres of farmland in western Fresno County.

The Westlands farmers produce more than 60 high quality commercial food and fiber crops sold for the fresh, dry, canned and frozen food markets, both domestic and export. In addition, more than 50,000 live and work in those communities depending on the agricultural commodities.

The communities near the District's boundaries include Mendota, Huron, and Tranquility. You will visit Mendota tomorrow, Madam Chairwoman. Tranquility, Firebaugh, Three Rocks, Cantua Creek, Helm, San Joaquin, Kerman, Lemoore and Coalinga, most of which are in my district.

The water provided by Westlands is conveyed through the Sacramento-San Joaquin Rivers Delta and pumped from the Delta at the C.W. "Bill" Jones Pumping Plant. When diversions at the pumping plant are reduced to avoid the take of listed species like the Delta smelt the effects on farming and the economy of Fresno County are dramatic and devastating. As an example, there are farmers on the west side of Fresno County who this year have plowed under their growing crops because they lack supplies of water to irrigate those crops to maturity. The shortage of water, if it is not due to the drought or other climatic conditions, although 2007 has been a dry year, the two preceding years were wet and storage in Central Valley Project reservoirs north the Delta at the beginning of the water year was about average—rather the water shortages that have caused farmers to plow under their crops was caused by restrictions on the operations of the Delta export pumps, including the complete shutdown of the Harvey O. Banks Pumping Plant to protect the Delta smelt.

Immediate action must be taken to prevent the economic disaster this can bring, and we must work together to find a long-term solution that will help us avoid similar crises in the future.

The consequences of such action affect more than just the farmers who have lost their crops and their investment in those crops. Such actions affect farm workers who will not be employed to complete the production and harvest of those crops, and small businesses that exists to provide goods and services, to provide the activities of farms in western Fresno County.

While recognizing the importance of maintaining a healthy ecosystem, it must be balanced with the economic impacts. There is a very human face to the decisions that are made.

Last winter Fresno County's agriculture was impacted by a naturally occurring disaster, the freeze of 2006. The impacts on people were real and I believe that it will mirror the potential impacts of limiting water flow through the Delta. Fresno freeze related agricultural losses were over $111 million, but the real story is how those losses directly impacted families. Freeze-related unemployment claims in Fresno County were 1,805 and 3,168 in Tulare County, and that does not account for those who did not file because of legal status concerns.

Assistance provided by La Cooperativa Campesinos de California via the Employment Development Department (EDD) grants serviced 1,114 participants, utility payments of $50,152, rental of $260,602 and mortgages of $55,679 for a total of $366,443. The total for Tulare County exceeded $1.1 million and the State total was over $3 million. Since January the Fresno County food bank has served approximately 64,359 individuals, a total of 689,841 pounds of food distributed.

To put a clearer face on what impacted agricultural losses have on real families, the Cornerstone Church in Fresno County EOC still distributed on May 27th more than 4,000 pounds of food.

My testimony is on your record and there are some substantial anecdotes to go with it. I would submit those to you as my testimony. I am ready for any question.

Thank you, Ma'am.

[The prepared statement of Mr. Larson follows:]

Statement of John P. (Phil) Larson, Supervisor, County of Fresno

Madam Chairwoman and members of the Subcommittee, my name is Phil Larson, and I am a member of the Board of Supervisors of the County of Fresno. I appreciate the opportunity to testify today on the current crisis in the Delta. I speak with unanimous support from my colleagues on the Board of Supervisor, as evident in a letter we submitted to Gov. Schwarzenegger regarding this issue (attachment A). This crisis is commonly seen as a very costly and damaging collision between the environment and the water management system that is the key to the future of California's rural and urban economies. Indeed, the future of our way of life is at stake. This crisis should be viewed as the first of many conflicts in the Delta where the dream that is California hangs in balance.

I was first elected to represent District One of Fresno County in November 2002 and was re-elected in June of 2006. District One includes the rich and productive farmland in the western portion of the county all the way to the San Benito County line. As a lifelong farmer and former president of the Fresno County Farm Bureau, I continue to fight for safe and secure water supplies in our region because I know without additional water supplies the social, cultural and economic impacts to our region could be devastating.

Fresno County is blessed to have rich soils and a climate that is ideal for irrigated agriculture. The hard work of farmers who came to Fresno County from all over the world has made the County the richest and most productive agricultural county in America. Our gross agriculture production value in 2006 exceeded the four billion-dollar mark for the fifth consecutive year. The County leads the nation in number of farms (6,592), farms with sales of $100,000 or more (2,321) and harvested cropland (1.16 million acres).

Water in western Fresno County is delivered through the Westlands Water District via the Central Valley Project. Westlands encompasses more than 600,000 acres of farmland in western Fresno and Kings Counties. The District serves approximately 600 family-owned farms that average 900 acres in size. Westlands' farmers produce more than 60 high quality commercial food and fiber crops sold for the fresh, dry, canned and frozen food markets, both domestic and export. In addition, more than 50,000 live and work in the communities dependent on the District's agricultural economy. The communities in and near the District's boundaries include Mendota, Huron, Tranquillity, Firebaugh, Three Rocks, Cantua Creek, Helm, San Joaquin, Kerman, Lemoore and Coalinga, most of which are in my district.

The water provided by Westlands is conveyed through the Sacramento—San Joaquin Rivers Delta and pumped from the Delta at the C. W. "Bill" Jones Pumping Plant. When diversions at the Jones Pumping Plant are reduced to avoid the take of a listed species like the Delta smelt the effects on farming and the economy of Fresno County are dramatic and devastating. For example, there are farmers on the westside of Fresno County who this year have plowed-under their growing crops because they lack adequate supplies of water to irrigate those crops to maturity. The shortage of water is not due to drought or other climatic conditions. Although 2007 has been a dry year, the two preceding years were wet and storage in Central Valley Project reservoirs north of the Delta at the beginning of the water years was above average. Rather, the water shortages that have caused farmers to plow-under their crops was caused by restrictions on the operations of the Delta export pumps, including the complete shut down of the Harvey O. Banks Pumping Plant, to protect the Delta smelt. Immediate action must be taken to prevent the economic disaster this can bring and we must work together to find a long-term solution that will help us avoid a similar crisis in the future.

The consequences of such action affect more than just the farmers who have lost their crops and their investment in those crops. Such actions affect farm workers who will not be employed to complete the production and harvest of those crops and small businesses that exist to provide goods and services to support the activities of farms in western Fresno County. While recognizing the importance of maintaining a healthy eco-system, it must be balanced with the economic impacts. There is a very human face to the decisions that are made. Last winter, Fresno County's agriculture was impacted by a naturally occurring disaster—the Freeze of 2007. The impacts on people were real and I believe that it will mirror the potential impacts of limiting the water flow through the Delta.

Fresno County freeze related agricultural losses were over $111 million. But the real story is how those losses directly impacted families. Freeze related Unemployment claims in Fresno County were 1805 matched with Tulare County 3168—we had 5000 Unemployment claims filed—and that does not account for those who did not file because of "legal status" concerns. Assistance provided by La Cooperativa Campesinos de California via Employment Development Department (EDD) Grants

serviced 1,114 participants, utility payments of $50,162, rental $260,602, and mortgage $55,679 for a total of $366, 443. The total for Tulare County exceeded $1.1 million and the state total was over $3 million (attachment B). Since January, the Fresno Community Food Bank has served approximately 64,359 individuals, a total of 689,841 pounds of food distributed (attachment C).

To put a clearer face on what impact agricultural losses have on real families, the Cornerstone Church and Fresno County EOC were still distributing on May 27, 2007 more than 4,000 boxes of food to the freeze impacted community of Orange Cove. This was a continuation of the more than 10,000 boxes of food distributed in three other efforts (attachment D). On the Westside of Fresno County, the communities and residents of Firebaugh, Mendota, Tranquillity, San Joaquin, and Huron, are directly impacted by agriculture. These communities are predominately Hispanic and already live below the poverty line. Mendota is a city with a 7,800 population and average household size of 4.32. Many of these families struggle to survive off an annual median household income of $23,700 (attachment E). The surrounding cities and unincorporated communities in my district share similar demographics and economic hardships.

As water reductions have occurred—quality of life has been impacted. Most of the folks that live in the region are agricultural workers. Many have been employed by the same farming operations for generations. I wish I could have you meet some of them. They are hardworking and proud people who love working the land, provide for their families, and are living the challenges of the changes that are impacting agriculture. I hope that you can understand that the answer to serving their needs is not moving them to cities—placing them within our over burdened social welfare system. It is providing them with the opportunity to earn a living, allowing them to maintain their family structure so that they can educate their children and prepare for the changes that will occur in farming. It has always struck me as ironic that groups who advocate for "environmental justice" support reduced diversions from the Delta to protect fish species without regard to the effect inadequate water supplies have on the low-income, minority population of western Fresno County.

By my comments I do not want to suggest that protecting the Delta smelt from extinction is unimportant. Rather, I mean to convey that we must find the means to provide adequate water supplies to support the agricultural economy of the San Joaquin Valley that does not conflict with efforts to protect this and other species of concern in the Delta. Such means do exist. For instance, I have read many comments from experts like Dr. Peter Moyle that one way to avoid the conflict between protecting fish and supplying water for agriculture is to move the intakes of the State Water Project and the Central Valley Project out of the southern Delta, to an area along the Sacramento River south of the City of Sacramento. I am afraid that if something like this is not done, the prediction of Lester Snow, the Director of the California Department of Water Resources will come true. He has stated as recently as mid-June that if we do not find some means of fixing the Delta conveyance problem, we fill face on an annual basis water supply shortages of the type that caused farmers in my supervisorial district to plow-under their growing crops.

The leadership of the federal and state governments is faced with a fundamental question: Do we want to preserve the agricultural economy of this state? As you probably could guess, my answer to that question is yes. From my perspective, protecting our ability to produce domestic food supplies rises to the level of a national security interest. Difficult decisions, which may be unpopular in some quarters, will have to be made if we are to protect a safe and reliable food supply, while providing jobs and serving as the economic engine of our state. While we all agree that extinction of species like the Delta smelt is not a sustainable water policy, we must work together to find a solution that supports the economy of California and the ability of our farmers to feed and cloth the nation and the world, while preserving our ecosystem.

Again, thank you for the opportunity to testify. I would be happy to respond to questions.

[NOTE: Attachments have been retained in the Committee's official files.]

Mrs. NAPOLITANO. Very much appreciate it. Thank you.

We want to be out of here by 12:00, and obviously we are not. So that is one of the reasons I have been trying to move it right along.

I appreciate all your testimony. There were a couple of things that came to mind as I listened to the testimony, one of them

being, and I am sorry I did not ask the question of the Bureau when they were here, but you realize there are major issues in California on water. Of course, water recycling which the Administration does not view as essential, the Salton Sea which is in decline, the San Joaquin Restoration, the San Luis drainage and the Bay-Delta. So what are California's priorities? I think either you are going to have to make some tough decisions and the funding is going to have to be committed by everybody, and the support has to be from all involved.

I am making that statement because when I listen to what is so important at the time we are talking to the issue, and yet there are other areas who feel they are just as important to them and to their economy and to the welfare of the State. So I just make that point because those are the things that we face in our Committee with regard to the California economy and the California water delivery system.

I am very much concerned because I am criticized by my colleagues on the other side that I am running a dog and pony show. That is furthest from our mind. We need to get at the truth. We need to get as much information, share it, make it open, transparent so that we know where we are leading. Unfortunately, we don't need to be finger pointing, but rather we need to try to reach decisions that are going to help us make the right solution possible.

So with that, I do have some questions but I will begin with Ms. Cooley. You mentioned that developing alternative water resources, such as water recycling and desalination—both good subjects to raise—are options for a new reliable water supply. Why do you think the Bureau is so reluctant to fund water recycling projects? They left them out of their water 2025 plan and they normally allocate $11 million for the whole nation to invest into recycling water. Can you give us some concrete examples of communities that have tried to develop alternative water supplies but have been inhibited due to lack of funding?

By the way, may I state that the Bureau has almost $400 million of backlog of water projects approved by this Committee that they have not moved on.

Ms. COOLEY. OK.

Mrs. NAPOLITANO. Yours.

Ms. COOLEY. I think part of the problem with the recycling is the public perception issue in that recycling is cost effective relative to other supply options, but many agencies are having to kind of put in a dual plumbing system. I do not know of any particular agencies that have held back because of a lack of funding. I do know of agencies that have proceeded. Irvine Ranch Water District, for example, meets 20 percent of their needs by recycling water. So I know that there is a tremendous amount of interest right now.

I also understand that you are putting through a bill that looks at making additional funding available. I am sure agencies would welcome that with open arms. That might be a better question for the Bureau as to why they withheld that financing.

Mrs. NAPOLITANO. Thank you.

You have advocated elimination of water subsidies. What do you a consider a water subsidy and how would doing so help environmental conditions in the Delta?

Ms. COOLEY. OK. In part, some of the water subsidies are via pricing policies, inexpensive water. We can look at the Central Valley Project, for example, and how the rates that farmers are paying for that water is very, very low.

Mr. Thompson had asked earlier about the various contracts that are under review and that they are thinking of increasing. It might be interesting for them to look at what farmers are being charged for that water. Because of the cheap water, it is actually a disincentive for conservation and it is encouraging them to grow low value water intensive crops.

Mrs. NAPOLITANO. Thank you.

Mr. Stelle, you and many of the witnesses who testified today have said that there is unacceptable status quo. What would you consider acceptable and how would we be able to achieve that?

Mr. STELLE. Acceptable to my view is when we get sued, and you can count on it. We are standing before a Federal district court. We make our case as to why the conservation plan we developed is scientifically well grounded and legally sufficient, and he or she agrees. We are then free to proceed to implement it in a manner that is reliable, both from a biological perspective and a water supply perspective. That is success.

Mrs. NAPOLITANO. Thank you, sir.

I will call Mr. Costa.

Mr. COSTA. Thank you very much, Madam Chairman. I have a number of questions so I want to go quickly here, starting with Mr. Miller.

First of all, the issue of the take, Mr. Miller, that we are talking about that one of my colleagues stated is a three alarm fire, this is not the first time we have had a take issue due to my recollection, is it not?

Mr. MILLER. That is correct.

Mr. COSTA. Can you cite just quickly offhand the last time we have had take issues in the last 10, 15 years?

Mr. MILLER. You mean the years?

Mr. COSTA. No, not the years. Just the crises and the time and how that——

Mr. MILLER. Well, I think anytime a lot of smelt show up at the pumps there is a perception of a crisis.

Mr. COSTA. I think there is a problem. But the point I am trying to make is this is not the first time we have had a take issue.

Mr. MILLER. Right. Right. I think the problem with the take issue is that take goes up, take goes down, Delta smelt go up, Delta smelt go down, but they do not do that together.

Mr. COSTA. Yes. OK. Let me ask you another question. Mr. Johns made a comment in the previous panel that we are using one knob and you relate it to your own study and other studies to try to deal with the issue, and that is the export of water. What are the other knobs out there that you would describe that are available that we are not utilizing right now?

Mr. MILLER. I do not have a great——

Mr. COSTA. Besides trying to find more food for the smelt.

Mr. MILLER. That is where I do not have a great answer to that question. I do think that turning the knob—if turning the export

knob were free, turn it. But it is not free. It is extremely expensive turning that knob, especially if you are not——

Mr. COSTA. So in terms of the 1,800-plus acre-feet of water that is extracted within the Delta, in terms of the organization, in terms of the urban waste and pesticide use none of those are knobs?

Mr. MILLER. They might be knobs. I would be all over this food issue. I would be trying to do toxicity studies, for example, on these zooplankton. I would be studying them to death. Instead, we have three or four meetings a week on exports. We got a lot of talent and brain power focused on exports.

Mr. COSTA. OK. I need to go because we have time issues.

Ms. Cooley, I appreciate your acknowledgement about the conservation and as I said in my opening statement, there has been a lot of conservation done. We can do a lot more and I am all for putting incentives and carrots as it relates to those incentives.

Let me ask you a simple question. Should we stop exports today or should we transition at some point in time, stopping all of the water exported south of the Delta in your opinion?

Ms. COOLEY. I do not think it is necessary to stop all of the export, but I do think we need to——

Mr. COSTA. You know about 10 to 12 million acre-feet per year on the average goes through the Delta?

Ms. COOLEY. Yes.

Mr. COSTA. We have contracted for 6.2 million acre-feet. This year we will probably do a little less than 5 million acre-feet. Last year we had almost 15 million acre-feet of water go through the Delta.

Ms. COOLEY. Yes, and so I do not think it is necessary to stop all of the exports. However, I do believe we need to start working in that direction. Exports have been increasing since the 19——

Mr. COSTA. Well, I think that is an important question that the environmental community needs to raise as we try to, frankly, look for solutions. I am always trying to look for solutions. Is the goal to stop all exports south of the Delta? Now that is the goal. I may disagree with it, but then I want to know that is the goal. If that is the goal, do we do it in a transitional phase or do we do it in five or ten years? I think those are important responses.

Mr. Larson, I am running out of time here. I want to go quickly. The subsidized crop issue, you subsidized water and in certain cases it had a lot more application 15 or 20 years ago. First of all, we had 1.5 million acre-feet of cotton grown in the Valley as little as 12 years ago. Today we have what? About 500,000 acre feet?

Mr. LARSON. Five hundred thousand acres.

Mr. COSTA. Five hundred thousand acres.

Mr. LARSON. Most of that is Pima cotton——

Mr. COSTA. Not subsidized.

Mr. LARSON. Not subsidized.

Mr. COSTA. Right. Are there any other crops besides the——

Mr. LARSON. In the Westlands——

Mr. COSTA. In the Valley?

Mr. LARSON. Oh, yes, in the Valley. There is wheat and there is some rice.

Mr. COSTA. A little wheat?

Mr. LARSON. Yes, a little bit.

Mr. COSTA. Rice?

Mr. LARSON. Rice. We have a little rice in Westlands.

Mr. COSTA. They have more water?

Mr. LARSON. Yes. They have all the water.

Mr. COSTA. What was the price of water prior to 1992 in Westlands?

Mr. LARSON. Well, they had to pump the water from deep wells.

Mr. COSTA. I know, but——

Mr. LARSON. 1992?

Mr. COSTA. Right.

Mr. LARSON. It was about $47 an acre-foot.

Mr. COSTA. What is it today?

Mr. LARSON. Today if you farm 900 acres or less, it is $70 an acre-foot. If you need more water than that, it is at the market demand, and some of it went as high as $500 a month ago——

Mr. COSTA. So in 15 years the price of water has doubled and beyond your 900 acres it has tripled.

Mr. LARSON. The interesting thing, Congressman Costa, is the fact that when you take $70 an acre-foot and a normal crop 4 acre-feet——

Mr. COSTA. Even with drip?

Mr. LARSON. Even with drip. The plant takes whatever it takes; drip, flood or however you put it on. When it takes it that way, that is the same as five houses per acre would be.

Mr. COSTA. Let me just close, because my time has expired almost.

Members, I have provided billions of dollars of money in water bonds when I was in the State legislature. I just want to provide sensitivity, that is all. Sensitivity. We have to fix these problems in the Delta, and I want to work with all of you to do it. But doing it at a subzero scorecard, zero scorecard where there is no impacts to any other region in California I find personally objectionable.

I mean, we are all in this together. I really believe that, and my course in history as a legislator on these issues has always indicated my desire to help every region of this State. I would just hope and pray that you would provide the same sort of sensitivity to the challenges that we have in the Valley.

Mrs. NAPOLITANO. Thank you, Mr. Costa. I might add in Southern California I think we pay about $600 an acre-foot. So there is a big difference for the consumer, the household consumer.

Mr. LARSON. Well when you look at urban and agriculture, there is a delivery system——

Mrs. NAPOLITANO. Precisely. That is what sometimes gets in the way.

Mr. Miller?

Mr. MILLER OF CALIFORNIA. Thank you, Madam Chair.

The question here I think is—I do not know. I have been at this 35 years and nobody has ever said we are going to cut off all exports from the Delta. Nobody that I know of. But the question is now whether or not, we are in a situation where we are in court, where we are being sued, the three alarm fire was to the collapse the Delta that goes beyond the smelt and what are we going to do about it?

Ms. Cooley suggested you might not want to put subsidized water on a subsidized crop that the government then buys back with the taxpayer money. So that over 2003 and 2005 in California with $600 million in cotton that the taxpayer put into that system. If that subsidy was not available, they might think of some other crop and some other use of that water.

As high as the price of water has gotten, it continues to be subsidized. You know, if you look at the cotton crop in California, this does not make them the sole problem with respect to the Delta, but they kind of look like the SUVs of the energy crisis, you know. That may not be where you want to be in this day and age.

Mr. Stelle has been through a series of these crises. I have been through most of them with him. The fact of the matter is until you come to this kind of event do people start to realize the misplaced priorities. The question is recycling. The question is use conservation. All of these go together. So you start to ask your questions.

Should we continue the massive subsidization of water in California? You know, in the urban areas, I do not know, all I hear from my wife is how much our water bill keeps going up and we are using less and less every year. That is going on all over.

There has been dramatic improvements in the agriculture community in the use of water and the conservation of water, and the rest of that. That is all good, but we are still not out of the woods. As we all know, we like to say we do not want the courts to run this system, but you know it was the courts that straightened out the Trinity River. It was the courts that straightened out the Northwest Woods. It was the courts that straightened the salmon problems. The fact of the matter is sometimes when systems get in front of the court they start to think about the realities of what is taking place as opposed to, as Mr. Isenberg said, how do I hold on to what I have. That is really a decision.

I hope we can avoid the courts. But I do not know that we are going to make it because if we are going to have an agriculture bill that comes to the Floor and it is going to suggest that we just do business as we have been doing it the last couple of years. I do not think that is sufficient for California. I do not think that is going to work for California. That is why we are raising these issues.

Listen, when nobody would join us we built—out of the ratepayers of Contra Costa County. We could not get the Federal Government to join us. We could not get other people to join us. Now people want to expand it, they want to participate. We welcome them, and I am excited about that proposal. That will help with some of the flexibility that I keep talking about.

You know, Mr. Miller, let me just say as I understand it—I appreciate all these things that you cited about pumping. I am not suggesting that that's a sole determinant at all. But when Fish and Wildlife reviewed your report, they concluded the study was on questionable science, unacceptable procedures and that it was "a serious flawed analysis of a limited set of selectively chosen data designed to support a predetermined conclusion."

Mr. MILLER. Which report is that?

Mr. MILLER OF CALIFORNIA. Well, that is apparently the analysis, as I understand it, of the U.S. Fish and Wildlife Service of your reports——

Mr. MILLER. No, no, no. That was—that was three years old——

Mr. MILLER OF CALIFORNIA. Another one of your reports?

Mr. MILLER. There was no estimate of the population of Delta smelt. A bunch of us thought there should at least be some sort of estimate. So I put one together and they did not like the idea that I estimated the population.

Mr. MILLER OF CALIFORNIA. The analysis was not solid.

Ms. Cooley, let me ask you, if I might——

Mr. MILLER. They can check this analysis if they want.

Mr. MILLER OF CALIFORNIA. Ms. Cooley, if I might, the Chairwoman has talked about recycling. We saw what California did both with energy in the 1970s and with water in the 1970s as we started to change direction. Is there a sense of what the real potential is there? Again, none of these are silver bullets but at this stage of the game it would seem to me that we would really start to focus on some of these that provide a real yield, if you were, in terms of the water world where yield is very important.

Ms. COOLEY. Right. In terms of recycling and reuse, I have not seen a good study to look at the actual potential. I believe current use is about 500,000 acre-feet, mostly for irrigation, agriculture and landscape. But I have not seen a thorough analysis of what the actual potential is.

My sense is that it is large and to be used for outdoor irrigation needs, also for agriculture and also for some commercial and industrial.

Mr. MILLER OF CALIFORNIA. I mean if we are doing 500,000 acre-feet of water, the consumption of the State of California de minimis?

Ms. COOLEY. It is small, yes. If we look at say what Irvine Ranch and some other agencies are doing where they are using up to 20 percent, it shows that there is a huge amount of potential.

Mr. MILLER OF CALIFORNIA. Mr. Stelle, is your group looking at this, these other alternatives in terms of water——

Mr. STELLE. Yes, we will be.

Mr. MILLER OF CALIFORNIA. You will be?

Mr. STELLE. Yes.

Mr. MILLER OF CALIFORNIA. Let me ask you something, if I might, and Madam Chairwoman I will stop here.

You talked about the time line going back to the court on the biological opinions and you thought that would be resolved when? You said something middle of 2008?

Mr. STELLE. Yes. The judicial concentric circles are—I believe that the State and Federal water agencies will be in front of the court next week with some proposals on how to operate through the course of 2007 and early 2009. There will be hearings on that in the middle of August, and then the judge will do what the judge will do.

The second circle is meanwhile back at the ranch, the Federal and the State are in consultation on how to operate over the longer term, say three to five years, and that consultation should be completed by spring of 2008.

Mr. MILLER OF CALIFORNIA. Are those two things inconsistent with one other, are they complementary of one another?

Mr. STELLE. Well, I do not know. I do not know the content of either. But if the answer to your question is no, we are not in good shape. There has to be a high degree of interdependence and consistency among those things, otherwise they will not be very defensible.

Mr. MILLER OF CALIFORNIA. OK.

Mrs. NAPOLITANO. Stop?

Mr. STELLE. For the moment.

Mr. THOMPSON OF CALIFORNIA. Thank you, Madam Chair.

I want to just touch on one issue that is somewhat related or very related to the conservation issue, and I am not sure who can best answer it. But I think Mr. Larson you mentioned the different types of irrigation that agriculture does in your area.

Mr. LARSON. That is correct.

Mr. THOMPSON OF CALIFORNIA. You mentioned drip irrigation. I was involved at one time when I was in the State Senate on trying to figure out how to remove the penalty from farmers who go from flood to drip irrigation, now they are reassessed, their property tax is reassessed and they have to pay more. So it is somewhat a disincentive to do that.

Is it your understanding that more people would do more projects such as this if they did not have that penalty?

Mr. LARSON. I think the disincentive for drip irrigation, although it is very good, the disincentive for irrigation is the $1,000 an acre it costs to install it.

Mr. THOMPSON OF CALIFORNIA. Well but it is a greater disincentive if you pay the $1,000 an acre to install it, then you turn around and your property is reassessed——

Mr. LARSON. I understand that was the case, and is still the case. That is still the case.

Mr. THOMPSON OF CALIFORNIA. The Fresno Bee was one of two papers that editorialized against my effort, which I thought was somewhat curious. They did not think that farmers should get more help from——

Mr. LARSON. Well, the Fresno Bee is sometimes curious.

Mr. THOMPSON OF CALIFORNIA. They were way off base on that one.

Mr. Stelle, I asked the earlier panel about the idea of creating a conservancy for the Delta. You have done extensive work throughout the country here on these sorts of things. But would something like that help?

Mr. STELLE. I think I would align myself with Phil's comments earlier. Maybe over the long term, yes. But getting wrapped around the axle on governance issues in the middle of the wild fire we have now that is the Bay-Delta I think is not placing the right priorities on the subject matter.

The subject matter needs to be—the focus needs to be on the content of what are we going to do and when are we going to do it. I would, therefore, defer on governance a little bit with all due respect to those who have spent a lot of time on it.

Mr. THOMPSON OF CALIFORNIA. Then a question for anyone who wants to take a shot at it. Is there anything that we should learn from what happened up in the Klamath that would allow us to be

a little bit more proactive, a little less contentious that you would recommend?

Mr. STELLE. I have been through several Endangered Species Act wars. I am totally convinced that if it is not scientifically robust and entirely transparent, it will not be defensible. If it is not defensible, it is not worth a whole lot in terms of reliability.

The notion that you can monkey around with this stuff, you cannot monkey around with it and get away with it.

So I think a real touchstone for the Bay-Delta Steering Committee is the touchstone of scientific robustness and transparency because people will disagree with what the Committee decides and does not decide. We will be in court. We need to defend it if we are going to achieve our reliability objectives.

Mr. THOMPSON OF CALIFORNIA. Anybody else?

I yield back, Madam Chair. Thank you.

Mrs. NAPOLITANO. Ms. Wolk.

Ms. WOLK. Very briefly, Madam Chair. I wanted to speak to the smelt issue, Mr. Miller. When we had our hearing at the Water, Parks, and Wildlife Committee in August of '05, the science was pretty clear and seemed to be fairly established that there were connections between the exports and the smelt.

I am curious you are not a biologist, and I respect that. That does not mean you cannot do the research. But the biologists who study this issue, those who are not local, seemed to agree with this. I just need to know what other peer review have you undergone?

Mr. MILLER. Well, I think the question that you ask the biologist is to show you the graph. Show you the graph, any graph, that has smelt abundance on the Y axis and some version of exports on the XX. You will not see that graph. So what you will get are opinions and this is a long—Congressman Costa talked about the paradigm. There is a very powerful paradigm that has been in place all my career that the exports have a significant effect on fish populations. It was first for striped bass, turned out to be ocean conditions. Then it was for salmon, and they have actually measured it and found out that it was less than a one percent effect of the exports on salmon.

Now we are at Delta smelt. Somebody from the U.S. Fish and Wildlife Service said the other day, "Gee, if you are right about Delta smelt, how are we going to control exports?"

Yes, ask them for the graph. Ask them for the graph. You will not get it.

Ms. WOLK. Ms. Cooley, a brief question about the alternatives to the current desire to build concrete dams, which seems to be making a comeback.

Since the current water plan for the State of California shows that in the past, I think 15 years since the year 1990, 1.5 million acre-feet of water has been added to California's water supply through groundwater storage. Could you talk a little bit about that and the relative differences between that and the above-ground dams construction?

Ms. COOLEY. OK. Generally for groundwater management in conjunctive use, which we heard someone from Semitropic today talking a little bit about, generally those are less expensive with fewer social and environmental impacts. So they generally take high

flows and store them underground. They take advantage of the fact that we have overdrafted much of our reservoirs and what we are seeing today, even during this crisis, that agencies are able to use that water to meet their demands. There is a tremendous amount of potential left for that, in part, because again we have overdrafted our reservoirs quite a bit and we have a huge underground reservoir that we can take advantage of.

Ms. WOLK. Thank you, Madam Chairman.

Mrs. NAPOLITANO. Thank you.

With that, we are getting to the very end of it. I would like to again state that the testimony will be available on the House Committee on Natural Resources website at: http://resourcescommittee.house.gov. We can get that information to you.

As a wrap up, I would like to accept into the record a letter received on June 29th from the State Water Contractors, General Manager Terry Irvine for the record.

Last, I have really enjoyed, and I thank my members for staying as long as you have, to the panelists, to the people out in the audience who are listening to this, maybe not for the first time, and to my staff, our staff who is putting all these together. It takes an exorbitant amount of time and effort to put them together.

Yes, Mr. Miller? OK.

To the city for allowing us to use this nice, beautiful facility. But I would like to put out something to all of the people who were either on the panel who are still around, but to those that are still here is that what I am listening to is that we need a lot more communication and networking, and working together to get to the solution. Because everybody seems to be doing their own thing. I am not kidding when I am saying that the agencies do not talk to each other. Because when I was in the State House I had to actually physically bring agencies, sit them next to each other and say OK now talk. This was just at the State level. Never mind at the Federal level. That is a whole different——

Mr. LARSON. Try county to county government.

Mrs. NAPOLITANO. Try county government? No, thank you.

The other area I would like to bring out and put into everybody's mind is that all elected officials at every level should begin to educate and inform their constituency about what we are facing; the shortages, the drought—and begin a process of asking them to start conserving.

People are not dumb. They get it. But you need to remind them and you need to be able to put before them something tangible that they can put to our surroundings, say I can do this to save water.

Recycling has always been an issue that I have advocated way back in my City Council days in the '80s. Now that is beginning to be talked about a lot more.

The connotation was that is used water. Ladies and gentlemen, we have no new sources of water. It is the same water God has given us that this Earth continues to recycle. How we use it, how we protect it and how we get the pollutants to clean it up is part of the solution for what we are facing. And until we all get together on the same page, I do not think we have an answer that we can provide to my great grandchildren. I already have a great grandson. But I want to ensure that my great grandson's grandchildren

are able to have clean water when they need it, and not have to buy it out of a bottle.

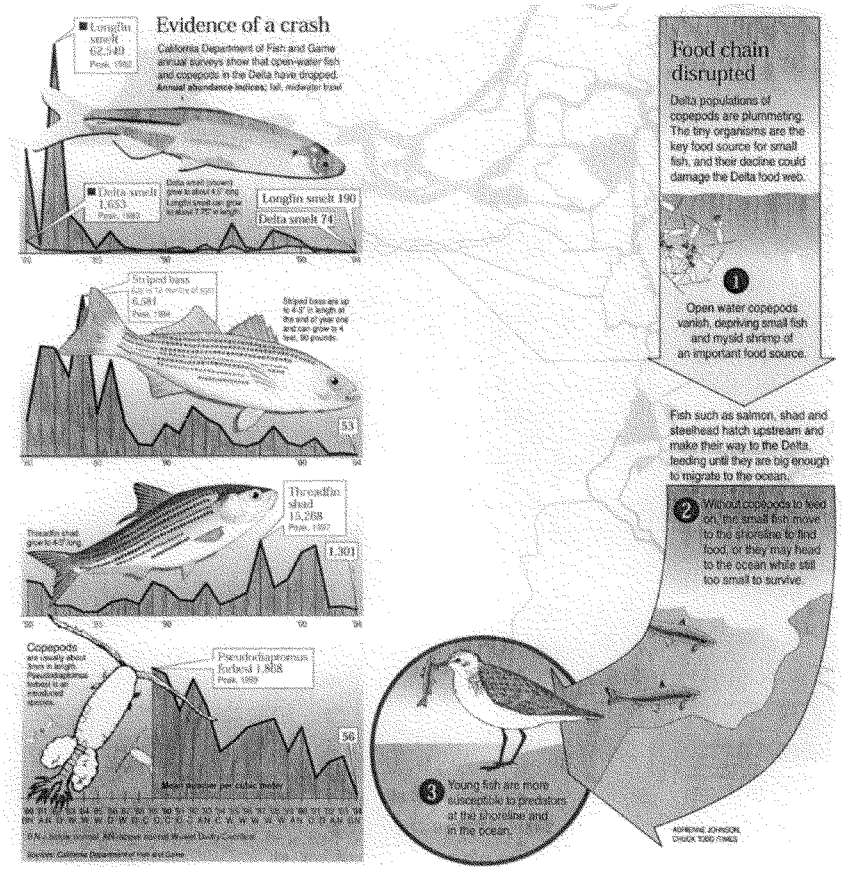
So with that, I thank you very much. This wraps it up.

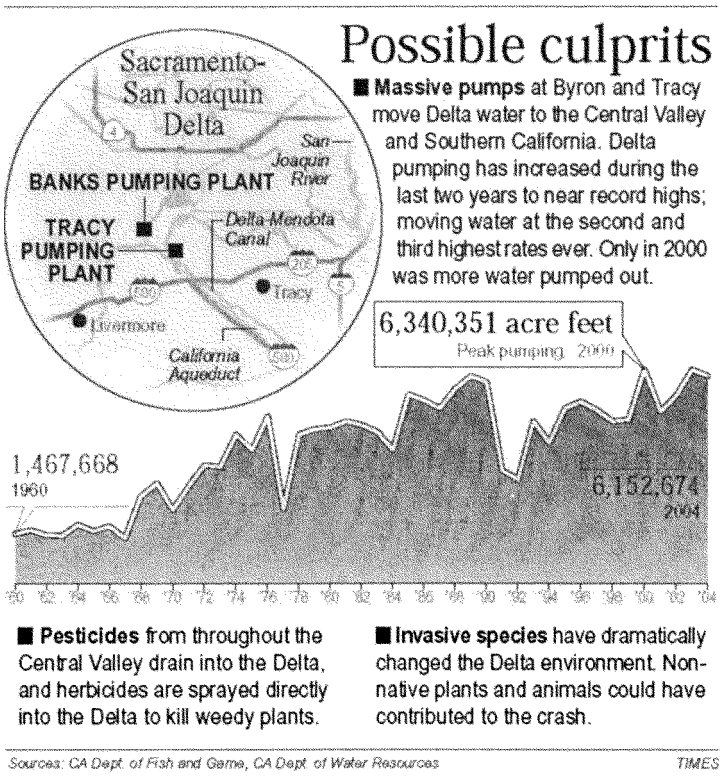
Mr. Miller?

Mr. MILLER OF CALIFORNIA. Thank you, Madam Chair.

I would ask unanimous consent to include as part of the record two graphs from Department of Fish and Game on the decline of the fisheries and the increase in pumping as we have gone from a million four to six million three hundred thousand acre-feet of water.

Mrs. NAPOLITANO. Without objection, so ordered.





Mr. MILLER OF CALIFORNIA. I would like very much to thank you again, Madam Chair, for taking your time and the time of the Committee to come to my district to have this hearing and to listen to the witnesses.

Mrs. NAPOLITANO. I thought it was his district.

Mr. MILLER OF CALIFORNIA. No, I think you are headed there tomorrow, unless there is something in this map that I have not seen. So what do you think about pumping now?

Mrs. NAPOLITANO. All right. Children, children, children.

Mr. MILLER OF CALIFORNIA. Now, I want to thank you very much. I know that this was a very, very fast response by the Committee to the request from me and my colleagues for this hearing. Clearly the staff had to do a lot of work because you also had a backlog of legislation that was reported out last week from the full Committee. So I really appreciate all of their effort on making this a successful hearing.

Thank you very much to my colleagues who came here. Lois, thank you so much.

Mrs. NAPOLITANO. Thank you, Lois, for being with us and staying the course and being able to shed a little more light from the State perspective.

I am serious when we say we need to communicate more.

Ms. WOLK. Madam Chair, I look forward to it.

I want to thank the leaders in the water area. I really appreciate your allowing me to join you.

I want to thank the Chair for coming to Solano County. I look forward to working in a partnership way to solve the problems of the Delta. Thank you.

Mrs. NAPOLITANO. So with that, we have somebody who would like to stand up and speak up? Would you mind coming up and taking a mike, sir. You have five minutes, sir. Five minutes.

Sir, let me clarify something. Because one of the things that again I was criticized for is that we did not have a pro and we did not have a con. There was a reason for that. We needed to get a picture of what was important. So if it is a pro, I am sorry, sir. If it is a con, same difference.

What we are trying to do is shed light and be able to get information for this Committee to then move forward.

You are on. Five minutes.

Mr. FRANCO. Yes, ma'am. I appreciate the opportunity. I come here with no agenda other than to ask that when these Committees meet——

Mrs. NAPOLITANO. Your name, sir.

Mr. FRANCO. My name is Mark Franco. I am the head man of the Winnemem Wintu Tribe of Mount Shasta and down into the town of Redding.

When we have these types of meetings, and we respect the government agencies, it is important that to have all of the voices represented to give you a full picture of what is happening within the Central Valley.

I have no pro or con in regard to what we have been discussing today. My only concern is in the protection of the water and the protection of my relatives who live in the water and fly above it, and walk on the land. We have asked for additional hearings at which time the tribal concerns can be presented. One of them was to ask for a hearing on the Central Valley Project Indian Land Acquisition Act on which all of the keystone projects of the Central Valley were built, but which the government has never completed, and of which my tribe is the beneficiary.

So I come here, and I appreciate the words of all of those who spoke and all of those who patiently waited. I do appreciate the work that you are doing and your Committee is doing, but I just ask that you keep the original people of this State in mind when you make decisions on how you are going to handle our relative, the water.

I thank you very much for my opportunity.

Mrs. NAPOLITANO. Thank you for your statement, sir.

Again, this Committee hearing was put together in 3 weeks, so it really was a very short window. I have only been chair since January. I have yet to see anything in writing requesting that. So if you will put it in writing, it will be taken under consideration.

With that, this hearing is adjourned.

[Whereupon, at 12:30 p.m. the Subcommittee was adjourned.]

[Additional material submitted for the record follows:]

[A statement submitted for the record by The Honorable Jerry McNerney, a Representative in Congress from the State of California, follows:]

Statement of The Honorable Jerry McNerney, a Representative in Congress from the State of California

I would like to thank Chairwoman Napolitano for holding this hearing today and for her attention to this important issue. I would also like to thank the other Members of Congress who are here today and the panelists for their efforts and for lending their expertise.

The dramatic decline of the smelt population in the San Joaquin Delta is cause for concern, not only for the future of this species but also for the health of the Delta and the effect of degraded water quality on businesses, particularly agriculture. Scientists believe that the plight of the smelt is indicative of considerable future challenges in California, and it is clear that the current infrastructure used to manage the state's water supply, and maintain water quality, cannot adequately balance the array of stresses on the system.

While many have debated the cause of the decline in smelt population, one thing is clear: action is needed, and we must have the best science available to make an informed decision about how to solve water issues in the Bay-Delta. We cannot afford to lose sight of the idea that improving water quality is vital for both environmental protection and also for maintaining healthy water for agriculture and drinking. Although water rights issues have been contentious throughout California's history, all Californians recognize that action is necessary.

We should also recognize that the challenges facing the Delta will only become greater with time. Climate change will cause sea levels to rise and will reduce runoff from melting snow, thereby increasing salinity in the Delta. Levees in the Delta are in critical need of repair, and natural processes outside of our control, such as earthquakes or floods, could devastate the Delta with severe consequences for the entire State.

Fundamentally, in order to deal with water issues in the Delta we should address how to improve water quality, prevent an increase in salinity, and ensure a clean supply of water for drinking and agriculture. To achieve these objectives, it is essential that enough fresh water enter the Delta to preserve the health of this essential water system.

Pumping operations have already reduced the amount of fresh water entering the Delta, which in turn reduces the dilution of the pollutants that threaten the ecosystem. Plans to divert more water around the Delta will increase salinity and have harmful consequences for potable drinking water and aquatic life.

Declining water quality and availability also has negative consequences for agriculture, the economic backbone of the Central Valley and a critical industry statewide. Farmers depend on a stable supply of clean, fresh water for their crops. California's economic future depends on our ability to effectively solve Delta challenges for farmers; the availability of clean water should be one of our foremost concerns.

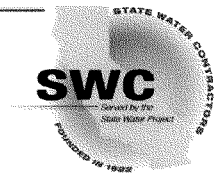
It is crucial for federal, state, and local policymakers to come together to address this growing problem. As we work to restore the Delta we will have to answer tough questions about sustainable development and how to balance appropriately the myriad concerns of stakeholders who are vested in this complex issue. And we will have to make sure that the decisions we make take into account the diverse water use needs of our citizens.

While the situation facing the Delta is serious, there is reason for optimism. Local authorities, the state government, and now Congress are hard at work bringing concerned parties together and developing plans of action based on sound science. Conservation and reclamation of water has shown great promise, as have conjunctive use projects and desalination. These efforts should be encouraged and expanded statewide.

The long-term solution to Delta challenges is collaboration and innovation, and I believe that federal, state, and local policymakers are up to this task.

I would like to thank the Chairwoman again for holding this hearing, and I extend my appreciation to the witnesses for their expert testimony.

[A letter submitted for the record by Terry Erlewine, General Manager, State Water Contractors, follows:]



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Ray Stokes
Central Coast Water Authority

Vince Wong
Alameda County FC & WCD Zone 7

General Manager
Terry L. Erlewine

June 29, 2007

The Honorable Grace Napolitano
U.S. House of Representatives
1610 Longworth Building
Washington, DC 20515

Re: Delta Crisis Management and Long Term Solutions

Dear Representative Napolitano:

I am writing today on behalf of the State Water Contractors (SWC), a statewide organization representing 27 public water agencies in California that provide water under contract from the State Water Project. Collectively, the SWC's deliver water to more than 25 million residents and to more than 750,000 acres of prime agricultural land. Whether our members are in Southern, Central or Northern California, they are all deeply concerned about the many critical challenges we face in the Delta.

Since the water supply of the State Water Project is conveyed through the Sacramento-San Joaquin Delta, the SWC has a direct interest in the health of its ecosystem. In reference to the July 2 hearing in Vallejo, we would like to bring to your attention the attached June 5 letter that the SWC sent to several members of the California Legislature. This letter identifies the need for a holistic approach to provide meaningful protection for smelt and other species. We believe the letter identifies many measures that should be considered by the Congressional Subcommittee on Water and Power in their July 2 hearing and subsequent deliberations. Further, it is clear to us that, in addition to the current smelt crisis, there are a number of very significant issues that threaten the viability of California's water management infrastructure. While the State of California has established several large scale planning efforts, such as Delta Vision and the Delta Risk Management Strategies, there is a significant open question as to the present and future role of the federal agencies in these processes and in taking actions to avoid future crises.

I appreciate the opportunity to provide you this information. If you or your office have any questions about this letter, or our views on the many challenges we face, please contact me at (916) 447-7357.

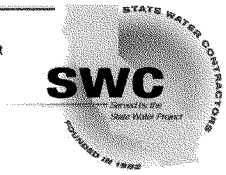
Sincerely,

Terry Erlewine
General Manager

Attachment

1121 L Street, Suite 1050 • Sacramento, California 95814-3944 • 916.447.7357 • FAX 916.447-2734 • www.swc.org

Attachment



June 5, 2007

The Honorable Darrell Steinberg
California State Senate
Chair, Senate Natural Resources & Water Committee
State Capitol, Room 4032
Sacramento, CA 95814

The Honorable Lois Wolk
California State Assembly
Chair, Assembly Water, Parks & Wildlife Committee
State Capitol, Room 3120
Sacramento, CA 95814

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Solano County Water Agency

Ray Stokes
Central Coast Water Authority

Vince Wong
Alameda County FC & WCD Zone 7

General Manager
Terry L. Erlewine

Dear Senator Steinberg and Assemblymember Wolk:

I am writing today on behalf of the State Water Contractors (SWC), a statewide organization representing 27 public agencies that purchase water under contract from the State Water Project (SWP). Collectively, the SWC's deliver water to more than 25 million residents throughout Northern, Central and Southern California and more than 750,000 acres of prime agricultural lands. As public agencies, we have a mandate to provide safe and reliable water supplies to the people we serve.

We have reviewed your letters to the Schwarzenegger Administration concerning the population decline of Delta smelt. The SWC share your concern with the smelt's decline. We believe that a reliable water supply from the San Francisco/Sacramento-San Joaquin Bay-Delta (Delta) requires a healthy Delta ecosystem. We hope this letter will clarify the significant steps already taken this year by the California Department of Water Resources (DWR) and the U.S. Bureau of Reclamation (Bureau) to protect the smelt.

The reason for the decline of the smelt is uncertain. State and federal biologists have identified invasive species, power plant operations, pesticides from urban and agricultural runoff, diversions by Delta farmers, and invasive predatory fish, along with water exports from the state and federal projects as possible causes for the decline.

On May 31, DWR temporarily and voluntarily shut down the SWP pumps that deliver water from the Delta to protect smelt, which at the time were located near the SWP pumping plant. DWR announced it would curtail SWP pumping for 7 to 10 days allowing time for the fish to move away from the pumps. At the end of that period DWR will reassess the need for the shutdown.

During the past year, a number of actions were implemented to help the smelt, with additional actions planned for the coming months. As noted in Senator Steinberg's letter, Governor Schwarzenegger issued a Pelagic Fish Action Plan (Plan) in March

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2007 which included measures to address all of the many factors affecting the smelt. Many of those measures were implemented this year in addition to the current shutdown. In some cases measures were implemented in ways that exceed the recommendations of the Plan. For example:

- The Winter/Early Spring action of minimizing net upstream flows in Old and Middle River to 3,500 to 5,000 cubic feet per second (cfs) was implemented for the entire January 15 to February 15 period. Flows during this period were targeted to keep net upstream flows in Old and Middle River at less than 4,000 cfs. This level of protection has been extended into June, exceeding the recommendation of the Pelagic Fish Action Plan.
- Currently, the VAMP Flow Reduction measure, with a targeted Old and Middle River downstream flow of zero, has been extended until Delta temperatures reach 25 Centigrade. This extension, which likely will last through mid- to late June, also exceeds the Pelagic Fish Action Plan measures.

While there have been significant water management measures implemented this year, the SWC are seriously concerned by the lack of actions by regulatory agencies to address other causes that likely bear responsibility for the decline of the Delta smelt. Much remains to be done to solve the Delta smelt puzzle, and we request that actions by those responsible agencies be taken immediately. For 2007, water export operations appear to be a less important factor than other factors affecting the smelt. However, surprisingly no actions have been taken to address other causes of Delta smelt declines including:

- Increased presence of invasive species throughout the Delta system, such as Asian clams, *Egerira densa* and numerous others;
- Increasing concentrations of toxic pyrethroids in Delta waters that are used by smelt for spawning and rearing;
- Effects of toxics contamination in the Delta, including most recently at the Stockton sewage outfall;
- Low dissolved oxygen in the lower San Joaquin River caused by the Stockton Deep Water Ship Channel;
- Unscreened water diversions throughout the Delta;
- Power plant water diversions in the West Delta;
- Failure to address predation of smelt by exotic introduced species of bass; and
- Continuing pattern of minimal flow down the San Joaquin River.

We strongly believe that state leaders must take action on *all* potential causes of the smelt decline. As recent media reports and editorials have noted, the export pumps are the easiest "knob" to turn but are not the sole cause of the decline. A number of scientists have said that reduced pumping alone will not prevent extinction of the Delta smelt. That point is

underscored by the fact that actions implemented in early 2007 to reduce water supplies did not result in increased numbers of Delta smelt.

We strongly urge Governor Schwarzenegger and the State Legislature to support a comprehensive plan that includes consideration of all the factors described above. A comprehensive plan must include near-term steps to improve the use of water supplies already available to better protect smelt. A science-based approach to developing a comprehensive plan will inform how the state responds to the decline and should ensure the plan is applied equally to non-pumping stress factors.

We think that any comprehensive plan should include a variety of actions on each of the several factors affecting the smelt. At a minimum we suggest the following:

1. Request the State Water Resources Control Board to review the effect of in-Delta pumping on smelt and develop appropriate actions to reduce those effects.
2. Direct the Central Valley Regional Water Quality Control Board to review toxicity impacts on smelt and associated effects of wastewater discharges from wastewater treatment plants in the Delta and develop actions to reduce the effects of those discharges on smelt.
3. Direct the Department of Fish and Game (DFG) to develop and implement a list of recommended actions to reduce predation of smelt by non-native predatory species in the Delta.
4. Direct DWR to work with the Bureau to augment or redirect San Joaquin Flows to better protect smelt.
5. Request the Department of the Interior to work with the State to expedite consultation on the biological opinions for the SWP and the CVP.
6. Direct DWR and DFG to expedite review of near-term infrastructure solutions such as siphons and gates that protect smelt and water supplies, and which can be implemented under an emergency order if necessary.

This list is not exhaustive and many more actions should be included in a comprehensive plan to protect the smelt. In addition to the actions necessary in a comprehensive plan, it is also imperative that existing environmental water supplies are used in the best way possible to benefit smelt population.

The attached summary from DWR identifies the significant actions already taken to meet the Delta's environmental needs. Recent biological studies have increased our understanding of the smelt lifecycle, and this knowledge should be used to modify our use of existing environmental water supplies available under existing regulatory standards to better protect the smelt.

June 5, 2007
Page 4

A comprehensive plan should also result in a decision to improve the Delta's conveyance infrastructure. The SWP and Central Valley Project (CVP) take smelt when water is required to flow in reverse up Old and Middle Rivers toward the SWP and CVP pumps. New water supply infrastructure can resolve this problem. The Administration must make a decision to pursue new conveyance infrastructure around the Delta, and must be prepared to act on that decision.

The state's economic impacts also must be considered. The severity of the economic impacts underscores the need for resolving the water supply vs. fish conflict. Water project operations similar to those undertaken during 2007 will cost a minimum of $200-300 million annually. If these operations and their related costs go on indefinitely, the situation will not be economically sustainable and statewide economic impacts will skyrocket.

The SWC are committed to a healthy Delta ecosystem. Unfortunately, decades of Delta management that relies only on pumping restrictions has left the Delta ecosystem in crisis. The State must change to a comprehensive approach that includes all of the factors that affect the smelt, and the broader Delta ecosystem.

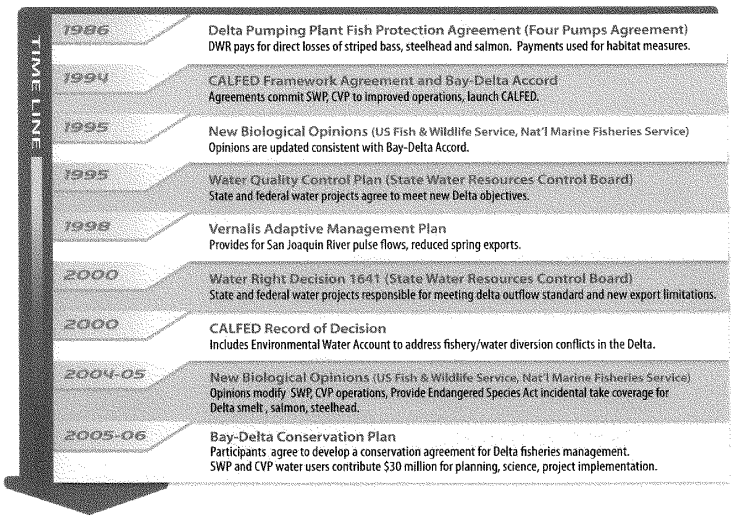
Sincerely,

Terry Erlewine
General Manager, State Water Contractors

cc: Assemblyman Jared Huffman
Assemblywoman Mary Salas
Assemblyman Pedro Nava
Assemblyman Gene Mullin
Assemblyman Ted Lieu
Assemblywoman Anna Caballero
Assemblyman Juan Arambula
Assemblywoman Nicole Parra
Governor Arnold Schwarzenegger
Director Lester Snow, Department of Water Resources
Director L. Ryan Broddrick, Department of Fish and Game
Tam Doduc, Chair, State Water Resources Control Board

Attachment

State Water Project Fish Protection Actions for the Delta



[A letter submitted for the record by Bert Michalczyk, General Manager, Dublin San Ramon Services District, follows:]

DUBLIN
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July 2, 2007

The Honorable Grace Napolitano
Chairwoman
Committee on Natural Resources
Subcommittee on Water and Power
U.S. House of Representatives
Washington, D.C. 20515

Hearing Topic: Extinction is not a Sustainable Water Policy: The Bay Delta Crisis and the Implications for California Water Management

Dear Chairwoman Napolitano and Members of the Committee:

We write to submit our views on the health of the Bay Delta and the implications for water supply in California. As an agency within the Delta region, we believe the hearing is an important step in developing necessary responses to the needs of the Delta. As part of the hearing record, we request that this letter be made part of the official hearing record.

The Dublin San Ramon Services District is the northern-most customer of the California State Water Project's (SWP) South Bay Aqueduct. DSRSD serves water to 50,000 people in the Cities of Dublin and San Ramon, who will be without sufficient water for drinking and fire suppression if the SWP is unable to deliver water promised to municipalities. While our community is a small part of the 25 million people relying on their drinking water from the Sacramento-San Joaquin Delta, we are more impacted than most because we have little or no local storage facilities like many other agencies to carry us through interruptions of the SWP. We believe it is important to identify our unique situation as the Committee considers options to address the Bay-Delta crisis. The decisions that the committee reaches will affect millions of Californians, their businesses, their health and safety, and their recreational interests.

A key concern for our region is the important role that the State of California must play in any defined response to mitigate the threats posed to the Delta. Any solutions that are developed must maintain a commitment to meet the needs of municipal and industrial water users. A good start would include sufficient and reliable federal and state resources to construct alternative water supply projects. This is particularly the case at the federal level. We note that you have been a vocal supporter of water recycling and desalination technologies and projects. We are grateful for your commitment, and we hope that any response you may decide to develop will make such projects a key element.

Our customers will suffer the impact of the Bay-Delta crisis, and we have no means of providing sufficient water supplies without the SWP. This situation is especially worrisome as we move into the wildfire season, which is especially volatile this year due to the drought.

We support the restoration of the Bay-Delta. We think that any response should address the development of effective and efficient alternatives to supply water to our communities. This will have the twin benefit of reversing the decline of the Bay-Delta, and bringing projects that provide a safe and reliable supply of water to communities that depend on the Delta. The absence of such an approach will result in economic disruption, environmental decline, and potentially years of litigation. With strong and meaningful input from state and federal policymakers, we are certain that a response can be developed to address these needs. However, the political will must be there. The past several months have not illustrated this.

As a leader in water resources policy, we urge you and your colleagues to ensure that elected officials who can make a difference in developing a response to this crisis do so with all dispatch. Mid-course corrections can always take place as solutions are implemented and tested. All of us must work together, but the state and federal government have a leadership role to fill to guide the process that ultimately will reverse the threats posed to the Bay-Delta.

Sincerely,

Bert Michalczyk
General Manager

[A statement submitted for the record by Felix E. Smith, Carmichael, California, follows:]

Statement of Felix E. Smith, Carmichael, California

To Chairwoman-Representative Napolitano and other members of this subcommittee.

My name is Felix E. Smith. I appreciate the opportunity to provide these comments. Please include these comments into the record of this hearing.

I held the first deformed migratory bird, an American coot hatchling, found at Kesterson NWR in 1983. At that time I was a U.S. Fish and Wildlife Service biologist recently assigned to look into the emerging issues involving agricultural drainage and wastewater. That experience impacted my life. Some of my concerns regarding Selenium contamination of the lands and waters and associated resources, uses and values are described in my article, "The Kesterson Effect: Reasonable Use of Water and the Public Trust", published in the San Joaquin Agricultural Law Review, Volume 6, Number 1 - 1996. I submit this article for the hearing record by this reference.

Water is the environment in which fish and other aquatic resources must carry on all their life processes. Such resources, associated uses and values are inextricably tied to the physical, chemical and biological aspects of that aquatic environment. Healthy and diverse aquatic populations are indicative of good water quality conditions (flow, temperature, oxygen and chemical parameters). Good water quality allows for near optimum use of water as an M & I supply, an irrigation supply and as an environment for fish and other aquatic life. For healthy and sustainable fish populations to exist (also wildlife populations), the total aquatic environment (the water, the bed, the riparian vegetation and associated insect life, the food web) all interact and therefore must be suitable for aquatic life at the individual, population and community levels.

The Federal Clean Water Act, as amended, and the Public Trust embrace affirmatively and positively that the people are to be protected against all unwise and unreasonable uses of Federal and State waters. Uses of water can be considered unreasonable because they pollute; because they offend our sense of aesthetics or natural beauty; because they interfere with the right of the public to enjoy a natural resource of state or national significance; because they threaten in a harmful way to upset the ecological balance of nature, or because to allow this unreasonable use confers a valuable privilege which is inconsistent with protecting the public trust.

Agencies like the Federal Environmental Protection Agency (EPA) and California's EPA were established to protect the public interest and quality of the Nation's lands and waters. Such agencies are not to squander clean air, allow the pollution of our rivers, streams and groundwater, allow the pollution or other degradation of our land leaving a degraded legacy for our grandchildren or allow the pollution of the body's of our children, our fish and wildlife resources or our food supply. These same agencies should not look like shills for corporate farms or massive water districts (Boswells Farms, Westland Water District).

Any effort at maintaining sustainable water quality, agriculture and wetland ecosystems (fish and wildlife resources) must involve an understanding of the interaction between the soil and the flow of water over, through, and under the soil well beyond the point of application. Preserving soil fertility is critical to sustaining its productivity. Preserving and maintaining water quality is critical to the productivity of water as an ecosystem and as a commodity for domestic and industrial uses. Unlike soil, which can be built up over time, water can't be built or enhanced. A river can be lost to a farmer; to a species of fish or to fish resources; lost as a place to recreate or as a water supply. It can be diverted, polluted, misused or over appropriated. Aldo Leopold's Round River makes the principles of ecology clear and vivid, suggesting that nature is a "Round River", like a stream flowing into itself, going round and round in an unceasing circuit, going through all the soils, the flora and fauna of the earth while supporting many resources, beneficial uses and values. Destroying one part can destroy it all and all its benefits to society.

A use of the lands and waters of a watershed that so degrades the sustainability of a downstream ecosystem or a component of that ecosystem to make it unsuitable for sustaining viable agriculture, wildlife, fish and other aquatic life, or which makes fish unsuitable for human consumption, or which is a hazard to other fish and wildlife, or which degrades ecological, aesthetic, recreational uses, small craft navigation, and scenic values, is inconsistent with public trust protection, the reasonable use of water is therefore a nuisance. When chemicals enter the bodies of children, or enter the domestic or wildlife food supply to toxic levels without our consent, it is a trespass.

Here is an example brought to you in part by the Federal Bureau of Reclamation and the Central Valley Project.

It was known for a long time that the soils of the Westside of the San Joaquin Valley were derived from parent material formed in an old seabed. The California Department of Water Resources Bulletin No. 89, Lower San Joaquin Valley Water Quality Investigation—1960, discusses concerns about the chemicals and various salts in the soils and drainage from the area. The soils and parent material extend throughout the Westside, south to the end of the Valley. The sodium ion was a major concern along with a variety of sulfates, boron and numerous trace elements. Even at that time drainage was believed to be a serious and emerging problem. Drainage from the Panoche area was highly concentrated from a quality standpoint and "unusable for beneficial purposes" (see pg. 95 of DWR "Bull. No 89). At that time the San Joaquin River was already seriously polluted from agricultural drainage and wastewater.

The observation "that the drainage was highly concentrated from a quality standpoint and unusable for beneficial purposes", sparked little attention. With the application of vast quantities of Bureau of Reclamation water to the highly saline / seleniferious soils, the need for drainage works quickly become apparent. Surface waters and the San Joaquin River showed additional evidence of pollution.

By 1982 some people, including a few Grassland duck club owners, believed that something was wrong in the northern Grasslands. They had noticed sick and dead birds in 1981 and 82. In 1983 the first deformed young of migratory birds were found on Kesterson NWR by researchers from the U.S. Fish and Wildlife Service. Kesterson Reservoir (NWR) was the then terminus of the San Luis Drain. People were disturbed by the pictures of dead and grossly deformed waterfowl and shorebirds obtained from Kesterson Evaporation Ponds that were appearing on the nightly television news at dinnertime. Selenium (Se) in the agricultural drainage accumulated via the food chain to high levels in their tissues resulted in dead adults, dead and deformed young. Several species of fish had elevated Se levels in their tissues.

In September 1984, California's State Board, in its Agricultural Water Management Guidelines for Water Purveyors, stated, "Failure to take appropriate measures to minimize excess application, excess incidental losses, or degradation of water quality constitutes **unreasonable use of water"** (Emphasis added).

The State Board followed with its Order WQ 85-1(February 1985). The State Board found that agricultural drainage and wastewater reaching Kesterson Reservoir "is creating and threatening to create conditions of pollution and nuisance"

(Emphases added). The Order then warned "If the Bureau closes Kesterson Reservoir and continues to supply irrigation water to Westlands Water District without implementing an adequate disposal option, continued irrigation in the affected area of Westlands Water District could constitute an **unreasonable use of water"** (Emphasis added).

From 1986 to today (2007), Selenium contamination is sufficient to cause deformities and threaten reproduction of key species within the area of the greater Grasslands, in the San Joaquin River to the Bay-Delta estuary. Deformed migratory birds have been found in every year field investigations were conducted for such evidence. Selenium concentration was also high in eggs that were sampled, which in turn could have lead to deformities. Fish resources continue to show high levels of Se because of a Se-contaminated food chain. Selenium has been found in what is usually called edible tissues and in reproductive organs of birds and fish.

Human health advisories have been issued against consuming Se contaminated edible tissues of fish (bluegill and largemouth bass) and of migratory birds (ducks and coots). Women of childbearing age and children are cautioned against eating such tissues. State Board reports indicate that in the Bay-Delta, surf scoter, greater and lesser scaup and particularly white sturgeon appear to be the most at risk to Se toxicity because they feed on filter feeders (i.e. bivalves). Concentrations Se found in 62 white sturgeon muscle samples and 42 liver samples far exceed tissue thresholds for reproductive effects. Recent findings add the Sacramento splittail to the list of species exhibiting elevated Se levels.

The USGS report (Report) "Forecasting Selenium Discharges to the San Francisco Bay-Delta Estuary; Ecological Effects of a Proposed San Luis Drain Extension" by Drs. Samuel N. Luoma and Theresa S. Presser "2000), indicates that the reservoir of Se on the Westside of San Joaquin Valley is sufficient to provide loading at an annual rate of about 42,500 pounds of Se to the Bay-Delta disposal point for 63 to 304 years at the lower range of its projection. This is with the influx of Se from the Coast Range curtailed.

Selenium bioaccumulation is a major water quality problem. The combination of California's climate, hydrology, Se loading, Se reactivity, and Se bioavailability poses a significant threat to the aquatic ecosystem of the Lower San Joaquin River and Bay-Delta. Selenium contamination is damaging beneficial uses, degrading food sources of humans and wildlife, aesthetic, recreation and ecological values. Risks to fish and bird reproduction could lead to extinction via contamination of the invertebrate food supply. Filter feeders are great concentrators of Se. Aquatic insects were the primary food item of shore birds. The Report concludes that bivalves appear to be the most sensitive indicator of Se contamination in the Bay-Delta. In the Bay-Delta and the lower San Joaquin River tidal action will increase the resident time of Se, exposing all aquatic organisms and increasing the ability of food organisms to accumulate greater amounts of Se and pass it up the food chain to predators.

Studies indicate that the highest concentrations of Se (12 to 23 ppb) were measured in green sunfish (lepomis cyanellus) from the San Luis Drain where seleniferous drainage is most concentrated. The second highest concentrations of Se (7.6 to 17 ppb) were measured in green sunfish (lepomis cyanellus) and 14 to 18 ppb Se in bluegills (Lepomis macrochirus) taken from North Mud Slough. The high levels (body burden) of Se could be related to the Se sequestered in the sediments and benthic organisms that are mobilized by the detritus-based food chain. (USGS, Biological Resources Division "Effects of an Agricultural Drainwater Bypass on Fishes Inhibiting the Grassland Water District and the Lower San Joaquin River, California" by Saiki, Michael J., Barbara A. Martin, Steven E. Schwarzbach, and Thomas W. May. In North American Journal of Fisheries Management, Vol. 21:624-635, 2001.

One can conclude that water borne Se is the single most predictor of pollution, that it can and continues to have an adverse affect on the aquatic ecosystem, associated fish and wildlife resources, uses and values (Saiki, et al-2001)

The bottom line is that saline / seleniferious soils of the Westside of the San Joaquin Valley contain a reservoir of Se, other trace elements and a variety of salts, that with irrigation, will continue to leach from the soils to the shallow groundwater for years and years to come. This Se leachate / drainage will continue to degrade down slope lands, surface and groundwater, fish and wildlife habitats and other beneficial uses of the receiving waters including the San Joaquin River and Delta.

Today we have the longest Selenium hazardous waste site know to man, extending from at least the Mendota pool and the Grasslands (near Los Banos), downstream via the San Joaquin River to the Delta, Suisun Bay and adjacent marshes. This involves 130 miles of San Joaquin River, miles of waterways in the Delta and 1,000s upon 1,000s of acres of San Joaquin Valley lands and aquatic ecosystems.

With the above information one could allege that the continued irrigation of saline / seleniferious soils of the Westside of the San Joaquin Valley and Se contaminated discharges to the San Joaquin River constitute a waste and unreasonable use of the State's water, and a nuisance. All of this is not within the meaning of beneficial use of Section 8 of the Reclamation Act of 1902 and the contemporary equal priority setting of CVPIA, Section 3406 (a) (3) and the Clean Water Act, as amended.

This Committee or a court should review the drainage issue and associated impacts to determine if such a use of water is both beneficial and reasonable within the context of continuing shortage of water, the broadened meaning of beneficial use of Section 8 of the Reclamation Act of 1902 and the contemporary equal priority setting of CVPIA, Section 3406 (a) (3) and the Clean Water Act, as amended.

To me this irrigation use of water, associated drainage, Selenium and other impacts is just as inconsistent with reasonable use and public trust protection as is the filling of tidelands (Mark v. Whitney 6 Cal, 3d 251 - 1971); as is allowing mining waste and debris that impacted water quality and impede navigation (Woodruff v North Bloomfield Gravel Mining Co. (Fed Rpt. Vol. 12—1884) and People v Gold Run Ditch and Mining Co. (4 Pac Rpt at 1152—1884); as is a ranch or farm which allows animal wastes and other filth to contaminate the waters of a stream which impacts the water supply and beneficial uses of downstream users (People ex rel Ricks Water Co. v Elk River Mill and Lumber Co. (40 Pac Rpt 486 "1895); as is the deposition of mill wastes and other debris which destroys aquatic life and a fishery (People v Truckee Lumber Co.(16 Cal 397, 48 Pac 347 - 1897) , and as is the diversion of water which destroys numerous uses and values protected by the public trust reaffirmed or clarified in Audubon (National Audubon Society v Department of Water and Power, City of Los Angeles (33 Cal 3d 419, 658 P 2d 709, 189 Cal Rpt.346; cert denied 464 U.S. 977—1983).

The point made by the Elk River Court that if the conformation of the defendant's land is such that he cannot carry on a dairy without putting such filth directly into the water, then he must find some other use for the land (emphases added). This rational thinking of over 110 years ago is particularly relevant to today's Se, salt, drainage and wastewater issues associated with the irrigation of selected lands in the San Joaquin Valley. Following the thinking of the Elk River Court, if the Westside farmers cannot carry on their operations without polluting the local ground and surface waters, then they must find some other use for the land. And there is no taking issue for a use that is deemed unreasonable and a nuisance (Audubon).

Some Suggested Actions

Control of agricultural pollution also might be achieved by instituting best management practices, land retirement, and by economic incentives (substantial fines, forfeiture of all or a portion of appropriated water rights or contract allotments). Land retirement is an important option. Removing Federal irrigation water from being use on the Se source lands. Taking the land out of production that is the source of the majority of the salt and selenium problems should have quick and positive results and many public benefits. This can be attained by direct purchase of land or the irrigation rights, leasing land, purchasing the irrigation water allotment to such lands while prohibiting the use of groundwater on those lands.

Retiring lands containing significant levels of selenium or other toxic materials would have just a one time cost. A long-term lease might also work, for there would be little if any maintenance costs. Land not needed for conservation purposes such as restoring native grasslands and related fauna of the San Joaquin Valley, could be sold, with title restrictions, for selected compatible uses such as dry land farming, grazing, etc. Within the Westlands Water District problem soils have been estimated at 100,000 to 275,000 acres (USBR, April 1991).

At a cost of $1,000.00 per acre it would cost $100,000,000.00 to retire 100,000 acres or $275,000,000.00 for the 275,000 acres. Lands acquired should be purchased with today's realities in mind. This includes limited or poor ground water, extensive selenium and sodium sulfate problems. Any value added to the price of land should not be based on speculation, the availability of Federally subsidized water, or on the potential construction of a Federal drainage facilities. A reality is that problem soils without water are just about worthless.

For each acre of irrigated land retired, there would be commensurate saving of about 2.0 to 3.5 acre feet of water per acre (depending on crop) or about 200,000 to 350,000 acre feet for each 100,000 acres taken out of irrigation. This water is firm yield water imported from northern California. For each irrigated acre taken out of production there would be a reduction of 20 to 60 pound of pesticides (active ingredients) plus 80 to 250 pounds of carrier materials, (oils, etc.) not applied to the soils. There would be a reduction of the amount of drainage and wastewater generated

of about .6 to .8 acre feet per acre of land retired or 60,000 to 80,000 acre-feet for each 100,000 acres retired. There would be a saving in electrical energy by not having to pump water from the Delta. There should be benefits to fish resources and associated fisheries as up to 600,000 to 900,000 acre-feet would not have to be pumped from the Delta.

The water savings could be used to restore or otherwise benefit fish resources and fisheries throughout the waters of the Bay-Delta watershed. Any remaining water could be sold for municipal uses.

Economic incentives may be effective because of the existence and potential threat of law suits using the public trust doctrine, waste and unreasonable use, and the State's enforcement powers. A finding of a waste and unreasonable use of water by a court or the State Board or a finding based on the public trust could bind all entities discharging selenium, boron and sodium sulfate laden drainage and wastewater in to state waters.

Based on the State Board's 1984 (Agricultural Water Management Guidelines for Water Purveyors) and 1985 State Board Order WQ 85-1 definition of what constitutes an unreasonable use of water, the effects from irrigating saline, seleniferious soils are such that this use must be considered a waste and unreasonable use of water and the resultant drainage and wastewater a nuisance. This violates Article X, Section 2, of the State Constitution. The premise of the Federal Clean Water Act, as amended, is violated. The impacts violate Section 8 of the 1902 Reclamation Act, which requires compliance with State laws. Section 8 also says; Provided, That the right to the use of water acquired under the provisions of this Act shall be appurtenant to the land irrigated, and beneficial use shall be the basis, the measure and the limit of the right.

Thank you.

June 25, 2007

To: SARA Board and other interested parties

From: Felix Smith

Subject: The Lower American River, the FMS and temperature criteria

Over the past several years the consulting firm SWRI (now HDR-SWRI) developed for the Water Forum, the best flow management option for the American River given the constraints of Folsom Reservoir, and the Bureau of Reclamation's integrated operations of the CVP through the OCAP. This operation will be much better than the Bureau's pre-CVPIA operations and will improve on the Bureau's post-CVPIA operations. However, the controlling factor is really the lack of cool water to meet temperature needs of the flows in the LAR. There just is not enough cool water in Folsom storage for blending with massive amounts of release (up to 4,000 cfs during June and July) and still attain the desired flow and temperature criteria to meet salmonid needs during late summer and fall months.

Water is the environment in which fish and other aquatic life carry on all their life processes. Healthy and diverse aquatic populations are indicative of good instream conditions (water quality, temperature, oxygen and chemical parameters). Good water quality allows for near optimum use of water as a domestic and industrial supply, an environment for fish and other aquatic life, and as a recreational and esthetic resource. In this situation, the LAR environment must include the timing and amount of instream flow, the temperature and water quality and flow conditions necessary for adult migration and holding, spawning, egg incubation, rearing of fall -late fall run Chinook salmon, steelhead and American shad and their dependent food web.

HDR-SWRI developed the Flow Management Standard for the LAR. The FMS mirrors the purpose and intent of Judge Hodge decision in EDF v EBMUD of 1990. His decision was based on the best information available to him, his understanding of the Audubon decision (Mono Lake decision) of 1983, the Cal Trout v SWRCB decision of 1989 and California Fish and Game Code Section 5937. The basic meaning of Section 5937 and the Cal Trout decision, is protecting and managing aquatic ecosystems, associated resources, uses and values covered by the State's public trust protection comes first in any appropriation and use of water. Judge Hodge has stated that the public trust doctrine occupies an exalted position in any administrative or judicial determination of water resource allocation and use.

Judge Hodge physical solution contains a flow pattern that amounts to about 1.7 to 1.8 MAF out about 2.7 MAF, or about 66 percent of an average annual runoff of the American River Basin. Hodge flow schedule:

October 15 thru February	2,000 cfs
March 1 thru June 30	3,000 cfs
July 1 thru October 15	1,750 cfs

An additional 60,000 acre-feet was to be maintained in reserve in Folsom Reservoir from mid October thru June 30 for release when recommended by the CDFG.

The Hodge decision, in essence, established a water right allocation for the Lower American River ecosystem, its resources, uses and values irrespective of those operating the Folsom / Nimbus project, water right holders or the needs of downstream contractors. The released flows would extend throughout the LAR from point of release at Nimbus Dam to the Sacramento River.

Water temperature plays a critical roll in the conservation and protection of salmon and steelhead. At some life history stages water temperatures can vary quite a bit, while at other times water temperature is critical to life requirements. Such temperatures are fairly defined and should be met if there is to be good survival and growth of salmonid fishes. Temperature criteria, however, was not a component of the Hodge decision.

Water temperature targets / objectives to be attained at the Watt Ave gage.

October 15 / Nov.1 to May 1 / 15	less than 58 F. Degrees
May 1 / 15 to October 31	less than 65 / 69* F. Degrees
As early in October as reasonably possible given cold-water constraints.	60 F Degrees

*/ Modifications of the temperatures targets / objectives at various reaches of the LAR may be necessary to protect the cold water pool for adult fall-run Chinook salmon entering and holding during the fall before spawning occurs.

Evidence indicates that spring and summer releases warm up as they progress downstream from Folsom Reservoir through Nimbus Reservoir as measured at the Fair Oaks and Watt Ave gages. In the fall flows released from Nimbus Reservoir cool as they progress down stream. It takes about 24 to 30 days for water temperatures of 58 to 60 FD measured in the North Fork American River to reach the Chinook salmon spawning grounds.

It has been long realized the Folsom Reservoir is cold water deficient. Under the Bureau's operation of Folsom Reservoir, this cool water deficiency is acerbated when releases of 3,500 to 4,000 cfs draw on the cool water to meet export needs south of the Delta. This cold water deficiency will in time impact the LAR ecosystem and several life stages of the Chinook salmon and steelhead utilizing the LAR as well as the operation of the Nimbus Salmon and Steelhead Hatchery (NSSH). The American River is also the water supply for the American River Trout Hatchery (ARTH).

Based on Bureau data (April 25, 2007) for the years 2001 to 2007, a Folsom Reservoir pool greater than of 600,000 acre-feet of storage end of September does not guarantee sufficient cold water to meet the needs of the anadromous fishes of the LAR. In some years there will be insufficient cold water during the summer hold over of steelhead young. This could easily stress the 2-year classes of steelhead both in the LAR and being reared at the NSSH.

The minimum amount of water needed to meet the SWRI / Water Forum's Flow Management Standard of 1,500 to 2,000 cfs is about 1,282,000 acre-feet. Because there are temperature objectives / targets to be met, the flows released from Folsom Reservoir may have to be increased above the minimums during the summer and fall months in order to maintain adequate water temperature to keep the holding adult Chinook salmon and summering over steelhead young in good condition. These flows would extend throughout the LAR from Nimbus Dam to the Sacramento River.

From the Bureau's end of May (web) data, June releases were forecasted at 3,000 cfs, at 3,292 cfs for July and at 3,049 cfs for August. The amount of water involved in these three months is about 568,000 acre-feet. End of September storage was listed at 359,000 acre-feet. In the past several years Folsom releases in August are frequent cut back by mid August. Therefore the releases could be considerable higher than forecast for July and August to meet Delta export contracts. The released water will have to be blended to meet the temperature criteria for steelhead in the LAR. Even at 68 DF the salmonid population in the LAR will be under considerable stress.

At the May 31, Fish Working Group meeting, Bureau and FWS representatives presented DRAFT operational data for the Folsom Project through the summer and early fall months. They expounded on how the operation and flows would be under historical baseline operation, or about 3,200 cfs during July, instead of 4,000 cfs in the baseline conditions. Can you imagine 4,000 cfs of natural summer flow in a low runoff year? This amounts to 7,932 acre-feet a day and 237,960 acre-feet for 30 days. There goes much of the cool water pool and once it is gone there is little chance to get it back.

For most of the month of May and the first 10 days of June the Folsom/ Nimbus release was about 1,500 cfs. Delta CVP export was about 850 cfs through the Tracy Pumping plant during this same period. Flows released from Folsom were increased to 2,000 cfs for 3 days to meet Delta Water Quality. On June 12 the flows were reduced to 1,500 cfs to conserve water. On June 15, flow was increased to 3,500 cfs toping out at 4,000 cfs on June 16, 2007. The Bureau has scheduled an increase to 4,500 cfs on June 26, 2007. This is 8,923 acre-feet per day and 267,705 acre-feet for 30 days. The duration of such release is unstated. The reason given by the Bureau was to "meet Delta requirements". Unstated purpose is to "meet export contracts". CVP Tracy pumping plant is scheduled to pump 4,200 cfs on June 25.

From the Bureau's June 19, 2007 (web site), June releases were forecast at 3,305 cfs, July at 2,774 cfs and 2,082 cfs for August. The amount of water involved in these three months is about 496,000 acre-feet. End of September storage was listed at 420,000 acre-feet or about 60,000 acre-feet more water in storage than the May forecast. Releases to the LAR are forecast at 1,285 cfs for October, 994 cfs for November and 800 cfs for December. The 800 cfs is the minimum flow of the Flow Management Standard except during extreme drought conditions. The Bureau's June 19, 2007 web site forecast was already out of date and is far from reality.

The massive summer transfer of water draws heavily upon Folsom storage, greatly reducing the cool water pool. This reduced cool water storage will in turn impact the LAR ecosystem. It will extend to any holding over young Chinook salmon, the summering over of young steelhead and early arriving run fall adult Chinook salmon that must hold in the LAR for water of spawning temperature. We could see water temperatures into the upper 60's, i.e. 68 DF with excursions into the low 70's DF this summer. Since the American River is also the water supply for the NSSH, the Hatchery's mitigation function could be impaired. The Hatchery's function is to mitigate the impacts to salmon and steelhead resources (lost spawning and nursery grounds) resulting from the construction and operation of the Folsom / Nimbus Unit of the CVP. This mitigation function is equal to a contract and carries with it a perpetual obligation.

What is the Bureau's Plan to offset or lessen the impacts to public trust resources, uses and values in the Lower American River under its operating scenario for 2007,or 2008 and 2009? Under the public trust doctrine, I do not believe the Bureau of Reclamation can walk away from the problems it has to a significant degree created. It is the responsibility of the owner of a dam to comply with Fish and Game Code Section 5937, whether or not it is specifically stated in a water right permit or license issued by the State Board. Therefore the Bureau has an obligation to protect the resources of the LAR under any operational plan for the Folsom / Nimbus project.

Under the CVPIA, Section 3046 (b) (1) has a target of doubling the natural production of anadromous fish relative to the average level attained during 1967-1991. As a part of the doubling program, the CVP operators are to give first priority to measures that protect and restore natural channels and riparian habitat values through restoration actions and through modifications to CVP operations.

The (b) (1) (A) water is re-operation water and is to meet regulatory and project needs. The effort here is to re-operate the Folsom / Nimbus project to best meet the needs of fish / aquatic resources in the LAR and meets Delta water quality objectives. The operators of the CVP are to provide flows of suitable quality, quantity and timing to protect all life stages of anadromous fishes. The Section 3046 (b) (2) water is not to be used until all aspects of CVP re-operation have been undertaken to meet the doubling plan using re-operation water.

The Bureau representatives expounded during the May 31 Working Group meeting about how this years flows were under historical baseline operations. However the Bureau has not presented a progress report on the development of the base case scenario. This project re-operation and baseline / accounting must be transparent. It is from this base case (flow / ecological conditions) that all other stream flow actions / releases will be based and from which benefits (improved stream flow, temperatures and timing of flows) or liabilities (impacts to stream flows, temperatures and timing of flows) are or can be measured. Without a transparent base case, the

FWS can be accused of camping with the Bureau and managing the LAR with smoke and mirrors.

The basic meaning of Code Section 5937 and the Cal Trout decision is that protecting and managing aquatic ecosystems, associated resources, uses and values covered by the State's public trust protection comes first in any appropriation and use of water. The State Board acted that way with its implementation of the Mono Lake decision.

One must be aware that the Supreme Court Decision in S.D. Warren Co v. Maine Board of Environmental Protection, et al, (No. 04-1527, May 15, 2006), a case involved water released from a dam for generating electrical energy. The Court indicated that because there are inherent risks in limiting, modifying the movement and circulation of a river, it is within the State's legitimate business to regulate. State Certification under Section 401 of the Clean Waters Act is required for discharges from dams. The operation of the Folsom / Nimbus Reservoirs store and modify the flow of the American River and generates electrical energy while doing so. This manipulation can and does impact water quality character (temperature); therefore a 401 CWA certification by the State Board may be required. A CWA Section 401 certification by the State Board could include the purpose and intent of CDFG code section 5937, and temperature criteria to protect the LAR's salmon and steelhead fishes. Measures could become a part of the Bureau's modified water use permit for the operation of the Folsom / Nimbus facilities.

The Audubon Court effectively tied the protection of public trust assets to the perpetuation of the natural and ecological aspects of Mono Lake for their innate values, not the private off-site uses of water.

Now may be the time and the occasion for a court or massive public opinion to demand that the Bureau operate the Folsom / Nimbus project in such a way to meet the Water Forum's Flow Management Standard (as a minimum flow standard) with its temperature component to conserve and protect the salmonid populations of the Lower American River. The plan could be called the "ESA fish protection / public trust protection and operations plan" for the LAR. Some questions however should be investigated as a part of this plan. For example:

What would happen to Folsom Reservoir's cool water pool and the LAR salmonid resources under a Bureau's plan of operation that is limited to meeting the FMS and temperature criteria in the LAR?

Would the Water Forum's FMS meet Delta Water Quality Standards? If not, how much water is needed to meet such standards? How much of the released water could be exported and still meet Delta Standards?

The Bureau should model such a plan of operation and report back to the Water Forum, the Fish Working Group, and report the results for public review and comment.

The Water Forum through SWRI should model such a plan of operation for so it and the Fish Working Group can remain well informed.

I believe that mitigating the impacts of the construction and operation of the Folsom / Nimbus project is a first priority and continuing obligation of the Bureau. Protecting the people's public trust interests in the area of origin should be at a higher priority than meeting water contracts south of the Delta. This is especially so when such water is used to produces subsidized crops or contributes additional salts and trace elements like selenium to the wetlands and waters of the San Joaquin Valley.

One thing is certain, the greater the uncertainty is the protection of the Lower American River resources, uses and values, including its Chinook salmon and steelhead, the greater the uncertainty of the Bureau of Reclamation's ability to continue to take water from the American River.

July 18, 2007

To: SARA Board and other interested parties.

From: Felix Smith

Subject: The Lower American River, the FMS, Temperature Criteria and Call

This is an addendum to my memo on subject dated June 25, 2007. This should help clarify some of the thinking behind that memo.

The Central Valley Project Improvement Act (CVPIA) was passed in 1992. The first two purposes of the CVPIA as set forth in the statute (Section 3402 (a) and (b)) are to protect, restore, and enhance fish, wildlife and associated habitats in the Central Valley and Trinity River Basins, and to address impacts of the CVP on fish, wildlife and associated habitats.

It is now time (2007) for the Water Forum and the people of the greater Sacramento Region to see the purpose and intent of the CVPIA become a reality on the American River. If the collective Water Forum and other interested parties do not continue to ask how much flow and temperature stress, harm and other mortality Chinook salmon and steelhead resources of the Lower American River (LAR) can be prevented by the Bureau of Reclamation's operation of the Folsom / Nimbus facilities, I doubt we will ever see the Bureau take the first step to correct an ecological problem.

Question

Is it the broad public interest to make trade-offs, go along with or approve a new or modified Bureau of Reclamation water right permit for the operation of Folsom / Nimbus facilities that does not meet the flow and water quality (temperature) needs of Chinook salmon and Steelhead of the LAR?

To say it another way; how can the stress, harm and mortality to Chinook salmon and steelhead from flow fluctuations and elevated water temperatures in the LAR be prevented? Or the question is; what is needed to prevent damage to the sustainability of such public trust resources on a year in and year out basis? Asking what is an acceptable risk for public trust resources, uses and values to endure for the sake of out-of-basin agricultural benefits should not be a part of the trade-off?

The GOAL

Operate Folsom / Nimbus Reservoirs and associated facilities to protect and foster public trust and ESA purposes (Chinook salmon and steelhead resources) until adequate temperature, flow regimen and perceived / necessary facilities and operational criteria are put in place. The goal is to ensure the restoration and sustainability of the LAR ecosystem, associated Chinook salmon and steelhead resources, uses and values. While not attainable, we must strive for 100 percent reliability and sustainability of such resources.

This effort may require operational or structural modifications to Folsom / Nimbus facilities to ensure successful holding, spawning of adult Chinook salmon, successful egg incubation, and safe rearing and downstream passage of young salmon and steelhead. This could include maintaining specific daily average water temperature goal of 65 FD with the upper range not to exceed 68 FD in the LAR between Nimbus Dam and the Sacramento River during the summering over period and reducing flow fluctuations. Temperatures of 58 FD or less are needed for successful Chinook salmon and steelhead spawning and egg incubation. Flow without meeting temperature criteria is not habitat of Chinook salmon and steelhead.

Call to Action

Now is the time for the Water Forum and the people of the greater Sacramento Region to demand that the Bureau operate the Folsom / Nimbus project in such a way to meet the Water Forum's Flow Management Standard, with its continuous flow and temperature component, to conserve and protect the Chinook salmon and steelhead resources of the Lower American River.

- Now is the time for the Bureau to institute an ESA fish / public trust protection and operations plan for the LAR based on the flow and temperature criteria of the FMS. The Bureau should report annually to the public on the success of the plan and ways to improve it to better serve fish conservation needs of the LAR.
- Now is the time to require the Bureau to modify Folsom Dam's powerhouse intakes (at least one) to access the coldest water in Folsom Reservoir.
- Now is the time for the Bureau to construct an automated and temperature activated shutter system on at least one powerhouse intake.
- Now is the time for the Bureau to modify the daily / weekly operation of Nimbus Reservoir. Nimbus Reservoir is a heat sink. This may require modifying the intake structure to the Nimbus Dam power generating facilities (it pulls from surface water). Another modification may require a continuous flow equal to a run of the river situation during periods of high temperature and low flow releases.
- Now is the time to require the Bureau operate the Folsom / Nimbus project in such a manner to meet the Water Forum's Flow Management Standard with its continuous flow and temperature component to conserve and protect the Chinook salmon and steelhead resources, uses and values of the Lower American River.

There may be other operational changes or structural modification that should be made to help bring greater control (operational flexibility) over the temperature of water released by the Folsom / Nimbus project to the LAR.

This all may take Congressional encouragement and action. Now is the time for the Bureau to do everything necessary to protect the public trust assets of the Lower American River. The Bureau and the Greater Sacramento Community needs all the help they can get.

Background material and reasoning

The construction and operation of the Central Valley Project (CVP) reworked the natural flows of the Central Valley. This massive undertaking was largely to help the eastside San Joaquin Valley farmers who had seriously over drafted their groundwater. The Sacramento Basin water covered the needs of the Lower San Joaquin River water rights holders (riparian and adjudicated) so the eastside farmers could be served water from the San Joaquin River via Friant Reservoir and the Madera and Friant—Kern Canals. The needs of the fish resources (riparian needs) were not incorporated into the Friant project. Folsom Reservoir on the American River quickly became and is the Bureau's safety valve to get water to the Delta ASAP to meet export needs and water quality standards until water released from Shasta Reservoir arrives in the Delta.

The CVP has benefited the farming economy of California and probably the U.S. balance of payments. However the CVP unquestionably has had a devastating environmental legacy. The negative impacts include dewatering reaches of a major river system—the San Joaquin River with it spring-run of Chinook salmon now extinct. The Sacramento River's Winter-run Chinook salmon was bought to near extinction. On the Trinity River after years of abuse there was Congressional action to bring back the Trinity River ecosystem to support the salmon and steelhead runs of yesteryear. Flow reversal in the south Delta. Much of the agricultural drainage in a major portion of the Westside of the San Joaquin Valley was discovered to be toxic with disastrous environmental consequences to wetlands, migratory birds and resident wildlife, and surface and groundwater supplies. The drainage problem was greatly magnified and expanded with the imported of Sacramento and Trinity Basin water. (Dunning, Harrison C. - 1993 - Confronting the Environmental Legacy of Irrigated in the West, the Case of the Central Valley Project, in Environmental Law, Volume 23 at 942—1993, Northwest School of Law, Lewis and Clark College.) This agricultural drainage (a variety of salts) plus 49 agricultural pesticides and other chemicals, some banned in 1970 (DDT, toxaphene and chlordane) are still found in mud and in clams and fish tissue samples from the San Joaquin River and Delta (USGS 1998). Such a chemical soup could be a contributor to the Delta's Pelagic Organism Decline. On the San Joaquin River, after more than 50 years, a Court settlement to restore the San Joaquin River with releases from Friant Dam and Reservoir has been accepted by the parties pending Federal Congressional action and financial support.

The CVPIA calls for bold moves to address the severe environmental impacts caused by past operation of the CVP. The results could be downsizing the safe yield of the Project, downsizing irrigated agriculture on the Westside of the San Joaquin Valley as a result of economics, salt intrusion, continued drainage problems; selenium toxicity to wetland biota, including fish, resident and migratory wildlife; the need to provide and protect urban supplies, and the need to correct and provide for improved instream environmental conditions. It could include facilities like automated shutters; modifying the intake structures to access the coldest water in reservoirs; modifying the reservoir release to better meet the needs of Chinook salmon and steelhead. All of this could come by deliberate Bureau action, Congressional action, change in policy, or by a court order (Dunning, Harrison C. "1993). There have been some corrective actions put in place. However, the jury is still out regarding the success of such actions.

As recently as July 3, 2007, Representative George Miller said that there is water that is used in large quantities that brings relative little economic return to the state. Water could be shifted away from cotton and alfalfa farms in the San Joaquin Valley, by changing subsidy policies or if government decides not to renew contracts from the Federally owned Central Valley Project. (Contra Costa Times, July 3, 2007)

Adolph Moskovitz in a March 3, 1994 presentation to the Sacramento Area Water Forum emphasized the importance of the Public Trust. He stated the Public Trust cannot be diluted by treating it as merely another beneficial use under Article X, Section 2 of the California Constitution, co-equal with irrigation, power production and municipal water supply. The Public Trust Doctrine occupies an exalted position in any judicial or administrative determination of water use allocation. He went on to say that the Public Trust Doctrine applies to the American River water stored in Folsom Reservoir as well as natural flow, so that instream standards (requirements) are to be met by stored water releases in addition to restrictions on diversions. (This restriction could apply to Delta diversions) Also protection of public

trust resources may prevail over the constitutional requirements to put the State's waters to their fullest beneficial use, when the two are irreconcilable.

The State Board's 1994 decision regarding Mono Lake shared the water with out-of-stream uses only after the instream resources, their uses and values were protected and assured a great chance of long-term sustainability.

The Water Forum's Flow Management Standard (FMS) including temperature criteria was modeled by SWRI. The conclusion was that the flows and temperature would be met about 65 to 70 percent of the years modeled. SWRI came up with the best management option for the American River given the constraints of Folsom Reservoir, and the Bureau of Reclamation's OCAP for integrated operations of the CVP. There will be years when protection will be less, may be marginal or simply not available because of the lack of Folsom storage and cold water to meet temperature criteria of flows released. The Chinook salmon will have to wait the arrival of fall rains and cooler temperature. This could delay Chinook salmon spawning until late November and into December. Adult salmon holding in water that in the mid 60 DF would be expected to suffer high mortality, with their eggs suffering lower survival rates. This is what happened in the 2001spawning year. The Water Forum's FMS will be better than the Bureau's pre CVPIA operations and should improve on the Bureau's post CVPIA operations. However, the controlling item will be lack of cool water or access to the coldest water in Folsom Reservoir for blending to attain the desired stream temperature without by passing power generating facilities. Flow fluctuations of the LAR could continue to be a problem during spawning and rearing periods.

All of this may take Congressional encouragement and action. Now is the time for the Bureau and the Greater Sacramento Region to do everything necessary to protect the public trust assets of the Lower American River.

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