DEPARTMENT OF THE INTERIOR

Office of the Secretary

43 CFR Part 11

RIN 1090–AA21 & 1090–AA23

Natural Resource Damage Assessments—Type A Procedures

AGENCY: Department of the Interior.

ACTION: Final rule.

SUMMARY: This final rule amends the regulations for assessing natural resource damages under the Comprehensive Environmental Response, Compensation, and Liability Act. Federal, State, and Indian tribe natural resource trustees may use these regulations to obtain compensation from potentially responsible parties for natural resource injuries resulting from hazardous substance releases. Trustees obtain a rebuttable presumption in litigation for damages, up to $100,000, calculated in accordance with this rule. The rule does not change the overall administrative process for conducting assessments but simply revises an existing ''type A'' procedure for assessing natural resource damages in coastal and marine environments and establishes a new type A procedure for the Great Lakes.

EFFECTIVE DATE: The effective date of this final rule is June 6, 1996. The incorporation by reference of certain documents listed in this rule was approved by the Director of the Federal Register and is effective June 6, 1996.

FOR FURTHER INFORMATION CONTACT: Mary Morton at (202) 208–3302 (for questions about the rule language) or David Rosenberger at (202) 208–3811 (for questions about the computer models). Interested parties may obtain copies of the computer models and supporting documentation free of charge from the Department through July 31, 1996, and thereafter for a fee from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, ph: (703) 487–4650. The models are also on the Internet at http://www.usgs.gov/doi/oepc/oepchome.html.

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I. Background

A. Statutory Provisions

The Department of the Interior (the Department) is amending the regulations for assessing natural resource damages under the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (42 U.S.C. 9601 et seq.) (CERCLA). CERCLA provides that certain categories of persons, known as potentially responsible parties (PRPs), are liable for natural resource damages resulting from a release of a hazardous substance. CERCLA sec. 107(a). Natural resource damages are monetary compensation for injury to, destruction of, or loss of natural resources. CERCLA sec. 107(a)(4)(C).

Only those Federal, State, and Indian tribe officials designated as natural resource trustees may recover natural resource damages. CERCLA defines ''State'' to include:

> The District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Commonwealth of the Northern Marianas, and any other territory or possession over which the United States has jurisdiction. CERCLA sec. 101(27).

Trustees must use all sums they recover in compensation for natural resource injuries to restore, rehabilitate, replace, or acquire the equivalent of the injured natural resources. CERCLA sec. 107(f)(1). Trustee officials may also recover the reasonable costs of assessing natural resource damages. Natural resource damages are distinct from response costs. Response costs are the costs of actions taken under the National Contingency Plan (40 CFR part 300) to remove threats to human health and the environment caused by hazardous substance releases. Today's final rule addresses only the assessment of natural resource damages and is not intended for use in connection with response-related activities, such as setting cleanup priorities.

CERCLA requires the President to promulgate regulations for the assessment of natural resource damages resulting from hazardous substance releases. CERCLA sec. 301(c). The President delegated the responsibility for promulgating these regulations to the Department. E.O. 12316, as amended by E.O. 12580. The regulations must identify the ''best available'' procedures for assessing natural resource damages. CERCLA sec. 301(c)(2). CERCLA requires that the natural resource damage assessment regulations include two types of assessment procedures. ''Type A'' procedures are ''standard procedures for simplified assessments requiring minimal field observation.'' CERCLA sec. 301(c)(2)(A). ''Type B'' procedures are ''alternative protocols for conducting assessments in individual cases.'' CERCLA sec. 301(c)(2)(B). Federal and State trustees who perform assessments in accordance with these regulations receive a rebuttable presumption in court. CERCLA sec. 107(f)(2)(C). The Department must review the regulations, and revise them as appropriate, every two years. CERCLA sec. 301(c)(3).

B. History of this Rulemaking

On March 20, 1987, the Department published a final rule establishing a type A procedure for coastal and marine environments that incorporated a computer model, known as the Natural Resource Damage Assessment Model for Coastal and Marine Environments (NRDAM/CME). 52 FR 9041. The Department indicated that it would consider developing additional type A procedures as experience was gained with the type A procedure for coastal and marine environments. Id. at 9057. On June 2, 1988, the Department published an advance notice of proposed rulemaking soliciting comment on the development of a type A procedure for Great Lakes environments that would incorporate a computer model called the Natural Resource Damage Assessment Model for Great Lakes Environments (NRDAM/GLE). 53 FR 20143. A few months later,

the Department published an advance notice of proposed rulemaking announcing the commencement of the statutorily required biennial review of the type A procedure for coastal and marine environments. 54 FR 5093 (Feb. 1, 1989).

On July 14, 1989, the U.S. Court of Appeals for the District of Columbia Circuit issued two decisions that affected these two pending type A rulemakings. The Department had issued type B procedures on August 1, 1986. 51 FR 27674. State, industry, and environmental group petitioners challenged those procedures in *State of Ohio* v. *United States Department of the Interior* (*Ohio* v. *Interior),* 880 F.2d 432 (D.C. Cir. 1989). The court in *Ohio* v. *Interior* upheld various aspects of the type B procedures but ordered the Department to revise the type B procedures to reflect the statutory preference for using restoration costs as the measure of natural resource damages. The court used the term ''restoration costs'' to encompass the cost of restoring, rehabilitating, replacing, and/or acquiring the equivalent of the injured natural resources. The court also ordered the Department to revise the type B procedures to allow for the recovery of all reliably calculated values lost to the public as a result of the injury to natural resources.

State, industry, and environmental group petitioners also challenged the original type A procedure for coastal and marine environments in *State of Colorado* v. *United States Department of the Interior (Colorado* v. *Interior),* 880 F.2d 481 (D.C. Cir. 1989). The court in *Colorado* v. *Interior* upheld the Department's sequential approach to developing type A procedures but urged the Department to develop additional type A procedures to address as many different cases as possible. The court also remanded the type A procedure for coastal and marine environments, based on the reasoning in the *Ohio* v. *Interior* decision, to permit the Department to allow for the calculation of restoration costs. The original type A procedure for coastal and marine environments calculated damages based solely on certain lost public uses of the injured resources.

On September 22, 1989, the Department published an advance notice of proposed rulemaking stating that it would revise the type A procedure for coastal and marine environments in compliance with *Ohio* v. *Interior* and *Colorado* v. *Interior* during the ongoing biennial review. 54 FR 39013. The Department also announced that it would modify the development of the type A procedure for Great Lakes environments to conform with *Ohio* v. *Interior* and *Colorado* v. *Interior.* 54 FR 39015 (Sept. 22, 1989).

The Department published a notice of proposed rulemaking for the type A procedure for Great Lakes environments on August 8, 1994. 59 FR 40319. The August 8, 1994, Federal Register notice also contained two proposed amendments to the natural resource damage assessment regulations that would affect all type A procedures. The Department proposed to revise the conditions under which both type A and type B procedures could be used in the same assessment, and to make explicit the scope of judicial review of assessments performed using type A procedures. The Department later extended the comment period on the August 8, 1994, proposed rule through February 6, 1995. 59 FR 54877 (Nov. 2, 1994).

On December 8, 1994, the Department issued a notice of proposed rulemaking for the modified type A procedure for coastal and marine environments. 59 FR 63300. On February 7, 1995, the Department extended the comment periods on both the proposed Great Lakes type A rule and the proposed coastal and marine type A rule through July 6, 1995. 60 FR 7155 and 7156. The Department noted that, in light of the similarities between the two proposed rules, it would consider the public comments on the two rules concurrently. Id. at 7156 and 7157. Today's final rule covers both the type A procedure for coastal and marine environments and the type A procedure for Great Lakes environments.

C. Oil Pollution Act Regulations

Originally, trustees could use the Department's regulations to assess natural resource damages resulting from either a hazardous substance release under CERCLA or an oil or hazardous substance discharge into navigable waters under the Clean Water Act (33 U.S.C. 1251 *et seq.*). However, the Oil Pollution Act of 1990 (OPA) amended the natural resource damage provisions of the Clean Water Act. See 33 U.S.C. 1321, 2702(b)(2), and 2706(a). OPA authorized the National Oceanic and Atmospheric Administration (NOAA) to develop new natural resource damage assessment regulations for assessing natural resource damages resulting from discharges, or threats of discharges, of oil into navigable waters that, once final, would supersede the provisions of the Department's regulations addressing oil. 33 U.S.C 2706(e)(1) and 2751(b). NOAA published a final OPA rule on January 5, 1996. 61 FR 439.

The Department began developing the type A procedures before the enactment of OPA and, thus, originally included both hazardous substances and oil in the NRDAM/CME and NRDAM/GLE algorithms and databases. The Department has worked closely with NOAA during the development of the type A procedures. During its rulemaking, NOAA indicated it would allow use of the Department's type A procedures under the OPA regulations. See 59 FR 1062, 1124–25 (Jan. 7, 1994); and 60 FR 39803, 39831 (Aug. 3, 1995).

NOAA's final rule states that trustees may use ''[m]odel-based procedures, including type A procedures identified in 43 CFR part 11, subpart D,'' provided that any such procedure meets the following conditions:

(1) The procedure must be capable of providing assessment information of use in determining the type and scale of restoration appropriate for a particular injury;

(2) The additional cost of a more complex procedure must be reasonably related to the expected increase in the quantity and/or quality of relevant information provided by the more complex procedure; and

(3) The procedure must be reliable and valid for the particular incident. 61 FR at 503 (15 CFR 990.27).

Therefore, the Department has retained components relating to oil in the final versions of the NRDAM/CME and NRDAM/GLE, while recognizing that these components are without any direct regulatory effect. The Department is also providing responses to comments it received on the oil-related components of the type A models. However, the Department wishes to emphasize that its regulations do not govern the assessment of natural resource damages for oil discharges under OPA. Trustees who wish to use the type A procedures and obtain a rebuttable presumption for assessments of oil discharges must follow the process established by NOAA's regulations.

Further, some of the language in the CERCLA rule varies from that in the OPA rule. For example, today's final rule incorporates the existing definition of ''reasonable cost'' at 43 CFR 11.14, from which the definition in the OPA rule differs. See 61 FR at 504 (15 CFR 990.30). Section 11.35(b) of today's final rule, which requires trustees to conduct type B procedures if the PRPs advance the reasonable costs of using such procedures, differs from the OPA rule conditions governing PRP requests for alternative assessment procedures. See 61 FR at 501 (15 CFR 990.14(b)(6)). Also, § 11.44(f) of today's final rule

provides that if the models calculate damages in excess of $100,000, then trustees who wish to obtain a rebuttable presumption must either: (1) limit the portion of their claim calculated with the type A procedure to $100,000; or (2) compute all damages using type B procedures. The OPA rule, on the other hand, contains no dollar cut-off for use of specific procedures. Because use of the type A procedures for oil discharges is governed by the OPA rule, the Department defers to NOAA on how such differences are to be resolved when the NRDAM/CME and NRDAM/GLE are used for assessments of oil discharges.

II. Relationship of Today's Final Rule to the Existing Regulations

The existing regulations establish an administrative process for conducting assessments. See 43 CFR part 11. The administrative process covers all the steps trustees need to follow if they wish to obtain a rebuttable presumption in litigation of their claim. However, trustees have the authority to settle their damage claims at any time during the administrative process and the Department continues to encourage trustees and PRPs to pursue settlement. Furthermore, trustees are not required to follow the regulations. If, however, trustees and PRPs fail to reach a settlement and the case is litigated, trustees will only obtain a rebuttable presumption if they performed their assessment in accordance with the regulations.

The same general administrative process applies regardless of whether type A or type B procedures are used. The process has four phases: Preassessment, Assessment Plan, Assessment, and Post-Assessment. During the Assessment Phase, trustees use type A and/or type B procedures to perform the technical work needed for the actual determination of damages.

Today's final rule does not change this overall administrative process. The rule simply revises the type A procedures available for use during the Assessment Phase and modifies the standards for using both type A and type B procedures for the same release.

A. Preassessment Phase

Today's final rule does not affect the Preassessment Phase. The Preassessment Phase consists of the activities that precede the actual assessment. For example, upon detecting or receiving notification of a release, trustees decide, based on a number of criteria, whether further assessment actions are warranted. Trustees document this decision in the Preassessment Screen Determination. For more information on the Preassessment Phase, see subpart B of 43 CFR part 11.

B. Assessment Plan Phase

If trustees determine that additional assessment work is warranted, they begin the Assessment Plan Phase. The Assessment Plan Phase includes the preparation of a written Assessment Plan describing the procedures trustees intend to use to determine damages. The trustees must make the draft Assessment Plan available for public review and comment.

The regulations provide two types of assessment procedures: type A and type B. Type A procedures, such as those contained in today's final rule, are simplified procedures requiring minimal field observation. Type B procedures involve more detailed field studies. The Assessment Plan documents whether trustees plan to use a type A procedure, type B procedures, or both. Today's final rule revises the standards that trustees must follow when selecting assessment procedures .

Section 11.34 of today's final rule identifies several conditions that must be met before trustees can use a type A procedure and obtain a rebuttable presumption. If the conditions are not met, then trustees who elect to follow the regulations must use type B procedures to assess all damages. If the conditions are met, then trustees must decide whether to use a type A procedure, type B procedures, or both. This decision is based on whether the benefits of the increased accuracy provided by type B procedures would offset the anticipated additional cost of using type B procedures, and whether the anticipated damages would exceed the anticipated cost of using type B procedures.

Trustees may use both type A and type B procedures for the same release if: (1) The type B procedures are cost-effective and can be performed at a reasonable cost; (2) the type B procedures are used only to determine damages for injuries or economic values of a type not addressed by the type A procedure; and (3) there is no double recovery. Section 11.36 of the final rule lists the categories of damages that are included in the type A models and for which trustees may not conduct supplemental type B studies. Trustees must document in the Assessment Plan how they intend to prevent double recovery when they use both type A and type B procedures.

Today's final rule also maintains the requirement that trustees use type B procedures, even if they determine that use of a type A procedure would be appropriate, whenever a PRP submits a written request and justification for use of type B procedures and advances all reasonable costs of using type B procedures within a time frame acceptable to the trustees.

For more information on the Assessment Plan Phase, see §§ 11.30 through 11.37 of today's final rule and subpart C of 43 CFR part 11.

C. Assessment Phase

During the Assessment Phase, trustees conduct the work described in the Assessment Plan. The work consists of three steps: Injury Determination; Quantification; and Damage Determination. In Injury Determination, trustees determine whether any natural resources have been injured. If trustees determine that resources have been injured, they proceed to Quantification, in which they quantify the resulting change in baseline conditions. ''Baseline'' conditions are the conditions that would have existed had the release not occurred. Finally, in Damage Determination, trustees calculate the monetary compensation to be sought as damages for the natural resource injuries. Damages include two components: (1) The cost of restoring, rehabilitating, replacing, and/or acquiring the equivalent of the injured natural resources; and (2) the economic value lost by the public pending recovery of the resources (compensable value).

When trustees use type B procedures, they perform Injury Determination, Quantification, and Damage Determination through laboratory and field studies. The regulations provide a range of alternative type B scientific and economic methodologies for conducting such studies. For more information on use of type B procedures during the Assessment Phase, see subpart E of 43 CFR part 11.

When trustees use a type A procedure, they perform Injury Determination, Quantification, and Damage Determination through a computer model. Today's type A procedure for coastal and marine environments incorporates Version 2.4 of the NRDAM/CME. Today's type A procedure for Great Lakes environments incorporates Version 1.4 of the NRDAM/GLE.

Trustees must supply a number of data inputs to operate the NRDAM/CME and the NRDAM/GLE. The rule also requires trustees to modify certain data contained in the models if they have more reliable information. Section 11.41 and Appendices II and III of the final rule describe the required data inputs and modifications. After trustees supply

the data inputs and modifications, the models themselves perform the remaining calculations necessary to establish if there has been an injury, quantify the extent of injury, select appropriate restoration actions, and value economic losses. With the availability of these computer models, trustees will now be able to pursue compensation for cases in which the cost of detailed type B studies is prohibitive.

Trustees may not implement type B procedures until after the public review period on the Assessment Plan. However, today's final rule provides that trustees who use a type A procedure must perform a preliminary application of the model before issuing the Assessment Plan and then include the data inputs and the results of the preliminary application in the publicly reviewed Plan. This requirement should provide PRPs and other members of the public with a more meaningful opportunity for comment. Performance of a preliminary application of the models will also allow trustees to determine if type B procedures are warranted in light of a new cap on the damages that can be claimed through use of a type A procedure.

The rule now provides that if the preliminary application indicates damages in excess of $100,000, then trustees who wish to obtain a rebuttable presumption must decide whether to: (1) limit the portion of their claim calculated with the type A procedure to $100,000; or (2) compute all damages using type B procedures. The $100,000 limit applies only to damages calculated by a type A procedure and does not limit damages calculated through supplemental type B studies. This dollar cut-off is based on the fairness of allowing trustees to receive a rebuttable presumption for damages calculated by the NRDAM/CME or NRDAM/GLE given the current level of experience with these models. The cut-off is not based on reliability. The Department believes the NRDAM/CME and NRDAM/GLE are capable of generating reliable damage estimates at levels above $100,000. Therefore, although trustees cannot use the models and obtain a rebuttable presumption above $100,000, the Department believes the models are appropriate for use in other contexts, such as settlement negotiations and litigation without the rebuttable presumption.

After the close of the comment period on the Assessment Plan, trustees must carefully review and substantively respond to all comments they receive and must decide whether to continue using the type A procedure. If they do decide to continue using the type A procedure, they must make any necessary revisions to the user inputs, and perform a final application of the model.

For more information on the Assessment Phase, see §§ 11.40 through 11.44 of the final rule. For more information on how the NRDAM/CME and the NRDAM/GLE perform Injury Determination, Quantification, and Damage Determination, see Section IV of this preamble.

D. Post-Assessment Phase

Once the Assessment Phase is completed, trustees enter the Post-Assessment Phase. Today's final rule does not substantively modify the Post-Assessment Phase.

During the Post-Assessment Phase, trustees prepare a Report of Assessment detailing the results of the Assessment Phase. When trustees use a type A procedure, the Report will include the printed output of the final model application. If a trustee is aware of reliable evidence that a private party has recovered damages for commercial harvests lost as a result of the release, the trustee must eliminate from the claim any damages for such lost harvests included in the lost economic rent calculated by the model. If a trustee is aware of reliable evidence that the model application covers resources beyond his or her trustee jurisdiction, the trustee must either: (1) have the other trustees who do have jurisdiction over those resources join in the type A assessment; or (2) eliminate any damages for those resources from the claim.

Trustees present the Report of Assessment to the PRPs along with a demand for damages and assessment costs. If a PRP does not agree to pay within 60 days, the trustees may file suit. Federal and State trustees receive a rebuttable presumption of correctness if they performed their assessments in accordance with the Preassessment Phase, Assessment Plan Phase, Assessment Phase, and Post-Assessment Phase requirements set forth in the regulations. Once a court awards damages or the trustees and PRPs have reached a settlement, trustees establish an account to hold the recovered damages pending preparation of a Restoration Plan describing how they intend to use the funds.

When trustees use a type A procedure, they are not restricted to implementing the general restoration methods used by the model to calculate the restoration cost component of the damage claim. Instead, trustees have the discretion to spend recovered sums on other actions to restore, rehabilitate, replace, and/or acquire the equivalent of the injured resources.

Also, existing 43 CFR 11.93(d), which was not a subject of this rulemaking, provides that trustees may apply several type A recoveries to a single Restoration Plan, so long as the Plan is intended to address the same or similar injuries as those identified in each application of the type A procedure.

For more information on the Post-Assessment Phase, see subpart F of 43 CFR part 11.

III. Nature of Type A Procedures

The Department believes it is important that trustees, PRPs, and the public clearly understand what the type A procedures are, as well as what they are not, intended to provide. The NRDAM/CME and the NRDAM/GLE are sophisticated computer models. These models incorporate a significant level of site-specific detail about actual physical and biological conditions in the geographic areas they encompass. The language and legislative history of CERCLA suggest that Congress envisioned type A procedures as look-up tables based on dollars per gallon or unit of affected area. See, e.g., S. Rep. No. 96–848, 96th Cong. 2d Sess. 86 (July 11, 1980). In requiring the development of two types of assessment procedures—one simplified and the other more complex and site-specific—Congress made a policy choice that trustees be provided with a simplified, inexpensive mechanism for obtaining recoveries in smaller cases. By envisioning a mechanism such as a look-up table, Congress obviously recognized that trustees who use type A procedures should not be required to develop—or be prejudiced for not developing—the same degree of site-specific accuracy as might be achieved using more expensive type B procedures. Nevertheless, in order to increase accuracy, the Department has developed computer models that enable the consideration of site-specific factors. For example, the NRDAM/CME and NRDAM/GLE take into account physical variations among geographic areas, differences in the toxicity and physical characteristics of hazardous substances, seasonal and temperature effects, and differences in the biological productivity of the spill site. The Department believes that when applied correctly using reliable input data, the NRDAM/CME and NRDAM/GLE are powerful, reliable tools for assessing the injuries and compensable values they address.

However, as sophisticated and reliable as they are, the NRDAM/CME and NRDAM/GLE do not, and were

never intended to, constitute automated type B procedures. The NRDAM/CME and NRDAM/GLE are, after all, only models of selected aspects of reality and, like all models, they are incapable of precisely capturing reality in every case. Modeling always necessitates some simplifying assumptions, and the modeling of something as complex as the effects of hazardous substance spills on natural resources necessitates numerous simplifying assumptions.

Section 11.34 of the final rule identifies a number of assumptions the Department made during the development of the NRDAM/CME and NRDAM/GLE. If these assumptions are not reasonable in a particular case, trustees may not use the models and obtain a rebuttable presumption. But even when these assumptions are reasonable, the models' damage estimates will differ from the damages that type B procedures would produce. However, Congress explicitly authorized the development of simplified type A procedures that required less field work than type B procedures and then explicitly granted a rebuttable presumption to assessments performed using these type A procedures just as it granted a rebuttable presumption to assessments performed using type B procedures. Finally, the Department has retained in today's final rule the safety valve that always allows PRPs to require trustees to use type B procedures rather than a type A procedure if they advance all reasonable costs of using such type B procedures within an acceptable time frame.

The standard for evaluating the results of the NRDAM/CME or the NRDAM/GLE in a particular case is not whether the model projections conform precisely to field observations. Rather, the standard is whether the overall damage figure calculated by the models is fair and reasonable in light of the feasibility and cost of developing more specific information using type B procedures. For example, if a spill occurs in an area where biological conditions are relatively uniform over a wide area, the fact that the NRDAM/CME or NRDAM/GLE project that the surface trajectory would turn to the right when in fact it turned to the left is not necessarily adequate grounds to reject wholesale the results of the model.

IV. Workings of the NRDAM/CME and NRDAM/GLE

A. Overview

The NRDAM/CME and the NRDAM/GLE consist of integrated submodels and databases that calculate natural resource damages based on certain types of estimated restoration costs and compensable values. The NRDAM/CME and the NRDAM/GLE are complex computer models; however, their use is not restricted to computer specialists.

The NRDAM/CME was developed under contract to the Department by Applied Science Associates, Inc., A.T. Kearney, Inc., and Hagler Bailly Consulting, Inc. The NRDAM/GLE was developed under contract to the Department by Applied Science Associates, Inc., and Hagler Bailly Consulting, Inc.

''CERCLA Type A Natural Resource Damage Assessment Model for Coastal and Marine Environments Technical Documentation,'' dated April 1996 (the NRDAM/CME technical document) describes the NRDAM/CME. Volume I of the NRDAM/CME technical document discusses the content and derivation of the NRDAM/CME submodels and databases. Volume II is a user's manual. Volume III is a compilation of the chemical and environmental databases used by the NRDAM/CME. Volume IV contains the biological databases on the species life histories, species abundances, and trophic-level production rates used by the NRDAM/CME. Volume V is a compilation of the compensable values and restoration costs used by the NRDAM/CME. Volume VI is a listing of the active source code for the NRDAM/CME.

''CERCLA Type A Natural Resource Damage Assessment Model for Great Lakes Environments Technical Documentation,'' dated April 1996 (the NRDAM/GLE technical document) describes the NRDAM/GLE. Volume I of the NRDAM/GLE technical document discusses the content and derivation of the NRDAM/GLE submodels and databases. Volume II is a user's manual. Volume III is a compilation of all the databases used by the NRDAM/GLE. Volume IV is a listing of the active source code for the NRDAM/GLE.

Today's final rule incorporates by reference the NRDAM/CME, the NRDAM/CME technical document, the NRDAM/GLE, and the NRDAM/GLE technical document. Anyone can obtain computer diskettes containing the models and technical documents from the National Technical Information Service for a fee. The technical documents supplied on diskette are formatted in WordPerfect® 5.1. Some databases are formatted in QuatroPro®. Hard-bound copies of the technical documents are also available. Also, to facilitate prompt distribution of the models, the Department will be providing diskettes of the models and technical documents free of charge until July 31, 1996.

The models have a menu-driven graphic display to assist users. The minimum computer configuration required to use the models is:

- IBM®-compatible personal computer (PC) using MS–DOS® 3.3 or higher;
- 80386 processor or better with math co-processor;
- 1.4 megabyte 3.5 inch floppy disk drive;
- 4 megabytes of RAM with 540 kilobytes available;
- Hard disk with 75 megabytes of available space;
- VGA monitor; and
- Microsoft®-compatible mouse and mouse driver software. For further information on installation of the models, see Section 2, Volume II of the NRDAM/CME and NRDAM/GLE technical documents.

B. Data Inputs and Modifications

The models' databases include most of the data used by the models to determine injury and damages. However, the final rule requires trustees to provide certain data inputs. The rule also requires trustees to modify certain data contained in the models if they have more reliable information. The required data inputs and modifications are described in § 11.41 and Appendices II and III.

Trustees may have direct knowledge of some of the required data inputs. Additional information may be available from the On-Scene Coordinator (OSC), who is responsible for managing response actions following a release. The U.S. Coast Guard will normally be the OSC for releases in coastal or marine environments or the Great Lakes. However, trustees remain responsible for ensuring that all data inputs are reliable.

C. Geographic Information System

The models incorporate a geographic information system (GIS) that supplies geographically distributed information to the submodels. The submodels divide space into series of rectangular grids. In the NRDAM/CME, each grid contains 10,000 cells (100 × 100). In the NRDAM/GLE, each grid contains 2,500 cells (50 × 50). The size of a specific grid and, therefore, the interior cells, varies based on the physical geometry of and the availability of natural resource information about the particular geographic area. For example, the GIS uses smaller grids for nearshore areas than for offshore areas. The models assign a habitat type to each grid cell. The GIS draws the necessary

environmental and biotic data from the appropriate databases. The models assume that conditions are uniform throughout a particular grid cell.

For further information about the GIS and grid system, see Section 2, Volume I of the NRDAM/CME technical document; and Section 3.15, Volume I of the NRDAM/GLE technical document.

D. Submodels

Both models include four linked submodels: a physical fates submodel, a biological effects submodel, a restoration submodel, and a compensable value submodel. The NRDAM/GLE also has a hydrodynamics submodel.

1. Physical Fates Submodel

The physical fates submodel estimates the distribution of the released substance on the water surface, along shorelines, in the water column, and in sediments over time. The submodel uses an array of computational ''particles'' to represent the released substance. A variable fraction of the released substance is associated with each particle. The submodel tracks the distribution of the particles in both time and space as they move across a three-dimensional gridded environment.

Modeled wind and current effects drive the movement of the particles on the water surface and in the water column. In the NRDAM/GLE, the hydrodynamics submodel simulates the wind-driven currents occurring in the water column. In the NRDAM/CME, the physical fates submodel simulates wind-driven currents in the upper water column and employs user-supplied data inputs on background and tidal currents to simulate movement in the upper and lower water column.

Drawing data about the physical and chemical properties of the released substance from the chemical and toxicological database, the submodel continues simulating the transport and fate of the substance until all environmental exposure levels are below a specified concentration (the acute toxicity threshold). The acute toxicity threshold serves as a switch to turn off the physical fates submodel and activate the biological effects submodel. The submodel creates a time-series file of surface slick coverage, shoreline coverage, and substance concentration levels in the water column and in bottom sediments that is used by the biological effects submodel.

For further information on the physical fates submodel, see Section 3, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. For further information on the chemical and toxicological database, see Section 7, Volume I, and Section 2, Volume III of the NRDAM/CME and NRDAM/GLE technical documents.

2. Biological Effects Submodel

The biological effects submodel determines whether certain types of natural resource injuries have resulted from the release and, if so, quantifies those injuries. The biological effects submodel determines and quantifies the following types of injury: (1) Direct mortality resulting from short-term exposure to the released substance; (2) direct loss of production resulting from short-term exposure to the released substance; (3) indirect mortality resulting from food web losses; and (4) indirect loss of production resulting from food web losses. The biological database supplies data on habitat type and species biomass to the biological effects submodel.

The biological effects submodel determines direct mortality of fish, shellfish, and wildlife and direct loss of production for plants and invertebrates by calculating exposure of different species to the released substance. When performing these calculations, the biological effects submodel uses the time series data generated by the physical fates submodel concerning the distribution and concentration of the released substance.

The biological effects submodel determines direct mortality of fish and shellfish through use of an array of computational ''particles'' that move through the gridded environment. Each particle represents a portion of the fish or shellfish populations potentially exposed to the release. Each time a particle enters an area with dissolved water or sediment concentrations of the spilled substance, the submodel calculates the percentage mortality of the fish or shellfish population represented by the particle. These calculations continue until concentrations of the released substance fall below acute toxicity thresholds.

The biological effects submodel uses similar procedures to determine direct mortality of birds and mammals. However, the submodel only determines direct mortality of birds and mammals when the released substance forms a surface slick.

The biological effects submodel determines direct mortality of fish and shellfish eggs and larvae through use of particle arrays that move with the currents, as biologically appropriate. For plants and invertebrates, the submodel determines direct loss of production based on the assumption that such biota are uniformly distributed throughout a particular habitat type within the model grids rather than through use of particle arrays.

Once the biological effects submodel determines direct mortality and direct loss of production , the submodel then calculates indirect mortality and indirect loss of production for fish, shellfish, and wildlife resulting from reductions in food resources. The submodel uses a generalized food web model to determine the effect that direct loss of plant production, invertebrates, and noncommercial fish and mammals have on higher trophic-level fish, shellfish, and wildlife.

After determining injuries from both direct exposure and food web losses, the biological effects submodel quantifies those injuries both in terms of lost populations over time and, in the case of fish, shellfish, and wildlife, fishing and hunting losses. The submodel also computes fishing and hunting losses resulting from closures. The compensable value submodel uses this information to determine compensable value.

For further information on the biological effects submodel, see Section 4, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. For further information on the biological database, see Section 6, Volume I, and Volume IV of the NRDAM/CME technical document; and Section 8, Volume I, and Section 3, Volume III of the NRDAM/GLE technical document.

3. Restoration Submodel

The restoration submodel estimates the cost, if any, of restoring the injured resources. The submodel first evaluates possible habitat restoration and restocking actions. The submodel analyzes the costs and benefits of any possible habitat restoration and restocking actions to determine whether these forms of active restoration or natural recovery should be assumed for purposes of the models' damage calculations. In some cases, the submodel also determines the cost of restoring lost assimilative capacity. The active restoration costs, if any, computed by the restoration submodel comprise one component of the damage figure; the other component, compensable value, is calculated by the compensable value submodel.

For certain types of habitats, the restoration submodel evaluates habitat restoration action. The submodel identifies those habitats for which human intervention may potentially facilitate recovery. For each such habitat in each affected area, the restoration submodel evaluates the effect that a

particular active restoration alternative would have on the compensable value calculated by the model. If the relevant active habitat restoration alternative would result in a lower total compensable value for a particular grid cell than reliance upon natural recovery, then the restoration submodel computes the cost of performing that alternative for that grid cell. The restoration cost database supplies information on unit restoration costs to the restoration submodel. The biological effects and compensable value submodels supply information to the restoration submodel concerning the extent of injury and compensable value with and without active habitat restoration. If the active habitat restoration alternative would not result in a lower total compensable value than reliance upon natural recovery, then the restoration submodel does not compute any habitat restoration costs.

The restoration submodel evaluates the following types of active habitat restoration alternatives against natural recovery:

For open water sediments: dredging and refilling with clean material (shallow water); or capping (deep water);

For wetlands, macroalgal beds, and seagrass beds: replacement of contaminated substrate and replanting (if sediments are toxic); or replanting (if sediments are not toxic but mortality has occurred);

For invertebrate reefs (coral and mollusk): replacement of contaminated substrate and reseeding (if sediments are toxic); or reseeding (if sediments are not toxic but mortality has occurred); and

For shorelines in coastal or marine environments: washing of sand and gravel; replacement of mud; and chemical washing of rocky shoreline.

The restoration submodel then considers restocking of fish and wildlife. If stocks of the same age as the injured fish and wildlife are available through captive breeding programs, then the submodel computes the cost of restocking those species after the habitat has recovered, either through natural recovery or active habitat restoration. The restoration cost submodel supplies data on the availability and cost of stocks to the restoration submodel.

If the relevant active habitat restoration alternative would reduce compensable value or if restocking is possible, then the submodel performs a cost-benefit test of these forms of active restoration. The submodel compares the total costs of active habitat restoration and restocking against the measured benefits of such restoration (i.e., compensable value assuming natural recovery minus compensable value assuming active habitat restoration and restocking). If the costs exceed ten times the measured benefits, then the submodel assumes, for purposes of generating a damage figure, that natural recovery, rather than active restoration, will be used to reestablish baseline conditions. If the costs do not exceed the measured benefits by ten times, then the submodel assumes, for purposes of generating a damage figure, that habitat restoration and restocking actions will be implemented.

Finally, for releases that generate a damage figure related to mortality and loss of productivity, the restoration submodel also calculates the cost of restoring the water's baseline ability to absorb pollutants (assimilative capacity). In the case of such releases, the restoration submodel determines the amount of the released substance that would remain in the environment after environmental exposure levels are below acute toxicity thresholds and after any habitat restoration actions are completed. The submodel then computes the cost of removing a contaminant mass with toxicity equivalent to the remaining non-acutely toxic dispersed mass of the released substance from other identified contaminated sites. When determining the amount of contaminant mass to remove, the submodel adjusts for the relative degradability of that contaminant compared to that of the spilled substance. The restoration cost database supplies data on unit costs to the restoration submodel.

The restoration submodel sums the costs of any selected types of active restoration. The models combine this figure with the compensable value figure computed by the compensable value submodel to form the final damage figure.

For further information on the restoration submodel, see Section 5, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. For further information on the restoration cost database, see Sections 5, 12, and 13, Volume I, and Sections 5 through 7, Volume V of the NRDAM/CME technical document; and Section 9, Volume I and Section 5, Volume III of the NRDAM/GLE technical document.

4. Compensable Value Submodel

Compensable value, as computed by the compensable value submodel, is the sum of certain economic use values lost to the public pending the reestablishment of baseline conditions through either natural recovery or active restoration, as determined by the restoration submodel. Only public losses are included in compensable value.

The submodel computes the following types of compensable values:

Lost economic rent for lost commercial harvests resulting from any closures specified by the authorized official and/or from population losses;

Lost recreational harvests resulting from any closures specified by the trustee and/or from population losses;

In the NRDAM/CME, lost wildlife viewing, resulting from population losses, by residents of the States bordering the provinces in which the population losses occurred;

In the NRDAM/GLE, lost wildlife viewing, resulting from population losses, by residents of local areas bordering the provinces in which the population losses occurred; Lost beach visitation due to closure; and

In the NRDAM/GLE, lost boating due to closure.

The submodel calculates compensable value for lost economic rent by multiplying the total lost harvest of the species, as computed by the biological effects submodel, by the commercial price per unit of harvest, as supplied by the compensable value database. The rule provides that if a trustee is aware of reliable evidence that a private party has recovered damages for commercial harvests lost as a result of the release, the trustee must eliminate from the claim any damages for such lost harvests included in the lost economic rent calculated by the model.

The submodel calculates compensable value for lost recreational harvests by multiplying the total lost recreational harvest of the species, as computed by the biological effects submodel, by the marginal value of harvesting an additional animal, as supplied by the compensable value database. The submodel computes damages only for harvests lost due to populations losses or closures. The submodel does not compute damages for lost quality of recreational fishing unrelated to lost harvests or for lost trips due to de facto closures.

The compensable value submodel computes compensable value for a specific range of lost wildlife viewing. First, the submodel only calculates wildlife viewing damages resulting from population losses and does not address damages resulting from closures. Second, the submodel only calculates losses incurred by certain segments of the wildlife viewing public. The models divide geographic areas into provinces. The NRDAM/CME computes lost wildlife viewing only for residents of States bordering the provinces in which the population loss occurred. The NRDAM/GLE computes lost wildlife viewing only for residents of local areas bordering the provinces in which the population loss occurred. The submodel calculates damages by multiplying the

number of viewing trips affected by the release by the per-animal marginal viewing value for the animals killed.

The compensable value submodel computes compensable value for lost beach visitation only if trustees specify that there has been a closure of a beach. The submodel does not calculate damages for lost quality of beach visitation or for lost beach visitation due to de facto closures. If a closure is specified, the compensable value submodel calculates compensable value by multiplying the length of beach closed per day and the number of days closed, as supplied by trustees, by the per-day value of trips to the closed length. The compensable value database supplies data on the per-unit value of lost beach visitation.

The NRDAM/GLE computes compensable value for lost boating only if trustees specify that there has been a closure of a boating area. The model does not calculate damages for lost quality of boating or for lost boating trips due to de facto closures. If a closure is specified, the compensable value submodel calculates compensable value by multiplying the geographic area closed per day and the number of days closed, as supplied by trustees, by the per-day value of trips to the closed area. The compensable value database supplies data on the per-unit value of lost boating. The NRDAM/CME does not compute compensable value for lost boating.

The per-unit values in the compensable value database are stated in 1991 dollars for the NRDAM/CME and 1990 dollars for the NRDAM/GLE. The compensable value submodel uses the Gross National Product Implicit Price Deflator, as supplied by trustees, to adjust per-unit values to current dollars. The compensable value submodel discounts the value of future losses using a three percent discount rate.

After applying the Gross National Product Implicit Price Deflator and the discount rate, the compensable value submodel sums the lost values to calculate a compensable value figure. This figure is added to the restoration costs, if any, computed by the restoration submodel to form the final damage figure calculated by the models.

The rule provides that if a trustee is aware of reliable evidence that the model application covers resources beyond his or her jurisdiction, the trustee must either: (1) Have the other trustees who do have jurisdiction over those resources join in the type A assessment; or (2) eliminate any damages for those resources from the claim. Further, the rule provides that if the model output indicates damages in excess of $100,000, then trustees who wish to obtain a rebuttable presumption must either: (1) Limit the portion of their claim calculated with the type A procedure to $100,000; or (2) compute all damages using type B procedures.

For further information on the compensable value submodel, see Sections 8 through 11, Volume I of the NRDAM/CME technical document; and Section 6, Volume I of the NRDAM/GLE technical document. For further information on the compensable value database, see Sections 8 through 11, Volume I, and Sections 1 through 4, Volume V of the NRDAM/CME technical document; and Section 6, Volume I, and Section 4, Volume III of the NRDAM/GLE technical document.

V. Use of the NRDAM/CME and NRDAM/GLE in Other Contexts

The Department is issuing today's final rule in compliance with the statutory requirement to develop procedures for conducting simplified assessments that are entitled to a rebuttable presumption. The standards in today's final rule apply only when trustees use the type A models to develop a damage figure and intend to obtain a rebuttable presumption for that figure in litigation. Trustees who use the models in other contexts, such as settlement negotiations or litigation without the benefit of the rebuttable presumption, are not subject to the rule standards. In these other contexts, trustees are free to make modifications to the model databases beyond those permitted under the rule and to use some, but not all, of the components of the models.

For example, trustees may wish to use the models to develop a benchmark damage figure for settlement negotiations but may have more up-to-date or more site-specific information on recreational fishing values. In that case, trustees may choose to apply the models using modified recreational fishing values, notwithstanding the rule provisions concerning modification of the model databases. In other situations, trustees may choose to rely on the models' predictions of injury but perform their own analyses of restoration alternatives and compensable values. Trustees may also choose to rely on the models' damage calculations for some resources but for other resources substitute their own damage calculations for other resources covered by the models. The Department believes that although use of the type A models in these ways would not be covered by today's rule and, therefore, would not be entitled to a rebuttable presumption, such use can produce reliable damage estimates if done properly.

VI. Summary of Major Changes from the Proposed Rules

The Department has made numerous changes in the rule language and models based on the comments received. The Department discusses its rationale for these changes in Section VII of this preamble.

A. Rule Language

The Department has made several major substantive changes to the proposed rule language. With regard to the applicability of the type A procedures, the Department has modified the conditions that must be met before a trustee can use a type A procedure to obtain a rebuttable presumption and has eliminated the provision that would have required trustees to use the type A procedures in some circumstances. Instead of delineating ''primary'' and ''secondary'' conditions for use as the proposed rule did, the final rule now provides that if the conditions for use of the models listed in § 11.34 are met, then trustees decide whether to use type A or type B procedures based on an evaluation of the averaged data and simplifying assumptions listed in the NRDAM/CME and NRDAM/GLE technical documents. The Department has also more clearly delineated the conditions under which trustees can use type B procedures to supplement a type A procedure and the process for doing so.

With regard to operation of the NRDAM/CME and the NRDAM/GLE, the rule now allows trustees to modify the habitat designations in the models and still obtain a rebuttable presumption. The rule also requires trustees to perform a preliminary application of the NRDAM/CME or NRDAM/GLE and make the results available for public review before performing a final application and presenting a demand to the PRP.

The final rule contains three new provisions that require trustees in some cases to adjust the damage figure calculated by the models before presenting a demand. First, the rule now provides that if trustees are presented with evidence that private parties have obtained recoveries for lost commercial harvests, they must eliminate any damages for such lost harvests included in the lost economic rent calculated by the model. Second, the rule provides that if a trustee is aware of reliable evidence that the model application covers resources beyond his or her trustee jurisdiction, the trustee must

either: (1) Have the other trustees who do have jurisdiction over those resources join in the type A assessment; or (2) eliminate any damages for those resources from the type A damage calculation. Third, the rule provides that if the model output indicates damages in excess of $100,000, then trustees who wish to obtain a rebuttable presumption must either: (1) Limit the portion of their claim calculated with the type A procedure to $100,000; or (2) compute all damages using type B procedures.

The Department has also eliminated the proposed clarification of the scope of review of a type A assessment in a natural resource damage case.

Finally, as part of its regulatory reform efforts, the Department has rewritten the final rule in plain English. The Department believes this revision has made the rule significantly clearer and easier to read.

The following is a section-by-section analysis of the final rule:

Subpart A—Introduction

Section 11.15 What Damages May a Trustee Recover?

The Department has rewritten the heading of this section to make it easier to understand. The final rule language revising subsection (a)(1) is unchanged from the August 1994 proposed rule. The final rule eliminates the separate subsections referring to type A procedures, type B procedures, or a combination of type A and B procedures in the same assessment. Sections 11.34 through 11.36 include the criteria and standards for selecting type A procedures, type B procedures, or a combination, making additional detail in this introductory section unnecessary.

Section 11.18 Incorporation by Reference

The final rule slightly revises and updates the proposed rule language incorporating by reference the NRDAM/CME technical document, and adding language incorporating by reference the NRDAM/GLE technical document.

Section 11.19 Information Collection

The final rule retains the December 1994 proposed rule language to remove and reserve this section.

Subpart C—Assessment Plan Phase

Section 11.30 What Does the Authorized Official do if an Assessment is Warranted?

The final rule makes several revisions to this section that were not included in the proposed rules, but which are necessary to conform to other provisions in today's final rule. Existing subsection (a), which applied to both type A and type B procedures, did not authorize performance of any assessment methodologies until after the period of public review and comment for the Assessment Plan. Section 11.42 of today's final rule requires trustees to perform a preliminary application of the NRDAM/CME or NRDAM/GLE before releasing the Assessment Plan for public review and comment. Trustees who use type B procedures, however, must still make the Assessment Plan available for public review and comment before performing any of the procedures contained in the Plan. See § 11.32(c) of today's final rule. The Department has revised the heading of the section and the language of subsection (a) to make them easier to understand and to make this conforming change. The Department has also modified subsection (c)(1)(vi) to make a necessary conforming change cross-referencing other rule provisions.

Section 11.31 What Does the Assessment Plan Include?

The final rule revises the heading and rule language to make the section easier to understand. Subsection (a)(1) adopts as final the language in the August 1994 proposed rule.

The Department has revised subsection (b) from the August 1994 proposed rule to make it clear that the Assessment Plan must include a detailed explanation of how the trustee's decision to use a type A procedure, type B procedures, or a combination, satisfies the decisional standards contained in the rule.

Subsection (c) clarifies and corrects existing rule language, which was garbled in 1988. Compare 53 FR 5174 (Feb. 22, 1988) with 51 FR at 27731. Although this language was not in the proposed rules, it is a nonsubstantive change. Subsection (c)(1) has been modified to make a necessary conforming change cross-referencing redesignated § 11.37.

Subsection (d) revises the existing rule language to make it easier to understand. Subpart D contains the requirements concerning identification and documentation of information, and therefore it is unnecessary to repeat them in subsection (d).

Section 11.32 How Does the Authorized Official Develop the Assessment Plan?

The Department has revised the heading of this section to make it easier to understand.

The final rule revises subsection (c) to make it easier to understand and to make the same necessary conforming change described in the discussion of § 11.30.

The final rule language revising subsection (f) is slightly reworded, but substantively the same as, the language in the August 1994 proposed rule. As explained in the August 1994 notice of proposed rulemaking, this provision clarifies that the confirmation of exposure requirement applies to type B, but not type A, procedures. Original §§ 11.34(a)(1), 11.31(c)(1), and 11.33(b)(4) already established this distinction. Today's final rule language merely makes the rule easier to understand.

Section 11.33 What Types of Assessment Procedures Are Available?

Today's final rule revises § 11.33 to limit this section to providing a brief description of the difference between type A and type B procedures.

Section 11.34 When May the Authorized Official Use a Type A Procedure?

New § 11.34 combines and revises changes that were proposed for § 11.33 in the August 1994 and December 1994 proposed rules. This section now states the threshold conditions that must be present before a trustee may use a type A procedure, many of which were included among the ''primary'' conditions in the proposed rules.

Section 11.35 How Does the Authorized Official Decide Whether to Use Type A or Type B Procedures?

New § 11.35 further revises changes that were proposed for § 11.33. The section provides decisional criteria for the determination whether to use type A or type B procedures, assuming that the conditions in § 11.34 are met. The final rule language requires trustees to base the decision whether to use type A or type B procedures on an evaluation of the data and assumptions in the type A procedures, as described in the NRDAM/CME and NRDAM/GLE technical documents. These assumptions include many of the ''secondary conditions'' contained in the proposed rules.

Section 11.36 May the Authorized Official Use Both Type A and Type B Procedures for the Same Release?

New § 11.36 provides standards for when trustees may use both a type A procedures and type B procedures for the same release. The August and December 1994 proposed revisions to § 11.33 included similar modifications.

Today's final rule language provides clearer, more specific criteria, and specifically identifies the categories of injury and compensable value addressed by the type A procedures.

Subsection (d) addresses the issue of which type B procedures must be followed when a trustee decides to combine a type A and type B procedures in a single assessment.

Section 11.37 Must the Authorized Official Confirm Exposure Before Implementing the Assessment Plan?

The Department has revised the heading of this section (formerly § 11.34) and has modified subsection (a) from the proposed rule to make it easier to read. Subsection (a) clarifies the intent of the existing rule that the confirmation of exposure requirement applies only to type B procedures. Although former § 11.34(a) did not expressly distinguish between type B and type A procedures, former §§ 11.31(c)(1) and 11.33(b)(4) limited the confirmation of exposure requirement to type B procedures.

Subpart D—Type A Procedures

Section 11.40 What Are Type A Procedures?

The Department has revised the heading of this section and the language of subsection (a) to make them easier to read, to add references to the type A procedures for Great Lakes environments, to provide additional information about both type A procedures, and to incorporate the requirement that a trustee must follow the procedures in §§ 11.41 through 11.44 when using either of the two type A procedures. Today's final rule provides a more detailed description of type A procedures than was contained in the August 1994 proposed revision to § 11.40.

Section 11.41 What Data Must the Authorized Official Supply?

This section identifies the data inputs and modifications that the trustee must supply to use the NRDAM/CME or NRDAM/GLE. Today's final rule modifies and simplifies proposed § 11.42 (c) and (d) in the August 1994 proposed rule, and proposed revisions to § 11.41 in the December 1994 proposed rule. The final rule language for § 11.41 is considerably shorter than that in the proposed rules, because the format for data inputs and modifications is now contained in two new appendices to the rule. The final rule now requires trustees to make certain modifications to the model databases, including the habitat designations, if they have reliable evidence that the databases are incorrect.

Section 11.42 How Does the Authorized Official Apply the NRDAM/CME and NRDAM/GLE?

This section contains a new procedure requiring trustees to perform a preliminary application of the NRDAM/CME or NRDAM/GLE as part of the process for deciding whether to use a type A procedure. If the trustee decides to continue with a type A procedure, then the data inputs, modifications, and results of the preliminary application become part of the Assessment Plan.

Section 11.43 Can Interested Parties Review the Results of the Preliminary Application?

This section requires trustees who decide to continue with a type A procedure to develop an Assessment Plan, which must include the data inputs, modifications, and results of the preliminary application. The trustee must make the Assessment Plan available for public review and comment.

Section 11.44 What Does the Authorized Official do After the Close of the Comment Period?

Subsections (a) through (c) of this section state the procedural and substantive requirements following public comment on the Assessment Plan, which include performing a final application of the NRDAM/CME or NRDAM/GLE and preparing a Report of Assessment. Subsection (d) includes specific criteria to preclude double recovery for economic rent for lost commercial harvests if a private party has already recovered for the same damages. Subsection (e) resolves a potential problem arising when trustees have not agreed in advance to use a type A procedure jointly. Subsection (f) limits the damages that may be recovered by trustees who use the NRDAM/CME or NRDAM/GLE and intend to obtain a rebuttable presumption.

Subpart E—Type B Procedures

Section 11.73 Quantification Phase-Resource Recoverability Analysis

The Department has revised subsection (a) to make a necessary conforming change to cross-reference redesignated § 11.35 (now § 11.38).

Subpart F—Post-Assessment Phase

Section 11.90 What Documentation Must the Authorized Official Prepare After Completing the Assessment?

The Department has revised the final rule from the August 1994 proposed rule to make the heading and rule language simpler and easier to understand. The substantive effect of this provision is the same as existing § 11.90.

Section 11.91 How Does the Authorized Official Seek Recovery of the Assessed Damages From the Potentially Responsible Party?

Today's final rule revises the heading of the section and the first sentence of subsection (a) to make the rule language simpler and easier to understand. The substantive effect of this provision is the same as existing § 11.91.

Appendices

The Department has added two new appendices to the rule. These appendices specify the format for data inputs and modifications for the NRDAM/CME and NRDAM/GLE.

B. NRDAM/CME and NRDAM/GLE

The Department has made several major substantive changes to the NRDAM/CME and NRDAM/GLE computer code and databases. The Department has revised the chemical database for both the NRDAM/CME and NRDAM/GLE to incorporate an additional 24 oils and petroleum products. The Environment Canada publication, ''A Catalogue of Crude Oil and Oil Product Properties,'' and NOAA's ADIOS (Automated Data Inquiry for Oil Spills) database provided the principal sources of information for revision of the databases. The Department also deleted the following hazardous substances from the database: pure metals, nontoxic substances, and substances for which the toxicity threshold was less than the water solubility. The Department deleted a total of 31 hazardous substances from the NRDAM/CME database and 32 hazardous substances from the NRDAM/GLE database.

The Department has included an additive toxicity model for oil and petroleum products in the biological effects submodel to address the additive toxicity of the multiple substances in oil and petroleum products. The additive toxicity model also addresses the effects of oil weathering.

The Department has updated the wildlife viewing values contained in both the NRDAM/CME and NRDAM/GLE economic databases based on

recent information available from the 1994 addendum to the 1991 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation developed by the U.S. Fish and Wildlife Service (FWS). Also, in the NRDAM/CME, the Department revised the wildlife viewing values to reflect the total population of the respective coastal states.

In the NRDAM/CME, the Department has modified the habitat grids to provide a finer scale resolution. The Department changed the scale from a 50 x 50 grid to a 100 x 100 grid. The Department has also upgraded the Microsoft® compiler to allow for use of 32-bit processing and additional random access memory (RAM).

The Department has revised the east coast wetland habitats represented in the NRDAM/CME grids for provinces 11, 12, and 13 (New York and New Jersey) to incorporate more site-specific data provided by commenters. See Section 3.4, Volume III of the NRDAM/CME technical document.

In the NRDAM/CME, the Department has substantially revised wildlife abundance data for provinces 40 through 51 (west coast and the Gulf of Alaska) based on additional information and data provided by public commenters.

The Department has added a habitat editor to the NRDAM/GLE user interface consistent with that provided in the proposed NRDAM/CME.

The Department has included intertidal seagrass as an additional habitat type in the NRDAM/CME. The intertidal seagrass habitat includes those common habitats for tropical seagrass and eelgrass.

The Department has disaggregated the model output files for the injury and damage calculations resulting from direct kills versus food web and habitat losses, and from commercial versus recreational fishing losses.

The Department has revised the active habitat restoration alternatives evaluated for structured habitats (i.e., wetlands, seagrass beds, macroalgal beds, and invertebrate reefs) to include not only sediment replacement with replanting but also replanting alone.

The Department has eliminated the calculation of compensable value for lost boating and subsistence losses from the NRDAM/CME.

The Department has revised the restoration submodel to include a cost-benefit test for determining whether the measured benefits of active habitat restoration and restocking, as compared to natural recovery, are worth the additional costs.

Finally, the Department has revised the calculation of assimilative capacity restoration costs to correct for the degradation rate of the spilled substance and to limit the calculation of assimilative capacity restoration costs to cases where biological injury has occurred and produces compensable value.

VII. Response to Comments

The Department received numerous public comments on the proposed type A procedures. The Department and NOAA also asked several independent technical reviewers to examine the proposed NRDAM/CME. The Department made the comments of these independent technical reviewers available to the public and included them in the administrative record for this rulemaking. See 60 FR 28773 (June 2, 1995). The Department provides responses to both the public comments and the comments of the independent technical reviewers below.

In addition to the issues discussed below, commenters addressed a number of issues beyond the scope of this rulemaking. The Department explicitly limited this rulemaking to four issues: the revision of the existing type A procedure for coastal and marine environments; the development of a new type A procedure for Great Lakes environments; the conditions for combined use of type A and type B procedures; and the scope of judicial review of assessments performed using type A procedures. See 59 FR at 40319–20, 63300, and 63302. Nevertheless, some commenters raised additional issues, including: whether trustees should be allowed to pool natural resource damage recoveries to implement regional restoration plans; the permissibility of using type A and type B procedures for the same release; and whether lost economic rent and the cost of restoring lost assimilative capacity are legally permissible categories of damages. The Department has not evaluated, and is not providing substantive responses to, comments on these issues in this rulemaking.

Section 11.93(d) of the existing regulations, which was promulgated in 1987, allows pooling of multiple type A recoveries to implement a single restoration plan, so long as the plan is intended to address the same or similar injuries as those identified in each application of the type A procedure. See 52 FR at 9100. The Department neither reproposed, revisited, nor solicited comment on § 11.93(d) and merely cited it in the preambles to the proposed rules by way of background. 59 FR at 40324 and 63305.

Section 11.15(a)(1)(iii) of the original type A rule, which was promulgated in 1987, established that trustees could use both type A and type B procedures for the same release under certain circumstances. See 52 FR at 9095. The Department did not repropose, revisit, or solicit comment on whether CERCLA allows trustees to combine type A and type B procedures. The only issue raised and addressed in this rulemaking was whether the Department should expand the authorization for combined use of type A and type B procedures.

Finally, the Department did not repropose, revisit, or solicit comment on its long-standing positions on the recoverability of damages for lost economic rent and lost assimilative capacity. Both the original type B rule and the original type A rule explicitly allowed for the recovery of lost economic rent. See 43 CFR 11.83(c)(1); 51 FR at 27749; and 52 FR at 9047. The Department has recognized the loss of assimilative capacity as a legitimate category of natural resource damages since the promulgation of the original type B procedures in 1986. 51 FR at 27716; see also 59 FR at 14273. The Department has begun a biennial review of the type B procedures and will be considering the issues of lost economic rent and lost assimilative capacity in that context. See 59 FR 62749 (Oct. 19, 1994).

A. General Comments

Comment: Some commenters supported the concept of a reliable, accurate, automated damage assessment procedure that would eliminate the need for expensive tailor-made studies. However, other commenters objected to the calculation of damages through what they considered to be abstract application of theoretical, generic models. Some of these commenters thought that many of the calculations of the NRDAM/CME and NRDAM/GLE were based on unsubstantiated assumptions.

A number of commenters, including some of the independent technical reviewers, questioned the Department's use of ''grand averages'' to extrapolate data for a specific species, substance, or location, to different species, substances, and locations. Commenters were particularly concerned about the extrapolation of economic values made in the compensable value submodel. For example, commenters noted that some of the studies used to value recreational fishing in the NRDAM/CME were based on freshwater fishing and commercial fishing. Commenters also stated that many of the studies used outdated data and outdated or unreliable

methodologies. For example, commenters noted that recreational hunting values were derived from a 20-year old contingent valuation study. Some commenters suggested specific criteria that they thought should be met when performing benefits transfer (i.e., the extrapolation of economic values derived from studies of one situation to another situation).

Response: CERCLA requires that type A procedures involve ''minimal field observation'' and authorizes type A procedures to be based on ''units of discharge or units of affected area.'' CERCLA sec. 301(c)(2)(A). The Senate Report that accompanied the predecessor bill to CERCLA provides the following indication of Congress' intent:

> Natural resource damage assessments based on this type of regulation [type A] should require as little fieldwork as possible, and rely on a combination of habitat values, tables of values for individual species, and previously conducted surveys and laboratory studies, related to units of discharge or units of affected area. S. Rep. No. 96–848 at 86.

This language indicates that Congress envisioned the development of type A procedures that do not require the performance of any new studies but instead use existing studies to provide generalized values that can be applied in specific cases. Inherent in the concept of developing unit values from existing studies is the notion of making assumptions in the absence of empirical data and applying average values across a range of nonidentical items. Therefore, the Department believes that CERCLA authorizes it to make appropriate extrapolations from existing data.

The science of natural resource damage assessment is still evolving. The universe of relevant studies is still very small for many crucial aspects of damage assessment. Existing data are particularly limited as to the effects of small spills. Even when addressing the limited range of scenarios covered by the NRDAM/CME and the NRDAM/GLE, the Department faced significant challenges in bridging data gaps. Although Congress did authorize the Department to make extrapolations from existing data, the Department recognizes that any such extrapolations must be reasonable. Thus, when developing the models, the Department tried to make use of the most reliable information available based on extensive reviews of published and unpublished information and data; make only those assumptions that are necessary; ensure that any assumptions that are made are reasonable; and identify clearly all assumptions that were required for the development of simplified procedures.

With regard to the compensable value submodel, the Department did apply specific criteria during its selection of studies to use for benefits transfer. The Department used only studies that: (1) Were based on an extensive literature review and consultations with relevant governmental agencies; (2) reasonably represented the natural resource and public use under investigation; (3) contributed to a reasonable representation of the different regions included in the models; (4) were conducted by a recognized university-associated researcher or established consulting firm; and (5) used appropriate valuation methodologies. The Department believes that these criteria adequately address all the concerns that the commenters' suggested criteria are intended to address. The first three criteria assure that the resources considered in the selected studies are as similar as possible to the resources to be valued in the models. The fourth criterion assures that the selected studies are scientifically sound. The fifth criterion assures that the selected studies use appropriate valuation methodologies.

Comment: One commenter suggested that the Department had developed the models by selecting values from a few studies while ignoring others. The commenter argued that the Department had failed to provide adequate justification for the values it selected.

Response: The Department conducted extensive searches for available information. Some data the Department identified were not used because better or more applicable data were available. However, none of the identified data was ignored. The Department believes that the NRDAM/CME and NRDAM/GLE technical documents adequately explain and justify the values in the models.

Comment: Some commenters thought that the proposed type A models were so technically flawed that they did not meet the statutory standard of ''best available procedures'' and, therefore, trustees should not obtain a rebuttable presumption if they use the models. These commenters urged the Department to abandon the models noting that *Colorado* v. *Interior* does not require or authorize the Department to issue a model that is unreliable. One commenter acknowledged that the proposed revised NRDAM/CME appeared to be an improvement over the original NRDAM/CME Version 1.2 issued in 1987. However, the commenter thought the proposed revised model still contained too many flaws to accomplish its intended purpose. Another commenter stated that the damage figures produced by the models are nothing more than sheer speculation and are not legally sufficient due to the compounding of errors, uncertainties, biases, and overestimates.

Response: As discussed in more detail below, the Department has carefully reviewed all comments it received on the proposed models and rule language. Based on this review, the Department has made numerous modifications to the models and the rule language. Where the Department concluded that no changes were needed, the Department has explained its reasoning. The Department believes that the final type A models, as revised in response to comments, are best available procedures when used in accordance with the standards and process set forth in today's final rule. The models, with their state-of-the-art modeling and extensive databases, represent a significant advancement beyond the original NRDAM/CME issued in 1987. The final type A procedures provide for reliable, cost-effective, simplified assessments that are entitled to a rebuttable presumption.

Comment: Several commenters thought the Department had been overly ambitious in attempting to develop models like the NRDAM/GLE and the NRDAM/CME. Specifically, these commenters stated that the biological effects submodel attempted to perform a task that is beyond the current state of ecological modeling. The commenters contended that state-of-the-art ecological modeling is not yet capable of producing accurate quantitative determinations and is primarily useful only for making qualitative predictions. The commenters also thought that the multiple iterative calculations performed by the biological effects submodel did not alleviate the problem but simply amounted to averaging of nonsense.

Response: The Department agrees that ecological models should generally be used only for qualitative predictions. However, the biological effects submodel in the NRDAM/GLE and the NRDAM/CME is not a true ecological model in the sense suggested by commenters. Ecological models evaluate the changes in ecosystem structure and function resulting from disturbances. The biological effects submodel, on the other hand, is a toxicological effects model. The biological effects submodel simply calculates acute mortality and lost production and projects these injuries forward as biota not present or used in future years. The submodel need not, and does not attempt to, address the higher-order ecological

changes in the structure and functions of biological systems as true ecological models do.

The Department believes that the NRDAM/CME and NRDAM/GLE are reasonable tools for assessing the injuries and compensable values that they address and do not generate ''nonsense.'' Further, the use of iterative calculations is designed to, and does, enhance the reliability of damage estimates in particular cases. The biological effects submodel uses several randomized algorithms for processes, such as swimming by fish, that are considered random at the relevant spatial and temporal scales. For each spill modeled, the submodel performs multiple iterative runs and then selects the mean result. This approach is a generally accepted method of modeling the most probable biological effects for events that have an element of randomness.

Comment: Some commenters thought the proposed models were fundamentally flawed because they used overly simplistic simulations of movement of biota within a population. The commenters stated that these simulations could not be improved because of the lack of basic data on population movement.

Response: The Department believes that the NRDAM/CME and the NRDAM/GLE use the best available procedure for simulating the movement of biota and that this procedure is reliable for the purposes of a simplified damage assessment. The Department acknowledges that the directed movement of biota is not well understood quantitatively. However, at the smallest scale, there is a random component to the movements of animals within the habitats they occupy, and the NRDAM/CME and NRDAM/GLE can and do model this component. The models do not simulate within-season, between-habitat movements, except where currents carry organisms across boundaries. However, the seasonal and habitat-specific abundances included in the database do account for inter-habitat movement between seasons.

Comment: Some commenters, including some of the independent technical reviewers, thought that the Department should validate the models against real-world data and perform sensitivity analyses. A few commenters also thought the Department should calibrate the models.

Response: The Department has conducted extensive sensitivity studies of both the NRDAM/CME and NRDAM/GLE. It is difficult to conduct conclusive validation studies of the models due to the extreme lack of data on the natural resource effects of small spills. In fact, although more data exist for large spills, even those data are limited. Nonetheless, the Department has used the data that are available to conduct validation studies of the NRDAM/CME physical fates and biological effects submodels and believes that these studies suggest that the submodels provide reasonable estimates of the actual physical fates and biological effects of spills. Even less data exist for spills in the Great Lakes than for spills in coastal and marine environments. However, since the NRDAM/GLE contains the same algorithms as the NRDAM/CME, the Department believes the results of the validation studies of the NRDAM/CME also support the NRDAM/GLE.

Because of the cost involved in performing site-specific type B studies, trustees have rarely pursued damage claims for minor releases. Therefore, virtually no data exist with which to validate the restoration and compensable value submodels or determine the need for calibrating the damage estimates produced by the models. In the absence of such data, the Department has relied primarily on careful reviews of the accuracy and reasonableness of the data and algorithms used in the models. The Department believes that these reviews of the scientific underpinnings of the models provide adequate support for the reliability of the damage estimates produced by the models.

The Department further believes that the models are consistent with congressional intent underlying the directive to produce procedures for simplified assessments. The models are best available simplified procedures. They produce reliable, fair, and reasonable results when used for their intended purpose. The Department has clearly identified the capabilities and limitations of the models and has allowed trustees to select between type A and type B procedures based on specified criteria. Finally, the Department has retained the provision allowing PRPs to require trustees to use type B procedures if they advance the reasonable cost of using such procedures within an acceptable time frame.

Comment: One commenter stated that the NRDAM/GLE should be peer reviewed in an open forum prior to promulgation.

Response: The Department believes that the NRDAM/GLE has been adequately reviewed. The proposed model was made available for public review and comment for eleven months. Also, the review of the proposed NRDAM/CME by independent technical reviewers was directly relevant for the NRDAM/GLE because the NRDAM/GLE incorporates the same basic modeling as the NRDAM/CME.

Comment: Some of the independent technical reviewers claimed that the proposed NRDAM/CME underestimated damages. In support of this claim, these reviewers noted that when used to calculate damages for certain actual releases, the model generated damage figures that were usually at least an order of magnitude less than the figure for which the parties settled.

Response: The Department believes that when the conditions set forth in § 11.34 are met, the models will generate reasonable and appropriate damage figures for the injuries and losses these simplified procedures address. The Department does not believe that historical settlements provide an accurate or meaningful standard against which to judge the reliability of damage figures generated by the NRDAM/GLE and the NRDAM/CME. Although real-life case data on physical fates and biological effects can, in some instances, provide useful comparisons when evaluating the physical fates and biological effects submodels, bottom-line settlement figures may differ from model damage figures for a number of reasons that have nothing to do with reliability.

First, because of the cost involved in performing site-specific type B studies, trustees have rarely pursued damage claims for minor releases. Therefore, historical natural resource damage settlements usually involve large spills. The type A models were designed for minor releases and are based on various assumptions that often are not reasonable in the case of large spills. Therefore, the restoration and compensable value submodels would not have been applicable to the cases in which natural resource damage settlements have been reached.

Second, it is difficult to determine the appropriate user inputs for some of the actual cases, many of which are several years old. For example, user-supplied information on beach, and fisheries closures can significantly affect the total damage figure, yet data on the actual extent of such closures are in some cases no longer available.

Third, the models do not purport to capture all, or even most, of the ''real world'' or ''actual'' damages that could be determined if the costs of a full on-site assessment were not a consideration. Instead, the models use averaged values to calculate a specific subset of the damages resulting from a release. When used for the minor

releases for which they are intended, the models yield reliable and appropriate damage figures that are calculated at a reasonable cost. Past natural resource damage settlement agreements have generally identified a single damage figure that is not broken down by component. In fact, most settlement agreements to date have not even listed which types of injuries and losses the agreement is intended to address. Therefore, it is usually impossible to determine if the model is even calculating the same type of damages as those covered by the settlement, let alone whether the calculation produces a damage figure that matches the settlement figure. The larger—and more complicated—the release, the greater the likelihood of a divergence between the type A damage figures and the more site-specific damages that might be calculated using type B procedures. The fact that such divergence occurs, and even at times might appear ''extreme,'' does not suggest unreliability or an inappropriate ''underestimation'' of damages by the type A models. Rather, it only serves to illustrate the limited function these procedures are intended to serve, and the reason they are designed to be used for minor releases, for which the costs of type B procedures cannot be justified when compared to the anticipated level of damages.

Finally, settlements are the result of negotiation. The negotiation process usually begins before either party has completed its assessment work. Settlement negotiations are influenced by both parties' perception of several factors extraneous to the assessment process. These factors include: the transaction costs associated with delaying settlement or terminating negotiations and litigating the case; the strength of the liability portion of the case; the PRP's financial condition; and the trustee's ability to fund a complete assessment. In light of the influence of these factors in settlement negotiations and the other difficulties in comparing settlement figures against model calculations, the Department does not believe that variances between model damage figures and historical settlements indicates anything about the reliability of the models, when used as intended.

Comment: One of the independent technical reviewers questioned why the damages calculated by the proposed NRDAM/CME do not agree with those calculated by the original NRDAM/CME for the same spill.

Response: The new NRDAM/CME differs significantly from the 1987 version of the model due to modifications made in compliance with the *Colorado* v. *Interior* remand as well as modeling and database improvements made as a result of the biennial review. Among the most significant differences, the original model assumed a generic study area defined by the user with uniform depth, habitat, and environmental conditions. Today's final NRDAM/CME allows for geographic resolution of multiple habitats, depths, coastline, shore type, currents, ice cover and other environmental condition. The new NRDAM/CME contains much larger biological and economic databases, resolving many more species categories and geographic regions. Also, the new NRDAM/CME contains a restoration submodel and restoration cost database. The Department believes that these and other changes have resulted in significant improvements in the reliability of the calculations of the model.

Comment: One commenter stated that the models were unreliable because NOAA used them to develop proposed OPA compensation formulas that generated unrealistic damage figures.

Response: The Department does not believe that damage figures produced by NOAA's proposed OPA compensation formulas are relevant to the evaluation of either the proposed or final versions of the NRDAM/GLE and NRDAM/CME. On January 7, 1994, NOAA proposed compensation formulas for determining natural resource damages under OPA. 59 FR at 1176–77. These formulas were based on early developmental drafts of the NRDAM/GLE and the NRDAM/CME that the Department made available to NOAA in 1991. The Department has extensively modified both the NRDAM/CME and NRDAM/GLE since 1991. For example, the Department has revised the algorithms contained in the physical fates and biological effects submodels; expanded and updated the biological databases; and revised the chemical and economic databases. Section VI.B of this preamble identifies other major changes that the Department made to the NRDAM/CME and NRDAM/GLE as a result of public comments.

Comment: One commenter stated that the proposed NRDAM/CME dramatically underestimated damages as compared to the compensation table developed by the State of Washington under its natural resource damage laws. The commenter expressed concern that PRPs may use the NRDAM/CME to seek reductions in the State compensation table.

Response: The Department does not believe it is appropriate or relevant to compare the results of type A model runs against the figures in Washington's compensation table, because the type A models and the State table are based on different approaches to damage assessment. The Washington table establishes a pre-set, per-gallon scale of damages. The type A models, on the other hand, estimate the actual effects of the release and then generate a site-specific damage figure based on the cost of restoring injured resources plus selected public economic values lost pending recovery.

With regard to PRPs' potential use of the type A models to undermine the Washington table, the Department would like to emphasize that the type A models were developed specifically for use under Federal law. State or tribal simplified procedures may take into account costs, economic values, or other considerations not reflected in the type A models. As such, the damages produced by the type A models are not an appropriate point of comparison for evaluating State or tribal procedures. The type A models in no way preempt State or tribal procedures that are authorized under and designed to enforce non-Federal laws.

Comment: Several commenters questioned the disparity between the levels of sophistication of different components of the models. Some of the independent technical reviewers noted that the compensable value submodel, unlike the relatively complex physical fates and biological effects submodels, essentially amounted to a look-up table. These reviewers thought that the Department should develop a more dynamic economics model. Other commenters thought that significant disparities in complexity existed even within the physical fates and biological effects submodels.

Response: The Department has attempted to incorporate the best available procedures for modeling all components of the type A models. The Department acknowledges that the levels of intricacy vary throughout the models. These variances reflect the differing degrees of current technology and scientific knowledge. Economic science has not progressed to the point where there are general models of recreational demand that can be readily applied to specific recreational activities at specific locations. This is in distinct contrast to the biological and physical sciences. The physical fates and biological effects submodels are based on parameterizations of known and generally accepted models of physical and biological processes.

Comment: One of the independent technical reviewers stated that the models incorporate some biases that will result in underestimates of damages and other biases that will result in

overestimates. The technical reviewer suggested that the models provide a range of damage estimates that reflect consistent use of conservative assumptions on one end and consistent use of liberal assumptions at the other end. Another independent technical reviewer suggested that the models be modified to perform an uncertainty analysis for each run.

Response: The Department believes it has adequately and appropriately addressed the potential for bias in the NRDAM/CME and NRDAM/GLE. The type A procedures are principally designed to establish a process for trustees to follow if they wish to pursue a natural resource damage claim and obtain a rebuttable presumption in court. In a suit for damages, trustees will need to identify a specific claim. Therefore, the Department has developed type A models that generate a single damage figure rather than a range of possibilities.

Moreover, where commenters, or the Department itself, identified specific potential biases in the proposed models, the Department modified the models to correct for such biases to the extent possible. Where the Department could not eliminate the potential for bias, it identified the simplifying assumptions made in the models that produce that potential. As discussed further below, those assumptions that could result in significant overestimates of damages if they are not reasonable in a particular case are listed in § 11.34 as conditions that must be met if the trustees expect to obtain a rebuttable presumption. Those assumptions that are not likely to result in significant overestimates of damages if they are not reasonable in a particular case, and, in fact, may result in underestimates, are explicitly identified in Section 1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. Section 11.35(a) provides that if a type A procedure is applicable, trustees must determine whether to use type A or type B procedures based on an evaluation of those model assumptions.

As discussed in Section III of this preamble, the type A models are neither expected nor intended to produce damage estimates that ''match'' the results of more complex site-specific assessment procedures. Therefore, the Department has concluded that a traditional uncertainty analysis is not needed.

Comment: Several commenters thought the scope and complexity of the proposed NRDAM/GLE and NRDAM/CME were too great. A few commenters thought the models were so complex and difficult to use that operating them was beyond the ability of untrained users. One commenter thought the technical documents should clearly state the required user qualifications. Several commenters, including some of the independent technical reviewers, suggested improved user interfaces. Some of the independent technical reviewers thought that additional user guidance was needed; one suggested that the Department develop an animated tutorial.

Response: While the Department acknowledges that the NRDAM/CME and NRDAM/GLE are functionally very complex, it does not believe that they require an undue level of expertise to operate. Users must simply be able to: (1) Understand the conditions for use in § 11.34; (2) evaluate the models' simplifying assumptions listed in of Section 1, Volume I the technical documents; (3) evaluate the averaged data included in the models as described in Volumes III through IV of the NRDAM/CME technical document and Volume III of the NRDAM/GLE technical document; and (4) enter correctly the required user-supplied data as described in Appendices II and III of the rule. Users who meet these standards will obtain reliable results regardless of whether they have a full understanding of all the models' components.

As discussed further below, the Department has revised the regulatory conditions for use of the models to clarify a number of points of confusion. Section 1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents now contains a clearer, simpler discussion of all the major model assumptions of which users should be aware when determining whether to use type A or type B procedures. The Department has also rewritten the regulatory discussion of the user-supplied information and moved that discussion into appendices in an attempt to make it easier to read. Volume II of the technical documents includes a revised discussion of how to develop and input the user-supplied data. Finally, the models provide a graphic user interface that has been revised to further simplify the task of the user. While additional guidance might be helpful and may be developed in the future, the Department believes that the current level of guidance is adequate to allow non-expert users to operate the model correctly.

Comment: Some of the independent technical reviewers questioned why the user interface was not consistent with Windows® software.

Response: The Department chose to develop the user interface as a stand-alone product that would not require licensing a copyrighted product such as Windows® software.

Comment: A few commenters complained about the speed of the proposed models. Some commenters called upon the Department to upgrade the computer platform required to run the models. The commenters thought that such an upgrade would enable users to complete model runs in hours rather than days and would allow the models to use more detailed databases, thus increasing accuracy.

Response: In developing the type A models, the Department had to strike a balance between the desire for the speed afforded by high-powered computer equipment and the need to ensure that any type A procedure developed is readily accessible to a wide array of potential users. The Department believes it has struck the appropriate balance in the PC environment.

It is evident from even a cursory review of the technical documents that the models are very complex and perform millions of individual calculations during a run. The Department has made every effort to optimize the models for speed without compromising their accuracy or applicability. Obviously, there continue to be advances in PC technology. For the development of the type A models, it was necessary for the Department to settle on a widely-available computer platform and finalize the rule. While more recent technological developments will allow these models to run faster on improved computer platforms, the Department decided that maintaining the models for use on 386 PCs would not compromise their function or purpose and would keep them readily accessible to potential users.

Model run times are affected by the complexity of the spill (e.g., amount spilled, duration of the spill, and degradation rate of the spilled substance) as much as the computer platform utilized. Nonetheless, for minor spills, most runs are executed in a matter of minutes rather than hours or days even on a 386 PC. The models will take significantly less time to run on a 486 PC or a Pentium® PC, but the user is not precluded from using an older model of computer.

Since the issuance of the proposed rule, the NRDAM/CME has been moved to a 32-bit FORTRAN® compiler. This move allowed the Department to subdivide the habitat grids by a factor of four and increase the number of computational particles used to represent spilled material and biota. These changes should improve the accuracy of the model. The area

modeled in the NRDAM/GLE is much smaller than that modeled in the NRDAM/CME. Therefore, the Department concluded that these changes were not needed in the NRDAM/GLE to increase speed or accuracy.

Comment: One of the independent technical reviewers stated that when he attempted to replicate test runs on the proposed NRDAM/CME he obtained different results.

Response: Users will obtain identical results if, but only if, they use identical inputs. The Department designed the type A models so that they will produce identical results, regardless of the make or model of PC used, if the user-supplied inputs are identical. To accomplish this result, the Department built a table of random numbers into the models' code rather than have the models use the random number generating features of the microprocessor.

Comment: Several commenters, including some of the independent technical reviewers, suggested that the Department include additional categories of damages in the type A models. Commenters recommended that the Department add the following losses to the models: sublethal biological effects; chronic biological effects; wetland losses; nonuse losses (i.e., economic values that are not dependent on use of a resource, such as the value of knowing a resource exists); de facto beach, boating, and fisheries closures; reductions in the quality of boating and beach recreation in the absence of closures; reductions in the quality of recreational fishing unrelated to mortality or closures; and ecosystem functional losses such as reductions in filtration, mineral recycling, and decomposition. These commenters expressed concern that if the models are not expanded to cover additional losses, then type A assessments will consistently underestimate damages. They noted that *Ohio* v. *Interior* and *Colorado* v. *Interior* instructed the Department to allow for the recovery of all reliably calculated losses. Commenters also thought that, in light of the cost of type B procedures, it was disingenuous of the Department to state that trustees could simply use type B procedures to calculate damages for losses not included in the models.

Response: The Department has attempted to include in the models all categories of loss and injury for which adequate, reliable information exists in a format that enables the calculation of damages for the wide range of substances, resources, and geographic areas covered by the models. The Department acknowledges that the type A models do not address all potential losses and injuries that might result from a release and that, in some cases, losses not included in the models may be significant. The Department further acknowledges that *Ohio* v. *Interior* and *Colorado* v. *Interior* instructed the Department to allow for the recovery of all reliably calculated values. The issue, then, is reliability. The exclusion of certain categories of injury and loss from the models was based on the Department's evaluation of whether there was adequate reliable information to support their inclusion.

For example, the Department has considered the comments suggesting the addition of nonuse losses, but continues to believe that the addition of such values is not feasible at this time. As discussed in the proposed NRDAM/CME technical document, most studies of nonuse values do not report marginal nonuse values that would be required for the type A models as they are presently designed. See Section 8.5.2, Volume I of the proposed NRDAM/CME technical document. Furthermore, these studies have tended to focus on the nonuse values of threatened or endangered species. As a consequence, the bulk of available studies are not directly applicable to the estimation of nonuse values that would be lost as a result of the small spills addressed by the type A models.

Furthermore, the final rule explicitly provides that where trustees expect losses that are not addressed by the models, they may consider using type B procedures in addition to a type A procedure, provided that type B procedures are cost-effective, can be performed at a reasonable cost, and do not result in double recovery. The Department recognizes that type B procedures are likely to be significantly more costly than type A procedures and, in some cases, trustees may not be able to perform type B procedures and still satisfy the rule's reasonable cost standard. Nevertheless, the Department does not believe that the cost of performing type B procedures justifies the inclusion in the models of losses for which there is an inadequate basis to determine damages. During future biennial reviews, the Department will reevaluate whether additional information has become available that supports expansion of the categories of losses and injuries included in the models.

Comment: One of the independent technical reviewers stated that additional detail should only be added to the models if it influences the final damage figure.

Response: The ultimate purpose of all the calculations made by the type A models is the determination of a reliable damage figure. Therefore, while reviewing the comments and deciding which changes to make to the models, the Department has focused on whether the suggested changes would significantly improve the reliability of the final damage figure.

Comment: One commenter suggested that trustees be allowed to use simplified procedures developed by States and receive a rebuttable presumption under the CERCLA regulations. Another commenter requested that the Department develop compensation tables for commonly released hazardous substances.

Response: Some simplified State or tribal procedures may well be appropriate for use under CERCLA. However, only a handful of coastal States have developed such procedures. Further, these State procedures have been developed under State laws, which may establish somewhat different objectives and standards than CERCLA. The Department believes it would need to evaluate carefully any particular State or tribal procedure to determine its consistency with CERCLA's regulatory mandate before allowing it to be used and accorded a rebuttable presumption under these regulations. Therefore, the Department decided it was more appropriate to develop its own simplified procedures for the coastal and marine and Great Lakes environments.

The primary advantage of compensation tables appears to be their ease of use. The Department believes that the NRDAM/CME and NRDAM/GLE are simple enough to operate that compensation tables are not necessary. Further, the Department believes that the models will provide a level of site-specific accuracy beyond that which a compensation table could offer.

Although the Department has decided not to incorporate compensation tables or simplified State or tribal procedures in this rulemaking, the Department has begun to evaluate the need for, and feasibility of, additional type A procedures. See 60 FR 24604 (May 9, 1995). The Department will further consider the use of simplified State procedures and the development of compensation tables in that context.

B. Technical Documents

Comment: Some commenters stated that the Department had failed to provide adequate documentation explaining how the proposed models operated and why the Department made the choices it did when developing

different components of the proposed models. One commenter stated that the scope and complexity of the models were too great and suggested that a revised program be developed and accompanied by a simplified synopsis of the technical assumptions and formulas presented in a format more amenable to comment. Commenters cited case law requiring agencies to provide a complete explanation and defense of models used in the development of regulations. The commenters noted that the Department's obligation to provide a full discussion of the type A models was even greater because the models are used to determine monetary liability of particular parties.

Response: The Department acknowledges its duty to provide an adequate explanation and justification of the models and to provide the public with a meaningful opportunity to review and comment on the proposed models. The Department believes it has fulfilled this duty.

The proposed models were accompanied by lengthy and detailed technical documents describing the content, workings, and development of the models. The proposed NRDAM/CME technical document exceeded 2,400 pages in length; the proposed NRDAM/GLE technical document was almost 1,500 pages in length. Also, the preambles to the proposed rules provided a roadmap to the technical documents, highlighting areas of potential concern and identifying where various issues were discussed in the technical documents. The Department made the proposed models and technical documents available on diskette free of charge to anyone who requested them.

To assist commenters in reviewing the models, the Department equipped the proposed models with a user interface that included pull-down menus, ''help'' screens, and graphic displays of the physical environments and user-generated runs of the physical fates submodel. The Department also incorporated pertinent calculations from the physical fates, biological effects, restoration, and compensable value submodels into the printed model output to enable reviewers to evaluate the reliability of the models for incident-specific model applications.

The Department notes that the goal of developing models that calculate compensatory damages for spills throughout the Great Lakes and coastal and marine environments has necessitated a relatively high level of complexity in modeling. The Department recognizes that with models as complex as the NRDAM/CME and NRDAM/GLE some reviewers will always want more information on specific elements while others will be overwhelmed as the documentation becomes more extensive. Although the Department never deliberately omitted any discussion it thought would be of interest to reviewers, the Department did recognize that providing too much information can be just as problematic as providing too little. The Department has tried to be sensitive to the risk that important information can become buried in a mountain of detail.

The Department extended the public comment period on the proposed NRDAM/CME once and on the proposed NRDAM/GLE twice. The total comment periods were seven months for the proposed NRDAM/CME and eleven months for the proposed NRDAM/GLE. Those reviewers left with questions after reviewing the models and technical documents were free to contact Departmental staff at any time during the comment period.

Finally, the Department has provided additional discussion of specific model aspects in the final versions of the NRDAM/CME and NRDAM/GLE technical documents and in this preamble as a result of specific public comments.

Comment: Several commenters, including some of the independent technical reviewers, said that the technical documents were either unclear or difficult to use. Others noted confusing table captions and headings, inconsistencies, incorrect citations, and typographical errors. One commenter suggested that major assumptions for each submodel be placed in bold print at the beginning of each section. One commenter recommended that the technical documents be amended to give examples of when the models might underestimate or overestimate damages.

Response: The Department has reviewed and revised the NRDAM/CME and NRDAM/GLE technical documents to further clarify algorithms, assumptions, and data sources. The Department has also checked the documents for consistency, particularly with regard to terminology and has fixed the noted typographical errors and incorrect citations. Section 1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents now more clearly identifies all the major assumptions of which trustees should be aware when deciding whether to use the models and describes the likely results if the assumptions are not reasonable in a particular case. Further, the discussion of each submodel in Volume I of the technical documents now starts with a list of the assumptions relevant to that submodel.

C. Selection of Assessment Procedures

Comment: The Department received numerous comments on the proposed conditions for use of the type A models. The proposed rules identified a set of primary conditions and a set of secondary conditions. Under the proposed rules, if any primary condition were not met, trustees would not have been allowed to use the type A procedure. If all primary and all secondary conditions were met, trustees would have been required to use the type A procedure for all damages. If all primary conditions but only some secondary conditions were met, trustees could have used a combination of type A and type B procedures.

Some commenters thought the proposed rules were overly prescriptive in dictating which type of assessment procedures trustees may use. These commenters argued that trustees should have greater discretion to determine which procedures, type A, type B, or a combination, are appropriate in a particular case. Commenters expressed concern that the conditions regarding use of the type A procedures were vaguely defined and would invite confrontation and litigation if they were imposed as requirements. These commenters supported expansion of the authority to use type A and type B procedures in combination, but thought the proposed rules still did not provide adequate flexibility. These commenters also stated that the type A procedures were particularly useful when used with selective site-specific studies of impacts not addressed in the type A models.

Other commenters, including one of the independent technical reviewers, thought that the proposed rules gave trustees too much discretion in selecting assessment procedures. Some of these commenters thought that the conditions regarding use of the type A procedures should be clearer and stricter. One of the independent technical reviewers suggested that the Department recharacterize the assumptions made by the models as limits of applicability. One commenter argued that trustees be required to use a type A procedure unless they provide scientific justification for using type B procedures. On the other hand, some commenters expressed concern that the proposed rules would allow excessive use of the type A procedures and suggested making the primary conditions more restrictive.

Several commenters objected to the proposed provision allowing combined

use of type A and type B procedures. The commenters argued that Congress intended the type A and type B procedures to be mutually exclusive. These commenters also thought that combined use of type A and type B procedures would pose significant risks of double recovery of damages and that the proposed rules failed to provide any guidance on how to prevent such double recovery. One commenter stated that combined use of type A and type B procedures was inconsistent with the ''average'' values justification for simplified procedures, since type B procedures would be used to offset type A underestimates without any corresponding offset of type A overestimates. Another commenter expressed concern that if allowed to supplement type A assessments, trustees would spend enormous sums assessing nonuse values for small releases even though such releases are unlikely to produce any meaningful nonuse losses. Some commenters stated that if the final rule allowed use of type B procedures to supplement a type A assessment, then such use should be limited to resources not included in the type A procedure.

Response: The type A models are powerful tools for completing assessments and beginning restoration as quickly and cost-effectively as possible. The Department has sought to balance the utility of making these tools available in the widest possible range of cases against the potential dangers that they may produce unreliable results when stretched beyond their limits or that they may result in double recovery when inappropriately combined with type B procedures.

The Department has carefully reexamined both the proposed conditions regarding use of the models as well as the additional major simplifying assumptions incorporated into the models and described in the technical documents. The Department has concluded that the conditions for use of the models should recognize two different categories of assumptions built into the models. The first category encompasses those assumptions that could result in significant overestimates of damages if they are not reasonable in a particular case. The second category encompasses those assumptions that are not likely to result in significant overestimates of damages if they are not reasonable in a particular case and that may well result in underestimates.

The Department believes it is inappropriate to grant a rebuttable presumption to an assessment performed using the NRDAM/CME or NRDAM/GLE if one of the assumptions in the first category is not reasonable in the particular case. If an assumption in the second category is not reasonable in a particular case, it may be appropriate for trustees to use type B procedures to ensure that the public receives full compensation for its losses. However, the Department believes trustees in those cases should have the option of using the type A models when the costs of type B procedures are not reasonable. The appropriateness of the models in these cases will depend on site-specific factors. The Department has concluded that it is more appropriate to allow trustees to analyze these factors in the context of a particular case than to establish inflexible, overly rigid standards.

Therefore, the Department has identified all the major model assumptions and for each one determined into which of the two categories they fall. Those assumptions in the first category are identified in § 11.34 of the final rule as conditions that must be met if trustees intend to use the NRDAM/CME or NRDAM/GLE and obtain a rebuttable presumption. These assumptions include most of the primary conditions in the proposed rules.

The Department has identified the assumptions in the second category and listed them, along with the other assumptions, in Section 1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. These assumptions include many of the secondary conditions in the proposed rule. Section 11.35(a) provides that if the conditions for use of a type A procedure are met, the trustee must decide whether to use that procedure or use type B procedures by weighing the difficulty of collecting site-specific data against the suitability of these additional assumptions as well as of the averaged data described in Volumes III through IV of the NRDAM/CME technical document, and in Volume III of the NRDAM/GLE technical document.

The Department has eliminated the proposed provision that would have required trustees to use a type A procedure in some cases. That requirement was originally motivated out of concern over potential misuse of unnecessarily expensive and time-consuming type B procedures. 59 FR at 40322. Although the models are cost-effective, reliable tools where applicable, the Department has concluded that trustees should not be prevented from conducting site-specific work if they can do so at a reasonable cost and if the additional costs of performing type B procedures are warranted in light of the degree of additional precision and accuracy that such procedures will provide.

The issue of the legal permissibility of allowing trustees to use both type A and type B procedures for the same release is one that the Department decided and resolved in 1987 and is beyond the scope of this rulemaking. Today's final rule merely expands the use of supplemental type B studies beyond resources not addressed by the type A procedure to include compensable values and injuries of a type not addressed by the type A procedure.

The Department acknowledges that combined use of type A and type B procedures can, in some instances, pose potential double counting problems. However, trustees should not be forced to choose between forgoing compensation for a public loss not addressed by the type A model on the one hand and funding a full-scale, time-consuming, labor-intensive type B assessment of all injuries on the other hand. Instead, the potential problems with combined use of type A and type B procedures should be addressed through limitations designed to protect against double recovery.

The final rule provides that trustees who use a type A procedure may perform additional type B studies only for injuries or compensable values of a type not addressed by the type A procedure. The secondary conditions in the proposed rules have been recast to identify explicitly the injuries and compensable values that are addressed in the type A models and, therefore, may not be supplemented with type B procedures.

Given the vast range of potential scenarios, it is infeasible to develop a single, uniform formula for preventing double recovery. Instead, § 11.15(d) of the existing regulations prohibits double recovery of damages. Also, § 11.36(a)(2) of today's final rule provides that trustees may only perform supplemental type B procedures if such procedures will not result in double recovery. Further, § 11.36(c) requires trustees to provide an explanation in the Assessment Plan of how they intend to avoid any double recovery in the case of combined use of type A and type B procedures. PRPs and the public will have an opportunity to review the trustees' strategy for preventing double recovery when the Assessment Plan is made available for public comment.

The Department agrees with the comment that the type A procedures can be particularly useful when combined with selective studies of impacts not addressed by the models. The Department would like to ensure that

where combined use of type A and type B procedures is warranted, trustees are freed from conducting duplicative assessment procedures. Therefore, the Department has modified the final rule to clarify that when using type B procedures for compensable values that are not included in a type A procedure, but that result from injuries addressed by the type A procedure, trustees need not conduct injury determination and quantification all over again using type B procedures. Instead, trustees may rely on the injury projections of the type A model and simply use one of the type B valuation methodologies authorized by § 11.83 (a) and (c) to compute compensable value.

With regard to the concern about unwarranted type B studies of nonuse values, aside from the implausibility of the scenario suggested by the commenter, the Department notes that calculation of nonuse values using type B procedures is under examination in a separate rulemaking. See 59 FR 23097 (May 4, 1994). Therefore, this rulemaking need not address this issue.

Finally, the Department believes it is appropriate to revise the existing rule to allow supplemental use of type B procedures beyond resources not addressed in the type A models. The public can experience significant and distinct losses associated with the same resource. *Ohio* v. *Interior* emphasized that the regulations should allow for the recovery of all reliably calculated lost values. 432 F.2d at 464. The Department sees no reason to impose an arbitrary distinction between losses associated with different resources and losses associated with the same resource so long as there is no double recovery.

Comment: One commenter suggested that trustees be allowed to use supplemental type B procedures to determine damages for habitats that are not accurately represented in the models.

Response: In cases where the models assign an incorrect habitat designation for a specific area, trustees have the ability to correct that designation and would not need to conduct supplemental type B studies. In cases where releases affect habitats beyond the models' level of spatial detail, trustees may perform supplemental type B studies so long as such studies do not address injuries or compensable values in the categories listed in § 11.36(b) of the final rule. The Department does not believe it is appropriate to expand this authority to conduct supplemental type B studies and still obtain a rebuttable presumption. When such small habitats are affected, the models will nonetheless determine injury and damages for the geographic area in which those habitats are located. If a trustee were to use one of the models and then conduct supplemental type B studies of such a habitat, the trustees would need to adjust the type A damage figure to eliminate any damages calculated for the area over which the habitat is located. The Department has concluded that in the context of a simplified assessment, trustees who wish to obtain a rebuttable presumption should be limited to conducting type B studies for the purposes of addressing additional injuries and compensable values that are not included in the model rather than substituting for damages already calculated by the model.

Comment: A number of commenters thought that trustees should be prohibited from using type A procedures unless all interested trustees agree to a single joint assessment. These commenters stated that such a provision was necessary to avoid the problems of double recovery and improper allocation of damages among trustees. These commenters thought that these problems were more significant for type A assessments than for type B assessments because the type A models provide less detail than type B procedures on the type and location of injured resources and the damages associated with those resources.

Response: The Department acknowledges that the type A models pose a unique problem when trustees do not act jointly. The type A models generate a total damage figure for all affected resources. Therefore, if a trustee acts independently and applies a type A model, the total damage figure generated by the model might include damages for resources that are not under that trustee's jurisdiction.

To address this problem, § 11.42 now requires a trustee to perform a preliminary application of the model before making the draft Assessment Plan available for public review and comment. The trustee must include a summary of the model application in the draft Assessment Plan and make available a copy of the model output. The output of the model does in fact identify the type and location of injured resources. Section 11.31(a)(2) of the existing regulations requires trustees to include in the Assessment Plan a statement of authority for asserting trusteeship for those resources addressed in the Plan. Therefore, PRPs and other interested members of the public will have an opportunity to comment on whether any of the injured resources identified in the model output are beyond the scope of the trustee's jurisdiction.

Also, § 11.44(e) provides that if a trustee is aware of reliable evidence that a type A application covers resources beyond his or her trustee jurisdiction, the trustee must either: (1) Have the other trustees who do have jurisdiction over those resources join in the type A assessment; or (2) eliminate any damages for those resources from the claim for damages.

Furthermore, the Department strongly encourages trustees to work together to ensure that natural resource damage assessments remain focused on restoring the injured resources rather than debating over which trustee has jurisdiction over them. As noted by some of the commenters, § 11.32(a)(1) of the existing regulations requires a trustee to notify all other interested trustees before beginning an assessment and encourages all trustees to cooperate and coordinate. Also, § 11.15(d) of the existing regulations prohibits double recovery of damages.

The issue of inter-trustee coordination extends beyond this rulemaking to the overall administrative process for conducting all assessments. The potential for overlapping claims exists whenever trustees conduct separate assessments, regardless of whether type A or type B procedures are used. The Department has initiated a biennial review of the administrative process for conducting assessments. The Department will be further examining the issue of inter-trustee coordination during that review. 59 FR at 52752.

Comment: A few commenters stated that PRPs should be ensured a meaningful opportunity to participate in the selection of assessment procedures. These commenters requested that PRPs be given a chance to review trustees' assumptions and reasoning. Commenters also expressed support for cooperative trustee-PRP assessments.

Response: The Department agrees that PRPs should have an opportunity to participate in selection of assessment procedures. Section 11.32(a)(2)(iii)(A) of the existing regulations already requires trustees to invite PRPs to participate in the development of the type and scope of the assessment as well as the performance of the assessment procedures. Today's final rule does not change that requirement. Section 11.32(c) requires trustees to make their Assessment Plans available for public review and comment. The proposed rule required trustees to include in their Assessment Plans documentation of their decision whether to use a type A procedure, type B procedures, or both. Section 11.31(b) of today's final rule

now makes more explicit the trustees' duty to provide a detailed explanation of their rationale for using a type A procedure, type B procedures, or both. Also, § 11.35(d) now clarifies that trustees may change their decisions about the types of procedures they use based on public comments.

Comment: Many commenters addressed specific proposed conditions for use of the models. Some commenters questioned the condition regarding whether the data in the models reasonably represented the spatial and temporal distribution of affected biological resources. One commenter suggested that this condition was inconsistent with the habitat editor. Another commenter requested clarification of the term ''reasonably represented.'' This commenter expressed concern that the condition seemed to require trustees to collect baseline data, which would defeat the intent of requiring minimal field observation in type A procedures.

Response: The Department has reexamined this proposed condition regarding use of the models. The condition addressed two different model assumptions. First, the condition addressed the assumption that the release did not affect any small but important environments beyond the level of spatial detail of the model. Second, the condition addressed the assumption that species biomass is averaged spatially and temporally. The Department has concluded that if the first assumption is not reasonable in a particular case, then the model will most likely underestimate, rather than overestimate, damages. Therefore, the Department has eliminated this assumption from the conditions for use listed in § 11.34 of the final rule. Instead, the Department has identified the assumption in the NRDAM/CME and NRDAM/GLE technical documents as one of the factors for trustees to consider when deciding whether to use type A or type B procedures, once they have established that the conditions set forth in § 11.34 are met. See Section 1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. The Department has clarified the second assumption, concerning species biomass, and included it in § 11.34 as a condition that must be met if trustees intend to use the models and obtain a rebuttable presumption.

The habitat editor does not conflict with either of these assumptions. The final rule allows trustees to change the habitat designation for an entire existing grid cell. However, the rule does not allow trustees to redraw the boundaries of the grid cells or modify the species biomass for a particular habitat. Even with correct habitat designation, edited or through the built-in designation, the models may not reflect small habitats or populations with densities that differ from the seasonal average.

The Department acknowledges the confusion generated by the term ''reasonably represented.'' The term was not intended to require trustees to conduct field surveys to collect baseline data. Instead, it was designed to address cases where information already existed about baseline conditions and such pre-existing information differed significantly from the data in the model. Section 11.34(e) now simply provides that a trustee may not use the models if he or she is aware of reliable evidence that, for species expected to represent a significant portion of the claim, the species biomass is significantly lower than the species biomass assigned by the models.

Comment: A few commenters noted that the models may significantly underestimate damages when the released substance causes chronic or sublethal effects, when sensitive habitats or life stages are affected, when animals aggregate for feeding or reproduction, or when long-term effects, such as reproductive impairment or changes in food web structure, are expected.

Response: The Department acknowledges that the type A models may not accurately calculate total damages in the situations identified by the commenters. However, the Department has included provisions in the final rule to address these situations. Section 11.35(a) provides that if a type A procedure is applicable, trustees must determine whether to use type A or type B procedures based on an evaluation of the model assumptions listed in Section 1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. One of the listed assumptions is that there are no affected environments beyond the spatial detail of the models. This assumption will alert trustees to the potential for underestimating damages where sensitive habitats are affected. Another listed assumption is that species biomass is averaged spatially and temporally. This assumption will alert trustees to the potential for underestimating damages when animals aggregate. Finally, the rule explicitly identifies the injuries addressed by the type A models; therefore, trustees will have notice that they will need to perform supplemental type B procedures if they wish to address chronic or sublethal biological injuries.

Comment: Some commenters thought that trustees should be allowed to use the models only if the release is a single event. These commenters expressed concern that in the absence of such a requirement, trustees could use a type A procedure to assess one release in a multi-release incident and use type B procedures to assess the other releases. The commenters thought that such a practice would result in double counting because some of the injuries predicted for one release would already be accounted for in the assessment of another release. These commenters also thought that the rule should be rewritten to clarify that the type A models can be applied only to releases of a single substance. The commenters noted that without this change, similar double counting problems could arise from multiple applications of the models.

Response: The Department has concluded that the model assumption that the release is a single event need not be made a condition for use of the models. Instead, Section 1, Volume I of the technical documents notes that the models assume that each spill is an independent, short-term event.

Section 11.15(d) of the existing regulations already prohibits double recovery of damages. In the case of a multi-release incident, if trustees choose to use a type A model for one release and then conduct type B studies for the other releases, they will be required to ensure that the type B procedures do not result in double recovery. The Department acknowledges that in some cases it may be difficult for trustees to satisfy this requirement. However, the Department believes that in those multi-release cases where trustees can tailor their type B studies to address only the effects of the releases not assessed by the type A model, they should have the opportunity to do so.

With regard to releases of multiple substances, the rule now provides that trustees must select and assess only one of the substances that was released. See Appendices II and III. This requirement will eliminate double counting problems. In fact, toxicity of mixtures has been found to be additive or synergistic in aquatic environments for a wide variety of substances. See Section 4, Volume I of the NRDAM/CME technical document. Thus, this requirement may actually result in underestimates of damages. However, the Department believes that in cases of mixtures when the cost of using type B procedures is not reasonable, trustees should have the option of using a type A procedure rather than forgoing all compensation.

Comment: A few commenters addressed the use of the models for

substances not specifically identified in the database. Some commenters supported giving trustees flexibility to use the models for such substances provided that they identified a proxy that was included in the database and documented the reasons why the use of that proxy was appropriate. Other commenters expressed concern that allowing use of proxies would add a significant range of discretion given the number of different physical and chemical attributes that must be considered when identifying a proxy. Some commenters, including one of the independent technical reviewers, suggested that the Department expand the oil database.

Response: The Department has concluded that allowing the use of proxies for hazardous substances without significant guidance on selection of such proxies would raise serious concerns about the uniformity and reliability of the type A model results. Moreover, developing guidance on selection of proxies would be impractical given the extremely wide range of hazardous substances and the diversity of their relevant attributes. Therefore, for chemical releases, trustees may only use the models if the released material is one of the specific chemicals listed in the database.

As discussed in Section I.C. of this preamble, use of the models for oil discharges is governed by NOAA's OPA rule rather than by today's final rule. However, the Department notes that it has expanded the database to include 33 types of oils that cover a broad range of chemical and physical characteristics.

Comment: Some commenters stated that trustees should be allowed to use the type A models and obtain a rebuttable presumption for releases that did not originate in, but later migrated into, a coastal or marine or Great Lakes environment. These commenters argued that the type A models could accommodate such releases. On the other hand, one commenter thought that such use should not be allowed because there are no data on conditions outside the boundaries of the type A models.

Response: The Department has concluded that the type A models can produce reliable damage figures for releases that do not originate in, but do migrate within, the boundaries of the models provided that the user supplies appropriate data inputs. So long as the user supplies data inputs that reflect conditions at the point that the substance enters the model boundaries, the models are just as capable of computing reliable damages as they would be if the release had actually started at that point. In such cases, the models will start their simulations at the point that the released substance enters water within a geographic region represented in the models. The only potential problem is that the models will not account for the effects produced before the release entered the model boundaries, a consideration that may support use of type B procedures in some cases. However, the Department believes trustees should have the option of using the models to assess such releases when the cost of performing type B procedures to develop a more complete damage figure is not reasonable.

Therefore, the rule allows trustees to use the models for releases that occur outside the boundaries of the models so long as the user-supplied inputs appropriately reflect conditions at the point that the substance entered such waters rather than the point of the original release. Appendices II and III specify that when using the models for releases that originate on land or outside the model databases, trustees must adjust the data inputs.

Comment: One commenter said that the definition of ''minor'' was vague, but supported the Department's discussion of it and the proposal to allow trustees discretion to define ''minor'' on a case-by-case basis. Other commenters, including one of the independent technical reviewers, thought that the Department should define ''minor.'' One commenter suggested that the rule require trustees to justify their determination of whether a release is minor with scientific documentation. Another comment recommended the Department define ''minor'' based on spill size, prediction of affected area, or resulting damage estimates.

Response: In light of Congressional intent to restrict use of type A procedures to minor releases and after considerable analysis and deliberation, the Department has decided to impose a specific dollar cut-off for use of the models to obtain a rebuttable presumption. The final rule provides that if the model output indicates damages in excess of $100,000, then trustees who wish to obtain a rebuttable presumption must either: (1) limit the portion of their claim calculated with the type A procedure to $100,000; or (2) compute all damages using type B procedures. The Department believes this provision establishes an appropriate standard of fairness for allowing trustees to receive a rebuttable presumption for damages calculated by the NRDAM/CME or NRDAM/GLE given the current level of experience with these models.

The language and legislative history of CERCLA indicate that Congress intended the type A procedures as a tool for obtaining a rebuttable presumption in cases of minor releases. Thus, the Department included a provision in the proposed rules that prohibited trustees from using the models to obtain a rebuttable presumption unless the release was minor. The proposed rule provided no definition of ''minor,'' and the Department indicated in the preamble to the proposed rules that it had been unable to develop a uniform standard for all substances and areas encompassed by the models. See 59 FR at 40330 and 63313. However, after reviewing the comments, the Department has concluded that given the significance of this term and the fact that type A procedures were intended as simplified procedures requiring limited analysis by trustees, it is appropriate to provide clear guidance.

The Department evaluated a number of different approaches to defining ''minor.'' First, the Department reviewed the language and legislative history of CERCLA. The Senate Report that accompanied the predecessor bill to CERCLA states:

> [A] simplified type of regulation is necessary to effectively deal with damage assessment in most ''minor'' releases of hazardous materials * * *. The other type of regulations [type B] would be employed in large or unusually damaging releases and would be used to guide the site-specific damage assessment. S. Rep. No. 96–848 at 86.

However, nothing in the legislative history indicates what Congress meant by ''minor.''

Next, the Department considered basing the definition on the technical limitations of the NRDAM/CME and the NRDAM/GLE for modeling large or highly toxic spills. However, sensitivity analyses of the models failed to reveal any clear stages at which the model assumptions became invalid.

The Department then considered relying upon existing standards developed in other contexts of environmental law. The U.S. Coast Guard has developed a volume-based system for classifying oil spills for purposes of spill response. See 40 CFR 300.5 (minor discharge of oil is one of less than 1,000 gallons to inland waters or 10,000 gallons to coastal waters). The U.S. Environmental Protection Agency (EPA) is responsible for developing a parallel rating system for hazardous substance spill response. While EPA has developed a qualitative system, this system does not provide the type of clear, quantitative limits that the Department believes are needed in this context. See 40 CFR 300.5 (minor release of hazardous substance is one that poses minimal threat to public

health or welfare of the U.S. or the environment).

Next, the Department considered basing a definition of minor on the point at which type B procedures can no longer be performed at a reasonable cost. However, because trustees have rarely pursued damage claims for smaller spills, the Department was unable to develop reliable estimates of the cost of conducting type B procedures in such cases.

Therefore, the Department was left to make this policy decision about the upper limit on applicability of type A procedures without the benefit of clear empirical standards or legal precedents. The Department has chosen to base this limit on its sense of when it is no longer ''fair'' to allow trustees to obtain a rebuttable presumption using the NRDAM/CME or NRDAM/GLE as opposed to performing type B procedures. The Department believes that, given the current level of experience with these models, $100,000 represents a reasonable cut-off for their use. As more experience is gained with these models, the Department will reconsider this cut-off in future biennial reviews. Further, because this regulatory cut-off is based on considerations of fairness rather than the inherent reliability of the models, the Department wishes to emphasize that although use of the models to calculate damages above $100,000 is not entitled to a rebuttable presumption, such use may nonetheless be appropriate in other contexts, such as settlement negotiations or litigation without the benefit of the rebuttable presumption.

Finally, the Department recognizes that in some instances the models may project damages in excess of $100,000, yet it may not be reasonable to perform type B procedures. The Department believes that trustees should be allowed the option of claiming damages up to $100,000 in such cases instead of forgoing all compensation. Therefore, the Department has eliminated the proposed rule condition that type A procedures only be used for minor releases and instead imposed a cap on the level of damages that trustees can claim through use of a type A procedure and still obtain a rebuttable presumption.

Comment: Several commenters thought that the proposed condition requiring uniform subsurface currents would render the NRDAM/CME inapplicable to all spills in Massachusetts, New Hampshire, and Maine.

Response: The Department acknowledges that the condition regarding subsurface currents may limit the applicability of the NRDAM/CME in some circumstances but notes that it does not render the model inapplicable to all locations where subsurface currents are not uniform. The models use vertically averaged currents and assume that the speed and direction of horizontal transport is uniform over depth at a specific latitude and longitude. The models do include randomized motion in the vertical dimension, but not directed motion. The vertically averaged current is essentially a current that provides the correct net transport averaged vertically. If the transport of the released substance cannot be reasonably represented by a vertically averaged current, then the NRDAM/CME's projections may not be reliable. For example, substances with high densities, such as sulfuric acid, may sink rapidly through the water column so that the principal mass is transported in the direction of the subsurface current. However, in many cases, such as when a substance remains at or near the surface or sinks slowly, subsurface currents will not affect the fate of the spilled substance. In these cases the model can reliably predict damages. Therefore, the rule allows trustees to use the NRDAM/CME, even if subsurface currents are not uniform, so long as they are not expected to significantly affect the level and extent of injuries.

D. User-Supplied Information

Comment: Several commenters suggested changes to the proposed models and rules that would require trustees to confirm injury. These commenters asserted that the proposed models merely assume injury and that the proposed rules inappropriately failed to require field verification of this assumption. The commenters noted that CERCLA limits recovery to damages that ''result from'' a release. These commenters argued that this limitation requires that trustees conduct field studies that prove that an injury actually occurred and that it was caused by the release in question.

A number of commenters thought that Congress intended traditional tort law standards of causation to apply to natural resource damage cases and cited case law in support of this position. Some commenters noted that *Ohio* v. *Interior* rejected a challenge to the Department's strict acceptance criteria for determining injury under the type B procedures and upheld the Department's interpretation that CERCLA adopted traditional causation standards. 880 F.2d at 471. The commenters stated that CERCLA does not create a different standard of proof of causation when type A procedures, as opposed to type B procedures, are used.

Several commenters observed that CERCLA calls for type A procedures that involve ''minimal'' rather than ''no'' field observation. The commenters thought that the Department was engaging in sheer speculation when it asserted in the August 8, 1994, notice of proposed rulemaking that requiring confirmation of injury in type A assessments would be unduly burdensome. Finally, the commenters stated that none of the steps that trustees must take before applying a type A model, including the Preassessment Screen Determination, satisfy the required standard of causation.

Response: The type A models do not ''assume'' that injury occurs. Using both the information provided by the trustees and the biological and environmental information about the spill site contained in the model databases, the models perform millions of calculations to determine whether or not the release has caused an injury. The models project the distribution of the released substance over space and time, track the changing toxicity of the substance over that space and time, and simulate the movements of biota throughout the area around the release. The models only conclude that injury has occurred if biota are exposed to the released substance at concentrations and durations that exceed acute toxicity thresholds. If such thresholds have not been exceeded, the models conclude that there has been no injury. The models can and have projected that no injury resulted from particular releases. In such cases, the models determine that damages equal zero.

The issue is not whether the Department is attempting to excuse trustees from their legal requirement to prove causation; the Department agrees that trustees must demonstrate that injury resulted from a release. Rather, the issue is whether trustees should be allowed to use the type A models to make that demonstration. The Department believes that it is appropriate to allow trustees to use a type A model to demonstrate injury without on-site verification of the model projections.

There is a tension between the statutory provision requiring trustees to demonstrate that injury ''resulted from'' a release and the provision requiring the development of simplified assessment procedures that involve ''minimal field observation.'' As noted in the cases cited by commenters, the requirement that trustees demonstrate that injury resulted from the release indicates that

Congress intended that natural resource damage liability be compensatory. PRPs are to be held liable not just because they are responsible for a release but because they are responsible for a release that caused an adverse effect. On the other hand, by requiring the development of type A procedures, Congress recognized that assessment work can be expensive and time-consuming. In the case of minor releases, it is often not cost-effective or feasible to conduct more than minimal field observations. The Department has struggled to resolve the tension between these two statutory requirements by developing type A procedures that rely on computer models to predict actual site-specific effects to the maximum extent practicable but do not require on-site verification of the models' injury predictions.

Although the regulations do not require trustees to verify the injury projections of the type A models, they do require trustees who use a type A model to make several determinations that require field observations. Before trustees can proceed with a type A procedure, they must perform a Preassessment Screen Determination in which they establish if assessment work is warranted. Existing § 11.23(e) requires trustees to make a preliminary determination that the following conditions have been met:

A release of a hazardous substance has occurred; Natural resources under their trusteeship have been or are likely to have been adversely affected;

The quantity and concentration of the released substance is sufficient to potentially cause injury;

Data sufficient to pursue an assessment can be obtained at a reasonable cost; and

Response actions will not sufficiently remedy the injury.

If the trustees determine that these conditions are met, they must then demonstrate that the released substance entered the water, which is the only pathway considered by the models. Trustees must develop information on ambient environmental conditions at the site of the release and on the extent of response actions. Also, trustees must evaluate whether potentially affected resources are addressed by the model.

The Department agrees that these determinations in and of themselves do not establish causation. They are not intended to do so; causation is demonstrated by the models. However, these determinations do fulfill the standard of minimal field observations. The Department notes that Congress chose to use the word ''observations'' rather than ''studies,'' ''surveys,'' or ''analyses.'' Therefore, the Department interprets ''minimal field observations'' to be information that is readily or routinely collected following a release. The Department rejects the argument that the language of CERCLA requires on-site verification of causation, since observations would often be inadequate to determine causation. For example, the released substance may sink or disperse into the water column, precluding visual methods for documenting pathways and exposure. Furthermore, the potentially exposed resources may be difficult and costly to sample (e.g., endangered species, marine mammals, or subtidal organisms). In other instances, the persistence of the substance, or the remote location of the release, may prevent trustee scientists from reaching the spill site in a timely manner to conduct assessment work.

Moreover, today's final rule does not establish a new standard for proof of causation. The regulations did not require trustees to verify the injury projections of the original NRDAM/CME. The existing regulations require trustees to confirm exposure before implementing type B studies, but not type A procedures. Today's final rule does include language in § 11.31(c)(1) clarifying that the confirmation of exposure requirement only applies to type B procedures. The original type A rule contained the same substantive provision, only worded differently. See 52 FR at 9064. This final rule simply rewords and relocates the existing provision.

Even when trustees use type B procedures, there are some circumstances under which the existing regulations allow them to use models to determine injury to surface water, groundwater, and air. See 43 CFR 11.64(b)(6), 11.64(c)(8), and 11.64 (d)(2). The existing regulations also allow trustees who perform type B procedures to use models to demonstrate that a groundwater or air pathway exists between the site of the release and injured biological resources. See 43 CFR 11.63(c)(5)(ii)(C) and 11.63(d)(4). Demonstration of a pathway is an integral part of establishing causation.

The Department acknowledges that the existing regulations do not explicitly allow trustees who use type B procedures to demonstrate biological injury based on models alone. However, as *Ohio* v. *Interior* recognized, the language and legislative history of CERCLA are ambiguous as to the standard of proof of causation. 880 F.2d at 470. Nothing in the statutory language prohibits the Department from establishing different standards of proof of causation under type A and type B procedures, and the Department believes that in light of the statutory description of type A procedures, different standards are warranted. In fact, as discussed above, the legislative history of CERCLA suggests that the Department would have been justified in developing a look-up table or compensation formula as a type Aprocedure. Instead, the type A models use both site-specific information provided by the trustees and biological and environmental information about the spill site contained in the databases to approximate more precisely the actual effects of the release.

Finally, the Department notes that the final rule has been revised to require trustees to perform a preliminary application of the model and make the results available for public comment before presenting a damage claim. Therefore, PRPs will have an opportunity to evaluate the injury projections. They can then decide whether they have information that indicates that the projections are wrong and that the user inputs need to be modified or that type B procedures should be used.

Comment: The Department received several comments on the wind inputs. Some commenters expressed concern about the adequacy of the proposed rule language allowing trustees to supply one set of wind data for a 30-day period. These commenters noted that wind data were critical to correct functioning of the models and requested that trustees be required to supply actual hourly data. One commenter noted that such data are readily available from the National Climatic Data Center. These commenters also thought that actual wind data should be supplied for the entire duration of the model application because of gross oversimplifications in the data supplied by the models when the user-supplied wind data run out. One of the independent technical reviewers suggested that users be allowed to enter wind data in their choice of units.

Response: The Department agrees that one set of wind data for an entire 30-day period may not be adequate in all cases. Trustees are free to supply hourly wind data; however, the Department also believes that requiring trustees to do so in all cases would be onerous. Therefore, the Department has modified the final rule to require trustees to supply data on prevailing wind conditions for each day of the 30-day period. Recognizing that the type A procedures were intended to provide simplified procedures requiring minimal analysis by trustees, the Department has concluded that it is

appropriate to establish a uniform time frame for entry of wind data. Wind speed and direction are most relevant to the simulation of the surface trajectory. Released substances will generally only float for a few days or weeks before they sink or go ashore. Therefore, the Department believes that 30 days is an appropriate time frame for the vast majority of releases to which the type A models will be applied. Users are free to supply more than 30 days worth of wind data if they choose but are not required to do so. If a simulation continues past 30 days and the user has only supplied 30 days worth of data, the models will supply climatological wind data. With regard to the units of measurement for wind data, the Department notes that users are allowed to enter wind data measured either in knots or in meters per second. The Department believes this provides users with appropriate flexibility.

Comment: Several commenters addressed the currents inputs to the proposed NRDAM/CME. Some commenters, including a few of the independent technical reviewers, found it difficult to enter currents data and suggested that default values be made available. On the other hand, one commenter thought that the tool for supplying currents data in the proposed NRDAM/CME was already too simplistic. One of the independent technical reviewers noted a ''bug'' in the program.

Response: Currents have a profound impact on the physical fate of spilled substances and are highly variable. Provision by the model of a single set of default values for currents would adversely affect the reliability of the model. Therefore, the Department believes it is appropriate to require users to supply some level of site-specific data on currents. However, the Department is also committed to ensuring that the NRDAM/CME remain accessible to a wide range of potential users and, thus, recognizes the need to avoid excessively complicated user inputs. The Department has revised the currents entry tool to make it easier to use and to correct the ''bug.'' The Department has also provided additional guidance on developing and entering currents files in Volume II of the NRDAM/CME technical document.

Comment: Some commenters objected to the proposed provision allowing trustees to decide whether or not to have the models consider ice cover. These commenters stated that the rule should require trustees to have the models consider ice cover if ice is present during or after the release.

Response: The Department believes that the ice model contained in the NRDAM/CME and NRDAM/GLE reasonably reflects average ice conditions. However, the Department has modified the final rule to provide that when trustees have reliable evidence that ice was not present at the spill site, they must disable the ice modeling function.

Comment: A few commenters addressed the data inputs for response actions. One commenter thought that the models should take into account the effects of spill prevention and containment measures required under OPA and other laws. Some commenters stated that trustees should only be required to supply the volume of the released substance that was removed during the first 24 hours after the release. These commenters noted that the types of acute effects considered by the models should have occurred within that first 24-hour period.

Some commenters thought that limiting the data inputs to the first 24 hours would also alleviate the problem with the NRDAM/CME identified in the December 8, 1994, preamble. In that preamble, the Department noted that there may be cases where the proposed NRDAM/CME would not subtract the full volume removed even though users had provided full and accurate information about removal actions. This problem arose because the proposed model required users to specify the location and time frame of the removal. The proposed model then subtracted the mass removed at the time and location specified by the user. If the user specified that mass was removed from a location before the time that the model projected the substance would reach that location, then the model was unable to subtract any removed mass. See 59 FR at 63307–08. Another commenter expressed concern about this problem and suggested modifying the NRDAM/CME so that in such a situation the volume of the released substance actually removed would be subtracted from the nearest location where the model predicted that an equivalent volume of the substance could be found at that time.

Response: The final rule and models do account for the effects of successful spill prevention and containment measures. The models calculate damages only for the volume of substance that entered the water, was not removed, and caused injury. Therefore, any material prevented from entering the water as a result of voluntary or mandatory spill prevention or containment measures would not be considered by the models.

With regard to entry of data on removal that occurred more than 24 hours after the initial release, the final rule requires trustees to specify the time of the removal. Therefore, even for injuries that do occur within the first 24 hours, entry of the total volume removed would not result in an underestimate of damages because the models will take into consideration that the removal did not occur entirely within the first 24 hours. The Department assumes that the commenter's concern is that the models will underestimate damages if they subtract the entire volume removed because only the removal during the first 24 hours would reduce the likelihood of acute injury. However, not all direct effects considered by the models will occur within the first 24 hours after the release.

To address the problem identified in the December 1994 preamble, the Department has modified the final rule language addressing the required data input for response actions. Appendix II now states that when developing the data input on response actions, trustees must specify a geographic area that encompasses the entire surface water and shoreline area over which the spilled substance was likely to have spread. This requirement should ensure that the NRDAM/CME will subtract the full volume of spilled material that was removed during response.

Comment: Numerous commenters addressed whether users should be allowed to modify the model databases. One commenter suggested that the models would be too labor-intensive if trustees were expected to edit numerous databases. However, most commenters supported retaining the habitat editor in the final version of the models, noting the prevalence of default values in the habitat database. Some commenters, including one of the independent technical reviewers, stated that the Department should continuously update the model databases to ensure that they reflect current information. Other commenters expressed doubt that the Department could conduct such updates in a timely manner. These commenters thought that model accuracy would be increased if trustees were allowed to edit not only the habitat designations but also other data such as species biomass, baseline fishing mortality rates, commercial fish prices, and restoration costs. These commenters noted that PRPs would be protected from potential misuse of the editing feature by trustees because the input data would be subject to challenge. Some commenters recommended various mechanisms for allowing users

to substitute more precise or up-to-date site-specific information. For example, one commenter suggested creating an administrative process for obtaining variances from the model parameters or data.

Response: The Department acknowledges that allowing users to revise the models' databases would enable fine-tuning to better reflect site-specific conditions. On the other hand, Congress specifically mandated the development of type A procedures to simplify assessments and minimize fieldwork. The more trustees are expected to edit the model databases, the less the type A procedures fulfill this mandate and the closer such procedures approach the data-gathering requirements of type B procedures.

Therefore, the Department has decided to allow trustees to modify, under some circumstances, the models' default values for water temperature, total suspended sediment concentrations, mean settling velocity of suspended solids, air temperature, and habitat type. However, trustees may not make any additional modifications to the databases if they intend to obtain a rebuttable presumption.

The proposed rules included provisions allowing trustees to supply site-specific values for water temperature, total suspended sediment concentrations, mean settling velocity of suspended solids, and air temperature. The Department continues to believe that these parameters are highly variable and can profoundly affect the physical fate of released substances. Therefore, trustees should be allowed to change the default values for these parameters if they have more accurate data.

The Department has also concluded that retention of the habitat editor is appropriate given the importance of habitat designations to the total damage figure and the prevalence of default habitat designations in the models. Also, despite specific solicitations in both notices of proposed rulemaking, relatively few commenters supplied revised habitat information to the Department and some State commenters specifically stated that they had been unable to review the habitat designations.

The Department does not believe that the habitat editor requires excessive effort to operate. First, trustees are not required to edit habitat designations. Second, while the task could be substantial if a single user attempted to edit the large regions covered by the models, it is not so labor intensive for the area actually affected by any single spill. The Department also notes that trustees often perform habitat mapping as part of pre-spill planning, which should further expedite habitat editing. Once edited, the revised habitat designations may be saved within the models and used again for future model applications. However, trustees who save such redesignations would still need to justify those redesignations in any future Assessment Plans.

With regard to other model databases, the Department believes that allowing additional editing would undermine Congress' intent for developing type A procedures. Allowing other edits would require users to make additional conforming changes that would complicate use of the models. For example, changing the fisheries biomass or parameters would require recalculation of egg and larval abundance using the model equations. Changing wildlife abundances would require recalculation of lost wildlife viewing values.

The final rule no longer requires use of the type A models. Therefore, when trustees have, or are provided with, evidence that the model databases are inaccurate for a specific incident, they are free to use type B procedures, provided they can do so at a reasonable cost. When trustees or PRPs already have site-specific information indicating that model data are inaccurate, the cost and effort associated with conducting type B procedures, and in turn the need for a type A procedure, should be reduced.

The Department does not have the resources available to support an administrative process for reviewing petitions for variances from the computer model parameters or databases. However, the Department is statutorily required to review and update the models every two years and, thus, will be incorporating more up-to-date information as it becomes available. Also, the Department notes that the models already update the compensable value and restoration cost databases to account for inflationary effects through application of the implicit price deflator. Finally, the Department notes that while the results of model runs made with customized changes beyond those identified in the rule would not receive the rebuttable presumption for damage claims made under CERCLA, they may nonetheless be reliable and useful in other contexts, such as settlement negotiations or litigation without the benefit of the rebuttable presumption.

Comment: A few commenters addressed the implicit price deflator data input. In response to the Department's solicitation of comment on whether the proposed rules should be modified to require trustees to supply the implicit price deflator for the Gross Domestic Product (GDP) instead of that for the Gross National Product (GNP), one commenter indicated that use of the implicit price deflator for the GNP should be retained. Another commenter stated that the Department should change the base year from 1987 to 1992.

Response: The Department has decided to retain the GNP implicit price deflator as the index with which to adjust past dollar amounts to current dollar equivalents. Because GNP refers to income that is available to U.S. residents, it is appropriate for analyses that are related to the use of that income, such as expenditures for environmental restoration. GDP, on the other hand, refers to income that is derived from production within the U.S., regardless of whether that income is available to U.S. residents or accrues to non-U.S. residents. For more information regarding GNP and GDP, readers are referred to the August 1991 issue of the Survey of Current Business available from the Bureau of Economic Analysis, U.S. Department of Commerce. Also, the Department has updated the index numbers in the models to accommodate the change in base year from 1987 to 1992.

Comment: One of the independent technical reviewers questioned the user inputs to the proposed NRDAM/CME concerning boat closures. The technical reviewer thought that it might be difficult for trustees to estimate the number of boats affected by the closure.

Response: As discussed in Section VII.P of this preamble, the Department has eliminated the calculation of damages for lost boating from the NRDAM/CME.

Comment: A few commenters responded to the Department's solicitation of comment on whether users should be allowed to supply a site-specific discount rate and, if so, how they should determine the correct rate. These commenters stated that the models should use a fixed discount rate but that the fixed rate should be three percent rather than the seven percent rate included in the proposed models.

Response: The Department believes that the appropriate discount rate is the consumer's rate of time preference for natural resource services. This is the rate at which individuals are willing to trade natural resource services today for similar natural resource services in the future. The Department further believes that the real (inflation-adjusted) rate of return on U.S. Treasury bills is a reasonable proxy for this rate of time preference. An analysis of real rates of return on U.S. Treasury bills reveals an

indicated annual discount rate of three percent. Therefore, the Department agrees with the commenters that future lost use values should be discounted at a three percent rate. This discount rate has been incorporated in the models.

The Department believes that use of a fixed discount rate is appropriate in the context of a simplified procedure. Further, the Department believes it is unlikely that the rate will change significantly over the next two years. During the biennial review, the Department will reexamine this issue.

E. Physical Fates

Comment: Several commenters, including some of the independent technical reviewers, thought the physical fates submodel was well developed and well tested. Another commenter stated that the proposed models produced spill trajectories that resembled actual spill events. Conversely, one commenter experienced difficulty with the models' trajectory component noting that, during some trial runs, the spill did not move.

Response: The Department acknowledges and appreciates the supportive comments concerning the physical fates submodel. Physical fates modeling is a technical discipline that has received extensive study. In reply to the trajectory difficulty, the Department notes that the model's spill trajectory is dependent upon the user's entry of wind and current data. Spilled material does not move during simulations if the user does not supply wind and current data.

Comment: Several commenters, including some of the independent technical reviewers, were disappointed by coarse resolution of most habitat grids in the NRDAM/CME. These commenters complained that the limited resolution results in the loss of consideration of critical shoreline habitats.

Response: The Department has improved the resolution in the NRDAM/CME by a factor of four through use of a new compiler and additional memory.

Comment: Several commenters claimed the proposed models used inadequate and nonrepresentative data on the physical and chemical properties of hazardous substances and oil and provided references to additional data sources. The commenters stated that the chemical and physical data on gasoline and diesel oil, particularly the sulfur content in diesel oil and vapor pressures in gasoline, do not accurately represent the products in use today. One of the independent technical reviewers stated that the relative toxicities used in the models for No. 6, No. 2, and crude oils do not agree with experiment results reported in the literature. Several commenters also concluded the Department inappropriately applied the same degradation rates to the nine oils included in the models (except for No. 2 diesel oil). They could not substantiate the model degradation rates, and concluded they were invalid. One of the independent technical reviewers suggested that the Department update the parameters for oils. Some commenters also thought that the models relied on overly simplistic and outdated modeling techniques.

Response: The Department found the physical and chemical parameters included in the models for hazardous substances to be in agreement with commenters' independent literature search, except with regard to the partition coefficient for epichlorohydrin. After reviewing the literature, the Department has decided to substitute the proposed parameter for this substance.

The Department has also increased the number of oils and petroleum products included in the models to a total of 33 and has revised the physical and chemical parameters for oils based on the most recent literature. The degradation rates for oils in the models apply to acutely toxic low molecular weight components. Thus, they are consistent for all oils. The Department reviewed the accuracy of these data and documented all sources in the technical documents when revising the oil database. For further information, see Section 2, Volume III of the NRDAM/CME and NRDAM/GLE technical documents.

The Department does not agree that the modeling techniques used are either outdated or overly simplistic. The Department has never intended the physical fates submodel, or any of the other submodels, to provide a comprehensive treatment of all known physical, chemical, and biological processes occurring in aquatic environments, nor is such treatment necessary for the limited purposes of the type A procedures. Instead, the modeling techniques employed are intended to reasonably approximate the most relevant processes pertaining to the fates and effects of spills that occur in aquatic environments based on readily available user input data.

Comment: One commenter thought that the models overstated wildlife injuries by inappropriately treating chemicals less dense than water as slicks. The commenter also stated that the proposed models' predictions of oil and chemical slicks failed to account for many of the physical processes that affect the size of the surface slicks.

Response: The models do treat all chemicals that are lighter than water as ''slicks.'' However, chemicals that are very soluble, such as ethanol and ammonia, will very quickly mix into the water column. Thus, chemicals that are highly soluble do not remain on the surface long enough to have any direct effect on wildlife at the water surface.

The Department disagrees that the models do not adequately account for the physical processes affecting surface slicks. The major processes affecting the size of surface slicks are spreading, evaporation, and entrainment, all of which are simulated in the models. For further discussion, see Sections 3.3 through 3.5, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Comment: One commenter referred the Department to the Ohio spill database as an additional source of information.

Response: The Department took this database into consideration when determining the types of spills to use for the sensitivity analysis of the NRDAM/GLE.

Comment: One commenter questioned whether the use of varying grid sizes makes the NRDAM/GLE less accurate for spills in areas of large grid size.

Response: The Department designed the grid sizes to represent the Great Lakes habitats at a resolution required by the local spatial variability. Areas with more spatial variability have smaller grids and higher resolution. The areas with large grid sizes are the open lakes where fine detail is not necessary. Thus, the NRDAM/GLE is not less accurate in the areas where grids are largest.

Comment: One commenter questioned why the Department did not incorporate the U.S. Army Lake Survey grid in the NRDAM/GLE.

Response: Development of the NRDAM/GLE grid required the representation of spatially varying habitats and depths as well as the contours of the connecting channels within a regular rectangular grid system. The U.S. Army Lake Survey grid does not consistently meet this requirement. Moreover, the Department has no reason to believe that use of the U.S. Army Lake Survey grid would significantly improve the reliability of the NRDAM/GLE.

Comment: A few commenters, including one of the independent technical reviewers, thought that the Department should use three-dimensional hydrodynamics models. Several commenters thought the

proposed type A models unrealistically assumed that currents were uniform with depth; unjustifiably failed to incorporate three-dimensional currents modeling; and inappropriately failed to account for the effects of wind-driven turbulence mixing processes that increase mixing as high winds make the water surface rough. One commenter stated that a three-dimensional hydrodynamics model was needed to account for the effects of seiches (i.e., occasional and sudden oscillations of the water of lakes, bays, or estuaries caused by wind or changes in barometric pressure).

Response: The NRDAM/CME and NRDAM/GLE use a three-dimensional transport model. The transport model assumes that currents are uniform vertically at each horizontally defined location. If the Department did include a three-dimensional current dynamics model in the NRDAM/CME and NRDAM/GLE, then users would need the assistance of expert hydrodynamic modelers to operate the type A models. For example, three-dimensional current dynamics models are dependent on physical forces at the boundaries of the modeled area, which the user would be required to enter. The Department believes that imposing such complex modeling requirements would conflict with the statutory directive to develop simplified assessment procedures.

The models utilize vertically averaged currents with the assumption that horizontal transport is uniform in speed and direction over depth at a given location in horizontal space (i.e., at a given latitude and longitude). One of the conditions for use of the models is that subsurface currents either are not expected to significantly affect the level and extent of injuries or are reasonably uniform with depth in the area of the spill. The models also include randomized motion in the vertical dimension, but not directed motion in the vertical. Thus, the currents carrying spilled material must be representable in a manner consistent with this assumption of the models.

The vertically averaged current is essentially a current that provides the correct net transport, averaged vertically. If the transport of spilled material cannot be reasonably represented by a vertically averaged current, the condition for use would not be met and the model would not be applicable. However in many cases, three-dimensional representation of current dynamics would not significantly change the damages calculated by the models. For example, for substances of low density, such as toluene, that remain at or near the surface, the present current dynamics model adequately addresses physical fates.

The Department recognizes that seiches occur in the Great Lakes. The Department has not, however, included such processes in the NRDAM/GLE because these processes are not a significant transport process for determining the physical fate of spilled substance in the Great Lakes. Further, any change in the location of a shoreline brought about by a seiche is likely to be small and should not have a significant effect on the injuries calculated by the model.

Comment: One commenter thought that the models should not include liquid asphalt. The commenter noted that liquid asphalt hardens and sinks to the bottom quickly, and can be completely removed by dredging.

Response: The Department agrees that the models are not designed to estimate damages for substances such as liquid asphalt. The models assume that oils and petroleum products float initially, although they may subsequently entrain, adsorb to particles, and sink. Liquid asphalt does not act in this manner and, thus, has not been included in the databases.

Comment: One commenter criticized the NRDAM/CME's treatment of ice, stating that the model inappropriately assumes that ice is always a solid mass.

Response: The model does not assume that ice is always a solid mass. For a discussion of how the models treat ice, see Section 3.11, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Comment: Some commenters thought a smooth function relating requisite thickness to spillet diameter would be more realistic than the step function proposed in the models.

Response: Not enough quantitative information is available to develop a smooth function. Available data are, in fact, in the form of a step function. Further, given the available data and the steepness of the relationship between mortality and dose in the pertinent range, the form of the function would not significantly affect the reliability of the model calculations.

Comment: One of the independent technical reviewers noted that the proposed NRDAM/CME treated wetlands as water cells and questioned why they were not oiled as other shorelines.

Response: Wetlands are either fringing or extensive in the model. ''Fringing'' wetlands are those which form narrow wetlands along shorelines. ''Extensive'' wetlands, on the other hand, are those sufficiently large to encompass a majority of the grid cell. For fringing wetlands, oiling occurs in the same manner as for other shorelines. For extensive wetlands, slicks keep moving across the area, as they do in water, but they can oil wetland biota in the same way as they do in fringing wetlands. Oil may accumulate in sediments in all cells, by partitioning onto suspended sediments and sinking.

F. Species Distribution and Abundance

Comment: Several commenters thought the default habitat designations in the NRDAM/CME generally provided an inadequate representation of coastal and marine habitats. Others recommended specific changes such as including habitat data available in existing or upcoming studies. One commenter provided specific habitat data for New York and New Jersey. Another commenter requested that the Department use information that would be available from the upcoming Texas Natural Resource Inventory.

Response: As stated in the notices of proposed rulemaking, the Department recognized the shortcomings of the default habitat designations and specifically solicited comment on those designations. See 59 FR at 40330 and 63314. The notices also provided technical instructions on transmitting information to the Department about suggested changes to the default habitat designations. The Department has reviewed and revised the habitat designations in the NRDAM/CME based on technical data provided to the Department for the coastal and marine waters of New York and New Jersey. The Department did not receive other specific recommendations for changing the default habitat designations within the format requested.

The Department recognizes that additional habitat data are continually becoming available. However, the Department needed to finalize the data in the models and chose not to delay issuance of the models to incorporate recent or upcoming studies, such as the Texas inventory. During future biennial reviews, the Department will update the habitat designations to reflect newer information. Meanwhile, today's final rule allows trustees to change the default habitat designations. As further studies provide better data, trustees may substitute such data for the default values included in the models using the habitat editor function.

Comment: One commenter stated that shoreline types in the NRDAM/GLE should include a cohesive (clay) component. The commenter also thought that rocky shoreline should be

changed to either rocky bluff or cobble beach.

Response: The Department does not believe that changes to the shoreline types are necessary. The suggested changes would have little impact on the reliability of the damage figure since biological injuries are not calculated based on shoreline designations. The models use shoreline type to approximate the oil retention on shorelines. Further, the distinct holding capacities for these shoreline types are unavailable but could be expected to fall within the holding capacities of the shoreline types already represented within the NRDAM/GLE.

Comment: One commenter provided maps of habitat types for Michigan and suggested that wetlands in the connecting waterways be hand-edited.

Response: Although the Department appreciates the effort provided by the commenter, the grid scale of the information was of a much smaller resolution than that contained in the NRDAM/GLE and could not be directly applied to revisions of the habitat grids. The Department believes the NRDAM/GLE habitat designations are consistent with the maps provided, were such information consolidated at the larger NRDAM/GLE grid scale. As a result, the default habitat designations were not revised in the NRDAM/GLE, and the Department has not hand-edited the habitat maps of the connecting waterways.

Comment: Some commenters, including one of the independent technical reviewers, thought that the models should map the location of critical habitats, such as bird colonies or rare communities and plants.

Response: The Department does not believe it is appropriate, in the context of developing simplified type A procedures, to attempt to map all critical habitats and rare communities throughout the entire geographic region covered by the models. The models were developed based on an assumed average abundance of biota by habitat within a biological province. The Department believes that if a release is expected to affect a critical habitat or rare community that is not adequately represented by the models, then use of type B procedures should be considered.

Comment: A number of commenters, including some of the independent technical reviewers, identified and suggested the Department fill data gaps in fish abundance. Several commenters believed the fish abundance data in the models were based on commercial catch data that were not generated with sound scientific methods and are known to have low accuracy. The commenters stated that the abundance data were inconsistent with catch data provided by Federal and State fisheries agencies and, thus, did not account for variability in fish populations. The commenters questioned the level of care and effort that had gone into estimating total lake fish stock data in the NRDAM/GLE.

Response: The Department notes that fishery statistics are collected to fulfill a variety of different research and management needs. For the purposes of these models, fish biomass abundance was required. However, such data were not uniformly available for all species and all geographic regions covered by the models. As a result, the Department drew upon available data from State and Federal fishery management and research organizations and extrapolated where needed to fill gaps. The criteria used for the selection and use of available data are outlined in Section 6.3, Volume I of the NRDAM/CME technical document. For all stocks where the National Marine Fisheries Service (NMFS) or State agencies have performed a stock assessment, these stock sizes were used. The Department used biomass surveys if stock assessments were not available. The Department used catch data only if these other data sources were unavailable. Thus, the data are consistent with that collected by Federal and State agencies and represent the best available data for each species included. Since the most valuable species in terms of total catch are also the most studied, data are likely to be more accurate for valuable species. Damages resulting from less significant species in the catch are typically insignificant.

Where the Department had to use catch data to estimate biomass, it used both commercial and recreational catch data compiled by NMFS, the Federal agency charged with assessing and regulating fisheries stock. These catch data are the best available source of information. The Department used commercial catch data as the sole source of information only where there was not a significant recreational fishery.

The Department did attempt to account for variability in fish populations. The areal extent of a species and its seasonal movements are based on life-history information for that species. Some species do not in fact move seasonally. Those that do are indicated in the database. In some cases, catch from large areas is represented in smaller areas if the life history warrants. In other cases, the data are not supportive of regional specificity. Also, some stocks do vary annually to a significant degree. For stocks where data were available, averages for the most recent three years were used. The models are designed to represent an average year.

Considerable care and effort went into estimating total lake fish stock data in the NRDAM/GLE, as documented in Section 3, Volume III of the NRDAM/GLE technical document. The Department considered both the data available and the species behavior in terms of habitats utilized by season.

Comment: Some commenters, including a few of the independent technical reviewers, questioned the wildlife abundance data sources used for determining hunting and trapping losses. One commenter thought that some abundance data from one area were used inappropriately to represent abundances in other areas. For example, the commenter noted that the study by Onuf (1987) was used inappropriately to extrapolate bird abundances over the entire west coast; and that the study by Breuggeman (1989) was used inappropriately to extrapolate marine mammal abundances to both the California coast and to Galveston Bay. Another commenter questioned the references to Bellrose (1980), specifically as applied to trumpeter swans in Prince William Sound.

Response: The Department has obtained additional sources of bird abundance data for the west coast and has incorporated those data into the wildlife abundance database of the NRDAM/CME. Also, the Department has revised the abundance data for Galveston Bay to include more recent data on dolphins. The Department has included additional osprey data and updated the eagle and harbor seal data. Further, the Department has deleted data for mysticetes (baleen whales) for provinces 4, 5, and 7. The Department applied data in Bellrose (1980) only where no other data were available. The Department has now replaced most references to Bellrose (1980) with more recent data. In particular, the Department has updated data for Prince William Sound based on a 1990 to 1995 waterbird survey. For further information, see Section 5, Volume IV of the NRDAM/CME technical document.

Comment: One of the independent technical reviewers thought that the definition of subtidal wetland was unclear and recommended that intertidal seagrass be added as a habitat type.

Response: Subtidal wetlands are the subtidal shallow waters in and around extensive wetlands. The Department has amended the NRDAM/CME technical document to include this more precise

definition of subtidal wetlands. See Table 4.4, Volume I, of the NRDAM/CME technical document. The Department has also included intertidal seagrass as an additional habitat type.

Comment: A number of commenters, including one of the independent technical reviewers, thought that use of province-wide abundance figures was inappropriate given the sizes of the provinces. An independent technical reviewer suggested that provinces be subdivided. Another commenter stated that grid-specific wildlife abundances should be used where such data are available.

For west coast wildlife densities, one commenter noted that the NRDAM/CME's provinces are not consistent with spatial strata within which seasonal densities of a species are relatively uniform. The commenter noted that this can result in wildlife densities that are orders of magnitude too high in some cases or too low in others.

Another commenter pointed out that the estimates of wildlife seasonal densities for the west coast were uniformly high and the numbers generated by extrapolation of density may exceed entire world population for many species. The commenter provided recent survey density data for birds and mammals. One of the independent technical reviewers suggested that the Department update data on west coast bird abundances.

Response: The wildlife data for the west coast and Gulf of Alaska were completely revised with more recent and actual survey data provided by one commenter. Wildlife data for other provinces were also updated with more recent information. These corrections have eliminated the extrapolation errors noted. The Department believes the revisions made to the database have sufficiently addressed the possible need for subdividing province-wide abundances. For further information, see Section 5, Volume IV of the NRDAM/CME technical document.

Comment: One commenter thought the way east coast province-wide wildlife abundances were distributed to the available individual habitats within NRDAM/CME grids resulted in an underrepresentation of wildlife abundances within the habitat grids. The commenter noted that individual habitat grids cannot hold enough habitat area to add up to the assumed provincial totals. The commenter suggested adding a multiplication factor to correct for the underrepresentation of habitat area, and resulting proportionate underrepresentation of wildlife abundances.

Response: The habitat grid will, by the fact that it is rectangular, never precisely represent actual shore length, which is curved. However, the Department notes that the NRDAM/CME's grid resolution has been increased by a factor of four and the habitat data for the area in question (provinces 11 through 13) have been revised based on information provided to the Department. These revisions have significantly improved the precision of the shore length estimate. The Department considered the commenter's suggestion of using a multiplication factor to correct shore width. However, such a multiplier would affect the manner in which the physical fates submodel addresses the oiling of shorelines and induce additional error into the calculations performed by the model. Thus, the multiplication factor method was not employed.

Comment: A few commenters, including some of the independent technical reviewers, suggested that monthly rather than seasonal averages be used where such data are available. Commenters noted that use of monthly averages was particularly important for migratory species.

Response: Adequate data do not exist at this time for most species to incorporate monthly averages. As more data become available, the Department will consider incorporating monthly averages in the models during future biennial reviews.

Comment: One commenter questioned the reliability of the abundance data in the proposed NRDAM/CME and offered different data from State wildlife agencies and available literature. The commenter recommended the following changes to the databases: modification of data for pigeon guillemots and kingfishers in Puget Sound and the Straits of Juan de Fuca (province 51) based on 1994 census data by Washington State; deletion of data on puffins along the New Hampshire coast; modification of data on bald eagles and osprey in Maryland based on Maryland's 1994 census; modification of data on pelicans and bald eagles in Florida based on the Florida Natural Resource Department's estimates; and addition of data on Loggerhead and Kemp's Ridley turtles for the Gulf of Mexico and Galveston Bay.

Response: The Department acknowledges that some errors occurred during the compilation of the wildlife abundance database, and additional information and data sources have been identified as a result of the public's review of these models. In fact, the Department specifically sought the assistance of the public on the wildlife abundance data. See 59 FR at 40330 and 63314. The Department has made a number of changes to the databases as a result of the public comments and now believes that the abundance data are more reliable.

In response to the specific data comparisons made by the commenter, the Department has updated the data for province 51 and revised seabird abundances for the northeast. Puffins are no longer included in province 2, but are present in province 3, offshore New Hampshire and Maine. The State of Maryland's 1994 census data are more recent and have been used. The Florida Natural Resource Department's 1994 estimates for pelican and bald eagles are more recent and have been used. The Department has not included the data for Loggerhead and Kemp's Ridley turtles in the offshore Gulf of Mexico since these species are not found in waters greater than 200 meters deep (NOAA 1985). Also, no data documenting abundances of these turtles in Galveston Bay are available. For further information, see Section 5, Volume IV of the NRDAM/CME technical document.

Comment: A commenter thought the wildlife abundance data were generally biased.

Response: The Department believes that the data used in the models represent the best available information collected by independent scientists and government agencies.

Comment: One commenter noted that the assumption of even distribution and random movement of biota may not be true. For example, the commenter noted that fish eggs and larvae are not randomly distributed.

Response: Although some biological populations may not be evenly distributed and may not move randomly across large areas encompassing multiple habitat types, the Department believes that, for purposes of these models, it is reasonable to assume that populations are randomly distributed within a single habitat type.

Comment: Several commenters noted that the proposed wildlife mortality model assumed that a wildlife species redistributes itself uniformly over its habitat each and every day. The commenters thought this assumption was not justifiable and would tend to overstate wildlife mortality.

Response: The Department believes that, for purposes of these models, it is reasonable to assume that a wildlife species redistributes itself uniformly over its habitat each day. Habitat area within the models is of a size on the order of an individual's actual home range. Each individual does tend to

cover its home range each day, either for feeding or territorial purposes. Thus, populations do redistribute themselves daily.

Comment: A commenter noted that the models' assumption that the density of a species in its designated habitat is constant throughout a given province could result in overestimates of actual mortalities for those provinces with multiple grids.

Response: The Department does not believe that this assumption leads to overestimates for provinces with multiple grids. The biological database assigns the densities of species on all appropriate designated habitats regardless of the number of grids contained in the province. However, losses occurring in one grid are not distributed across grid boundaries and, thus would not overestimate losses.

Comment: A commenter thought the NRDAM/GLE technical document should specify the time frame duration for all assumptions about species density.

Response: The model assumes that species densities are uniform by season. The abundance tables clearly specify that density figures are provided on a seasonal basis. See Tables III.3.17 through III.3.27 and III.3.40 through III.3.50, Volume III of the NRDAM/GLE technical document.

Comment: A commenter noted that several of the groups of marine birds and mammals used in the NRDAM/CME could be eliminated, based on documentation of relative lack of vulnerability to oil spills.

Response: The Department acknowledges that some groups of marine birds and mammals are not as sensitive as others to the effects of oil spills. However, the model also evaluates indirect effects (e.g., via the food web) for both oil and chemical spills, which could be significant in certain scenarios.

Comment: One commenter stated that the species contained in the NRDAM/CME should be limited to those for which reliable abundance data exist, or those that are threatened or endangered.

Response: The NRDAM/CME is limited to those species for which reliable abundance estimates were available. Section 6, Volume I of the NRDAM/CME technical document explains the criteria the Department used to establish the estimates. The Department included threatened or endangered species where data were available. However, in light of the limited range of injuries and compensable values considered by the models, if injuries to these species are significant, trustees should consider using type B procedures instead of a type A procedure.

Comment: One commenter addressed species abundance in New York Harbor. The commenter was unable to match the species abundance data for New York Harbor with that of the Erwin and Korschger (1979) reference cited. The commenter also stated that inaccuracies in abundance data resulted from a failure to adequately identify habitat types.

Response: The Department has rechecked the data and made revisions, as appropriate, using the Erwin and Korschger (1979) source and other more recent sources. The results of the retabulated data are contained in Section 5, Volume IV of the NRDAM/CME technical document.

The wildlife abundance data contained in the databases are province-wide abundances and, thus, are independent of the habitat grids and the habitat types assigned to the grid cells. Table 6.4, Volume I of the NRDAM/CME technical document contains the areas of habitat used for all calculations of wildlife abundances. Further, the habitat grids for New York Harbor have been revised based on comments submitted by the States of New York and New Jersey.

Comment: Another commenter stated that Great Lakes wildlife abundances should be based on a more thorough review of the literature and thought that Burt (1976) was an inappropriate source of data. The commenter recommended that the models incorporate site-specific data wherever they are available instead of applying average values for several provinces.

Response: The Department has incorporated site-specific information into each of the lake provinces. The Department used Burt (1976) only if more province-specific data were not available. Public commenters supplied no additional data on wildlife abundances in the Great Lakes. Further, the Department conducted a thorough search for published and unpublished data and located no additional sources of data. When abundances were highly variable among lake province-specific sources of equal validity, the Department averaged available data to reduce the error associated with the estimates. Professional judgment, based on life history information for the species in question, was used to determine how available data would be applied.

Comment: Some commenters disagreed with the statement in the proposed NRDAM/CME technical document that oysters are one of the most important species in southern Maine and New Hampshire.

Response: The commenter appears to have misinterpreted the data contained in the proposed technical document. The Department acknowledges that NMFS does not list commercial oyster fisheries in northern New England; however, there is a small recreational fishery for oysters. Thus, they are not commercially important but do have recreational significance.

Comment: One commenter asserted that shrimp is by far the most significant catch in South Carolina. The commenter also thought that roughtail rays, orange filefish, and scad were overly abundant in the database relative to shrimp.

Response: The Department could not find any Federal or State stock assessments or biomass surveys for shrimp, roughtail rays, orange filefish, or scad in South Carolina. Therefore, the Department based the abundance data for these species on NMFS commercial catch statistics. The NMFS catch data do not support the statement that shrimp are the most significant catch in South Carolina. Shrimp are a significant part of the inshore catch for many of the reporting areas, but are not common in offshore areas. The database includes all species for which NMFS catch data were available. Roughtail rays do form a large percentage of the catch by weight; however, they are not as significant economically as shrimp and, thus, are not as highly valued in the model. Orange filefish and scad are not major portions of the catch and the model accurately reflects that.

Comment: One commenter questioned why the NRDAM/CME did not include lobster in New York Harbor.

Response: The Department could not find any Federal or State stock assessments or biomass surveys of lobster in New York Harbor; therefore, the Department relied on NMFS commercial catch statistics. The NMFS commercial catch statistics do not show any catch for lobster in New York Harbor.

Comment: One commenter sought clarification of several aspects of the discussion of young-of-the-year modeling in the NRDAM/CME technical document. The commenter questioned the meaning of the term ''stable distribution;'' the connection between young-of-the-year and the adult stocks; and the meaning of the term ''monthly mean,'' since no monthly mean abundances are present in the young-of-the-year database.

Response: The term ''stable'' means constant in time. The Department has clarified the NRDAM/CME technical document on this point. See Section

4.3.2, Volume I of the NRDAM/CME technical document. The Department has also expanded the NRDAM/CME technical document to explain the connection between adult stock and young-of-the-year. See Section 6.5, Volume I of the NRDAM/CME technical document. The Department has modified the derivation of young-of-the-year abundance estimates so that such abundances are estimated on a daily basis for the first year of life and averaged for each month. See Section 6.5, Volume I, and Section 3, Volume IV of the NRDAM/CME technical document.

Comment: One commenter questioned how the NRDAM/CME could determine the young-of-the-year surviving the first year of life under equilibrium conditions without knowing the first year natural mortality rate.

Response: The NRDAM/CME calculates the number of one-year-old individuals needed to replace the fished stock, assuming equilibrium populations. Thus, the actual numbers of eggs and larvae are not calculated or needed. The model is calculating the percentage of one-year-old animals lost because of the spill.

Comment: Given that the abundance of a species may be seasonal, one commenter questioned how it was possible that the natural mortality rate and the fishing mortality rate are constant for members of a species group within and across years, as the equation for young-of-the-year requires.

Response: The natural mortality rates and the fishing mortality rates apply to the species population (stock) regardless of location and abundance. Stock abundances apply on a province-wide basis. The abundances in a specific province may vary by season due to migration of stock in and out of different provinces. Therefore, there is no inconsistency between using a constant mortality rate over time and using abundance figures that vary by season. For further discussion, see Section 6.5, Volume I of the NRDAM/CME technical document.

Comment: One commenter thought the young-of-the-year database in the NRDAM/CME was incomplete, noting that there are several species groups in the adult database that are absent in the young-of-the-year database.

Response: Certain species, such as anadromous fish, do not spawn in marine habitats. Thus, there may be adults present in a given province without young-of-the-year present.

Comment: One commenter questioned whether forage fish production was nonexistent outside of structured habitats as assumed in the database for California provinces 40 through 47.

Response: The NRDAM/CME does not assume that forage fish production is nonexistent outside of structured habitats. The food web model includes forage fish, in particular planktivorous forage fish, in open water habitats.

Comment: One commenter questioned the inclusion of goldfish as representative herbivorous forage fish in wetlands in the proposed NRDAM/GLE technical document.

Response: The Department used goldfish in the table to which the commenter refers simply as an example, because it is one of the few truly herbivorous fish. Most forage fish feeding on the bottom are omnivorous.

Comment: One commenter thought the proposed NRDAM/CME technical document was unclear how zooplankton production was determined since no zooplankton production values were presented in the biological database.

Response: The NRDAM/CME calculates zooplankton production based on a percentage of phytoplankton production. The technical document has been clarified. See Section 4.4, Volume I of the NRDAM/CME technical document.

Comment: A commenter noted that the rates of production for planktivorous forage fish were not provided in the NRDAM/CME biological database and questioned how primary production for these fish was calculated.

Response: The NRDAM/CME calculates planktivorous forage fish production based on a percentage of zooplankton production. The technical document has been clarified. See Section 4.4, Volume I of the NRDAM/CME technical document.

Comment: One of the independent technical reviewers questioned why several bait fish species were not included in the models.

Response: The Department did not include such species because it could find no quantitative data for such species.

G. Toxicity and Mortality

Comment: Some of the independent technical reviewers stated that the biological effects submodel was logical and well conceived for assessing the effects of minor spills. However, other commenters asserted that the submodel suffered from an overall lack of supporting data and questioned the methods used for calculation of mortality and toxicity data. One commenter noted that bioassay studies measuring the lethality of oil and petroleum mixtures directly were preferable to the oil toxicity assumptions used in the models and thought such information must surely be available. Another commenter asserted that laboratory bioassays overestimate metals toxicity and that the Department should consult EPA's Water Effects Ratio studies on binding capacity in natural waters. A few commenters thought that the models' treatment of metals speciation was overly simplistic. Another commenter maintained that the proposed toxicity values were too high compared with EPA water quality criteria. Further, the commenter suggested the Department refer to EPA sediment quality criteria for benthic organisms.

Response: The Department believes that the biological effects submodel incorporates the best available mortality and toxicity data. The Department has not been able to locate bioassay data on the toxicity of hydrocarbon products that have been developed under carefully controlled conditions, with constant aromatic concentrations in the water. Also, oil and petroleum products are highly variable in their percent composition and bioassay results. Very few studies have addressed oil toxicity and, therefore, the Department has not used direct bioassay data on oils in the models. See Section 4.2.3, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Laboratory bioassays more closely correspond to dissolved metal concentration toxicity than total metal concentration in the water. The models estimate dissolved metal concentrations, and these are the concentrations assumed to be causing the injuries. Thus, the models address metal speciation to the extent possible, without incorporating a complex speciation model. Further, even such a complex speciation model could not be coupled to appropriate toxicity data at the present time, as is well noted in EPA and other literature.

EPA's water quality criteria would not be an appropriate basis for the models' toxicity calculations. The toxicity data in the models are mean values for acute response. Water quality criteria are designed to be lower than any concentration found to have either an acute or chronic response for even the most sensitive species. Thus, the water quality criteria should be lower than the models' toxicity data. EPA sediment quality criteria are evaluated in Section 4.2.1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Comment: One commenter provided a highly technical review of the proposed toxicity model. The commenter noted that it was the commonly accepted toxicity model currently used in

environmental toxicology. The commenter encouraged the Department to apply chemical- and species-specific values to the alpha and gamma terms in the toxicity algorithm.

Response: The Department appreciates the in-depth review of the toxicity model provided by the commenter; however, insufficient data exist at this time to make the recommended changes. To the extent possible, the Department has used gamma values that are chemical-specific and alpha values that vary by class of chemicals. See Section 4.2.1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Comment: One commenter questioned the accuracy of the toxicity calculations of the proposed NRDAM/GLE, particularly with regard to releases of metals. The commenter provided information on a series of test cases in the Niagara River that the commenter ran using the proposed NRDAM/GLE.

Response: Based on the information provided, the Department believes the test cases run by the commenter may not provide an appropriate basis for evaluating the NRDAM/GLE. The NRDAM/GLE was not designed to address multiple releases from various sources over a number of years. It appears that the commenter may have run the cases with the accumulated mass of contaminants as if that mass had resulted from single event spills of short duration. Also, the model was not designed to evaluate long-term chronic exposures to hazardous substances.

The Department does agree, however, that pure metals are not correctly modeled by the NRDAM/CME and NRDAM/GLE. The toxicity data for these metals are based on bioassay studies that measured the dissolved metal ion concentrations in water. Such toxicity data are not representative of the chemical state of the metal that would occur under natural environmental conditions. As a result, the Department has deleted all pure metals from the chemical databases.

Comment: Some commenters, including one of the independent technical reviewers, expressed concern about the models' failure to account for the additive toxicity of aromatics in oils.

Response: The Department has modified the NRDAM/CME and NRDAM/GLE to include an additive toxicity model that accounts for the combined lethality of similar acting aromatics in oils. The Department used the information identified by one of the commenters to construct this additive toxicity model. See Section 4.2, Volume I of the NRDAM/CME and NRDAM/GLE technical documents for the specific algorithm used and further clarification of the changes made.

Comment: Several commenters noted examples, primarily for metals, where the proposed NRDAM/CME used toxicity thresholds that were lower than naturally occurring water solubilities. The commenters suggested these errors were due to the Department's inappropriate use of freshwater toxicity data in saltwater environments.

Response: Comparison of the salt- and freshwater databases for those chemicals where data existed showed no significant differences in toxicity values given the variability of such data. However, the Department has deleted those chemicals where a difference would be expected (i.e., those making up salinity such as sodium).

The toxic thresholds in the models are only used as switches to end the calculations of the physical fates submodel. When the physical fates submodel determines that concentrations are below this level in all locations, it stops running. The threshold is the concentration that would cause one percent mortality at 30 degrees Celsius after 96 or more hours of exposure for the most sensitive species group. The biological effects submodel calculates the actual mortality for each species group based on duration of exposure and temperature. The proposed technical documents contained an incorrect list of the toxic thresholds actually used by the models. The documents have been corrected. See Table III.2.1, Volume III of the NRDAM/CME and NRDAM/GLE technical documents.

The toxicity data in the database, including the threshold values, apply to dissolved concentrations, not total concentrations. For chemicals that are highly partitioned, such as metals and nonpolar organics, the dissolved concentrations will be a small fraction of the total. The physical fates submodel partitions chemicals in both the water column and the sediments. Only dissolved chemical in the water column or in the sediment pore water causes toxicity in the models. Thus, the toxicity values should not be compared to total concentrations in water, but rather to the dissolved portion only. This accounts for the discrepancies perceived by the commenter when comparing thresholds to total metal background concentrations. The Department has eliminated all chemicals with a solubility below the toxic threshold.

Comment: One of the independent technical reviewers thought that the use of toxicity values based on acute toxicity laboratory tests could underestimate toxic effects, because in acute tests involving up to 96 hours of exposure, animals are typically not fed. Thus effects result from water-borne exposure only. The technical reviewer concluded that the models may be inappropriate for spills of hydrophobic organic compounds where most of the exposure would be through contaminated food.

Response: The Department agrees that the models may not fully capture the effects of a spill that contaminates food sources. The Department has revised the technical documents to clarify this point. See Section 4.2.1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Comment: One of the independent technical reviewers thought that the models should account for the incremental effects of spills on existing levels of contamination.

Response: The Department did consider inclusion of background contamination data in the models. However, data sources were insufficient to include such information for the entire area covered by the models. As a practical matter, background contamination present at the spill site before a spill would lower the threshold for effects by the spill. Thus, not including background contamination in the models is likely to underestimate injuries. However, the Department believes that in cases where background contamination is significant but the cost of using type B procedures is not reasonable, trustees should still have the option of using a type A procedure.

Comment: Commenters suggested that rather than use average exposure concentrations in the plume, the models should evaluate mortalities that accrue from the actual cumulative exposure. One of the independent technical reviewers thought that it was not meaningful to estimate fractions of animals killed and recommended that the models round up fractional mortalities to total animals killed.

Response: Inadequate data currently exist to estimate effects of cumulative exposure. Further, the computational complexities and the potential size of the internal, intermediate data files are effectively beyond the capacity of currently available PCs. Instead, the biological effects submodel performs multiple iterative runs, using different randomized algorithms, and then averages the results of these runs to avoid anomalous model outputs and increase reliability. See Section 4.3.1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

The model is intended to generate valid mortality estimates for portions of

populations rather than discrete deaths of individual animals. Therefore, fractional mortality figures are appropriate.

Comment: One commenter thought the portions of the NRDAM/CME and NRDAM/GLE technical documents pertaining to the use of particles to represent biological populations were unclear. The commenter sought clarification of how the models operate when the particles hit a physical boundary within the models. The commenter also sought clarification of the fate of particles and their exposure history during a change of seasons. The commenter believed there should be exposure memory for particles representing those species whose density is constant across seasons. The commenter further supported the use of multiple iterative runs to minimize the variability error caused by using a finite number of particles to represent a population and by limiting particle movements on a daily basis.

Response: Particles may be transported out of a grid at the downstream edge and ''created'' as previously unexposed particles at the upstream edge. Particles intersecting land are reflected back into the water. At the change in seasons, the models assume that new individuals are present (at pre-spill abundances) and do not carry over the exposure history from the past season. The past season's injuries are tabulated and the exposure history for the new season is set at zero. Therefore, in a case where exposure extends across the seasonal boundary, the time of exposure would be underestimated. The technical documents have been clarified on these points. See Section 4.3, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. The Department agrees that multiple runs of the same scenario will give a better prediction of damages than a single run. Thus the models' internal procedures average multiple runs to arrive at a damage figure.

Comment: Several commenters generally criticized the proposed models' wildlife mortality calculations. Some commenters maintained that the models fail to adequately distinguish among effects of different types of compounds and questioned the application of wildlife mortality probabilities to substances other than crude oil since the only supporting data sources were for crude oil.

Response: The Department considers the wildlife mortality model to be reasonable, scientifically justified and consistent with experience in actual spill events. The probabilities of wildlife mortality used by the models are based on data obtained from observations of real spills. Some modifications have been made to the probability values based on more recent information.

The Department acknowledges that the supporting data sources for wildlife mortality do address crude oil. However, the Department believes that the models adequately account for the differences between crude oil and other petroleum products by calculating wildlife exposure dose based on the oil thickness and slick size. The mortality threshold is based on the exposure dose that is sufficient to cause an observable effect in experimental studies. If the exposure level exceeds the threshold, then wildlife mortality is assumed. For example, petroleum products that spread to sheen quickly, entrain, and/or evaporate have much less effect on wildlife in the models than thick, long-lasting oils, such as crude oil. Thus, the models account for differences among hydrocarbon-based oils and products through the physical fates submodel and the exposure algorithm. This algorithm is further explained in Section 4.3.4, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Comment: Some commenters contended that no data were available to support mortality rates for raptors. Commenters also questioned the extrapolation of sea otter mortality probabilities to polar bears.

Response: The Department considers the eagle mortality rates to be appropriate for raptors in general. Mortality of eagles and other raptors as calculated by the models generally results from contact with slicks in shallow waters and along shorelines, and both eagles and other raptors occupy such areas to similar degrees. The eagle mortality rates used in the models are also supported by evidence from the Exxon Valdez spill. Further, osprey behave very much like eagles. Thus, the Department believes it is reasonable to use the same mortality rate for eagles and osprey.

The Department recognizes that no explicit data are available on the probability of polar bears dying from spills. However, the Department believes that it is appropriate to use the same probability for all furbearers because the mechanisms of exposure and toxicity, namely ingestion of oil through grooming, are similar.

Comment: One commenter thought that the NRDAM/GLE should use a 90 to 95 percent mortality rate for ducks contacting heavy oil, as the proposed NRDAM/CME did.

Response: The Department has modified the NRDAM/GLE to include duck mortality rates that are consistent with those in the NRDAM/CME. Based on recent information, the Department has incorporated a 99 percent mortality rate in both models for those ducks that are exposed to a spill over the threshold dose. See Section 4.3.4, Volume I of the NRDAM/GLE technical document.

Comment: Commenters noted an apparent lack of correspondence between numbers of marine birds the models estimated to be killed, and numbers killed based on actual wildlife recoveries and detailed damage assessments. One commenter believed that the mortality counts for birds impacted by oil spills in Florida appeared low in almost all cases. Commenters suggested an alternative hindcast model for wildlife mortality estimation that was used for the T/V Puerto Rican, Apex Houston, Nestucca, and Exxon Valdez oil spills.

Response: The Department believes that the apparently low mortalities observed by the commenter were due to the low abundance data for certain bird species contained in the proposed biological database for the Florida coast. The Department has revised the wildlife database for the Florida coast based on additional information provided by commenters. Model runs conducted with the revised wildlife abundance database no longer reveal large discrepancies. See Section 5, Volume IV of the NRDAM/CME technical document.

Also, the Department has revised the probability of mortality for aerial divers using hindcasts, as suggested. See Section 4.3.4, Volume I of the NRDAM/CME technical document.

Comment: Several commenters, including one of the independent technical reviewers, generally questioned the oil mortality probabilities and suggested that they be calibrated to data from actual spills, noting that the wildlife mortality probabilities in the proposed models were inconsistent with experience in the Exxon Valdez spill.

Response: The mortality probabilities included in the models are based in part on data from actual spills. Very little data exist on the natural resource effects of small spills of the type addressed by the type A models. Therefore, it is impossible to determine the need for calibration. Nonetheless, the Department did consider data on physical fates and biological effects collected after the Exxon Valdez spill when evaluating the NRDAM/CME's mortality predictions. Bird and marine mammal injuries estimated by the

model provide reasonable agreement with estimated kills caused by the spill.

Also, the commenters may not have correctly interpreted how the model calculates wildlife mortality. The commenters inferred that the wildlife mortality probabilities are multiplied times all animals at risk, and include populations for all of the northern Gulf of Alaska in the total population at risk. Instead, the model only multiplies the probabilities times the animals actually encountering oil and receiving a dose above the threshold value. Thus, the population ''at risk'' in this sense is orders of magnitude lower than the commenter's suggested value.

Comment: Several commenters asserted that the models overestimate wildlife injuries by failing to account for weathering of oil, the effect of temperature, and the fact that light products like gasoline and other floating chemicals would be readily washed from the coats of furbearers.

Response: The physical fates submodel does account for weathering. Evaporation, degradation, and entrainment reduce the area and thickness of slicks, which in turn reduces the frequency with which wildlife will be exposed to oil doses large enough to induce effects. See Section 3.5, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. For example, extremely volatile compounds evaporate so quickly that their surface slicks have essentially no effect on wildlife.

The Department does not think that temperature is likely to have a significant effect on mortality rates. While one effect of oiling is a decrease in thermal conductance of fur and feathers, it is generally thought that the predominant toxic effects result from ingestion of oil during grooming. See Section 4.3.4, Volume I of the NRDAM/CME technical document. Also, animals are adapted to the climate in which they live. Thus, a tropical species suffers from hypothermia at a higher temperature than subpolar species.

Finally, the light products and chemicals contained in crude oil are widely recognized to be the more toxic components. The light products and chemicals are hydrophobic, and so would not be washed from fur by seawater. Given the same dose, in terms of mass of hydrocarbons, these products are expected to have similar effects to crude oils.

Comment: One commenter thought that the proposed 10 percent mortality rate for terrestrial mammals was too high.

Response: The Department agrees that the proposed mortality rate of 10 percent was too high and has reduced it to 0.1 percent. The Department considers this revised rate to be reasonable as compared to the mortality rate for seals. The NRDAM/CME assumes a seal mortality rate of 1.0 percent based on hindcast projections using Exxon Valdez data. Seals continuously inhabit open waters and shorelines, whereas terrestrial wildlife inhabit shorelines only a portion of the time. Therefore, terrestrial mammals would be expected to have lower rates of encountering spills and, thus, lower mortality rates.

Comment: Commenters suggested the models grossly overestimate fish mortality from oil spills by overestimating dissolved hydrocarbon concentrations. These commenters particularly took issue with the Department's assumption that total aromatic hydrocarbon content of a spill remains the same by percentage before and after the spill. These commenters cited studies showing that weathering results in little of the hydrocarbon content entering the water column.

Response: The Department does not think that the models overestimate fish mortality resulting from oil spills. Aromatics in oils are known to cause the most acute toxicity. See Section 4.2.3, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. The physical fates submodel separately tracks dissolved aromatics of two molecular weight size classes: (1) monoaromatic benzenes and (2) diaromatic compounds. These aromatics do volatilize rapidly in the models. Thus, relatively little of these aromatics end up in the water column and cause toxicity. See Section 3.5, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Also, the models do not assume that the percent composition of total aromatic hydrocarbons remains constant in the spilled substance. The Department has clarified the text of the technical documents on this point. See Section 4.2.3, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Comment: Commenters asserted that it is too simplistic to use a mean LC50 (the concentration at which 50 percent of test organisms die within a defined time period) for the whole taxonomic class of fish or for all plants, algae, or angiosperms. Further, commenters maintained that the Department failed to provide information sufficient to evaluate the statistical relationships involved.

Response: The NRDAM/CME and NRDAM/GLE technical documents contain detailed descriptions of the process the Department used to derive average toxicity parameters. Researchers have found that the LC50 for one species is a reasonable predictor of toxicity for other species within the same family and that, in many cases, cross-family correlations are also significant. See Sections 4 and 7, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. Also, the administrative record for this rulemaking includes additional material on the derivation of average toxicity parameters.

Available information is insufficient to disaggregate further the toxicity values used in the models. Disaggregation of the few data available would increase the error in the model result because of the uncertainties associated with individual data points. For plants, algae, or angiosperms, available data in EPA's AQUIRE database support the use of a mean LC50 value. There are insufficient data to quantify differing values by plant group. The Department does not believe that use of more specific plant values would significantly improve the reliability of the model damage figure because the model damage figures are not sensitive to the value assumed, within the range of observed data for a given chemical.

Comment: A few commenters generally criticized the Department's approach to assessing fish mortality from toxicity data using statistically averaged values, asserting that information necessary to review the adequacy of such an approach was not included in the proposed technical documents. One of the commenters noted apparent inconsistencies between the values used in the models and the values in the AQUIRE database. Another commenter asserted that unless the Department could demonstrate that the oil toxicity algorithms in the revised NRDAM/CME were more accurate than those in the original NRDAM/CME issued in 1987, the Department should return to the original algorithms.

Response: The Department believes it has provided sufficient information and opportunity to review the approaches used to calculate fish mortality and to derive the toxicity data contained in the databases. Section 4, Volume I of the NRDAM/CME and NRDAM/GLE technical documents explains how the models calculate fish mortality. Section 2, Volume III of the NRDAM/CME and NRDAM/GLE technical documents provides toxicity values for each substance contained in the chemical databases and the source of information used to derive those values. Due to the volume of material, the Department has

not included in the technical documents all of the raw data and statistical analyses that were compiled for each toxicity value. However, the sources of the raw data, such as AQUIRE, are available to the public. Also the methods used to derive the statistically averaged toxicity values are consistent with those commonly used in aquatic toxicology. The toxicity values used in the model are based on all literature in the AQUIRE database as of November 1991. The AQUIRE database has not been updated since that time. The commenter appears to have reviewed only a limited range of data in the AQUIRE database.

Finally, the Department believes that the revised NRDAM/CME is an improvement over the original NRDAM/CME and more accurately calculates oil toxicity. The technical documents explain all oil toxicity values used in the models. See Section 4.2.3, Volume I, and Section 2, Volume III of the NRDAM/CME and NRDAM/GLE technical documents. The toxicity parameters are for dissolved aromatic hydrocarbons of less than 200 molecular weight, which is what the models calculate as the toxic material. Literature estimates are for whole oil, total petroleum hydrocarbons, or water soluble fractions, and thus are inapplicable to and higher than those for the dissolved low molecular weight fraction.

Comment: One commenter noted that the susceptibility of developing fish eggs and larvae to toxic substances changes over time and sought clarification whether the models account for seasonal variations in toxicity.

Response: The Department recognizes that the susceptibility of fish eggs and larvae to toxic substances may change with age. However, the Department does not think that sufficient research data have been compiled to quantify a change in toxicity by age of eggs and larvae for all the species groups and chemical substances contained in the chemical database. Therefore, the models have not been revised to account for this potential effect.

Comment: Some commenters, including one of the independent technical reviewers, criticized the models for failing to account for the effects of avoidance of a spill by fish.

Response: The Department acknowledges that some portion of fish populations may avoid spills of some types of chemicals. However, the Department was unable to identify adequate quantitative data on this phenomenon to include it in the models at this time.

Comment: One of the independent technical reviewers thought the NRDAM/CME should account for the fact that fish and macroinvertebrates may be exposed to intertidal contamination when the tide is in.

Response: The model does account for tidal inundation in its calculation of the water column plume. Contamination in the water may move into intertidal areas when water is present over them. When the tide goes out, the plume is transported out as well.

Comment: One of the independent technical reviewers thought the fish swimming speeds used in the proposed models were extremely low.

Response: The Department believes that the swimming speeds incorporated in the models are appropriate for the time step involved. The models use these speeds as distance moved in a single direction in an individual time step. Direction is randomized, so that after many time steps, motion is random. The rates are low because of the time step used. Otherwise, there is too much migration of fish in the models. For further discussion, see Section 4.3.1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Comment: One commenter questioned the accuracy of the statement in the proposed NRDAM/GLE technical document that short duration disturbances of biota are not evaluated in light of the fact that the model specifically focuses on acute injury.

Response: The statement in the technical document to which the commenter refers simply addresses the model assumption that seasonal biological abundances do not change for reasons other than the spill. See Section 4.1.2, Volume I of the NRDAM/GLE technical document.

Comment: One commenter stated that the Department had made an unsubstantiated assumption that, for wildlife, death of parent animals will necessarily lead to death of immature animals. However, other commenters stated that, according to the equations in the proposed technical documents, the models fail to account for lost future harvest of young that are killed as a result of the death of their parents. A few commenters thought the models assumed that the spill occurred at the time of fledging and that the time of fledging is constant for all species. Some commenters also thought that the hatching and fledging times presented in the database were excessive.

Response: The models assume that if adult birds or mammals are killed while their young are dependent upon them, then the young will be lost as well. See Section 4.5.2, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. The models do not assume that the spill occurs at the time of fledging or that the time of fledging is constant for all species. The wildlife life history parameters used by the models include the age (in months) at which young are fledged or weaned, not the month of the year in which they are fledged or weaned. The fledging and weaning ages in the database are the ages at which young become independent. See Section 4, Volume IV of the NRDAM/CME technical document, and Section 3.6, Volume III of the NRDAM/GLE technical document.

A substantial volume of literature addresses the parental care of young birds and mammals and the inability of those young to survive without parents. See Section 4, Volume IV of the NRDAM/CME technical document, and Section 3.8.4, Volume III of the NRDAM/GLE technical document. The Department believes it has provided ample documentation to substantiate that the death of parent animals does result in the death of young that are dependent on them.

H. Loss of Production

Comment: One of the independent technical reviewers stated that direct oiling can kill seagrass and thereby reduce habitat function. The technical reviewer suggested that the models account for the effect of oiling on submerged macrophytes such as seagrass and kelp.

Response: The NRDAM/CME calculates the sublethal loss of production and the acute lethal effects to subtidal seagrasses and other submerged macrophytes exposed to concentrations of dissolved oil in the water. However, evidence of oil coating and smothering macrophytes that are under water or in floating beds, does not appear to be available. The Department does not consider smothering of subtidal seagrass to be likely given that oil slicks float on the water surface and wave action would flush the oil from floating beds. Therefore, the Department has not included the coating and smothering of subtidal macrophytes as an injury calculated by the model.

Intertidal seagrass habitats have been added to the NRDAM/CME as a new habitat type. The Department recognizes that intertidal seagrass can be coated by oil and smothered. Research studies have shown saltmarsh plant mortalities to occur from exposure to oil thicknesses of 14 millimeters. As a result, oiling of intertidal seagrass beds over a threshold thickness of 14

millimeters is considered lethal to seagrass, which is consistent with the model's treatment of oiling effects on other intertidal habitat types. See Section 4.3.3.2, Volume I of the NRDAM/CME technical document.

Comment: One commenter thought that the proposed method of estimating post-spill recovery of macrophyte primary production was adequate for the purposes of the NRDAM/CME. However, the commenter suggested that the Department consider adjusting the sigmoidal function used to estimate the rate of biomass production so that the maximum rate of production occurs at one-half of the pre-spill biomass level.

Response: The Department acknowledges the limitations of available data to specifically define the shape of the recovery curve for macrophyte production. However, the model results are not sensitive to the specific shape of the recovery curve; therefore, further effort to refine the curve is not likely to result in significantly improved reliability.

Comment: A few commenters, including one of the independent technical reviewers, thought the models should consider the effects of compensatory growth (i.e., enhanced production due to the removal of inter- and intra-species density-dependent growth-limiting factors). These commenters stated that the models would overestimate production losses unless compensatory growth were considered. The commenter also suggested that, for lower trophic levels, the models should use the upper 75th percentile of the available LC50 or EC50 (i.e., the concentration at which growth is reduced by 50 percent) values rather than the mean of the LC50 and EC50 values.

Response: The Department acknowledges that compensatory growth is not addressed within the models. However, the Department does not believe that production losses are overestimated as a result. For the small spills for which the models were designed, density-dependent growth and survival effects are likely to be insignificant. Further, density-dependent effects of large changes in fish population sizes have been difficult to quantify because of large natural variations and other ecological forces. The known disturbances that enhance productivity in ecosystems are natural events to which the ecosystem adapts rather than hazardous substance spills.

The selection of only the upper 75th percentile of the LC50 and EC50 data would arbitrarily exclude toxicity data that may be representative of all sensitive and nonsensitive organisms in the field. Instead, the use of only the higher LC50 data would likely be representative of only the direct mortality to nonsensitive organisms.

Comment: One of the independent technical reviewers recommended that the Department adopt a habitat-based approach to calculating the loss of production. Under this approach, each grid would have an associated biomass per unit area, and if that grid were oiled, an assumed percent of yield would be lost.

Response: The models do use a habitat-based approach in the calculation of lost production. Each contiguous grid cell of the same habitat type within the grid has an associated biomass per unit area. The models calculate a percentage loss of biomass for the defined habitat type based on concentration and time of exposure. Biomass losses are summed and multiplied times the fishing mortality rate within the habitat type to calculate the lost yield. See Sections 4.3 and 6.2, Volume I of the NRDAM/CME technical document, and Sections 4.3 and 8.2.2, Volume I of the NRDAM/GLE technical document.

Comment: Several commenters stated that the models rely on assumptions about ecological and exposure processes that are inconsistent with actual environmental conditions and could result in inflated damage estimates. Some commenters thought that the models inappropriately assume that ecological communities are evenly distributed both temporally and spatially. Several commenters disagreed with the model assumption that all demersal young-of-the-year are attached to the bottom and thought that this assumption would overestimate injury. Some commenters stated that the assumption that the depth of bioturbation is always 10 centimeters would also lead to overestimates of injuries. One of the independent technical reviewers thought that the models should account for vertical migration.

Response: Ecosystems have the resilience to adapt to a number of unpredictable disturbances. Further, most small spills do not appear to significantly alter ecosystem structure or the temporal distribution of populations. The purpose of the models is to evaluate effects of spills small enough that they do not significantly alter ecosystem structure and dynamics. The Department believes it is reasonable to assume stable temporal distributions and that such an assumption is not inconsistent with actual environmental conditions during small spills. Therefore, the models continue to assume temporal distribution is constant by season for fish and shellfish and by month for young-of-the-year.

The models do not assume even spatial distributions of ecological communities. The abundance data contained in the biological database were developed assuming evenly distributed species abundances within a particular habitat and biological province occupied by the species, and within a given season or month. The species abundance data are assigned to the models' biological computational particles. Abundances of young-of-the year change monthly between habitats, provinces, and portions of the water column (pelagic, demersal or benthic), as appropriate to the species' life history. Therefore, the particles do not represent abundances that are evenly distributed spatially.

The Department acknowledges that a small portion of demersal young-of-the-year are potentially carried by currents. However, for the purposes of these models, the Department believes it is reasonable to assume that all demersal young-of-the-year are attached to the bottom. See Section 4.3.2, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. If any demersal young-of-the-year did in fact drift with the current, they would likely be more exposed to the released substance, which would also be moving with the current. Therefore, if the assumption that all demersal young-of-the-year are attached to the bottom is not reasonable in a particular case, the models are likely to underestimate rather than overestimate damages.

Also, simulation of vertical migration would require substantial additional modeling. The Department does not believe that adding such complexity would substantially improve the reliability of the final damage figure.

In some contaminated, and thus ecologically stressed, habitats, the depth of bioturbation may be less than 10 centimeters. However, for most regions covered by the models, the Department believes it is reasonable to assume a depth of 10 centimeters, since most estuarine and marine sediments are relatively uncontaminated. Contrary to the commenters' assertion that this assumption may cause an overestimate in pore water concentrations in areas where bioturbation is small, the dilution of contaminants over the assumed depth of 10 centimeters could underestimate pore water concentrations and injuries.

Comment: Some of the commenters, including one of the independent technical reviewers, thought the food web model was crude. For example, the independent technical reviewer

questioned the assumption that all biota are equivalent as food sources. Another commenter stated that the model provided only a rough approximation of upper trophic-level production losses attributable to spill-related reductions in primary productivity.

Response: The Department acknowledges that the food web model is generalized for all aquatic habitats, but believes it is reasonable for the purposes of the NRDAM/GLE and NRDAM/CME. The food web model provides a reliable approximation of spill-related upper trophic-level production losses due to lost primary productivity. The Department believes that development of a more sophisticated, geographic-specific food web model would not significantly improve the reliability of the final damage figure.

Comment: One of the independent technical reviewers thought that the consumption rate parameters contained in the food web model should vary seasonally.

Response: Seasonal changes in lower trophic-level production rates and in temperature already partially provide a seasonal effect in the models. The Department does not believe that further refinement would significantly improve the reliability of the final damage figure.

I. Catch and Bag Losses

Comment: Several commenters addressed the methods used to translate fish mortality and wildlife mortality into reductions in catch and bag. Commenters noted that a correct translation was needed because mortality is not a sufficient basis for damages if it does not result in a quantifiable reduction in the services provided by the resources. Some commenters thought the proposed single-species approach to modeling fishery complexes and ecosystems was simplistic but adequate for the purposes of the type A models. Other commenters argued that predictions of catch and bag losses were wholly unreliable and resulted in inflated estimates of service losses.

Some commenters stated that the models sometimes predict a catch loss that exceeds the prediction of total mortality. These commenters asserted that inaccurately high fishing rates in the proposed NRDAM/GLE lead to the estimation that 50 to 70 percent of some fish species would be caught in a single year. Commenters complained that lost wildlife bag predictions failed to account for regional differences. Some commenters thought that failure to consider hunting regulations would inappropriately result in the calculation of losses even when hunting is prohibited. Commenters also criticized the use of uniform annual hunting mortality rates that do not assume any particular underlying daily patterns that would produce such rates.

Response: The type A models calculate lost catch based on a standard fisheries model. See Section 4.5.1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. Fishing mortality is an instantaneous rate, the coefficient of an exponential, first-order ''decay'' curve. The nature of this equation is that an instantaneous fishing mortality rate of one corresponds to an annual harvest of 63 percent of the standing stock abundance present at the beginning of the year. The models account for growth of animals over the year they are harvested. Thus, the harvest may exceed the standing stock biomass present at any given time if the growth rate of the species is high. An annual harvest rate of 63 percent of standing stock abundance at the beginning of the year is not equivalent to a 63 percent catch of all the fish species stock cumulatively available throughout the year. The fishing mortality rates assumed in the database are based on best available fisheries statistics estimated by NMFS and State fisheries management agencies.

The models apply hunting mortality rates to a population, i.e., a stock or group of interbreeding animals. See Section 4.5.3, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. The hunting mortality rate in the models is simply the probability of being hunted successfully at some time and place over one year of life. Therefore, the models need not consider exactly where or when the animals are actually taken during a given year or whether hunting seasons are open or closed at the spill site. The Department derived the hunting mortality rates from tagging studies. A considerable amount of literature shows that birds and mammals have similar hunting mortality rates per animal (or per 100 animals) throughout North American populations due to migratory behavior and biological limits on productivity. See Section 4, Volume IV of the NRDAM/CME technical document. Therefore, the models use per-animal rates that are justifiably constant in time and space.

Comment: Some commenters thought it was inconsistent for the models to assume that a fish species may be present or absent in certain seasons while also assuming that fishing and natural mortality rates are constant and act continuously on the population throughout the year.

Response: The models include fishing and natural mortality rates that apply to stocks, which may move seasonally. The rates apply to the entire population of fish within the provinces occupied by a given stock no matter whether they are present or absent from particular locations at different times of the year.

Comment: One commenter thought that the fish biomass figures used in the calculation of predation rates should reflect the entire stock, not just the exploitable stock biomass.

Response: The models do, in fact, use the total stock biomass in these calculations.

Comment: A few commenters noted that the yield model assumes that the biomass of each fish species is uniformly distributed over the entire province in which it is found, while the figures in the database reflect the actual distribution of the stock. The commenters further noted that if a species did not extend throughout the entire province, then this assumption would lead to an overestimate of loss of yield.

Response: The Department chose province boundaries to minimize this source of error in the models. Additionally, there are three sub-areas (habitats) within each province with unique fishery biomasses. See Section 6.3, Volume I of the NRDAM/CME technical document.

Comment: A few commenters raised questions about the interplay between the user-supplied information on closures and the models' spill-related mortality predictions. The commenters noted that the models do not adjust fishing mortality rates when there is a closure. Commenters suggested that users be allowed to make such an adjustment to avoid underestimating recovery periods.

Response: The Department believes the assumption of a constant fishing mortality rate is reasonable for purposes of calculating recovery periods after minor spills. Only very large changes in fishing would be measurable in the population over the long term. For minor releases, it is unlikely that extended closures will occur.

Comment: One commenter questioned the yield formulas in the proposed NRDAM/CME technical document and offered alternative formulas. The commenter noted that the proposed equations appeared to be missing the final year's contribution to yield.

Response: The Department has reviewed the alternative formulas offered by the commenter and has concluded that they are more precise. The Department has modified the final versions of the models accordingly. The

models continue to calculate losses through the last year after the spill effects where killed individuals would have lived and died naturally. The Department has clarified the language of the technical documents on this point. See Section 4.5.1, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

J. Habitat Restoration

Comment: Several commenters thought that the proposed methodology for calculating habitat restoration costs was so flawed that the Department should eliminate such damages from the models. These commenters identified four major flaws in the methodology that, taken together, render it invalid: (1) The models' acute toxic threshold is unrealistically low, leading the models to overestimate the size of the areas needing restoration; (2) the models often overestimate the time necessary for natural recovery; (3) the models select specific physical restoration measures without regard to their feasibility; and (4) the Department overestimated the fixed costs for small spills.

Response: As discussed in more detail below, the Department believes that the methodology for calculating habitat restoration costs is reliable. Therefore, the Department has retained the methodology in the final versions of the NRDAM/CME and the NRDAM/GLE subject to the revisions described in Section VI.B of this preamble.

Comment: Several commenters said the Department had failed to consider adequately the feasibility or the cost-effectiveness of the specific restoration actions included in the models. For example, commenters argued that sediment capping in deep water is not a proven technique and that the cost of such capping is highly site-specific. Therefore, these commenters thought that deep-water capping should be eliminated from the models. Commenters also thought that the Department had failed to substantiate its claim that the types of habitat restoration actions considered by the models are in fact the most cost-effective. Some commenters, including one of the independent technical reviewers, thought the Department had unduly limited the range of restoration actions the models consider, and should have included off-site restoration, partial rehabilitation, and other mitigating actions.

Response: The Department has concluded, based on an extensive literature review, that all restoration options considered by the models are technically feasible. For additional discussion see Sections 5 and 12, Volume I of the NRDAM/CME technical document, and Sections 5 and 9, Volume I of the NRDAM/GLE technical document.

Sediment capping in deep water is technically possible. The models calculate damages based on the cost of capping only if toxicity in sediments of an entire grid cell is so persistent that recovery following capping would be faster than natural recovery. The Department believes that in such cases, sediment capping is appropriate. The Department has attempted to account for site-specific factors relating to offshore capping by including cost figures that take into consideration the different distances that equipment and sediments must be transported.

The Department also carefully evaluated a wide range of possible habitat restoration actions, including replacement of the affected resources with other resources, acquisition of equivalent resources, natural recovery, and other technologies. Based on this evaluation, the Department believes that it has identified the most cost-effective types of habitat restoration that can reasonably be included in models of this type.

With regard to off-site restoration, the Department acknowledges that after recovering damages through the use of a type A procedure, trustees may well decide that the recoveries are best spent on off-site actions, such as the purchase and enhancement of nearby property to provide equivalent habitat to that lost. However, the availability of nearby land of the same habitat type as that injured, the cost of any available land, and the need for and feasibility of any actions to make the land equivalent in quality to that lost are all highly site-specific factors. The Department does not believe that adequate data are currently available to include off-site restoration among the list of restoration actions evaluated by the models. With regard to partial rehabilitation, the Department has improved the resolution of the NRDAM/CME by a factor of four, which allows the restoration submodel to consider restoration of much smaller geographic areas.

Comment: One commenter noted that techniques for reestablishing freshwater macrophyte beds of wild celery have been well demonstrated and should be separately included in the NRDAM/GLE.

Response: The NRDAM/GLE does evaluate actions to restore wild celery beds but does so through consideration of a single type of restoration action for all aquatic bed habitats. The Department does not think the differences between the techniques for restoring various types of aquatic beds necessitate the development of distinct per-unit restoration costs for each type.

Comment: Several commenters said that the models grossly overestimate the size of the areas to be restored because they use unrealistically low toxicity thresholds. To illustrate this point, commenters noted that the models assign a toxicity threshold to cupric chloride that is less than 1/40th its normal concentration in saltwater. These commenters argued that a spill of cupric chloride would have to spread over a huge area before it would dissipate below the toxic threshold, which would then necessitate restoration over a similarly huge area.

Response: The toxicity thresholds included in the models merely serve as switches to end a model run. When the physical fates submodel determines that concentrations of the released substance are below the threshold level for that substance in all locations, it stops running. The threshold is the concentration that would cause one percent mortality at 30 degrees Celsius after 96 or more hours of exposure in the most sensitive species group. When calculating habitat restoration costs, the restoration submodel will examine all areas over which the spill has spread but will only calculate the cost of active restoration if it would result in lower compensable value than natural recovery. Compensable value is generated only when there is mortality or loss of production. The biological effects submodel calculates mortality and loss of production not on the basis of the toxicity thresholds but rather on the basis of mean LC50 and EC50 values. Therefore, the toxicity thresholds do not determine the extent of habitat restoration. Further, the models will only include the cost of active restoration in the final damage figure if such active restoration passes the cost-benefit test discussed below.

Comment: There were several comments concerning the models' predictions of recovery times. One of the independent technical reviewers suggested that the recovery times be modified. Another commenter noted that recovery times are very uncertain and that relatively small adjustments can have significant effects on estimates of total losses. Several commenters said the proposed restoration submodel generally overestimated the time required for natural recovery. Some commenters stated that the NRDAM/CME appeared to incorporate recovery times for seagrass beds and coral reefs that exceeded the literature values listed in the proposed NRDAM/CME technical document. Other commenters

questioned the lack of data for saltmarsh wetlands and mudflats and criticized the Department's use of identical recovery times for mudflats and sandy beaches.

Response: The Department believes that the scientific literature supports the recovery times for seagrass beds, coral reefs, saltmarsh wetlands, and mudflats contained in the NRDAM/CME. Further, the recovery periods included in the NRDAM/CME for seagrass beds and coral reef are consistent with the literature cited in the technical document. See Section 4.3.3.2, Volume I of the NRDAM/CME technical document.

Comment: One commenter questioned the Department's assumption that reproduction of fish and wildlife species resumes normal levels as soon as toxicity is no longer present.

Response: The Department recognizes that substances may cause sublethal or chronic injuries that affect reproduction after concentrations have dropped below acutely toxic levels. However, the models do not attempt to address the effects of such sublethal or chronic injuries. If trustees believe such injuries are likely to be significant, they should consider conducting type B studies instead of, or in addition to, a type A procedure.

Comment: There were a few comments about the inclusion of fixed restoration costs in the models. Some commenters, including some of the independent technical reviewers, thought that the fixed cost figure was too low; other commenters thought it was too high. One of the independent technical reviewers thought different fixed costs should be applied depending on the type of habitat affected.

Response: Trustees who use a type A procedure will have to develop a restoration plan once they obtain compensation for the natural resource injuries. See 43 CFR 11.93(a). The proposed models included a fixed cost of $18,300 to cover restoration planning costs. The Department recognizes that the extent of the restoration planning costs for each particular case may vary dramatically. Such costs depend on whether the trustees intend to implement the restoration actions chosen by the model or develop other restoration actions. The costs also vary depending on the complexity of the selected restoration actions. In light of the highly site-specific nature of restoration planning costs, the Department has chosen to eliminate them from the models.

Nevertheless, § 11.15(a)(3) of the regulations, which is not changed by this rulemaking, allows trustees to recover the reasonable and necessary costs of an assessment. These costs include ''[a]dministrative costs and expenses necessary for, and incidental to * * * restoration, rehabilitation, replacement, and/or acquisition of equivalent resources planning.'' 43 CFR 11.15(a)(3)(ii). Therefore, trustees who use a type A procedure and wish to recover restoration planning costs may develop their own estimates of such costs and include them as assessment costs in the demand presented to the PRPs under revised § 11.91(a).

Comment: One commenter was generally concerned about the quality of the Department's information-gathering efforts on habitat restoration techniques, noting the lack of current references in the technical documents. The independent technical reviewers recommended that the Department update the per-unit restoration cost data included in the models.

Response: NOAA conducted an extensive literature search on natural resource restoration while developing guidance documents in connection with its natural resource damage assessment rulemaking under OPA. The Department has updated the per-unit restoration costs included in the models based on information compiled through this NOAA effort as well as other recent information. Also, as discussed below, the Department has revised the habitat restoration actions evaluated for structured habitats (i.e., wetlands, seagrass, macroalgal, coral, mollusk, and reef).

Comment: A few commenters thought that the costs of upland disposal of sediments in the proposed NRDAM/GLE inappropriately failed to factor in long-term operation and maintenance.

Response: The model includes the per-unit costs that a commercial facility would charge to accept sediment for disposal. These costs are one-time costs charged by the commercial facility and, thus, should include the facility's anticipated long-term operation and maintenance costs. Trustees would not incur any additional long-term costs.

Comment: Some of the independent technical reviewers thought that the NRDAM/CME incorrectly assumed that seagrass replanting and oyster reef seeding would entail destruction and subsequent reestablishment of the entire habitat. These technical reviewers also thought this assumption would produce a bias against invoking habitat restoration because habitat restoration of this nature will generally result in compensable value in excess of that which would occur under natural recovery.

Response: The Department has reevaluated the habitat restoration actions included for seagrass beds, invertebrate reefs, and other structured habitats and decided that in certain circumstances it would be technically feasible and more cost-effective to perform restoration actions that are less invasive than replacement of substrate. Therefore, the Department has revised the NRDAM/CME to include two potential restoration actions for such habitats. Where the sediments are sufficiently contaminated, the restoration submodel evaluates substrate replacement or capping followed by replanting or reseeding of the vegetation or invertebrate structure. Where sediments are not contaminated but mortality of the structural habitat has occurred, the submodel evaluates replanting or reseeding alone. The submodel evaluates each affected grid cell. See Section 12.2, Volume I of the NRDAM/CME technical document.

Comment: One commenter thought that the Department had inappropriately based freshwater wetland restoration alternatives for hazardous substance releases on oil-related experiences.

Response: The Department did not base freshwater wetland restoration for hazardous substance releases on data relating to oil spills. In fact, data on freshwater wetland restoration arises almost entirely out of non-oil experiences. See Section 5.7, Volume I of the NRDAM/GLE technical document.

Comment: One commenter noted that removal and replacement of soils and vegetation is subject to failure and, even if ''successful,'' results in different habitat.

Response: The Department agrees that removal of substrate and replanting can result in failures and the emergence of different habitats. The Department developed recovery rates and per-unit restoration costs that account for such risks.

Comment: One commenter objected to the inclusion of washing and steam cleaning as restoration alternatives, noting that such actions caused injury during the Exxon Valdez response.

Response: The Department has retained washing and steam cleaning as a potential shoreline habitat restoration alternative in the NRDAM/CME. The Department agrees that washing and steam cleaning cause injury but believes that inclusion of such alternatives in the model is appropriate subject to the decision criteria used by the models. When the model evaluates these alternatives, it assumes that the actions will destroy the habitat. The model will only select these alternatives if,

notwithstanding their deleterious effects, they nonetheless result in lower compensable value than natural recovery. In coastal and marine environments, the tidal flux creates a distinct shoreline habitat that is not present in the Great Lakes. Therefore, the NRDAM/GLE does not include shoreline washing and steaming.

Comment: One commenter disagreed with the statement in the proposed NRDAM/GLE technical document that fish production is not negatively affected by dredging.

Response: The Department acknowledges, and the models recognize, that dredging of a habitat reduces egg and larval fish production in the dredged habitat to zero initially, and then production follows vegetative and benthic recovery. The models simply assume that adult fish production is unaffected.

K. Assimilative Capacity Restoration

Comment: Several commenters argued that assimilative capacity restoration costs are not legally recoverable. A number of commenters thought that inclusion of damages for lost assimilative capacity was overly speculative. These commenters stated that the presence of a spilled substance only causes a meaningful reduction in assimilative capacity if the resource will be required to assimilate more of a similar substance in the same area before the spilled substance degrades. The commenters argued that the type A models merely assume that assimilative capacity has been reduced. Some of these commenters thought that the assumption of an actual reduction in assimilative capacity is particularly troubling in the case of minor spills. The commenters noted that if type B procedures are used, trustees would be required to demonstrate an actual reduction in assimilative capacity. One commenter noted that *Ohio* v. *Interior* had stated that a procedure that permitted unduly speculative assessments would not constitute a best available procedure under CERCLA. 889 F.2d at 462.

Response: The issue of whether lost assimilative capacity is a legally permissible category of damages was decided and resolved by the Department in 1986 and is beyond the scope of this rulemaking. The only issues that the Department is considering in this rulemaking are: whether the type A models adequately demonstrate a loss of assimilative capacity; and, if so, whether the models accurately compute the costs for restoring that loss. The Department believes that the assimilative capacity restoration costs computed by the final NRDAM/CME and the NRDAM/GLE are based on demonstrable, rather than speculative, losses.

Assimilative capacity is an ecosystem's ability to repair itself by digesting, degrading, transforming, absorbing, or otherwise eliminating the pollutants placed in it. The Department recognizes that there are contrasting views of the nature of assimilative capacity. The purist position is that no materials placed in aquatic environments will ever simply disappear. Some substances cannot be broken down and will reenter and recycle through the ecosystem even if they have no detrimental effects. Other substances may be completely digested in the ecosystem and transformed into harmless or naturally occurring elements. This digestion, however, will consume some of the ecosystem's resources (e.g., dissolved oxygen) at the expense of natural processes and components of the system. Thus, following this purist approach, all additions to a water body will change it to a greater or lesser degree, and the only way to ensure restoration of the equilibrium in the ecosystem is to eliminate or remove all introduced material.

Recognizing, however, that absolute removal of a discrete spilled substance can be impractical, if not impossible, some experts have adopted a more pragmatic approach. Under this approach, the assimilative capacity of a water body is usually viewed in relation to some water quality standard or level of service. In other words, assimilative capacity is the ability of a water body to absorb a particular pollutant up to the point where certain detrimental effects are realized.

The Department carefully considered both the purist and pragmatic approaches to assimilative capacity. Based on this consideration, the Department included in the proposed type A models a methodology for computing assimilative capacity restoration. After reviewing the public comments, the Department has modified that methodology to ensure that the models more accurately quantify assimilative capacity losses. The Department believes that the modified methodology is appropriate for inclusion in the models.

The Department does not believe that recovery of damages for lost assimilative capacity using the type A models is speculative. Trustees are authorized to recover damages to restore injured resources to their baseline conditions. Baseline is measured in terms of the services that the injured resources would have provided in the absence of the release. See 43 CFR 11.70(a). The assimilation of pollutants is a real service provided by natural resources and is well-founded in scientific literature. Assimilative capacity will be reduced whenever a release occurs. Releases use some of the assimilative capacity of aquatic environments and so long as the pollutants remain in the environment, some portion of assimilative capacity—a service provided by the natural resource—is lost. The Department does not agree that reduction in assimilative capacity is dependent on a subsequent release of the exact same substance in the exact same area. A release reduces assimilative capacity regardless of subsequent spill events.

Nevertheless, the Department recognizes that there are practical limitations on measuring and addressing assimilative capacity loss, particularly in the context of a standardized procedure for minor releases. The issue, then, is not whether there is a reduction in assimilative capacity but, rather, the extent of the reduction and the type of actions that are appropriate to restore the lost assimilative capacity. As discussed above, assimilative capacity can be seen as the ability to absorb pollutants up to a threshold where detrimental effects occur. The type A models focus on injury to biological resources. Therefore, the threshold for meaningful loss of assimilative capacity now built into the models is mortality or loss of production resulting in compensable value. Releases that generate compensable value related to mortality or loss of production have, by definition, exceeded the assimilative capacity of the ecosystem. In the case of such releases, the models estimate the cost of restoring assimilative capacity. The cost is based on the removal of a mass equivalent in toxicity to the amount of the spilled substance that remains after concentrations have fallen below acute toxicity thresholds and after any habitat restoration actions are completed. Such removal will return the aquatic system to a state that is functionally equivalent to its baseline condition. When there has been no acute mortality or loss of productivity, the models do not calculate any assimilative capacity restoration costs.

Comment: Some commenters asserted that the models fail to take into account how spatial, temporal, and chemical factors affect the assimilative capacity and function of a resource.

Response: The Department has modified the models to account more fully for the factors affecting

assimilative capacity. The extent of assimilative capacity reduction depends on how long a substance remains in the environment. The proposed versions of the type A models did not consider degradation rates when computing lost assimilative capacity. The Department has modified the models to correct for the degradation rate of the released substance relative to the degradation rates of the contaminants found in the sediment at the sites at which dredging is presumed to occur. See Section 5.4.4, Volume I of the NRDAM/CME and NRDAM/GLE technical documents. The Department believes that this modification, along with the models' methodology for ensuring that the removed mass is equivalent in toxicity to the released substance, adequately account for the different factors affecting assimilative capacity.

Comment: Several commenters objected to basing assimilative capacity restoration costs on the cost of dredging projects outside the area affected by the release. The commenters complained that there was no relationship between these dredging projects and the injured resources. One commenter asserted that inclusion of these damages was motivated by a desire to circumvent the normal appropriations process for funding dredging projects unrelated to the spill. Commenters, including one of the independent technical reviewers, observed that at dredging sites with heavy contamination, less material would have to be dredged than at sites with lower levels of contamination. These commenters noted that this method generates dramatically different figures for different geographic areas and that such differences were unfair because they were unrelated to the spill. A few commenters stated that since the Department seems to believe that assimilative capacity is affected over extremely large areas, the models should base damages on the lowest dredging cost for any of the provinces.

Some commenters, including one of the independent technical reviewers, also argued that it would be more cost-effective to calculate damages based on prevention of wastewater discharges from point sources, such as publicly owned treatment works (POTWs). Another commenter suggested that the rule allow PRPs the option of determining and implementing more cost-effective methods of restoring lost assimilative capacity rather than paying the damages calculated by the models.

Response: The Department agrees that the method for restoring lost assimilative capacity should be reasonably related to the actual release and cost-effective. The Department believes that the methodology included in the final type A models meets both these standards. Biota are potentially exposed to the released substance throughout an entire biological province; therefore, the Department evaluated potential dredge sites on a province-wide basis. Within each province, the Department focused on National Status and Trends (NST) sites and International Joint Commission (IJC) areas of concern because there are considerable data available on the sites and because they are heavily contaminated. The higher the toxic mass per volume at a site is, the cheaper is the cost of dredging sediment equal in toxicity to the remainder of the released substance. Therefore, for each province, the Department determined which NTS site or IJC area of concern had the highest toxic mass per volume and used that site to develop assimilative capacity restoration costs. See Section 13, Volume I of the NRDAM/CME technical document, and Section 9.4, Volume I of the NRDAM/GLE technical document.

Had the Department restricted dredging to areas closer to the site of the release, the costs would likely have increased significantly, because the levels of contamination in those areas would be lower than at NST sites and IJC areas of concern. On the other hand, had the Department considered NST sites and IJC areas of concern well beyond the boundaries of the province in which the release occurred, the dredging would be less clearly related to the actual release.

The Department considered using the cost of preventing discharges from point sources, such as POTWs, as a possible basis for assimilative capacity restoration costs. However, the Department was unable to locate adequate data on point source discharges for toxic chemicals. Commenters presented no additional information that would enable the Department to develop assimilative capacity restoration costs based on reducing point source discharges.

With regard to allowing PRPs to develop alternative methods of restoring lost assimilative capacity, the objective of the type A models is to provide a sum certain on an inexpensive, expedited basis. Allowing PRPs to develop alternative restoration methods, providing trustees with an appropriate opportunity to evaluate the feasibility and adequacy of the PRPs' proposal, and giving the public a chance to review the proposal could undermine this objective. Where the models predict significant assimilative capacity restoration costs, PRPs who believe that they could restore lost assimilative capacity in a more cost-effective manner than that predicted by the type A models would have the option of funding type B procedures or pursuing an appropriate settlement with the trustees.

Comment: One commenter thought that loss of assimilative capacity was a legitimate basis for recovery but stated that damages for the loss should be characterized as compensable value rather than restoration costs.

Response: The Department believes that the damages for lost assimilative capacity are correctly categorized as restoration costs rather than compensable value. Under the existing regulations, compensable value is the economic value that the public loses until the injured resources recover. See 43 CFR 11.83(c)(1). The type A models calculate damages for lost assimilative capacity based not on economic value lost to the public but rather the cost of restoring baseline services.

Comment: One commenter noted that the proposed NRDAM/CME in some cases predicts that more of the substance will remain in the environment than was spilled in the first place.

Response: This result was caused by a coding error that the Department has corrected in the final version of the NRDAM/CME.

Comment: Commenters noted that, contrary to assertions in the August 8, 1994, and the December 8, 1994, notices of proposed rulemaking, the models do compute habitat restoration costs and assimilative capacity restoration costs for the same release.

Response: The models compute assimilative capacity restoration costs for any toxic mass that remains in the environment either because no habitat restoration action is taken or because habitat restoration does not fully remove the toxic mass. The preamble and technical documents have been clarified. See Section 5.4.4, Volume I of the NRDAM/CME and NRDAM/GLE technical documents.

Comment: One commenter noted that there are now 43, not 42, IJC areas of concern in the Great Lakes.

Response: At the time that the proposed NRDAM/GLE was being developed, there were only 42 IJC areas of concern. As more IJC areas of concern and NST sites are identified, the Department will consider updating the models in future biennial reviews. However, it was not feasible for the Department to revise the NRDAM/GLE to account for this one additional site within the available time frame.

Comment: One commenter questioned the use of standardized sediment LC50s

based solely on bulk sediment concentrations.

Response: The LC50s used in the models are for pore water concentrations, not bulk sediment concentrations.

Comment: One commenter stated that the proposed NRDAM/GLE generated inappropriately high assimilative capacity restoration costs for releases of metals. The commenter thought these inappropriate costs resulted from underestimating the rate at which metals attenuate in the Niagara River and Lake Ontario. The commenter stated that metals fall to the bottom, are buried, and pose no toxicity threat.

Response: As discussed in Section VII.G of this preamble, the Department has eliminated all pure metals from the chemical database. For metal compounds, the Department believes that the NRDAM/GLE adequately accounts for attenuation. The model calculates the fate of the released substance by partitioning the dissolved fraction from the particulate fraction in both the water and the sediments. The LC50s used in the model for assimilative capacity calculations are limited to those for dissolved chemicals.

L. Restocking

Comment: Several commenters questioned the reasonableness of the methodology for invoking and calculating restocking costs. A few commenters thought that the proposed NRDAM/CME should not include restocking costs for species, such as dolphins, polar bears, eagles, and alligators, that have never been and are unlikely to be restocked after a spill. These commenters stated that including restocking costs for such species was particularly troubling in light of the weakness of the model's underlying estimates of mortality for these species. Further, the commenters thought the Department's restocking cost estimates for captive breeding programs, in some cases, came from unpublished sources and lacked real-world precedent. The commenters noted, for example, that there was no reason to assume that osprey and raptors cost the same to restock as eagles. Finally, another commenter considered the salmon restocking costs included in the proposed NRDAM/CME to be unrealistically high.

Response: The Department agrees that it is highly unlikely that trustees would restock polar bears and, thus, has deleted polar bear restocking costs from the NRDAM/CME. The Department has limited the rest of the restocking component to those species that are actually available from hatcheries or commercial suppliers and used the actual market prices of acquiring such species. The Department believes that this approach adequately ensures that the restoration costs in the model are realistic and reasonable. The Department has added Table 12.7 to Volume I of the NRDAM/CME technical document to present the data obtained from the International Animal Exchange, Inc.

Bald eagles and other raptors have been restored by hand-rearing hatchlings in a number of States. The models use the same costs for all raptors because the activities and effort required are similar for all species. The eagle restocking cost may be considered a general figure for all raptors.

The Department has revised the calculations for fish restocking costs in the NRDAM/CME. The proposed NRDAM/CME used an average size for all salmon species. The final model uses species-specific parameters for salmon in each of the three applicable provinces. See Table 12.6, Volume I of the NRDAM/CME technical document.

Comment: One commenter questioned the assumed source of restocked animals, noting that simply moving animals from one location in the wild to another would still leave the public with a net loss.

Response: The Department believes that translocation of animals in the wild may, under some circumstances, be an appropriate restoration action. However, for purposes of the type A procedures, the Department chose to consider only restocking of captive-bred animals, the cost of which is generally lower than the cost of translocation in the wild. See Table 12.7, Volume I of the NRDAM/CME technical document.

Comment: One commenter thought that it would be more appropriate to consider predator control than restocking for canvasback and redhead ducks in the Great Lakes.

Response: After recovering damages through the use of a type A procedure, trustees may well decide that the recoveries are better spent on predator control rather than restocking. However, the feasibility, effectiveness, and methods of predator control are highly site-specific. The Department does not believe that adequate data are currently available to include predator control among the list of restoration actions evaluated by the models.

Comment: One of the independent technical reviewers thought the restocking scenario described in the proposed NRDAM/CME technical document would result in a net loss of fish and wildlife.

Response: The scenario does not result in a net loss of fish and wildlife because the model calculates a loss and allows only one-to-one replacement, with correction for restocking survival, of missing individuals. The Department has clarified the technical document. See Section 5.4.3, Volume I of the NRDAM/CME technical document.

Comment: One of the independent technical reviewers noted that the proposed NRDAM/CME technical document stated that only fish that would be caught are restocked in the model. The technical reviewer thought that all fish killed should be restocked, not just those ultimately caught.

Response: The models assume that all fish and shellfish killed are restocked, if stocks are available. The technical document has been clarified. See Section 5.4.3, Volume I of the NRDAM/CME technical document.

Comment: One of the independent technical reviewers thought that the models should grant habitat restoration priority over restocking.

Response: The models decide whether to invoke habitat restoration independently from the decision whether to restock. Therefore, prioritization is not necessary.

M. Consideration of Costs and Benefits of Active Restoration

Comment: Numerous commenters, including some of the independent technical reviewers, criticized the models for failing to consider whether the various active restoration alternatives were warranted in light of the relationship between the benefits of those actions and the costs of the alternatives. Some commenters offered examples where the models computed restoration costs that were millions of dollars or hundreds of times greater than estimated compensable values. Many commenters thought that the models should incorporate a decision rule to screen out restoration actions that would impose grossly disproportionate costs.

Response: As it indicated in the March 25, 1994, type B rulemaking, the Department believes that the relationship between costs and benefits is an important factor in selecting an appropriate restoration action. See 59 FR at 14271. The Department acknowledges that the proposed rules and models did not explicitly address this factor. After careful consideration, the Department has revised the models to perform a cost-benefit analysis of habitat restoration and restocking actions.

If the relevant active habitat restoration alternative would reduce

compensable value or if restocking is possible, then the submodel performs a cost-benefit test of these forms of active restoration. The submodel compares the total costs of active habitat restoration and restocking against the measured benefits of such restoration (i.e., compensable value assuming natural recovery minus compensable value assuming active restoration). If the costs exceed ten times the measured benefits, then the submodel assumes, for purposes of generating a damage figure, that natural recovery, rather than active restoration, will be used to reestablish baseline conditions. If the costs do not exceed the measured benefits by ten times, then the submodel assumes, for purposes of generating a damage figure, that habitat restoration and restocking will be implemented.

The Department determined in the March 25, 1994, rulemaking that although cost-benefit considerations are an important factor in selecting an appropriate restoration action when a trustee uses type B procedures, the exact determination of how to evaluate this factor should be resolved on a case-by-case basis. Therefore, 43 CFR 11.82(d) lists the relationship between costs and benefits as one of several factors that trustees must evaluate before selecting a restoration action when using type B procedures. The Department continues to believe that this is the most appropriate approach in the type B context. However, in the type A context, where a model, rather than the trustees, determine the range and type of restoration actions on which to base the damage claim, and where the intent is to minimize the level of analysis that trustees must conduct, the Department believes it is appropriate to impose a bright-line standard.

The Department has concluded that the evaluation of the costs and benefits of active habitat restoration and restocking versus natural recovery should focus on incremental costs and benefits. Therefore, the models compare the total costs of active habitat restoration and restocking against compensable value assuming natural recovery minus compensable value assuming active restoration.

When determining what an appropriate cost-benefit ratio would be in the type A context, the Department considered the dicta in *Ohio* v. *Interior* suggesting three-to-one as a possible ratio. See 880 F.2d at 443–44, n. 7. However, the NRDAM/CME and NRDAM/GLE quantify only a very narrow range of compensable values. Thus, the Department does not believe that a three-to-one ratio is appropriate. Therefore, the Department was left to make this policy determination without the benefit of clear empirical standards or legal precedents. The Department has selected a ratio of ten-to-one based on its sense of fairness and reasonableness.

Although the models do impose a uniform standard, the Department continues to believe that a truly ''correct'' cost-benefit ratio depends on site-specific factors. The standard contained in today's models is not intended to suggest that a similar ratio is appropriate in a type B context but rather has been included in recognition of the unique nature of the type A procedures. Even when trustees use type A procedures, if the ratio is exceeded, they may nevertheless conclude that compensable values assuming natural recovery as determined by the models will not provide adequate funding for necessary restoration actions. In such cases, trustees are free to calculate damages using type B procedures.

Finally, the Department has chosen not to apply the cost-benefit test to assimilative capacity restoration. The Department believes that assimilative capacity does have an economic value. However, the Department is unaware of any economic study that calculates the consumer surplus or economic rent associated with assimilative capacity. Accordingly, the Department has not included assimilative capacity in the cost-benefit test since its inclusion does not affect the calculation of compensable values.

N. Damages for Fishing and Hunting Losses

Comment: Some of the independent technical reviewers noted that closures to recreational fishing represent a change in access rather than in catch rate. These technical reviewers thought that random utility models (RUMs) should be used to value both the changes in catch rates and in access, noting that RUMs are designed to capture substitution across sites.

Response: The Department acknowledges that recently evolved techniques for resource valuation could potentially improve the calculation of damages in the models. However, inclusion of such techniques would require considerable additional work, including the development of a RUM describing recreational choices across the broad geographic regions covered by the models and a database containing the parameters required as inputs to the RUM. The Department has concluded that such additional work is not feasible at this time. The Department may reconsider this issue in future biennial reviews of the models.

Comment: Commenters objected to the calculation of damages for lost recreational fishing on the grounds that the Department had failed to link the injury to a reduction in services by using trip values rather than marginal (per fish) values. Other commenters, including some of the independent technical reviewers, noted that all species are assigned to a single mode of recreational fishing. They stated that data are available on percentage caught by each mode, and recommended these data be included in the models to weight the recreational fishing values.

Response: Though not fully explained in the proposed NRDAM/CME and NRDAM/GLE technical documents, the Department established the link between the injury and a reduction in services by calculating average trip values (dollars of trip value per kilogram of fish caught) and then adjusting these values by applying ratios of average trip values to marginal values (additional trip value per fish caught) that were obtained from studies that have compared these values. The Department has revised the technical documents. See Section 9.3.4, Volume I of the NRDAM/CME technical document, and Section 6.3, Volume I of the NRDAM/GLE technical document.

The Department acknowledges that additional data on percentage of fish caught by different modes of fishing are becoming available. However, due to the fact that the majority of species in a particular area tend to be caught by a dominant mode of fishing and that there are not always major differences between values in the various modes of fishing, the Department does not believe that weighting recreational fishing values using data on percentages caught by each fishing mode would significantly improve the reliability of the final damage figure. As additional data become available, the Department will reconsider this issue in future biennial reviews.

Comment: One commenter noted that, in an attempt to maximize total utility, anglers tend to reduce the number of fishing trips they take as the marginal utility from fishing falls in response to a reduction in the catch rate. This commenter argued that the models should, therefore, account for reductions in participation in addition to reductions in catch. The commenter suggested that the models estimate reductions in participation for spills that exceed some given threshold volume.

Response: The Department believes that, while participation in fishing activities may be affected by moderate or large-scale spills, small spills are

likely to affect primarily the quality of such activities. Specifically, the Department believes that the principal effect of small spills on recreational anglers is a reduction in catch rather than a reduction in fishing trips. The commenter appears to agree with this position by suggesting that the models account for reductions in participation for spills over a given threshold size. However, where participation is reduced, trustees may conduct supplemental type B studies.

Comment: One commenter thought that the models inappropriately assumed that species that lacked catch data had no recreational value.

Response: The Department recognizes that there may be species for which catch data are not available that nevertheless have recreational value. However, the only fish-related compensable value that the models compute is for lost harvests. Without catch data, the models cannot determine lost harvests and, thus, cannot compute compensable value. If an injured fish species has values unrelated to harvest, then trustees may conduct supplemental type B studies to capture those values.

Comment: A few commenters, including some of the independent technical reviewers, thought that the lost recreational fishing and hunting values used in the models were outdated.

Response: The Department has not updated the recreational fishing and hunting values in the models. The Department will revisit this issue during the next biennial review.

Comment: One of the independent technical reviewers questioned why the hunting values included in the proposed models did not account for the effects of changes in effort.

Response: The Department is not aware of any evidence that effort changes in cases of minor spills.

Comment: Some of the independent technical reviewers recommended that the Department include habitat equivalency analysis (HEA) in the models.

Response: HEA is a method of determining damages for interim losses that does not require the explicit calculation of the economic value lost by the public. Instead, HEA bases damages on the cost of obtaining or creating additional acreage that would provide the same habitat services as that lost pending recovery of the injured resources. While HEA has merit, the Department has elected not to pursue its inclusion in the type A models at this time. The use of HEA to compute compensation for interim losses is an issue that extends beyond this rulemaking. HEA is currently not listed as one of the type B methodologies for calculating compensable value, although the regulations do allow use of additional unlisted methodologies if they meet certain criteria. The Department is conducting a biennial review of the type B methodologies and will be examining the use of HEA in that context. The Department believes that inclusion of HEA in a type A procedure should await the resolution of the biennial review of the type B procedures. Also, the availability and cost of obtaining habitat equivalent to that injured is highly site-specific. The Department currently does not have adequate data to incorporate HEA into the models.

Comment: Commenters objected to the method used to value lost subsistence fishing. The commenters stated that the proposed NRDAM/CME does not clearly define subsistence anglers and inappropriately assumes that the full value of the subsistence resource is lost without considering substitutes. In addition, the commenters argued that the proposed NRDAM/CME measures subsistence loss by the gross cost of an alternate food supply (rather than considering net subsistence losses) and adjusts the costs to account for supposed differences in protein between store-bought and wild-harvested fish based on a study of birds, not fish. Several commenters thought that inclusion of damages for lost subsistence fishing was legally impermissible. On the other hand, one of the independent technical reviewers noted that subsistence hunting, not only subsistence fishing, is significant in Alaska and should be included in the model.

Response: The Department acknowledges that the proposed NRDAM/CME failed to clearly define subsistence anglers, failed to consider substitutes, and inappropriately measured subsistence loss as the gross cost of an alternate food supply. All of these shortcoming raise significant questions about the reliability of the model's calculation of compensable value for subsistence loss. Data are unavailable at this time to correct these problems. Therefore, the Department has decided to delete subsistence losses from the NRDAM/CME. Because the Department has decided to delete subsistence losses for technical reasons, it is not necessary for the Department to address the legal permissibility of trustees recovering natural resource damages for subsistence losses.

Comment: Some commenters, including some of the independent technical reviewers, objected to the inclusion in the models of damages for loss of commercially harvested fish and furbearers. These commenters rejected the explanation that inclusion of damages for such losses was designed to compensate the public for lost economic rent. The commenters noted that the government does not in fact charge rent for commercial harvests and concluded that the public, therefore, does not incur any loss of economic rent. Commenters argued that the models were not capturing the public's lost economic rent but rather were inappropriately calculating the commercial users' private losses, which are not recoverable as natural resource damages under CERCLA. The commenters cited *Satsky* v. *Paramount Communications, Inc.* for the proposition that trustees may only bring claims ''for injuries to interests which all citizens hold in common.'' 7 F.3d 1464, 1470 (10th Cir. 1993). The commenters argued that private economic interests, such as commercial losses, are not interests that all citizens hold in common. Citing various floor debates on the Superfund Amendments and Reauthorization Act, the commenters argued that Congress intended the double recovery prohibition to bar natural resource damage claims for losses that are subject to private recovery. Commenters also noted that if damages for such losses are retained in the models, then serious double recovery problems arise because commercial users will assert overlapping claims.

Response: The type A models include damages for lost commercial harvests in order to capture lost economic rent. The issue of whether lost economic rent is a legally permissible category of damages was decided and resolved by the Department in 1986 and is beyond the scope of this rulemaking. The only issues that the Department is considering in this rulemaking are: whether economic rent is, in fact, generated by commercially harvested species; if so, whether the type A models correctly calculate any loss of that economic rent resulting from releases covered by the models; and whether the rule adequately protects against double recovery.

In the preamble to the original type B rule, economic rent is defined as ''the excess of total earnings of a producer of a good or service over the payment required to induce that producer to supply the same quantity currently being supplied.'' 51 FR at 27691. In other words, economic rent for commercially harvested resources is the fee that commercial harvesters could pay to the government and still find harvesting economically feasible.

Commercial harvesters invest capital in equipment (e.g., gear, traps, and boats). This capital could have been liquidated and put to another use, such as investment in a bank. Therefore, commercial harvesting is worthwhile only if the harvester receives a price for the harvest that both covers labor and fuel costs as well as provides a reasonable return on capital. To the extent that the harvester receives a price that exceeds costs plus a reasonable return on capital, the government could charge a fee and the harvester would continue to engage in harvesting. Thus economic rent is generated.

The Department believes that economic rent is being generated by commercially harvested fish and wildlife. The one situation in which economic rent is clearly eliminated is when natural resources are exploited to the point that all profits, including economic rent, have been competed away. This situation arises when commercial harvests are not regulated and, thus, harvesters have free and unlimited access. Economic theory predicts that in such cases harvesters will ignore both the value of the resources for future use as well as the costs of crowding. Fisher, A.C., Resource and Environmental Economics, New York: Cambridge Univ. Press, 1981.

One way of preventing this situation and generating economic rent, is to charge fees. Currently, resource managers do not generally charge fees except to cover administrative costs of processing permits. See, e.g., Magnuson Act, 16 U.S.C. 1854(d). However, resource managers do regulate commercial harvesting through limits on the gear that may be used, limits on the length of the harvest season, catch restrictions, tradeable permits for limited entry or individual catch quotas, and other programs. For example, NMFS has recently established a pilot program to buy back fishing permits to restore stocks of cod, haddock, and flounder in the Atlantic Ocean. These programs are designed to protect the resources for future use. The Department believes that these programs do in fact curb overexploitation of stocks and thus prevent profits (including economic rent) from being driven down to zero. For example, Alaska salmon and herring fisheries are regulated with tradeable entry permits. The aggregate value in 1988 of all permits in the salmon, herring, and herring roe fisheries was $925 million.

Market prices are largely set on a national or international basis. Therefore, in the case of minor spills, it is unlikely that market prices will change. Also, total biomass effects should be limited for minor spills, thus it is unlikely that there will be long-term effects on the catchability of resources. Finally, the Department believes it is reasonable to assume for minor spills that the same number of commercial harvesters will continue to expend the same amount of economic resources to conduct harvests and that the markets for the necessary labor and capital inputs to commercial fishing are competitive. Therefore, the type A models compute damages based on the harvesters' forgone revenue, which is the market price the harvesters could have received at the time the resources would have been harvested. The Department believes that this figure will capture lost economic rent.

With regard to potential double recovery, the Department acknowledges that in some cases commercial harvesters may bring private causes of action that include economic rent. As noted above, resource managers generally do not charge fees to capture economic rent; therefore, when commercial harvesters sell their harvests they obtain a profit that includes economic rent. Under OPA, commercial harvesters have a specific private cause of action. CERCLA does not grant commercial harvesters a private cause of action. However, some commercial harvesters, such as commercial fishermen in coastal waters, probably do have private causes of action for hazardous substance-related injuries under State law or common law. When commercial harvesters bring a claim for lost profit it will most likely include economic rent. Therefore, if trustees also bring a claim for lost economic rent there will be a potential double recovery problem.

The governmental regulation of commercial fish and wildlife harvest implies a public concern that these resources be managed in order to sustain their contribution to economic productivity. The public's value for commercial harvesting is further reflected in express policy statements that the government is committed to promoting resources' contribution to economic productivity. See, e.g., Fish and Wildlife Act of 1956, 16 U.S.C. 742a. Therefore, when there are reductions of commercial harvests, the public suffers a loss.

If commercial harvesters can and do bring a private cause of action, then the harvesters may be fully compensated and the public's interest in promoting commercial harvests may be satisfied. If harvesters are compensated for full social losses, then trustees should not recover separate damages for lost economic rent. However, in some cases commercial harvesters may not have a private cause of action or their recoveries may be subject to geographic or temporal limitations. For example, commercial harvesters may be limited to recovering damages incurred during the period of formal closure, or incurred in the area closed or in the area in which fish were directly exposed to the released substance. See, e.g., *Golnoy Barge Co.* v. *M/T Shinoussa*, Civ. No. H–90–2414, 1993 WL 735038 (S.D. Tex. Aug. 17, 1993). In other cases, commercial harvesters may choose not to bring private causes of action. If commercial harvesters do not obtain direct full compensation, then the public's interest is not satisfied and the trustees may bring a claim for lost economic rent.

For minor releases where damages may be relatively low and data establishing injury and causation may be difficult to obtain, the Department believes that it is unlikely that commercial harvesters will go to the expense and trouble to pursue a legal claim. Therefore, the Department has retained the calculation of lost economic rent in the models. However, to prevent double recovery, § 11.44(d) provides that if the trustee is aware of reliable evidence that a private party has recovered damages for commercial harvests lost as a result of the release, the trustee must eliminate from his or her claim any damages for such lost harvest that are included in the lost economic rent calculated by the model. When the Assessment Plan is made available for public review and comment, PRPs and commercial harvesters will have an opportunity to alert trustees to any private actions for lost commercial harvests.

Comment: A few commenters, including some of the independent technical reviewers, thought that the prices used to calculate damages for lost commercial harvests were invalid because they did not account for seasonal and regional variations. Commenters also stated that the data used were from 1984 through 1988 and should be updated.

Response: The models account for seasonal and regional differences in commercial prices to the extent possible given available data. In the Great Lakes, pelt prices were available on a State-by-State basis. The Department used these prices to develop average prices for each of the Great Lakes. In the coastal areas, pelt prices were available only on a regional basis.

At the time the Department performed the bulk of the work on the commercial fisheries component, 1984 through 1988

was the most recent 5-year period for which final statistics were available for the offshore zone in which the catch occurred (rather than ports where harvest was taken). The Department decided to average the figures over a five-year period to eliminate short-term variability. The Department believes that the commercial fishing statistics currently incorporated in the models are reliable. However, as additional data become available, the Department will consider updating the models during future biennial reviews.

O. Damages for Lost Wildlife Viewing

Comment: One commenter supported the proposed approach for calculating damages for lost wildlife viewing as reliable and reasonable. However, most commenters criticized the approach. Commenters noted that the Department itself appeared to have serious reservations about the approach. A number of commenters thought that the approach would consistently underestimate damages; others thought that damages would be overestimated. Some commenters stated that the Department's methodology for calculating wildlife viewing losses was so unreliable that such losses should be deleted from the models.

Several commenters thought it was incorrect to assume that a given reduction in wildlife population would produce a comparable reduction in the wildlife seen. Thus, the commenters concluded that the Department was unable to link the injury to a reduction in services. The commenters further stated that the calculation used inappropriate assumptions and studies to calculate the value of a wildlife viewing trip on a per-animal basis.

A few commenters thought the values appear arbitrary since they vary so widely by province. One commenter suggested that the wide variations in province values be eliminated either through the use of uniform average values or through the deletion of extreme values. On the other hand, some commenters thought the models did not adequately account for the variable characteristics of affected sites.

Response: In the notices of proposed rulemaking, the Department solicited comment on a number of aspects of the proposed methodology for determining damages for lost wildlife viewing. 59 FR at 40328–29 and 63311–12. Based on its careful consideration of the comments it received, as well as its own reexamination of the models, the Department has modified the methodology and believes that it is sound.

Wildlife viewing is one of the most significant direct use services that wildlife provide to humans. Inclusion of lost wildlife viewing damages in the type A models necessitated that the Department draw conclusions about the relationship between changes in wildlife populations and changes in the perceptions of wildlife by viewing participants. There is no known empirical research that indicates how participants perceive changes in wildlife populations. The proposed models assumed that a given percentage reduction in wildlife populations results in the same percentage reduction in the wildlife seen by participants.

The Department has determined that percentage reductions in wildlife viewing perception could be lower or higher than the percentage reduction in wildlife populations. For example, a wildlife population may consist of 100 animals yet the public may only perceive, on average, 50 of those animals. If a spill were to kill 50 percent of the population, then the public's perception of the population would be reduced by 20 percent if the 50 killed animals included only 10 of the animals the public normally sees. However, if the 50 killed individuals included 30 of the animals the public normally sees, then the change in perception would be 60 percent. Therefore, in the absence of empirical evidence on the subject, the Department has decided to assume that percentage reductions in wildlife viewing perception are equal to percentage reductions in wildlife populations.

When determining how a given reduction in the number of animals viewed affects the value the public derives from viewing, the Department relied on the only available studies that identified a marginal value for wildlife viewing (Loomis et al. (1989) and Cooper and Loomis (1991)). The Department believes that these studies are reliable. The Department acknowledges that one of the studies dealt with trips that were not taken primarily for the purpose of wildlife viewing. However, contrary to the assertions of some commenters, the studies specifically examined how changes in the number of animals seen affected the value of the trips. Therefore, the wildlife viewing values used in the type A models do not reflect any other non-viewing aspects of recreational trips.

The biological effects submodel quantifies wildlife mortality in terms of the number of animals killed. Therefore, the Department needed to develop per-animal viewing values. The Department developed such per-animal values by using Loomis et al. (1989) and Cooper and Loomis (1991) to establish the relationship between changes in wildlife seen and changes in value and by using FWS' National Survey of Fishing, Hunting, and Wildlife-Associated Recreation to establish total viewing values for particular species. The Department first estimated the total value of wildlife viewing at ocean- or lake-side for an entire State. Then the Department allocated this total value among species and wildlife individuals within species that reside along the State's ocean- or lake-side. For further discussion of this methodology, see Section 8.4, Volume I of the NRDAM/CME technical document, and Section 6.4.1, Volume I of the NRDAM/GLE technical document.

The Department recognizes that the per-animal viewing values assigned by the models for some species vary widely by province. However, the Department has concluded that these variances are not errors that need to be corrected but, rather, reflect actual and relevant regional differences. The value that the public derives from viewing a particular animal in a particular area depends on how many people engage in wildlife viewing in that area and how many animals of that type there are to view in that area. Therefore, the models appropriately contain relatively low per-animal values for species that are abundant and for areas with low participation in wildlife viewing. Conversely, the models contain higher per-animal values for less abundant species and for areas with higher wildlife viewing participation.

Not only are the regional variances in per-animal values appropriate, but also, such variances do not lead to unrealistic differences in the damage figures calculated by the models for particular releases. When determining damages for a particular release, the models calculate damages for lost wildlife viewing based on the probability that the release will kill wildlife. The probability that an animal will come into contact with, and be killed by, a release is directly related to the wildlife abundance in the area affected by the release. In areas with low wildlife abundance, minor releases would have a low probability of killing wildlife. Therefore, although the per-animal values in these areas may be significantly higher than in areas of high abundance, the actual damage figure may not be.

Comment: Some commenters contended that the methodology for calculating viewing damages relies on assumptions that overstate the number of wildlife viewing trips to affected

areas. Some commenters also claimed that the Department had used unreliable survey data to derive per-animal viewing values. Several commenters thought the models used outdated data.

Response: The Department has revised the wildlife viewing damage component of the models to reflect more recent data. When developing the proposed models, the Department used FWS' 1985 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. This survey was updated in 1991. The Department has revised the final models to reflect this update. FWS has conducted wildlife-related recreation surveys roughly every 5 years since 1955. The results of these surveys are widely disseminated and are relied upon both by governments and by private individuals for a range of purposes. The Department believes it is appropriate to use these surveys to determine participation rates for wildlife viewing as well as the value of wildlife viewing trips.

Comment: A few commenters, including some of the independent technical reviewers, suggested that the proposed models be expanded to account for viewing losses incurred by individuals other than residents of coastal counties. One commenter stated that in Michigan, regional populations are not concentrated either in lake shore counties or at substantial distances inland and suggested that the NRDAM/GLE incorporate lost wildlife viewing on a two-county deep basis. One of the independent technical reviewers noted that the absence of damages for lost viewing by out-of-State tourists was a significant problem in Alaska.

Response: The Department has revised the NRDAM/CME to account for impacts on the populations of coastal States rather than just coastal counties. See Section 8.4, Volume I of the NRDAM/CME technical document. Wildlife viewing damage calculations in the NRDAM/CME rely on State-level estimates of participation rates for wildlife viewing at the ocean. The Department believes that it is more appropriate to apply these State-level participation rates to State populations than to county populations in the NRDAM/CME.

The Department has not applied the participation rates in the final NRDAM/GLE to the entire State population due to the existence of alternative recreation sites in other parts of the Great Lakes States. Instead, the Department has generally limited the participation rate to the populations of lake-side counties in the NRDAM/GLE. In a few instances involving very narrow counties, the Department has gone beyond the lake-side county to include residents of areas within an average one-way trip distance from the provinces where injury occurred. Statewide average participation rates were used in the NRDAM/GLE due to a lack of reliable data at the county level.

The Department recognizes that out-of State visitors may experience viewing losses; however, adequate data are not currently available to incorporate such losses into models. As more data become available, the Department may reconsider this issue in future biennial reviews. Meanwhile, the rule allows trustees to conduct supplemental type B studies to assess damages for such losses.

Comment: Some commenters, including a few of the independent technical reviewers, suggested including viewing losses incurred by individuals under the age of 18. One commenter noted that the Department had relied on wildlife participation survey data supplied by individuals 16 years or older but used population data that only included individuals 18 years or older.

Response: The Department has revised the models to include viewing losses experienced by individuals 16 years of age and older.

Comment: Some commenters, including a few of the independent technical reviewers, thought that spills could affect not only the quality of the wildlife viewing trips but also the number of trips taken. These commenters thought the models should account for this effect.

Response: Adequate data are not currently available to incorporate damages for lost participation in wildlife viewing. Further, while participation in wildlife viewing may be affected by moderate or large-scale releases, minor releases, for which the type A models are designed, are likely to affect primarily the quality of such activity. As more data become available, the Department may reconsider this issue in future biennial reviews.

Comment: A few commenters thought the models did not account for all species that had viewing value.

Response: The Department believes that the species addressed by the models account for the vast majority of viewing values.

Comment: One commenter noted that the deaths of migratory species could result in viewing losses in locations beyond the spill site and thought that the models should account for such losses.

Response: The Department acknowledges that releases can result in off-site viewing losses; however, adequate data are not currently available to incorporate such losses into models. As more data become available, the Department may reconsider this issue in future biennial reviews. Meanwhile, the rule allows trustees to conduct supplemental type B studies to assess damages for such losses.

Comment: Some commenters asked whether the models considered the effect of closures on wildlife viewing losses.

Response: The models do not address the effect of closures on wildlife viewing. The models only compute mortality-related wildlife viewing losses.

P. Damages for Beach and Boating Closures

Comment: The Department received several comments on the proposed NRDAM/CME's methodology for calculating damages for beach closures. A few commenters thought that the Department had made unsubstantiated and questionable assumptions in estimating beach visitation. Some commenters, including one of the independent technical reviewers, claimed that the Department had failed to account adequately for differences in visitations and values associated with different beach types and different seasons. One independent technical reviewer stated that beach visitation is highly variable within provinces, and that more localized visitation data could be mapped in a GIS from survey data.

Response: The Department could not locate adequate data to develop separate per-person values for visiting Federal beaches versus non-Federal beaches. However, the Department believes the NRDAM/CME adequately accounts for differences between the two types of beaches through the use of different visitation figures. A sample of monthly visitation data was taken from representative beaches in each economic province. This sampling was designed to account for differences in visitation that exist between economic provinces. The Department also collected separate visitation data for National Seashores and other public beaches. The user is required to enter the type of beach affected (National Seashore or other public beach) as an input to the NRDAM/CME. Further, before the compensable value submodel applies an average beach use value to the estimated loss in beach use, the submodel adjusts the value to account for seasonal variations. The NRDAM/CME uses seasonal variations in the duration of beach visits as a reasonable approximation of the seasonal variations in beach use values. Data on the duration of beach visits were available

for National Seashores, but not for other public beaches. Therefore, the Department applied the National Seashore duration data to other public beaches. For further discussion, see Section 10, Volume I of the NRDAM/CME technical document.

Comment: Several commenters raised concerns about valuation of beach closures in the proposed NRDAM/GLE. Some commenters criticized the use of studies of saltwater beaches to value Great Lakes beach use. A few commenters stated that the studies the Department used to value Great Lakes beach use were outdated. Other commenters complained that the NRDAM/GLE used the same values for Federal and non-Federal beaches.

Response: In the NRDAM/GLE, the per-day value of beach recreation is based on the average of several values reported for general beach recreation. The Department acknowledges that basing beach-related recreation values on studies carried out exclusively at Great Lakes locations would have been ideal. However, no such studies were available. Intuitively, beach recreation on the Great Lakes combines some aspects of seashore beach recreation with some aspects of freshwater beach recreation. Therefore, the Department used a range of studies, including both studies of saltwater beach recreation as well as studies of freshwater beach recreation.

The Department believes that the data used are still the best available. If additional data on the value of beach-related recreation in the Great Lakes become available, the Department will consider incorporating such data in the NRDAM/GLE during future biennial reviews.

Data limitations required that the Department make assumptions concerning the distribution of monthly trips to non-Federal lake shores. The NRDAM/GLE assumes that the distribution is identical to the distribution of monthly trips to National Lake shores. See Section 6.4.2, Volume I of the NRDAM/GLE technical document.

The Department could not locate adequate data to develop separate per-person values for visiting Federal beaches versus non-Federal beaches. However, the Department believes the NRDAM/GLE adequately accounts for differences between the two types of beaches because the per-person values translate into different per-meter values for Federal and non-Federal beaches.

Comment: Some of the independent technical reviewers were confused by the discussion in the proposed technical documents on consideration of substitutes when valuing beaches. They recommended that values from appropriate studies be selected based on an understanding of the welfare economics of substitutes. Specifically, they expressed concern over the Department's use of studies of loss of beach use over large regions. The technical reviewers thought that such studies would not account for individuals' ability to substitute one beach for another within a given region and, thus, would not correctly capture the value of particular beaches.

Response: The Department did use studies that account for the effect of substitution. See Section 10.3.2, Volume I of the NRDAM/CME technical document.

Comment: One of the independent technical reviewers suggested that losses on private beaches should be included.

Response: CERCLA authorizes trustees to pursue claims only for injuries to public resources, namely those resources ''belonging to, managed by, held in trust by, appertaining to or otherwise controlled by'' the United States, a State, or an Indian tribe. CERCLA sec. 101(16). Private beaches will generally not constitute public resources. Therefore, the rule only allows trustees to use the type A models for public beaches.

Comment: One of the independent technical reviewers stated that the NRDAM/CME should be modified to allow for the recovery of damages for lost use of rocky shoreline.

Response: The Department was unable to identify sufficient data on the relative value of recreation on different shoreline types in coastal and marine environments to permit distinctions between rocky and sandy shorelines. Therefore, the models compute damages for lost use of all types of closed Federal or State beaches; however, the models assign the same values regardless of habitat type. The Department believes that this approach is reasonable in light of the geographic breadth of the studies used to develop the beach values in the models. Further, although the August 1994 proposed rule required trustees who used the NRDAM/GLE to specify whether a closed beach was rocky or sandy, the model itself did not assign different values based on that designation. Therefore, the Department has revised the final rule to remove the requirement.

Comment: Several commenters thought the models used unreliable boating area coefficients that were likely biased upward. The commenters complained about the use of freshwater boating studies to determine a boating value for coastal and marine waters in the proposed NRDAM/CME. The commenters stated that marine boating is different from freshwater boating. Some commenters, including some of the independent technical reviewers, thought that the coastal regions of the United States were so heterogenous that applying one boating value to the entire coastline of the United States was not appropriate.

Further, the commenters stated that the proposed NRDAM/GLE inappropriately assumed that all boat trips were evenly distributed along the Great Lakes shoreline, which would result in an overestimate of damages. These commenters also thought the studies used to derive boating value in the NRDAM/GLE were unpublished and outdated, and inappropriate for the transfer of values.

Response: The Department was unable to establish the similarity of marine boating to freshwater boating for the NRDAM/CME. Therefore, the Department has eliminated the calculation of lost boating values from the NRDAM/CME.

As to the NRDAM/GLE, the density of recreational boating is higher near ports. Thus, due to the greater likelihood of spills occurring near port facilities, the Department believes the even allocation of boating trips used in the model could tend to underestimate the number of boating trips that would be affected by a small spill rather than overestimate the value.

The Department does not agree that the models calculate only upwardly biased boating damages. In the NRDAM/GLE, lost trips are estimated using a formula that distributes the estimated number of trips across the total area of water covered by the near shore forecast. In some areas this may result in underestimates of the number of affected boating trips. For example, areas near major ports or marina facilities are likely to have a higher density of boating trips than is assumed in the NRDAM/GLE. Nevertheless, the Department believes that in those areas when type B procedures cannot be performed at a reasonable cost, trustees should have the option of using the NRDAM/GLE.

Q. Judicial Review and the Rebuttable Presumption

Comment: Some commenters supported proposed § 11.91(c)(2), and the Department's related statements regarding which elements of a type A damage assessment can be challenged following application of the NRDAM/CME or NRDAM/GLE in a specific case, and which aspects of the rule (which

incorporates the models) must be challenged within 90 days of promulgation, as provided by section 113(a) of CERCLA. Proposed § 11.91(c)(2) states that judicial review of a type A damage assessment shall be limited to the trustee's decision to use the type A procedure and the incident-specific data supplied by the trustee. It further states that the decision to use the type A procedure and the incident-specific data collected by the trustee receive CERCLA's rebuttable presumption. The commenters supporting this proposed provision suggested that it would reduce the potential for litigation and attendant delays to restoration, although they conditioned their support on how the Department responded to their other comments.

Numerous other commenters strongly objected to proposed § 11.91(c)(2), as beyond the Department's authority and as contrary to the two provisions in CERCLA interpreted and applied in proposed § 11.91(c)(2). These commenters asserted that proposed § 11.91(c)(2) is outside of the rulemaking authority provided by section 301(c)(1) of CERCLA, and therefore beyond the Department's legal authority. These commenters stated that while the Department has authority to promulgate regulations for assessments, it does not have authority to prescribe what effect those assessments will have in future judicial proceedings.

These commenters also asserted that the Department's proposed rule language that judicial review of a type A assessment in a specific case would be limited to the trustee's decision to use the type A procedure and the incident-specific data supplied by the trustee is contrary to sections 113 and 107(f)(2)(C) of CERCLA and the Administrative Procedure Act (5 U.S.C. 551 *et seq.*). These commenters stated that because CERCLA provides a rebuttable presumption to assessments performed in accordance with the regulations, CERCLA allows a PRP to introduce any relevant evidence that may rebut the presumption. In the view of these commenters, proposed § 11.91(c)(2) would deny PRPs any meaningful opportunity to rebut the rebuttable presumption, effectively rendering the presumption irrebuttable. These commenters interpreted section 113(a) of CERCLA as only barring future judicial review of whether the regulations are valid and meet statutory requirements. Section 113(a) does not, according to these commenters, preclude judicial consideration of all relevant evidence in an assessment not performed at the time the regulations are reviewed—e.g., evidence in a particular case that the computer model grossly overstates the number of affected fish and wildlife. Some commenters suggested that application of proposed § 11.91(c)(2) would raise constitutional due process questions.

Finally, some of these commenters objected to the provisions in proposed § 11.91(c)(2) that the rebuttable presumption applies to the trustee's decision to use the type A procedure and the data inputs. These commenters stated that CERCLA's rebuttable presumption is granted only to the final results of an assessment, not to intermediate steps such as the decision to use the type A procedures and the data input selections. These commenters also asserted that the Department had provided no criteria for ensuring the accuracy and reliability of site-specific data inputs, and that absent such regulatory criteria, the inputs would not be entitled to the rebuttable presumption. The commenters cited the absence of a rebuttable presumption for the statement of trusteeship as an example where the Department concluded that the absence of guidance resulted in the absence of a rebuttable presumption.

Response: The Department has given this issue careful consideration, and decided not to include proposed § 11.91(c)(2) in today's final rule. Whether or not a court ultimately would uphold the authority of the Department to promulgate proposed § 11.91(c)(2), and the interpretation of CERCLA reflected in it, the Department has concluded that there is sufficient uncertainty about the precise effect of sections 107(f)(2)(C) and 113(a) of CERCLA, as applied in a specific case, to warrant leaving proposed § 11.91(c)(2) out of the rule at this time.

The Department recognizes that there are numerous scenarios giving rise to natural resource damage claims. Whether or not proposed § 11.91(c)(2) as applied would be overly broad could depend on the specific circumstances of a given case. Aside from whether the commenters objecting to this provision are legally correct, the questions raised have convinced the Department that this issue is best addressed outside the rulemaking context, at least until additional experience has been gained through case-specific application of these simplified procedures. Therefore, the Department has concluded for now that the precise delineation of CERCLA's preclusive review and rebuttable presumption provisions to type A damage assessments is best left to specific cases. As a result, the Department need not address whether it has the legal authority under section 301(c)(2) to promulgate proposed § 11.91(c)(2), nor whether that section accurately interprets CERCLA.

The Department does note that some of the comments interpreting CERCLA's rebuttable presumption provision appear largely to read CERCLA's preclusive review provision out of the statute. Undoubtedly, Congress intended that PRPs have a meaningful opportunity to rebut specific aspects of a trustee's case, but not if it is a ''matter with respect to which review could have been obtained'' in a challenge to the regulations. CERCLA sec. 113(a). In the case of the type A rules, the validity of the regulations themselves is closely related to the content and workings of the incorporated computer models. The Department believes that section 113(a) of CERCLA requires that challenges to aspects of the rule that are clearly discernible from the rule language, the models, the incorporated technical documentation, and this Federal Register notice be brought within 90 days after promulgation. Sections 107(f)(2)(A) and 113(a) of CERCLA should be read in harmony with one another.

Also, contrary to the view of some commenters, the statutory language of CERCLA does not limit the effect of the rebuttable presumption to the ''final results'' of an assessment. Rather, section 107(f)(2)(C) of CERCLA provides that ''[a]ny determination or assessment of damages * * * made * * * in accordance with the regulations * * * shall have the force and effect of a rebuttable presumption.'' Although the Department has decided not to promulgate regulatory language delineating the scope of the rebuttable presumption, the statute appears to be worded more broadly than was recognized by these commenters. Furthermore, the rule does provide procedures requiring trustees to include data inputs in the Assessment Plan, which is subject to public review and comment. As such, the rule does contain procedural criteria to ensure the accuracy and reliability of data inputs through a public review and comment process. The commenters also failed to recognize a primary reason for the Department declining to afford the rebuttable presumption to the statement of trusteeship. Unlike a statement of trusteeship, which is in essence a legally-founded assertion, data inputs are factual in nature and can be checked, reviewed, and verified through the public comment process.

National Environmental Policy Act, Regulatory Flexibility Act, Paperwork Reduction Act, and Executive Orders 12866, 12630, 12778, and 12612

The Department has determined that this rule does not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, the Department has not prepared any further analysis pursuant to section 102(2)(C) of the National Environmental Policy Act (43 U.S.C. 4332(2)(C)).

The Department certifies that this rule will not have a significant economic effect on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 et seq.). The rule provides technical procedural guidance for the assessment of damages to natural resources. It does not directly impose any additional cost. As the rule applies to natural resource trustees, it is not expected to have an effect on a substantial number of small entities.

This rule does not contain information collection requirements that require approval by the Office of Management and Budget (OMB) under the Paperwork Reduction Act (44 U.S.C. 3501 et seq.).

OMB has reviewed this rule under Executive Order 12866. This rule does not have takings implications under Executive Order 12630. The Department has certified to OMB that this rule meets the applicable standards provided in Sections 2(a) and 2(b)(2) of Executive Order 12778. This rule does not have federalism implications under Executive Order 12612.

List of Subjects in 43 CFR Part 11

Coastal zone, Environmental protection, Fish, Hazardous substances, Incorporation by reference, Indian lands, Marine resources, National forests, National parks, Natural resources, Public lands, Recreation areas, Sea shores, Wildlife, Wildlife refuges.

For the reasons set out in the preamble, Title 43, Subtitle A of the Code of Federal Regulations is amended as follows:

PART 11—NATURAL RESOURCE DAMAGE ASSESSMENTS

1. The authority citation for Part 11 continues to read as follows:

Authority: 42 U.S.C. 9651(c), as amended.

Subpart A—Introduction

2. Section 11.15 is amended by revising the heading and paragraph (a)(1) to read as follows:

§ 11.15 What damages may a trustee recover?

(a) * * *

(1) Damages as determined in accordance with this part and calculated based on injuries occurring from the onset of the release through the recovery period, less any mitigation of those injuries by response actions taken or anticipated, plus any increase in injuries that are reasonably unavoidable as a result of response actions taken or anticipated;

* * * * *

3. Section 11.18 is amended by revising paragraph (a)(4) and adding a new paragraph (a)(5) to read as follows:

§ 11.18 Incorporation by reference.

(a) * * *

(4) The CERCLA Type A Natural Resource Damage Assessment Model for Coastal and Marine Environments, Technical Documentation, Volumes I–VI, dated April 1996, prepared for the U.S. Department of the Interior by Applied Science Associates, Inc., A.T. Kearney, Inc., and Hagler Bailly Consulting, Inc. (NRDAM/CME technical document). Interested parties may obtain a copy of this document from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; PB96–501788; ph: (703) 487–4650. Sections 11.34 (a) (b) and (e), 11.35(a), 11.36(b), 11.40(a), and 11.42(a), and Appendix II refer to this document.

(5) The CERCLA Type A Natural Resource Damage Assessment Model for Great Lakes Environments, Technical Documentation, Volumes I–IV, dated April 1996, prepared for the U.S. Department of the Interior by Applied Science Associates, Inc., and Hagler Bailly Consulting, Inc. (NRDAM/GLE technical document). Interested parties may obtain a copy of this document from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; PB96–501770; ph: (703) 487–4650. Sections 11.34 (a) (b) and (e), 11.35(a), 11.36(b), 11.40(a), and 11.42(a), and Appendix III refer to this document.

* * * * *

4. Section 11.19 is removed and reserved.

Subpart C—Assessment Plan Phase

5. Section 11.30 is amended by revising the heading and paragraphs (a) and (c)(1)(vi) to read as follows:

§ 11.30 What does the authorized official do if an assessment is warranted?

(a) If the authorized official determines during the Preassessment Phase that an assessment is warranted, the authorized official must develop a plan for the assessment of natural resource damages.

* * * * *

(c) * * *

(1) * * *

(vi) Any other Assessment Plan costs for activities authorized by §§ 11.30 through 11.38.

* * * * *

6. Section 11.31 is amended by revising the heading and paragraphs (a)(1), (b), (c) introductory text, (c)(1), and (d) to read as follows:

§ 11.31 What does the Assessment Plan include?

(a) *General content and level of detail.* (1) The Assessment Plan must identify and document the use of all of the type A and/or type B procedures that will be performed.

* * * * *

(b) *Identification of types of assessment procedures.* The Assessment Plan must identify whether the authorized official plans to use a type A procedure, type B procedures, or a combination. Sections 11.34 through 11.36 contain standards for deciding which types of procedures to use. The Assessment Plan must include a detailed discussion of how these standards are met.

(c) *Specific requirements for type B procedures.* If the authorized official plans to use type B procedures, the Assessment Plan must also include the following:

(1) The results of the confirmation of exposure performed under § 11.37;

* * * * *

(d) *Specific requirements for type A procedures.* If the authorized official plans to use a type A procedure, the Assessment Plan must also contain the information described in subpart D.

7. Section 11.32 is amended by revising the heading and paragraph (c)(1) and adding a new paragraph (f)(3) to read as follows:

§ 11.32 How does the authorized official develop the Assessment Plan?

* * * * *

(c) *Public involvement in the Assessment Plan.* (1) The authorized official must make the Assessment Plan available for review by any identified potentially responsible parties, other natural resource trustees, other affected Federal or State agencies or Indian tribes, and any other interested member of the public for a period of at least 30 calendar days, with reasonable extensions granted as appropriate. The authorized official may not perform any

type B procedures described in the Assessment Plan until after this review period.

* * * * *

(f) * * *

(3) Paragraphs (f)(1) and (f)(2) of this section do not apply to the use of a type A procedure.

8. Section 11.33 is revised to read as follows:

§ 11.33 What types of assessment procedures are available?

There are two types of assessment procedures:

(a) Type A procedures are simplified procedures that require minimal field observation. Subpart D describes the type A procedures. There are two type A procedures: a procedure for coastal or marine environments, which incorporates the Natural Resource Damage Assessment Model for Coastal and Marine Environments, Version 2.4 (NRDAM/CME); and a procedure for Great Lakes environments, which incorporates the Natural Resource Damage Assessment Model for Great Lakes Environments, Version 1.4 (NRDAM/GLE).

(b) Type B procedures require more extensive field observation than the type A procedures. Subpart E describes the type B procedures.

9. Sections 11.34 and 11.35 are redesignated as §§ 11.37 and 11.38 and new §§ 11.34 through 11.36 are added to read as follows:

§ 11.34 When may the authorized official use a type A procedure?

The authorized official may use a type A procedure only if:

(a) The released substance entered an area covered by the NRDAM/CME or NRDAM/GLE. Section 3.4, Volume III of the NRDAM/CME technical document (incorporated by reference, see § 11.18) identifies the areas that the NRDAM/CME covers. Section 6.2, Volume III of the NRDAM/GLE technical document (incorporated by reference, see § 11.18) describes the areas that the NRDAM/GLE covers;

(b) The NRDAM/CME or NRDAM/GLE cover the released substance. Table 7.1, Volume I of the NRDAM/CME technical document lists the substances that the NRDAM/CME covers. Table 7.1, Volume I of the NRDAM/GLE technical document lists the substances that the NRDAM/GLE covers;

(c) The released substance entered water at or near the surface;

(d) At the time of the release, winds did not vary spatially over the area affected by the release in a way that would significantly affect the level or extent of injuries;

(e) The authorized official is not aware of any reliable evidence that, for species that are likely to represent a significant portion of the claim, the species biomass is significantly lower than the species biomass assigned by the NRDAM/CME or the NRDAM/GLE Tables IV.2.1 through IV.2.115 and IV.5.1 through IV.5.77, Volume III of the NRDAM/CME technical document list the species biomasses in the NRDAM/CME. Tables III.3.17 through III.3.27 and III.3.40 through III.3.50, Volume III of the NRDAM/GLE technical document list the species biomasses in the NRDAM/GLE ; and

(f) Subsurface currents either: are not expected to significantly affect the level or extent of injuries; or are reasonably uniform with depth over the water column in the area affected by the release.

§ 11.35 How does the authorized official decide whether to use type A or type B procedures?

(a) If the authorized official determines under § 11.34 that a type A procedure is available, the authorized official must then decide whether to use that procedure or use type B procedures. The authorized official must make this decision by weighing the difficulty of collecting site-specific data against the suitability of the averaged data and simplifying assumptions in the type A procedure for the release being assessed. The authorized official may use type B procedures if they can be performed at a reasonable cost and if the increase in accuracy provided by those procedures outweighs the increase in assessment costs. Section 1, Volume I of the NRDAM/CME technical document (incorporated by reference, see § 11.18) lists the simplifying assumptions made in the NRDAM/CME. Volumes III through IV of the NRDAM/CME technical document list the data in the NRDAM/CME. Section 1, Volume I of the NRDAM/GLE technical document (incorporated by reference, see § 11.18) lists the simplifying assumptions made in the NRDAM/GLE. Volume III of the NRDAM/GLE technical document lists the data in the NRDAM/GLE.

(b) The authorized official must use type B procedures rather than a type A procedure whenever a potentially responsible party:

(1) Submits a written request for use of type B procedures along with documentation of the reasons supporting the request; and

(2) Advances all reasonable costs of using type B procedures within a time frame acceptable to the authorized official.

(c) If there is no available type A procedure, the authorized official must use type B procedures to calculate all damages.

(d) Except as provided in paragraph (b) of this section, the authorized official may change the type of procedure used in light of comments received on the Assessment Plan. [See § 11.32(e)(2) to determine if the authorized official must provide for additional public review.] However, if the authorized official decides to use type B procedures in lieu of a type A procedure, and cannot confirm exposure under § 11.37, the authorized official may not then use a type A procedure.

§ 11.36 May the authorized official use both type A and type B procedures for the same release?

(a) The authorized official may use both a type A procedure and type B procedures for the same release if:

(1) The type B procedures are cost-effective and can be performed at a reasonable cost;

(2) There is no double recovery; and

(3) The type B procedures are used only to determine damages for injuries or compensable values that do not fall into the categories addressed by the type A procedure. [Sections 11.14(v) and 11.62 define ''injury.'' Section 11.83(c)(1) defines ''compensable value.'']

(b) The type A procedures address the following categories of injury and compensable value:

(1) Direct mortality of species covered by the NRDAM/CME or NRDAM/GLE resulting from short-term exposure to the released substance. Volume IV of the NRDAM/CME technical document (incorporated by reference, see § 11.18) lists the species that the NRDAM/CME covers. Section 3, Volume III of the NRDAM/GLE technical document (incorporated by reference, see § 11.18) lists the species that the NRDAM/GLE covers;

(2) Direct loss of production of species covered by the NRDAM/CME or NRDAM/GLE resulting from short-term exposure to the released substance;

(3) Indirect mortality of species covered by the NRDAM/CME or NRDAM/GLE resulting from disruption of the food web by direct mortality or direct loss of production;

(4) Indirect loss of production of species covered by the NRDAM/CME or NRDAM/GLE resulting from disruption of the food web by direct mortality or direct loss of production;

(5) Lost assimilative capacity of water column and sediments;

(6) Lost economic rent for lost commercial harvests resulting from any

closures specified by the authorized official and/or from population losses;

(7) Lost recreational harvests resulting from any closures specified by the authorized official and/or from population losses;

(8) For the type A procedure for coastal and marine environments, lost wildlife viewing, resulting from population losses, by residents of the States bordering the provinces in which the population losses occurred. [A province is one of the geographic areas delineated in Table 6.1, Volume I of the NRDAM/CME technical document.] For the type A procedure for Great Lakes environments, lost wildlife viewing, resulting from population losses, by residents of local areas bordering the provinces in which the population losses occurred. [A province is one of the geographic areas delineated in Table 8.1, Volume I of the NRDAM/GLE technical document.];

(9) Lost beach visitation due to closure; and

(10) For the type A procedure for Great Lakes environments, lost boating due to closure.

(c) If the authorized official uses both type A and type B procedures, he or she must explain in the Assessment Plan how he or she intends to prevent double recovery.

(d) When the authorized official uses type B procedures for injuries not addressed in a type A procedure, he or she must follow all of subpart E (which contains standards for determining and quantifying injury as well as determining damages), § 11.31(c) (which addresses content of the Assessment Plan), and § 11.37 (which addresses confirmation of exposure). When the authorized official uses type B procedures for compensable values that are not included in a type A procedure but that result from injuries that are addressed in the type A procedure, he or she need not follow all of subpart E, § 11.31(c), and § 11.37. Instead, the authorized official may rely on the injury predictions of the type A procedure and simply use the valuation methodologies authorized by § 11.83(c) to calculate compensable value. When using valuation methodologies, the authorized official must comply with § 11.84.

10. Newly designated § 11.37 is amended by revising the heading and paragraph (a) to read as follows:

§ 11.37 Must the authorized official confirm exposure before implementing the Assessment Plan?

(a) Before including any type B methodologies in the Assessment Plan, the authorized official must confirm that at least one of the natural resources identified as potentially injured in the preassessment screen has in fact been exposed to the released substance.

* * * * *

11. The heading of subpart D is revised to read as follows:

Subpart D—Type A Procedures

12. Section 11.40 is amended by revising the heading and paragraph (a), removing paragraph (b), removing the heading from paragraph (c), and redesignating paragraph (c) as paragraph (b) to read as follows:

§ 11.40 What are type A procedures?

(a) A type A procedure is a standardized methodology for performing Injury Determination, Quantification, and Damage Determination that requires minimal field observation. There are two type A procedures: the type A procedure for coastal and marine environments; and the type A procedure for Great Lakes environments. The type A procedure for coastal and marine environments incorporates a computer model called the Natural Resource Damage Assessment Model for Coastal and Marine Environments Version 2.4 (NRDAM/CME). The NRDAM/CME technical document (incorporated by reference, see § 11.18) includes and explains the NRDAM/CME. The type A procedure for Great Lakes environments incorporates a computer model called the Natural Resource Damage Assessment Model for Great Lakes Environments Version 1.4 (NRDAM/GLE). The NRDAM/GLE technical document (incorporated by reference, see § 11.18) includes and explains the NRDAM/GLE. The authorized official must follow §§ 11.41 through 11.44 when using the type A procedures.

(b) * * *

13. Section 11.41 is revised to read as follows:

§ 11.41 What data must the authorized official supply?

(a) The NRDAM/CME and the NRDAM/GLE require several data inputs to operate. The authorized official must develop the following data inputs:

(1) The identity of the released substance;

(2) The mass or volume of the identified substance that was released;

(3) The duration of the release;

(4) The time of the release;

(5) The location of the release;

(6) The wind conditions;

(7) The extent of response actions;

(8) The extent of any closures;

(9) The implicit price deflator; and

(10) For the NRDAM/CME, the condition of the currents and tides.

(b) The authorized official must change the data in the NRDAM/CME and the NRDAM/GLE for the following parameters if he or she is aware of more accurate data:

(1) Air temperature;

(2) Water temperature at the surface;

(3) Total suspended sediment concentration;

(4) Mean settling velocity of suspended solids; and

(5) Habitat type.

(c)(1) If the release occurred in Alaska and the authorized official is not aware of any reliable evidence that ice was absent from the site of the release, then he or she must turn on the ice modeling function. Otherwise, the authorized official must leave the ice modeling function off.

(2) If the release occurred in the Great Lakes and the authorized official is aware of reliable evidence that ice was absent from the site of the release, then he or she must turn off the ice modeling function.

(d) The authorized official must develop the data inputs and modifications and include them in the Assessment Plan in the format specified in Appendix II (for the NRDAM/CME) or Appendix III (for the NRDAM/GLE).

14. New §§ 11.42 through 11.44 are added to subpart D to read as follows:

§ 11.42 How does the authorized official apply the NRDAM/CME or NRDAM/GLE?

(a) The authorized official must perform a preliminary application of the NRDAM/CME or NRDAM/GLE with the data inputs and modifications developed under § 11.41. Volume II of the NRDAM/CME technical document (incorporated by reference, see § 11.18) describes how to apply the NRDAM/CME. Volume II of the NRDAM/GLE technical document (incorporated by reference, see § 11.18) describes how to apply the NRDAM/GLE. For cases involving releases of two or more substances or a release of a mixture of substances, the authorized official may only apply the NRDAM/CME or NRDAM/GLE once using only one of the substances.

(b) If the preliminary application of the NRDAM/CME or NRDAM/GLE indicates damages in excess of $100,000, then the authorized official must decide whether to:

(1) Limit the portion of his or her claim calculated with the type A procedure to $100,000; or

(2) Compute all damages using type B procedures.

§ 11.43 Can interested parties review the results of the preliminary application?

After completing the preliminary application of the NRDAM/CME or NRDAM/GLE, if the authorized official decides to continue with the type A procedure, he or she must issue an Assessment Plan for public comment as described in § 11.32. The Assessment Plan must include the information described in § 11.31, the data inputs and modifications developed under § 11.41, and a summary of the results of the preliminary application. The Assessment Plan must also identify a contact from whom a complete copy of the printout of the preliminary application can be obtained.

§ 11.44 What does the authorized official do after the close of the comment period?

(a) The authorized official must carefully review all comments received on the Assessment Plan, provide substantive responses to all comments, and modify the Plan as appropriate. [See § 11.32(e)(2) to determine if the authorized official must provide for additional public review.]

(b) If, after reviewing the public comments, the authorized official decides to continue with the type A procedure, he or she must then perform a final application of the NRDAM/CME or NRDAM/GLE, using final data inputs and modifications based on § 11.41 and any reliable information received during the public review and comment period.

(c) After completing the final application of the NRDAM/CME or NRDAM/GLE, the authorized official must prepare a Report of Assessment. The Report of Assessment must include the printed output from the final application as well as the Preassessment Screen Determination and the Assessment Plan.

(d) If the authorized official is aware of reliable evidence that a private party has recovered damages for commercial harvests lost as a result of the release, the authorized official must eliminate from the claim any damages for such lost harvests that are included in the lost economic rent calculated by the NRDAM/CME or NRDAM/GLE.

(e) If the authorized official is aware of reliable evidence that the NRDAM/CME or NRDAM/GLE application covers resources beyond his or her trustee jurisdiction, the authorized official must either:

(1) Have the other authorized official(s) who do have trustee jurisdiction over those resources join in the type A assessment; or

(2) Eliminate any damages for those resources from the claim for damages.

(f) If the final application of the NRDAM/CME or NRDAM/GLE, adjusted as needed under paragraphs (d) and (e), calculates damages in excess of $100,000, then the authorized official must limit the portion of his or her claim calculated with the type A procedure to $100,000.

(g) After preparing the Report of Assessment, the authorized official must follow the steps described in subpart F.

15. The heading of subpart E is revised to read as follows:

Subpart E—Type B Procedures

16. Section 11.73 is amended by revising the second sentence of paragraph (a) to read as follows:

§ 11.73 Quantification phase-resource recoverability analysis

(a) * * * The time estimated for recovery or any lesser period of time as determined in the Assessment Plan must be used as the recovery period for purposes of § 11.38 and the Damage Determination phase, §§ 11.80 through 11.84.

* * * * *

Subpart F—Post-Assessment Phase

17. Section 11.90 is amended by revising the heading, paragraphs (a) and (b), and the first sentence of paragraph (c) as follows:

§ 11.90 What documentation must the authorized official prepare after completing the assessment?

(a) At the conclusion of an assessment, the authorized official must prepare a Report of Assessment that consists of the Preassessment Screen Determination, the Assessment Plan, and the information specified in paragraphs (b) and (c) of this section as applicable.

(b) When the authorized official has used a type A procedure, the Report of Assessment must include the information specified in subpart D.

(c) When the authorized official has used type B procedures, the Report of Assessment must include all documentation supporting the determinations required in the Injury Determination phase, the Quantification phase, and the Damage Determination phase, and specifically including the test results of any and all methodologies performed in these phases. * * *

18. Section 11.91 is amended by revising the heading and by removing the first sentence of paragraph (a) and inserting three new sentences in its place to read as follows:

§ 11.91 How does the authorized official seek recovery of the assessed damages from the potentially responsible party?

(a) At the conclusion of the assessment, the authorized official must present to the potentially responsible party a demand in writing for the damages determined in accordance with this part and the reasonable cost of the assessment. [See § 11.92(b) to determine how the authorized official must adjust damages if he or she plans to place recovered funds in a non-interest-bearing account.] The authorized official must deliver the demand in a manner that establishes the date of receipt.

* * *

* * * * *

19. New Appendices II and III are added to read as follows:

Appendix II to Part 11—Format for Data Inputs and Modifications to the NRDAM/CME

This appendix specifies the format for data inputs and modifications to the NRDAM/CME under § 11.41. Consult the back of this appendix for definitions.

Starting Point for the NRDAM/CME

The NRDAM/CME begins its calculations at the point that the released substance entered water in an area represented by its geographic database. Any water within the geographic boundaries of the NRDAM/CME is a ''coastal or marine environment.'' The authorized official must determine all data inputs and modifications as of the time and location that the released substance entered a coastal or marine environment. In the case of a release that began in water in an area within the boundaries of the NRDAM/CME, this point will be the same as the point of the release. However, for releases that begin on land or that begin outside the boundaries of the NRDAM/CME, this point will not be the point of the release but rather the point at which the released substance migrates into a coastal or marine environment.

Required Data Inputs

Documentation of the source of the data inputs; and

Identity of Substance

For release of single substance:

Name of the substance that entered a coastal or marine environment as it appears in Table 7.1, Volume I of the NRDAM/CME technical document (incorporated by reference, see § 11.18).

For releases of two or more substances or a release of a mixture of two or more substances:

Name of only one of the substances that entered a coastal or marine environment as it appears in Table 7.1, Volume I of the NRDAM/CME technical document.

Mass or Volume

For release of single substance:

Mass or volume of identified substance that entered a coastal or marine environment

stated in tonnes, barrels, gallons, liters, pounds, or kilograms.

For releases of two or more substances or a release of a mixture of two or more substances:

Mass or volume of the one identified substance (rather than total mass) that entered a coastal or marine environment stated in tonnes, barrels, gallons, liters, pounds, or kilograms.

Duration

Length of time over which the identified substance entered a coastal or marine environment stated in hours.

Time

Year, month, day, and hour when the identified substance first entered a coastal or marine environment.

Location

Latitude and longitude, stated in degrees and decimal minutes, where the identified substance entered a coastal or marine environment.

Winds

At least one set of data on prevailing wind conditions for each day of the 30-day period beginning 24 hours before the identified substance entered a coastal or marine environment. Each set must include:

Wind velocity stated in knots or meters per second; and

Corresponding wind direction stated in the degree angle of the wind's origin.

[One possible source of information is the National Climatic Data Center, Asheville, NC (703) 271–4800.]

Response Actions

If removed from water surface:

A rectangular geographic area encompassing the surface water area over which the released substance was likely to have spread, stated in terms of the northern- and southern-most latitude, and the eastern- and western-most longitude;

One or more time frames for removal stated in terms of the number of days and hours after the identified substance entered a coastal or marine environment that removal began and ended; and

For each time frame, volume of the identified substance removed from the water surface (not the total volume of contaminated water or sediments removed) stated in barrels, gallons, or cubic meters.

If removed from shoreline:

A rectangular geographic area encompassing the shoreline area over which the released substance was likely to have spread, stated in terms of the northern- and southern-most latitude, and the eastern- and western-most longitude;

One or more time frames for removal stated in terms of the number of days and hours after the identified substance entered a coastal or marine environment that removal began and ended; and

For each time frame, volume of the identified substance removed (not the total volume of contaminated water or sediments removed) stated in barrels, gallons, or cubic meters.

Closures

Documentation that the closure was ordered by an appropriate agency as a result of the release;

Province(s) in which closure occurred; and

For beaches:

Whether the beach was Federal or State (including municipal or county);

Number of days of closure stated by calendar month; and

Length of shoreline closed, stated in kilometers, for each month in which closure occurred.

For fisheries and shellfish harvest areas:

Whether area closed was seaward open water, landward open water, or structured;

Number of days of closure; and

Area closed stated in square kilometers.

For furbearer hunting or trapping areas and waterfowl hunting areas:

Number of days of closure; and

Area closed stated in square kilometers.

Implicit Price Deflator

Quarterly implicit price deflator for the Gross National Product (base year 1992) for the quarter in which the identified substance entered a coastal or marine environment. [See the Survey of Current Business, published by the U.S. Department of Commerce/Bureau of Economic Analysis, 1441 L Street, NW, Washington, D.C., 20230, (202) 606–9900.]

Currents

For a rectangular geographic area encompassing the area affected by the release stated in terms of the northern- and southern-most latitude, and the eastern- and western-most longitude:

At least one set of data concerning background (mean) current consisting of—

An east-west (U) velocity stated in centimeters per second or knots;

A north-south (V) velocity stated in centimeters per second or knots; and

Latitude and longitude of the origin of the U and V velocity components.

At least one set of data concerning tidal current at time of flood stage (i.e., rising tide) consisting of—

An east-west (U) velocity stated in centimeters per second or knots;

A north-south (V) velocity stated in centimeters per second or knots; and

Latitude and longitude of the origin of the U and V velocity components.

[Possible sources of information are: the National Ocean Service, U.S. Department of Commerce, Riverdale, MD (310) 436–6990; and the Eldridge Tide and Pilot Book, Robert Eldridge White Publisher, Boston, MA (617) 742–3045.]

Tides

Hour of high tide on the day that the identified substance entered a coastal or marine environment;

Tidal range at point that the identified substance entered a coastal or marine environment stated in meters; and

Whether the tide in the area affected by the release is diurnal (i.e., completes one full cycle every day) or semi-diurnal (i.e., completes two full cycles every day).

Modifications to the NRDAM/CME Databases (if Any)

Documentation of the source of the modification; and

For air temperature:

Air temperature, stated in degrees Celsius, assigned by the NRDAM/CME at the point that the identified substance entered a coastal or marine environment (see Table III.3.2, Volume III of the NRDAM/CME technical document); and

Substitute air temperature stated in degrees Celsius.

For water temperature at the surface:

Water temperature at the surface, stated in degrees Celsius, assigned by the NRDAM/CME at the point that the identified substance entered a coastal or marine environment (see Table III.3.3, Volume III of the NRDAM/CME technical document); and

Substitute water temperature stated in degrees Celsius.

For total suspended sediment concentration:

Total suspended sediment concentration, stated in milligrams per liter, assigned by the NRDAM/CME at the point that the identified substance entered a coastal or marine environment (see Section 3, Volume I of the NRDAM/CME technical document); and

Substitute suspended sediment concentration stated in milligrams per liter.

For mean settling velocity of suspended solids:

Mean settling velocity of suspended sediments, stated in meters per day, assigned by the NRDAM/CME at the point that the identified substance entered a coastal or marine environment (see Section 3, Volume I of the NRDAM/CME technical document); and

Substitute suspended sediment concentration stated in milligrams per liter.

For habitat type:

Latitude and longitude bounds of area for which the habitat type is being modified;

Habitat type assigned by the NRDAM/CME (see Section 3.4, Volume III of the NRDAM/CME technical document); and

Substitute habitat type.

For releases in Alaska, if the authorized official leaves the ice modeling function off, he or she must provide documentation that ice was absent at the site of the release.

Definitions

Background (mean) current—net long-term current flow (i.e., one direction only), attributable to forces such as winds, river flow, water density, and tides, that remains when all the oscillatory (tidal) components have been removed either mathematically or by measurement techniques.

Landward open water—a body of water that does not contain vegetation (e.g., wetland, seagrass, or kelp) or invertebrate reef (e.g., coral reef) and is classified as ''landward'' in Table 6.2, Volume I of the NRDAM/CME technical document.

Province—one of the geographic areas delineated in Table 6.1, Volume I of the NRDAM/CME technical document.

Seaward open water—a body of water that does not contain vegetation (e.g., wetlands, seagrass, or kelp) or invertebrate reef (e.g., coral reef) and is classified as ''seaward'' in

Table 6.2, Volume I of the NRDAM/CME technical document.

Structured—in an area that contains vegetation (e.g., wetlands, seagrass, or kelp) or invertebrate reef (e.g., coral reef).

Tidal current—currents caused by alternating rise and fall of the sea level due to the gravitational forces between the earth, moon, and sun.

Tidal range—difference between the highest and lowest height of the tide.

Appendix III to Part 11—Format for Data Inputs and Modifications to the NRDAM/GLE

This appendix specifies the format for data inputs and modifications to the NRDAM/GLE under § 11.41. Consult the back of this appendix for definitions.

Point of Analysis

The NRDAM/GLE begins its calculations at the point that the released substance entered water in an area represented by its geographic database. Any water within the geographic boundaries of the NRDAM/GLE is a ''Great Lakes environment.'' The authorized official must determine all data inputs and modifications as of the time and location that the released substance entered a Great Lakes environment. In the case of a release that began in water in an area within the boundaries of the NRDAM/GLE, this point will be the same as the point of the release. However, for releases that begin on land or that begin outside the boundaries of the NRDAM/GLE, this point will not be the point of the release but rather the point at which the released substance migrates into a Great Lakes environment.

Required Data Inputs

Documentation of source of data inputs; and

Identity of Substance

For release of single substance:

Name of the released substance that entered a Great Lakes environment as it appears in Table 7.1, Volume I of the NRDAM/GLE technical document (incorporated by reference, see § 11.18).

For releases of two or more substances or a release of a mixture of two or more substances:

Name of only one of the released substances that entered a Great Lakes environment as it appears in Table 7.1, Volume I of the NRDAM/GLE technical document.

Mass or Volume

For releases of single substance:

Mass or volume of identified substance that entered a Great Lakes environment stated in tonnes, barrels, gallons, liters, pounds, or kilograms.

For releases of two or more substances or a release of a mixture of two or more substances:

Mass or volume of the one identified substance (rather than total mass) that entered a Great Lakes environment stated in tonnes, barrels, gallons, liters, pounds, or kilograms.

Duration

Length of time over which the identified substance entered a Great Lakes environment stated in hours.

Time

Year, month, day, and hour when the identified substance first entered a Great Lakes environment.

Location

Latitude and longitude, stated in degrees and decimal minutes, where the identified substance entered a Great Lakes environment.

Winds

At least one set of data on prevailing wind conditions for each day of the 30-day period beginning 24 hours before the identified substance entered a Great Lakes environment. Each set must include:

Wind velocity stated in knots or meters per second; and Corresponding wind direction stated in the degree angle of the wind's origin.

[One possible source of information is the National Climatic Data Center, Asheville, NC (703) 271–4800.]

Response Actions

Percentage of identified substance removed from water surface, bottom sediments, and shoreline; and

For each medium cleaned (water surface, bottom sediments, or shoreline), the number of days after the identified substance entered a Great Lakes environment that removal began and ended.

Closures

Documentation that the closure was ordered by an appropriate agency as a result of the release; and

For boating areas:

Number of weekend days of closure stated by calendar month;

Number of weekday days of closure stated by calendar month; and

Area closed stated in square kilometers.

For beaches:

Whether the beach was Federal or State (including municipal or county);

Number of days of closure stated by calendar month; and

Length of shoreline closed stated in meters.

For fisheries:

Whether area closed was an offshore, nearshore, or wetland fishery;

Number of days of closure; and

Area closed stated in square kilometers.

For furbearer hunting or trapping areas and waterfowl hunting areas:

Number of days of closure; and

Area closed stated in square kilometers.

Implicit Price Deflator

Quarterly implicit price deflator for the Gross National Product (base year 1992) for the quarter in which the identified substance entered a Great Lakes environment. [See the Survey of Current Business, published by the U.S. Department of Commerce/Bureau of Economic Analysis, 1441 L Street, NW, Washington, D.C., 20230, (202) 606–9900.]

Modifications to the NRDAM/GLE Databases (if Any)

Documentation of the source of the modifications; and

For air temperature:

Air temperature, stated in degrees Celsius, assigned by the NRDAM/GLE at the point that the identified substance entered a Great Lakes environment (see Table III.6.1, Volume III of the NRDAM/GLE technical document); and

Substitute air temperature stated in degrees Celsius.

For water temperature at the surface:

Water temperature at the surface, stated in degrees Celsius, assigned by the NRDAM/GLE at the point that the identified substance entered a Great Lakes environment (see Table III.6.2.6, Volume III of the NRDAM/GLE technical document); and

Substitute water temperature stated in degrees Celsius.

For total suspended sediment concentration:

Total suspended sediment concentration, stated in milligrams per liter, assigned by the NRDAM/GLE at the point that the identified substance entered a Great Lakes environment (see Section 3, Volume I of the NRDAM/GLE technical document); and

Substitute suspended sediment concentration stated in milligrams per liter.

For mean settling velocity of suspended solids:

Mean settling velocity of suspended sediments, stated in meters per day, assigned by the NRDAM/GLE at the point that the identified substance entered a Great Lakes environment (see Section 3, Volume I of the NRDAM/GLE technical document); and

Substitute suspended sediment concentration stated in milligrams per liter.

For habitat type:

Latitude and longitude bounds of area for which the habitat type is being modified;

Habitat type assigned by the NRDAM/GLE (see Section 6.2, Volume III of the NRDAM/GLE technical document); and

Substitute habitat type.

If the authorized official turns off the ice modeling function, then he or she must provide documentation that ice was absent from the site of the release.

Definitions

Nearshore fishery—fishery in an open water area that is less than 30 feet in depth or is in a connecting channel.

Offshore fishery—fishery in an open water area that is 30 feet or more in depth.

Wetland fishery—fishery that is not in an open water area.

Dated: April 25, 1996.

Bonnie R. Cohen,

Assistant Secretary—Policy, Management, and Budget.

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