EXECUTIVE SUMMARY

ES.1 INTRODUCTION

This manual is intended as a training tool and information resource for U.S. Department of the Interior (DOI) Fish and Wildlife Service field personnel in the application of economics to assess damages resulting from the release of oil or other hazardous materials to the environment. The purpose of the manual is not to provide a step-by-step guide for the conduct of primary economic analyses, but to provide a better understanding of how economics fits within the overall damage assessment process. With this understanding, Service personnel can work to assure that injury studies which are performed are of maximum benefit to the overall damage assessment process. In particular, this manual provides field personnel with:

- An understanding of the techniques that are often applied to generate economic damage claims for use in settlement negotiations;
- A basic understanding of the types of economic tools that may be applied in more complex and large-scale cases; and,
- A general understanding of the types of information required to support an economic damage claim.

This manual does **not** represent official DOI or Fish and Wildlife Service guidance or policy. The opinions and assertions expressed in this manual are solely those of the authors. In addition, this manual assumes a basic understanding of natural resource damage assessment. While an overview of the natural resource damage assessment process is included, this manual addresses only economic damage assessment in detail.

The purpose of this Executive Summary is to provide an overview of the issues and questions addressed in this manual.

ES.2 An Overview of Natural Resource Damage Assessment

Chapters 1 and 2 provide a general overview of the role of economics in damage assessment. Chapter 1 defines important concepts within damage assessment, and notes that:

- Natural resource damages are separate, distinct from, and residual to remedial activities and spill response actions;
- The principal goal of the damage assessment process is timely restoration of all injured resources;
- The secondary goal of the damage assessment process is to recover compensable values and assessment costs;
- The "value" of a natural resource is the economic value of the services provided by the resource;
- The "services" provided by a resource include all services provided to humans or other resources, including nonconsumptive and passive use services;
- The categories of economic loss that are compensable include changes in consumer surplus or economic rent and reductions in fees or payments for use of a resource;
- The categories of economic damage that <u>are not</u> compensable include taxes foregone, lost wages or other personal income, and losses associated with speculative uses of a resource;
- A relationship exists between restoration costs and compensable values within a damage claim (i.e., trustees should find a balance between these two components of economic damage); and,
- The Department of Interior is a trustee for a wide-range of natural resources over a broad geographic area.

Chapter 2 outlines the steps for conducting natural resource damage assessments under DOI's final rule and NOAA's proposed rule, focusing on the role of economics in the damage assessment process. This chapter presents readers with two general guidelines. First, a preliminary damage estimate, including both restoration costs and compensable values, should be established early in the damage assessment process. This estimate should be updated on a regular basis as additional information is obtained. These estimates need not be made public, but can be used simply to support management of the damage assessment process, and to assure that the costs incurred in conducting the assessment are reasonable. Second, economics has an important role in the restoration alternative selection and costing process. Specifically, the selection of an appropriate restoration option may require the balancing of restoration costs with compensable losses, consideration of the cost-effectiveness of available options, and consideration of the relationship between expected costs

and benefits of proposed restoration options. In addition, economic tools are used to assure that sufficient funds are recovered to allow for completion of selected restoration options.

Chapter 2 also provides guidance on the selection of a damage assessment approach, including descriptions of each of the assessment procedures available under DOI's and NOAA's rules. In addition, brief reviews of issues encountered in data gathering to support compensable value determination, including the need for focused studies and the challenges in dealing with perishable data, are addressed in this chapter.

ES.3 Restoration Costing for Purposes of Natural Resource Damage Assessment

The primary goal of any damage assessment is the full restoration of all injured resources and the services those resources provide. A common problem encountered by trustees in natural resource damage assessment is understating the likely costs of restoration actions, leading to under-recovery of economic damages (i.e., funds recovered are insufficient to support the restoration actions envisioned by the trustees). In addition, responsible parties often reject trustee restoration cost claims as inaccurate, incomplete or poorly documented. Such concerns on the part of the responsible party can slow the settlement negotiation process and delay restoration of injured resources. Thus, Chapter 3 provides a framework for the generation of accurate and complete restoration cost estimates within a CERCLA, CWA or OPA damage claim. Specifically, this chapter describes:

- DOI's and NOAA's rules for restoration costing for purposes of damage assessment under CERCLA, CWA and OPA, including the role of cost in restoration alternative selection, the categories of cost that can be included in a claim, and cost estimating methodologies;

- The potential for pooling recoveries from several releases or sites to fund regional restoration actions;

- The application of a phased approach to restoration planning;

- Typical restoration cost components (e.g., planning costs, implementation costs, program evaluation and monitoring costs);

- The importance of accounting for time in estimating restoration costs (e.g., expected changes in the cost of the project over time, the expected lifespan of capital equipment, the timing of recurrent expenses, and the need to estimate the rate of return (i.e., interest) on recovered funds); and

- Various factors that may introduce uncertainty into the restoration costing process. While it is impossible to account for all sources of uncertainty in a restoration cost estimate, all efforts should be made to account for obvious sources of uncertainty and to make the assumptions used in accounting for these factors explicit in the restoration cost claim. In addition, in some cases, it may be advantageous to allow

the responsible party to undertake the restoration action directly, in order to reduce the exposure of the trustee to this source of uncertainty.

ES.4 Primary and Secondary Methods for Compensable Value Determination

The second component of a claim for natural resource damages is compensation of the public for the interim loss of the injured resources' services. The monetized value of the interim lost services is known as "compensable value." Compensable values can be estimated in a number of ways, depending on the specific characteristics of the damage assessment. In certain cases, the results of existing research can be applied. This technique, referred to as "benefits transfer," is the subject of Chapter 5. In other instances, primary research may be required. Primary research involves collection of original data, and/or development of a model or valuation function specific to the case at hand. The range of primary research techniques that can be applied to estimate compensable values, as identified in the DOI and NOAA rules, is the subject of Chapter 4.

The purpose of Chapter 4 is not to provide step-by-step instructions for the conduct of primary economic research. Rather, this chapter provides field staff who have little or no formal training in economics with a basic understanding of economic tools that may be applied in damage assessment. More specifically, this chapter:

- Provides guidance for conducting primary research in simple assessments;
- Provides a general understanding of more complex valuation methods to allow field staff to conduct assessment planning and management activities for more complex cases; and
- Allows field staff to recognize the potential for claims based on various valuation approaches.

In addition, a better understanding of these techniques will help Service staff in drawing on the results of these types of studies in the context of benefits transfer.

Chapter 4 first provides an overview of the concept of consumer surplus, the proper measure of economic loss in damage assessment. This chapter then provides descriptions of six classes of valuation techniques. These include market-based approaches (e.g., market demand and supply models, fee losses, and the appraisal methodology); added or averted cost approaches; revealed preference techniques (e.g., travel cost and property valuation models); the factor income approach; contingent valuation; and habitat equivalency. Each of these sections include a non-technical explanation of the technique, including the data requirements, examples of the ways in which the technique can be applied, and the technique's advantages and disadvantages. Two examples of the application of the habitat equivalency approach are provided. Since no one method will typically capture call categories of damage resulting from a release event, multiple methods are commonly applied. Thus, this chapter also describes how to identify and account for double counting.

Chapter 5 describes the "benefits transfer" method for assessing economic damages resulting from injury to natural resources, and provides detailed guidance for the application of this technique. Benefits transfer involves the application of value estimates, functions, data and/or models developed in one context to address a similar resource valuation question in an alternative context. In natural resource damage assessment, benefits transfer is often employed:

- When there is insufficient time or financial resources to gather primary data to support a full damage assessment;
- To generate preliminary, or "back-of-the-envelope," compensable loss estimates for purposes of damage assessment planning and budgeting; and/or
- When the expected magnitude of the damage claim does not justify the cost of primary research.

Chapter 5 provides discussion of (1) steps for conducting benefits transfer; (2) uses and types of benefits transfer; (3) limitations of benefits transfer; (4) commonly referenced sources of valuation studies; and (5) the use of public and private expenditures and activities data as a means to infer resource values.

ES.5 The Role of Time in Natural Resource Damage Assessment

In many cases natural resource damages will occur over an extended period of time. For example, the release of hazardous contaminants from an uncontrolled waste disposal site may have resulted in the loss of natural resource services in the past. In addition, these losses may be expected to continue into the future, pending full restoration of the resource. Similarly, trustees may have incurred natural resource damage assessment costs in the past, and may expect to incur costs associated with resource restoration in the future. Under DOI's final rule and NOAA's proposed rule, trustees are expected to present a single, "present value" damage claim to the responsible party. Thus, in many cases, it will be necessary for trustees to apply the concept of "discounting" to a damage claim. The application of appropriate discounting rules is necessary to assure that the public is appropriately compensated for compensable losses, made whole for the cost of conducting the damage assessment, and provided with sufficient funds for the completion of necessary restoration actions.

Chapter 6 provides a general introduction to discounting and capital budgeting for purposes of natural resource damage assessment. Addressed are:

- The need to discount past and future compensable losses in developing a present value damage claim;
- The need to put damage assessment costs in present value terms; and,
- The capitalization of future restoration costs.

Specifically, this chapter provides a brief introduction to the key concepts in discounting; reviews DOI's and NOAA's guidance on discounting in the context of natural resource damage assessments; recommends an approach for discounting past and future compensable losses; recommends an approach for calculating the present value of past and expected future damage assessment and response costs; and provides guidance on capital budgeting for purposes of generating a present value restoration cost claim.

ES.6 Uncertainty in Damage Assessment

Uncertainties exist in any damage claim. For example, it may be difficult to establish the exact number of birds or fish killed as a result of an oil spill, to estimate the time period required for full recovery of a resource, or to measure the public's willingness to pay for an environmental improvement. Uncertainty in the context of damage assessment often extends beyond standard measures of statistical confidence to cases in which little or no primary data are available to support development of a claim. This is especially true for preliminary damage estimates developed for purposes of assessment planning or settlement negotiations.

Chapter 6 outlines the various factors that introduce uncertainty into an economic damage estimate. It also proposes a value of information approach for determining whether to undertake additional research to reduce such uncertainties. The value of information framework allows analysts to consider whether the cost of additional research is warranted given the likely improvement in the accuracy or precision of the final estimate. This approach can be applied to any phase of the damage assessment process as a means to establish priorities for potential data gathering and analytic tasks.