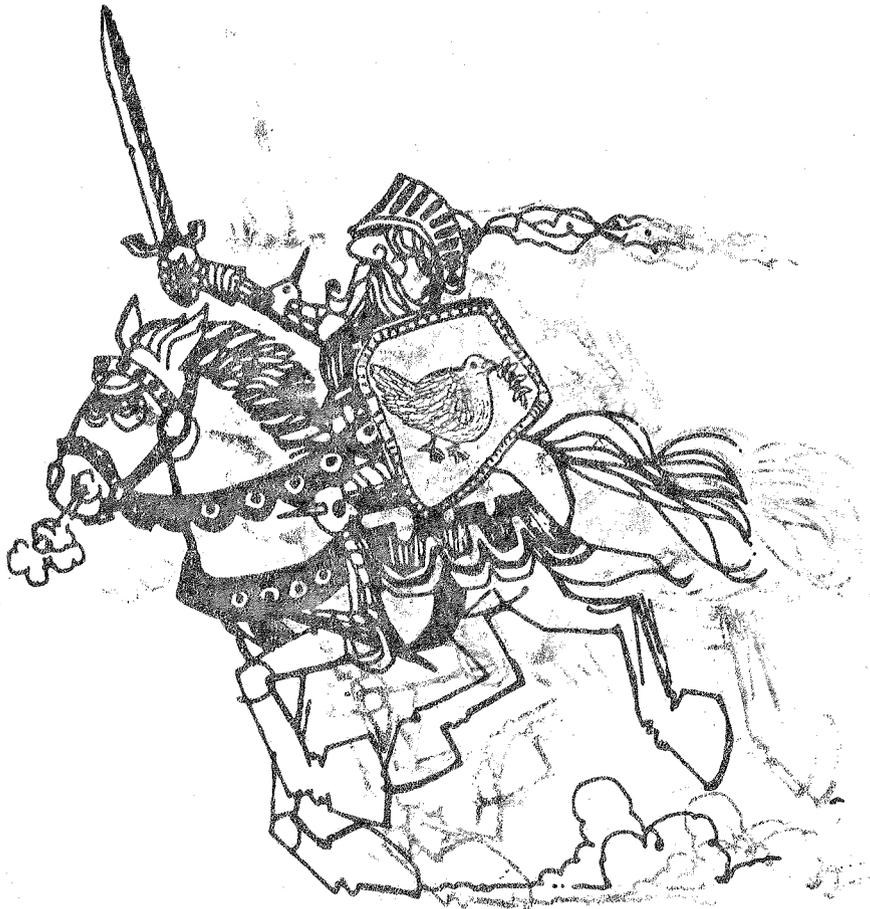


A GUIDE TO THE ANALYSIS OF SIGNIFICANCE



ENVIRONMENTAL RESOURCES SECTION
SEATTLE DISTRICT
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SEATTLE, WASHINGTON

1 APRIL 1983

Executive Summary

Significance analysis is a process by which the importance of resources in a region of influence and the importance of impacts of various deployment alternatives on resources identified as significant are determined. Significance determinations play a major role in environmental impact analysis in the planning process and are key to determining what will be done in response to a defined impact to a resource. This guide will assist the user in understanding significance analysis and its importance and will provide the user with a systematic approach for applying it to real world situations. The guide was written to be suitable for use by two major groups: (1) the practitioners who are professionals in environmental disciplines and (2) involved managers who may have no formal environmental training.

Key points highlighted in the "guide" include:

- Significance of the basic resources must be determined before a judgment on the significance of impacts can be made.

- A model of significance presents multiple levels and multiple thresholds.

- A number of "tests" are utilized to facilitate significance analysis: legal, political/public, and professional judgment.

- The steps of impact assessment are (1) identify significant resources, (2) predict changes in resources, (3) define the magnitude of resource changes, (4) judge the significance of resource changes, and (5) determine the consequences of impact significance. Significance analysis occurs in steps 1 and 4 and plays a role in step 5.

- The consequences of identified significant impacts are discussed in terms of impacts that need to be included in NEPA documentation, impacts that require mitigation or a change in deployment alternative, and impacts that singly or in combination require preparation of an environmental impact statement.

- After following a highly systematic process that emphasizes professional judgment, the analysis of significance still requires a major ingredient of common sense.

The underlying message is not that the finding of significance is a "problem" that will "stop the project," but is an ingredient of planning that will potentially result in a better project. To find and admit "significant impacts" will not stop a project necessarily, but to fail to perceive and address such impacts positively will clearly threaten projects.

A GUIDE TO THE ANALYSIS OF SIGNIFICANCE

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SECTION I.
GENERAL PRINCIPLES

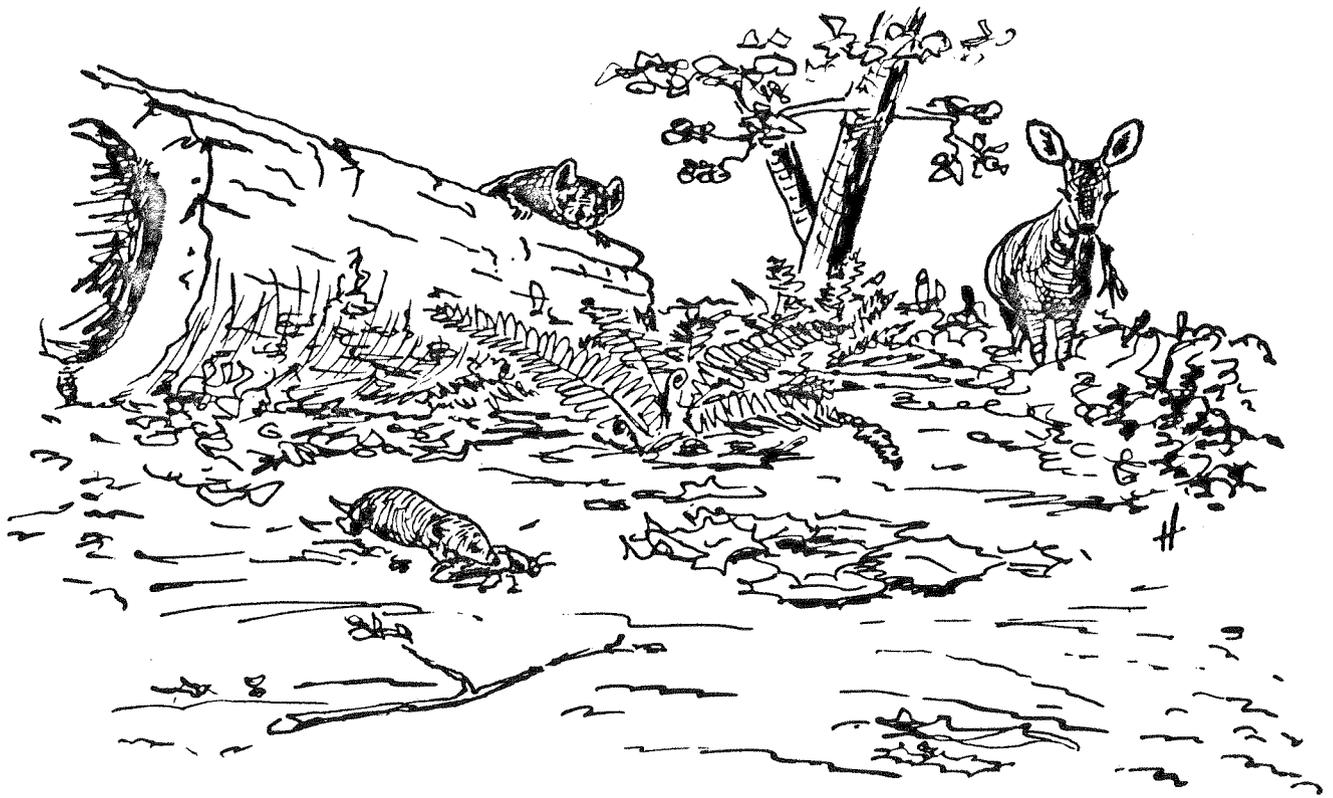


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I. INTRODUCTION TO THE GUIDE

1. Introduction to the Guide

The purpose of the guide is to assist the user in understanding the subject of environmental significance, its limitations and constraints and importance and use, and to present a process for analyzing significance as it relates to decisionmaking in BMDSCOM planning. The guide is a combination of concepts and processes, philosophy, and "how-to" methods, all considered essential to perform meaningful and systematic analyses of significance.

The guide will aid the user in:

- Understanding what significance analysis is and why it is important.
- Defining the interrelationship between planning, impact assessment, and significance analysis.
- Conducting significance analysis in a systematic manner.
- Applying significance analysis in real world situations for BMDSCOM planning.

Explaining significance is a challenging task. Webster sets forth a number of definitions of "significant," "significance," and "significantly." Among them are "having or likely to have influence or effect," "weighty," "of moment," "important," "of consequence," and "having meaning," but all of them seem to have the same limitation: the defining words themselves need definition. One can improve understanding if consideration is given to the adjective "significant," the noun "significance," and the adverb "significantly" as they have been used in environmental planning and as they have evolved and are evolving in that use over the past 20 years or so. Thus, for purposes of this guide, "significance" is defined as the attribute(s) of an environmental resource or impact that result in it being of sufficient "importance" that the environmental planner and decisionmaker must do something about it.

Merely defining significance, however, is not enough. It is important to place the concept in the proper context of the environmental planning process. What is significance analysis and what is its purpose? How does significance analysis fit into the decisionmaking process and what adjustments to the eventual project does it catalyze? Significance, we shall find, comes in a variety of forms, with different levels and kinds, depending on the resources or impacts under analysis, the degree of public awareness and understanding of the proposal, and numerous

other factors. The following portions of this guide attempt to provide insights into the role of significance analysis in planning, first with respect to the overall process and then with focus on specific resource issues.

The central theme in section II, for instance, is that the reasonable point of view is not that the finding of significance is a "problem" that will "stop the project," but is an ingredient of planning that will potentially result in a better project. To find and admit "significant impacts" will not stop a project necessarily, but to fail to perceive and address such impacts positively will clearly threaten projects. The methods by which significance is recognized and addressed (i.e., evaluated in the decision process, mitigated, documented) are also explained in section II.

In section III, IV, and V, the guide articulates the thinking of the professional planner in several basic disciplines. A generalized and systematic process is presented, but with the caution that no "by-the-numbers" procedural methodology will always lead to total resolution in matters of significance. Ample allowance must be made to incorporate reason, judgment and common sense.

The guide was written to be suitable for use by two major groups: (1) the practitioners who are professionals in environmental disciplines and (2) involved managers who may have no formal environmental training. Considerable effort has gone into developing a sound analytic framework which is as straightforward as possible and which emphasizes practical application. To aid the systematic presentation, many format and editorial tools are utilized to emphasize key points, and to assist the user in establishing and maintaining an organized thought pattern throughout the guide.

A final introductory point, perhaps the most important of all, is that the effectiveness of this guide as an environmental planning tool is, like that of any tool, directly dependent upon the amount of use it gets and the expectations and expertise of the users. There must be, first of all, a goal of sound environmental planning. Second, users must be prepared to invest planning resources - trained personnel and reasonable funds - to implement the principles and procedures explained. If these prerequisites are met, the guide will contribute "significantly" to the successful accomplishment of the BMDSCOM mission.



2. SIGNIFICANCE - AN OVERVIEW

2. Significance - An Overview

Prior to passage of the National Environmental Policy Act (NEPA), few development agencies had the interdisciplinary environmental staffs which some now have. Instead, these agencies, to the extent they engaged in environmental planning at all, relied on professionals in state and Federal conservation agencies (e.g., state fish and game agencies, and the U.S. Fish and Wildlife Service). These professionals were management-oriented with many duties in that arena, so planning was necessarily a secondary concern. Consequently, they used the term "significant" seemingly ubiquitously as a professional judgment to cover for a lack of hard facts. The wildlife habitat value in a foothill canyon was said, for example, to be "significant," as was the impact of virtually any roadbuilding, borrowing, or deployment proposal for that canyon. The term could be, and was, mixed and matched with "relatively" and the prefix "in" to provide a smorgasbord of vague terms to describe resources and compare potential impacts on them.

Passage of NEPA largely changed this casual use of the term "significant" because it had now become a word that meant something - it meant, at least in some cases, that an agency might have to "do an EIS."^{1/}

Federal agencies began to define significance in terms of their activities, preparing lists of those that were "major Federal actions" having a significant impact upon the "quality of the human environment," and those that weren't - activities for which EIS's were required and those for which an EIS was not required.

Initially, many agencies defined the majority of their activities to fall into the latter category, but increasingly, environmental interest groups, growing interdisciplinary staffs in development agencies, and others who were very active in the "environmental decade" sought to have "significance" for purposes of NEPA determined in terms of resources and impacts on them. The President's Council on Environmental Quality (CEQ), influenced largely by these environmentalists, and litigation, or threats of litigation (but also by the environmental priority established by the Administration during the late 1970's), defined significance in this way in a revision of their earlier guidelines.

^{1/}"Environmental" acquired a new meaning with NEPA, too. Previously it had been largely perceived as being a biological or natural science term, but now it had come to include social and economic resources and concerns - public health and safety, education, transportation, and community infrastructure, for example.)

This definition, binding on all Federal agencies was published in November 1978: ^{1/}

§ 1508.27 Significantly.

"Significantly" as used in NEPA requires considerations of both context and intensity:

(a) *Context.* This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) *Intensity.* This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

(1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

(2) The degree to which the proposed action affects public health or safety.

(3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

(4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.

(5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

(6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

(7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

(8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

(9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

(10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment. ^{2/}

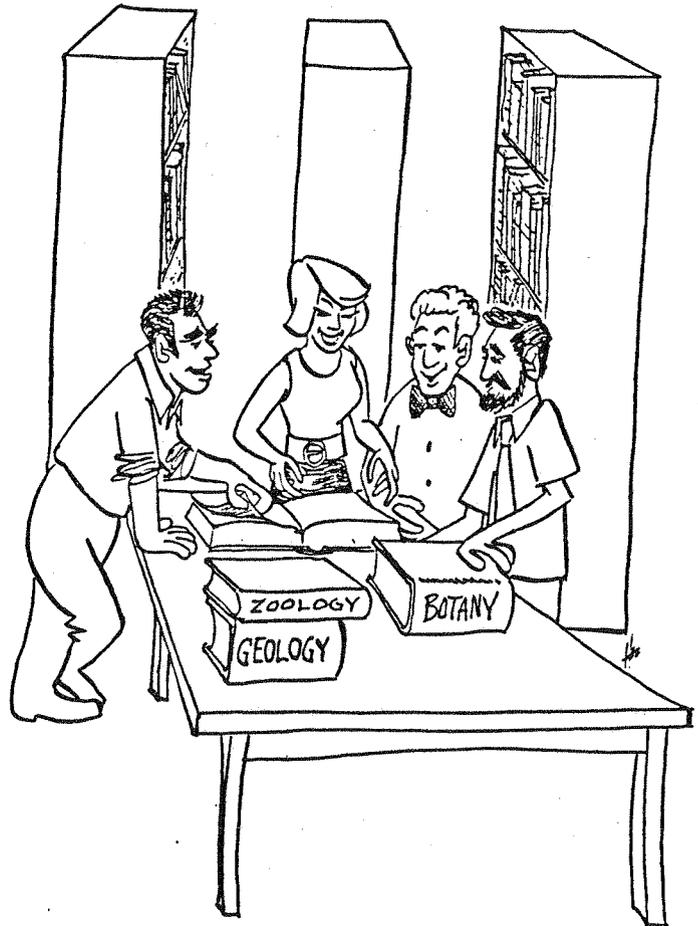
^{1/}Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, 43 FR 55978-56007, November 29, 1978, 40 CFR Parts 1500-1508.

^{2/}The content, both in substance and intent, of the CEQ regulation is incorporated in later chapters of this guide; notable examples of direct applicability may be seen in chapters 11 and 12. Similarly, AR 200-2 is an implementation regulation that is supplementary to the CEQ rules.

While this definition was finally made formal only as late as 1978, the process that led to it had been going on for several years. It is this evolution of agency planning procedures that has resulted in increasingly sophisticated and insightful environmental planning concepts and the labels given these concepts - "mitigation," "short- and long-term impacts," "cumulative impacts," "direct and indirect impacts" and "significance." Thus, NEPA, whether it was intended or not, became a driving force for fundamental upheavals in agency planning procedures, probably its most dramatic result, though not the most immediately visible one (EIS's are clearly the most well-known of NEPA results). This NEPA-inspired metamorphosis of agency planning has been ably chronicled and analyzed in the literature.

As development agencies began to gain experience with NEPA and its planning requirements and as they developed environmental staffs, the original "professional judgment" usage of "significance" became more sophisticated, developing into a legitimate technique of analysis that was the province of trained environmental planners continually gaining experience. But there was also a new type of definition masked somewhat by other words in new environmental laws and administrative directives subsequent to NEPA (Endangered Species Act, Clean Water Act Amendments, etc.). If, for instance, a "wild and scenic" river, "prime or unique agricultural land," or "threatened or endangered" species was involved, there was a need to treat these as "significant" in the planning process and to deal with them procedurally as well as consider various mitigation measures if an impact on these "significant" environmental resources was judged to be "significant." So there developed the professional planner's treatment of "significant" as well as laws dealing with specific significant resources that were both aside from the question of whether or not the proposal at hand did or did not "significantly" impact the human environment and, therefore, required an EIS.

Given this brief history of the evolving, dynamic nature of the concept we call significance, what can be learned that will be useful in today's planning? Can one formulate criteria as to when, why, and how a resource or impact might fit into one of the categories or levels of significance? What happens when significance is recognized? Equally important, how can we recognize when something is not significant and what do we do if this is the case? These questions are addressed in the chapters to follow.



3. WHAT IS SIGNIFICANCE ANALYSIS?

3. What is Significance Analysis?

3.1 Definition of Significance Analysis. Basic to establishment of a common framework for environmental significance analysis is a definition of what significance analysis is, who performs it, where and when it is performed, and why it is important.

What is environmental significance analysis?

Environmental significance analysis is a process by which the importance of resources in a region of influence (ROI)^{1/} and the importance of impacts of various deployment alternatives^{2/} on resources identified as significant are determined.

Is environmental significance analysis the same as statistical significance analysis?

No. Significance analysis used in statistics is a calculation by which sample results are used to determine the acceptance, or rejection, of a specific hypothesis. This statistical analysis or "test" is highly defensible scientifically and may be used by the environmental practitioner as a tool to determine if there is a real difference or correlation at a specified level of confidence. The "test," however, does not in itself give the importance of the difference; rather, it indicates only whether the observed difference is statistically real or not. In environmental planning, the practitioner must judge the importance of that change. The assignment of a level of importance is the process of environmental significance analysis, which will hereafter be referred to in this guide as significance analysis.

^{1/}Region of influence is the environment(s) likely to be affected by the construction and operation of any one of the various deployment alternatives.

^{2/}For ease of presentation, only one of the phases of the life cycle of BMD is referenced in this guide. The four phases are: (1) Research, Development, and Testing; (2) Production; (3) Deployment; and (4) Decommissioning and Disposal.

Who performs significance analysis?

Significance analysis is performed by an interdisciplinary planning team.

Where does significance analysis occur?

Significance analysis is an integral part of any defense planning effort and occurs in the impact assessment step of planning for all project stages, including initial planning, design, construction, operation, maintenance, and decommissioning.

When does significance analysis occur?

Significance analysis begins in the early stages of planning and is repeated and refined through successive iterations as additional information is gained regarding the ROI resources and deployment alternatives.

Why is significance analysis important?

Whether a resource or an impact of a deployment alternative on that resource is determined to be significant can affect one or more of the following:

- Political/public^{1/} acceptance of the deployment alternative.
- Cost and timing of the deployment alternative.
- Extent of unavoidable adverse impacts associated with the deployment alternative (i.e., significant impacts to significant resources are likely to be avoided or mitigated).
- Effectiveness of the deployment alternative in meeting defense needs.

Because of the major effects determinations of significance can have on a deployment alternative's acceptance, cost, timing, and effectiveness, the performance of significance

^{1/}For the purpose of this guide, public is defined as Federal, state, and local agencies, Indian tribes, interest groups, organizations, and individual private citizens.

analysis becomes essential for the provision of key input to decisions made throughout planning regarding:

- Formulation and design of deployment alternatives.
- Selection of a deployment alternative for implementation.
- Development of mitigation.
- Environmental documentation.

The key role that significance analysis plays in the planning of deployment alternatives emphasizes the need for a systematic and well documented approach for determining significance.

3.2 The Relationship of Significance Analysis to the Planning and Decisionmaking Process. A familiarization with the overall planning process, the impact assessment stage of planning, and the relationship of significance analysis to these processes will provide a foundation for understanding the complexity of significance. General knowledge of these processes will establish a reference point for significance analysis and will remind the user that as decisionmaking occurs throughout planning, significance analysis provides continual input to decisions made and is an integral aspect of the process itself, rather than merely being one of its end products.

The Planning Process

The steps of the planning process are as follows:

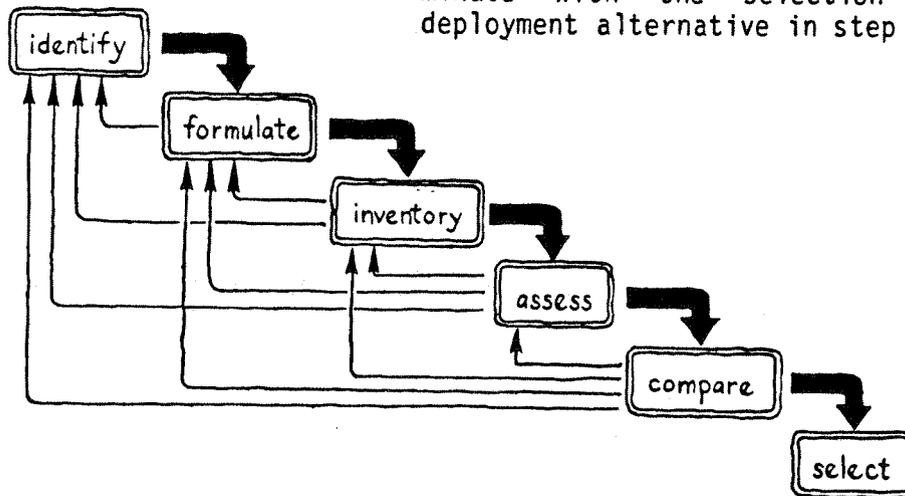
1. Identify defense needs.
2. Formulate deployment alternatives to meet those needs.
3. Inventory^{1/} resources of the ROI for the alternatives formulated.
4. Assess the impacts of each alternative on the resources of the ROI.

^{1/}In the context of this guide, resource inventory is presented as a separate step of the planning process although it is often considered a part of the impact assessment process.

5. Evaluate and compare alternatives in terms of meeting defense needs and engineering, economic, and environmental criteria.

6. Select a deployment alternative.

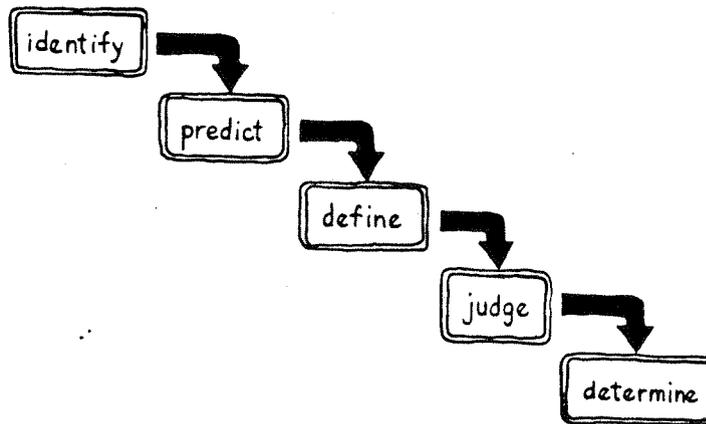
Steps one through five are repeated throughout planning with shifting emphasis and increasing level of detail commensurate with the study schedule and funding level and terminate with the selection of a deployment alternative in step 6.



The Impact Assessment Process

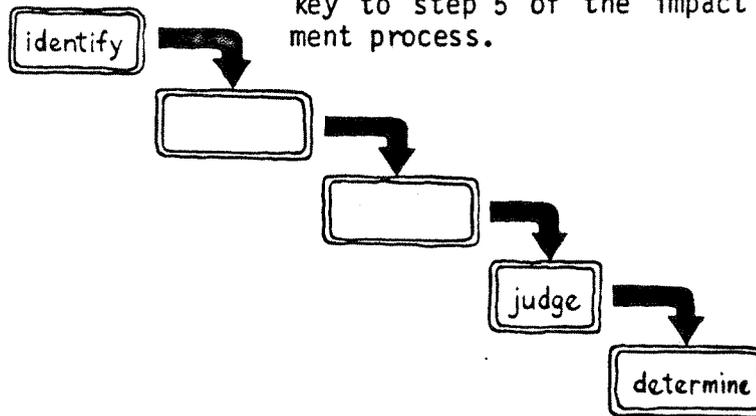
The steps of the impact assessment process (step 4 of the planning process) are as follows:

1. Identify which resources are significant.
2. Predict changes in resources from deployment alternatives.
3. Define the magnitude/scale of resource changes.
4. Judge the significance of resource changes.
5. Determine the consequences of impact significance.



Significance Analysis

Significance analysis occurs in steps 1 and 4, and its results are key to step 5 of the impact assessment process.



Significance analysis involves:

- Testing for the significance of resources in the ROI and of impacts of the deployment alternatives on those resources. In this guide, the major tests of significance are:

- (1) Legal Criteria
- (2) Political/Public Criteria
- (3) Professional Judgment Criteria

These tests involve addressing key questions about the resource or impact which will lead the user to an evaluation of its significance.

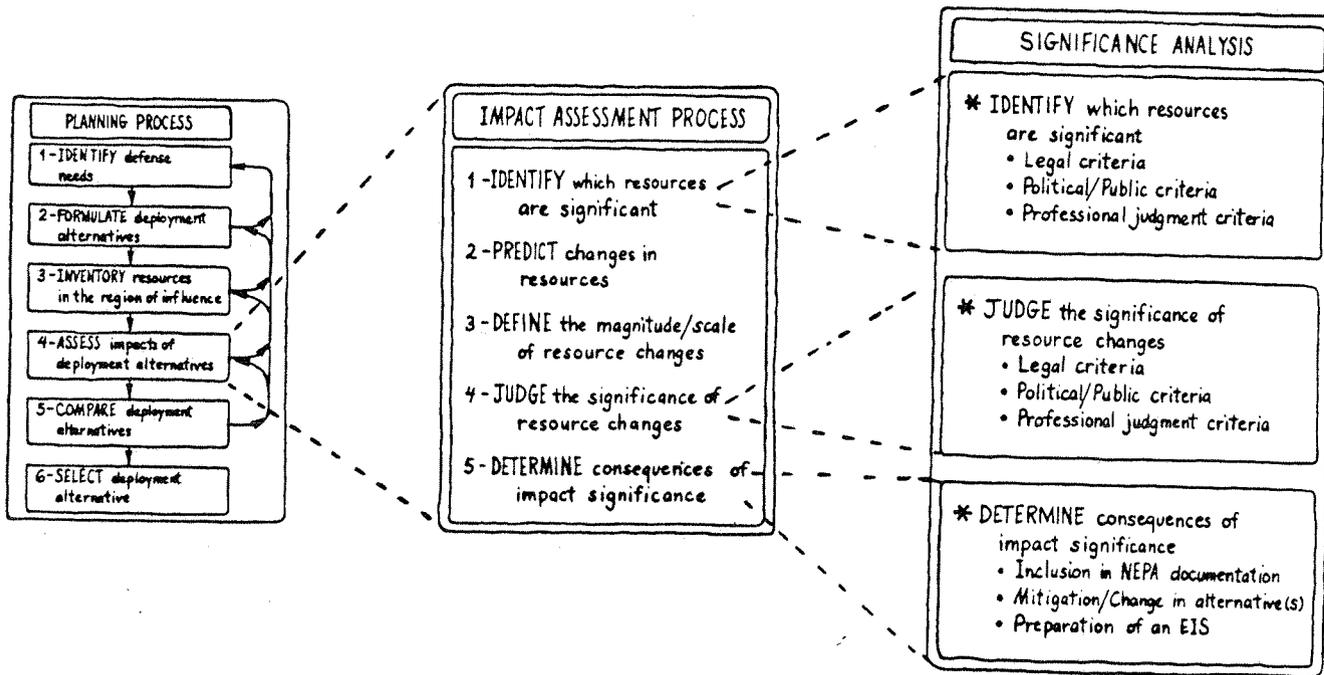
● Evaluating test results to determine if the resource or impact is:

- (1) Significant, or
- (2) Nonsignificant

● Refining significance determinations by describing levels of significance for each on a relative scale. Chapter 6 will discuss levels of significance (and non-significance) and how they are applied to the planning process.

Relationship of Significance Analysis to Planning and Impact Assessment

The interrelationship among significance analysis, planning, and impact assessment can be summarized diagrammatically.



SECTION II.
THE FRAMEWORK FOR
SIGNIFICANCE ANALYSIS



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4. HOW TO USE THE GUIDE TO CONDUCT SIGNIFICANCE ANALYSIS

4. How to Use the Guide to Conduct Significance Analysis

This section of the guide presents a framework for conducting significance analysis and is structured in such a way that in order to maintain its maximum utility, the user should progress through each chapter from beginning to end without skipping around. The order and content of the chapters are designed to guide the user logically through the framework by presenting the following in sequence:

- Basic "tools" necessary for significance analysis (chapter 5).
- Key concepts of significance analysis (chapter 6).
- Overview of the significance analysis process (chapter 7).
- Discussion of the steps of impact assessment with focus on an evaluation of the steps in which significance analysis plays an essential role (chapters 8 through 12).
- Application of significance analysis to the real world (chapter 13).



5. BASICS - PRECURSORS TO SIGNIFICANCE ANALYSIS

5. Basics - Precursors to Significance Analysis

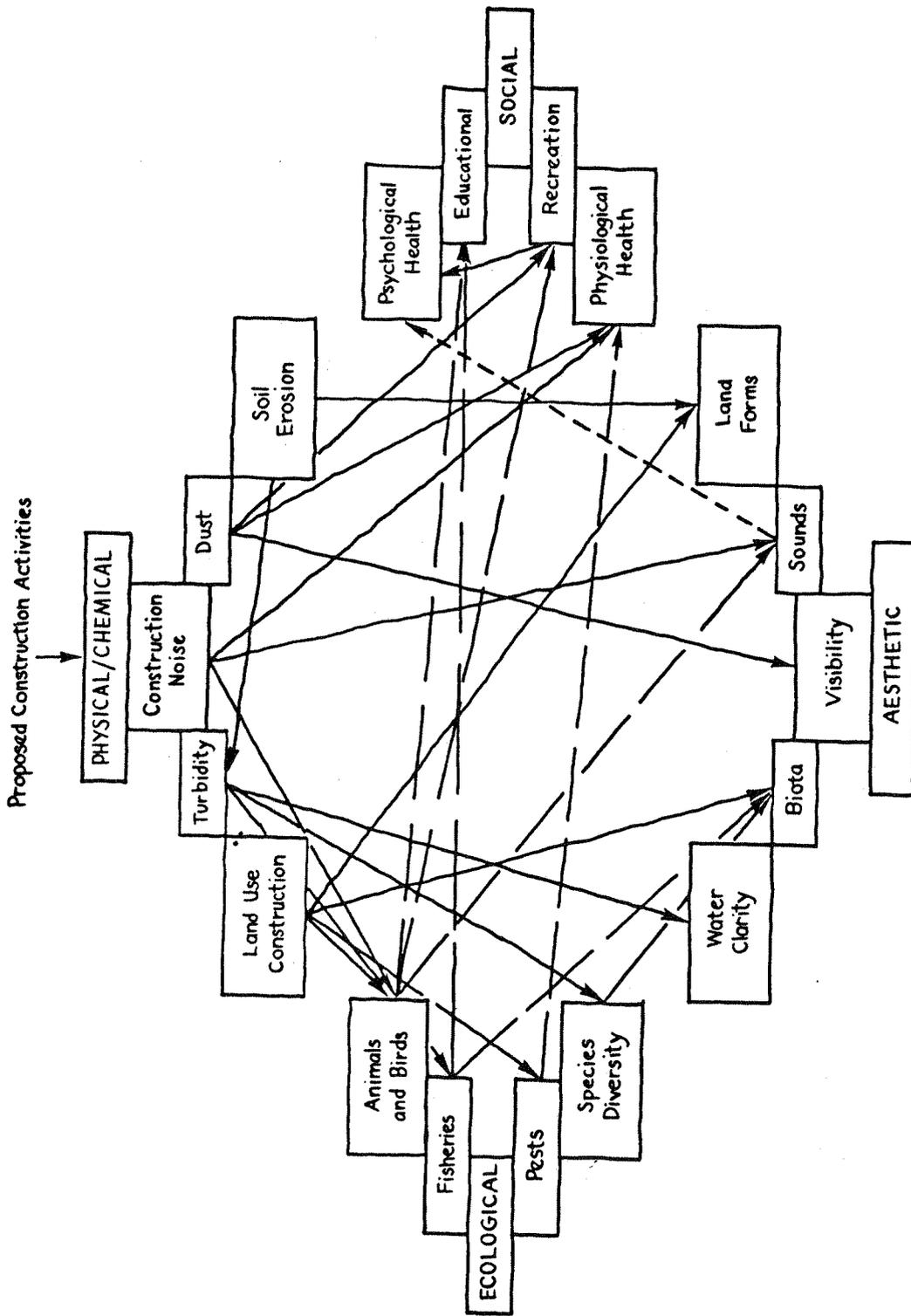
Certain information and actions are necessary before any useful significance analysis can begin. It cannot be overemphasized that adequate treatment of the following "Basics" is essential to effective significance analysis:

- Project description.
- Complexity of the environment.
- Region of influence.
- Inventory (data base).
- Environmental setting.

5.1 Project Description. A complete, accurate, and detailed description of all actions/activities required to construct, operate, and decommission the facility is a basic ingredient for a complete assessment. Systematic consideration of each aspect of the project will later be utilized to identify all potential impacts. Lack of information on the project will translate into lack of information on impacts. Complete project information is rarely available at the outset of impact assessment; sometimes little more than concepts and system constraints are formulated. As was shown in chapter 3, the planning process is highly iterative, with impact assessment progressing as the project description is formulated and continuously feeding back implications to other planners and decisionmakers. The earlier deployment alternatives are developed in detail, the sooner the significance analysis can identify whether and what project adjustments or mitigations or other consequential steps must be taken. If essential details cannot be developed, surprises and late-stage problems are inevitable.

5.2 Complexity of the Environment. The environment must be viewed by the planner as a complex web of interdependent factors with a seemingly endless array of interrelationships. The components and interrelationships must be systematically considered to identify all potential impacts. Superficial consideration of environmental components alone will result in superficial evaluation of impacts. The impacts of a construction activity can be highly complex and extend outward to distant and less obvious results that affect the basic structure and function of ecosystems (see figure on next page). The figure displayed is simplified in that it does not introduce all components of the environment (e.g., cultural resources not included) nor specific facets of construction purposes (e.g., aspects of national defense implications).

5.3 Region of Influence (ROI). Determination of the ROI is a basic precursor, albeit one of far-reaching consequences. The environment(s) likely to be directly and indirectly affected by the construction, deployment, and decommissioning of the facility must be predicted. Some



ENVIRONMENTAL IMPACTS AND INTERRELATIONSHIPS

actions/impacts like placement of a radar station or location of sources of aggregate for construction are reasonably straightforward as to location concerns. Other actions/impacts (such as, impacts to water quality or migratory birds) pose a considerable exercise in professional judgment when defining the circuitous cause and effect pathways over which the project has influence. This determination, like most others in planning, can be iterative, that is, revised as information develops; yet there is an inherent risk. Since the initial judgment as to the limits of the ROI determines the nature and extent of data collection, agency and public coordination, field surveys, and many basic activities, an error on the "short" side could invite later delays while initial data are extended.

5.4 Inventory (Data Base). The adequacy of basic data is another essential precursor to significance determination. To the extent accurate, complete, and current data are not available, the assessor will be constrained and sometimes misled. In general, data collection should be oriented to those resources and impacts where the greatest potential for significance exists. Initial identification of which resources are important and likely to be significant (chapter 8) and which impacts will be most consequential (chapter 11) should guide and orient early data collection. As scoping, coordination, and significance analysis progress, the areas requiring expanded data collection will become evident. However, one cannot depend on being alerted by the public to areas/subjects of concern at this early stage. In any large endeavor, some inventory of all key components of the affected environment is necessary to support analysis of whether significant concerns exist. Collection of new data may be necessary for many if not all resources. Controversial and consequential concerns may require special studies to assist full evaluation or to confirm whether a suspected impact is real.

The goal of good project management should be to assure that essential data is inventoried and special studies completed in advance of their need in planning and decisionmaking. The weapons systems designer and the significance analyst alike, will need certain key (often common) data to support their efforts. Toward this end, the inventory must present a data base that conveys an accurate and complete description of the affected environment.

5.5 Environmental Setting. In its simplest sense, the setting may be viewed as an intuitive translation by the environmental professional of the amassed separate inventory data into an understanding of the nature, diversity, productivity, and interrelatedness of a system. Eventually the environmental setting will be distilled for presentation in an EIS. Such a description should not be encyclopedic but written clearly with the degree of detail proportional to the expected magnitude and significance of impacts. The intuitive setting has relevance to the systematic analysis and understanding of impacts, while the latter one provides an environmental context for an EIS reader. The insights available from a knowledge of the environment, cast in terms of the actual data base (obtained from recent inventory and available data), and oriented to the ROI (from the project description) will support such a description.



6. KEY CONCEPTS OF SIGNIFICANCE ANALYSIS

6. Key Concepts of Significance Analysis

Several concepts of significance warrant special mention as they are common to any significance analysis.

- Significance is complex.
- Significance is dynamic.
- Significance is relative.
- Nonsignificance determinations are a part of significance analysis.
- There are levels of significance.
- Significance determinations can be substantially influenced by a knowledge of the past, present, and future condition of a resource.
- Significance can be real or perceived.
- Significance tests can be developed.

Concepts of Significance

Key Points

Complex

As resources are complex both in their relationship to each other as well as within themselves, so is the task of determining their significance and the significance of impacts to them. Such complexity reinforces the need to have a systematic approach to significance analysis. In any thought process framework, however, one must be careful to avoid oversimplification at the risk of missing a critical point or issue.

Dynamic

The significance of a resource or impact is dynamic and may change during the planning process. A resource or impact initially determined to be significant may later be judged as less significant, or even nonsignificant, as a result of new information, changed perceptions, or as various mitigation measures or plan modifications are developed and brought to bear. The converse may be true for a resource or impact initially identified as nonsignificant. The planner must be prepared to reexamine his analyses throughout planning and to refine his determinations to the extent possible within the constraints of the study. Significance determination is not a traffic light ("stop" or "go") for the planning process, but is part of the process. A "yellow, proceed with caution, light" is perhaps more applicable regarding the influence of significance determination on the planning process.

Relative

Resource and impact significance varies relative to the context in which it is being considered (local, regional, state, Federal) and relative to the specific ROI. A resource/impact significant in one context and location is not necessarily significant in another.

Concepts of Significance

Nonsignificance

Key Points

A resource or impact not judged to be significant is identified as nonsignificant relative to the specific ROI. Identifying nonsignificance and documenting why a resource or impact is not significant is almost as important as determining whether a resource or impact is significant, because such determinations affect the degree of continued emphasis placed on a resource or impact in the environmental analysis and ultimately what is done about it. Key points pertinent to nonsignificance, addressed later in chapters 8, 11, and 12, are as follows:

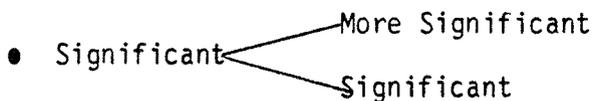
- Impact significance analysis is only performed on resources identified as significant. Resources identified as nonsignificant may not automatically be dropped from any further consideration, but may be reviewed periodically for any change in their status.
- There are levels of nonsignificance, as well as significance.
- Whether an impact to a resource is significant or nonsignificant has a critical influence on the consequences of significance analysis. For example, a significant impact to a significant resource may require mitigation or a major project modification; a nonsignificant impact would typically not be mitigated, but it would not necessarily be ignored. It may be "important" enough to warrant reducing the impact through careful planning even though it did not pass the "threshold of significance."

Levels

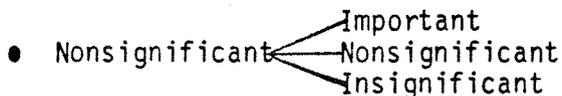
The concept of levels of significance is critical to decisionmakers in the planning process when faced

with making tradeoffs among resources. It may not be enough to know that a resource or impact is significant, but may be necessary to define "how" significant. Being able to define the level of significance (or nonsignificance) will affect what is eventually done about the affected resource, and ultimately the outcome of the deployment alternative being studied.

There are many different gradations or levels of significance that could be developed into a model of significance depending upon the specifics of the situation, the level of detail required, the data available, and the professional(s) performing the environmental analysis. For the purposes of this guide, the levels established for the major categories of "significant" and "nonsignificant" are:



Threshold of Significance



The point at which a resource or an impact becomes significant is somewhere between "important" and "significant." This gray area is called the "threshold of significance."

The relevance of refining the degree or level of significance is addressed later in chapters 8, 11, and in 12, where a model of significance is presented.

Concepts of Significance

Past, Present, and Future Condition

Key Points

It is important to examine not only the present condition of a resource, but its past history, its potential and its predicted future condition with and without the deployment alternatives under study. The definition of an impact or resource as significant can be influenced substantially by knowing what has happened to the resource in the past, what could occur to it, and what is predicted to occur to it in the future. This can be particularly pertinent when considering cumulative impacts to a resource.

Real or Perceived

Impact or resource significance can be "real" and is supportable by fact, or "perceived" and perhaps not fully supportable even with rigorous study.^{1/} The degree to which either type of significance can carry equal weight in determining what is done depends upon the acceptance of the perception by the planning team and/or by the public and the level of controversy developed. If accepted, "perceived" significance has the same weight as "real" significance in effecting the appropriate planning response, alternative refinement, or mitigation. If the perception is not accepted but is a critical issue that affects the feasibility of an alternative, a decision must be made whether additional information or study can change that perception. If the perception cannot be changed and controversy persists, an analysis must be performed of the tradeoffs involved in ignoring the perception versus accepting the perception and treating it the same as "real" significance. Questions regarding perceived significance form a part of

^{1/}A basic assumption used in this guide is that "real" significance is always also "perceived," but that the reverse may not necessarily be true.

Concepts of Significance

Key Points

Tests

significance analysis and are presented as such later in chapters 8 and 11.

There are a number of approaches for testing the significance criteria and a variety of labels that might be chosen for these. For purposes of this report, the following criteria tests have been selected:

- Legal criteria.
- Political/Public criteria.
- Professional Judgment criteria.

It is important to realize that these tests overlap and that some tenets (real versus perceived significance, for example) apply to all. Similarly, all criteria tests may be brought to bear on a single environmental resource/situation.

Legal

Legal Criteria are, perhaps, the most straightforward and are best expressed that "if the law says it is significant, then it is." The question becomes which level of law (Federal, state, local) and what procedures must be followed to deal with the recognition of significance. Legal criteria also include consideration of those documents which may have the force of law (Executive Orders, regulations that are "rules," etc.).

Political/Public

Political and Public Criteria are, in many ways, interrelated. Components of these criteria are public perceptions, controversial resource use questions, and the political decisionmaking process. Resources or impacts that are perceived by various publics (resource users, environmental interest groups, the

Concepts of Significance

Key Points

public at large) or their elected or appointed representatives and administrators to be significant may have to be treated as such in the planning process - in terms of analysis, mitigation planning, decisionmaking, and documentation (preparation of an EIS may be justified purely on the grounds of public interest/controversy). Again, there are levels of significance attached to the political/public perceptions and the level of response will be gauged on an accurate assessment of the level of the political/public "significance."

"Significance" as determined by political/public criteria is often a real challenge to the environmental planner and decisionmaker alike. Public involvement and education skills are extremely important in this arena - both to accurately interpret resource impact levels to the public, and to reflect public interest in decisions. While there were clearly very difficult real resource impact questions to address in the Air Force's planning of the Utah/Nevada Peacekeeper deployment alternative, the political and public perceptions were probably key to the ultimate dropping of that proposal.

Professional Judgment

Professional Judgment Criteria are the tests, insights, biases, and knowledge that the environmental practitioner uses in determining the significance of resource questions and impacts. Judgments made by the professionals represent completely professional endpoints of a somewhat regimented thought process, although these judgments frequently must appear to laymen to be similar to the pronouncements of Sherlock

Holmes who often made accurate inferences of great detail from what appeared to be no evidence at all. It may seem to be a "black box" to some.

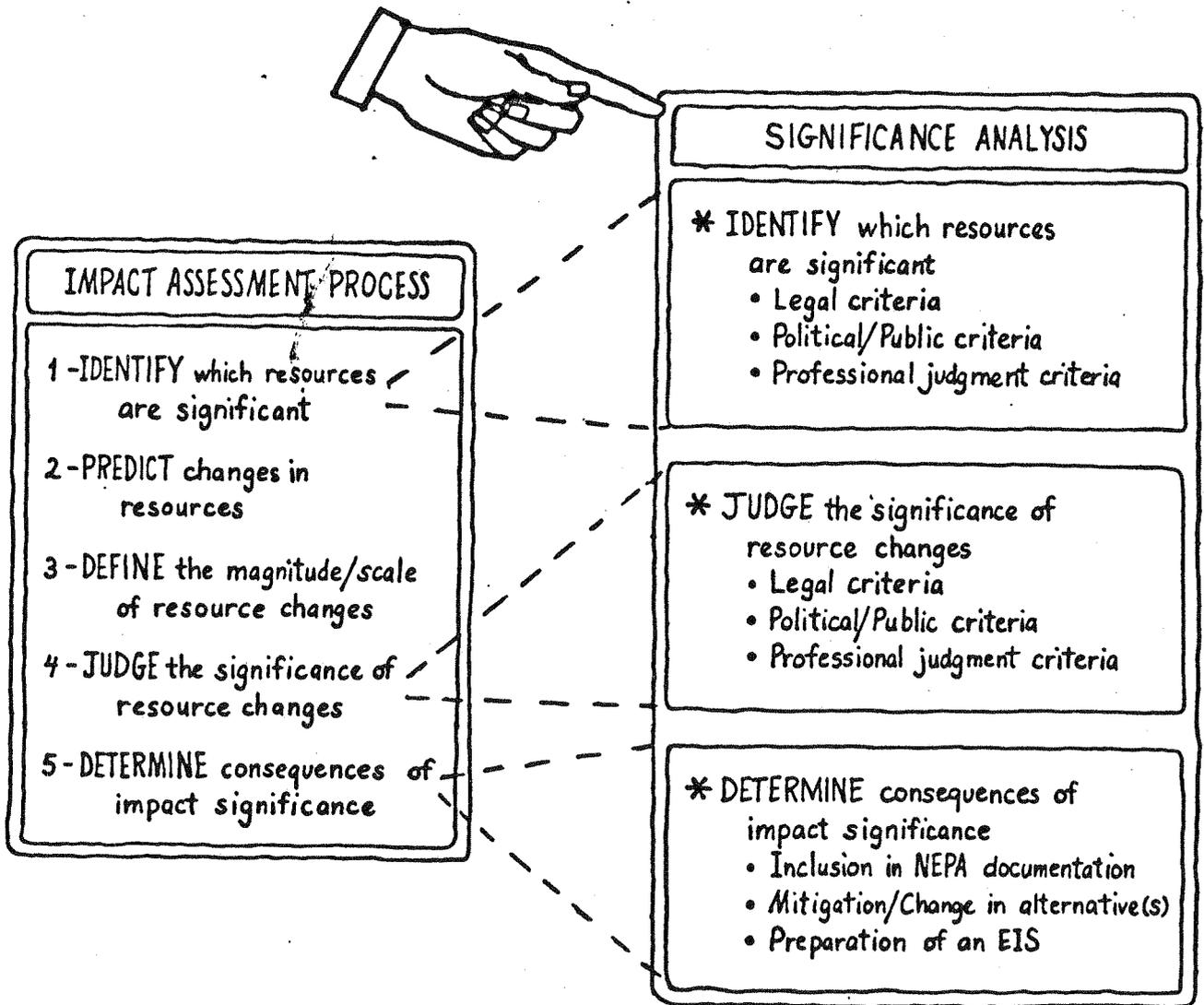
"Judgment" is in the words of the noted trial lawyer, Louis Nizer, "a word we substitute for an imponderable bundle of past experience and psychological factors, all unconsciously sifted and evaluated to give insight into the future. If the ingredients of this process are adulterated or their evaluation defective, we call the result bad judgment. If the cerebration points in the right direction, we call it wisdom. 'Judgment,' 'wisdom,' these are semantic disguises for a mysterious process too involved to dissect scientifically." Nizer is probably correct in stating that the professional judgment process cannot ever be dissected or diagramed, but the environmental planner has a number of considerations to make in forming a judgment of the significance of various resources or impacts. The planner begins with a consideration of the existing information, its depth, accuracy, applicability and need for supplementation, and proceeds through such questions as what is the extent, magnitude, and duration of the impact; what is its probability of occurring; is it direct or indirect; beneficial or adverse; and arrives at a conclusion or series of conclusions concerning a resource or an impact to that resource. The specific tools used during this thought process vary specifically from professional to professional and discipline to discipline. The archeologist will have a different repertoire of diagnostic/predictive

Concepts of Significance

Key Points

techniques than the physical scientist, and the limnologist will use different approaches than will a social scientist or economist. These differences reflect a number of factors, among them the degree to which the amenity being dealt with is "soft" or "hard," the question of esthetics or "quality of life" being an example of the former and aquatic chemistry of the latter. There are similarities too. Literature research, field surveys/investigation and consultation with other professionals, for example, will appear as "professional judgment" tools for virtually any environmental discipline. If the various tools and processes available are used competently, the environmental professional, like Sherlock, will in the end have a sound and highly valid basis for the judgments rendered.

The specifics of all significance tests are considered in more detail in chapters 8 and 11, and their real world application is presented in sections III, IV, and V.

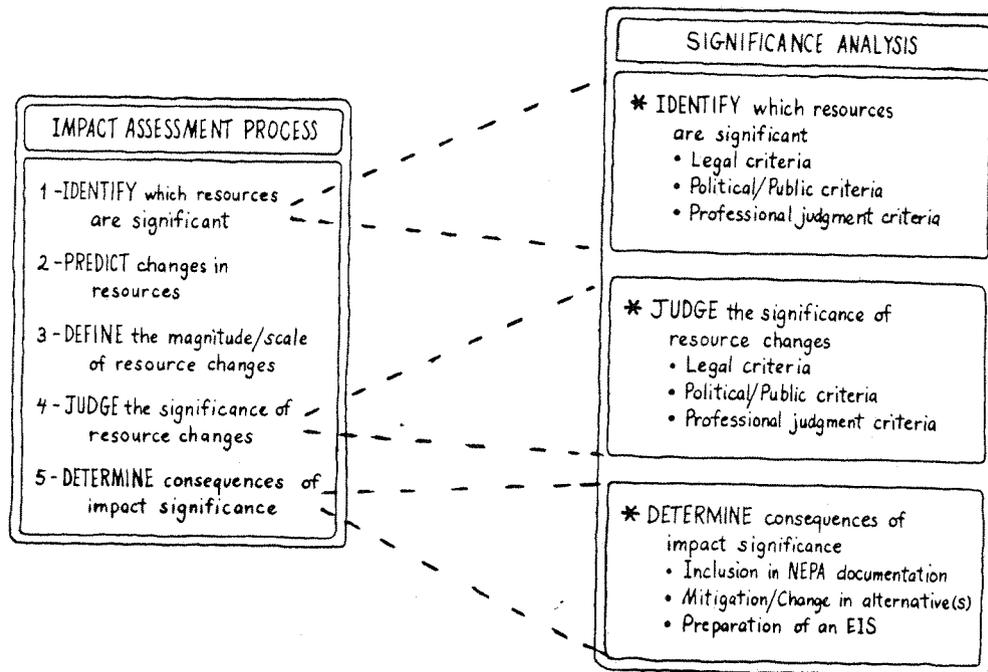


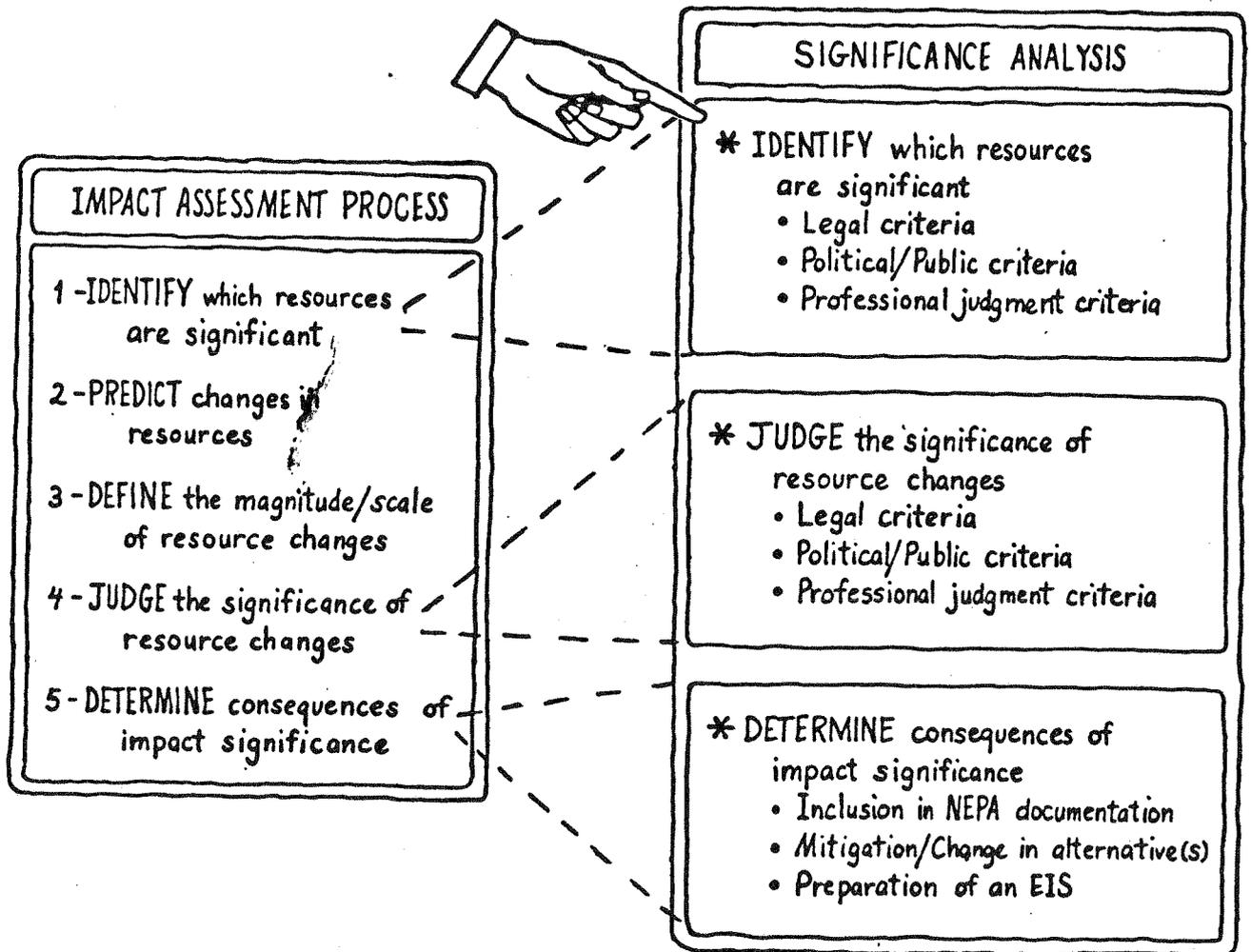
7. THE PROCESS OF SIGNIFICANCE ANALYSIS

7. The Process of Significance Analysis

As outlined in section I, significance analysis occurs in steps 1 and 4, and plays a critical role in step 5 of the impact assessment process presented in this guide. Both steps 1 and 4 of the impact assessment stage of project planning deal with the establishment of resource or impact value (or importance, either beneficial or adverse) which directly influences step 5, or what is done about a predicted impact. Note that it is necessary to examine both resource and impact significance in planning. Resource significance is the first analysis performed to narrow the range of impact assessment to significant issues. Analysis of the significance of impacts to those key resources is then performed to complete the significance analysis process. Steps 2 and 3 of impact assessment involve relatively value-free descriptions of changes to resources as a result of the various deployment alternatives.

To provide continuity of thought, all steps of the impact assessment are discussed in the following chapters, although the focus will be on those steps where significance analysis occurs (steps 1 and 4) or exerts a critical influence (step 5).

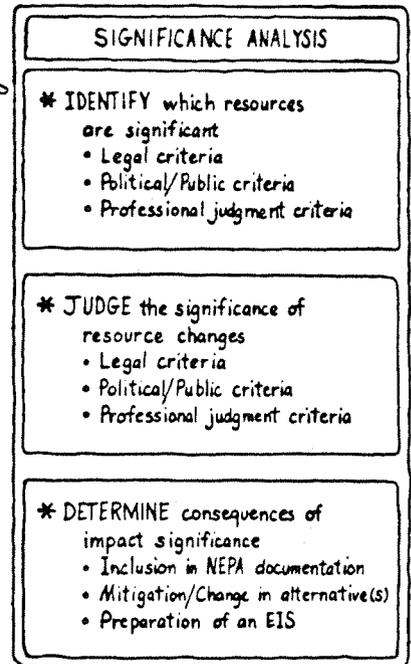




8. IDENTIFY WHICH RESOURCES ARE SIGNIFICANT

8. Identify Which Resources are Significant

By determining which resources existing in the ROI are significant, the planner explicitly or implicitly establishes the degree of emphasis and study effort (in terms of time, level of detail, and dollars) placed on a resource in subsequent steps of the impact assessment. Once the resource inventory is completed, the significance of each resource in the ROI is evaluated in terms of criteria and parameters involved in the various "tests" of significance presented in chapter 6. The process of significance analysis is organized in the following as key points and questions designed to guide and stimulate the user in testing, evaluating, and refining resource significance.



Significance Tests

Is the resource legally recognized as significant?

Key Points in Evaluating and Refining Resource Significance

- A resource is significant if it is specifically protected by a law, policy, plan, control, or regulation.
- A resource is significant if it is part of a legally defined management unit, such as a Wild and Scenic River or a State Habitat Management Area.
- The level of legal protection (i.e., Federal, state, regional, or local) and the type of protection (i.e., law, plan, policy, control, or regulation) can affect the level of resource significance.
- In addition to its present legal status, the past and future predicted status of a resource should be examined.

Significance Tests

Is the resource politically or publicly recognized as significant?

Key Points in Evaluating and Refining Resource Significance

● A resource legally identified as significant is commonly also publicly, politically, and professionally identified as significant and as such usually ranks high on the relative scale of significance.

● Definition of a resource as politically significant is greatly influenced by public perception.

● The political level at which significance is identified (i.e., local, regional, state, or Federal) influences the level of significance.

● Depending on its level of origin, political significance can increase the level of significance of a resource determined to be significant by other tests.

● A resource politically defined as significant may become legally significant.

● Conditions of a resource that may lead to its recognition as politically and publicly significant include the following:

(1) Conflict over the use(s) of the resource.

(2) Resource availability and supply, and changes to that base.

(3) Demand for the resource, and changes to that demand.

(4) Knowledge about the resource, and changes in that knowledge.

● A resource may be identified as significant by any segment of the public, and the significance may be perceived rather than real.

Significance Tests

Key Points in Evaluating and Refining Resource Significance

- A function of the scoping process in environmental planning is to derive through public participation the significant issues (resources and impacts) to be examined in the environmental analysis as well as deemphasize the nonsignificant issues.
- Resource significance determinations made early in the planning process can be changed through public input.
- Some key questions in assessing the significance of a resource and the level of that significance based on public input include the following:
 - (1) Who's saying the resource is significant?
 - (2) How many are saying the resource is significant?
 - (3) What is the past history of the use of that resource in the ROI and the public's expectations of its future use?
 - (4) What is the value of the resource to the public (monetary and otherwise)?
 - (5) Is the significance judged by the planning team to be real or perceived?
 - (6) If perceived, can the perception be changed through additional existing information?
 - (7) Are additional studies necessary/appropriate to support or refute the significance determination?

Significance Tests

Is the resource professionally judged to be significant?

Key Points in Evaluating and Refining Resource Significance

(8) Can an assumption of significance be made with little or no effect on the planning of the deployment alternative(s)?

● Professional judgment may often form the only basis of recognition of significance for a resource. Careful documentation of that determination is essential.

● Some of the key questions asked and evaluated by the professional in analyzing the significance of a resource include the following:

(1) What is the past, present, and projected future condition of the resource in the ROI?

(2) What is the condition of the resource in the context of the local area, the region, the state, the nation?

(3) What is the size and extent of the resource?

(4) Is the resource scarce?

(5) Can a monetary value be placed on the resource? If so, what is that value?

(6) What are the biological, physical, and socioeconomic attributes of the resource?

● The professional must decide when it is necessary/appropriate to conduct more study to evaluate and/or refine resource significance. Some of the key questions involved in a decision of when to conduct additional study include the following:

Significance Tests

Key Points in Evaluating and Refining Resource Significance

(1) Assuming the resource is significant and based on a preliminary analysis made early in the study (chapter 11), is the resource likely to be significantly impacted by the various deployment alternatives and thus become critical to decisions made regarding alternative selection and feasibility?

(2) What are the tradeoffs of assuming significance?

(3) Will planned studies provide the answers to questions about the significance of the resource?

(4) What are the costs of the study (monetary and time)?

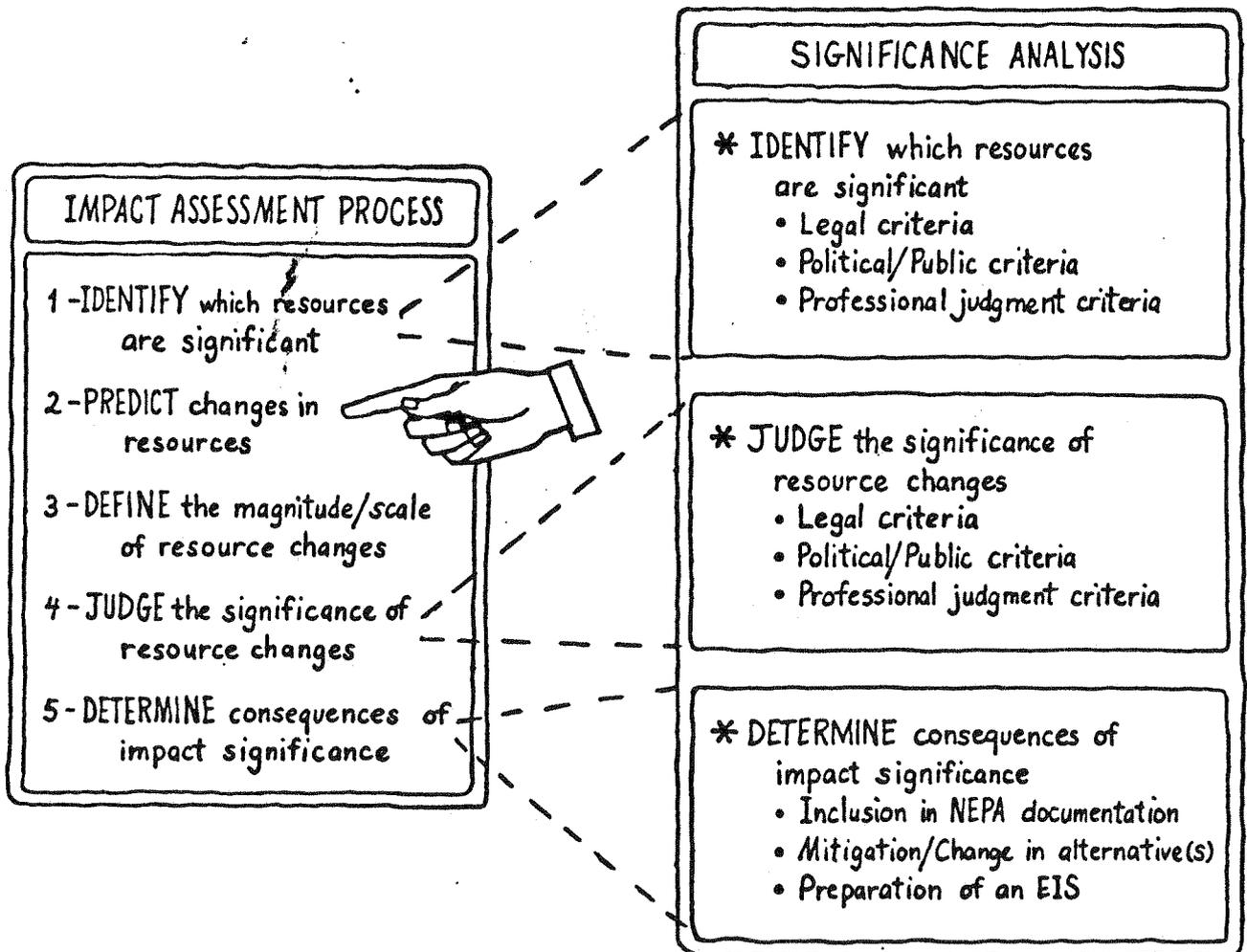
(5) Are additional baseline data necessary to resolve controversy?

(6) Is further study necessary to make a responsible professional judgment based on a level of detail commensurate with other aspects of planning? Or can further study be deferred to a later stage of planning?

Resources not identified as significant by the above tests are labeled as nonsignificant in the ROI. Some nonsignificant resources may be "important," but they have been judged not to have crossed the "threshold of significance." Other resources may be of so little consequence in the ROI that they are identified as "insignificant." Although the focus of the environmental analysis is on significant resources, "important" resources should be periodically reviewed throughout the course of the study for any changes in their status. Those resources clearly identified as "nonsignificant" should receive little further attention. Those labeled "insignificant" need not be analyzed further in the impact assessment.

The adequacy and completeness of the determinations of resource significance are a function of the following:

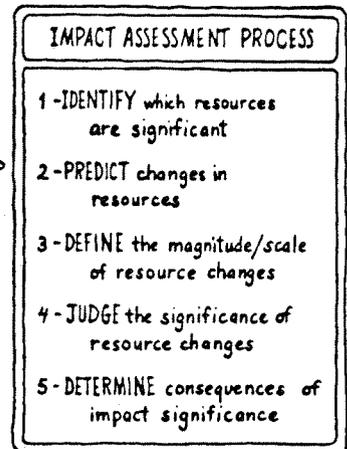
- adequacy of data base/resource inventory,
- state-of-the-art,
- accurate definition of ROI,
- knowledge of deployment alternatives,
- skills and expertise of the person(s) involved in determining resource significance,
- peer review opportunities,
- information exchange between the planning team and the public, and
- study funding and schedule.



9. PREDICT CHANGES IN RESOURCES

9. Predict Changes in Resources

Predicting changes (impacts) in resources is the key step in the impact assessment process. It is not a step where significance is directly determined, although such factors as the nature and extent of the changes will influence the eventual determination of significance. Accordingly, basic steps for predicting changes in resources are presented to fully explain the context of significance analysis. There are many approaches for the prediction of impacts and some combination of them may ultimately be appropriate for BMD application although the analysis of prediction techniques is beyond the scope of this guide. Basics include the following:



a. Divide each deployment alternative into those components likely to cause either beneficial or adverse impacts to resources either due to direct or indirect actions. Such causal factors include obtaining construction materials, actual construction processes, operation of the facility, management of the work force and many others.

b. Analyze the ROI, considering all identified causal factors, and identify major impact sites.

c. Project the future environmental setting without construction of the various deployment alternatives.

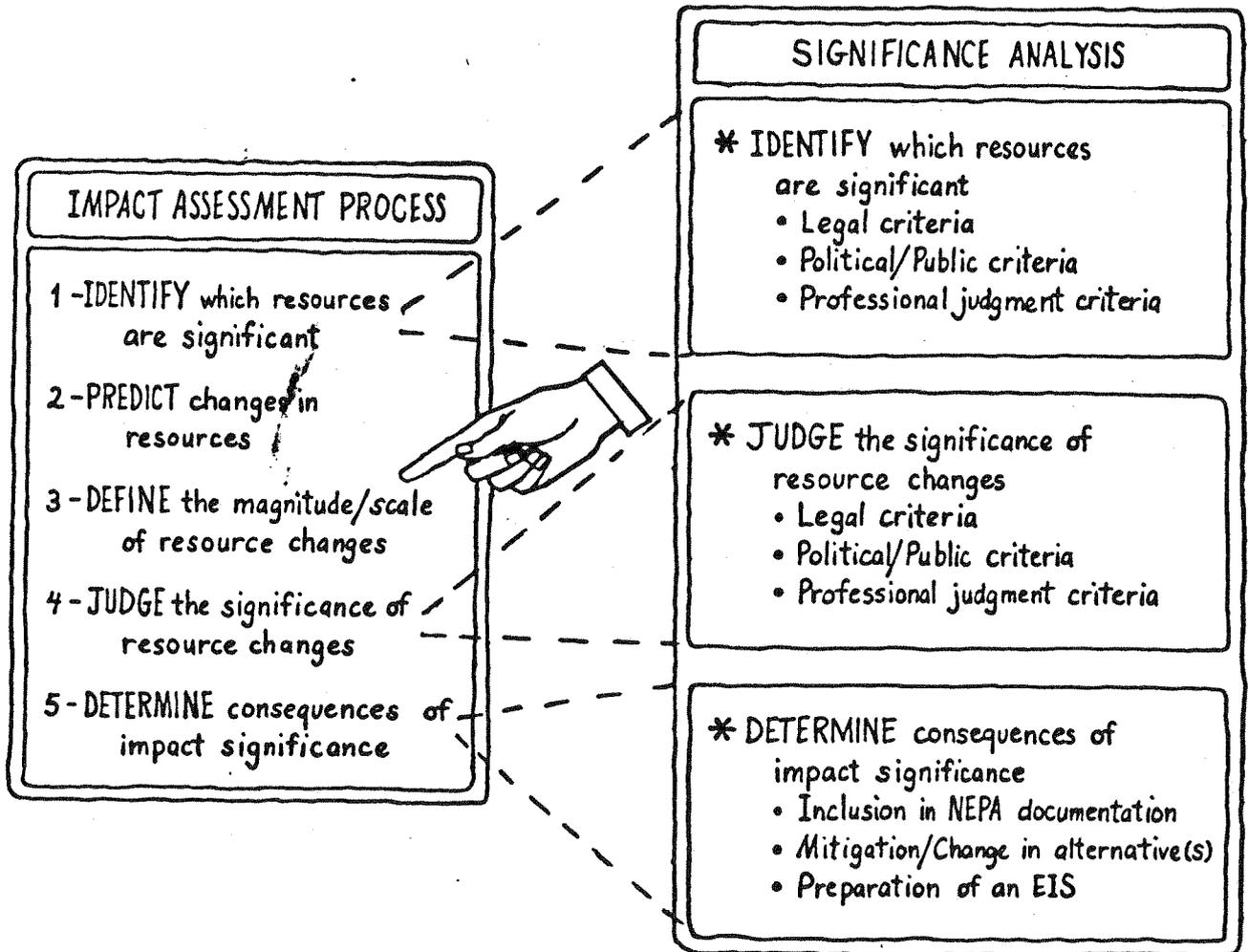
d. Systematically consider the physical/biological/socioeconomic resources of the ROI, as influenced by causal factors identified for each alternative, and develop a listing of likely resource changes resulting from implementation of each deployment alternative.

e. Revise above listing to reflect changes identified in "c" that would occur even without each deployment alternative.

f. Predict areas of controversy and public and agency concerns that may not be identified above.

The inventory of predicted impacts consists of items from e and f. Its completeness and utility is basically a function of:

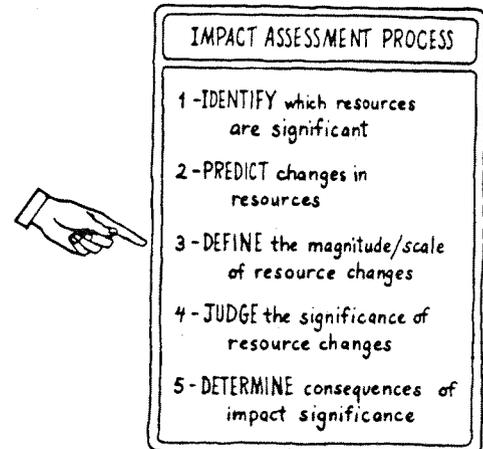
- adequacy of data base/resource inventory,
- rigor of systematic evaluation (e),
- knowledge of deployment alternatives, and
- skills of the person(s) involved in predicting the impacts.



10. DEFINE THE MAGNITUDE/SCALE OF RESOURCE CHANGES

10. Define the Magnitude/Scale of Resource Changes

Predicting the magnitude or scale of changes in resources is a step in the impact assessment process that does not directly determine significance. Since many factors, such as size, intensity, and degree of certainty, influence significance, the step is summarized to ensure the user gains a complete understanding of significance analysis and its role in impact assessment. An analysis of the approaches utilized to define the magnitude or scale of resource changes, however, is also beyond the scope of this guide.

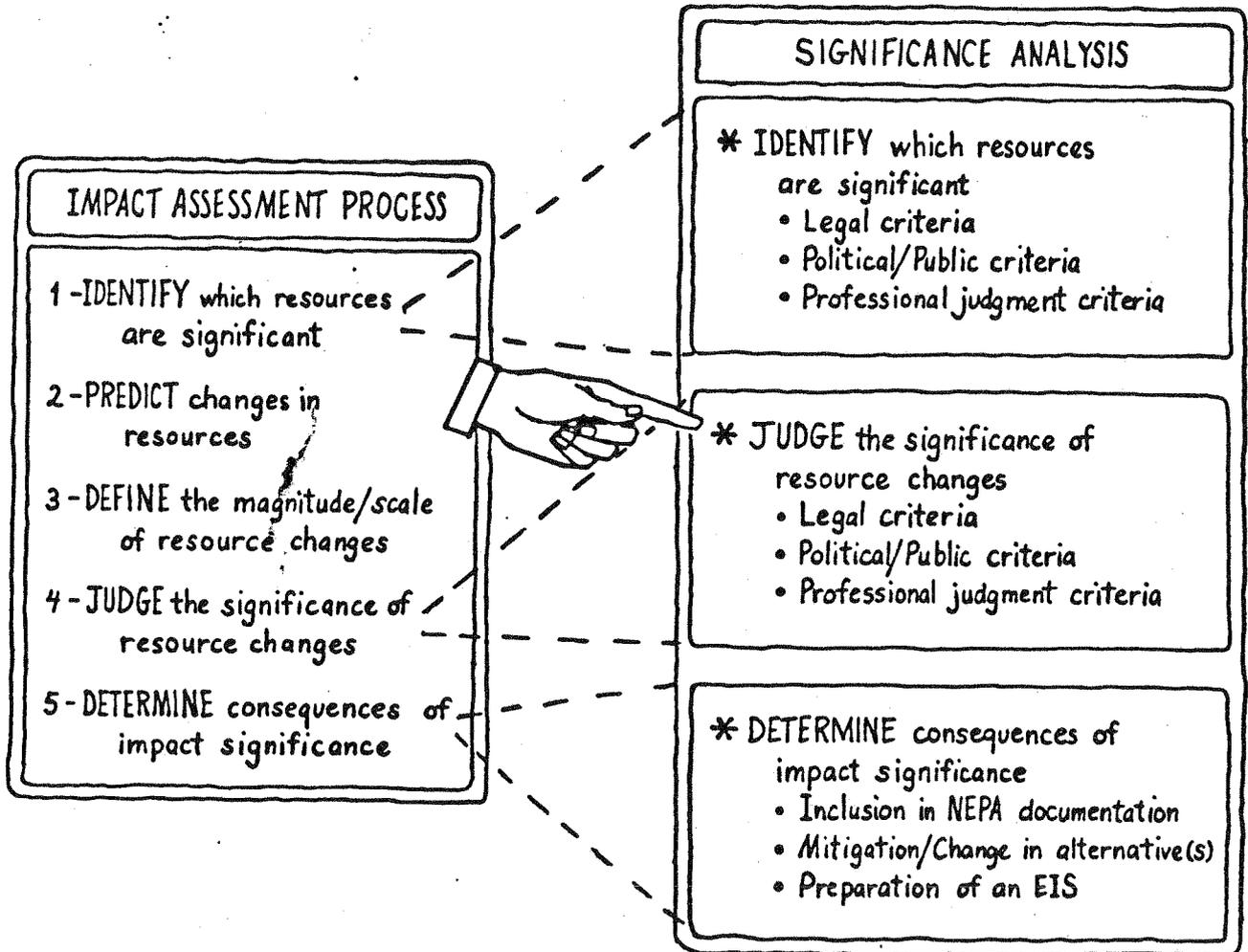


Determining the magnitude of resource changes is not a fixed process but is iterative and requires considerable professional judgment by an interdisciplinary staff. Both qualitative and quantitative projections of change are made by:

- estimation from general knowledge,
- prediction from comparable situations,
- extrapolation or interpolation from experience,
- use of models,
- actual pilot studies, and
- professional judgment.

The adequacy and accuracy of this determination is a function of:

- adequacy of data base/resource inventory,
- state-of-the-art,
- knowledge of deployment alternatives,
- skills and expertise of the person(s) involved,
- peer review opportunities, and
- study funding and schedule.



II. JUDGE THE SIGNIFICANCE OF RESOURCE CHANGES

11. Judge the Significance of Resource Changes

In this step, values are placed on changes through a significance analysis. This keys the environmental impact assessment process to significant issues (resources and impacts). Determining impact significance is critical to plan formulation and influences what will be done in response to a predicted impact (i.e., mitigation, project reformulation, avoidance, etc.) as well as how the impacts will be reported (i.e., EIS or EA).

Significance is analyzed for those impacts identified through steps 2 and 3 of the impact assessment and occurring to resources identified as significant in step 1. To ensure adequate consideration of all resources, impacts to both significant and nonsignificant resources should be recorded, although only significant resources need be carried through this step of the impact assessment process which prepares the user for determining the consequences of significance in the next chapter.

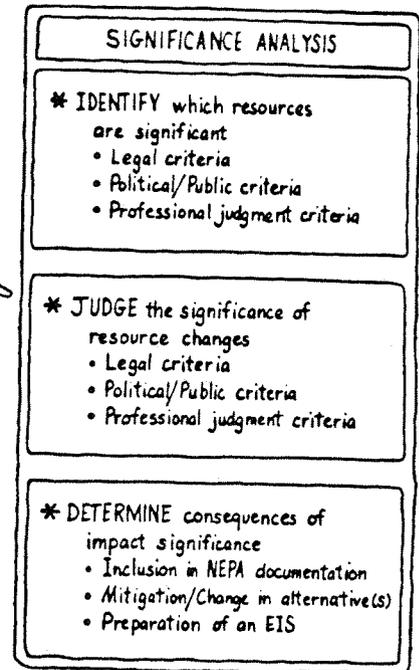
To focus the analysis on significant issues, the first question the user must ask is whether the resource that will be impacted has been identified as significant by the significance tests utilized in this guide. If the answer is yes, the user then proceeds to analyze impact significance according to the same significance tests.

Has the resource that will be impacted been identified as significant?

- Determine resource significance in step 1 of the impact assessment process (chapter 8).

- If the resource has been identified as significant, perform impact significance analysis.

- If the resource has been identified as nonsignificant, but "important," review the resource periodically to determine any changes in its status. If the resource definition changes to significant, perform impact significance analysis.



- If the resource has been identified as clearly nonsignificant (including those labeled insignificant), terminate further analysis.

Because of the key role impact significance determinations can have on planning, it is important that significance determinations be systematic, well-documented, and highly defensible for the benefit of both the decisionmakers and the public and legal arenas. A framework that lends itself to documentation of the key points of impact significance analysis is provided by the following:

Significance Tests

Key Points in Evaluating and Refining Impact Significance

Is the impact to the resource legally identified as significant?

- An impact may be significant if it occurs to a resource that is protected by law (Federal, state, regional, or local).
- For a legally protected resource, there may be a legally defined process for determining the significance of an impact to that resource.
- The level of legal protection (i.e., Federal, state, regional, or local) and the type of protection (i.e., law, plan, policy, control, or regulation) can affect the impact significance determination as well as the level of impact significance.
- In addition to its present legal status, the past and predicted future status of a resource should be examined in determination of impact significance.
- An impact may be significant if it establishes a legal precedent.
- An impact legally identified as significant is commonly also publicly, politically, and professionally significant and as such is usually ranked high on the relative scale of impact significance.

Significance Tests

Is the impact to the resource politically or publicly identified as significant?

Key Points in Evaluating and Refining Impact Significance

- Definition of an impact as politically significant is greatly influenced by public perception.
- An impact may become politically significant if it establishes a political precedent.
- The political level at which significance is identified (i.e., local, regional, state, or Federal) influences level of significance.
- Depending on its level of origin, political significance can increase the level of significance of an impact determined to be significant by other tests.
- An impact may be identified as significant by any segment of the public, and in many cases, the impact significance may be perceived rather than real.
- A function of the scoping process in environmental planning is to derive through public participation the significant issues (resources and impacts) to be examined in the environmental analysis.
- Impact significance determinations made early in the planning process can be changed through public input.
- Impacts publicly recognized as significant may become politically recognized as significant.
- Political/public recognitions of impact significance may be more restrictive than legal recognitions.
- Some key questions in assessing the significance of an impact and/or the level of significance based on public input include:

Significance Tests

Key Points in Evaluating and Refining
Impact Significance

(1) Who's saying the impact is significant and why?

(2) How many are saying it is significant?

(3) Is the significance judged by the planning team to be real or perceived?

(4) If perceived, can the perception be changed through additional existing information?

(5) Are additional studies necessary/appropriate to support or refute the significance determination?

(6) Can an assumption of significance be made with little or no effect on planning?

(7) Is the public willing to pursue litigative action over the impact?

Is the impact professionally judged to be significant?

● Professional judgment may often form the only basis of recognition of impact significance. Careful documentation of that determination is essential.

● Professional judgment of impact significance involves a certain amount of risk taking and educated guesses where information is lacking and because of the state-of-the-art, money, or time (or a combination of these factors) cannot be obtained.

● The professional often must rely on expertise and professional "rules-of-thumb" to assist in determining the point at which an impact becomes significant.

Significance Tests

Key Points in Evaluating and Refining Impact Significance

● In evaluating impact significance, the professional draws upon information gathered from contacts with other professionals, pertinent data in the scientific literature, and on real world experience from other projects with ingredients common to the alternative(s) under study.

● Common sense is a major feature of professional judgment.

● There are many key questions asked and evaluated by the professional in determining impact significance based on judgment. Addressing these questions and determining the threshold at which an impact becomes significant is what professional judgment is all about. Some of these include the following:

(1) What biological/physical/socioeconomic attributes of the resource are being impacted?

(2) What is the extent, magnitude, and duration of the impact?

(3) To what degree does the impact affect public health or safety?

(4) What is the probability of the impact occurring?

(5) Is the impact on the human environment highly uncertain or involve unique or unknown risks?

(6) When will the impact occur (i.e., construction, operation, maintenance)?

Significance Tests

Key Points in Evaluating and Refining Impact Significance

(7) What type of impact is it (direct, indirect; beneficial, adverse; temporary, permanent; short term, long term)?

(8) Does the impact become significant when considered cumulatively with other impacts?

(9) Does the impact result in the violation of established criteria?

(10) What is the past, present, and future condition of the resource being impacted?

(11) What is the context and intensity of the impact and its magnitude/importance in terms of the local area, region, state, or nation?

(12) Is the impact occurring to resources or amenities considered to be unique in the ROI?

(13) Is the impact likely to be highly controversial?

(14) Will the impact result in the loss or destruction of notable scientific, cultural, or historical resources?

(15) Will the impact result in the irreversible or irretrievable commitment of any resource?

(16) Will the impact affect the long-term productivity of the human environment?

(17) Can the impact be easily and successfully mitigated?

(18) What is the cost of the impact (monetary and otherwise)?

Significance Tests

Key Points in Evaluating and Refining Impact Significance

- The professional must decide when it is necessary/appropriate to conduct more study to evaluate and/or refine impact significance.

Some of the key questions involved in decisions of when to conduct additional study include the following:

(1) What is the probability that the impact will affect key decisions made regarding the various deployment alternatives?

(2) Is the impact unavoidable and if so, will it jeopardize an alternative's feasibility?

(3) What are the tradeoffs (monetary, time, project benefits) of assuming significance and modifying the alternative, mitigating the impact, or avoiding the impact versus the cost of the additional study? What is the probability that the study will find the impact to be significant?

(4) Is additional study required to develop mitigation? Will mitigation attempts succeed?

(5) What is the state-of-the-art? Will the additional study provide the answers to questions about the impact's significance?

(6) Is further study necessary to fulfill a legal (or even political) requirement? To avoid controversy?

(7) Is further study necessary to make a responsible professional judgment based on a level of detail

Significance Tests

Key Points in Evaluating and Refining Impact Significance

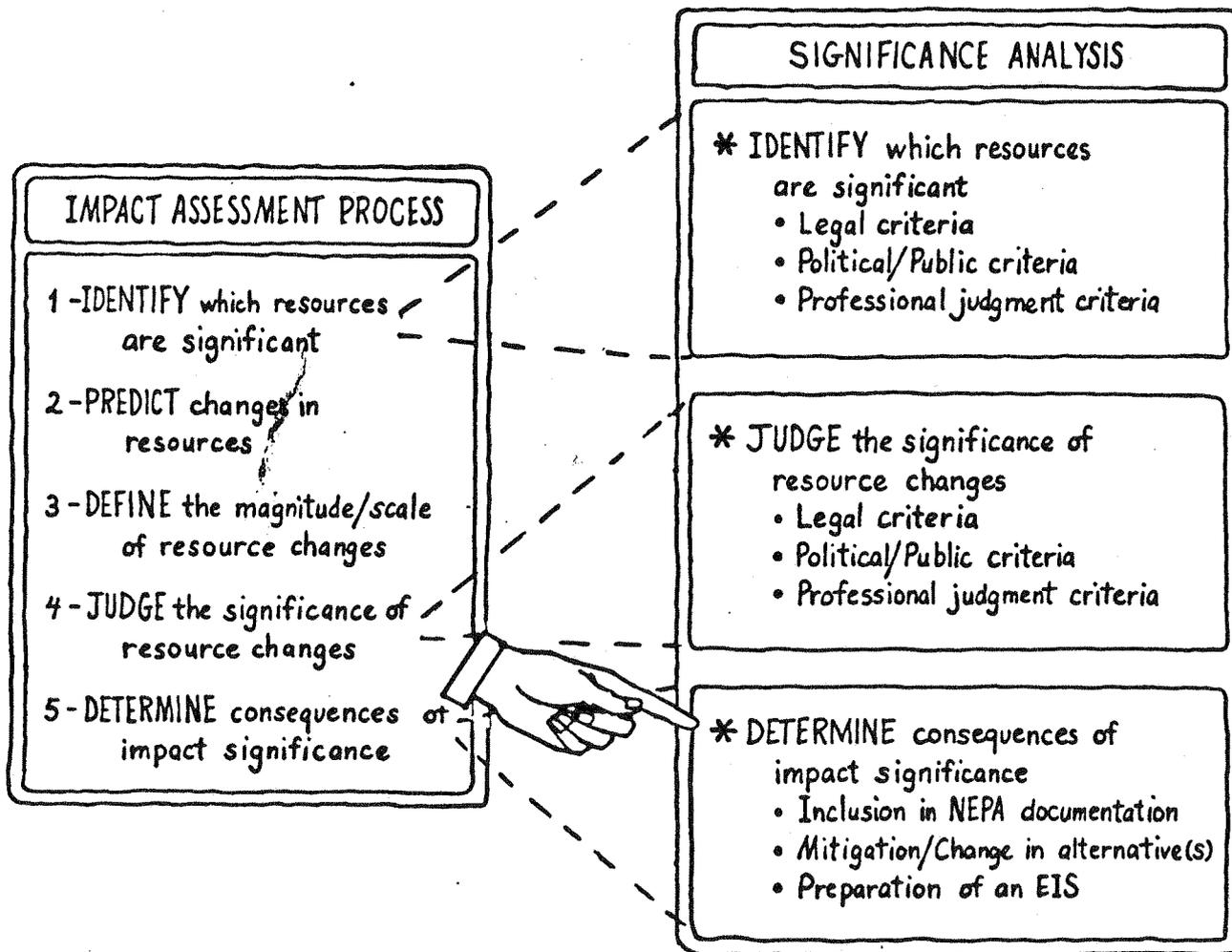
commensurate with other aspects of planning? Or can further study be deferred to a later stage of planning?

Throughout the course of planning, refinement of impact significance determinations should be made as necessary and should input to decisions regarding the deployment alternatives. Refining the level of impact significance/nonsignificance will contribute to determining the consequences of significance to the planning process (chapter 12). For example, "more significant" impacts would have the greatest weight on a relative scale of significance and would have the greatest effect on decisionmaking.

Impacts not identified as significant by the above tests are labeled nonsignificant in the context of the ROI. Some nonsignificant impacts may be "important," but have been judged not to have crossed the threshold of significance. Others may be clearly "nonsignificant" and of so little consequence that they are labeled "insignificant." For "nonsignificant" and "important" impacts, actions should be taken as part of careful planning to reduce or avoid adverse impacts where practicable. Impacts identified as "important" should be reviewed periodically through the course of the study for possible elevation from "important" to "significant." Those impacts identified as "insignificant" should be dropped from further analysis. A model of the multiple levels of significance is presented in chapter 12.

The adequacy and accuracy of the determinations of impact significance are a function of:

- adequacy of data base/resource inventory,
- state-of-the-art,
- knowledge of deployment alternatives,
- expertise of the person(s) involved in judging impact significance,
- peer review opportunities,
- information exchange between the planning team and the public, and
- study funding and schedule.



12. DETERMINE THE CONSEQUENCES OF IMPACT SIGNIFICANCE

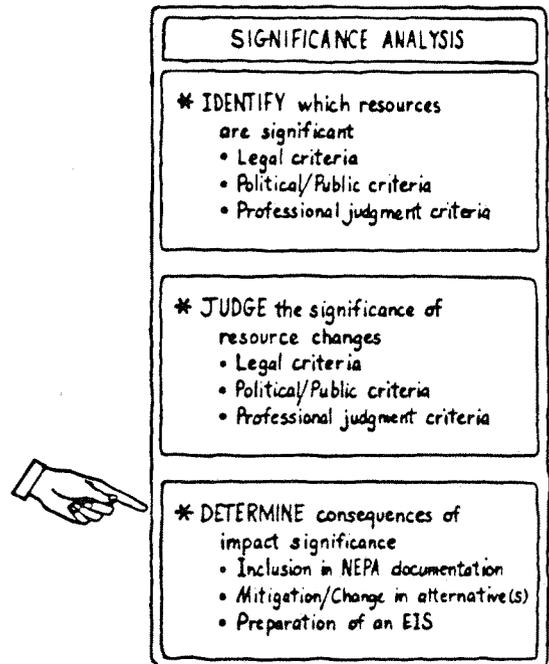
12. Determine the Consequences of Impact Significance

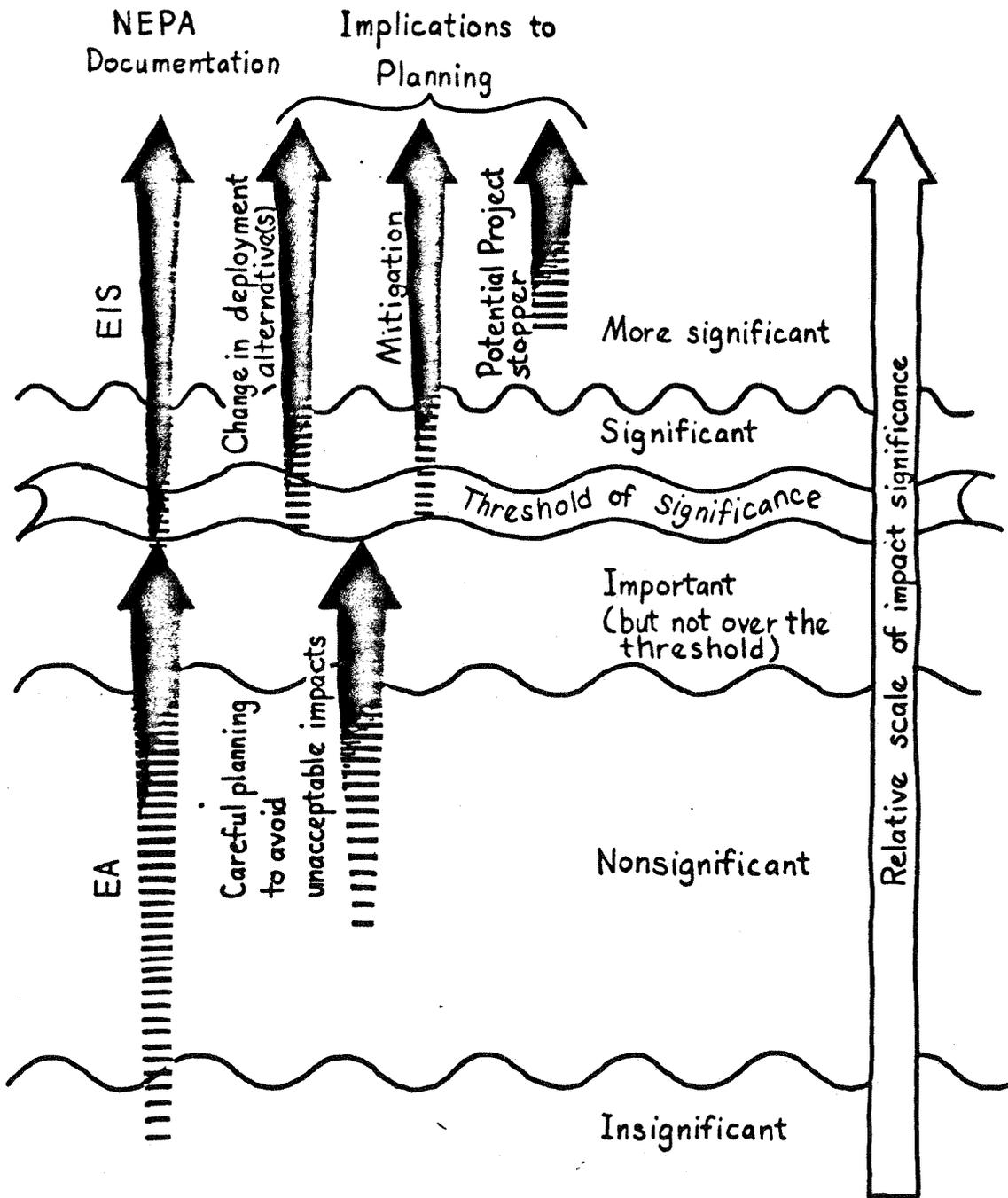
12.1 A Significance Model. Significance as determined in the previous section is not derived from a precise process nor does it merely reflect the passing of a simple "threshold" beyond which the importance - the significance - of the impact cannot be denied. The concept of a prime threshold is valid and useful, but significance should be considered to be relative, with virtually multiple thresholds of concern. The following idealized model is based on a range of theoretical levels of significance. There can be no precise definition of most thresholds. Where a legal guide is present, the "more significant" level will be identified - otherwise professional judgment and precedent are the only guides. A number of explanatory points should be made about the model of significance:

- The levels of significance above the prime threshold involve significant impacts to significant resources. The levels of significance in the region immediately below the prime threshold involve significant resources but nonsignificant impacts thereto.^{1/}

- The prime threshold of significance as well as other indicated thresholds are conceptualized as wavy (nonfixed) bands/regions. This connotes both the imprecision of significance determination, as well as the dynamics of the public, political, and professional ingredients involved in its determination. In a sense, even the legal determinants are dynamic.

^{1/}To avoid confusion and to focus on significant impacts to significant resources, this guide does not specifically address the intuitive question of what happens in the situation in which a nonsignificant, but "important" resource is "importantly" impacted. This is a gray area where professional judgment plays a leading role. Depending on the individual case specifics, the professional planner may decide that the particular situation should be dealt with the same as either an "important" or "significant" impact to a significant resource in determining the consequences of the impact in the planning process.





Idealized Model of Significance

12.2 Specific Consequences of Impact Significance. The preceding chapters have presented a detailed guide to the analysis of significance in planning and decisionmaking. The following conceptualization depicts, in summary manner, the steps whereby the planner proceeds from basic inventory, through impact assessment, to a final judgment of significant impacts. As impact assessment nears completion and judgments on significant impacts are being made, one must begin analyzing the consequences of the findings. This determination again involves intuitive tests of legal, political/public, and professional judgment factors. In reality, these are iterative efforts that do not await total completion of impact assessment but are part of an ongoing, systematic, reassessment process. In the final steps of the process, the planning team analyzes impacts relative to the action that must be taken. Specifically, the nature of the identified significant impacts will be interpreted as requiring one or more of the following:

- inclusion in the EIS
- mitigation
- change in deployment alternative(s)
- EIS preparation

a. Impacts Significant Enough to Require Inclusion in NEPA Documentation. The present CEQ regulations dictate an emphasis in NEPA documents on important issues. The guidance indicates that such documents:

". . . must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail."

The regulations indicate further that:

"Impacts shall be discussed in proportion to their significance. There shall be only brief discussion of other than significant issues."

Impacts identified in chapter 11 as significant must be included in an EIS even though they may not singly be so consequential that they "trigger" a need for an EIS or EIS supplement preparation. Later, in subparagraph c, factors influencing the decision to prepare an EIS are discussed.

b. Impacts Significant Enough to Require Mitigation or a Change in Deployment Alternative(s). This level of significance is higher on the theoretical scale of importance and involves impacts that, taken singly or in combination, have consequences that suggest a need to mitigate, compensate, or adjust/alter the basic deployment alternative(s). Such

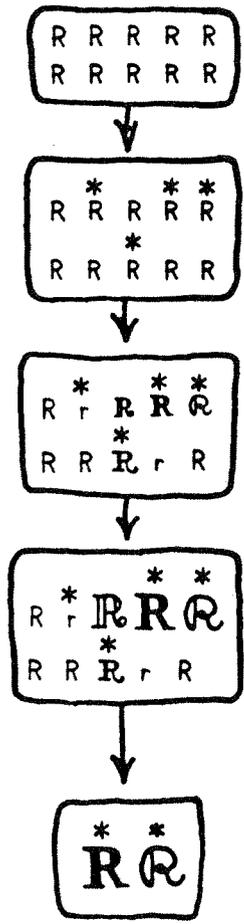
Basics. Inventory resources.

Step 1. Identify which resources are significant (*).

Step 2. Predict changes in resources (identify impacts).

Step 3. Define the magnitude/scale of resource changes (extent/size of impacts).

Step 4. Judge the significance of resource changes (screen for significant impacts).



Step 5. Determine the consequences of impact significance.

● must include in EIS.

* * R R *

● requires mitigation.

*
R

● requires change in alternative.

*
R

● requires an EIS.

* *
R R

A Conceptual Summary of the Role of Significance Analysis in Impact Assessment.

1/R = resource.

impacts are judgmental but generally have one or more of the following ingredients if the mitigation or changing of deployment alternative(s) were not accomplished:

- integrity, scheduled completion, operational efficiency, or similar feature of deployment alternative is threatened;
- severe impact to resource(s) is likely;
- major public or interest group opposition/controversy/litigation is a real possibility; and
- Federal, state, or local support (to include permits, licenses, easements, etc.) may be withdrawn.

c. Impacts Significant Enough to Require Preparation of an EIS. Some impacts and some actions are so consequential that they require preparation of a formal EIS. The full process to determine the appropriate type of NEPA documentation is more complex than is relevant here but is detailed in AR 200-2 and summarized in appendix A. The following generalized process highlights categorical exclusions because Department of the Army insights/priorities/examples of EIS-level significance are inferred. The basic process includes the following in sequence:

- Check to see if categorical exclusions exempt action from EA and EIS requirement.
- If categorical exclusions appear to be found, test to see if extraordinary circumstances would require an EA or EIS.
- If no categorical exclusions are found, prepare an EA to see if the proposed deployment alternative has the potential to create a significant effect on the human environment and thus require an EIS.

(1) Categorical Exclusions are actions that have been judged by the DA to not have a significant effect on the human environment. As such, activities that are included in a categorical exclusion are procedurally exempted from needing preparation of an EA or an EIS. Criteria to determine these exclusions are:

- Minimal or no individual or cumulative effect on environmental quality and
- No environmentally controversial change to existing environmental conditions and
- Similarity to actions previously examined and found to meet the above criteria.

The user should judge whether proposed actions are encompassed by one of the established categories in appendix B. Since a master list is kept updated at all times by HQDA (DAEN-ZCE), that office should be contacted for recent changes.

(2) Extraordinary Circumstances may be present that would result in a normally excluded action having to be covered by an EA or EIS. Tests to apply to determine whether exclusions truly have the potential to have a significant effect on the human environment are:

- Greater scope or size than normally experienced for a particular category of action.

- Potential for degradation, even though slight, of already existing poor environmental conditions or initiation of a degrading influence, activity, or effect in areas not already significantly modified from their natural condition.

- Employment of unproven technology.

- Presence of threatened or endangered species, archeological remains, historical sites, or other protected resources.

- Use of hazardous or toxic substances which may come in contact with the surrounding environment. However, use of hazardous and toxic substances under adequately controlled conditions in established laboratories is categorically excluded.

- Proposed actions affecting areas of critical environmental concern such as prime or unique agricultural lands, wetlands, coastal zones, wilderness areas, flood plains, or wild and scenic river areas.

(3) EIS Required. As indicated in the CEQ Regulations and in AR 200-2, an environmental assessment must be prepared to provide evidence and analysis for determining whether an EIS is required. If the assessment reveals that there are no significant impacts, the assessment is formalized as an EA and constitutes the record of such determination. An EIS must be prepared if the assessment indicates that the proposed deployment plan has the potential to:

- Significantly degrade environmental quality or public health or safety.

- Significantly affect historic or cultural resources, public parks and recreation areas, wildlife refuge or wilderness areas, wild and scenic rivers, sole or principal drinking water aquifers, prime and unique agricultural lands, wetlands, flood plains, coastal zones, or ecologically or culturally important areas or other areas of unique or critical environmental concern.

- Result in potentially significant and uncertain environmental effects or unique or unknown environmental risks.

- Significantly affect a species listed or proposed to be listed on the Federal list of endangered or threatened species.

- Have significant effect on properties listed or eligible to be listed in the National Register of Historic Places or the National Registry of Natural Landmarks maintained by the U.S. Department of Interior.

- Either establish a precedent for future action or represent a decision in principle about a future consideration with significant environmental effects.

- Adversely interact with other actions with individually insignificant effects so that cumulatively significant environmental effects result.

- Involve the production, storage, transportation, use, and disposal of hazardous or toxic materials which have the potential to cause significant environmental impacts.

- Involve significant controversy.

- Significantly affect local or regional energy availability.

- Major activities requiring land acquisition.

- Field activities on land not totally controlled by the military, including the firing of weapons or missiles over lands and navigable waters of the U.S.



13. REAL WORLD APPLICATION OF SIGNIFICANCE ANALYSIS

13. Real World Application of Significance Analysis

The definitions, concepts, and processes presented thus far seek to show an idealized situation. This is how environmental planning might occur in a "perfect world." The reality, of course, is that events rarely fall into place so neatly. Both the environmental planner and the decisionmaker have to deal, on a day-to-day as well as a long-term basis, with a wide variety of constraints:

- Budgets, tight schedules, reporting requirements.
- Data and state-of-the-art limitations.
- Office housekeeping, personnel turnover.
- Political pressure, real and perceived, from various levels and on most participants in the planning process.
- The extreme difficulty of fairly conveying all values for trade-off analysis.
- Environmental obstructionists (agencies, groups, or individuals) and their opposite numbers on the "business as usual" side who polarize issues and make it very difficult to conduct thoughtful planning.

The planner must, to the extent possible, conduct the idealized process while remaining effective in the real world. It is a large order; a comparison with an attempt at exercising textbook military principles on an actual battlefield is not entirely inappropriate.

The discussions of specific biological, physical, and cultural resources in sections III, IV, and V which follow clearly reflect the ways in which the "real world" has influenced the planner's art in significance analysis. Probably this is most evident in the diversity of tools the experts in the various resource disciplines describe.

While there are great similarities and interrelationships between various environmental amenities, there are important differences as well and these are largely "real world" imposed; differences in how various resources are perceived and valued, in the state-of-the-art of collecting data and understanding them are some examples. So the planner in analyzing significance, has various approaches depending on the resource being dealt with. Those protected by laws usually have well-defined procedures (e.g., threatened or endangered species) and some are almost entirely the realm of professional judgment and/or public concern (e.g., habitat). Some analyses result in fairly certain findings. Others must be qualified and carefully staked out with caveats.

Thus, the sections and chapters which follow "look different" from one another because they are different as a result of the various influences of the "real world."

SECTION III.
APPLICATION TO SPECIFIC
BIOLOGICAL RESOURCES

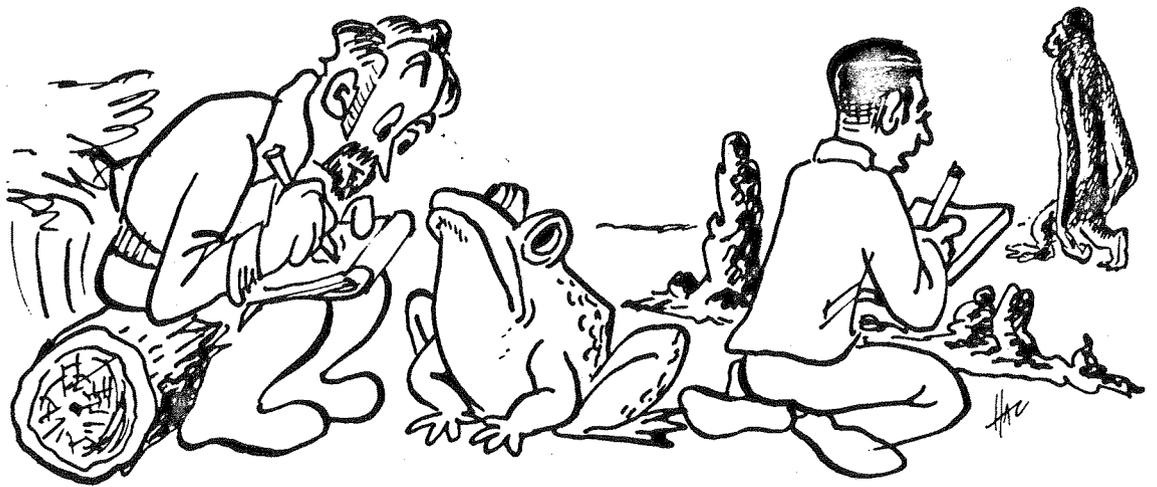


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14. HABITATS - GENERAL

14. Habitats - General

14.1 Introduction. Habitats are discussed here primarily in terms of provision of a place to live for fish and wildlife.

a. Definitions. Definitions integral to any discussion of habitats and their significance are as follows:

- Habitats. The sum total of environmental conditions of a specific place that is occupied by an organism, population, or a place/community where an organism or community lives. Habitat is both aquatic and terrestrial environments which provide the essential elements (e.g., substrate, food, cover, nesting sites) for growth and reproduction of an organism. Critical habitat^{1/} is any specific habitat within the geographical area occupied by the species without which the continued existence of that species in the area would be jeopardized. Recognize that the habitat may be necessary for only one stage in the organism's life cycle.

- Carrying Capacity. The maximum number of fish/wildlife that can be supported in a given habitat. Only a certain density of any species can be supported by the resources available in any environment.

- Ecosystem. All the component organisms together with the abiotic environment forming an interacting system.

b. Habitat Significance Analysis. Significance analysis for habitats in the context of project planning and environmental assessment is based on the simple fact that no organism (plant or animal) can exist by itself or without certain environment support. In all defense planning efforts, habitat becomes an important consideration as the tradeoffs between man's uses of the environment and use by fish and wildlife are examined, and a compromise is attempted by which all uses can be accommodated. Some of the questions central to an analysis of habitat significance are:

- At what point will the uses conflict to the extent that one or the other is significantly impacted?

- How is this point determined?

- What criteria/parameters enter into determining the point where the conflict becomes significant?

^{1/}The term "critical habitat" is not used here in the legal sense as defined under the Endangered Species Act (ESA) for threatened or endangered species. Rather, the term is used in a general sense applicable to any species.

A constraint of habitat significance analysis applies not only to obtaining physical habitat description information, but also in obtaining information of actual usage of the habitat by fish/wildlife. Often baseline data is lacking regarding habitats and habitat use within the ROI and cannot be obtained within the schedule and funding level of the overall planning effort. To fully assess a habitat, its physical and biotic features must be known. The biologist must often study animal usage in terms of multiple seasons of the year and multiple life history stages over a sufficient period of time to understand its population dynamics and habitat needs for each life stage. Without such baseline data regarding animal usage, the biologist must rely heavily on professional judgment based on his/her experience as well as that of others (including the literature). That judgment and a survey and evaluation of the substrate/vegetation/habitats of an ROI (both what is there and its condition) are used by the biologist to project fish/wildlife usage in the area and the probable effects a deployment alternative will have on those fish/wildlife.

One assumption that is usually made in the habitat analysis, especially when baseline information is lacking and a "worst case" impact analysis is being accomplished, is that a habitat is at its carrying capacity and cannot support additional fish/wildlife unless it is improved to support greater fish/wildlife numbers (i.e., increase amount of vegetation providing winter food supply; increase spawning area/substrate). In the past, project effects to wildlife habitat have often been mitigated by adding wildlife to an already existing habitat in order to replace numbers of wildlife lost due to habitat destruction elsewhere. These attempts have generally met with disaster as the habitat could not support the additional wildlife. Adding more numbers offset the natural stability of the habitat and led to population decline until stability could again be obtained at the habitat's carrying capacity. The current mitigation philosophy focuses on improving habitat through methods such as vegetation plantings to permit the population of the key wildlife species to increase naturally and reach stability at the new theoretically increased carrying capacity of the habitat.

The following discussion is a generic presentation of habitat significance utilizing specific examples as appropriate to illustrate key points. Habitats that are specifically protected by Federal laws, controls, or policies (e.g., critical habitat for threatened and endangered species and wetlands) are treated in other chapters of this manual.

14.2 Resource Significance.

a. Resource Inventory. A precursor to significance analysis for habitats is an inventory of the ROI to define what substrate/vegetation/habitats exist. Of critical importance is the careful definition of the geographical limits of the ROI as this defines the physical limits for each step of the significance analysis. Information regarding habitats is typically obtained through coordination with the public (especially

state and Federal resource agencies), literature search, aerial photograph interpretation, and field surveys using an interdisciplinary team. The resource inventory is continually refined (supplemented or reduced) throughout planning as more detail is generated about the ROI, the deployment alternatives, and their impacts - direct, indirect, and cumulative.

Once the inventory is made, the significance of each habitat is evaluated in terms of criteria and parameters involved in various tests of significance. These "tests" are generally categorized for ease of the following discussion although it is recognized that overlap exists among them.

b. Significance Tests.

(1) Is the Habitat Legally Recognized as Significant? Key to determining whether a habitat is legally recognized as significant are such questions as:

- Is the habitat specifically protected by a law, policy, or plan (Federal, state, and/or local)?
- Is the habitat part of a legally defined management unit?
- What is the past and potential future legal status of the habitat?

If there is a law, policy, or plan specifically protecting a habitat, it is identified as a significant habitat of the ROI. An example at the Federal level would be critical habitat for a threatened or endangered species under the Endangered Species Act (ESA). An example at the local level would be development of regulations requiring a buffer zone of riparian vegetation be left along certain areas of a stream or river. For any planning study in those areas, the riparian habitat would be considered to be a significant resource (it can be safely assumed that inclusion of the buffer zone in the development practice regulation was based on the merit of the significance of the riparian habitat).

It is also important to determine whether the habitat within the ROI is part of a legally defined management unit, such as a National Park, a Wild and Scenic River, a National Wildlife Refuge, or a comparable state habitat management area. If so, the habitat is considered significant and management regulations are examined for any specifically defined administrative processes that may have to be pursued to include the area in formal plans.

An examination of the past and potential future legal status of a habitat, as well as its present status, can provide important insights to the significance of the habitat. For example, a habitat may be under consideration for future status as part of a National Wildlife Refuge or

may have been studied in the past for inclusion under the Wild and Scenic Rivers system but due to a variety of reasons was never listed. Or a habitat may be part of mitigation for another project within the same ROI.

(2) Is the Habitat Politically/Publicly Recognized as Significant? Key factors influencing the political/public recognition of a habitat as significant include:

- conflict/controversy over the use of a habitat,
- habitat availability and change in that availability,
- supply of/demand for the habitat and change in that supply/demand, and
- knowledge or awareness of the habitat and change in that knowledge or awareness.

A habitat can become politically significant when a conflict in its use arises. For example, aquatic habitat for fish may in itself not be a political issue but when a conflict occurs between fish user groups and a deployment alternative requiring diversion of flow for water supply, the aquatic habitat could become a politically "hot" issue. In examining the changes in demand for, availability, and awareness of a habitat, it is important to consider the past, present, and future condition of the habitat in the political arena. For example, an estuary 10 years ago may have had no political/public significance in an area, but the increasing encroachment of development on the estuary has continued, coupled with the increased awareness of the biological significance of an estuary and the fact that this type of habitat is becoming less and less available regionally. The demand for both its protection and development has consequently increased and the issue has become politically significant to the regional governmental representatives.

Political significance is certainly influenced by legal, public, and professionally defined significance for a habitat. A habitat politically defined as significant, if not already legally protected, may become legally significant depending, in part, upon the level of political significance (Federal, state, local). For example, the estuary above became politically significant at the Federal level and was made part of a National Wildlife Refuge.

Generally, if a public identifies a habitat in the ROI as significant, it is initially considered to be significant. Some of the factors that are involved in assessing a habitat's significance based on public input include:

- Who's saying the habitat is significant and why?
- How many are saying it?
- Is the significance judged to be real or perceived?

These factors influence not only the determination of whether a habitat is or is not significant, but also if significant, at what level, and contribute to decisions made regarding the habitat. For example, a habitat is likely to be considered more significant and have a greater impact on the study outcome if a state or Federal resource agency identifies it as such based on field studies and professional experience, as opposed to a citizen defining the habitat as significant on his casual observations of wildlife usage.

This is not to say that private citizens cannot have a profound effect on a study's outcome. Citizens can have a substantial impact on decisions made especially when they organize into interest groups which may succeed in elevating the publicly defined significance to the levels of political and even legal significance.

In many instances, publicly defined significance may be perceived significance. For example, an interest group perceives that the riparian habitat along a particular 0.5 mile stretch of a river is critical to the survival of juvenile salmonids on their downstream migration to the sea. The habitat has been professionally judged by biologists to be nonsignificant relative to juvenile salmon rearing or migration. The interest group is willing to pursue legal action to protect this reach of habitat. The planners/biologists have the options of accepting the perception and assuming the habitat is significant, trying to convince the group that the habitat is not significant, possibly conducting additional studies to better support a new judgment of significance, or going ahead as though the habitat was not significant. There is also the possibility that the public "perception" of significance is purely political and that a false perception is being used as a tool to meet some other objective. For example, a certain segment of the public in a small town is against any government agency encroaching on their lands for whatever purpose. Knowing that environmental issues can produce delays to development, the public may make an issue over a habitat's significance in an attempt to stall or prevent government encroachment. In this case, further study to define the habitat's significance would help at a technical level but the planner had best put his primary efforts into defining the real source of the public's concern.

An important aspect of perceived significance is the past history of an area as well as its projected future. For example, 20 years ago, the Department of the Army (DA) established a military installation and committed 200,000 acres of tall grass prairie to military use. Over the years, the public has witnessed a gradual degradation of the habitat by military vehicles and artillery training and perceives a reduction in wildlife usage which they believe to be the result of habitat losses associated with military use. The DA now wants to expand the boundary of the installation to encompass another 10,000 acres of tall grass prairie and is met with much public opposition. The significance of the 10,000 acres of tall grass prairie may have not been surfaced by the public had the previous installation not been present or had it incorporated features to reduce or ameliorate habitat degradation.

Public input to the significance analysis should be taken seriously, and continued information exchange between the planner and the public should be an essential part of defense planning. Not only should the public be provided information regarding the study and its alternatives but information should be actively sought from the public early in the planning process regarding what habitats they believe to be significant in the ROI and what the criteria are that contribute to that significance. This information is used to scope the environmental analysis to significant issues (resources and impacts).

(3) Is the Habitat Professionally Judged to be Significant? Professional judgment may often form the only basis of recognition of a habitat's significance. Some of the key parameters utilized by a professional in judging the significance of a habitat are discussed below. Note that these parameters are not necessarily discrete, but are most often interrelated.

(a) The Past, Present, and Future Condition of the Habitat Without the Project. A given acreage of shrub-steppe habitat, for example, has been historically overgrazed and has also been disturbed by military training activities. The vegetation coverage on that habitat today reflects that past disturbance. The future projected use of the area is continued military training and livestock grazing, although a range management program should contribute to a reduction of further adverse effects of overgrazing. Having a knowledge of the use history and future of the habitat contributed to the determination that the habitat within the ROI was not significant. Another example is that of a habitat that is presently being considered for future establishment as a critical habitat under the ESA. Knowledge of its potential future condition contributes to the understanding of its current significance.

(b) The Regional Condition of the Habitat. The significance of habitat increases when it is learned that, regionally, most of that habitat type has been lost. This parameter reflects the cumulative aspect of previous impacts to a habitat that contribute to a knowledge of its current significance. An example is a river on which past development has resulted in the loss of much of its riparian habitat. Within the 10-mile ROI for a defense project, 2 miles of riparian habitat remain. This 2-mile stretch may be professionally judged to be significant because of the past cumulative effects on the riparian habitat of that river not only in the project reach but outside the ROI.

(c) Size and Extent of the Habitat. A habitat may be considered significant because there is so little of it remaining within the ROI or region as a whole, as in the case of the riparian habitat above. Conversely, a habitat may be determined to be nonsignificant because so little of it exists or remains in the ROI that it is not effectively utilized by fish/wildlife. For example, a military development has resulted in the filling of 19 acres of a 20-acre wetland which

historically had significant waterfowl value. The 1 acre remaining can no longer function as a major rearing area for waterfowl not only due to its reduced carrying capacity but because of its proximity to human activity. The wetland no longer is significant (assuming other functional values attributable to wetlands are negligible in this specific case, i.e., floodwater storage, nutrient/food supply to adjacent streams, etc.).

(d) The Biological Attributes of the Habitat. Many of the questions asked and addressed by the professional in assessing the significance of a habitat relate to the biological attributes of the habitat. Some include:

- Does the habitat support a diversity of fish/wildlife? What fish/wildlife does it support?
- Does it constitute critical habitat for any species to the extent that without it, that species would cease to exist in the study area?
- Does the habitat support any federally listed threatened or endangered species or state listed plant or animal species of concern?
- Is the habitat part of any ongoing scientific research study?
- Does the habitat provide all or part of the range for the particular species that utilize it?
- What is the function of the habitat in terms of the local ecosystem as a whole?
- Does a resource management plan exist dictating human use of this habitat?
- Do the fish/wildlife that utilize the habitat or the vegetation of the habitat provide a significant fishing/hunting/gathering resource?
- What does the literature say regarding the use and quality of this habitat to fish/wildlife?
- Could the habitat be potentially used by a species under the projected future condition of the habitat?
- Is enough known about the biological attributes of the habitat to clearly define its significance?
- If not, based on what is known about its biological attributes, is there reason to believe it is significant?

- Is the habitat a unique feature of the ROI?

- Has the habitat been impacted severely by past activities, such that its present habitat quality is marginal?

An examination of a habitat's biological attributes combined with a knowledge of its physical condition, including size, regional abundance, and history, and its social value, including human use and monetary value, forms the basis for a professional judgment of its significance. Primarily, the professional will focus on the habitat's condition and use by fish and wildlife and evaluate that information in view of his experience and knowledge of the habitat.

To gather the information regarding the parameters used to determine habitat significance, the professional relies on his own insights, expertise, and experience as well as inputs from a variety of sources including Federal and state resource agencies, the scientific literature, the interdisciplinary planning team, and actual field studies. When to conduct additional studies is an important consideration of any professional judgment.

Professional judgment is not without professional bias and is subject to pressures from all other categories of significance tests, i.e., legal, political, and public, for support of what may be perceived significance. For example, the public in opposition to the military installation expansion in paragraph (2) above may hire a professional ecologist to evaluate the tall grass prairie and provide information that could be used to support the public's perception that the habitat is significant.

Because of the somewhat "black box" nature of professional judgment, determinations of habitat significance based upon professional judgment are often closely scrutinized by the decisionmakers and may require considerable back-up data to support the significance determinations. A professional may even be called upon in court to provide the rationale for his conclusions regarding resource significance. The degree to which the professional's judgment is accepted by the decisionmakers depends largely on (1) the faith the decisionmaker has in the ability of the professional to make a sound judgment and (2) the ability of the professional to provide key information explaining and supporting his judgment. An additional aspect of (1) is the acceptance of the professional's judgment by his/her professional peer group. There will be cases in which it may be necessary to utilize a professional that is renowned in his field of expertise in order for the judgment to have a high degree of acceptability. For example, in the case of critical habitat for an endangered species that may make a difference in whether a project can or cannot be constructed at a particular site, it may be prudent to hire a renowned expert on habitat for the particular species in question.

c. Resource Nonsignificance. Habitats not determined to be significant according to the tests outlined above are nonsignificant in the context of the ROI. Those that are clearly nonsignificant would receive little further attention, if any, in the study and may even be of so little consequence, they are called insignificant. For example, 100 acres of disturbed tall grass prairie are projected to be continually disturbed by military activities in the future. The habitat is of poor quality and provides for only marginal use by wildlife who have been not only impacted by loss of habitat but also by human disturbances on the 100-acre site. Professionally, the habitat has been judged nonsignificant. The habitat does not constitute critical habitat for any threatened or endangered species nor any plant or animal species of concern and as such has no legal significance. The habitat is not politically or publicly defined as significant. This habitat within the ROI is then clearly defined as nonsignificant.

Nonsignificance determinations made recognizing lack of sufficient data are not as clear. For example, a certain area of aquatic habitat in a river is not thought to be significant from the standpoint of fish use. This determination is based on professional judgment although a study of actual fish use of that habitat has never been done. Based on his/her expertise and knowledge of the area, the professional finds no reason to believe that the habitat is significant. Nor has the habitat been defined as significant legally, politically, or publicly. This habitat within the ROI is then defined as nonsignificant. There may be cases when additional study must be done to support or refute the nonsignificance determination. Often the designation of nonsignificance for a habitat is based on its use by fish/wildlife rather than by its substrate and vegetative cover.

The aquatic habitat in the paragraph above may be considered "important" to fish use in the ROI, but its importance has been judged not to have crossed the "threshold of significance." Habitats defined as "important" should be reviewed periodically throughout project planning for any changes in information or study conditions that may affect the determination of their significance.

14.3 Impact Significance.

a. Prediction of Impacts. After habitats of the ROI have been inventoried and their significance determined,^{1/} the next major task in the significance analysis is to determine the impact of the project alternatives on the habitats. The main emphasis of the impact assessment should be placed on impacts to significant resources.

For the assessment, input is obtained from the public, literature search, and field analyses using an interdisciplinary team.

^{1/}The total analysis should be thought of as an iterative process that should be consistent with other levels of planning detail and refined throughout planning as more detail is formulated regarding the ROI and deployment alternatives.

Such tools as habitat evaluation methods and economic evaluation procedures for user-days use of the habitat are used to qualitatively and quantitatively define impacts to the extent possible. It may even be necessary to conduct special studies when insufficient information is available.

Once the impacts are determined, the significance analysis is performed on those impacts to habitats identified as significant in the ROI. The determination of impact significance is critical to what is done in planning regarding an impact, as discussed in chapters 11 and 12 of this guide.

b. Significance Tests.

(1) Is the Impact to the Habitat Legally Identified as Significant? Key to determining whether an impact to a habitat is legally recognized as significant are such questions as:

- Is there a legally defined process for determining the significance of impacts to the habitat?

- Are there any established policies or legal controls that constrain impacting the habitat?

- Is this an impact over which someone is willing to pursue litigative action?

- Does the impact result in a legal precedent?

- Are there any legal actions planned for the habitat?

Some habitats that are legally protected require that a defined process be followed for determination of impact significance. Examples include wetlands, critical habitat for threatened or endangered species, and wild and scenic rivers. The determinations of impact significance by these processes rely heavily on professional judgment.

The planner should give consideration not only to federally protected habitats but also to habitats that may be subject to locally established policies or controls that would influence the significance of an impact on those habitats. For example, an Indian tribe has obtained an injunction which prohibits the clearing of riparian habitat along a certain river because they believe this habitat to be critical to the salmonid fish resource. As such, the habitat is significant in the area. The DA project under study will result in the loss of 0.5 mile of a previously disturbed riparian habitat. That loss, although it may not be professionally judged to be significant, may be defined as legally significant due to the injunction and the fact that the Tribe is willing to pursue litigative action over any impacts to that habitat.

A knowledge of what legal actions may be planned for a particular habitat may be critical to a defense project that will impact the habitat and can make a difference in whether an impact is defined as significant from a legal perspective. For example, a particular plant species is being studied for potential listing under the ESA and is known to occur on a military installation. A project proposed on the installation will impact that plant species and its substrate (habitat). Knowing that the plant is being studied for listing and trying to avoid significant conflict between the project and the plant community, the DA works with the FWS to establish a memorandum of understanding (MOU) which sets up guidelines to avoid significant impact to the plant and its habitat without holding up implementation of the planned project. Without this MOU, the FWS would have pursued listing the species under the ESA in an effort to protect it from the military project being proposed. Development of the MOU resulted in a minor modification to the project plan to preserve the plant community and habitat and avoided the potentially lengthy process of consultation that would have been necessary under the ESA. The issue was successfully resolved early in the planning process and a possible last minute problem was averted that could have occurred had the plant community been listed just prior to or during construction.

(2) Is the Impact to the Habitat Defined as Politically/Publicly Significant? Key aspects of the political/public recognition of an impact to a habitat as significant include:

- public perceptions/controversy,
- level of political/public recognition (local, regional, state, or Federal),
- political precedent, and
- whether the recognition is real or perceived.

Definition of an impact as politically significant is greatly influenced by the public's perception of the impact's significance. For example, a military project is going to result in a certain amount of unavoidable disturbance to habitat due to construction of a temporary road for hauling borrow material to the project site. Studies have shown that the impacts to tall grass prairie (a significant resource of the ROI) will not be significant. A local sports group believes that the impact will be significant and will result in a significant impact on the local hunting resource. The group gathers citizen support and applies pressure on their governmental representatives. The issue has now become visible at the political level.

Political significance can increase the level of significance of an impact that has been determined to be significant by other tests or criteria. For example, impacts to aquatic habitat from construction of a water supply diversion for a military installation are professionally judged to be significant. Losses of this habitat would result in a significant impact to the fishery resources of the river. Politically,

this becomes an issue in an ROI where water supply is in critical shortage and there are multiple demands being placed on that supply (agricultural, fish, and military). The impacts may become so politically significant that a moratorium on future development in the ROI is imposed until a basinwide water resources management plan is prepared and implemented. Because of this moratorium, an alternative site may be found for construction of the deployment alternative. Political significance increased the degree of impact significance to the extent that it had a profound influence on the decisions made regarding the defense project.

The level of politically identified significance (i.e., local, regional, state, or Federal) and the type of project being considered (local, regional, state, or Federal) influences the degree of impact significance and eventually what is done about the impact. In the example of the military project above, politically defined significance at the Federal level had a profound impact on decisions of project feasibility.

Another aspect of political/public significance is whether the impact is involved in establishing a political precedent. For example, in his home state, Senator Jones has been instrumental in setting aside thousands of acres of land under the National Forest system. The state has always been against development and for protection of its resources and its citizens vote for politicians who support that philosophy. Senator Jones' state is suffering under the current economic situation and a proposal for a large military project would bring money and jobs to the state. The project would result in the loss of 25,000 acres of wildlife habitat within the National Forest. For Senator Jones to support this project would establish a political precedent for the environmentally oriented state. The loss of the 25,000 acres of habitat becomes politically and publicly a significant impact. The public is worried that allowing one such project will establish the precedent for continued development and ultimate loss of the state's natural resources. Obvious from this example is the interrelationship between publicly and politically defined impact significance.

An impact to a habitat may be identified as significant by any segment of the public. That identity may be either real or perceived. It is the task of the planner to determine whether a perception can be changed through additional information or whether he agrees with the poorly defined significance. In either case, he/she must make a decision on whether the assumption of significance can be made with little or no effect on project planning or whether the assumption of significance will have a critical effect on project planning and additional studies may be appropriate to support or refute the significance determination.

Impact significance determinations made early in the planning process can be changed through public input and increased awareness regarding a project and its impacts. The influence that public input can have on defense project planning is illustrated by the following examples.

● Example 1. A large segment of the public perceives that activities associated with a large military project will significantly impact riparian habitat, which has been defined as a significant habitat of the ROI, and is requesting that several acres of mitigation land be purchased and improved for wildlife. The project manager and project biologist meet with the concerned public via workshops and field trips to the project site and explain that the riparian habitat will not be significantly impacted. Once presented with the additional project information, the public agrees and the impact is defined as nonsignificant. No mitigation plan is recommended.

● Example 2. A project will result in the loss of 100 acres of deciduous forest (a significant habitat of the ROI) initially not considered to be a significant impact. As planning continued, information provided by the public (including Federal and state resource agencies) resulted in a change in the significance determination because this site was found to contain numerous springs with associated wetlands and to provide a more diverse habitat than other adjacent areas of the forest. Consequently, a mitigation that was acceptable to the public was developed for the loss of habitat. The cost of the mitigation was less than the cost of moving the project site.

● Example 3. Mrs. Smith, a major landowner in the ROI, will lose a mile of rangeland (a significant resource of the ROI) due to construction of a road through her property to a military installation. Loss of the mile of rangeland habitat was not defined as a significant impact by the project planning team or by the public at large. Mrs. Smith is being monetarily compensated for the loss of her land, however, she perceives the loss as a significant adverse impact to the antelopes which roam her rangeland. No amount of additional information will be able to alter Mrs. Smith's perception of the significance of the impact, which is unavoidable with implementation of the project. Through good and careful planning, the loss of Mrs. Smith's rangeland is reduced to a level she finds to be acceptable. The impact is judged to be not significant enough to attempt to mitigate it. In this case, actions are taken to reduce the impact, although it was defined as nonsignificant by the planning team.

● Example 4. People in an area are very sensitive to a military development due to past experience and the habitat losses associated with other similar projects in the ROI. As a result, the public does not trust any developer and perceives any habitat loss as significant in view of the cumulative effects incurred by previous projects. In this case, the DA may have to launch an extensive public involvement/education program to gain the trust of the public and try to change some of the preconceived perceptions. Looking at what's happened to the people in the ROI in the past is very pertinent to understanding the biases of their impact perceptions and may result in modifications to the approach in which planning is accomplished.

● Example 5. One thousand acres of disturbed shrub-steppe habitat will be lost due to construction of a military project. Due to its disturbed condition, this habitat was not judged to be significant in the ROI. Segments of the public perceived this as a significant loss of a habitat initially defined as nonsignificant and were not willing to accept the uncategorical loss of 1,000 acres of even marginal habitat. In this case, the public included state resource agencies and several environmental groups. Loss of the habitat was an integral part of the project and could not be avoided; further, state approval was necessary for the project. As a result, the habitat was redefined as a significant issue (resource and impact) due to controversy and a mitigation plan was developed to improve some marginal shrub-steppe habitat elsewhere in the area.

● Example 6. In this final example, an impact believed to be significant by the planner is not considered significant by the public. The planner believes that a beneficial impact is expected to occur to fisheries spawning habitat in a small stream due to regulation of stream-flow from a small hydroelectric dam proposed for provision of energy to a large military complex. The public does not agree and perceives that the impact is overstated in order to increase the public acceptability of the project. Meetings with the public do not result in changing that perception. Eventually, the issue becomes a politically/publicly significant one to the extent that the project location is moved.

(3) Is the Impact to the Habitat Professionally Judged to be Significant? Professional judgment may be an integral part of the other tests of significance or may stand alone as the basis for determining an impact's significance. Because of the nature of professional judgment, it often demands closer scrutiny and increased justification and documentation than other tests of significance. It involves parameters that can be documented and quantified as well as professional "rules-of-thumb" and intuitions that cannot be quantified but are based on experience, expertise, and accepted professional practice. Some of the key parameters that contribute to an impact significance analysis of habitats based on professional judgment are discussed below.

(a) The Extent, Magnitude, Duration of the Impact in View of the Habitat's Past, Present, and Future Condition. The permanent loss of 1,000 acres of tall grass prairie, for example, a significant habitat of the ROI, may not in itself be considered a significant impact. However, in terms of the past history in the region of conversion of this habitat type to agricultural land and the projection that such a trend will continue, a loss of 1,000 acres of tall grass prairie is professionally judged to be significant due to the fact that so little quality tall grass prairie remains regionally.

On the other hand, a temporary disturbance to 2,000 acres of tall grass prairie which will be restored through vegetation plantings, thus accelerating natural recovery following disturbance, may not be considered a significant impact by the professional. Even though a larger area of habitat will be impacted than the previous example, the impact will be temporary and vegetative restoration is planned.

Loss of a small area of habitat, if critical to the existence of a "significant" species (particularly if it is threatened or endangered), in the ROI would be rated significant just as loss of a large area of significant habitat. The magnitude of impact, and remedial action, may well be greater for the loss of a small area of habitat for a significant species than for a large habitat loss.

The professional usually focuses on key wildlife species that relate to man's use of the habitat. For example, salmon are a significant resource in the Pacific Northwest for commercial, Indian, and sport fishermen. Any impacts to prime salmonid habitat would be judged to be significant; whereas, impacts to carp and catfish habitat may not be considered significant. These are value judgments and reflect professional bias as well as man's use of the habitat in question.

(b) Type of Impact. Professional judgment of impact significance includes consideration of all types of impacts including:

- beneficial and adverse,
- direct and indirect,
- permanent and temporary,
- long-term and short-term, and
- individual and cumulative.

For example, permanent loss of 500 acres of disturbed tall grass prairie may not be significant but the long-term secondary effects of increased erosion due to loss of vegetative cover may result in significant, adverse, indirect impacts on undisturbed prairie habitat in the adjacent area from increased runoff and soil deposition.

An impact that may individually be nonsignificant (e.g., the loss of 0.5 mile of riparian habitat may, when added to other impacts (e.g., loss of 1 mile of riparian habitat upstream and 1 mile of habitat downstream), become cumulatively significant.

(c) The Probability of the Impact Occurring. While probability of impact occurrence is important, the nature and magnitude of impact, are still the critical issues in significance determination. An impact can have a very low probability of occurring, e.g., chemical spill in a waterway, but if it does occur, the severity of impact to the fishery makes the impact significant.

(d) Plants/Fish/Wildlife That Will be Impacted. Impact significance for habitats varies depending upon the types and numbers of plants/fish/wildlife that would be impacted by loss or degradation of the habitat. In determining impact significance, the professional addresses many of the same questions he/she asked under resource significance regarding the biological attributes and human uses of the habitat and analyzes what the impacts to the habitat mean to the fish and wildlife using the habitat, as well as to man. Some of the questions the professional addresses are:

- Will the impact result in a decrease in habitat (and subsequent wildlife) diversity?

- Will the impact result in the loss of critical habitat for any species?

- Does the impact to the habitat affect a portion of or all of a species range?

- Will the impact result in the gradual elimination of a species from the area?

- How much of the habitat can be lost before the fish/wildlife utilizing it are significantly impacted?

- How will the impact to the habitat affect the fish and wildlife using the area (i.e., actual loss of habitat; decreased productivity; increased stress to wildlife; secondary habitat losses; temporary or permanent disturbance; beneficial or adverse effect; loss of food source, cover, nesting sites; species interactions)?

- How will the impact affect man's consumptive and nonconsumptive use of the habitat?

- Will the long-term productivity of the habitat be affected?

- When will the impact occur (i.e., construction, operation, maintenance, decommissioning)?

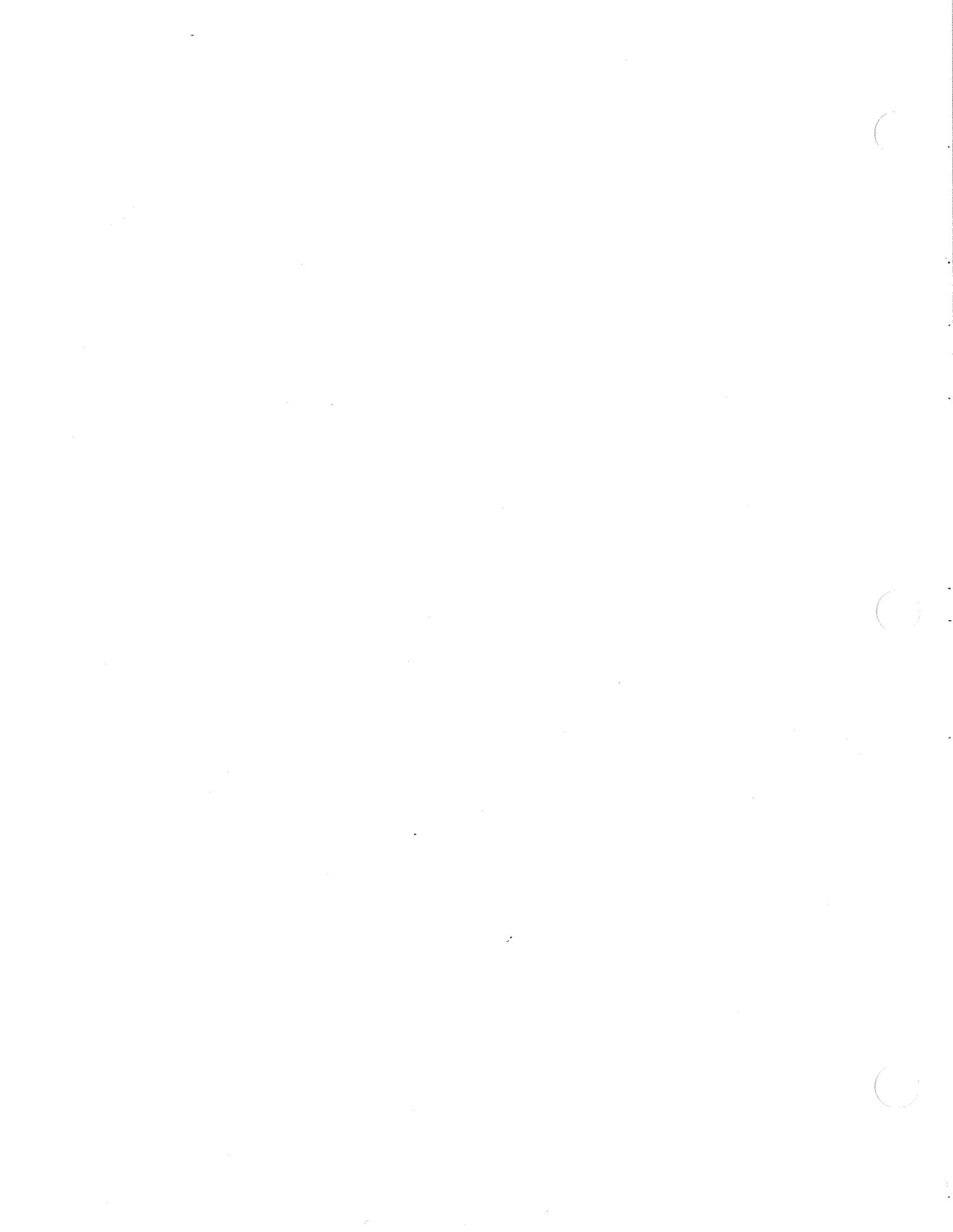
- How resilient are the species being affected by impacts to habitat?

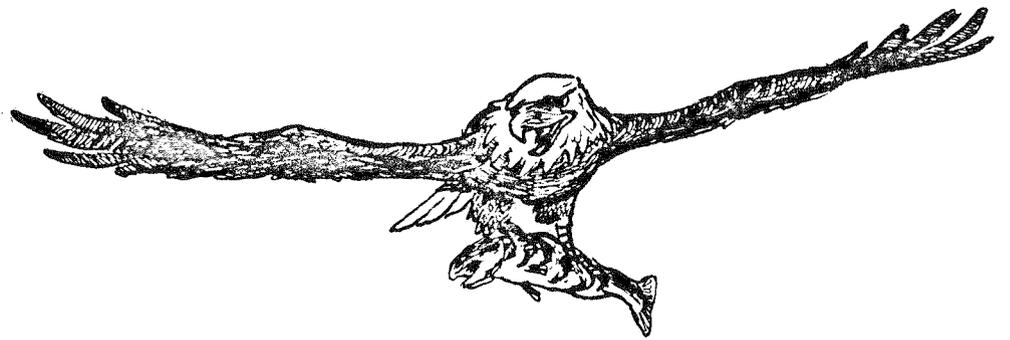
(e) Ability to Mitigate. The ability to mitigate an impact has an effect on the level of its significance. For example, impacts to the riparian habitat from temporary military activities could be mitigated by restoring the habitat following the military field exercise. Experience has shown that this mitigative method is usually feasible, successful, and is viewed by the professional community and the public as a satisfactory means of reducing the significance of the adverse impact to an acceptable level. Although the impact of losing the habitat is significant, its level of significance is reduced by the ability to successfully mitigate its loss.

On the other hand, such an impact as the permanent loss of 10,000 acres of tall grass prairie to construction of a military installation cannot be mitigated onsite and is a tradeoff of the project. Even with mitigation by development of tall grass prairie offsite, the impact or loss would likely have a high degree of significance professionally, as well as publicly and politically. Further, it may take several years to restore tall grass prairie, if successful at all, and the cost, both monetary and biological, may not be acceptable. State-of-the-art in mitigation methods becomes an issue here.

c. Impact Nonsignificance. Impacts not identified as significant are nonsignificant in the context of the specific ROI. The rationale for the determination of nonsignificance should be documented, as well as the rationale for impact significance. Consideration should be made for the possibility that a nonsignificant impact may become significant, or vice versa, through the course of the planning effort. This is particularly pertinent for impacts for which there is insufficient data but no reason to believe that the impact is significant. Nonsignificant impacts defined as "important," but not judged to cross the "threshold of significance" should be reviewed periodically for new information or changed conditions, including legal, political, public, and professional perceptions, that may affect the impact significance determination.

Although all impacts should be analyzed, study focus should be placed on significant impacts to significant habitats and on reducing significant impacts to nonsignificance through project modifications, avoidance, and/or mitigation. Note that consideration should also be given to reducing adverse impacts (though nonsignificant) through careful project planning to the extent possible.





15. THREATENED AND ENDANGERED SPECIES

15. Threatened and Endangered Species

15.1 Introduction.

a. History. The Endangered Species Act (ESA) was originally passed into law in 1969 (Public Law 91-135). A rather weak Act, it nevertheless was very important as a national and worldwide precedent for protection of rare species. It also established a list of all species of animals and plants determined to be in danger of extinction (Red Data Book). However, the law had little legal clout and was ineffective in protecting these species on federally controlled lands. The law was replaced and strengthened considerably in 1973 with passage of a completely new Act (Public Law 93-205). Federal agencies were given the new responsibility of protecting endangered and threatened species as listed by the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS). Procedures and time frames for consultation with these agencies were clearly defined and elaborated in the regulations prepared by FWS/NMFS (50 CFR 402). Since 1973, the Act has been amended many times, with the most significant changes occurring in the 10 November 1978 amendments (Public Law 95-632). The latest amendment was enacted 13 October 1982 (Public Law 97-304). As a result of those amendments, the consultation procedures have also been modified. Those procedures described below reflect the latest changes. (Note: The latest regulations from FWS/NMFS are draft regulations dated 24 February 1981. These were never finalized due to the frequently changing nature of the ESA, and because a number of agencies never completely concurred with the regulations. As a result, these regulations were directed to be the interim regulations until revised regulations could be drafted. The Department of the Army (DA) has also prepared regulations, EC 1105-2-77, dated 16 January 1978, providing guidance on carrying out the requirements of the ESA.)

b. Definitions.

(1) The term "critical habitat" for a threatened or endangered species means:

- the specific areas within the geographical area occupied by the species, at the time it is listed, and on which are found those physical or biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection; and

- specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary of the Interior or Secretary of Commerce that such areas are essential for the conservation of the species.

Critical habitat may be established for those species now listed as threatened or endangered species for which no critical habitat has

already been established. Critical habitat designations are made to assist Federal agencies in locating endangered species and in fulfilling their responsibilities under the Act for conserving them. Private activities on non-Federal lands are not restricted by the ESA unless direct harm to listed species would result. Areas designated as critical habitat are not closed to human activity.

(2) The term "endangered species" means any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary of the Interior or Secretary of Commerce to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man.

(3) The term "fish or wildlife" means any member of the animal kingdom, including any mammal, fish, bird (including any migratory, non-migratory, or endangered bird for which protection is also afforded by treaty or other international agreement), amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate, and includes any part, product, egg, or offspring thereof, or the dead body or parts thereof.

(4) The term "listed species" is any species currently on the Federal list of endangered and threatened wildlife and plants.

(5) The term "plant" means any member of the plant kingdom, including seeds, roots, and other parts thereof.

(6) The term "species" includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature. Thus, this includes an isolated subspecific population of a species such as the Columbian white-tailed deer in southwestern Washington.

(7) The term "threatened species" means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

15.2 Resource Significance.

a. Resource Inventory. There are several ways to determine the presence of a listed species in an ROI. Not the least of these is professional expertise. A biologist familiar with the local flora and fauna of an area will more than likely be aware of any listed species that is present. The latest Federal List of Endangered and Threatened Wildlife and Plants (published 30 September 1981, in 46 FR 47798) indicates, to the state level, the distribution of each species on this list. The best method to determine the presence of a listed species is to write the FWS and NMFS for a list of endangered or threatened species that may be present in an ROI.

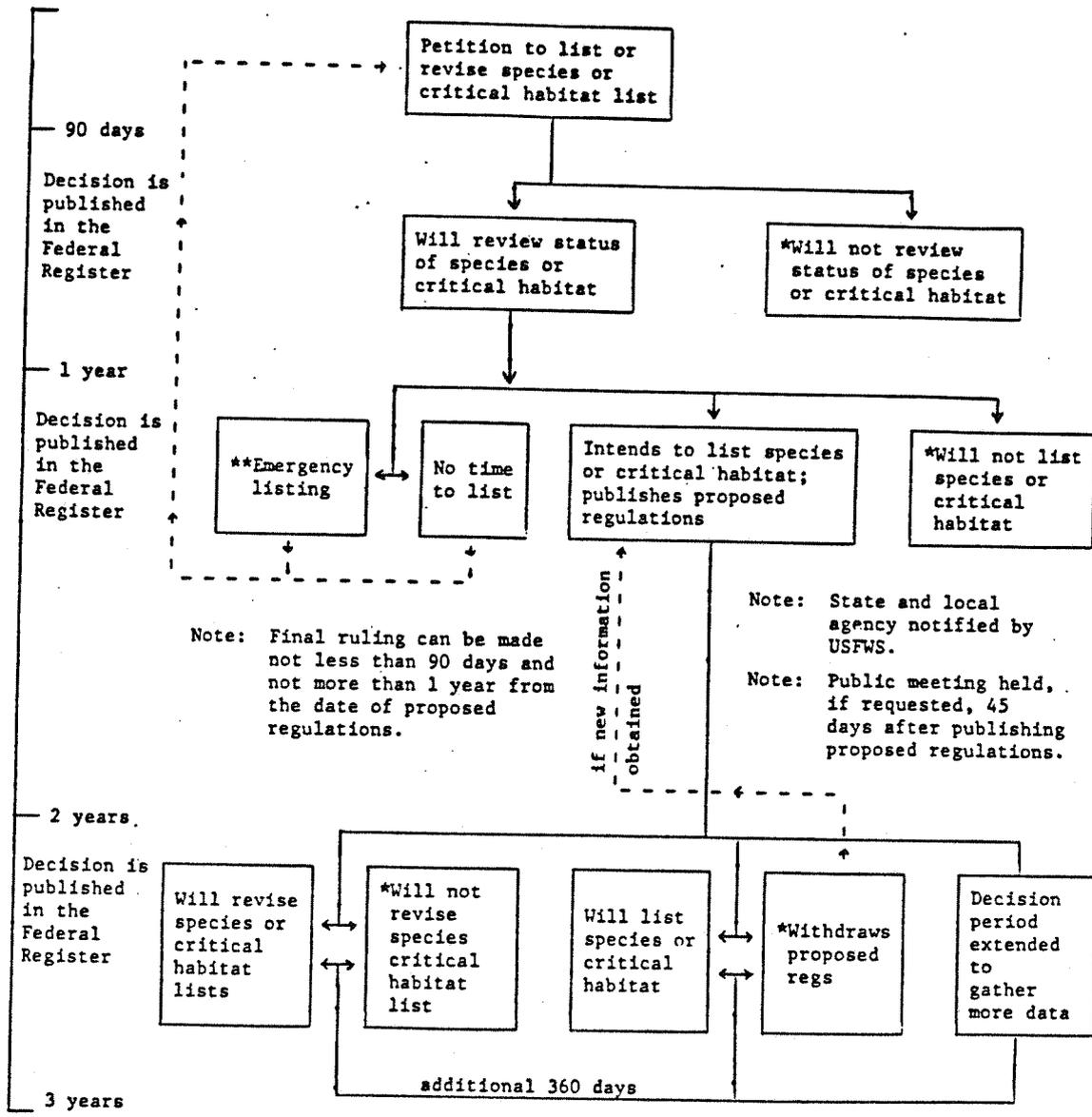
b. Significance Tests.

(1) Legal Significance. All federally listed species are protected by law and the DA must follow certain procedures to assure that listed species are not adversely affected by proposed actions. An explanation of the procedure for placing species on the endangered and threatened species list follows. Section 4 of the ESA explains the process for placing animals on the list, which is the responsibility of FWS/NMFS. Any person may petition to have a species placed on the list, but a substantial amount of biological information must be included with such a petition. If a petition does not contain enough justification for listing a species, the FWS/NMFS will publish a notice of review in the Federal Register, soliciting more information on the species from any source. When information is sufficient to warrant listing, the FWS/NMFS publishes a proposed rulemaking, which may or may not include designation of critical habitat (if designating critical habitat would adversely impact a species by making known specific locations of nests - of peregrine falcons, for example - then critical habitat is not designated). The public has 60 days to respond to this proposed rulemaking, and a species is listed if it is determined that its existence is threatened by one or more of the following factors:

- The present or threatened destruction, modification, or curtailment of the species' habitat or range.
- Overutilization for commercial, sporting, scientific, or educational purposes.
- Disease or predation.
- The absence of regulatory mechanisms adequate to prevent the decline of a species or degradation of its habitat.
- Other natural or manmade factors affecting the species' continued existence.

FWS/NMFS has 2 years in which to list a species following publication of the proposal. If a species is not listed within 2 years, the proposal is withdrawn. A species can be repropoed for listing, and the entire listing process must be followed again. A flow chart graphically demonstrating the listing process is provided in figure 15-1. A brochure has been printed by Government Printing Office (GPO: 1981 O-329-246, "Placing Animals and Plants on the List of Endangered and Threatened Species") that provides a more detailed discussion of the listing process.

Whether a species is listed as "endangered" or as "threatened" makes no difference with regard to DA responsibilities for protecting such species. They have equal status under the law, and must be treated equally. Likewise, no one species, such as the bald eagle, is more important (or less important) than any other species, such as the Madison Cave isopod.



*Note: Judicial review allowed for every negative decision.
 **Note: Emergency listing of species or critical habitat remains in force only 240 days.

Figure 15-1. Endangered and Threatened Species and Critical Habitat Listing Process.

(2) Political/Public Significance. A listed species can become politically significant as a result of an unpopular action or decision by the DA and/or FWS/NMFS, thus spurring local interest groups to call for action from their congressmen. In addition, a species proposed for listing, or a candidate species (a species under scrutiny that someday could be proposed for listing if its situation worsens), may locally be quite important. A proposed project may become the impetus to list the species and, thus, may inspire political "warfare" between project proponents and species proponents.

(3) Professional Judgment. Professional judgment may be required to determine whether proposed or candidate species, or species which are on a state endangered species list (which are not legally significant to Federal agencies), but not on the Federal list, are significant. It may be that such species are determined to be important by the professional and should be treated equally or nearly equally with federally listed species. Such determinations are, by necessity, made only through the professional's background knowledge of the species, as well as through communication with other knowledgeable professionals in resource agencies, universities, or private enterprises. In the case of proposed and candidate species, it is sometimes expedient to treat them thoroughly at the same time that listed species are being treated, so in the event that the proposed and candidate species are listed, no delays to project actions will result from having to reinstate the consultation process.

c. Resource Nonsignificance. Proposed and candidate species are not considered legally significant and may not be politically or publicly significant, although they may be (and usually are) professionally significant. However, as the preceding paragraphs pointed out, these can also become publically or politically significant. Finally, proposed and candidate species can change status - the former may be listed, thus changing from nonsignificant (or less significant) to legally significant.

15.3 Impact Significance.

a. Introduction. During the planning stages of a proposed project, the presence of any endangered, threatened, or proposed species in the ROI must be identified. If such species are identified, then potential impacts to those species must be assessed. As mentioned in paragraph 15.2a, a letter to FWS/NMFS is the best way to learn of a listed species in an ROI. In fact, if a proposed action requires preparation of an EIS, the DA must write to FWS/NMFS to request a list of species. This is the start of the informal consultation process, and the beginning of the assessment process to identify whether or not potential impacts are significant.

b. Significance Tests.

(1) Legal Significance. Section 7 of the ESA describes three separate procedures for Federal agencies to consult with FWS/NMFS. The initial process is "informal consultation." Should this process result in identification of impacts to a listed species, "formal consultation" with FWS/NMFS is initiated. Should this process result in irresolvable conflicts, two options are available: (1) decide to forego the project or (2) request initiation of the "exemption process."

To initiate informal consultation, the ESA requires that the Federal agency must write to FWS/NMFS for a list of endangered or threatened or proposed species for any proposed action that requires preparation of an EIS. Proposed actions are any actions that result in impacts to the environment and include permit actions. (Note: Prior to applying for a permit, potential permit applicants may consult with FWS/NMFS without the aid of the permitting agency. Once application for permit is made, however, the agency has lead responsibility to consult with FWS/NMFS.) For less substantial actions (i.e., actions requiring only an EA), Federal agencies are not required to routinely consult with FWS/NMFS, but nevertheless must consult if it appears listed species may be impacted by construction of the proposed project. A certain amount of professional expertise may be necessary to recognize when listed species may be impacted by such (often very small) actions. If the Federal agency does not consult with FWS/NMFS, it may eventually result in delays to the project, as the FWS/NMFS can, at any time, request the agency to initiate consultation on a particular species. Thus, it is important to initiate early informal consultation to prevent late surprises. The FWS is consulted for all actions that may affect any listed terrestrial species of plant or animal, and for all freshwater aquatic species except anadromous fish. NMFS is consulted for all actions that may affect marine species and anadromous fish. Many project actions will require consultation with both agencies. The Regional Director of the FWS has the responsibility for ESA actions, though in some regions he has passed on the responsibility to an endangered species team leader located in a local office in the region. If in doubt, correspondence should always be directed to the Regional Director. Likewise, correspondence to NMFS should be directed to the Regional Director. Requests for lists should include a description of the project, a map of the project location, and should request a list of any endangered, threatened, and proposed species that may be found in the area of the ROI.

Once informal consultation has been initiated, the FWS/NMFS has 30 days from receipt of the request to respond with a list. If no list is sent, the DA's responsibilities with the ESA are procedurally completed with respect to that particular action. If FWS/NMFS provides a list of species, the DA must prepare a biological assessment (BA) to evaluate whether the proposed action will impact those species on the list. If the DA does not initiate preparation of the BA within 90 days of receipt of the list, then it must verify with the FWS/NMFS the continuing accuracy of the list whenever the BA is initiated. At a minimum, the BA must accomplish the following:

- Conduct a scientifically sound onsite inspection of the area affected by the action, which must, unless otherwise directed by FWS/NMFS, include a detailed survey of the area to determine if listed or proposed species are present or occur seasonally and whether suitable habitat exists within the area for either expansion of the existing population or potential reintroduction of populations.

- Interview recognized experts on the species at issue, including those within the FWS, NMFS, state conservation agencies, universities, and others who may have data not yet found in scientific literature.

- Review literature and other scientific data to determine the species' distribution, habitat needs, and other biological requirements.

- Review and analyze the effects of the action on the species, in terms of individuals and populations, including consideration of the cumulative effects of the action on the species and habitat. Predicting project effects on endangered species is seldom an easy task and is often not much more than educated guesswork. But the guesswork is based on professional knowledge and experience and depends especially on judgments of other professionals in Federal and state resource agencies, universities, and private enterprises. Consider the example of a proposed BMD site near which is a nesting pair of bald eagles. Analysis of the project's effects on the eagles must consider whether construction noise and other activities would cause abortion of nesting activities, whether loss of habitat would cause a loss of prey large enough to affect the pair, whether project activities might disrupt feeding, and numerous other such questions. The professional must strive to consider all possible human activities that may result from the project and whether those activities may impact any listed species in the ROI.

- Analyze alternative actions that may provide conservation measures.

- Conduct any studies necessary to fulfill the above requirements.

- Review any other relevant information.

Note that the fourth item above indicates that cumulative effects must be considered. Cumulative effects are those resulting from other projects combined with the action under study - the proposed action alone may not result in impacts to listed species, but when the effects of the proposed action are combined with effects from other (past or proposed) actions, the cumulative effects may adversely impact the listed species. Although not highlighted above, secondary effects of the proposed action (those resulting from development that may occur in support of the proposed action, but are not part of the action) on listed species must also be considered.

The DA has 180 days to complete the BA following receipt of the list from FWS/NMFS. The DA is not required to transmit the BA to FWS/NMFS if the BA concludes that no listed species will be affected by the proposed action. However, it is highly recommended that FWS/NMFS be apprised of the DA's conclusions. If the BA concludes that the action may impact a listed species, the DA must transmit the BA to FWS/NMFS and initiate formal consultation.

Note that the BA must identify any and all impacts to listed and proposed species. Significant impacts in the case of the ESA are any impact that may occur to the listed species. Thus, if any impacts are identified, formal consultation must be initiated. If impacts to proposed species are identified, the DA must confer with FWS/NMFS to determine a course of action. Formal consultation is not required for proposed species, as such species are not given legal status under the Act. However, it is important to remember that a proposed species may eventually be listed, at which time formal consultation would be required unless a conference with FWS/NMFS during the early planning stages (when the species was still "proposed") resulted in modifications that would not impact the species. If such was not accomplished, and the species is eventually listed, then formal consultation will be required at the time of listing which could result in delays to project construction.

Requests for formal consultation shall include: (a) a description of the action to be considered; (b) a description of the specific area that may be affected by the action; (c) a description of any listed species or critical habitat that may be affected by the action; (d) a description of the manner in which the action may affect any listed species or critical habitat and an assessment of any cumulative effects; (e) reports including any EISs, EAs, or BAs prepared; and (f) any other relevant available information on the action, the affected listed species, or critical habitat. Any request for formal consultation may encompass, subject to the approval of the FWS/NMFS Regional Director or area manager, a number of similar individual actions within a given geographical area or administrative unit; or a segment of a comprehensive plan.

During the formal consultation, FWS/NMFS shall:

- review all relevant information provided by the DA and information otherwise available. Such review may include an onsite inspection of the area affected by the action with representatives of the DA and/or the permit applicant;
- evaluate the current status of the listed species or critical habitat;
- evaluate the impacts of the action and its cumulative effects on the species or critical habitat;

- formulate its opinion as to whether the action, taken together with its cumulative effects, is likely to jeopardize the continued existence of the listed species or result in the destruction or adverse modification of critical habitat. In formulating its opinion, FWS/NMFS shall use the best scientific and commercial data available;

- discuss with the DA and/or the permit applicant the availability of reasonable and prudent alternatives that would avoid violation of section 7(a)(2) of the ESA, and that the DA can take in implementing its action. FWS/NMFS will utilize the expertise of the DA and/or the permit applicant in identifying these alternatives. If FWS/NMFS is unable to develop such alternatives, it will indicate that to the best of its knowledge, there are no reasonable and prudent alternatives;

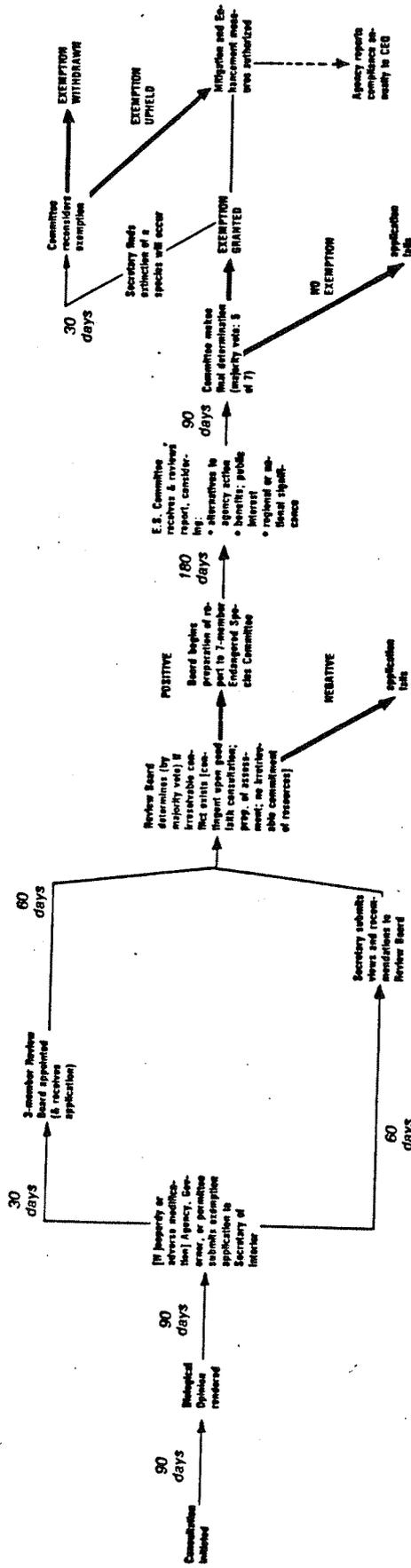
- consider the long-term implication of resource utilization similar to that of the action on the survival and recovery of the listed species; and

- recommend programs that should be carried out by the DA to conserve the listed species at issue.

Formal consultation shall be completed within 90 days after initiation with a written biological opinion by FWS/NMFS. The biological opinion shall include (1) a summary of the information on which the opinion is based, (2) a detailed discussion of the impacts of the action on listed species or critical habitat, (3) the FWS/NMFS conclusion whether the action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat, and (4) recommendations. Jeopardy biological opinions (402.13(i)) shall set forth reasonable and prudent alternatives. Any biological opinion may include additional suggestions for modifications in the action which would enhance the conservation and protection of a listed species or critical habitat. If there is not sufficient information to form a biological opinion, an extension beyond 90 days may be mutually agreed to between the DA and FWS/NMFS. If an extension is not agreed to, the FWS/NMFS must provide a biological opinion based on the available information. Following receipt of the biological opinion, the DA must determine whether to accept FWS/NMFS recommendations, to forego the action, or to dispute the recommendations and apply for an exemption. The exemption process is most easily illustrated by figure 15-2. Definitions of certain exemption process terms are as follows:

- "Review Board" consists of three members: one member appointed by the Secretary of the Interior within 15 days following application for exemption, one member from the affected state to be appointed by the President within 30 days following application for exemption, and the third member will be an Administrative Law Judge selected by the Civil Service Commission.

- "Secretary" means Secretary of the Interior.



Exemption process provided for in Endangered Species Amendments of 1978

Figure 15-2. Exemption Process Provided for in Endangered Species Amendments of 1978

- "Endangered Species Committee" is composed of seven members:

The Secretary of the Interior (as chairman)
The Secretary of Agriculture
The Secretary of the Army
The Chairman of the Council of Economic Advisors
The Administrator of the Environmental Protection Agency
The Administrator of the National Oceanic and Atmospheric Administration
A State Representative, as appointed by the President

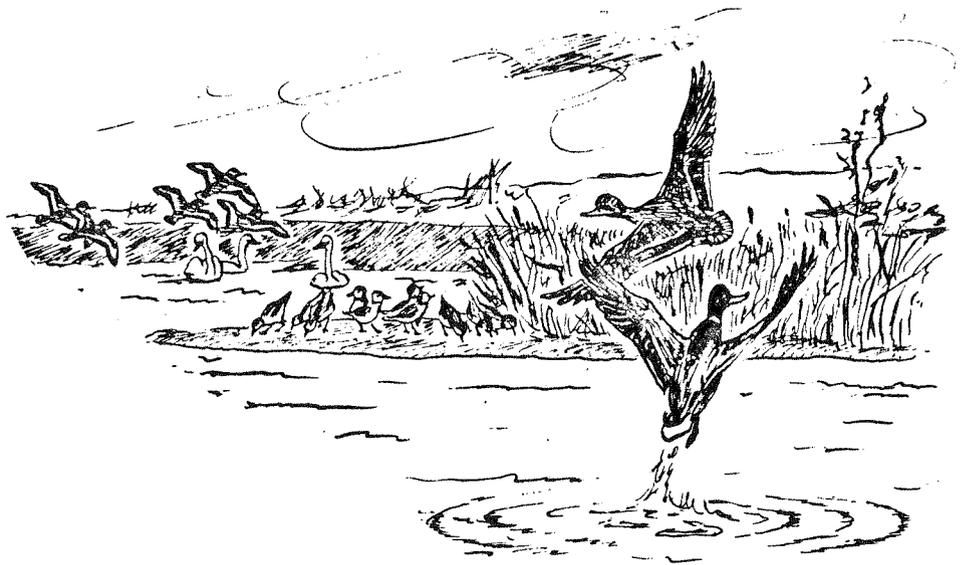
As the flow chart indicates, the committee considers not only project benefits versus costs and versus the impacts to the listed species, but also all potential alternative actions, public interest, and regional or national significance of the proposed action. Also as indicated in the flow chart, the committee must develop mitigation measures for the listed species should it rule in favor of the proposed action, and the DA must carry out any such mitigation measures.

(2) Political/Public. As stated in paragraph 15.2b(2), proposed and candidate species, and species on a state endangered species list (and not federally listed) may be politically/publicly significant if locally the species is considered important. Every attempt should be made to assure that the proposed action does not impact such sensitive species.

(3) Professional Judgment. There may be proposed or candidate species, or species occurring only on the state list that are not well known to the general public or considered important politically. However, a professional judgment could be made that such a species could be severely impacted by the proposed action and some modifications should be made to avoid those impacts. Of course, the cost and feasibility of such modifications should be weighed against the importance of protecting the species in question. In the case of a proposed species, impacts could potentially be severe enough to impel FWS/NMFS to list the species; thus, from a project standpoint, the importance of protecting a proposed species may be quite high. However, it is seldom easy to ascertain this importance and it may, in fact, seem impossible at times. Coordination with FWS/NMFS can be of enormous help in such cases. Early identification of such impacts could result in modifications to the project that would make listing, and therefore consultation, unnecessary. FWS/NMFS should always be contacted in cases such as this so that workable solutions can be found jointly and prevent potential delays at a later date.

c. Impact Nonsignificance. Impacts that are not identified as significant by the above tests are nonsignificant. Proposed and candidate species may eventually be listed and could change from nonsignificant to legally significant during the planning of the project. State listed species may become politically/publicly significant with public support, even though the species may not have been regarded as important previously. This is a particularly important point to remember for impacts

for which there is insufficient data but no reason to believe that the impact is significant. Neither the DA nor the FWS/NMFS could hope to make a determination as to whether or not impacts to a species will result if there is insufficient information about the species. Therefore, it is prudent for the professional to research as thoroughly as possible by contacting experts (both locally and nationally known) as well as conducting field and literature searches on the species in question, so that an informal determination can be made as to whether the species could be impacted by the proposed action.



16. WETLAND HABITATS

16. Wetland Habitats

16.1 Introduction. Wetlands are a diverse group of habitats, the particular importance of which has only quite recently become widely recognized and accepted. Specific functional values generally attributed to wetlands include:

- food chain production;
- aquatic study areas, sanctuaries and refuges;
- hydrologic support function;
- shoreline protection;
- storm and flood water storage;
- natural groundwater recharge;
- water purification;
- sediment trapping;
- nutrient retention and removal;
- habitat for fisheries;
- habitat for wildlife;
- active recreation; and
- passive recreation and heritage value.

Consideration of the resource sections of this guide dealing with above factors and their importance in performing functional values will help provide the basis for an estimate of the significance of any particular wetland, complex of wetlands, or interrelationship between wetlands and other resources in a project area. In making such an estimate the basic and most important functional values of wetlands (i.e., provision of fish and wildlife habitat and food chain protection) should be given great emphasis. The significance determination documentation should contain data sources, assumptions, and pinpoint areas where potentially important data is lacking. The following sections explicate key aspects of such analysis.

16.2 Resource Significance.

a. Resource Inventory. Wetlands have been variously defined by agencies and academicians ever since their initial recognition as particularly valuable fish and wildlife habitats. There continue to be many

definitions in common usage for a variety of purposes. Normally, the definitions used affect the purpose of the program or study. The major definitions currently in use and their intended purposes are discussed below:

- Fish and Wildlife Service (FWS) - National Wetlands Inventory. The intent of the FWS was specifically to define all the wetlands of the nation for purposes of conducting a nationwide wetland inventory. The definition is the broadest of any in present use and includes many habitat types which have not previously been termed wetlands. For detailed information the reader is referred to Cowardin et al. (1970).

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

- Corps of Engineers/Environmental Protection Agency. This definition addresses those wetlands which are waters of the United States and therefore are subject to regulation under the Clean Water Act.

The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

- Executive Order 11990. This definition speaks to the special effort by Federal agencies to avoid projects which would have adverse impacts on the wetlands.

The term "wetlands" means those areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

● Fish and Wildlife Service, Circular 39. This definition, published in 1956, was developed to describe the wetlands of the United States for purpose of a nationwide inventory. The emphasis is almost entirely on waterfowl habitat but the twenty wetland types defined are considered to be the "classical" wetlands.

The term "wetlands" as used in this report and in the wildlife field generally, refers to lowlands covered with shallow and sometimes temporary or intermittent waters. They are referred to by such names as marshes, swamps, bogs, wet meadows, potholes, sloughs, and river-overflow lands. Shallow lakes and ponds, usually with emergent vegetation as a conspicuous feature, are included in the definition, but the permanent waters of streams, reservoirs, and deep lakes are not included. Neither are water areas that are so temporary as to have little or no effect on the development of moist-soil vegetation. Usually these very temporary areas are of no appreciable value to the species of wildlife considered in this report.

In all cases these definitions define those habitats which are interfacial between truly aquatic and mesophytic or xeric habitats. These wetland habitats range from those which are submerged at all times of the year to those which are never submerged. The common thread is that wetland habitats are sufficiently wet during all or part of the year to cause selection of plant and animal associations ecologically adapted to such conditions of wetness.

Those types of wetlands which occur in areas potentially influenced by BMDSCOM activities are described below. Included among others are the potholes of the north-central states, river overflow areas of the lower Mississippi and elsewhere, diverse types of bogs and several other extremely valuable wetland habitat resource types. In general, of the categories described, the most valuable types are (1) seasonally flooded basins or flats, (2) inland shallow fresh marshes, (3) inland deep fresh marshes, (4) inland open freshwater, and (5) wooded swamps. It is extremely important, however, to avoid considering wetland value in terms of single wetland types. Rather, it is the spatial relation and areal extent of the wetland types within a wetland complex which determine ecological value. Further information on these and other types can be found in Shaw and Fredine (1956).

● Seasonally Flooded Basins or Flats. The soil is covered with water, or is waterlogged, during variable seasonal periods but usually is well drained during much of the growing season. This type is found both in upland depressions and in overflow bottomlands. Along river courses, flooding occurs in late fall, winter, or spring. In the uplands, basins or flats may be filled with water during periods of heavy rain or melting snow.

Vegetation varies greatly according to the season and the duration of flooding. It includes bottomland hardwoods as well as some herbaceous growths. Where the water has receded early in the growing season, smartweeds, wild millet, fall panicum, tealgrass, chufa, redroot cyperus, and weeds (such as marsh elder, ragweed, and cockleburs) are likely to occur. Shallow basins that are submerged only very temporarily usually develop little or no wetland vegetation.

Upland depressions included in the inventory are confined largely to the three Lake States, the two Dakotas, Montana, and the Panhandle of Texas. In the Northern States, the presence of this temporary water stimulates high waterfowl production by providing greater area for the establishment of territories by breeding pairs. When water occurs abundantly in the Panhandle, the temporarily flooded basins (playas) are used extensively by migrating and wintering waterfowl.

The overflow bottomlands in the southern part of the Mississippi Flyway provide a major wintering area for ducks as well as good shooting sites for hunters. Particularly in good mast years, feeding ducks use bottomlands when they are flooded. Although there remain more than 10 million acres of overflow lands in Missouri, Kentucky, Tennessee, Arkansas, Mississippi, and Louisiana, most of the wintering waterfowl in this flyway concentrate in certain key areas.

- Inland Fresh Meadows. The soil usually is without standing water during most of the growing season but is waterlogged within at least a few inches of its surface. Vegetation includes grasses, sedges, rushes, and various broad-leaved plants. In the North, representative plants are carex, rushes, reedtop, reedgrasses, prairie cordgrass, and mints. In Florida, cordgrasses and various species of paspalums and beakrushes are common. Meadows may fill shallow lake basins, sloughs, or farmland sags, or these meadows may border shallow marshes on the landward side. Wild hay oftentimes is cut from such areas.

Fresh meadows are used somewhat in the North by nesting waterfowl, but in most of the country their value is mainly as supplemental feeding areas. If shallow water can be impounded on them, their value can be increased considerably.

- Inland Shallow Fresh Marshes. The soil is usually waterlogged during the growing season; often it is covered with as much as 6 inches or more of water. Vegetation includes grasses, bulrushes, spikerushes, and various other marsh plants such as cattails, arrowheads, pickerelweed, and smartweeds. Common representatives in the North are reed, whitetop, rice cutgrass, carex, and giant burreed. In the Southeast, maidencane, sawgrass, arrowhead, and pickerelweed are characteristic. These marshes may nearly fill shallow lake basins or sloughs, or they may border deep marshes on the landward side. They are also common as seep areas on irrigated lands.

Marshes of this type are used extensively as nesting and feeding habitat in the pothole country of the North Central States and elsewhere. In combination with deep fresh marshes, they constitute the principal production areas for waterfowl. Florida and Georgia are the only states where the majority of the shallow fresh marshes are considered to be of lesser importance to waterfowl. Florida alone contains more than 2 million acres of this type.

- Inland Deep Fresh Marshes. The soil is covered with 6 inches to 3 feet or more of water during the growing season. Vegetation includes cattails, reeds, bulrushes, spikerushes, and wildrice. In open areas, pondweeds, naiads, coontail, watermilfoils, waterweeds, duckweeds, waterlilies, or spatterdocks may occur. Water-hyacinth and waterprimroses form surface mats in some localities in the Southeast. These deep marshes may almost completely fill shallow lake basins, potholes, limestone sinks, and sloughs, or they may border open water in such depressions.

Deep fresh marshes constitute the best breeding habitat in the country, and they are also important feeding places. In the Western States, they are heavily used by migrating birds, especially diving ducks. Florida and Texas are the only states in which the vast majority of these marshes are not rated as being of primary importance to waterfowl.

- Inland Open Fresh Water. Shallow ponds and reservoirs are included in this type. Water is usually less than 10 feet deep and is fringed by a border of emergent vegetation. Vegetation (mainly at water depths of less than 6 feet) includes pondweeds, naiads, wildcelery, coontails, watermilfoils, muskgrasses, waterlilies, spatterdocks, and (in the South) water-hyacinth.

In the pothole country of the North Central States, these areas are used extensively as brood areas when, in midsummer and late summer, the less permanent marshes begin to dry out. The borders of such areas are used for nesting throughout the Northern States. Where vegetation is plentiful, they are used in all sections of the country as feeding and resting areas by ducks, geese, and coots, especially during the migration period.

- Shrub Swamps. The soils are usually waterlogged during the growing season, and are often covered with as much as 6 inches of water. Vegetation includes alders, willows, buttonbush, dogwoods, and swamp-privet. Shrub swamps occur mostly along sluggish streams and occasionally on flood plains. They are used to a limited extent for nesting and feeding in the North and for roosting and feeding in some of the Mississippi Alluvial Valley States. Elsewhere, shrub swamps are little used except in a few special situations.

- Wooded Swamps. The soil is waterlogged at least to within a few inches of its surface during the growing season, and is often covered with as much as 1 foot of water. Wooded swamps occur mostly along

sluggish streams, on flood plains, on flat uplands, and in very shallow lake basins. In the North, trees include tamarack, arborvitae, black spruce, balsam, red maple, and black ash. In the South, water oak, overcup oak, tupelo gum, swamp black gum, and cypress are dominant. In the Northwest, western hemlock, red alder, and willows are common. Northern evergreen swamps usually have a thick ground covering of mosses. Deciduous swamps frequently support beds of duckweeds, smartweeds, and other herbs.

Wooded swamps often occur in association with shrub swamps, and waterfowl often use the two types interchangeably. In the Southeast, these swamps become particularly important in years when lack of sufficient fall and early winter rains leave overflow areas dry. At such times, wooded swamps represent the only shallow water available over wide areas. This type is particularly useful to the wood duck throughout the range of this species.

● Bogs. These are often called pocosins, bays, and savannahs in the South. The soil is usually waterlogged and supports a spongy covering of mosses. Bogs occur mostly in shallow lake basins, on flat uplands, and along sluggish streams. Vegetation is woody or herbaceous, or both. Typical plants are heath shrubs, sphagnum moss, and sedges. In the North, leather-leaf, Labrador-tea, cranberries, carex, and cottongrass are often present. In the South, cyrilla, persea, gordonia, sweetbay, pond pine, Virginia chainfern, and pitcher-plants are common. Scattered, often stunted, black spruce and tamarack may occur in northern bogs.

Bogs have the lowest waterfowl rating, country-wide, of all the wetland types. In northern New England, however, they assume considerable significance. In Maine alone, 25,500 acres are classed as being of primary importance to waterfowl.

● Inland Saline Flats. The soil is without standing water except after periods of heavy precipitation, but it is waterlogged to within at least a few inches of the surface during the growing season. Vegetation (often sparse or patchy) consists of salt-tolerant plants such as sea-blite, saltgrass, Nevada bulrush, saltbush, and burro-weed. These wetlands occur in undrained sumps in many parts of the arid West. Sometimes they cover extensive areas.

Saline flats, under natural conditions, are used very little during most seasons, but ducks and geese feed extensively in flats that become flooded in the fall and winter.

● Inland Saline Marshes. The soils are usually waterlogged during the growing season and are often covered with as much as 2 or 3 feet of water. This type occurs mostly in shallow lake basins. Vegetation is mainly alkali or hardstem bulrushes, often with wigeongrass or sago pondweed in openings.

Saline marshes are used heavily by nesting and feeding ducks and geese. They are extremely valuable to waterfowl in both the Pacific and Central Flyways. Throughout the range of this type, 98 percent of the saline marshes are considered to be of primary importance to waterfowl.

- Inland Open Saline Water. These more permanent areas of shallow, saline water are often closely associated with inland saline flats and inland saline marshes. Depth of water is variable. Vegetation (mainly at water depths of less than 6 feet) includes sago pondweed, wigeon-grass, and muskgrasses.

These wetlands are used very extensively by feeding ducks and geese wherever vegetation is plentiful. In the Pacific Flyway, where 93 percent of this type is located, it is of major importance during migration seasons. Throughout its range, 87 percent of these areas are considered to be of primary importance to waterfowl.

b. Significance Tests.

(1) Legal. A number of legal tests must be applied to wetland habitats to determine significance of the resource:

- Federal Wetland Regulation/Protection. There is no Federal law which has wetland protection or conservation as a specific objective. However through judicial interpretations, executive orders and Federal agency policies there is clearly a Federal authority and mandate to regulate certain activities which impact wetlands and to avoid, whenever practicable, impacts to wetland habitats.

- Clean Water Act (CWA). The basic objective of the Clean Water Act is to restore and maintain the chemical, physical and biological integrity of the nation's waters. Wetlands are part of the "waters of the United States" and are therefore subject to regulation under the CWA. The principal way in which such regulation occurs is pursuant to section 404 which authorizes the Chief of Engineers to regulate permits for the discharge of dredged or fill material into waters of the United States. This section of the CWA has become the single most important authority whereby the Federal government can regulate activities in wetlands. In implementing its authority the Corps of Engineers has issued a stringent wetland policy:

(1) Some wetlands are vital areas that constitute a productive and valuable public resource, the unnecessary alteration or destruction of which should be discouraged as contrary to the public interest. For projects to be undertaken by Federal, state, or local agencies, additional guidance on wetlands considerations is stated in Executive Order 11990, dated 24 May 1977.

(2) Wetlands considered to perform functions important to the public interest include:

(i) Wetlands which serve significant natural biological functions, including food chain production, general habitat, and nesting, spawning, rearing and resting sites for aquatic or land species;

(ii) Wetlands set aside for study of the aquatic environment or as sanctuaries or refuges;

(iii) Wetlands the destruction or alteration of which would affect detrimentally natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics;

(iv) Wetlands which are significant in shielding other areas from wave action, erosion, or storm damage. Such wetlands are often associated with barrier beaches, islands, reefs and bars;

(v) Wetlands which serve as valuable storage areas for storm and flood waters;

(vi) Wetlands which are prime natural recharge areas. Prime recharge areas are locations where surface and ground water are directly interconnected; and

(vii) Wetlands which through natural water filtration processes serve significant and necessary water purification functions.

(3) Although a particular alteration of wetlands may constitute a minor change, the cumulative effect of numerous such piecemeal changes often results in a major impairment of the wetland resources. Thus, the particular wetland site for which an application is made will be evaluated with the recognition that it may be part of a complete and interrelated wetland area. In addition, the District Engineer may undertake reviews of particular wetland areas in consultation with the appropriate Regional Director of the Fish and Wildlife Service, the Regional Director of the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration, the Regional Administrator of the Environmental Protection Agency, the local representative of the Soil Conservation Service of the Department of Agriculture, and the head of the appropriate state agency to assess the cumulative effect of activities in such areas.

(4) No permit will be granted which involves the alteration of wetlands identified as important by paragraph (b) (2) or of this section because of provisions of paragraph (b)(3), of this section, unless the district engineer concludes, on the basis of the analysis required in paragraph (a), of this section, that the benefits of the proposed alteration outweigh the damage to the wetlands resource. In evaluating whether a particular alteration is necessary, the district engineer shall consider whether the proposed activity is dependent on being located in, or in close proximity to the aquatic environment and whether practicable alternative sites are available. The applicant must provide sufficient information on the need to locate the proposed activity in the wetland and the availability of practicable alternative sites.

Also pursuant to Section 404 the Environmental Protection Agency has promulgated regulations to be used in evaluating Section 404 permits. These regulations emphasize the value of wetlands and require an analysis to determine if practicable alternatives which do not involve discharge into wetlands are available. The specific policy is as follows:

From a national perspective, the degradation or destruction of special aquatic sites,¹ such as filling operations in wetlands, is considered to be among the most severe environmental impacts covered by these Guidelines. The guiding principle should be that degradation or destruction of special sites may represent an irreversible loss of valuable aquatic resources.

Where the activity associated with a discharge which is proposed for a special aquatic site does not require access or proximity to or siting within the special aquatic site in question to fulfill its basic purpose (i.e., is not "water dependent"), practicable alternatives that do not involve special aquatic sites are presumed to be available, unless clearly demonstrated otherwise. In addition, where a discharge is proposed for a special aquatic site, all practicable alternatives to the proposed discharge which do not involve a discharge into a special aquatic site are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise.

The above policies must be met for issuance of Section 404 permits for discharge of dredged or fill material in wetlands.

Other regulatory authorities of the CWA can also be utilized in managing the nation's wetland resources. For example, Section 402 requires permits for the point source discharge of waste material into waters of the United States. The 402 permit programs are administered by the states with EPA oversight. The discharge of waste materials into wetlands (e.g., oil field drilling muds, wood processing wastes, etc.) can be regulated through Section 402 permit programs though such regulation has generally not been aggressively pursued.

● Executive Order 11990. Executive Order 11990 requires that all agencies of the Federal government provide leadership in minimizing the destruction and loss or degradation of wetlands. In implementing the requirements of the Executive Order, Federal agencies must make the following findings regarding construction in wetlands:

1/Wetlands are one type of special aquatic site defined by EPA.

(1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use. In making this finding the head of the agency may take into account economic, environmental and other pertinent factors.

- Federal Agency Policies. Several Federal agencies have issued policy statements regarding wetland protection and importance. In some cases the policies are implemented through review of Federal construction or permit actions (e.g., the Fish and Wildlife Service) and in some cases they are issued by construction agencies for use in their planning, construction and maintenance programs. For example, the Corps of Engineers policy stated above is applicable to the entire Corps permit program as well as to all planning, design, construction and maintenance the Corps undertakes in its water resource development program. The Fish and Wildlife Service emphasizes wetland protection throughout their statement on objectives and policies for review of Federal projects and permits. Other agencies have affirmed their commitment to wetland protection through their regulations for implementing Executive Order 11990.

- State Agency Laws/Regulations. Many states and some local governments have passed legislation aimed specifically at wetland protection. Other states have adopted an aggressive approach to wetland protection through land use planning authorities or through coastal zone management planning requirements.

(2) Political/Public. The discussion of political/public resource significance tests contained in chapter 14 on Habitat - General (paragraph 14.2(b)(2)) is particularly applicable to political/public tests of significance for wetland resources. The reader should review this section prior to reading the following discussion.

In addition to the above referenced discussion, there are other tests of significance that are particularly pertinent to wetland resources. These are as follows:

- The planner should determine if the wetland area is utilized by environmental interest groups (Friends of the Earth, Sierra Club, Audubon Society, National Wildlife Federation, local environmental councils, et cetera). Utilization could include: programs for purchase and preservation of the wetland area (for example, purchase by the Nature Conservancy), nonconsumptive uses of wetland resources (for example, resource tours, birdwatching, educational programs, et cetera), and consumptive uses of wetland resources (for example, hunting, specimen collection, et cetera). Utilization of a wetland area results in public awareness and concern, leading to resource significance.

- Isolated, small wetland areas, given the substantial legal attention that wetlands presently have, may be perceived to be a significant resource even if the wetland is not contributing to the functional values for which wetlands are protected by law.

● The functional values of wetlands as discussed earlier are not usually well understood by all publics considering various proposals and, as a consequence, wetland values may be understated (even considered a "nuisance") in public perceptions. Wetlands are frequently geographically located in association with other features (coastlines, river outfalls, lakes) that are highly desirable for development-oriented uses. The history of conflict between past development, dredging, and filling of shoreline and wetland values is a classic example. Intense political pressure can be brought to bear in favor of development interests while the reverse usually is not the case. Thus, the political and public tests of wetland significance may often be biased in the direction of "nonsignificance."

● Public awareness of wetlands has generated sufficient recent political expression such that public wetland concerns have been substantially embodied in legal tests of significance.

(3) Professional Judgment. Clearly, the determination of wetland significance is not accomplished by reference to lists such as for endangered species. The laws, regulations and policies provide guidance on wetland significance in general but do not speak to specific types of wetlands of which there are hundreds. Neither do existing laws and regulations state that all wetland habitats are significant. Thus, significance can only be determined by analysis and evaluation of data on the particular wetlands of concern. As such, significance determinations will require an evaluation by a trained specialist to review available data to estimate site-specific habitat values. The determination/evaluation will rely on existing data combined with professional judgment. Standard investigative methods are available to obtain data on which to base a significance determination. The principle factors which need to be evaluated include:

- Diversity of wetland habitat types in the ROI.
- Spatial relation of wetland habitats in the ROI.
- Areal extent of each wetland type.
- Spatial, chemical and biological relation of wetlands to adjacent uplands and/or adjacent aquatic habitats.
- Plant associations and plant species diversity
- Animal associations and animal species diversity
- Primary productivity

- Secondary productivity
- Presence of threatened or endangered species
- Water regime (hydrology) of the area
- Water quality

In summary then, the significance of any particular wetland is not defined by law or regulation but rather requires a technical evaluation on which to base a significance determination. Such an evaluation must rely on data which is available or can be obtained within the framework of specific project time and budgetary constraints. The wetland specialist can provide the needed interpretation based on data analysis and interpretation and (optionally) application of a formalized evaluation methodology and infusion of professional judgment.

16.3 Impact Significance

a. Prediction of Change to the Resource. The factors and functional values summarized in paragraphs 16.1 and 16.2 above must be considered to ultimately determine the significance of wetland impacts for any given project. The areal extent and degree of impact on the ability of wetlands in the ROI to provide the functional values must be estimated. A relatively straightforward approach to impact evaluation is discussed in the professional judgment section below.

b. Significance Tests.

(1) Legal. Legal tests for impact significance are provided by:

- Relation to Council on Environmental Quality Regulations for Implementing NEPA. The EIS is the most universally used medium whereby Federal agencies address the issue of wetlands significance and impacts. Most Federal agencies incorporate evaluations required in response to EO 11990 as well as their own or other agency policies on wetlands within the EIS or EA. For example, Corps regulations in preparation of EIS's specifically require wetland evaluation pursuant to EO 11990 and Corps policies on wetlands. Thus, wetland significance and significance of wetland impacts become important requirements in implementing NEPA and obviously important in determining the potential for significant impacts on any project.

- A more definitive legal relationship between wetlands and NEPA appears in the Clean Water Act. Section 404(r) of the CWA states that if the evaluations required by Section 404(b) of the CWA are included in a Federal EIS which has gone to Congress for review, the Federal government is exempt from any further regulation under the Clean Water Act.

(2) Political/Public. The discussion of political/public testing for resource impact significance contained in chapter 14 on Habitats - General (paragraph 14.3(b)(2)) is virtually identical to the political/public tests of resource impact significance that would be utilized for wetlands. The reader is advised to review this section prior to reading the following discussions.

In addition to the discussions in Habitats - General, the following points are germane:

- Public concerns about impacts to wetland areas have been substantially embodied in recent laws and regulations and are, therefore, expressed as legal tests of wetland impact significance.

- Beyond legal and professional tests of significance, the public may indicate that a wetland impact is significant if it affects or is perceived to affect the public's utilization of the area (consumptive and nonconsumptive uses).

(3) Professional Judgment. This method of professional analysis of wetland impacts is appropriate to early project planning stages prior to collection of detailed data for the ROI. The end product of the evaluation is not quantitative but rather provides an objective evaluation in subjective terms. In later iterations of planning, the method can be refined (or another method used) to provide semiquantitative or even quantitative estimations of impact significance. The actual approach used would depend on the nature and significance of impacts identified in early planning stages, the data base available, and time and funds available to complete the evaluation.

Initial Assessment of Wetland Impact Significance. The approach described here for the assessment of wetland impacts within the ROI for a deployment alternative is a modification of that described by Reppert, et al. (1979) and Shapiro and Driscoll (1978). The approach allows the wetland specialist to predict the specific and cumulative impacts of a proposed alternative in a particular ROI given the dimensions of the activity and the general characteristics of the wetland. It is intended to function as a generalized analysis to allow the evaluator to assess the relative value of a wetland and the degree of impact of an action on the wetland's value and functional characteristics.

This approach to impact assessment is a "red flag" mechanism to identify the relative significance of alternatives. The method should provide key input for the decision on the need for further studies, more detailed evaluation, further planning, and environmental documentation. The approach sets up a framework for the assessment of wetland or habitat values using the functional values defined earlier in this report. The proposed activity is evaluated in terms of its effect on the natural functional values of wetlands. The severity and significance of the effects of the activity are considered by describing the MAGNITUDE and

DURATION/TIME. DURATION/TIME assesses when and for how long an effect is expected to persist. MAGNITUDE addresses the question of how much of an effect, measured in absolute units (acres, c.f.s.) or as a relative proportion (percent increase or decrease).

Cumulative effects are defined as both the loss of wetlands and habitat acreage in comparison to the remaining acreage of wetlands habitats of various types in the ROI and as the additive effects of activities of the same type or with similar impacts. Secondary activities, which indirectly result from the implementation of the proposed activity, should be identified for each alternative and their impacts listed.

In general, construction activities and associated effects have been viewed as short-term, while the physical presence of structures, operation, and cumulative effects are considered long-term. The mode of operation, however, may be seasonal with short-term effects while the operation is on-going but with no significant long-term consequences.

The judgment of impacts in this approach is expressed in quantitative terms. This does not mean that quantitative data, if available, cannot be used in the expression of value or effect. On the contrary, quantitative measures (specific wetland acreage, percent of habitat in ROI, specific fauna associated with area, specific pollutants generated) are to be used wherever possible. A logical stepwise approach to determining impact significance is summarized as follows:

- Determine with available information or a field investigation, the total areal extent of wetlands in the ROI and the areal extent of different types of wetlands. The specific types of wetlands listed will depend on the classification system chosen for use by the wetland specialist.

- Proposed Activity. Describe the nature of the proposed activity with respect to wetlands alteration in the ROI. In particular, define the construction activities such as road construction, grading, excavation, or waste disposal which will impact the wetlands.

- Exact Location. Define as precisely as possible the location and areal extent of the wetlands which will be impacted.

- Wetland Types. Determine the areal extent of individual wetland types; e.g., shallow ponds, cattail marshes, swamps which will be impacted.

- General Values. Describe the general value of the wetland habitat types in the ROI based on information available for the area.

- For each wetland type, compare the acreage impacted by the alternative to the total acreage presently existing within the ROI. Express as a percentage.

• For each wetland type, describe the specific nature of the impact which will accrue to that wetland area. This analysis should include consideration of the specific type of impact (e.g., construction of a fill), the duration (e.g., 5 years to complete the fill), the magnitude (e.g., 30 acres of swamps and 20 acres of cattail marsh will be impacted at the rate of 10 acres per year), and whether the impacts will be short-term (e.g., during construction only) or long-term.

Note. At this point, a first-cut estimate of impact significance can be made. This should be considered a preliminary determination only. Further, more detailed analysis can be made utilizing a semiquantitative or quantitative method if sufficient time, funds, and data are available or can be obtained.

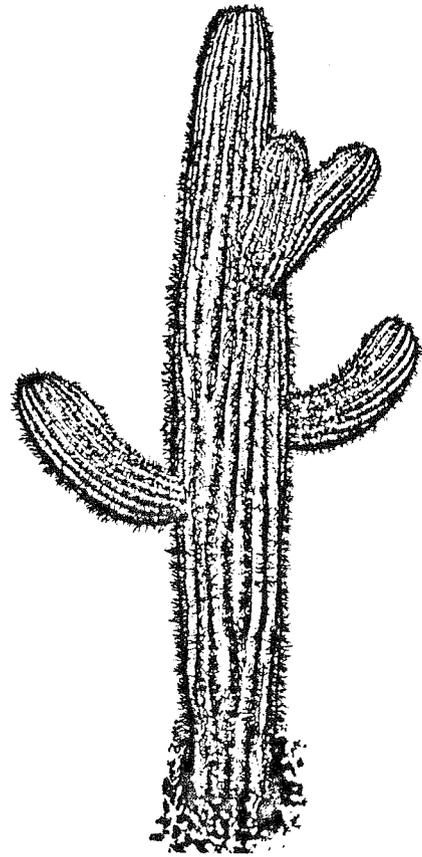
The essence of further analysis should be to develop a narrative (quantify where possible) summary of the relation of the wetland impacts to the factors and functional values described earlier in this chapter. For each of the functional values, a rating of impacts in the subjective terms; e.g., low, medium, or high, should be made and a succinctly stated basis of the rating setdown in writing. Cumulative impacts can be evaluated as follows:

• Cumulative Impacts: Loss of Wetlands. Compare the acreage of wetlands which would be lost for the alternative with the historic trend within the ROI over time. A careful data search and some analysis will be necessary for this effort. Review other ongoing or proposed actions within the ROI to determine acreage, areas, and wetland types which would be affected. Estimate the total amount of existing acreage of these wetland types and the acreage lost if all planned activities were completed. These figures will indicate the cumulative effects of the alternative plus other activities with the ROI. An example assuming 50 acres of wetlands lost for the proposed alternative from a total of 2,000 acres in the ROI is provided below.

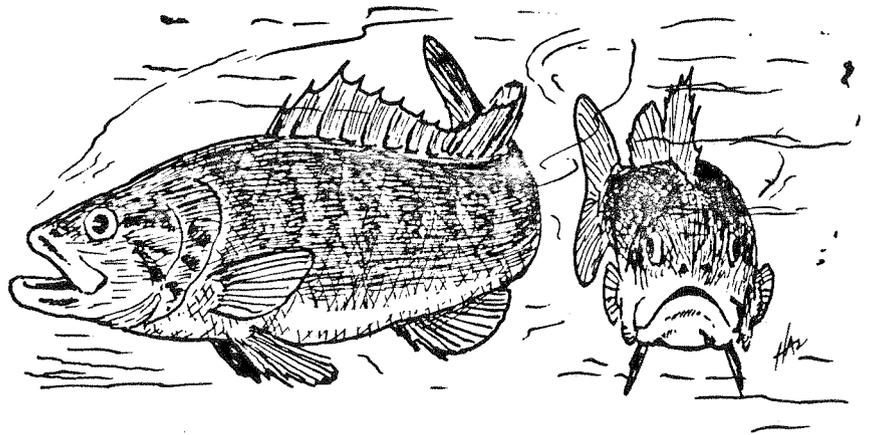
1. Acreage lost for the proposed alternative	50 acres
2. Ongoing or planned actions by others which would result in loss of wetlands in the ROI	75 acres
3. Total loss of wetlands for proposed alternatives plus other ongoing or planned actions	125 acres
4. Total wetlands in ROI	2,000 acres
5. Percent of total wetlands projected to be lost	6.25 percent
6. Percent of total loss due to proposed alternative $(50/125)(100)$	40 percent
7. Historic rate of wetland loss in the ROI	25 acres/year
8. If losses from the proposed alternative will occur over a 5-year period, the percent contribution to the rate of wetlands loss attributable to this project would be $((50/(5 \times 25))(100)$	40 percent

The above cumulative analysis can be done for each type of wetland or for all wetland types combined depending on availability of data and functional values involved. In any event, interpretation of the significance of the percentages calculated will depend greatly on the functional value impact analysis described above.

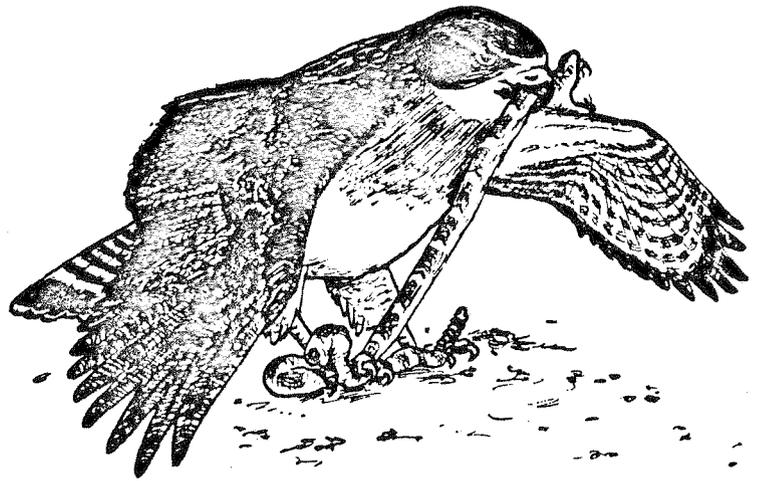
Secondary Impacts. Analysis of secondary impacts for wetlands is essentially similar to such analyses for other resource categories. Therefore, no special treatment is necessary in this chapter. In general, the analysis should consider what additive impacts might be spawned by implementations of the proposed alternative. This would include more intensive development in adjacent areas; e.g., residential construction, roads, traffic, noise, etc., etc.



17. UNIQUE HABITATS



18. FISH



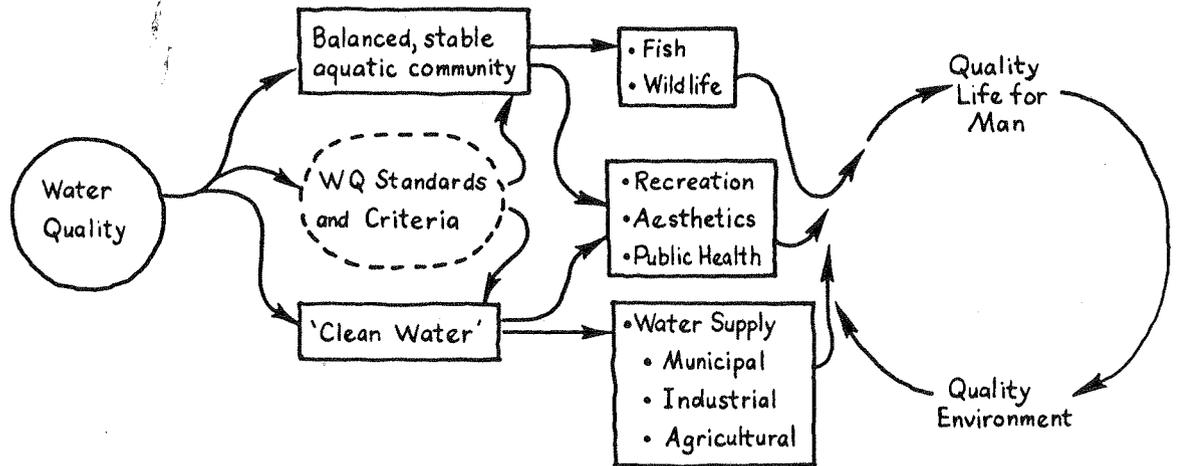
19. WILDLIFE

SECTION IV.
APPLICATION TO SPECIFIC
PHYSICAL RESOURCES



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20. WATER QUALITY

20. Water Quality

20.1 Introduction. Water quality is the biological, chemical, and physical condition of water. The importance of water quality lies in its interrelationship with:

- components of the aquatic ecosystem,
- recreation,
- esthetics,
- public health, and
- water supply.

This interrelationship and the role water quality plays in a quality environment for man are shown diagrammatically in figure 20-1. Inherent in water quality criteria and standards is the establishment of water quality characteristics for designated uses. The goal is to protect man from the consequences of degraded water quality; the consequences of which are expressed in impairment in quality and/or quantity of fish and wildlife, recreation, aesthetics, public health, and supply.

Water pollution refers to the artificial and adverse perturbation of the condition of water. The legal definition of pollution (Public Law 92-500, Section 501) adds man as the perpetrator of the change:

The term "pollution" means the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

Initially, the control of water pollution was intended to protect public health because the public, scientists, and regulatory persons considered health to be the priority issue. Prior to 1948, each state was responsible for its own water pollution laws. In 1948, Congress enacted the Federal Water Pollution Control Act to consolidate state regulations into a uniform law. With the passage of this act, it was recognized that the concern of all institutions was to assure that the nation's waters are not degraded. Subsequent amendments to the Act, including the 1977 amendments which changed the name to the Clean Water Act (CWA), were targeted at strengthening the regulatory process. In addition to public health, concerns for fish and wildlife were added to the original goal.

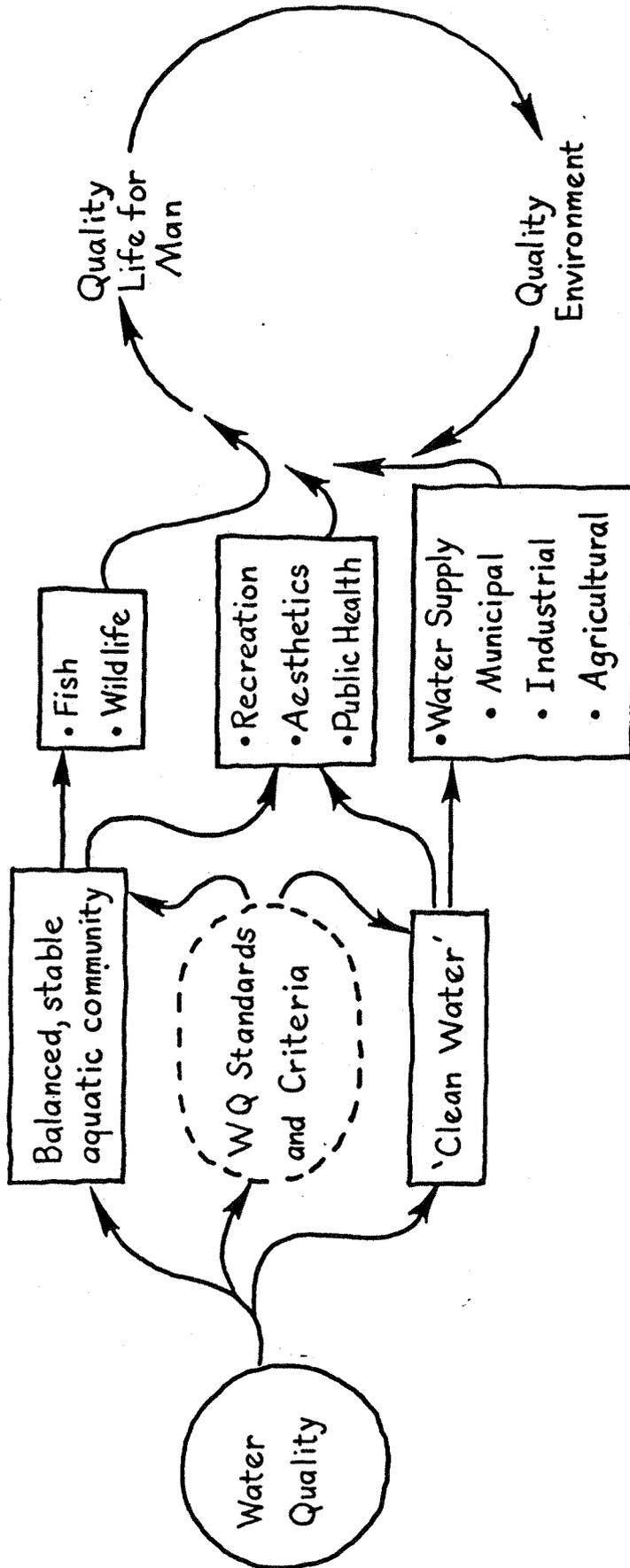


FIGURE 20-1. WATER QUALITY AND ITS RELATIONSHIP TO A QUALITY ENVIRONMENT FOR MAN.

Section 101(a) of the CWA of 1977 clearly states the nation's present goals and policies for water quality:

(1) it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985;

(2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;

(3) it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited;

(4) it is the national policy that Federal financial assistance be provided to construct publicly owned waste treatment works;

(5) it is the national policy that areawide waste treatment management planning processes be developed and implemented to assure adequate control of sources of pollutants in each State; and

(6) it is the national policy that a major research and demonstration effort be made to develop technology necessary to eliminate the discharge of pollutants into the navigable waters, waters of the contiguous zone, and the oceans.

20.2 Resource Significance.

a. Resource Inventory. The essential precursor to significance determination is resource inventory within the ROI. For the study of water quality, the inventory should include:

- identification of water bodies within the ROI (including ground water);
- compilation of available water quality for identified water bodies;
- determination of uses of the water bodies;
- identification of the legal restrictions placed on the water bodies (use classifications and water quality standards).

The data base is acquired through such methods as:

- Literature review. A review of all available documents (scientific journals, government publications) on the study area, to gain information on water quality and water use. Water quality numerical data may be accessed through computerized data bases such as STORET (Environmental Protection Agency (EPA) storage and retrieval system) and WATSTORE (U.S. Geological Survey (USGS) storage system).

- Area and topographic map surveys. Land use patterns which may be mapped are a useful tool in identifying existing conditions. Infrared and remote sensing photography provide views of vegetation and plumes of effluents and tributaries which may not be readily recognizable from ordinary photographic prints. USGS and state mapping of ground water profiles are important for identifying potential water supplies.

- Field reconnaissance with an interdisciplinary team to delineate the physical, chemical, and biological characteristics of the ROI. The ROI should include the specific site of the proposed project and any adjacent area which may be directly or indirectly affected (e.g., upstream and downstream or the ground water).

- Interagency coordination; many state, local, and Federal agencies have streamgauge and water quality stations located at various sites on water bodies throughout the United States. Government agencies are also responsible for documenting special aquatic sources (e.g., sole source aquifers).

- Local contacts; residents of the area will have local knowledge of past conditions, including such information as location of drain fields, septic systems, etc., which may not be recorded in official documents.

- Water quality sampling and resource studies. The actual water quality monitoring of the water bodies and study of its uses will be required when there is not sufficient existing information to characterize the resource.

The rigor of the data acquisition should be proportional to the level of impact. Accordingly, the inventory process will be an iterative one; as more becomes known about the importance of impact, more data becomes necessary until the professional is confident that the impact is adequately characterized.

b. Significance Tests.

(1) Legal. Water quality is significant when protected by law. In determining the legal constraints which may govern water quality, the following laws should be consulted:

- The CWA and its amendments
- The Safe Drinking Water Act (SDWA)

Details of these laws and other pertinent legislation is presented in appendix C (tables C-1 and C-2). The CWA defines the waters of the United States as (40 CFR Part 122, 1982):

Waters of the United States or Waters of the U.S. means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(b) All interstate waters, including interstate "wetlands;"

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in paragraphs (a)-(d) of this definition;

(f) The territorial sea; and

(g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States.

The term "navigable waters of the U.S." as defined by the CWA is interchangeable with the term "waters of the U.S." If the project area includes waters of the U.S., then water quality is a Federal concern.

The individual states have been delegated to develop a classification for uses of the waters of the U.S. per section 303(a) of the CWA. Accordingly, the states have identified uses for their water bodies (often delineated to specific river reaches) and specified the water quality necessary to protect and maintain that use. The basic use classifications include uses within the categories of:

- recreation and esthetics,
- aquatic life and wildlife,
- public water supplies,
- agriculture, and
- industry.

Depending upon the classification applied to a particular water body, such specific uses as fish reproduction or stock watering, may or may not be protected.

The nondegradation policy of the Federal water quality standards program states that all waters of the U.S. must be evaluated to assure nondegradation. If the water body is classed as poor, such as an industrial receiving source, then the planner need expend less effort in assuring that the water is not degraded since the standards to protect that use will be less restrictive than for higher use classifications.

The CWA does not establish policies for ground waters in general (although the CWA does provide policies for disposal via underground injection wells). It is primarily aimed toward regulation of surface waters. However, states may apply surface water goals to ground waters. This applies particularly to ground water sources which could be used as drinking water supplies. These are designated by states.

The only Federal restrictions for ground water quality are found in the SDWA. Part C of the SDWA allows for designation of specific areas (sole source aquifers) as known or potential drinking water supplies. Since the quality of the water is of primary importance in a drinking water supply, any project which will affect the water of these areas must address water quality as a significant issue.

(2) Political/Public. Water quality becomes politically/publicly significant in cases where:

- the public puts a higher use on the affected water body than legally prescribed and

- the public criteria for a water quality parameter is more restrictive than that prescribed by law.

The public may desire higher use of a water body and, accordingly, higher quality water than established by state use classification and water quality standards established to meet those needs. Should there be a publicly/politically expressed need for a higher use of a water body (e.g., increase the use to include recreation with water contact), then the water quality issue would become elevated in importance. Along the same line, many water bodies may not have a legal use classification or water quality standards pertaining to that use, but the public has explicitly identified a use which they are not willing to forego. The water quality to meet the desired use then becomes a significant issue. Of particular reference is quality of ground water where public/political concerns may not be expressed in law.

Water quality significance can be elevated by public or political opinion when the "public" criteria for a water quality parameter is more restrictive than Federal or state standards. This is particularly the case for controversial parameters involving public safety, such as radionuclides and pesticides and herbicides that are, or are suspected to be, toxic, teratogenic, or carcinogenic. The regulations may prescribe acceptable levels for these parameters that are not considered acceptable to the public in the ROI.

(3) Professional Judgment. A water quality parameter(s) is a significant resource when:

- it is a determinant in the prescribed use of the water and there is a potential that the water quality will be affected.

The professional must evaluate how the use of the water body is related to the quality of the water. It is here that the main determination of significance will be judged. It is use, whether by waterfowl and fish, microorganisms, or man that will establish the importance of the system and its requisite water quality needs.

The professional in his analysis will need to:

- inventory the water bodies in the ROI,
- determine the legal use classification for the water bodies,
- research the public's use needs and desires for the water bodies,
- identify the water quality criteria/standards for the defined uses (legal and planned), and
- judge the scientific relevance of the water quality requirements for the uses in order to determine the level of importance of water quality parameters as issues in the impact analysis process.

The professional must be able to determine from the resource inventory the extent of the area which may be affected; e.g., a short reach of a large stream, the riparian zone of a lake or stream, and the ground water. It is also necessary to examine the characteristics outside the limits of the site to determine if these outside systems are of such importance to need to be analyzed with greater detail. In the instance of ground water examinations, it is generally assumed that ground water is a potential water supply. Unless some restrictions (geological or hydrological) can be identified which would prevent the water from being a usable source, it can be considered a water supply source.

Where there are no water quality standards legally set for a water body (or no use classification legally established for the water body), the professional must establish the water quality criteria to meet the desired use of the water.

c. Resource Nonsignificance. A water quality parameter(s) will be a nonsignificant resource when:

- it is neither a determinant in the prescribed use of the water, nor identified as legally significant.

20.3 Impact Significance.

a. Prediction of Changes to the Resource. The next stage to be addressed in water quality significance is to determine if the proposed action will result in a perturbation of the condition of the water. The steps in this process are:

- Compile data for each water quality parameter that there is reason to believe may be changed (an iterative process).
- Estimate future conditions on a parameter-by-parameter basis for the "without project" and "with project" condition (including both construction and operation modes).
- Determine the differences in water quality between the "without" and "with" condition.
- Evaluate changes reflected by each parameter with regard to their:
 - magnitude,
 - duration,
 - frequency,
 - relative importance, and
 - affect on prescribed uses of the water body.

The following water quality impact significance evaluation is confined to direct or indirect actions which result in the discharge of pollutants into the ground water and surface waters of the United States. Physical changes to the hydrologic regime such as impoundment and diversion are not addressed.

Change to the environment must be predicted for the different levels of the construction process. During initial planning, the legal aspects of the study versus planned alteration must be examined. At this stage, any standards or criteria which may be relevant are set as a baseline for change. Any direct, construction-related activities such as drilling, filling, or disposal of pollutants must be evaluated for short-term, localized impacts.

b. Significance Tests.

(1) Legal. Impacts will be considered significant if, unmitigated, they violate a Federal, state, or local requirement embodied in law, regulation, or formal policy.

The evaluation process for the impacts to water quality have been addressed in detail through the various legislative acts. Sections 303 and 304 of the CWA provide the practitioner with criteria and standards to test the significance of predicted impacts. These are promulgated by the Federal and state governments. The national goals and policies to protect the aquatic environment are implemented through these guidelines. Water quality criteria are guidelines provided by the Federal Government to aid the states in developing effluent limitations (Section 302 of CWA), water quality standards (section 303 of CWA), best management practices (section 208 of CWA), and toxic pollutant effluent standards (section 307 of CWA). The criteria consist of discussions of available scientific data on the effect of pollutants on aquatic organisms, water supply, human health and recreation, and quantitative concentrations or procedural statements regarding the level of a constituent in water which will ensure the suitability of the water to support a designated use. EPA published water quality criteria in 1973 (the Green Book"), 1976 (the "Red Book"), and 1980 (FR, volume 45, No. 231, 28 November 1980). Water quality standards are enforceable concentrations or narrative statements for biological, chemical, and physical condition of the water. The standards contain two parts:

- a designated use for each water body to be protected and
- criteria which are numerical pollutant concentrations or narrative statements necessary to preserve or achieve the designated use.

In cases where use is designated as public water supply, water quality standards establish limits for water prior to entering the public water supply system. The drinking water standards promulgated by states under the SDWA apply to the water after it has undergone treatment. Untreated water supplies are regulated by the CWA water quality standards. All states have established standards for conventional measures of pollution (dissolved oxygen, pH, fecal coliform bacteria, temperature, and esthetic qualities). All states have not adopted standards for priority (toxic) pollutants but they do include narrative statements regarding elimination of toxic pollutants in toxic amounts. Any action which, unmitigated, results in an exceedance of standards is a significant impact. Water quality impacts may be mitigated through controls (i.e., mixing zone, water quality variances specific to time, duration, etc.) sanctioned by law. These controls are monitored through permit programs. The permit programs are summarized below.

EPA monitors five permit programs under what is now called the consolidated permit program. Only the four programs which apply to water are presented herein, the fifth pertains to air quality. These programs are (40 CFR Part 122.1, 1982):

(1) *The Hazardous Waste Management (HWM) Program under Subtitle C of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (RCRA) (Pub. L. 94-580, as amended by Pub. L. 95-609; 42 U.S.C. 6901 et seq.);*

The hazardous waste program applies to actions which involve the disposal or discharge of hazardous wastes into the waters of the U.S., including ground waters (hazardous wastes are defined in 40 CFR Part 261.3, 1982). States may administer the program after approval by EPA. DOD delegated authority to the Defense Property Disposal Service to review all military hazardous waste requirements.

(ii) *The Underground Injection Control (UIC) Program under Part C of the Safe Drinking Water Act (SDWA) (Pub. L. 95-523, as amended by Pub. L. 95-190; 42 U.S.C. 300f et seq.);*

The underground injection program was developed to prevent the degradation of the nation's ground waters by the injection of pollutants into wells. EPA provides the policies, guidelines, and standards for the program.

(iii) *The National Pollutant Discharge Elimination System (NPDES) Program under sections 318, 402, and 405(a) of the Clean Water Act (CWA) (Pub. L. 92-500, as amended by Pub. L. 95-217 and Pub. L. 95-576; 33 U.S.C. 1251 et seq.);*

NPDES permits are needed in situations which involve the discharge of a pollutant into waters of the U.S. from a point source. NPDES permits may be applied to ground waters if so determined by an individual state. NPDES permits are administered by the states with EPA approval. Federal facilities receive permits from the Federal Government (EPA) unless EPA and the states have a memorandum of agreement for state control. NPDES permits usually require submittal of reports, monitoring of effluents, and effluent limitations.

(iv) *The Dredge or Fill (404) Program under section 404 of the Clean Water Act; and*

The 404 permit program was established to regulate the discharge of dredged or fill material into the waters of the U.S. 404 permits are administered jointly by EPA and the COE, unless a state has reached an agreement to administer permits for nontidal waters within its state boundaries. The 404 permits program requires that the applicant complete a detailed evaluation of the proposed action, including an analysis of alternatives, impact assessment, bioassay testing (if appropriate), and findings of compliance or noncompliance.

Certain actions defined in the permit programs result in degradation of the waters of the U.S. These are:

Discharge of a pollutant (NPDES) means:

(a) (1) Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source," or

(2) Any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation.

(b) This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channelled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works.

This term does not include an addition of pollutants by any "indirect discharger."

Discharge of fill material (404) means the addition from any "point source" of "fill material" into "waters of the United States." The term includes the following activities in waters of the United States: Placement of fill that is necessary for the construction of any structure; the building of any structure or impoundment requiring rock, sand, dirt, or other materials for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; dams and dikes; artificial islands; property protection and/or reclamation devices such as riprap, groins, seawalls, breakwaters, and revetments; beach nourishment; levees; fill for structures such as sewage treatment facilities, intake and outfall pipes associated with power plants and subaqueous utility lines; and artificial reefs.

Discharge of dredged material (404) means any addition from any "point source" of "dredged material" into "waters of the United States." The term includes the addition of dredged material into waters of the United States and the runoff or overflow from a contained land or water dredged material disposal area. Discharges of pollutants into waters of the United States resulting from the subsequent onshore processing of dredged material are not included within this term and are subject to the NPDES program even though the extraction and deposit of such material may also require a permit from the Corps of Engineers or the State section 404 program.

Disposal (RCRA) means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any "hazardous waste" into or on any land or water so that such hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground water.

Well injection (UIC) means the subsurface emplacement of "fluids" through a bored, drilled, or driven "well;" or through a dug well, where the depth of the dug well is greater than the largest surface dimension.

Injection well (RCRA and UIC) means a "well" into which "fluids" are being injected.

Injection zone (UIC) means a geological "formation," group of formations, or part of a formation receiving fluids through a "well."

Within the context of the water quality guidelines and consolidated permit program, certain elements have been identified as toxic pollutants, hazardous wastes, hazardous substances, radioactive materials, oil, and conventional pollutants. Pollutants are defined as (40 CFR 122.3):

Pollutant (NPDES and 404) means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 *et seq.*)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

- (a) Sewage from vessels; or
- (b) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

[NOTE: Radioactive materials covered by the Atomic Energy Act are those encompassed in its definition of source, byproduct, or special nuclear materials. Examples of materials not covered include radium and accelerator-produced isotopes. See *Truitt v. Colorado Public Interest Research Group, Inc.*, 426 U.S. 1 (1975).]

Section 307 of the CWA stated that toxic pollutants shall be controlled to prevent degradation of the nation's waters. Toxic pollutants are (CWA of 1977, Section 501):

The term "toxic pollutant" means those pollutants, or combinations of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring.

The 65 classes of toxic pollutants (defined by EPA as 129 specific priority pollutants) identified by the Federal Government are listed in appendix C (table C-3). Effluent criteria or numerical limitations for the discharge of these toxic materials have been proposed by EPA as guidelines for development of standards. Several versions of the guidelines were prepared by EPA, including the 1973 "Green Book," the 1976 "Red Book," and the 1980 Federal Register (see reference list for complete notation). States may adopt whichever version of the criteria they believe is appropriate.

Hazardous substances are designated under section 311 of the CWA. They are defined in section 311.(b)(2)(A) as:

The Administrator shall develop, promulgate, and revise as may be appropriate, regulations designating as hazardous substances, other than oil as defined in this section, such elements and compounds which, when discharged in any quantity into or upon the navigable waters of the United States or adjoining shorelines or the waters of the contiguous zone or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Fishery Conservation and Management Act of 1976), present an imminent and substantial danger to the public health or welfare, including, but not limited to, fish, shellfish, wildlife, shorelines, and beaches.

Those compounds designated as hazardous substances as of 1982 are listed in appendix C (table C-4).

According to Section 404 of the CWA dredged and fill material are defined as (40 CFR 122.3, 1982):

Dredged material (404) means material that is excavated or dredged from "waters of the United States."

Fill material (404) means any "pollutant" which replaces portions of the "waters of the United States" with dry land or which changes the bottom elevation of a water body for any purpose.

The above programs refer to the discharge from a point source versus a nonpoint source or an indirect discharger. A point source is (40 CFR 122.3, 1982):

Point source (NPDES and 404) means any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture.

An indirect discharger is (40 CFR 122.1):

Indirect discharger (NPDES) means a nondomestic discharger introducing "pollutants" to a "publicly owned treatment works."

Nonpoint sources which result in discharges into the waters of the U.S. are regulated according to state and local land use plans. In evaluation of nonpoint sources, the effects of dilution or treatment (e.g., land waste water treatment) are evaluated in determining the final concentration entering the receiving water.

In addition to complying with the consolidated permit program, section 313 of the CWA states that all Federal facilities will obtain state water quality certifications as part of the permit process. In this certificate, the state may provide restrictions for any actions which affect waters of the state, including point or nonpoint sources.

(2) Political/Public. Water quality impacts may become politically/publically significant, particularly in the cases where:

- The public puts a higher use on the affected water body than the legal use classification and, accordingly, higher water quality is prescribed.

- There are no legal standards for certain parameters or for a water body, and the public has established a use which would be affected by the water quality change.

- The impact on water quality is within legal standards but the impact is still perceived as significant. (Particularly the case for controversial parameters involving public safety; i.e., toxic, teratogenic, and carcinogenic substances).

- The public believes the accumulative water quality impacts of the proposed action and other actions in the basin will degrade the use of the water body.

The common thread in the above cases is that the legal standards do not meet the public's or specific user group's present needs. In these cases, water quality becomes controversial.

(3) Professional Judgment. The professional must judge whether water quality impacts are in any of the following categories:

- Represent a threat to public health.

- Violate a Federal, state, or local water quality standard.
- Are controversial.
- Involve unknown risks to the environment.
- Prevent or disrupt an established water use.
- Interfere with planned development of the water resource.

If impacts are judged to fall into any one of the above categories, then the water quality impacts are considered significant.

The professional must integrate the national goals and policies of the CWA and other legislation with scientific evidence and public needs. Technological advances and public needs are continually changing. The legal process (Federal and state) may be somewhat slow to respond to these changes. It is the professional who must assure that all new changes are applied where appropriate. The planner must bring together the public, scientific, and legal goals and restrictions to determine the change in water quality and judge significance in terms of its effect on the aquatic community and uses of the water body.

There is a significant water quality impact due to the deployment alternative when the professional judges the prescribed use of the water body is denied because of its water quality. Generally, this occurs when the Federal and state criteria/standards are violated. The professional, however, may judge the standards to be too restrictive or too lenient for a specific case. Note that a finding of a change in a water quality parameter value for a water body is relatively meaningless unless the value can be related to the impairment, enhancement, or status quo of the aquatic community and uses of that water. When in a specific case the professional judges the standard to be too restrictive for the use of the water, he/she will have to provide the scientific evidence to the Federal/state regulatory agencies in order to get a water quality variance. On the other hand, when the standards are judged to be too lenient, scientific evidence to demonstrate the relationship between the water quality parameter(s) and water use must be presented.

Additionally, the professional may be called upon to establish guidelines for water quality parameters for which there are no legal standards.

c. Impact Nonsignificance. A water quality impact will be non-significant when it does not affect the prescribed use of the water, does not present a threat to public health, does not violate a water quality standard embodied in law, is not controversial, involves no risks to the environment, and does not interfere with the planned development of the water resource.

Monitoring and construction constraints are frequently used to assure that any degradation of water quality is limited in extent and duration. In waste water management treatment, chemical treatment and soil percolation may be used to reduce the concentration of constituents which could result in significant contamination.

Timing of instream activities is another method used to assure that potential impacts to water quality or the use of the water body will not occur. This is particularly important in areas where fish or other aquatic organisms are known to be present during limited periods.



21. LAND USE RELATIVE TO NATURAL RESOURCES

21. Land Use Relative to Natural Resources

21.1 Introduction. Contemporary land use planning and consideration is at best a mixed bag of legal, social, and moral conventions that have emerged from the decreasing availability of "free land" and the origin and intent and subsequent changes in the concepts of private and public lands and their uses. However, at its heart, "land use" is a resource management craft that deals with the interactions of individuals or societies with the environmental resources associated with land and water. Whether that interaction involves hunting-gathering, agricultural production, or large-scale construction, land use occurs only in association with physical resources and amenities, even if they are little more than in favorable proximity to the desired use site. Land use regulations are managed constraints or approvals concerning human use of land and other resources that normally involve specific physical boundaries, whether natural (flood plain) or artificial (county lines). Land use planning, via a rational, political, and/or orderly process of defining and comparing land uses, anticipated user needs and desires, and developing and implementing regulations, normally attempts to strike a balance between conflicting and competitive resource uses based on social values, mores, and priorities. Most land use planning developed out of the theory of zoning, a regulation of land (and resource use) to serve the public interest. The primary purpose of zoning was to promote compatibility between different uses, and so geographic districts were defined and groups of uses listed which could locate in each district. Grouping of compatible uses was a legal consideration rather than a planning consideration, and whose justification was principally on nuisance grounds. First, that like situations should be regulated similarly. Secondly, the single-family residence should be protected from commercial operations. The point to be remembered is that most land use planning depends on the concept of zoning and zoning was not originally designed for the purpose of planning uses of land and the associated resources. This uneasy marriage fogs the criteria for determining significance regarding land use. Determining compatibility of land and resource uses while avoiding nuisance situations is usually a matter of insightful perception by the planner based on frequently unclear legal, social, and moral conventions.

In evaluating significance, two distinctions are important. Land use regulations are normally written broadly, and as such function more as guidelines than regulations. Secondly, the land use designation provided by the regulations or plan may not represent the current, existing use of land, but rather represents a perception of a possible future. This difference could alter the threshold for significance.

21.2 Resource Significance. Because land is a finite resource (space) and because of the value of the physical resources and amenities associated with a particular parcel, its use is immediately significant. With the diminished supply of "free land" enjoyed early in this

country's development, very little land today is truly unused. Development of a site for one user or use essentially eliminates its capability to satisfy a different use. Especially regarding undeveloped lands, changes to more intensive land uses are perceived to be virtually permanent by the public and this perception of "loss" colors the significance threshold. Because of this association between "perception" and significance, most land use significance issues are local in nature, and possess an inherent tendency to be controversial.

a. Resource Inventory. The first step in the assessment process is to inventory the resource. This means determining the size and location of the parcel under consideration, determining its character, its available resources and amenities, and ascertaining its present use and users. In determining current use, it is imperative to consider the resources and amenities associated with the site. While a particular site's most obvious use might be as open rangeland that is leased and grazed by local rangers in season, the presence of scenic or special environmental resources and amenities might make the site more intensively "used" by local or associated recreationalists, academic community (informal research site) or others, whose voiced concerns and perceptions could lead the planner to determine that the site is more important than he initially thought. This same inventory process should be extended to adjacent lands that may not be under consideration. Should the site under consideration be radically dissimilar to its surroundings, for example, the site is the only heavily forested bottomland within an agricultural county, then it gains a higher visibility and uniqueness as an existing resource and to the public's perception. Also included in the inventorying process is the securing and examination of existing land use plans, zoning ordinances or covenants. The results of this inventory will be used to determine the site's significance.

b. Significance Tests.

(1) Legal. Legal significance is determined through identification of the site as special in some way under the local land use plan or zoning ordinance. Most land use plans are formulated and adopted at the county level, although larger municipalities and a few states (most notably the State of Oregon) have enacted comprehensive land use plans for their jurisdictions. There is currently no Federal land use legislation, although other Federal acts exist that carry special land use considerations even though they themselves are not land use plans. The most obvious example is the Coastal Zone Management Act, which identifies the coastal zone as a resource of special concern to the Federal interest and establishes some procedural requirements. Further clarification is provided in the section of this manual that deals with the act. Other, similar Federal legislation covers wild and scenic rivers, prime and unique farmlands, designations of prime aquifer recharge areas, and similar high-priority resources or amenities. While not specifically land use plans, they establish resources with a legal

significance and may imply or actually mandate certain "land use" constraints that protect those resources. In the absence of any comprehensive land use plan on the local or state level, these may be the only legal tests for significance.

(2) Political/Public. Political significance with regard to land use or land use as a resource arises when a powerful landowner(s) is involved, and can often be surmised if legal significance exists. For example, all Indian lands should be considered to have political significance as well as legal significance arising from the enacting legislation that set aside those lands. Further, Indian lands relating to retained rights (e.g. fishing in the Pacific Northwest and hunting in the Northeast) is clearly an issue of political significance, especially in the local area. In the West, leasing of the grazing rights is a standard practice in ranching. While not owned by the rancher(s), use of that land is of particular significance to them. There may be no existing land use plan to trigger a significance determination on a legal basis, but this user group will certainly have sufficient leverage to raise it as a political issue.

Similarly, environmental groups can raise a political significance concerning a particular area (defacto wilderness, for example) that has no legal significance. The basic tests for political significance are who owns it? who uses it? and how powerful are they? Once the resource is brought to the attention of a sympathetic governor, congressman, or senator, the threshold has been long passed.

Whether a particular parcel has a public significance is often a function of whether it possesses legal or political significance. Someone will always maintain that a particular resource, land use, etc., is significant. A reasonable indicator of whether there could be a public significance attached to a particular parcel of land is the size of the parcel and numbers of persons using the parcel, whether formally or informally. This distinction stresses the importance for a thorough inventory. Should an area be unique (the last remaining forested bottomland), or should it be heavily used by the local people (recreation) then it would be safe to assume there would be public concern and hence, significance. The problem often encountered in determining whether a resource is significant to the public lies in correctly identifying the affected public uses. Often public concern can be avoided by sensitive mitigation or public education. Public significance is a matter of perception on a large scale. If many persons believe that the resource is significant, it is always easier to treat the resource as significant. While political significance can occur from the perceptions of a single individual (e.g. governor of a state), the opinion of a single individual does not signify public attitudes. There is no threshold number beyond which one could determine that a "public" significance exists. This falls into a risk analysis category of how much controversy, publicity, and risk of potential litigation, is the agency willing to accept.

(3) Professional. Professional judgment is a function of the first three tests: legal, political, and public. This judgment is aided by knowledge of other, similar situations and consideration of probable scenarios based on his/her perception of future needs. Measures that the professional will be concerned with in making his/her determination of significance include size of the area in question, current use, associated resources and amenities, proximity to existing and anticipated future population centers, and variety of uses the site is capable of supporting. Recreation is an obvious other use that must be considered. Reconsider the single, remaining forested bottomland previously discussed: Because that stand is unique for the planning area (county) it has immediate potential as a park site for which there are no alternatives. The professional will recognize this. Altering the situation slightly, assume that the stand is not the only one in the county, but is considered the best of five or six similar stands. The professional would look at the site's proximity to the population centers (assume average 25 miles) in comparison to the other stands (assume their range of distance is 2 to 7 miles). While the stand does possess resource significance based on quality of its resource, it is of lesser or no significance because it is too far removed from the (potential) recreational users. Normally this assessment will be supported by information gathered during the inventory process. From a professional standpoint, one of the key criteria for significance determination is the site's potential for future satisfaction of existing or anticipated needs. A parcel of land that possesses characteristics that make it attractive for a variety of possible uses must be judged a more significant resource than one whose characteristics make it attractive for only one or two types of use, unless a clear priority has been established for that single use.

c. Resource Nonsignificance. In a practical sense, land as a resource is treated as nonsignificant unless or until something occurs to focus attention on the issue, and then normally the issue of concern is impact assessment. Land use is a perceived issue and falls low on a study's pantheon of levels of significance. Because of the nature of the resource (land), its size, physical characteristics, and relative scarcity, it is the key to the project and therefore of utmost importance. Normally, however, the resource's significance is related to the other environmental resources and amenities associated with the particular site. Most legal tests of significance simply trigger procedural requirements (coastal zone management consistency determinations, wild and scenic river study, or treatment in an EIS). Land as a resource, or land use as an issue, almost never meets threshold for significance in isolation from other resource concerns and issues.

21.3 Impact Significance. Determining the significance or nonsignificance of land use changes is very much like tossing darts in an erratic windtunnel. If the planner can gauge the next gust and provide just the correct amount of thrust, his dart will at least hit the board. If he cannot accurately anticipate the changing winds, or if he applies too

much or insufficient thrust, his dart will be wide, high, low, or fail even to reach the wall. The contradictory result is that while the immediate effect may be significant, the dart-thrower loses his match, or the land use planner finds that development, or no development, has taken a wholly different turn than he expected, the long-term impact is unimportant. The loss of resources and amenities associated with the original site might be assessed significant and will be dealt with specifically as part of the resource impact assessment. From a land use perspective, there is only a different use of land. Land use, population distribution, and associated socioeconomic development are dynamic processes. Losses incurred are losses of opportunities: recreational or wildlife habitat use is foregone in favor of development of a coal-fired powerplant, a desirable residential community is converted over time to a large, esthetically less pleasant but perhaps economically more desirable, industrial complex. Should a land use plan and zoning ordinances exist, they will one day have to be appropriately revised to reflect the changed conditions of the new, current, and most likely scenario.

a. Prediction of Changes. Over the long term, change is inevitable. Even when land use designations cite a specific area for preservation, the channeling of development pressure to the lands around will directly or indirectly put pressure on the preserved land. The intensity of use may increase due to increased population. Deterioration of air quality may affect the vegetation, rendering the area less desirable as a preserved natural area. Long-term prediction is conjecture, sometimes accurate conjecture, but only conjecture. Land use planning, as reflected in most land use plans, attempts to provide mechanisms for orderly change within a fairly restricted time frame. It is no accident that most land use plans have written into them defined milestones where review of the plan and comparison to the then-existing conditions and social wants and needs is to occur. Nor is it by accident that most plans contain specific procedures for plan revision. Predictions always overlook some key factor, and normally the key factor is returned to human motivation and perceptions. These change over time due to any number of obvious or subtle social conditions. In the 1950's and 1960's in the United States, the population rush was to the suburbs which manifested many specific land use problems and concerns. In the 1970's the trend seemed to have reversed and the density was returning to the cities. This trend engendered new and different land use problems and issues. In the 1980's there appears to again be a movement toward the suburbs with some similar problems to those of the 1950's and 1960's, and with some new wrinkles. Land use planning is essentially a reactive craft over the long term, and significance blurs. For the short term, significance must be assigned based on immediate resource concerns and perceptions that were in effect at the time of formulation and adoption of the land use plan, the zoning ordinances, or other guidelines.

b. Significance Tests. Tests of significance for impacts are identical to those involved in assessing whether the resource itself is

significant. Often they are contradictory, and their assessment is adumbrated by the need to assess significance for the resource and amenities associated with the particular parcel of land.

Once again, the key to significance of an impact to land use involves a judgment of compatibility of resource uses and users. Is the new use compatible with the old use, or is it expected to be compatible with the ultimate use of the area at some future time. As these judgments rely on many assumptions about social and moral valuations: Is it "good" or "better" to retain agricultural use in a certain area or to let it be changed for development? Land use impact assessment is a true "black box" that requires sensitivity and flexibility and not a little luck.

(1) Legal. Most legal tests are straightforward. The predicted change is compared to the existing land use plan, zoning ordinances, or other guidelines and a determination is made as to whether the proposal conforms with the guidelines. It is presumed that if the proposal conforms, that is, if the proposed use is allowed by the guidelines, then there is no significant change. This may or may not be an accurate judgment from a political or public test, but is correct legally. If the plan does not conform, then there is a defacto significance, but in practically, it is not a real problem. If the legality of the plan is clear and the activity is not in conformance, then either the plan will be rejected, a waiver must be pursued (not always allowable) or the plan altered to conform with the guidelines. A true problem of "significance" occurs when the proposal is not clearly allowed or prohibited. Since most land use plans are written broadly, this frequently occurs. Interpretation is left to those implementing the plan until the judicial system is invoked to settle a dispute. The judicial decision then settles the issue for that question and may establish a precedent for future interpretations.

(2) Political/Public. Political tests arise from confrontations with powerful vested interests. A change in land use may be insignificant from a legal perspective, that is, it conforms to existing guidelines, but appears to directly or indirectly impact someone else's lands and/or rights. In nearly every case, the primary concern is one associated with resources. For example, construction of a large military facility along an estuarine shoreline is allowable under the local and state land use plans and guidelines. Use of that site, however, risks interfering with established Indian fishing activities because an increased number of vessel movements associated with the facility conflicts with their fishing season. While the problem may have some legal significance because of Federal Trust responsibilities, the primary significance test is a political one in its broad sense. The analogy holds for conflicts between other user groups as well. It is normally best to assume significance exists and attempt to resolve the differences and reach agreement rather than attempt to justify nonsignificance. Otherwise, as with the legal conflict, it ultimately will be resolved in court, Congress or other similar body and then not always satisfactorily or clearly.

Sadly, the most accurate measure of public significance is when the public follows the announcement of the proposed action with a large, well-attended demonstration or letter writing campaign. In its absence, one reasonably presumes that there is no public perception of significance. This can be dangerous as the public may merely be focused on other issues and will raise the land use concern later in the planning process. Usually a feel for public concerns/perceptions can be ferreted out during the inventory. At that time, when initial contacts are being made with other agencies and groups, local concerns will be spelled out or hinted at. Most public concerns that a land use change is "significant" involve cases where legal significance is absent or unclear. Additionally, a change is usually judged significant whenever there is a wide difference between the parcel's legal land use designation and the parcel's actual current use, whether of intensity or activity. An example of a common instance is when a land use plan has been developed and adopted designating an area as "urban," the normal designation that has the widest variety of allowable uses and intensity of development, but the area is currently used for low level agriculture with scattered residences. Any proposal that would mandate more intensive use of the site, and would almost certainly change the agricultural use of the parcel, could be expected to be judged significant by the public. It is best to simply treat the concern as a significant issue, undertake the appropriate studies and dialogues and attempt to reach a resolution. Anticipating the whims of public concern is seldom straightforward, but clues can be found by researching the possible issue ahead of time. Large site developments are more controversial than small ones. Proposals that affect publically perceived unique values or resources or that appear to establish a precedent will engage public attention and may be judged by that public to be significant as will land use changes that exclude public entry. This returns to the zoning concept of land use planning: compatible uses. Uses that are not clearly compatible with the existing character of current land use practices should be carefully scrutinized. The change will probably be perceived as significant.

(3) Professional. The bottom line in any significance determination is professional judgment and sensitivity to compatibility. The professional's criteria are all of the aforementioned tests plus knowledge about the local community, about future needs perceived for the community, knowledge of how other similar actions turned out, and his assessment of the proposal and parcel of land themselves. He will take into account the size of the proposal, its impact on other resources and amenities, and attempt to postulate what other changes to the area might result from the proposed development. Development of a particular parcel of land in accordance with the existing local land use plan may not directly be a significant change, but indirectly could result in other land use effects from increased populations, use of county facilities, or a perceived lowering of an adjacent area's attractiveness as a residential/recreational/ commercial area (the compatibility factor).

c. Impact Nonsignificance. Generally, land use changes that are within current intensive uses are considered compatible and nonsignificant. An example would be a change in land use from light industrial to commercial uses, or from one type of light industrial to another light industrial activity. Land use changes that involve undeveloped lands are seldom uncontroversial and should normally be considered significant enough to warrant evaluation and some explanation or dialogue with the affected public. The initial significance may not, probably will not, be enough in isolation to require preparation of an EIS; although it may serve to support such a determination to evaluate all effects.



22. NOISE

22. Noise

22.1 Introduction.

a. Definitions. Sound consists of two components: the source, vibrating in air or other medium which can conduct sound; and a receptor, equipped to translate changes in atmospheric pressure into nerve impulses perceived as sound. As a wave phenomenon, sound obeys basic physical laws and can be measured by numerous standard devices and techniques. The measurement of a receptor's sound perception is somewhat more difficult.

Noise can be defined as any sound that is undesired or interferes with hearing. This definition is influenced by the receptor's hearing ability, psychological predisposition, and social values. In animals, noise could be described as sounds which interfere with communication, reduce the ability to detect prey or predators, or induce symptoms of stress. The audible range for many species is still unknown, and the range of human experience so vast that uniform evaluation of noise significance can become extremely difficult. The point at which noise exposure becomes adverse can vary from area to area and individual to individual based on a multitude of factors including age, past experience, and hearing acuity. It is a common truism that states "one man's music is another man's noise."

Sound pressure is the fundamental measure of sound amplitude, perceived as loudness, and is measured in units called decibels (dB). The decibel scale is logarithmic to encompass all sounds which are subject to measurement. In humans, the sound pressure of the least audible sound, 1 dB, is one ten-millionth the pressure of a sharply painful sound level of 140 dB. Another property of the decibel scale is that the sound pressure levels of two sources are not arithmetically additive. For example, if a sound of 70 dB is added to another 70 dB sound, the sound pressure level is increased to 73 dB. If the sound sources differ by 10 dB, the lower level adds little to the upper. An existing 70 dB source joined by a 60 dB source results in a 70.5 dB total sound pressure level.

Frequency, the rate at which a sound source vibrates, producing changes in sound pressure level, is measured in cycles per second or Hertz (Hz). The Hertz scale ranges from 0.1 to 16 Hz (infrasound) to frequencies of over 20,000 Hz (ultrasound). The normal frequency range of human hearing is 16 Hz to 20,000 Hz.

Sound is also described in temporal terms, occurring in varying patterns of continuity, fluctuation, impulsiveness, and intermittency. Examples of sounds differing in temporal patterns are a waterfall, an aircraft takeoff, a pistol shot, and traffic. In real life situations, sounds with constant amplitude, pure tones and unchanging patterns of time and level are uncommon. Most sounds occur as a mixture, constantly changing in composition.

b. Assumptions. It is assumed that the preparer of noise environment documentation (NED) will have access to governmental agencies,

telephones, and other public services of information. It is further assumed that the preparer is capable of conducting onsite observations of the area or has a source capable of such work. The subject areas are assumed to be sparsely populated, short grass prairies with low existing noise levels. Such areas are assumed to contain wildlife sensitive to disturbance and human populations unaccustomed to high noise levels.

c. Key Concepts. The perception of noise by humans can be influenced by orientation, experience, personality, health, and numerous other factors. Differences of perception in individuals, geographical areas, and sources of sound make predictions of noise impacts difficult to quantify in generalized form. Even less information is available regarding wildlife. Animals utilize sound to attract mates, give warning, detect prey or predators, seek parents, and establish territory. During these processes, animals have been known to emit and respond to sounds beyond human perception.

22.2 Resource Significance.

a. Resource Inventory. Documentation of noise conditions which may be affected by a project must be listed in an inventory. If there is reason to believe noise will be a problem in a study area (e.g., range areas), historical and existing noise levels and trends for the affected areas must be obtained and arranged into a noise contour map. This map should include existing noise levels at the project site, proposed transportation routes, materials handling sites, maintenance areas, and support facilities as well as proposed and existing zoning, businesses, institutions, and living areas. Any sensitive receptors in the study area such as hospitals, schools, or endangered species should be identified at this time. The inventory should contain seasonal, periodic, diurnal/nocturnal, and projected noise levels without the project. Pertinent information available for development of the noise inventory includes:

- Technical Manual TM 5-803-2, Environmental Protection: Planning in the Noise Environment (1978).
- Technical Report CERL-TR-N-30, Environmental Noise Impact Analysis for Army Military Activities (1977).
- Guidelines for Preparing Environmental Impact Statements on Noise, by the Committee on Hearing Bioacoustics and Biomechanics, Assembly of Behavioral and Social Sciences, National Research Council (1977).

Publications by groups, individuals, or institutions within the affected area or state may provide critical information, including applicable state and local standards, ordinances, laws, and regulations. Due to the relatively low levels of noise and lack of attenuation in low relief in rural areas, it is possible that perceived noise levels may be higher than for similar activities in urban environments. Members of the affected communities may appreciate assisting in gathering and monitoring of historical and existing conditions.

b. Significance Tests.

(1) Legal. Legislation recognizes noise as a potentially significant pollutant, particularly in relationship to airports and highways. From the time of Julius Caesar's chariots to the present, noise has been recognized as significantly affecting the human environment. Regulation of the noise environment under the Noise Control Act of 1972 has resulted in noise standards for the workplace and most internal combustion engines. The Occupational Safety and Health Administration (OSHA) currently sets the workplace noise standard at 90 dB. If the noise level exceeds 90 dB for 8 hours a day or rises above 90 dB for shorter periods, the subject is overexposed and must be technically or administratively protected. Although certain individuals are able to behaviorally "get used to" high noise levels, all exposed subjects perceive such sounds until physical damage occurs. The 1972 Environmental Protection Agency report which led to passage of the Noise Control Act of 1972 stated that noise had a significant effect on 40 percent of the population and further quoted the World Health Organization as stating that \$4 billion a year was spent in the United States as a result of noise caused accidents. Substantial precedent exists for cases involving excess noise such as airport operations or construction activity as well as inadequate noise in the case of damages assessed against a railroad for using signals inaudible to a motorist. A summation of Federal laws dealing with noise follows:

Noise Pollution Legislative Acts

Act	Official Title and Dates	U.S. Code	Purpose of Act	Primary Responsible Federal Organizations
Federal Aviation Act	Federal Aviation Act of 1958, PL 85-726, August 23, 1958, Amended by PL 92-574, October 27, 1972	49 USC 1431	Afford present and future relief and protection to the public health and welfare from aircraft noise and sonic booms.	Environmental Protection Agency Department of Transportation
Airport and Airways Development	Airport and Airways Development Act of 1970, PL 91-258, May 21, 1970, Amended by PL 94-353, July 12, 1976	49 USC 1344 and others	Provide for the expansion and improvement of the Nation's airport and airways system.	Environmental Protection Agency Department of Transportation
Highway Noise Level Standards	Federal-Aid Highway Act of 1970, PL 91-605, December 31, 1970	23 USC 109	Protect the public health and safety on federal-aid highways, and other purposes.	Department of Transportation
Noise Act	Noise Control Act of 1972, PL 92-574, October 27, 1972, Amended by PL 94-301, May 31, 1976; PL 95-609, November 8, 1978	42 USC 4901 et seq., and others	Control the emission of noise detrimental to the human environment, and for other purposes.	Environmental Protection Agency Department of Transportation

(2) Political/Public. Public recognition of the value of low noise levels has been documented by many sources. Absence of noise as a resource however, is often taken for granted until a noticeable change occurs. Perceived noise, or noise which results in reductive action by the receptor, may not be equivalent to the standard levels adopted by legislators.

(3) Professional Judgment. Professional judgment in the determination of noise effects would incorporate knowledge of acoustical measurement techniques, previous experience, physical characteristics of the affected area, demographics of affected populations, and the opinions of other specialists to ascertain the value of existing noise levels to a given receptor population.

c. Resource Nonsignificance. A determination of noise nonsignificance must find that no Federal, state, or local laws, regulations, or ordinances will be violated as a result of the proposed action. In addition to compliance with maximum environmental noise standards, conditions such as the presence of a threatened or endangered species or other sensitive receptor must be considered. Project personnel should initiate and maintain coordination with the affected population to monitor changes in perception as well as measured noise levels throughout project planning. The same level of noise may be significant or nonsignificant depending upon ROI, i.e., noise significance or nonsignificance is relative. An understanding of the magnitude and extent of anticipated changes in the noise environment, presented by professionals of demonstrated integrity, should reduce or eliminate adverse political impacts. Since present noise sources, such as ultrasound generators, and levels of sound have never previously existed, the reactions of humans and animals exposed cannot be fully analyzed and should be assumed to be potentially significant until otherwise determined.

22.3 Impact Significance.

a. Prediction of Changes to the Resource. To predict changes in the noise environment as a result of project implementation, the inventory of historical and existing noise levels and receptors must be combined with estimated levels of noise produced by:

- the proposed construction equipment and techniques,
- estimated operational noise levels, and
- conditions which may affect sound transmission such as;
 - (1) temperature inversions,
 - (2) wind components,
 - (3) vegetation, or
 - (4) topography.

The Construction Engineering Research Laboratory (CERL) Environmental Impact Computer System (EICS) and the NoiseCalc Computer Program are two examples of current technology capable of assisting in the determination of potential noise impacts to:

- domestic animals and some wildlife,
- human health and physiological maintenance,
- sleep performance,
- oral communication,
- television/radio communication,
- annoyance/disruption of task performance,
- land-use compatibility,
- disruption of human activity, and
- property value depreciation.

Due to the variation between areas and individuals in their response to sound stimulation, psychoacoustic principles that allow for individual responsiveness may be necessary. Scaling methods, such as the Noy scale which introduces "noisiness" rather than "loudness" as a factor, can distinguish the subjective "irritation factor" from generalized awareness of increased noise levels.

b. Significance Tests. Once the changes in existing noise levels are determined, the significance of the predicted changes is addressed according to the four general categories of tests - legal, public, political, and professional judgment. This involves consideration of the indirect and cumulative noise resulting from increased population (which also may include sensitive receptors), increased congestion of local or regional transportation routes, workers commuting to the job-site, increased utilization of existing facilities, increased road maintenance, and new construction as well as direct noise impacts. The duration of the noise impact (short-term, long-term, permanent, temporary) and a knowledge of the historical noise conditions in the study area are also important considerations in noise impact significance determinations. Public and consequent political perceptions in a study area can also be very important in noise impact significance analysis.

(1) Legal. As a result of the Noise Control Act of 1972 (Public Law 92-574) and subsequent legislation, numerous states and municipalities have developed noise ordinances which govern legally permissible noise emissions. Compliance with applicable laws and regulations will reduce but may not eliminate the likelihood of legally significant impacts.

(2) Political/Public. Noise impacts can be identified as significant by the public with or without actual exposure. Public reaction to the American Supersonic Transport (SST) program resulted in large numbers of letters and telegrams to elected officials demanding that the SST project be stopped due to its potential for noise impacts. If the public has previously experienced the effects of similar large construction in the vicinity (i.e., significant economic gain), the perceived level of significance may be reduced.

(3) Professional Judgment. Professional judgments of noise impact significance will incorporate knowledge of sound characteristics; existing and projected population distribution; atmospheric phenomena; direct, indirect, and cumulative effects; extent, duration, and magnitude of potential exposure; probabilities of different levels of exposure; and methods to avoid, reduce, or eliminate undesirable impacts. The professional judgment would also incorporate the judgments of other technical specialists to thoroughly evaluate noise impacts in relation to sensitive receptors such as endangered species.

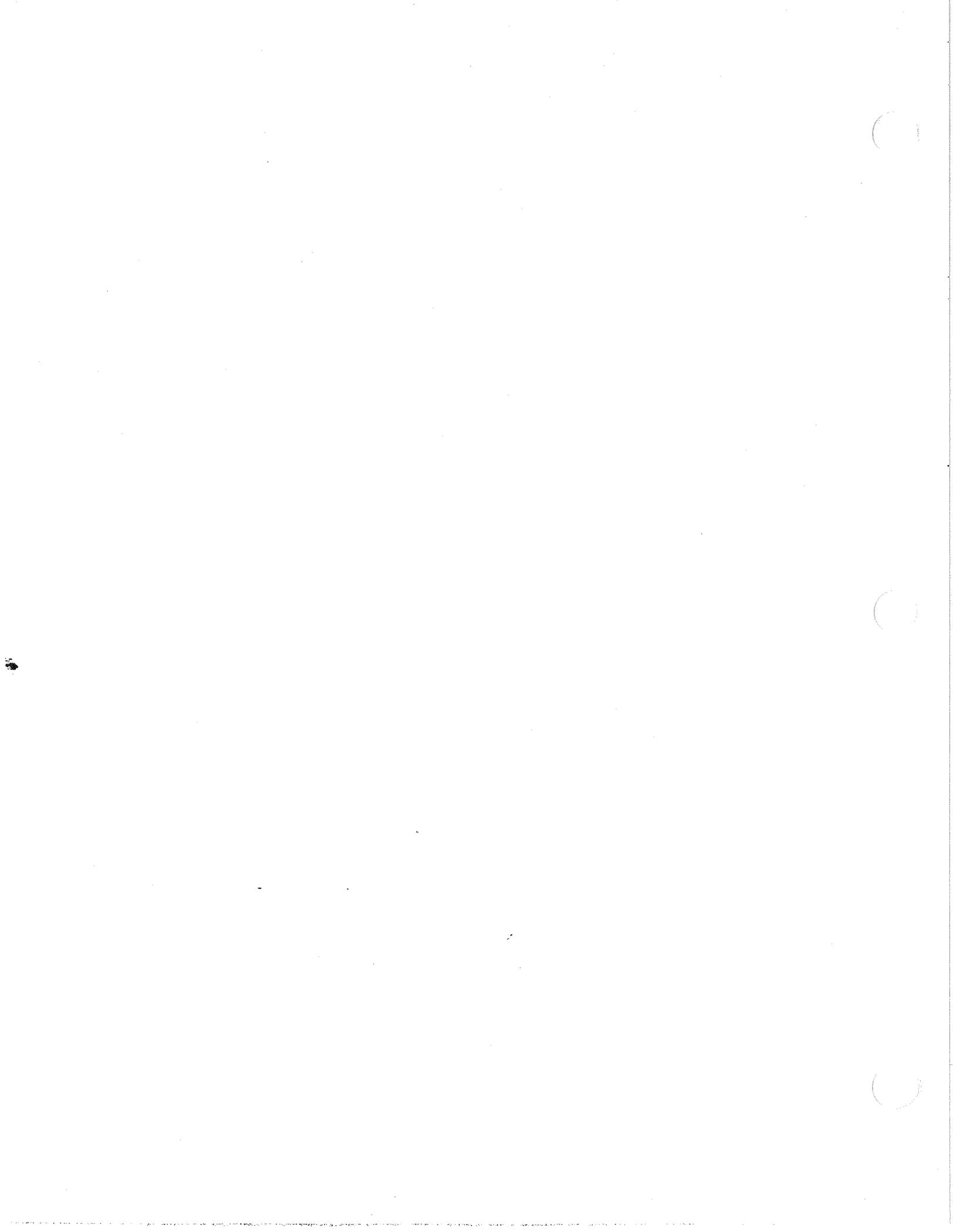
EPA (1975) guidelines for noise impacts consider the range of 0 to 5 dB increase to cause slight impacts, 5 to 10 dB increase to be a significant impact, and over 10 dB increase to be a very serious impact. Some tests indicate that a 3 dB increase is barely perceptible and a 5 dB increase, clearly noticeable. The Washington State Department of Ecology has developed a set of classifications based on the Environmental Designation for Noise Abatement (EDNA) of source and receiving properties, the amount of variation in noise, and the time (day or night) of occurrence. For example, class A areas, which include residential areas and the Nisqually Wildlife Refuge, have daytime noise limitations of 60 dB and nighttime limits of 50 dB. These levels may be exceeded by 5, 10, or 15 dB for up to 15, 5, and 1.5 minutes per hour respectively.

EPA states that no significant effect on human health or welfare is likely if the noise environment has a 24-hour day-night sound level of 55 dB or less. In Environmental Noise Impact Analysis for Army Military Activities, the 55 dB level is stated as not being official Army policy, with final implementation subject to coordination with the user's major command and the DA environmental office. The Committee on Hearing, Bioacoustics, and Biomechanics states that so long as the expected yearly day-night average sound level after the proposed project is completed is less than 40 dB and the sound pressure level is never greater than 105 dB in the range from 1 to 100,000 hz, the project is "screened out," and no further noise analysis is needed with no significance given to the existing noise level. Environmental Protection: Planning in the Noise Environment estimates acceptable sound levels without special noise barriers or insulation to range from 65 dB in residences, classrooms, and hospitals; to 70 dB in offices and commercial buildings; to 75 dB for playgrounds, sports arenas, and livestock. Acceptable noise levels for endangered species or a sensitized public have not been determined and will require further study. Noise perceived by a public in a

specific study area to be significant and/or unacceptable can actually fall below the standards set as "acceptable." Some planners say "we will not violate standards, therefore noise is not a significant problem," whereas people in a given area (based on specific cases as well as previous experience, historical, and possible future conditions) may consider noise impacts to be significant. All noise can be considered potentially significant if it results in disturbance and an undesired change of behavior in the receptor.

c. Impact Nonsignificance. Although preliminary findings may indicate that impacts of the proposed action on the existing environment are nonsignificant, consideration should be given to the certainty of change over time. Such changes may include the discovery or immigration of sensitive receptors, a shift in public opinion concerning the project, wear and deterioration of equipment or alterations in applicable standards and regulations.

Change may also result in a significant impact being reduced to nonsignificance through noise control technology, outmigration of affected populations, or operational changes. The analysis of impact significance should continue beyond initial planning and design phases, particularly when insufficient data is available to state definitely whether an impact is or is not significant. An ongoing effort should exist to monitor changes in conditions and incorporate new information into the planning, construction, and operational phases of the proposed project. Without continuous analysis, conflict with nonproject changes in the environment or individual perceptions may occur without warning.

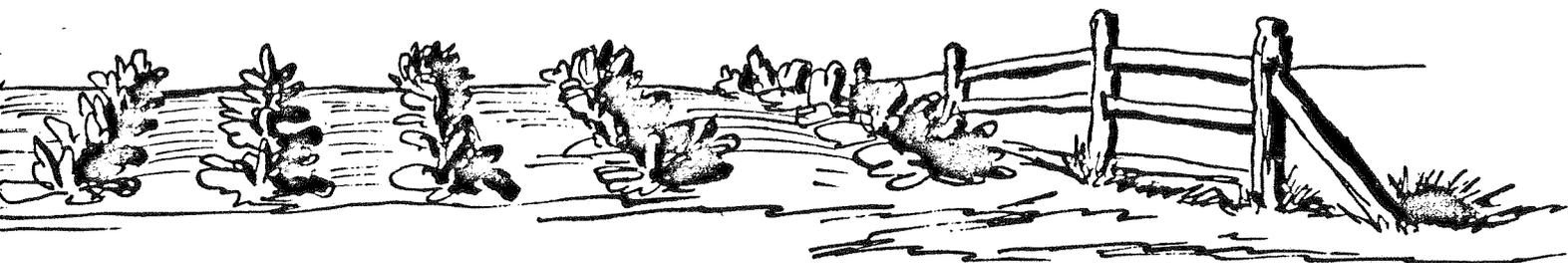




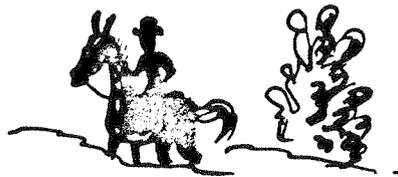
23. AIR QUALITY



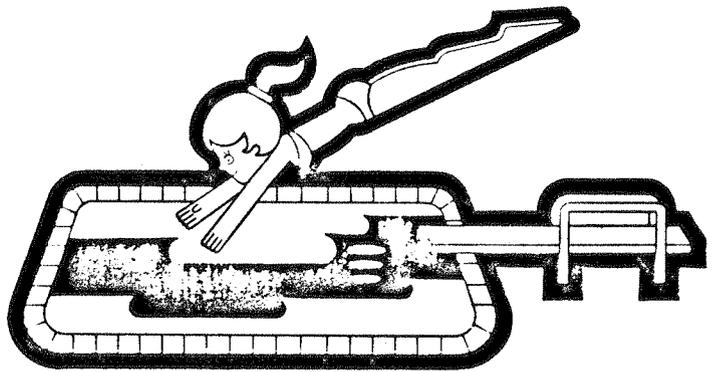
24. WILD AND SCENIC RIVERS



25. PRIME AND UNIQUE AGRICULTURAL LANDS



26. RECREATIONAL USE OF NATURAL RESOURCES



27. WATER SUPPLY

SECTION V.
APPLICATION TO SPECIFIC
CULTURAL RESOURCES

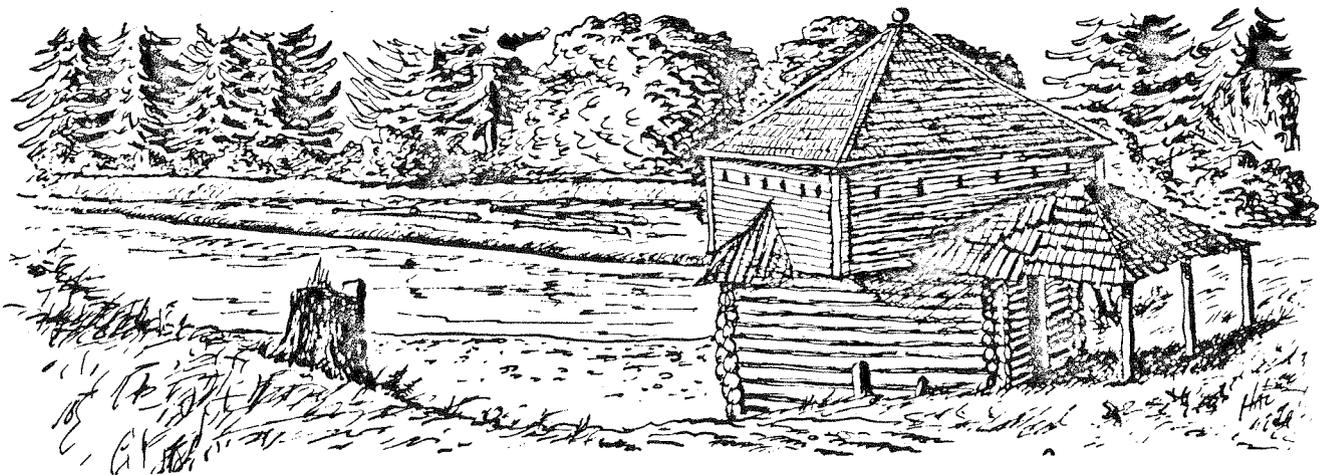
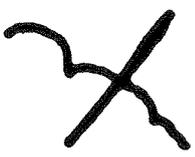


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28. Cultural Resources

28.1 Introduction. Cultural resources are districts, sites, structures, and objects having importance to a culture, a subculture, or a community for scientific, traditional, religious, and other reasons. These resources and relevant environmental information are important for describing and reconstructing past lifeways, for interpreting human behavior, and for predicting future courses of cultural development. They are nonrenewable resources that typically occur as archeological or historic sites. They may be aboriginal prehistoric peoples, historic ethnic groups, or the dominant American society. They are amenable to mitigation through study and may be valued for their scientific and/or heritage significance.

The significance of cultural resources is usually determined at the local and state levels, stressing the importance of different kinds and qualities of cultural resources in different regions of the country. Evaluations of cultural resource significance involve professional judgments by contractors, Federal agency specialists, State Historic Preservation Officers (SHPO), and the Keeper of the National Register of Historic Places (U.S. Department of the Interior). Cultural resource significance is relative in time and may vary with the type of significance considered. The most commonly used tests for resource significance emphasize investigative potential, site integrity, and value for public interpretation. The significance of cultural resource sites is dynamic in that new kinds of sites may become recognized and new investigative themes may become popular with the passage of time. Ultimately, the significance of cultural resources is a value judgment made by professionals at several levels and subject to the biases of change over time, research interests, and popular themes.

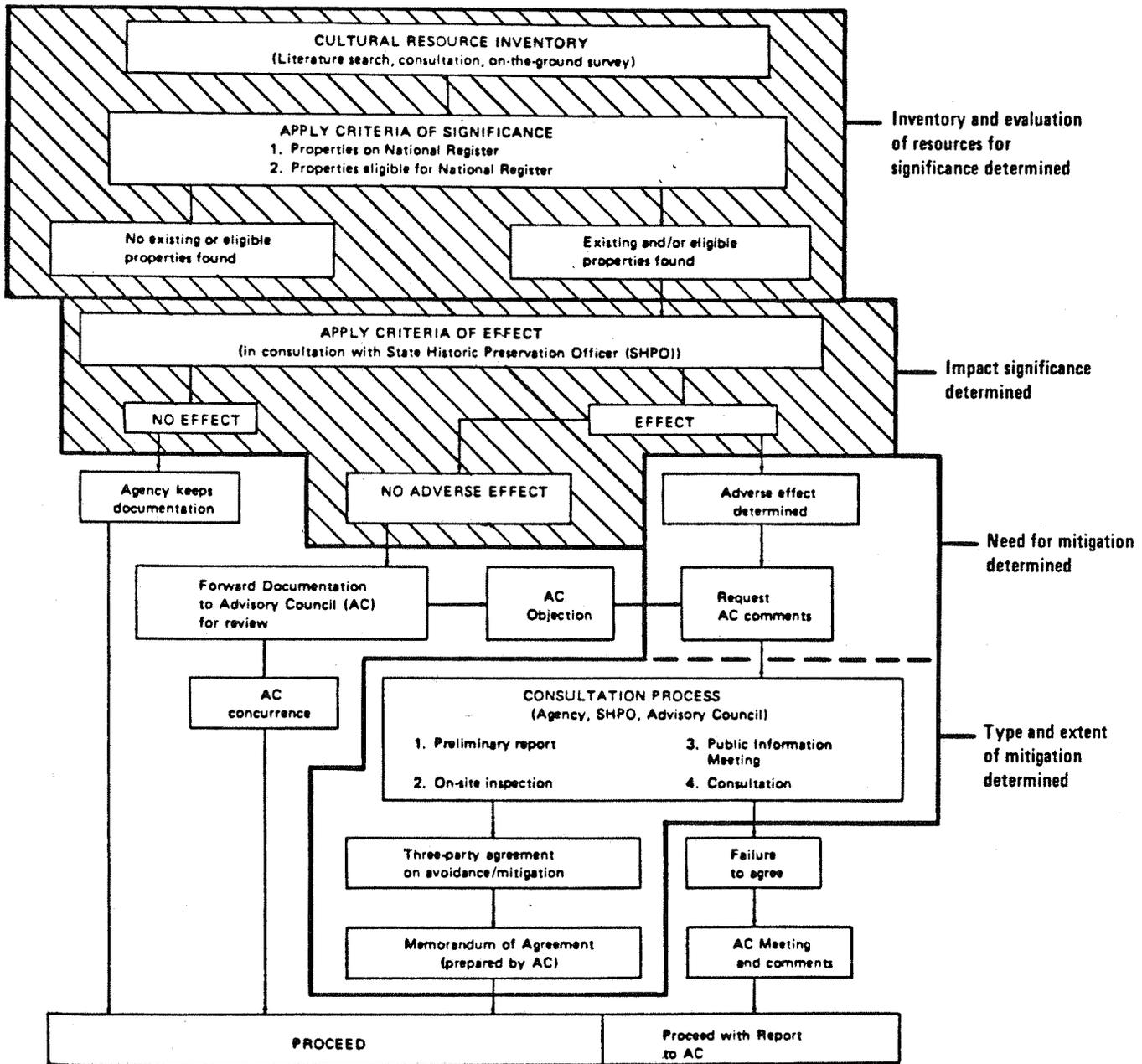
28.2 Resource Significance. The prescribed method for determining cultural resource significance is to conduct inventory studies to identify the resources within and adjacent to a project area (36 CFR Part 800.4), apply the National Register criteria (36 CFR Part 60.4), and, if eligible sites are found, seek a determination of eligibility from the Keeper of the National Register (36 CFR Part 63, 36 CFR Part 800.4).^{1/} Significance is determined, therefore, strictly in terms of National Register eligibility (see figures 28-1 and 28-2). Cultural resources meeting one or more of the following criteria are regarded as eligible for the National Register and considered significant resources:

National Register criteria for evaluation.^{2/}

The quality of significance in American history, architecture, archeology, engineering, and culture is

^{1/}Formal determinations from the Keeper are not necessary if agency and SHPO are in agreement, pursuant to suspension of 36 CFR Parts 63.2(c), 63.3 and 800.4(a)(3), effective July 6, 1982 (24306 Federal Register Vol. 47, No. 108).

^{2/}50189 Federal Register Vol. 46, No. 220 (November 16, 1981)



**Figure 28-1 . PRESIDENT'S ADVISORY COUNCIL SECTION 106 PROCEDURES
(NATIONAL HISTORIC PRESERVATION ACT)**

GENERAL ENVIRONMENTAL PLANNING PROCESS

HISTORIC PRESERVATION PLANNING PROCESS

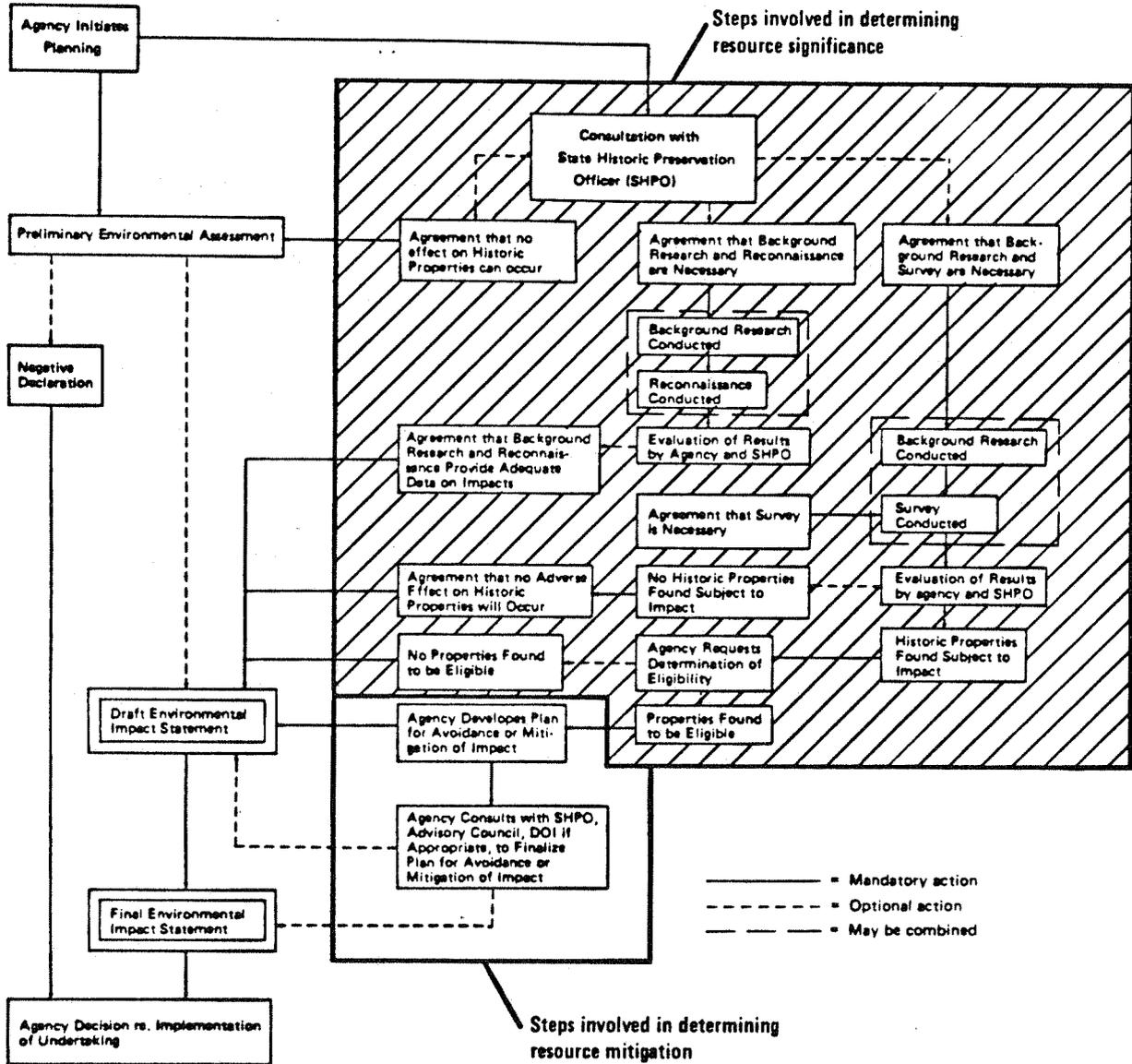


Figure 28-2. INTEGRATION OF HISTORIC PRESERVATION PLANNING

present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association; and

(a) that are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) that are associated with the lives of persons significant in our past; or

(c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) that have yielded, or may be likely to yield, information important in prehistory or history.

Criteria considerations. Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria of if they fall within the following categories;

(a) A religious property deriving primary significance from architectural or artistic distinction or historical importance; or

(b) A building or structure removed from its original location but which is significant primarily for architectural value or which is the surviving structure most importantly associated with a historic person or event; or

(c) A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life.

(d) A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or

(e) A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

(f) A property primarily commemorative in intent of design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

(g) A property achieving significance within the past 50 years if it is of exceptional importance.

a. Resource Inventory. In most cases, an inventory of cultural resources will result from a professional assessment of a given project area by a qualified archeologist. Cultural resource inventories are completed by combining a number of sources including the following:

- A comprehensive literature search, including review of all archeological, ethnographic, and historic studies that pertain to the project area and National Register listings and monthly supplements.

- A comprehensive records check from state and local agencies, archival and university sources, and possibly other Federal agencies.

- Consultation with the State Historic Preservation Officer and the Keeper of the National Register of Historic Places.

- An archeological survey of the project area, including on-the-ground coverage, subsurface testing, and interviews with local residents and informants.

b. Significance Tests.

(1) Legal Significance. In planning for or implementing any Federal undertaking, a cultural resource is regarded as legally significant in the following instances:

- When it is listed on or determined eligible for the National Register of Historic Places.

- When it is registered as a National Historic Landmark.

(2) Political/Public Significance. Cultural resources may take on a special meaning for some ethnic groups, particularly Native Americans. The heritage value or religious importance of some cultural

resources may become a political factor in the determination of eligibility for the National Register. Certain kinds of cultural resources such as Native American cemeteries or ceremonial sites within Federal project lands require consultation with traditional tribal groups and may involve special management practices (refer to discussion of Native American Concerns in the next chapter). In addition, testimony presented at public hearings or in comments to draft environmental impact statements (EIS) by archeological societies, historical societies, environmental preservation groups, and professional associations may strongly affect significance determinations made by state SHPO and other public officials.

(3) Professional Judgment. The element of professional judgment is an integral part of determinations of eligibility for the National Register and is discussed in the introduction to this chapter in 28.1 above. Because of the dynamic nature of significance, there will always be a need for professional judgments at several levels in cultural resource management. There will also be differences of opinion. Where agency professionals differ from academic professionals in this field stems largely from the focus of research study. The former tend to emphasize management needs and values, the latter theoretical or methodological interests and values. The professional societies in archeology and history have rarely played a part in professional determinations, judgments, or resolution of professional differences; they have traditionally been more concerned with the establishment of professional standards and the qualifications of individuals. Differences of opinion are resolved politically through the consultation process described in figures 28-1 and 28-2.

c. Resource Nonsignificance. Cultural resources are not regarded as significant in the following situations:

- Cultural resource sites are not found within the project area after a literature search, records check, and archeological survey have been conducted.

- Identified cultural resource sites do not meet any of the criteria for National Register eligibility in the opinion of the SHPO Keeper of the National Register.

- Sites potentially eligible for the National Register are found within the project area, but are more recent in origin than 50 years of age.

Caution should be exercised with the above categories of cultural resource nonsignificance for the following reasons:

- There is often a potential for finding unidentified buried sites during construction in the project areas that were previously surveyed (36 CFR Part 800.7).

● The heritage significance of some sites not eligible for the National Register based upon scientific evaluations may become a political issue among ethnic groups.

● With the passage of time, many kinds of cultural resources not now eligible will become eligible for the National Register as they move beyond the 50-year limitation. These kinds of sites are referred to as neoteric sites. Also, refer to "criteria considerations" under 36 CFR Part 60.4.

28.3 Impact Significance: This refers to the effects (short-term/long term; beneficial, adverse; direct, indirect; or cumulative) upon a cultural resource as a result of implementing a Federal undertaking. This discussion is concerned only with the determination of impacts to significant cultural resources.

a. Prediction of Change. Impacts to significant cultural resources (resources listed on or determined eligible for the National Register) are determined by following the procedures for compliance with Section 106 of the National Historic Preservation Act (36 CFR Part 800.4) (see Impact Significance Determined in figure 28-1).

b. Significance Tests.

(1) Legally significant impacts. As shown in figure 28-1 and 28-2, significant impacts to significant cultural resources (National Register eligible sites) are determined by the agency in consultation with the SHPO by applying the criteria of effect (35 CFR Part 800.3(a)) and the criteria of adverse effect (36 CFR Part 800.3(b)):^{3/}

● Criteria of Effect. An effect occurs when an undertaking changes the integrity of location, design, setting, materials, workmanship, feeling, or association of the property that contributes to its significance in accordance with the National Register criteria.

● Criteria of Adverse Effects. Adverse effects on National Register or eligible properties may occur under conditions which include but are not limited to the following:

- Destruction or alteration of all or part of the property's surrounding environment;

- Isolation from or alteration of the property's surrounding environment;

- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;

^{3/}From 6047 Federal Register Vol. 44, No. 21 (January 30, 1979).

- Neglect of a property resulting in its deterioration or destruction.

- Transfer or sale of a property without adequate conditions or restrictions regarding preservation, maintenance, or use.

The outcome of application of the criteria of effect and adverse effect includes one of the following:

● Finding of No Effect. The agency documents the determination and then proceeds with the undertaking. The agency documents the determination and then proceeds with the planned undertaking.

● Finding of No Adverse Effect. This means either that there will be no significant impact to cultural resource sites or that minor impacts will be offset by limited data recovery to aid in the evaluation of sites. The determination of no adverse effect is forwarded to the Advisory Council on Historic Preservation (ACHP) for comment (36 CFR Part 800.6(a)). If ACHP concurs, the undertaking may proceed. If ACHP objects with conditions, the agency may proceed if it accepts the conditions; if the agency does not accept the conditions, then further consultation is required (36 CFR Part 800.6(b)) and may include a preliminary case report, onsite inspection, and possibly a public information meeting. If ACHP objects to the agency finding of no adverse effect, then the case goes into consultation and may require a preliminary case report, onsite inspection, and public information meeting (figure 1: Need for Mitigation Determined). If consultation results in agreement on measures to avoid or mitigate adverse effects, then a Memorandum of Agreement is signed that specifies how the undertaking will be carried out (see Type and Extent of Mitigation in figure 28-1).^{4/} If consultation fails to result in agreement, the agency must take into account the ACHP comment, but is not required to abide by it.

● Finding of Adverse Effect. This means that the project undertaking will directly impact cultural resources and that a need for mitigation has been determined (see Need for Mitigation Determined in figure 28-1). The determination of adverse effect is made by the agency (36 CFR Part 800.4(d)) and requires consultation between the agency, SHPO, and ACHP (36 CFR Part 800.6(b)). A preliminary case report is prepared by the agency which provides background information forwarded to ACHP for comment. Consultation is directed towards exploring alternatives to the adverse effect. If alternatives cannot be found, then appropriate mitigation measures are determined according to the significance of the property (see Type and Extent of Mitigation Determined in figure 28-1).

(2) Politically/Publically Significant Impacts. Cultural resources ineligible for the National Register may possess heritage significance or religious value for Native American tribal groups. The

^{4/}36 CFR Part 800.6(c)(1) was suspended, effective July 6, 1982.

destruction of sites and/or loss of access to traditional religious places could significantly affect the practice of a traditional religion and could become a politically significant issue. The determination of politically significant impacts derives from the consultation process with the SHPO and with regional Native American groups. Consultation with Native American groups is required by Section 2 of the American Indian Religious Freedom Act (P.L. 95-341), by Section 4(c) of the Archeological Resources Protection Act (P.L. 96-95) for archeological permits, and by 33 CFR Part 320.4(j)(6) for Department of the Army permits. A model for consultation is presented in the National Park Service's proposed revised "Native American Relationships Policy."^{5/} Other publically significant impacts may be determined through public hearings or comments on draft EIS's. It is likely that statements and comments would come from archeological societies, historical societies, environmental conservation groups, and professional associations.

c. Impact Nonsignificance. Impacts to cultural resource sites that are not considered significant include:

- Impacts to cultural resource sites determined ineligible for the National Register; therefore, there is no effect upon significant cultural resources.

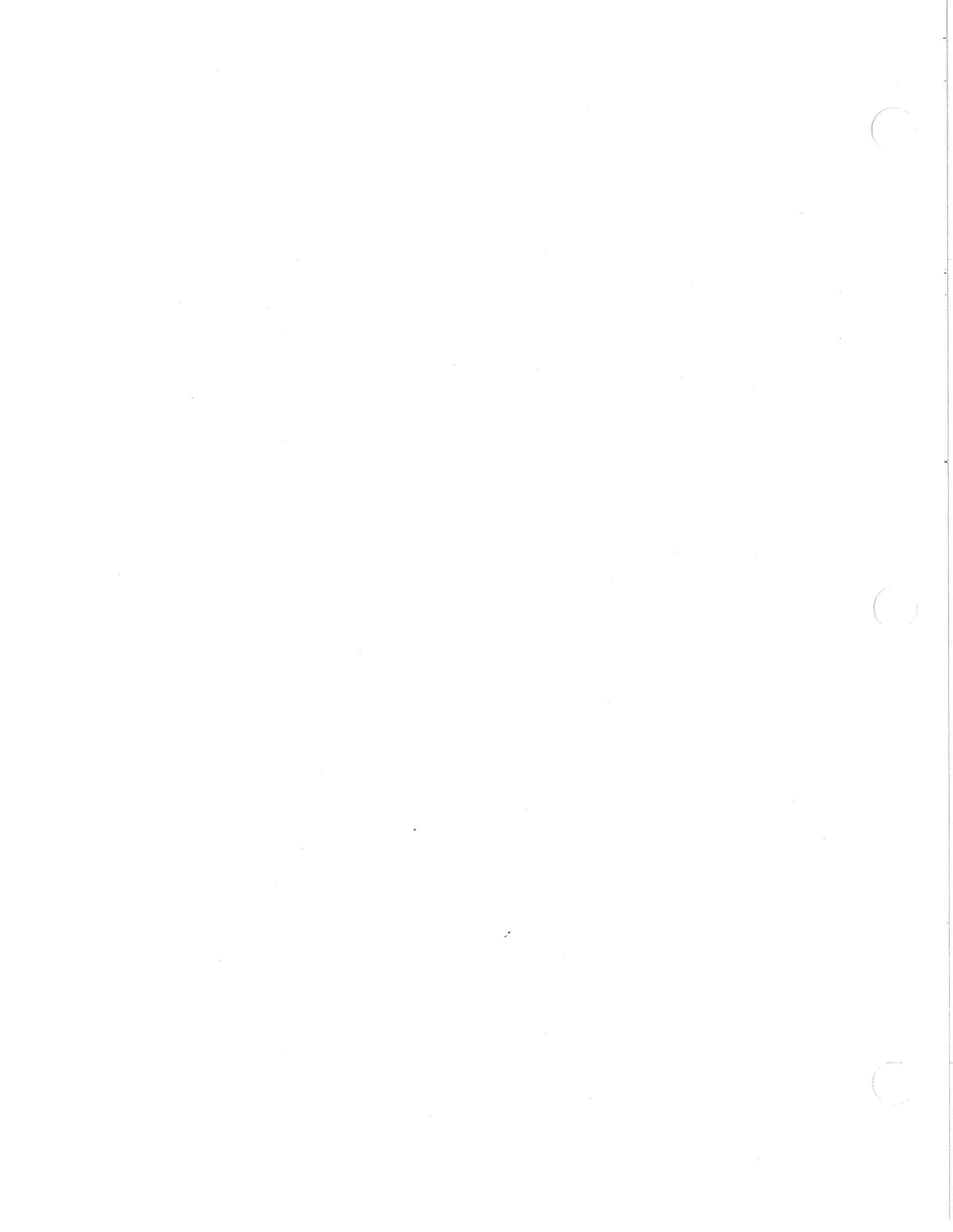
- Impacts that have been determined to have no adverse effect on National Register sites by the SHPO and ACHP.

Caution should be exercised in the above instances of nonsignificant impacts to cultural resources for the following reasons:

- There is often a potential for finding unidentified significant buried sites during construction in project areas that were previously surveyed (36 CFR Part 800.7).

- Impacts to sites ineligible for the National Register may become a political issue among Native Americans who may attach heritage significance or religious value to the sites impacted. The impact significance needs to be assessed by consultation with Native American groups pursuant to Section 2 of the Native American Religious Freedom Act (P.L. 95-341).

5/53688 Federal Register Vol. 47, No. 228 (November 26, 1982).





29. NATIVE AMERICAN CONCERNS

29. Native American Concerns

29.1 Introduction. Native Americans include American Indians, Aleuts, Eskimoes, Hawaiians, and Micronesians who were born and reside in the United States. Native Americans are recognized as a different class of citizens because of special legislation giving them a trust relationship to the Federal Government. The native peoples of this country believe that certain areas of land are holy. These lands may be sacred, for example, because of religious events which occurred there, because they contain specific natural products, because they are the dwelling place or embodiment of spiritual beings, because they surround or contain burial grounds, or because they are sites conducive to communicating with spiritual beings. There are specific religious beliefs regarding each sacred site which form the basis for religious laws governing the site. These laws may prescribe, for example, when and for what purposes the site may or must be visited, what ceremonies or rituals may or must take place at the site, what manner of conduct must or must not be observed at the site, who may or may not go to the site and the consequences to the individual, group, clan or tribe if the laws are not observed.

Over the past 150 years Indian law has shifted abruptly with broad, often disjunctive changes in Federal policy toward Indians and Alaska natives. Congress has implemented new laws to reflect each shift in Federal policy. Major changes included moving tribes of the contiguous United States onto reservations, then opening these reservations to non-Indian settlement, and finally fostering Indian self determination on reservations through tribal government under tribal constitutions. Throughout this history of change, however, a unique and continuing political relationship has existed with and between the tribes and the United States Government. This special relationship is recognized by the U.S. Constitution, U.S. Supreme Court decisions, and congressional legislation and Presidential Executive Orders. Indian tribes are tribal "nations" within the United States boundaries and possess reserved rights of self government thereby granting these tribes the necessary status to enter into treaties with the Federal Government. Indian treaty rights today like treaties with foreign nations are recognized by the Federal Constitution as the supreme law of the land. The Federal Government has accepted the obligation of a trustee to protect not only the rights afforded to the tribes but also the rights reserved and not delegated by the tribes. Congress does retain the right, however, to abrogate treaty rights by specific legislation, provided it expresses a clear congressional intent to do so. Indians are now citizens of the United States, possessing both privileges of tribal membership and those of all other U.S. citizens. An important aspect of the Indian trust relationship for the purposes of this study is the fact that Indian trust lands (reservation lands) may not be taken by condemnation for any Federal purpose (including that of a BMD site) without special legislation so authorizing. Likewise, because of tribal sovereign immunity, an Indian tribe may litigate in our courts but the tribe cannot be sued without its consent because of its immunity. Land is sacred to present-day tribes. Hence, reservation lands normally cannot be acquired today

by voluntary purchase for any amount of money. Exchanging off reservation lands or granting "in lieu" mitigation lands is not a viable option normally because of the legal ramifications of placing such off reservation lands in trust - thus freeing them from state control and local taxation. Another option, however, is that many Indian groups have made trust lands available through leases granted under their permitting authority. The consultation process now required with Native American groups for Federal projects is the key to the identification of options for any given undertaking.

Provisions of the Native American Religious Freedom Act (Public Law 95-341) and the Archeological Resources Protection Act (Public Law 96-95) require that Federal agencies consult with Native American groups to determine how their programs may affect cultural resources or the practice of traditional religion. General policies for evaluating applications for Department of the Army permits also require Native American consultation (33 CFR Part 320.4(j)(6)). The purpose of Native American consultation includes the following:

- To establish mutually agreed upon points of contact between the Federal agency and the tribal group.

- To identify specific concerns relative to a specific project or program.

- To formulate a Memorandum of Understanding (MOU) which specifies the Native American concerns and the measures the Federal agency will take to preserve and protect sites and resources of concern. In the case of the BMD program, a detailed mitigation plan should be formulated and incorporated into the MOU to mitigate any adverse effects from construction and to provide for construction monitoring. An MOU of this kind is now in effect for the Peacekeeper Missile Testing System at Vandenberg Air Force Base.

29.2 Resource Significance. The significance of Native American concerns is an inseparable combination of information derived from consultation, laws, professional judgments, and political actions. Consultation is the legal basis for establishing concerns. Issues of concern may be tempered or modified by professional judgments and/or political actions. Project plans which are likely to impact Indian reservations, trust lands, or water rights should clearly assess the legal and time constraints involved. Indian lands are an entirely different category of lands. Decisionmakers should be aware that it is highly unlikely that any Indian tribal groups would voluntarily acquiesce to the sale or conveyance of easements for any of their trust lands; that condemnation in the normal sense is not an available option; and that special congressional legislation is required to acquire Indian lands over the objections of tribal leaders. A recent Corps of Engineers example of the difficulties inherent in acquiring rights-of-way affecting Indian treaty rights is illustrated by the current Northern Tier Pipeline proposal to construct a pipeline from western Washington across Puget Sound

and intervening states to Minnesota. The President personally approved the proposed siting and gave the full support of his office for expedited approval to construct along the presidentially selected route. In spite of these efforts, several Puget Sound Indian Tribes have successfully blocked the project at the permit level. After more than 5 years of continuous effort, no permit has been issued and no construction has begun. The issue does not even pertain to Indian lands, but rather to Indian fishing treaty rights. Ironically, the selected route passes through two Indian reservations in Idaho and Montana with the concurrence of the tribal groups involved.

a. Inventory of Native American Concerns. In most cases, an inventory of significant concerns to Native Americans will result from the process of consultation initiated by agencies. Consultation on issues of cultural and religious concerns should follow background documentary research by a professional anthropologist. In the process of consultation it is important to keep in mind that each tribe has its own culture and somewhat different political, environmental, and economic objectives. No single Indian organization may speak for the tribal government. Like state and Federal officials, tribes hold elections and vote in new tribal leaders on a regular basis. The current tribal council chairman and council members only can officially speak for the tribe on tribal concerns. Key concerns among those listed above and other special concerns are usually identified by consulting the following sources (in order of importance):

- Tribal government leaders. Tribes have vastly different political, cultural, and economic objectives. Tribal government officials, like state and Federal officials, change by elections. Current tribal council members are an appropriate source of tribal concerns.

- Tribal staff (heritage coordinator, anthropologist, planner, attorney, tribal committee members: culture, ceremonial committees).

- Tribal members, agency, and area offices of the BIA.

- State commissions, liaison officers, or tribal policy boards for Native Americans (state and regional).

- National Congress of American Indians (Washington, D.C.).

- Native American Rights Fund (Boulder, Colorado).

Specific information regarding the above points of contact is contained in Klein (1973), including complete listings of reservations, addresses of Indian agencies and tribal councils, state and regional agencies.

Because of the fact of political factionalism within the tribes and because the focus of interest of tribal governments can change drastically, it is essential to draw upon other sources of information for

Native American concerns to complement those obtained from tribal government. Some sources should be investigated prior to direct consultation with the tribes in order to gain a sense of cultural appreciation about the tribes, proper etiquette, and the local traditional lines of authority and how authority is expressed. In addition to background documentary research, contact should be made with BIA area and agency offices prior to tribal consultation in order to identify appropriate tribal persons and their titles. Actual consultation with the tribes will invariably require a meeting with the tribal council but should be complemented by interviews with tribal staff and committees, as appropriate. These initial contacts may pave the way for more effective public hearings, questionnaires, and future meetings. Throughout the consultation process it is extremely important that any agreements or negotiations involve the appropriate responsible Federal official with the authority to make commitments. Native American tribal groups will want to know the name and title of the responsible Federal official and how that person may be reached. At the same time, responsible Federal officials will involve their professional staff in several field offices and disciplines as appropriate.

One purpose of consultation is to determine what, if any, concerns Native Americans may have about a proposed Federal undertaking. The range of Native American concerns is typically represented by the following categories:

- Preservation intact of all reservation trust lands.
- Protection of all treaty rights including tribal sovereign powers of self government.
- Religious concerns, including access to sacred sites, use or possession of sacred objects/substances, the practice of ceremonial and traditional rites, and the maintenance of natural habitat essential for religious practices.
- Heritage concerns, including historical or religious ties to cultural resources sites and the disposition of cultural remains and materials found within traditional territories.
- Socioeconomic concerns, including employment, education, housing, health facilities and services; support of traditional arts and crafts, language and culture, and maintenance of natural habitat for subsistence.

The degree and extent of these typical concerns for any given project will be determined by documentary research and the consultation process. Any of these concerns is potentially significant to Native Americans.

A second major purpose of consultation with Native Americans is to establish a Memorandum of Understanding (MOU) or a Memorandum of Agreement (MOA) that will ensure preservation and protection of resources of

concern to them. The MOU specifies the points of contact for coordination and creates the mechanism for ongoing consultation. All current and planned Federal agency projects are then coordinated with the tribe(s) in a continuing dialogue. Mitigation plans for Native American concerns may be made pursuant to an MOU. Department of the Navy has established MOA's with Native Americans at China Lake, California, and with Native Hawaiians at Kahoolawe Island to provide access for religious purposes.

b. Significance Tests. The primary test of significance for Native American concerns is consultation. Professional judgments and political actions usually will be part of the consultation process, depending upon the specific issue.

c. Resource Nonsignificance. Federal agencies are required to initiate consultation. Therefore, the fact that a Native American group has not voiced its concerns about a project in public hearings or comments to an environmental impact statement does not mean they have no significant concerns. Significant concerns will emerge through consultation. Potential concerns that are not expressed in consultation are not regarded as significant for that group. On the other hand, concerns of one group may not be generalized to all groups.

29.3 Impact Significance.

a. Prediction of Change. In planning for or implementing a Federal undertaking, Native American concerns should be regarded as significant if the undertaking will have an effect upon any Native American concern. The extent of the concern and its resolution is mostly a matter of consultation, tempered by professional judgments and political actions.

b. Significance Tests.

(1) Treaty rights, including preservation of Indian lands, the protection of fish and their environment, and Indian water rights both on and off the reservation. This category is significant because of the special status of Indian lands concerning taxation, land use zoning, special controls over rights-of-way on Indian lands (25 CFR Part 169), leasing of Indian tribal lands for mining (25 CFR Part 211), and various decisions regarding the allocation of water resources. In Alaska, village sites, native historic sites, cemeteries, and eligible selected lands have special significance (43 CFR Part 2650).

(2) The quality of or access to usual and accustomed places designated as treaty rights. Off-reservation treaty rights usually pertain to access to usual and accustomed places for subsistence use of in-lieu lands offered due to the destruction or alteration of the original places (25 CFR Parts 248/249).

(3) Access to natural resources and/or habitat essential for the practice of traditional religion, for curing, and for traditional

subsistence. On the west coast, resources like salmon and root-foods like camas and bitterroot are ceremonially treated each year as they become available seasonally. On the plains, stone quarries for pipes are of special significance. Among many Indian groups, the dead are buried with an eagle feather. Access to special plants and animals, particularly some endangered species, has become difficult and, in some cases, the habitat for special plant/animal species has been threatened, thus affecting their supply for religious use. Access may be essential in the performance of a critical ritual, such as burial in a traditional cemetery, or a calendrical rite, such as the Sun Dance Ceremony performed by many Plains Indian groups in the summer of each year.

The use or possession of sacred objects/substances may be significant because they may include items for which possession is generally illegal or prohibited under other laws, such as possession of eagle and hawk feathers or use of peyote. Use of these things are appropriate in the practice of some traditional Native American religions and sanctioned by the Native American Religious Freedom Act.

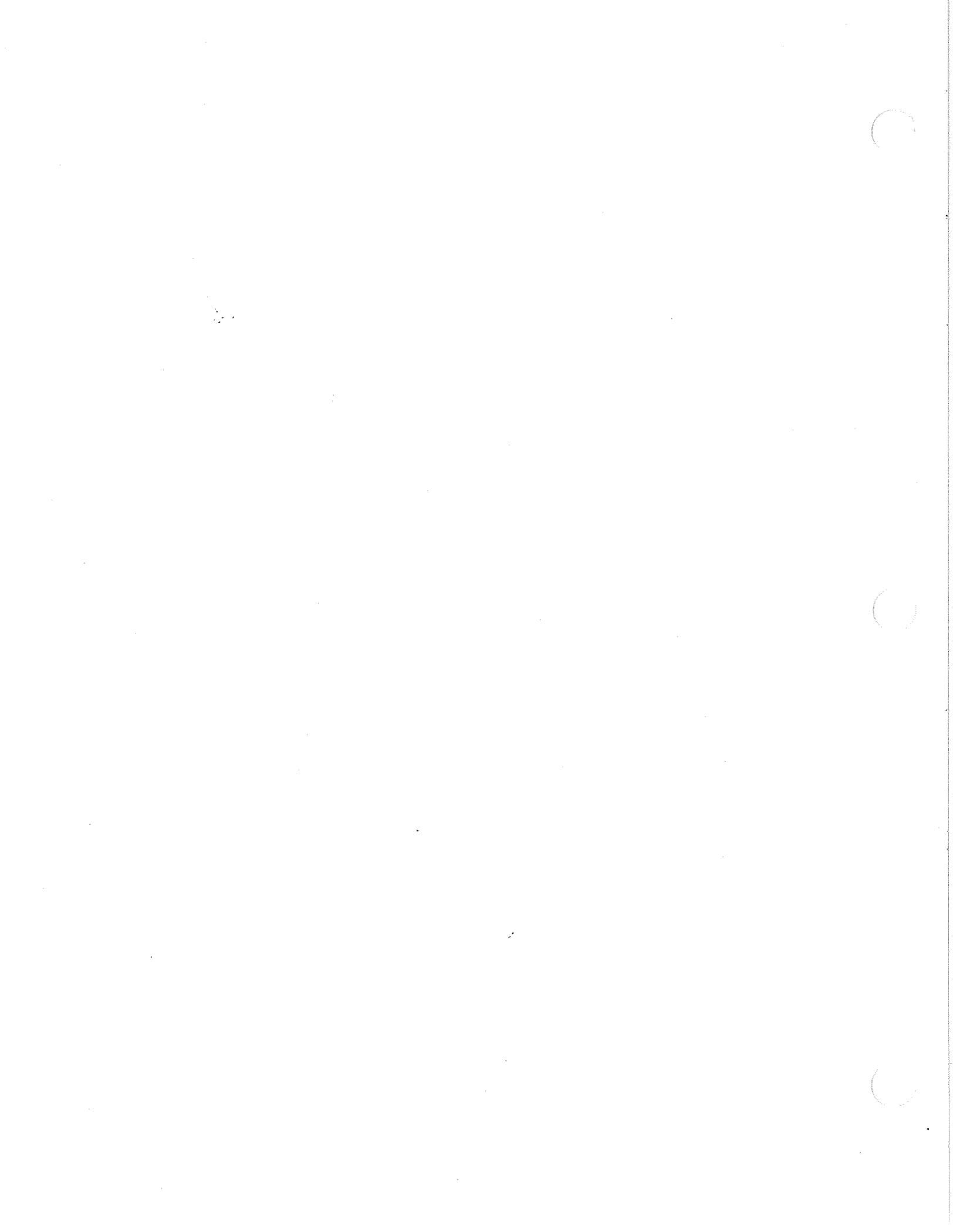
(4) Privacy/confidentiality in the practice of traditional religious rites. Information obtained through consultation with Native Americans and from background research may require confidential treatment. Under Section 9 of the Archeological Resources Protection Act (Public Law 96-95), information concerning the nature and location of cultural resource sites is confidential and exempt from inquiries through the Freedom of Information Act. To the extent that some sites of concern to Native Americans include cultural resource sites, the same confidential protection of religious site information should apply.

(5) Cultural resources having heritage value to the native peoples of the area. Traditional sacred places may include natural topographic features, ethnohistorical sites, and/or cultural resource sites. Among these kinds of sacred places, only cultural resource sites are in themselves protected legally (36 CFR Part 800). Some Native American groups are able to establish an historical connection with particular cultural resource sites. Their concern over the heritage value of such cultural resource sites could be a major factor in the determination of eligibility of these sites for the National Register of Historic Places.

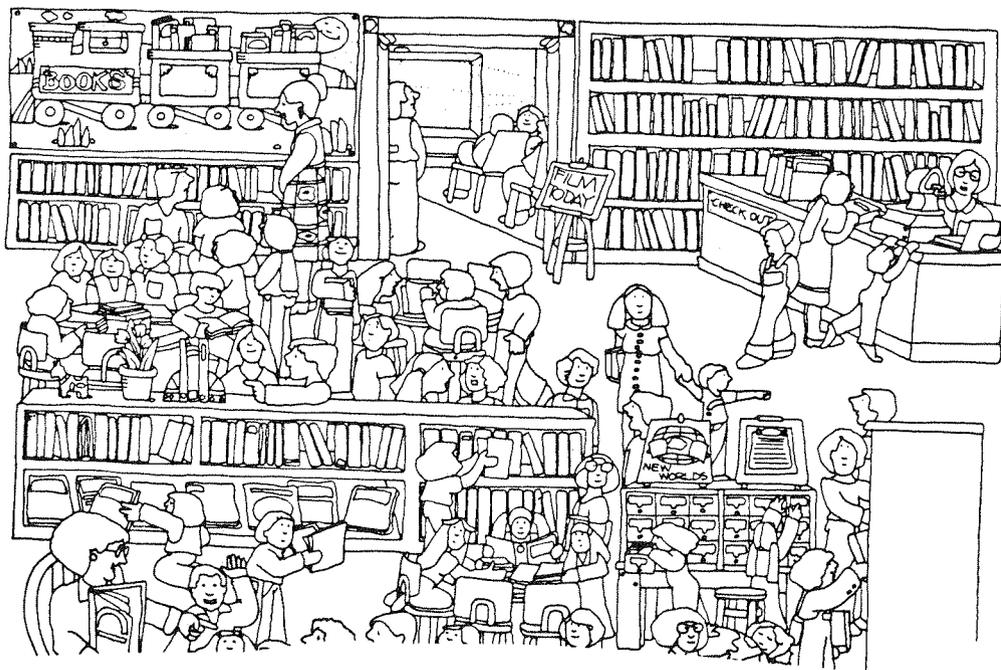
(6) Community cohesion, especially factors having an effect upon the practice of native, culture, language, and religion. The special trust relationship that native peoples have with the U.S. Government makes this topic especially significant if community relocations are proposed or required for a project. Serious time constraints and congressional action could be required for projects that do not carry the concurrence of tribal leaders.

In all of the above tests of significance, legal considerations, professional judgments, and political actions will be factors that affect project requirements for implementation. The extent that the above concerns may affect a project will, in most cases, be determined through the consultation process.

c. Impact Nonsignificance. Concerns or issues that do not emerge through the consultation process, through professional determinations, or through political actions may be regarded as nonsignificant. Nonsignificant concerns for one Native American group may be significant concerns for other Native American groups, however. Consultation is the key. Since expressions of Native American concern are now solicited from peoples who formerly were denied any self-expression, it is not surprising that individuals are reluctant to speak out even if they feel that their rights are being infringed upon. For this reason, it is desirable to involve professional anthropologists or sociologists in the consultation process. Lack of expression of concern does not necessarily mean that an issue is not significant, and agency professionals must take initiative to consult with Native American groups and are legally required to do so.



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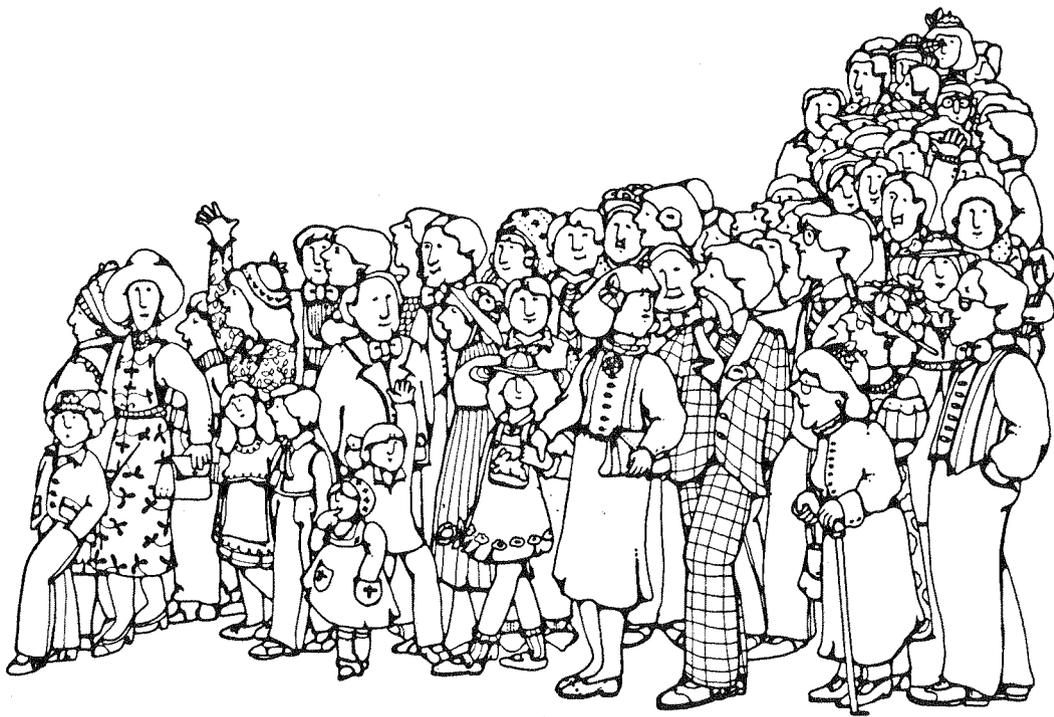
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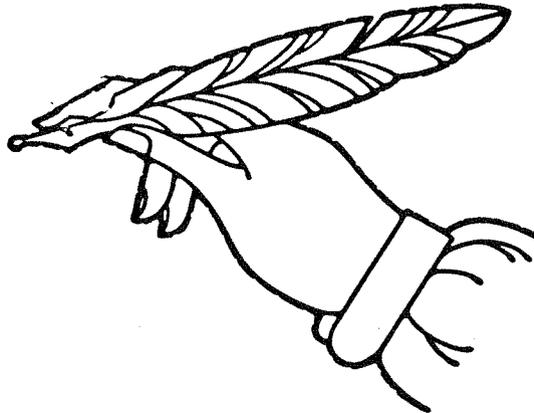


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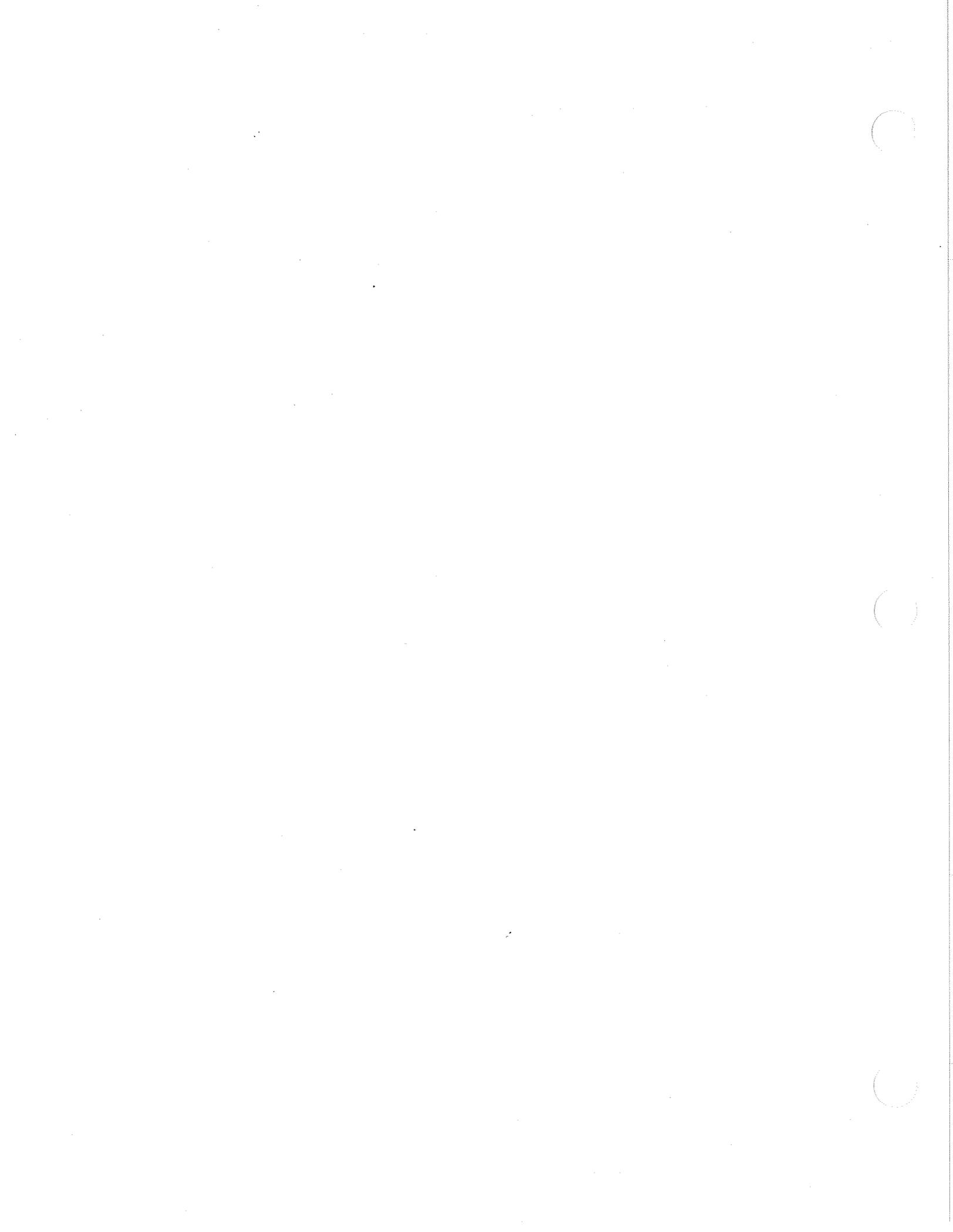
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APPENDIXES



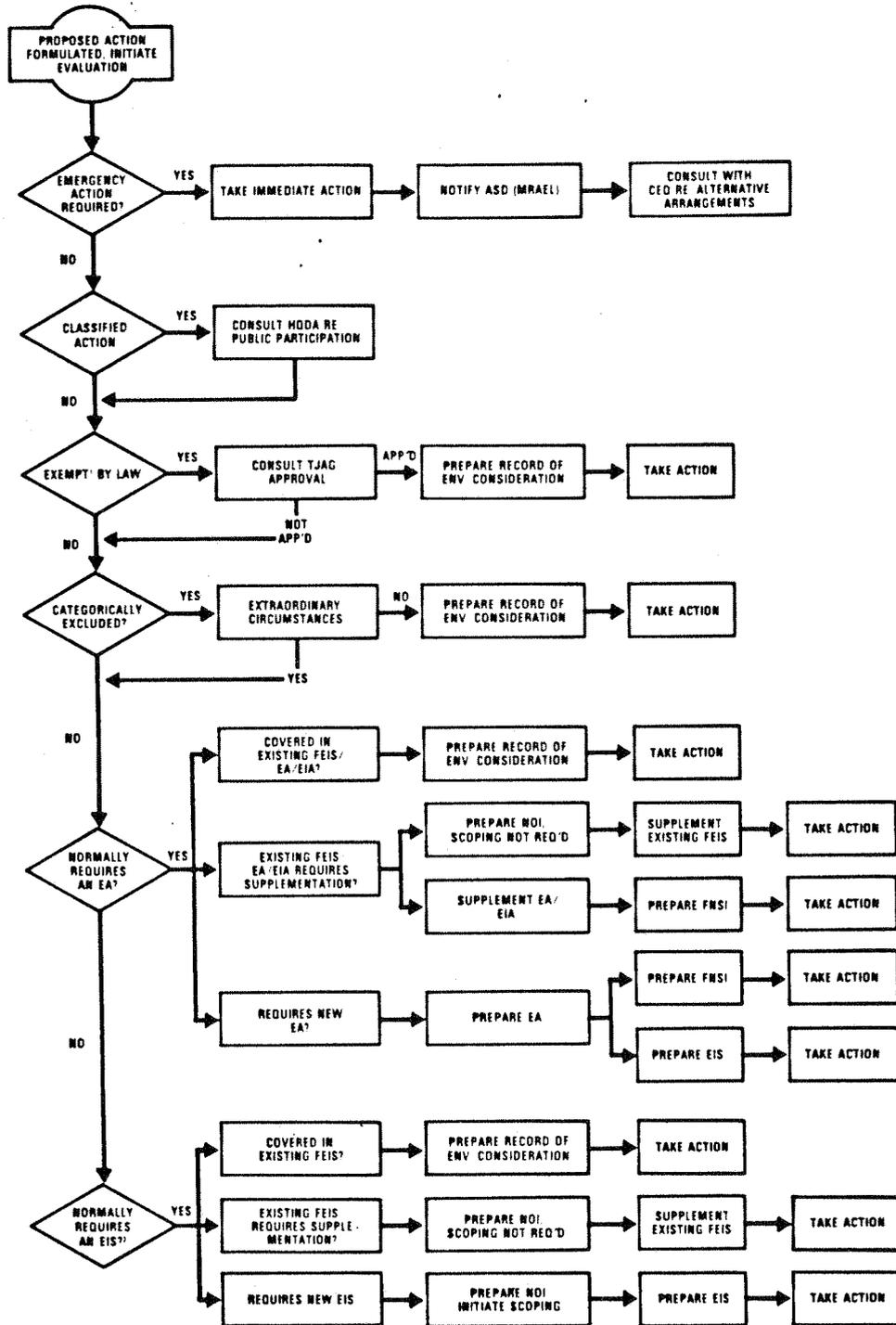
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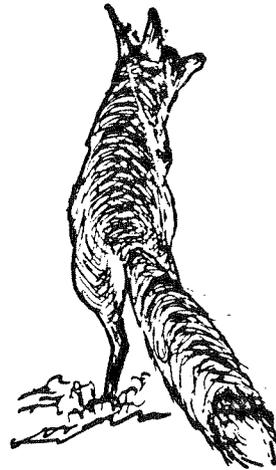
A. SUMMARY OF TYPES OF ENVIRONMENTAL ANALYSIS AND
REQUIRED DOCUMENTATION



¹DOD and/or DA exempts, prohibits, or makes impossible compliance. (40 CFR 1500.6)

²An EA may be done to help determine adequacy of previous documents in covering the specific new proposed action.

Summary of types of environment analyses and required documentation.



B. CATEGORICAL EXCLUSIONS

APPENDIX B
LIST OF CATEGORICAL EXCLUSIONS ^{1/}

A-1. Normal personnel, fiscal, and administrative activities involving military and civilian personnel (recruiting, processing, paying, and records keeping).

A-2. Law and order activities performed by military police and physical plant protection and security personnel, excluding formulation and/or enforcement of hunting and fishing policies or regulations which differ substantively from those in effect on surrounding non-Army lands.

★A-3. Recreation and welfare activities not involving off-road recreational vehicle management; forestry and fish and wildlife management plans and activities except those that involve introduction of or effect on exotic, endangered, or threatened species.

A-4. Commissary and PX operations.

A-5. Routine repair and maintenance of buildings, roads, airfields, grounds, equipment and other facilities to include the lay away of facilities except in cases requiring disposal of hazardous or contaminated materials.

★A-6. Routine procurement of goods and services, including routine utility services.

★A-7. Construction that does not significantly alter land use, provided the operation of the project when completed would not of itself have a significant environmental impact; includes outgrants to private lessees for similar construction. (REC required).

A-8. Simulated war games and other tactical and logistical exercises without troops.

★A-9. Training entirely of an administrative or classroom nature.

A-10. Material storage other than storage of ammunition, explosives, pyrotechnics, and nu-

clear materials, and other hazardous/toxic materials except for storage of such materials in structures designed and maintained for that explicit purpose.

★A-11. Operations conducted by established laboratories in enclosed facilities where—

a. All airborne emissions, waterborne effluents, external radiation levels, outdoor noise, and solid or bulk liquid waste disposal practices are in compliance with existing Federal, State, and local laws and regulations; and

b. No animals which must be captured from the wild are used as research subjects (excluding reintroduction projects).

★A-12. Developmental and operational testing on a military installation, where the tests are conducted in conjunction with normal military training or force maintenance activities so that the tests produce only incremental impacts, if any; and provided that the training/force maintenance activities have been adequately assessed, where required, in other Army environmental documents. (REC required)

★A-13. Routine movement of personnel; routine handling and distribution of non-hazardous and hazardous materials in conformance with DA, EPA, Department of Transportation and state regulations.

★A-14. Reduction and realignment of civilian and/or military personnel which fall below the thresholds for reportable actions as prescribed in AR 5-10. Conversion of commercial activities (CA) to contract performance of services from in-house performance under the provisions of DOD Directive 4100.15.

A-15. Preparation of regulations, directives, manuals and other guidance documents related to actions that qualify for categorical exclusion.

^{1/} From appendix A of
AR 200-2

★A-16. Acquisition, installation and operation of utility systems and communication, data processing, cable systems and similar electronic equipment which use existing rights of way, easements, distribution systems, and facilities.

A-17. Activities which identify the state of the existing environment without altering it (inspections, surveys, investigations), including the granting of any permits necessary for such surveys.

★A-18. Deployment of military units on a TDY basis where existing facilities are used and the activities to be performed have no significant impact on the environment (REC required).

A-19. Preparation of regulations, procedures, manuals, and other guidance documents that implement without substantial change the regulations, procedures, manuals, and other guidance documents of higher headquarters or another Federal agency which have already been environmentally evaluated.

★A-20. Grants of easements for the use of existing rights-of-way for use by vehicles; electrical power, telephone and other transmission and communication lines; transmitter and relay facilities; water, wastewater, stormwater, and irrigation pipelines, pumping stations, and facilities; and for other similar public utility, and transportation uses (REC required).

★A-21. Grants of leases, licenses, and permits to utilize existing Army controlled property for: agriculture and grazing; classroom, office warehouse and administrative space; housing; other use similar to previous or current Army use of the property; and historical or archaeological studies or preservation; use of non-Army property for Army activities where the action is consistent with existing land use plans (REC required).

★A-22. Grants of consent agreements to use a Government-owned easement in a manner not inconsistent with existing Army use of the easement; disposal of excess easement areas to the underlying fee owner (REC required).

★A-23. Grants of licenses for the operation of private or publicly-owned telephone, gas, water, electricity, community antenna television, and other distribution systems normally considered as public utilities (REC required).

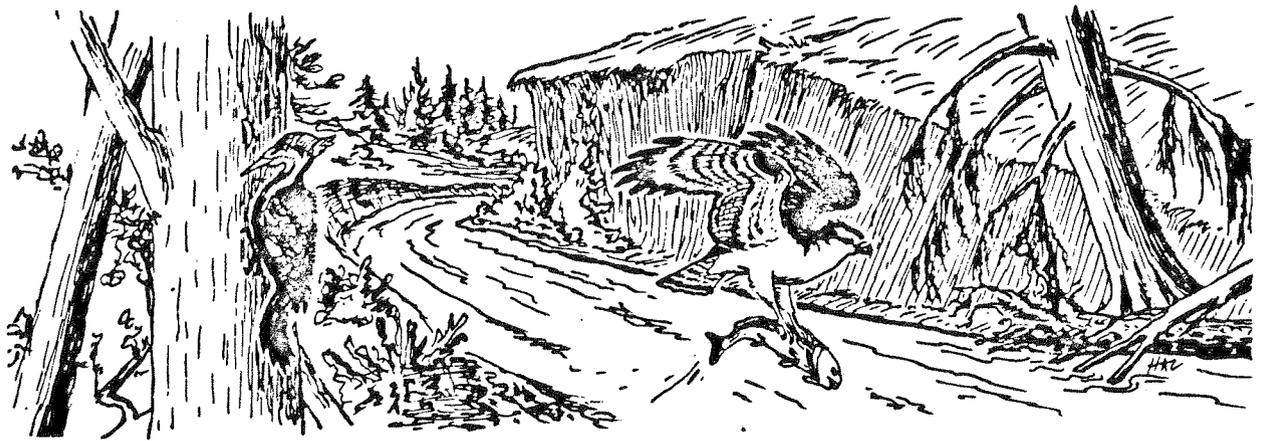
★A-24. Reporting excess real property to the General Services Administration; transfer of real property administrative control within the Army or to another military department or other Federal department or agency, including the return of public domain lands to the Department of the Interior; and reporting of property available for outgranting; and grants of leases, licenses, permits and easements for use of excess or surplus property without significant change in land use (REC required).

★A-25. Disposal of existing uncontaminated buildings and other improvements for removal off-site (REC required).

★A-26. Studies that involve no commitment of resources other than manpower (REC required).

★A-27. Study and test activities within the procurement program for Military Adaptation of Commercial Items for items manufactured in the US (REC required).

★A-28. Proposed actions determined to be of such an environmentally insignificant nature as not to meet the threshold for requiring an environmental assessment (REC required).



C. WATER QUALITY

TABLE C-1

WATER QUALITY LEGISLATIVE ACTS

<u>Legislation</u>	<u>Official Title and Dates</u>	<u>Summary</u>	<u>Administration</u>
Protection of Navigable Waters and Refuse Act	Protection of Navigable Waters Act of 1886, amended a number of times, including by Public Law 92-500, 18 October 1972. The 1972 amendment includes the River and Harbor Appropriation Act of 1889 33 USC 403, et seq.	Protect navigable waters.	Army Corps of Engineers.
Hazardous Waste Management	Resource Conservation and Recovery Act of 1976 (RCRA), as amended by Public Law 95-604; 42 USC 6901, et seq.	Management of hazardous waste disposal into surface and ground waters under Solid Waste Disposal Act.	EPA or states with EPA/state agreement.
River and Harbor and Flood Control Act	River and Harbor and Flood Control Act of 1970, Public Law 91-611, 31 December 1970. 33 USC 569a and others.	Authorize the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and other purposes.	Army Corps of Engineers. Section 101, Navigation; Section 122, Adverse Environmental Effects; Section 123, Contained Spoil Disposal; Section 201, Flood Control; Section 238, Comprehensive Water and Related Resource.
Ports and Waterways Safety Program	Ports and Waterways Safety Act of 1972, Public Law 92-340, 10 July 1972. 33 USC 1221, et seq.	Protect bridges and vessels from loss or destruction, and protect navigable waters and resources therein from environmental harm resulting from the destruction of any vessel, bridge, or other structure.	Coast Guard. Title I, Ports and Waterway Safety; Title II, Vessels Carrying Bulk Cargo.
Clean Water (CWA)	Federal Water Pollution Control Act of 1972, Public Law 92-500, 18 October 1972, amended by Public Law 95-217, 27 December 1977. 33 USC 1251, et seq.	Restore and maintain the chemical, physical, and biological integrity of the Nation's waters.	Environmental Protection Agency. Army Corps of Engineers. State Designation of Use, Standards, Permits, and Certificates.

TABLE C-1 (con.)

<u>Legislation</u>	<u>Official Title and Dates</u>	<u>Summary</u>	<u>Administration</u>
Safe Drinking Water Act (SDWA)	Safety of Public Water Systems Act of 1974, Public Law 93-523, 16 December 1974, amended by Public Law 95-190, 16 November 1977. 42 USC 300f, et seq.	Provide safe drinking water by requiring adequate treatment of public water supply systems.	Environmental Protection Agency. States are responsible for enforcement, supervision, designation of use and standards.
Water Resources Development	Water Resources Development Act of 1974, Public Law 93-251, 7 March 1974 42 USC 1962d and others.	Authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and other purposes.	Water Resources Council, Bureau of Reclamation, Army Corps of Engineers, Department of Agriculture, Environmental Protection Agency, Tennessee Valley Authority. Section 108, Navigation Flood Control.
Oil Pollution	Oil Pollution Control Act of 1961. 33 USC 1001	Prohibits any major discharges of oil or oily mixtures by ships.	Department of Transportation (Coast Guard).

TABLE C-2

SUMMARY OF PARTS OF THE WATER QUALITY STATUTES GENERALLY
PERTINENT TO DA PROJECTS

CLEAN WATER ACT, AS AMENDED
33 USC 1251, et seq.

a. Section 101, Congressional Declaration of Goals and Policy (33 USC 1251(a)). This statute establishes a national goal of eliminating all pollutant discharges into United States waters by 1985; an interim goal of making the waters safe for fish, shellfish, wildlife, and people by July 1983; and a national policy that the discharge of toxic pollutants in toxic amounts be prohibited.

b. Section 102b, Planning for Reservoirs; Storage for Regulation of Streamflow (33 USC 1252(b)). In the survey or planning of a Federal reservoir, consideration shall be given to inclusion of storage for regulation of streamflow. Such storage and water releases shall not be provided as a substitute for adequate treatment or methods of controlling waste at the source. The need for and value of storage for regulation of streamflow other than for water quality shall be determined by the Federal agency planning the project. These purposes include recreation, esthetics, and fish and wildlife. EPA will determine the need for an value of storage for regulation of streamflow for water quality. The EPA Administrator's views shall be set forth in any report to Congress proposing authorization or construction of a reservoir including such storage.

c. Section 107, Mine Water Pollution Control Demonstration.

d. Section 108, Pollution Control in Great Lakes.

e. Section 208, Area-Wide Waste Treatment Management.

f. Section 307, Toxic and Pretreatment Effluent Standards.

g. Section 311, Oil and Hazardous Substances Liability.

h. Section 316, Thermal Discharges.

i. Section 313, Federal Facilities Pollution Control (33 USC 1323). Any official of a Federal agency having jurisdiction over any property or facility or engaged in any activity that may result in the discharge or runoff of pollutants shall be subject to, and shall comply with Federal, state, interstate, and local requirements, both substantive and procedural, respecting control and abatement of pollution. The President may exempt certain executive branches effluent sources under certain conditions.

j. Section 303(a), Water Quality Standards and Implementation Plans. Water quality standards program administered by EPA; states set surface water classifications and adopt criteria to meet these classifications.

k. Section 304(a), Information and Guidelines. EPA issues criteria for the protection of aquatic life and human health; states use these criteria to develop water quality standards. EPA criteria have been published in quality criteria for water 1976 and November 1980, Federal Register.

l. Section 401(a), Compliance with Applicable Requirements; Application; Procedures; License Suspension (33 USC 1341(a)). Effective 27 December 1977, Federal agencies are no longer exempt from the requirement to obtain certification from the state or interstate agency for any discharge into navigable waters (except as provided in Section 404(r)).

m. Section 402, National Pollution Discharge Elimination System. Issuance of permits for the discharge of any pollutant or combination of pollutants, compliance may prescribe conditions for data and information collection and reporting. States may accept authorization for implementation of NPDES permits.

n. Section 404(b), Specification of Disposal Site (33 USC 1344(b)). Sites for the discharge of dredged or fill material shall be specified through the application of EPA guidelines.

o. Section 404(e), General Permits on State, Regional, or Nationwide Basis (33 USC 1344(e)). The Secretary of the Army, acting through the Chief of Engineers, is authorized to issue general permits for specific categories of activities involving discharge of dredged or fill material if the activities are similar in nature, and will cause only minimal adverse effects singly or cumulatively. Construction project activities covered by general permits do not need state certificates or permits. Similarly exempted are certain activities, including normal agriculture or silviculture, and activities covered by an approved best management practices program in a state where the 404 permit program has been transferred by EPA.

p. Section 404(f)(1), Non-Prohibited Discharge of Dredged or Fill Material (33 USC 1344(f)(1)). The discharge of dredged or fill material from certain activities is not subject to regulation. The exempted activities include discharge for the purpose of maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, and breakwaters, and for the purpose of construction of temporary sedimentation basins on a construction site which does not include placement of fill material into the navigable waters.

q. Section 404(r), Federal Projects Specifically Authorized by Congress (33 USC 1344(r)). Discharge of dredged or fill material as part of the construction of a Federal project specifically authorized by Congress is exempt from provisions of the Act (except toxic substances) if information on the effects of the discharge, including consideration of 404(b)(1) guidelines, is included in an EIS submitted to Congress prior to the discharge in connection with authorization or appropriations, or a Section 404 evaluation was completed before 27 December 1977 (unless method or location of discharge is changed). Otherwise, a 404(b)(1) evaluation must be made, public notice issued, and state water quality certificate obtained (unless EPA has transferred the 404 permit program to the state, in which case a state permit is required).

SAFE DRINKING WATER ACT
42 USC 3001

a. Section 1447, Federal Agencies. Each Federal agency shall comply with any applicable underground injection control program, and shall keep such records and submit such reports as may be required under such program. The Administrator shall waive compliance with subsection (a) upon request of the Secretary of Defense and upon a determination by the President that the requested waiver is necessary in the interest of national security. The Administrator shall maintain a written record of the basis upon which such waiver was granted and make such record available for in camera examination when relevant in a judicial proceeding under this title. Upon the issuance of such a waiver, the Administrator shall publish in the Federal Register a notice that the waiver was granted for national security purposes, unless, upon the request of the Secretary of Defense, the Administrator determines to omit such publication because the publication itself would be contrary to the interests of national security, in which event the Administrator shall submit notice to the Armed Services Committee of the Senate and House of Representatives.

PART C
PROTECTION OF UNDERGROUND SOURCES OF DRINKING WATER

b. Section 1421, Regulations for State Programs. Regulations for state underground injection programs shall contain minimum requirements for effective programs to prevent underground injection which endangers drinking water sources; underground injection will be prohibited without obtaining a state permit; applicants (including Federal agencies) for permits must satisfy the state that the underground injection will not endanger drinking water supplies. Temporary permits may be obtained if best available technology is applied to reduce volume and toxicity of fluid or if underground injection is less harmful than other means of disposing of wastes. Underground injection endangers drinking water sources if such injection may result in the presence in underground water which supplies or can reasonably be expected to supply any public water

system of any contaminant, and if the presence of such contaminant may result in such system's not complying with any national primary drinking water regulation or may otherwise adversely affect the health of persons.

WATER QUALITY IMPLEMENTING DIRECTIVES

a. Executive Order (EO) 11735 assignment of functions under Section 311 of the Federal Water Pollution Control Act delineates areas of responsibility for control of oil and hazardous substance discharges. All vessels and facilities operating in the United States and territorial waters are controlled by this order. EPA has responsibility for non-transportation related sources. Coast Guard is responsible for vessels and transportation related facilities.

b. EO 12088, Federal Compliance with Pollution Control Standards, 13 October 1978. The order, among other things, emphasizes the requirement of Section 313; requires cooperation and consultation with EPA, state, interstate, and local agencies in the prevention, control, and abatement of environmental pollution; requires an annual plan for the control of environmental pollution, including any necessary improvement in the design, construction, management, operation, and maintenance of Federal facilities and activities; and requires that construction or operation of Federal facilities outside the United States complies with pollution control standards of the host country.

TABLE C-3
LIST OF 129 PRIORITY POLLUTANTS

001	Acenaphthene	070	Diethyl Phthalate
002	Acrolein	071	Dimethyl phthalate
003	Acrylonitrile	072	1,2-benzanthracene (benzo(a)anthracene)
004	Benzene	073	Benzo(a)pyrene (3,4-benzopyrene)
005	Benzidine	074	3,4-Benzofluoranthene (benzo(b)fluoranthene)
006	Carbon tetrachloride (tetrachloromethane)	075	11,12-benzofluoranthene (benzo(b)fluoranthene)
007	Chlorobenzene	076	Chrysene
008	1,2,4-trichlorobenzene	077	Acenaphthylene
009	Hexachlorobenzene	078	Anthracene
010	1,2-dichloroethane	079	1,12-benzoperylene (benzo(ghi)perylene)
011	1,1,1-trichloroethane	080	Fluorene
012	Hexachloroethane	081	Phenanthrene
013	1,1-dichloroethane	082	1,2,5,6-dibenanthracene (dibenzo(h)anthracene)
014	1,1,2-trichloroethane	083	Indeno(1,2,3-cd) pyrene (2,3-o- pheynylene pyrene)
015	1,1,2,2-tetrachloroethane	084	Pyrene
016	Chloroethane	085	Tetrachloroethylene
017	Bis (chloromethyl) ether	086	Toluene
018	Bis (2-chloromethyl) ether	087	Trichloroethylene
019	2-chloroethyl vinyl ether (mixed)	088	Vinyl chloride (chloroethylene)
020	2-chloronaphthalene	089	Aldrin
021	2,4,6-trichlorophenol	090	Dieldrin
022	Parachlorometa cresol	091	Chlordane (technical mixture and metabolites)
023	Chloroform (trichloromethane)	092	4,4-DDT
024	2-chlorophenol	093	4,4-DDE (p,p-DDX)
025	1,2-dichlorobenzene	094	4,4-DDD (p,p-TDE)
026	1,3-dichlorobenzene	095	Alpha-endosulfan
027	1,4-dichlorobenzene	096	Beta-endosulfan
028	3,3-dichlorobenzidine	097	Endosulfan sulfate
029	1,1-dichloroethylene	098	Endrin
030	1,2-trans-dichloroethylene	099	Endrin aldehyde
031	2,4-dichlorophenol	100	Heptachlor
032	1,2-dichloropropane	101	Heptachlor epoxide (BHC- hexachlorocyclohexane)
033	1,2-dichloropropylene (1,3- dichloropropene)	102	Alpha-BHC
034	2,4-dimethylphenol	103	Beta-BHC
035	2,4-dinitrotoluene	104	Gamma-BHC (lindane)
036	2,6-dinitrotoluene	105	Delta-BHC (PCB-polychlorinated biphenyls)
037	1,2-diphenylhydrazine	106	PCB-1242 (Arochlor 1242)
038	Ethylbenzene	107	PCB-1254 (Arochlor 1254)
039	Fluoranthene	108	PCB-1221 (Arochlor 1221)
040	4-chlorophenyl phenyl ether	109	PCB-1232 (Arochlor 1232)
041	4-bromophenyl phenyl ether	110	PCB-1248 (Arochlor 1248)
042	Bis(2-chloroisopropyl) ether	111	PCB-1260 (Arochlor 1260)
043	Bis(2-chloroethoxy) methane	112	PCB-1016 (Arochlor 1016)
044	Methylene chloride (dichloromethane)	113	Toxaphene
045	Methyl chloride (dichloromethane)	114	Antimony
046	Methyl bromide (bromomethane)	115	Arsenic
047	Bromoform (tribromomethane)	116	Asbestos
048	Dichlorobromomethane	117	Beryllium
049	Trichlorofluoromethane	118	Cadmium
050	Dichlorodifluoromethane	119	Chromium
051	Chlorodibromomethane	120	Copper
052	Hexachlorobutadiene	121	Cyanide, Total
053	Hexachloromyclopentadiene	122	Lead
054	Isophorone	123	Mercury
055	Naphthalene	124	Nickel
056	Nitrobenzene	125	Selenium
0057	2-nitrophenol	126	Silver
058	4-nitrophenol	127	Thallium
059	2,4-dinitrophenol	128	Silver
060	4,6-dinitro-o-cresol	129	Zinc
061	N-nitrosodimethylamine		2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)
062	N-nitrosodiphenylamine		
063	N-nitrosodi-n-propylamine		
064	Pentachlorophenol		
065	Phenol		
066	Bis(2-ethylhexyl)phthalate		
067	Butyl benzyl phthalate		
068	Di-N-Butyl Phthalate		
069	Di-n-octyl phthalate		

Reference: Federal Register, Volume 45, No. 200, October 14, 1980

TABLE C-4
LIST OF HAZARDOUS SUBSTANCES
(40 CFR PART 116.4, 1982)

Common name	CAS No.	Synonyms	Isomers	CAS No.
Acetaldehyde.....	75070	Ethanal, ethyl aldehyde, acetic aldehyde.....		
Acetic acid.....	64197	Glacial acetic acid, vinegar acid.....		
Acetic anhydride.....	108247	Acetic oxide, acetyl oxide.....		
Acetone cyanohydrin.....	75865	2-methylactonitrile, alpha-hydroxyisobutyronitrile.		
Acetyl bromide.....	506967			
Acetyl chloride.....	79367			
Acrolein.....	107028	2-propenal, acrylic aldehyde, acrylaldehyde, acraldehyde.		
Acrylonitrile.....	107131	Cyanoethylene, Fumigrain, Ventox, propenitrile, vinyl cyanide.		
Adipic acid.....	124049	Hexanedioic acid.....		
Aldrin.....	309002	Octalene, HHDN.....		
Allyl alcohol.....	107186	2-propen-1-ol, 1-propenol-3, vinyl carbinol.....		
Allyl chloride.....	107051	3-chloropropene, 3-chloropropylene, Chloralylene.		
Aluminum sulfate.....	10043013	Alum.....		
Ammonia.....	7664417			
Ammonium acetate.....	631618	Acetic acid ammonium, salt.....		
Ammonium benzoate.....	1863634			
Ammonium bicarbonate.....	1066337	Acid ammonium carbonate, ammonium hydrogen carbonate.		
Ammonium bichromate.....	7789095			
Ammonium bifluoride.....	1341497	Acid ammonium fluoride, ammonium hydrogen fluoride.		
Ammonium bisulfite.....	10192300			
Ammonium carbamate.....	1111780	Ammonium aminofornate.....		
Ammonium carbonate.....	506876			
Ammonium chloride.....	12125029	Ammonium muriate, sal ammoniac, salmiac, Amchlor.		
Ammonium chromate.....	7788989			
Ammonium citrate dibasic.....	3012655	Diammonium citrate, citric acid diammonium salt.		
Ammonium fluoroborate.....	15826830	Ammonium fluoroborate, ammonium borofluoride.		
Ammonium fluoride.....	12125018	Neutral ammonium fluoride.....		
Ammonium hydroxide.....	1336216			
Ammonium oxalate.....	6009707			
	5972736			
	14258492			
Ammonium silicofluoride.....	18918190	Ammonium fluosilicate.....		
Ammonium sulfanilate.....	7773060	Ammate, AMS, ammonium amidosulfate.....		
Ammonium sulfide.....	12135761			
Ammonium sulfite.....	10196040			
	10192300			
Ammonium tartrate.....	3164292	Tartaric acid ammonium salt.....		
	14307438			
Ammonium thiocyanate.....	1762954	Ammonium rhodanide, ammonium sulfocyanate, ammonium sulfocyanide.		
Ammonium thiosulfate.....	7783188	Ammonium hyposulfite.....		
Amyl acetate.....	828637	Amylacetate ester.....	iso.....	123922
		Pearl oil.....	sec.....	826380
		Banana oil.....	tert.....	825161
Aniline.....	62533	aniline oil, phenylamine, aminobenzene, aminophen, lysanol.		
Antimony pentachloride.....	7847189			
Antimony potassium tartrate.....	28300745	Tartar emetic, tartarated antimony, tartarized antimony, potassium antimonytartrate.		
Antimony tribromide.....	7789619			
Antimony trichloride.....	10025919	Butter of antimony.....		
Antimony trifluoride.....	7783564	Antimony fluoride.....		
Antimony trioxide.....	1309644	Diantimony trioxide, flowers of antimony.....		
Arsenic disulfide.....	1303328	Red arsenic sulfide.....		
Arsenic pentoxide.....	1303282	Arsenic acid anhydride, arsenic oxide.....		
Arsenic trichloride.....	7784341	Arsenic chloride, arsenious chloride, arsenous chloride, butter of arsenic.		
Arsenic trioxide.....	1327533	Arsenious acid, arsenious oxide, white arsenic.		
Arsenic trisulfide.....	1303339	Arsenious sulfide, yellow arsenic sulfide.....		
Barium cyanide.....	842621			

TABLE C-4 (CONTINUED)

Common name	CAS No.	Synonyms	Isomers	CAS No.
Benzene	71432	Cyclohexatriene, benzol		
Benzoic acid	65850	Benzenecarboxylic acid, phenylformic acid, dracetic acid		
Benzonitrile	100470	Phenyl cyanide, cyanobenzene		
Benzoyl chloride	98884	Benzenecarbonyl chloride		
Benzyl chloride	100447			
Beryllium chloride	7787475			
Beryllium fluoride	7787497			
Beryllium nitrate	7787555			
	13597994			
Butyl acetate	123864	acetic acid butyl ester	iso- sec- tert- iso- sec- sec- tert-	110180 105464 540685 78819 513486 13952846 75649
Butylamine	109739	1-aminobutane		
n-butyl phthalate	84742	1,2-benzenedicarboxylic acid, dibutyl ester, dibutyl phthalate		
Butyric acid	107926	Butanoic acid, ethylacetic acid	iso-	78312
Cadmium acetate	543908			
Cadmium bromide	7789426			
Cadmium chloride	10108642			
Calcium arsenate	7778441	Tricalcium orthoarsenate		
Calcium arsenite	52740186			
Calcium carbide	75207	Carbide, acetylenogen		
Calcium chromate	13765190	Calcium chrome yellow, goblin, yellow ultramarine		
Calcium cyanide	592018			
Calcium dodecylbenzenesulfonate	26264062			
Calcium hypochlorite	7778543			
Captan	133062	Orthocide-406, SR-406, Vandic-69		
Carbaryl	63252	Sevin		
Carbofuran	1563662	Furadan		
Carbon disulfide	75150	Carbon bisulfide, dithiocarbonic anhydride		
Carbon tetrachloride	56235	Tetrachloromethane Perchloromethane		
Chlordane	57749	Toxichlor, chlordan		
Chlorine	75003			
Chlorobenzene	108907	Monochlorobenzene, benzene chloride		
Chloroform	67863	trichloromethane		
Chlorpyrifos	2921882	Dursban		
Chlorosulfonic acid	7790945	Sulfuric chlorohydrin		
Chromic acetate	1066304			
Chromic acid	11115745	chromic anhydride, chromium trioxide		
Chromic sulfate	10101538			
Chromous chloride	10049055			
Cobaltous bromide	7789437	Cobalt bromide		
Cobaltous formate	544183	Cobalt formate		
Cobaltous sulfamate	14017415	Cobalt sulfamate		
Coumaphos	56724	Co-Ral		
Cresol	1319773	Cresylic acid Hydroxytoluene	m- o- p-	106394 85467 106445
Crotonaldehyde	4170303	2-butenal propylene aldehyde		
Cupric acetate	142712	Copper acetate, crystalized verdigris		
Cupric arsenite	12002038	Copper acetoarsenite, copper acetate arsenite, Paris green		
Cupric chloride	7447394	Copper chloride		
Cupric nitrate	3251238	Copper nitrate		
Cupric oxalate	5893663	Copper oxalate		
Cupric sulfate	7758987	Copper sulfate		
Cupric sulfate, ammoniated	10380297	Ammoniated copper sulfate		
Cupric tartrate	815827	Copper tartrate		
Cyanogen chloride	806774			
Cyclohexane	110827	Hexahydrobenzene, hexamethylene, hexanaphthene		
2,4-D acid	84757	2,4-dichlorophenoxyacetic acid		
2,4-D ester	84111 84781 84804	2,4-dichlorophenoxyacetic acid ester		

TABLE C-4 (CONTINUED)

Common name	CAS No.	Synonyms	Isomers	CAS No.
Nitric acid	7697372	Aqua fortis		
Nitrobenzene	98953	Nitrobenzol, oil of mirbane		
Nitrogen dioxide	10102440	Nitrogen tetroxide		
Nitrophenol (mixed)	2515455K	Mononitrophenol	m- o- p- Ortho Meta Para	554847 88755 100027 88722 99081 99990
Nitrotoluene	1391998			
Paraformaldehyde	30525894	Paraform, Formagene, Triformol, polymerized formaldehyde, polyoxymethylene		
Parathion	50382	DNTP, Niran		
Pentachlorophenol	87865	PCP, Penta		
Phenol	108952	Carbolic acid, phenyl hydroxide, hydroxybenzene, oxybenzene		
Phosgene	75445	Diphosgene, carbonyl chloride, chloroformyl chloride		
Phosphoric acid	7664382	Orthophosphoric acid		
Phosphorus	7723140	Black phosphorus, red phosphorus, white phosphorus, yellow phosphorus		
Phosphorus oxychloride	10025873	Phosphoryl chloride, phosphorus chloride		
Phosphorus pentasulfide	1314803	Phosphoric sulfide, thiophosphoric anhydride, phosphorus persulfide		
Phosphorus trichloride	7719122	Phosphorous chloride		
Polychlorinated biphenyls	1338363	PCB, Aroclor, polychlorinated biphenyls		
Potassium arsenate	7784410			
Potassium arsenite	10124502	Potassium metaarsenite		
Potassium bichromate	7778509	Potassium dichromate		
Potassium chromate	7789106			
Potassium cyanide	151508			
Potassium hydroxide	1310582	Potassium hydrate, caustic potash, pot. lye		
Potassium permanganate	7722647	Chameleon mineral		
Propene	2312358	Ömte		
Propionic acid	79094	Propanoic acid, methacetic acid, ethylformic acid		
Propionic anhydride	123626	Propanoic anhydride, methacetic anhydride		
Propylene oxide	75589	Propene oxide		
Pyrethrins	121299 121211	Pyrethrin I Pyrethrin II		
Quinoline	91225	1-benzazine, benzo(b)pyridine, luocoline, chinoleine, leucol		
Resorcinol	108463	Resorcin, 1,3-benzenediol, meta-dihydroxybenzene		
Selenium dioxide	7446064	Selenium dioxide		
Silver nitrate	7761888	Nitric acid silver (1+) salt lunar caustic		
Sodium	7440235	Sodium		
Sodium arsenate	7631892	Disodium arsenate		
Sodium arsenite	7784465	Sodium metaarsenite		
Sodium bichromate	10588019	Sodium dichromate		
Sodium bifluoride	1333831			
Sodium bisulfite	7831905	Sodium acid sulfite, sodium hydrogen sulfite		
Sodium chromate	7778113			
Sodium cyanide	143339			
Sodium dodecylbenzene-sulfonate	25155500			
Sodium fluoride	7681494	Villiamite		
Sodium hydrosulfide	18721805	Sodium hydrogen sulfide		
Sodium hydroxide	1310732	Caustic soda, soda lye, sodium hydroxide		
Sodium hypochlorite	7681529	Bleach		
	10022705			
Sodium metaytlate	124414	Sodium methoxide		
Sodium nitrite	7832000			
Sodium phosphate, dibasic	7558794			
	10039334			
	10140955			
Sodium phosphate, trisasic	7785844			
	7801549			
	10101900			
	10981894			

TABLE C-4 (CONTINUED)

Common name	CAS No.	Synonyms	Isomers	CAS No.
	7758294			
	10124588			
Sodium selenite.....	10102198			
	7782823			
Strontium chromate.....	7789062			
Strychnine.....	57249			
Styrene.....	100425	Vinylbenzene, phenylacetylene, styrol, styrolene, cinnamene, cinnamol.		
Sulfuric acid.....	7664939	Oil of vitriol, oleum.....		
Sulfur monochloride.....	12771083	Sulfur chloride.....		
2,4,5-T acid.....	93785	2,4,5-trichlorophenoxyacetic acid.....		
2,4,5-T amines.....	9369966	Acetic acid (2,4,5-trichlorophenoxy)-morphine compound with N,N-dimethylmethanamine (1:1).		
	9369977	Acetic acid (2,4,5-trichlorophenoxy)-morphine compound with N-methylmethanamine (1:1).		
	1318728	Acetic acid (2,4,5-trichlorophenoxy)-morphine compound with 1-aminopropanol (1:1).		
	3813147	Acetic acid (2,4,5-trichlorophenoxy)-morphine compound with 2,2'-nitroethane [ethanol] (1:1).		
2,4,5-T esters.....	2545597	2,4,5-trichlorophenoxyacetic esters.....		
	93798			
	61792072			
	1928478			
	25188154			
2,4,5-T salts.....	13560991	Acetic acid (2,4,5-trichlorophenoxy)-sodium salt.		
TDE.....	72543	DDD.....		
2,4,5-TP acid.....	93721	Propanoic acid 2-(2,4,5-trichlorophenoxy).....		
2,4,5-TP esters.....	32534955	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-, lauroyl ester.		
Tetraethyl lead.....	78002	Lead tetraethyl, TEL.....		
Tetraethyl pyrophosphate.....	107493	TEPP.....		
Thallium sulfate.....	10031591			
	7448196			
Toluene.....	106883	Toluol, methylbenzene, phenylmethane, Methacide.		
Toxaphene.....	9001352	Carphachlor.....		
Trichlorfon.....	52686	Dipterex.....		
		Dylox.....		
Trichlorethylene.....	79018	Ethylene trichloride.....		
Trichlorophenol.....	25187822	Collunol, Dovicide 2 or 2s, Omal, Phenachlor.	(2,3,4-)..... 15950680 (2,3,5-)..... 933788 (2,3,6-)..... 933755 (2,4,5-)..... 95954 (2,4,6-)..... 88082 (3,4,5-)..... 909196	
Triethanolamine dodecylbenzenesulfonate.....	27323417			
Triethylamine.....	121448			
Trimethylamine.....	75503	TMA.....		
Uranyl acetate.....	541093			
Uranyl nitrate.....	10102064			
	96478789			
Vanadium pentoxide.....	1314821	Vanadic anhydride, vanadic acid anhydride.....		
Vanadyl sulfate.....	27774136	Vanadic sulfate, vanadium sulfate.....		
Vinyl acetate.....	108054	Acetic acid ethylene ether.....		
Vinylidene chloride.....	75354	1,1-dichloroethylene.....		
		1,1-dichloroethane.....		
Xylene (mixed).....	1330207	Dimethylbenzene.....	m..... 106383 o..... 95478 p..... 106423	
		Xylol.....		
Xylenol.....	1300718	Dimethylphenol, hydroxydimethylbenzene.....		
Zinc acetate.....	587348			
Zinc ammonium chloride.....	14839975			
	14839988			
	52828258			
Zinc borate.....	1332078			
Zinc bromide.....	7899498			
Zinc carbonate.....	9486359			
Zinc chloride.....	7848657	Butter of zinc.....		
Zinc cyanide.....	857211			
Zinc fluoride.....	7783495			
Zinc formate.....	857415			
Zinc hydrosulfite.....	7779864			
Zinc nitrate.....	7779888			
Zinc phenolsulfonate.....	127822	Zinc sulfocarbolate.....		
Zinc phosphide.....	1314847			
Zinc silicofluoride.....	18871719	Zinc fluosilicate.....		
Zinc sulfate.....	7733020	White vitriol, zinc vitriol, white copperas.....		
Zirconium nitrate.....	13748899			
Zirconium potassium fluoride.....	18923958			
Zirconium sulfate.....	14844812	Disulfatozirconic acid.....		
Zirconium tetrachloride.....	10026118			

