DRAFT

## INTRODUCTION

Natural Resources Management Programs play a vital role in managing the lands and resources under the stewardship of the Department of the Navy. These lands used for operational and training requirements include: open oceans, coastal areas, antenna fields, training ranges, wetlands, forests, agricultural lands, deserts, and mountain areas. These large tracks of land, many of which were once considered wastelands, are now valuable ecosystems providing habitats for many threatened and endangered species. In today's philosophy of ecosystems management, the Navy natural resources manager must expand from the traditional role of natural resource management and participate in all types of environmental programs to fully protect, restore and enhance the environment.

These programs include the Navy's environmental protection programs many of which have direct effects on the natural resources found on installations. These programs include Installation Restoration, Spill Response, Hazardous Waste, Underground Storage Tank, and Spill Containment Control and Countermeasures.

The Installation Restoration Program (IRP) is the topic of this guidance document because it is the largest environmental protection program conducted by the Navy and has the greatest potential to impact the natural resources at any installation. Navy natural resource managers are tasked to protect and enhance resources including air, water, land, wildlife, and habitats. The IRP can and does impact all aspects of natural resources management and therefore expands the responsibility of the natural resources manager.

The Installation Restoration Program is the Department of Defense's counterpart to the Superfund program. The Superfund program is mandated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) (Part 101, section 16). CERCLA defines natural resources as "land, fish, wildlife, biota, air, water, groundwater, drinking water supplies, and other such resources." This definition above, and the responsibilities of the Navy natural resources manager outlined in OPNAVINST 5090.1A (chapter 19) are almost identical and therefore require the attention of the natural resources manager.

The following guidance is organized in a manner which will allow the reader to follow natural resources issues through the IRP process from the initial site assessment phase to the remediation of a site. This is not an attempt to familiarize the natural resources manager with the entire IRP, but only with areas of the program having natural resources management concerns. Within each area of the program particular issues concerning natural resources will be highlighted and appropriate actions will be described.

**Purpose**. The purpose of this guidance document is to provide the Navy natural resource manager with the necessary information to adequately integrate the Natural Resources Management Program and the Installation Restoration Program (IRP) at the activity level. This guidance will direct the natural resources manager to specific areas within the IRP which have direct affects on natural resources and provide guidance in addressing these issues. This document will describe the importance of the natural resources manager's participation in the IRP by addressing potential conflicts and benefits to natural resources management.

**Federal Trustee:**

All natural resources managers employed by the Department of Defense are Federal trustees of the lands they manage. OPNAVINST 5090.1A (Chapter 19), Section 6.4 describes the responsibilities of the Commanding Officers of shore facilities to act as the trustee for natural resources under their juristiction and to develop and maintain an effective conservation program. This responsibility ultimately rests with the installation or Engineering Field Division (EFD) natural resources manager. As a trustee, the natural resources manager is tasked to "protect, conserve, and manage the watersheds, wetlands, natural landscapes, soils, forests, fish and wildlife, and other natural resources, as vital elements of an optimum natural resources program" (OPNAVINST 5090.1A, Section 5.4(b).

According to CERCLA as amended by SARA Part 101, Section 16, a trusteeship applies to all "natural resources including fish, wildlife, biota, air, water, ground water, drinking water, and other such resources located on, over, or under" these lands. Federal trustees are designated because of statutory responsibilities with regard to protection or management of natural resources or management of Federally owned land, or both. This designation outlined in CERCLA section 107(f), subpart G of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) is passed down through the Department of Defense to the natural resource manager in the field. This trustee designation also includes natural resources managers from other Federal natural resource management agencies.

The Navy natural resources manager as a Federal trustee has a broad responsibility to protect and restore the resources under their stewardship. This responsibility goes beyond the traditional boundaries of the natural resources management to include all aspects of environmental protection. CERCLA Section 104(b)(2) calls for coordination of trustees on "assessments, investigations, and planning" throughout the entire IRP process.

As a Federal trustee, the Navy natural resource manager is mandated to participate in the IRP program. The trustee responsibilities include:

* Technical Review Committee Member
* Preliminary Natural Resource Survey (PNRS)
* Natural Resource Damage Assessments (NRDA)

**Technical Review Committee:**

The most efficient way for the Navy natural resource manager to monitor the progress and provide on-site technical expertise of an installation's IRP is to become a member of the Technical Review Committee (TRC) as the installation's natural resources trustee. The TRC is a group made up of representatives from the cognizant

Engineering Field Division, EPA, state agencies, local authorities, appropriate installation personnel, and a public member with technical qualifications.

Members of a TRC may include individuals from various Federal and state agencies depending on the types of contaminants present and the trust resources involved. Natural resources trustees from state agencies will vary with the designated natural resources offices within each state. Federal natural resources trustees may be represented by individuals from agencies including:

* U. S. Fish and Wildlife Service
* U. S. Forest Service
* Soil Conservation Service
* National Oceanographic and Atnospheric Administration
* Bureau of Land Management
* National Park Service
* Bureau of Indian Affairs

The TRC is neither an advisory group or a decision-making body. This committee will provide the natural resources manager with current information on the installation's program including: fact sheets for program information, management plans for each site or group of sites, status on interim or removal actions, proposed plans listing alternatives for cleanup activities, and record of decisions for final cleanup actions. All these phases of the program should receive limited input from the natural resources manager.

On most installations, the most knowledgeable professional regarding natural resources, environmental issues and the physical layout of the land is the natural resources manager. This corporate knowledge has proven invaluable throughout the IRP process in many areas including: clean background sampling areas, endangered species locations, land use conditions, and many more. As a trustee, it is the responsibility of the natural resources manager to provide all pertinent program information to protect and ultimately restore the natural environment. Technical assistance crosses many disciplines and may include areas such as wildlife biology, fisheries, soil science, forestry, toxicology, geology hydrology, and wetland science.

In most Regional Environmental Protection Agency offices a group of one to several trustees serve on Biological Technical Assistance Groups (BTAG's). This group will provide reviews and advice to EPA project managers on ecological issues during the assessment and remediation phases of IRP sites. It is imperative that the BTAG's receive accurate site information provided by the natural resources manager through the documents prepared by Navy IRP contractors.

<u>Preliminary Natural Resource Survey (PNRS)</u>

The Environmental Protection Agency in accordance with the NCP Section 300.615 (c)(1), can request either the Department of the

Interior or the National Oceanographic Atmospheric Administration (NOAA) to conduct a PNRS at any IRP site. A PNRS consists of a site survey and a brief report identifying the natural resources, habitat types, endangered or threatened species, and any potential adverse effects or injury to trust resources. The PNRS is an effective screening tool to determine if a trust resource is involved at a site and can be conducted at anytime during the IRP process.

Information obtained from a PNRS conducted on an installation may be use to support or qualify any portion of the IRP process. This information may be used to select remedial alternatives which effectively protect natural resources, aid in determining sampling design, and assist in designing and conducting the ecological risk assessment to be conducted during the Remedial Investigation/ Feasibility Study (RI/FS) process.

In many instances information regarding the natural resources contained in a PNRS at a specific site is obtained from regional data bases with usually a one time visit to the actual site location. During this phase of the program, the natural resource manager can provide valuable assistance in providing abundance and locational data on the trust resources occurring on an individual installation.

**Natural Resources Damage Assessment:**

A vital role of the natural resources manager as a trustee is the participation in a Natural Resources Damage Assessment at an installation, if one is determined necessary. If a remedial action at an installation is judged insufficient to protect and restore natural resources injured by releases from an IRP site, or if the use of a natural resource is lost or curtailed, other natural resource trustees may seek to collect damages from responsible parties. Natural resources damages are monetary payments "for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such a release" (CERCLA Section 107(a)(4)(D)).

The following is an outline of the Natural Resource Damage Assessment (NRDA) process:

* Determine whether injury to, or loss of, trust resource has occurred;
* Ascertains the magnitude of the injury or loss;
* Calculates the dollar value of the injury, loss, and/or cost of restoration; and
* Develops a restoration plan.

In the formulation of a Natural Resource Damage Assessment, information obtained from the Preliminary Natural Resource Survey (PNRS) and the Ecological Risk Assessment (ERA) conducted as part of the RI/FS phase of the program may be used to determine the trust resource and the possible injuries to that resource. It is

therefore essential that the natural resources manager participate in the process and provide the most accurate natural resources data available throughout this program.

## Preliminary Assessment / Site Investigation

Once an uncontrolled or abandoned hazardous waste site has been discovered and the proper notification procedures followed, the Installation Restoration Program (IRP) will characterize and remediate the site. The first part of the remedial process includes the Preliminary Assessment (PA) which collects information from files and interviews for use in assessing the existence of hazardous wastes at a site and determine the potential for hazardous waste migration.

If the PA does not determine the existence of hazardous waste, the site may be removed from the program. If a determination is made that hazardous waste is present or that the potential exists, than a Site Investigation (SI) is conducted. The SI is an on-site investigation which further characterizes a release or threat of a release of a contaminant at a particular site. Again, at the conclusion of an SI, a determination is made weather to continue with the investigation or to remove the site if no contamination or threat is confirmed.

In order to characterize a site under the SI, a sampling and analysis plan is developed to sample the potentially contaminated media. This plan may include the drilling of ground water monitoring wells and the sampling of surface waters and soils.

Throughout this PA/SI phase the natural resources manager should be aware of the information being gathered regarding the possible contamination of the environment. The natural resources manager should also be aware of the locations and types of environmental sampling being proposed and assess their impacts to the surrounding environment. This review process by the natural resources manager is outlined in detail in the section below on sampling and analysis plans.

This PA/SI process may be conducted at anytime during the program when a new site of possible contamination is discovered.

If the determination is made to proceed to a remedial investigation, the information gathered during the SI will assist in the development of the Remedial Investigation (RI) management plans.

## Remedial Investigation/Feasibility Study (RI/FS)

The Remedial Investigation/Feasibility Study (RI/FS) according to CERCLA is to determine the nature and extent of the threat presented by a release and, where appropriate, to evaluate proposed remedies. The purpose of the Remedial Investigation (RI) is to collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives. This data collection effort is not only limited to the contaminated site, but includes background areas for data comparison.

The primary objective of the Feasibility Study (FS) is to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action (RA) options can be presented to a decision-maker and an appropriate remedy selected. The RI and the FS are performed concurrently with information from the RI constantly being integrated into the FS to support the development, evaluation, and selection of appropriate response alternatives.

Remedial Investigation:

The RI provides information to assess the risks to human health and the environment. There are several sections to the RI in which the natural resource manager should play a vital role in providing information regarding the contaminated site and surrounding areas. The main sections of the RI include; program scoping, site characterization, and data analysis.

Scoping Process:

During the scoping process information regarding the contaminated site is collected and evaluated for the development of the investigative phase of the RI and for the possible environmental impacts of the remedial alternatives. Based on available data, the media that may be contaminated and the resources and populations that may be exposed to contamination are delineated. Through this delineation process, species and populations of concern to the ecological risk assessment should be identified and evaluated during the RI investigation phase. Information on a site may change as data regarding the site is obtained. Information on contaminant pathways, common endpoints, treatment and disposal facilities, and any environmental resources that may be used for or directly impacted by potential remedial actions are identified. Information obtained through the Preliminary Natural Resource Survey (PNRS) is integrated into this phase of the program to ensure the protection of the natural resources. This information is essential in the planning of locations to be sampled during the site characterization phase at a contaminated site.

Site Characterization:

The information obtained during the site characterization phase of the RI is important in determining the types of contaminants present, extent of the contamination, and the selection of the remediation technology to be implemented. This process includes the drilling of ground water monitoring wells, soil borings, surface water sampling, surface soil sampling, and area background sampling. The site characterization portion of the RI may be conducted in one or more phases to document the presence and extent of contamination at a site or group of sites. To reduce the repeditivness in the investigative process and accelerate the program, most remedial investigations are conducted for a group of contaminated areas called an operable unit. Contaminated sites with an operable unit have similar characteristics including; like

contaminants, common contaminant pathways (contaminants moving together from different sites), and common endpoints (location where contaminants from different sites cease to move through the environment).

An important part of the site characterization phase is the identification of "applicable or relevant and appropriate requirements" (ARARs). Under CERCLA Section 121(d)(2)(A), remedial actions must meet Federal and State standards, requirements, criteria, or limitations that qualify as ARARs. Potential ARARs are identified for each site or group of sites by the On Scene Coordinator or the Remedial Project Manager. Upon reviewing the preliminary site characterization information, the natural resources manager should review all proposed ARARs for the protection of resources from the site characterization phase through the remedial phase. Listed below are several ARARs that directly invlove the natural resource manager.

* Endangered Species Act of 1973
* Fish and Wildlife Coordination Act of 1980
* Marine Mammal Protection Act of 1972
* Migratory Bird Treaty Act of 1972

Data Analysis:

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During the site investigation phase of an RI, a series of management plans are developed to coordinate the investigative portion of the RI. A single site or an operable unit will have a set of management plans which include:

* Work Plan

* Sampling and Analysis Plan

* Quality Assurance/Quality Control Plan

* Community Relations Plan

* Health and Safety Plan

The Navy natural resources manager does not need to review or comment on all of these documents in order to adequately address natural resources issues. In order properly carry out the policies of the Navy's natural resources management program, the natural resources manager should concentrate on portions of the Work Plan and the Sampling and Analysis Plan.

These plans are prepared in four phases: first, the internal draft - prepared by the contractor for only Navy review; second, the draft document - which the regulatory agencies review for the first

time and the Navy checks their comments from the internal draft; third, the draft final - which the agencies and Navy review their comments, and for the first time members of the Technical Review Committee (TRC) review; and fourth, without major changes the draft final becomes the final document. It is during the review period of the internal draft and the draft document that the natural resources manager provides comments and checks to see that the comments are addressed concerning the natural resources at the particular site.

The Work Plan is the heart of the site characterization phase of the RI. Within this plan is a detailed background history of the site with information obtained from interviews with the original workers on the site regarding possible contaminants present and past on-site disposal practices. Environmental information from data bases, on-site tours, and interviews with environmental and natural resource managers are used to develop the human health and environmental risk assessments contained within the work plan. Much of the natural resource information should be provided by the natural resource manager during the Preliminary Natural Resource Survey (PNRS) conducted prior to the development of these plans.

The first site maps are presented in this plan on which major decisions will be made throughout the program. It is very important that the natural resources manager review these site maps for detail and accuracy. These maps will be the same ones that the subcontractor and their subcontractor will be using in the field. If there is some important feature ie. study area, critical habitat, wetland, endangered species nest or nesting colony, burial ground, historic site, or whatever needs special recognition or protection, it needs to be indicated on these maps. Also, since the natural resources manager is the most familiar with the lay of the land for a particular installation, the work plan should be reviewed for physical features including; roadways, utilities, boundary fences, and structures. With the natural resources managers wide diversity of projects covering most aspects of an activity, sometimes information on possible conflicts outside the discipline of natural resources management may also be provided.

Baseline Risk Assessment:

The most important section of the work plan for the natural resources manager to become involved with is the baseline risk assessment. A baseline risk assessment is an evaluation of the potential threat to human health and the environment in the absence of any remedial action. CERCLA requires EPA to remediate uncontrolled hazardous waste sites in ways that will protect both human health and the environment and the National Oil and Hazardous Materials Contingency Plan (NCP) in 40 CFR Part 300.430(e)(2)(i)(G), requires that the baseline risk assessment specifically address sensitive habitats and critical habitats of species protected under the Endangered Species Act.

Human Health Assessment:

Though the primary responsibility of the natural resources manager lies within the ecological risk assessment, a secondary role must be developed to address the human health risk assessment. This role is two-fold and includes identifying sites within the program which may require the closure of certain areas from human recreational activity. The second area of concern is for the health and safety of the natural resources manager. Areas found to be contaminated may become restricted to only authorized personnel with appropriate health and safety training. This restricted access may require the natural resources manager to obtain health and safety training before entering an area.

Ecological Assessment:

The most important aspect of the IRP for the natural resources manager is the participation in the development of ecological risk assessments. An ecological risk assessment as defined by EPA's Environmental Protection Manual (EPA/540-1-89/001), 1989, is "the qualitative and/or quantitative appraisal of the actual or potential effects of a hazardous waste site on plants and animals other than people or domesticated species."

The ecological assessment is comprised of four interrelated activities: problem formulation, exposure assessment, ecological effects assessment, and risk characterization.

Problem Formulation. This activity defines the objectives and the scope of the ecological assessment. This is a review of existing data to develop a conceptual model that identifies the environmental values to be protected, the data needed, and the analysis to be used.

During this process ecological considerations are investigated relating to the release, migration, and fate of contaminants at a site. These considerations include:

* Ground water discharge to surface water and wetlands,
* Transport of contaminated sediment,
* Runoff from and erosion of contaminated soils, and
* Bioaccumulation and bioconcentration.

This type of information will lead investigators to the identification of exposure pathways and potential receptors. The exposure pathway is the link between the contaminant source and the receptor. In evaluating an exposure pathway all media are considered including: ground water, surface water, sediments, soil, air, and biota. It is very important to consider all potential receptors when identifying exposure pathways.

Receptors are individual organisms, populations, or communities that can be exposed to a contaminant. Receptor identification is accomplished by identifying potentially exposed habitats on or near the contaminated site. As these habitats are identified, lists of species known or likely to exist in each habitat type are

developed. Identification of receptors should include:

* Species considered essential to, or indicative of, the healthy functioning of the habitat (e.g., stream invertebrates);
* Rare, endangered or threatened species on or near the site; and
* Species protected under Federal or State Law (e.g., Migratory Bird treaty Act, Marine mammal Act).

Exposure Assessment. The quantification of the magnitude and type of actual and/or potential exposures of ecological receptors to site contaminants.

The key elements of an exposure assessment are:

* Quantification of contaminant release, migration, and fate;
* Characterization of receptors; and
* Measurements or estimation of exposure point concentrations.

During the exposure assessment phase, investigators develop estimates of current and future contaminants levels in affected media through direct sampling methods. This information provides information on the current location, movement, and concentration of contaminants.

Contaminated sites requiring an ecological assessment usually contain a large number of species or a few species of special concern. Evaluating risks for every species at a particular site is impossible. To evaluate the potential risks at a site, the investigator must focus on a limited number of species (receptors) at a given site. These species are selected based on the endpoints of concern and specific characteristics of the site under study.

Upon selecting the appropriate receptors for a particular site, an estimate of the concentration of the contaminant is performed. The estimate is calculated based on assumptions including: properties of the contaminant, nature of the receptor, organism assimilation, and physical/chemical properties of the media.

Ecological Effects Assessment. This component concerns quantitatively linking concentrations of contaminants to adverse effects in receptors. In order to study the direct effects contaminants may have on a receptor(s), field studies are conducted to establish a link between contamination and ecological effects. Evidence to establish this link may include:

* Reduction in population sizes of species,
* Absence of species normally occuring in the habitat,
* Presence of species associated primarily with stressed habitats,
* Changes in community diversity or tropic structure, and
* Incidence of lesions, tumors, or other pathologies.

Information obtained from a contaminated site is compared to a reference area not affected by contamination. These reference areas could be upstream from a contaminated site or in a nearby stream with similar characteristics.

Investigators conduct toxicity tests to evaluate the effects of contaminants on organisms living in the contaminated media. These tests evaluate the effects of the contaminated media on the survival, growth, reproduction, and metabolism of certain test organisms.

Risk Characterization. Risk characterization in ecological assessment is a process of applying professional judgement to determine whether adverse effects are occurring or will occur as a result of contamination associated with a site. It is a process of comparing the results of the exposure assessment with the results of the ecological effects assessment. This type of information is vital in the decision making process and must be carefully interpreted and presented to the decision makers.

Sampling and Analysis Plan:

The second most important document of the IRP management plans for the natural resources manager is the Field Sampling Plan (FSP). This document is located within the Sampling and Analysis Plan (SAP) and describes the number, type, and location of samples to be performed. This plan also describes the types of analysis, and decontamination procedures for the sites under investigation.

The planning stages of the field sampling program is the first real hands on application for the natural resource manager. Information concerning natural and cultural resources need to be directly integrated into the proposed sampling program in order to avoid conflicts between the sampling process and resources occurring on or near the study area.

Sampling points for each area under investigation are based on qualitative information obtained early in the investigation of a potentially contaminated area. These points are calculated and plotted on maps based on surface features and estimates of subsurface geology and hydrogeology. In many instances, these sampling points are designated with the natural resources of the area receiving little or no consideration. Input from the natural resources manager is crucial at this point because there will be impacts to the environment other than the sampling point itself.

Not shown on the field sampling maps are the routes the drilling equipment will traverse to reach a samlping point. This is usually a decision made in the field by the drilling subcontractor and typically results in the shortest and least expensive route possible. The access roads and contractor equipment storage areas utilize a substantial area and should receive careful review prior to siting approval.

Locations of sampling points may occur at some distance from the area under investigation in order to find the leading edge of a possible contaminant plume or an up gradient "clean" backgroound site. Background sampling locations may occur anywhere on the activity which have similar characteristics to the area under investigation. These outlying sampling points may impact programs including: agricultural outleasing, forestry, fish and wildlife, and recreation.

Once the phase one sampling phase in complete and the analysis of the samples verified, the phase two proposed sampling locations will be modified to further characterize to contaminated area. These revised sampling locations for the next phase of sampling must again be reviewed for possible impacts to natural resources.

During the field sampling phase of the program the natural resources manager may benefit by suggesting areas located on the activity suitable for background sampling. These could be areas such as ponds, streams, or fields that would provide the natural resources manager with important water or soils data for resource management.

Feasibility Study:

The primary objective of the feasibility study (FS) is to ensure that appropriate remedial alternatives are developed and evaluated such that revellent information concerning the remedial action options can be presented to a decision maker and an appropriate remedy selected. Depending on the remedial alternative selected, this portion of the program will determine the clean up strategy for each contaminated area and the subsequent impacts to existing environmental conditions.

The development and screening of remedial alternatives is performed based on a set of criteria that includes the effectiveness in reducing the threat, implementability, and cost. The alternatives being developed for evaluation must also include a "no action" alternative. This is important to the natural resources manager, because a "no action" alternative may result from a location-specific ARARs (e.g., Endangered Species Act).

Once the preferred alternative is selected, the natural resources manager has the opportunity to comment on possible options to the preferred alternative to benefit the natural resources found on the activity. Some examples of how input from the natural resources manager on the preferred alternative may benefit the environment are listed below.

* An area to be excavated with the contaminated soils removed for treatment could be used as a water impoundment, if a water source and current land restrictions allow. If the excavated area could not be used as a water impoundment, the contractors could be directed to an area where soils are available, thus creating a possible impoundment area at a desired location.

* The decision to construct an impermeable cap over an existing landfill may provide the natural resources manager with the ability to create a variety of habitat types. Suggestions as to the type of vegetation to be planted on the cap could provide food and cover for local wildlife.

* The pump and treat remediation technology for ground water contamination can produce large amounts of clean water. This water is sometimes reinjected into the aquifer from where it was pumped or it may be held in large impoundments to enhance percolation back through the soil. This water, or portions of it, could be used for certain natural resources projects.

There is a second reason why the natural resources manager should become involved in the development of the preferred alternative. This is because the alternative or portions of the alternative may not be feasible due to conflicts with other programs. For example, the establishment of a water impoundment near a runway may increase the incidence of bird aircraft strike hazards (BASH) or the alternative may impact an endangered species on or adjacent to the remediation area.

Once the Feasibility Study is completed, the preferred alternative is presented to the public by the installation in a proposed plan. A public comment period is offered followed by a public meeting. The selection of the preferred alternative is documented in a decision document called the Record of Decision (ROD).

Remedial Design / Remedial Action (RD/RA)

The RD/RA is the next major phase of the IRP. During this phase the preferred alternative is designed and the actual cleanup process begins. Although not as significant as in the RI/FS, the natural resources manager has an important role in the RD/RA to ensure that the natural resource issues agreed to in the RI/FS are implemented.
Remedial Design.

The purpose of the remedial design is to convert the conceptual design for the preferred alternative into a final design. The final design package will typically include final design plans and specifications, a construction cost estimate, and other construction analysis. This design package should include requirements that the remedial contractor develop for mitigating environmental impacts including natural resources and ecological integrity considerations while construction occurs. The reason for including natural resources and ecological considerations within the design package is because the RD/RA contractor may not be the same contractor that developed the management plans during the RI/FS phase of this program. If this situation occurs, it is essential that the same natural resource considerations be implemented throughout remedial design and construction.

During remedial design, additional investigations may be necessary

to further characterize known contaminated sites that may require input from the natural resources manager.

Remedial Action.

Once the remedial design is complete, the contract to construct the preferred alternative will be awarded. Overseeing the construction of the remedial action on the installation is the responsibility of the Navy Resident Officer in Charge of Construction (ROICC). The ROICC is responsible to see that the work is accomplished in a fashion which protects human health and the environment. The role of the natural resources manager is to ensure that the ROICC understands and implements the natural resource considerations developed throughout the program. To accomplish this, the natural resources manager should attend meetings and on-site visits with the ROICC and the contractor.

## Conclusion