

Digital Map Product Development from existing Seasonal  
Environmental Sensitive Area Maps  
of Cook Inlet/Kenai Peninsula, Alaska

Project Number: 02622

Restoration Category: General Restoration

Proposer: Hazardous Materials Response and Assessment Division, National Oceanic and Atmospheric  
Administration (NOAA)

Lead Trustee Agency: NOAA

Cooperating Agencies: None

Alaska Sea Life Center: No

Duration: 1st year, 1-year project

Cost FY 02: \$36,600.

Geographic Area: Cook Inlet and Kenai Peninsula

Injured Resource/Service: All resources and services injured by the Exxon Valdez spill, since it is a sensitive areas  
mapping project

#### ABSTRACT

A series of national standardized digital map products will be produced from the existing seasonal environmental sensitive index (ESI) maps for Cook Inlet/Kenai Peninsula made by NOAA in 1994. A four map seasonal series was originally developed for Cook Inlet by the NOAA Hazardous Materials Response and Assessment Division in the ArcInfo digital format with the output and distribution primarily being poster maps at a scale of 1:450,000. Since then, combined with the greater demand for digital products, NOAA's digital ESI products have greatly expanded. NOAA proposes to transform the existing Cook Inlet/Kenai Peninsula digital data into a four-tiered nationally standardized set of digital map products with the deliverable being 100 CD's. These will be the same products that were just recently provided for the Prince William Sound ESI mapping project for EVOS contract # 99368.

#### INTRODUCTION

One of the primary objectives of spill response, after protecting human life, is to reduce the environmental consequences of the spill and clean-up efforts. This objective is best achieved if the locations of sensitive resources are identified in advance of a spill so that protection priorities can be established and clean-up strategies identified. The most widely used approach to sensitivity mapping in the United States is known as the Environmental Sensitivity Index (ESI). This approach systematically compiles information in standardized formats for shoreline sensitivity, biological resources, and human-use resources. The strategy emphasizes standardization in the following areas: definitions of shoreline sensitivity rankings; data structures for organizing resource information; and map formats, for both electronic and hard copy output.

ESI maps have been prepared for Cook Inlet/Kenai Peninsula in two formats: 1) a detailed atlas consisting of 50 maps at a scale of 1:63,360 published in 1985; and 2) a series of four seasonal maps each at a scale of 1:450,000 published in 1994. The summary maps are a subset of the more detailed data included in the ESI atlas, focusing on the most sensitive resources. Summary maps have also been produced for Kodiak Island/Shelikof Straits in 1997, for the Beaufort Sea in 1999, for Prince William Sound in 2001, and for SE Ak in 1992, 1995, and 2001. Since 1992 all the products have been rendered digitally, and since 1998 the digital map products have been developed following national standardized formats.

NOAA proposes to update the Cook Inlet summary maps digital data to these new national standardized formats.

These include the following:

1. Full GIS format
2. Desktop Mapping format
3. Free ESI Viewer format
4. PDF ESI Navigator format

All these above digital products were provided just this spring to EVOS as part of the Prince William Sounds ESI update project. It is also anticipated that minor content updates may be included in this Cook Inlet/Kenai Peninsula project as the result of new information learned from the numerous studies of the impacts of the Exxon Valdez oil spill and/or new information that may be available from the natural resource agencies since 1994. However, it is anticipated that no new seasonal summary poster-style maps of Cook Inlet/Kenai Peninsula will be printed.

#### NEED FOR THE PROJECT

##### A. Statement of Problem

The seasonal sensitivity maps of Cook Inlet/Kenai Peninsula have been shown to be a valuable tool for oil spill planning and response. At this point this data is only available in a poster-style format, and needs to be upgraded to a variety of digital map products for greater accessibility and usefulness.

## B. Rationale/Link to Restoration

Updating the original digital files of the summary maps will satisfy several needs:

1) The existing maps are primarily available only as a series of four poster-style maps. Updating the digital files to all the above mentioned digital products will vastly expand the availability and usefulness of the ESI information. The information will be more readily accessible to decision makers, stake holders, resource managers and the public.

2.) Since the Cook Inlet ESI maps were last updated in 1994, a minor amount of new content data may need to be added to them.

3) The process of gathering data and reviewing the maps will provide the opportunity for resource agencies to discuss the concepts of what resources are most sensitive and require priority protection.

## C. Location

The area to be covered by the seasonal sensitivity maps will be the same as the existing maps, that is, all of Cook Inlet and the outer Kenai Peninsula coast east to Day Harbor.

## COMMUNITY INVOLVEMENT & TRADITIONAL ECOLOGICAL KNOWLEDGE

NOAA will work with the Cook Inlet Regional Citizen Advisory Council to make sure that the communities in Cook Inlet are aware of the mapping and digital update project and given the opportunity to participate and comment.

## PROJECT DESIGN

### A. Objectives

The objective of the mapping project is to:

Update the digital map output of the seasonal sensitivity map series for Cook Inlet/Kenai Peninsula, with the integration of minor content updates from the results of studies on the biological and human-use resources in the area since 1994.

### B. Methods

NOAA has taken the lead in the U.S. in developing standards for sensitivity mapping for oil spill planning and response. Detailed guidelines for developing sensitivity maps have recently been revised and described in an October 1997 manual, Environmental Sensitivity Index Guidelines, Version 2.0, published as NOAA Tech. Memo. NOS ORCA 115, by the Hazardous Materials Response and Assessment Division. The Cook Inlet/Kenai Peninsula digital updates of the seasonal sensitivity map series will be produced in accordance with these guidelines, following the map content and format as used in the recent projects in the Kodiak Island/Shelikof Strait, in the Beaufort Sea, and in Prince William Sound.

The methods used for updating the 1994 summary Cook Inlet/Kenai Peninsula digital ESI data are basically in house procedures that will be carried out by our GIS staff. The output will be digital map data of Cook Inlet in four different digital formats. These include the following:

1. Full GIS format: double-precision ARC export files along with the relational database files
2. Desktop Mapping format: ArcView 3.x project and shape files where each major data element corresponds to a theme with links in place to the comprehensive flat file data structure. Data are also provided in single-precision MOSS format (MOSS is a simple ASCII format suitable for writing translators to other mapping software packages).
3. Free ESI Viewer: This freeware mapping and data base engine allows viewing, printing and simple query of the ESI data. Designed to run on either a PC or Macintosh platform, this program allows users without access to other mapping software to explore the digital ESI data. It is simple to install and a guided tour is provided on each CD.
4. ESI's in PDF format: Each of the four seasonal summary ESI maps will appear as a PDF file allowing zooming and panning. It is complete with an entire introduction which includes photos and descriptions of the shoreline types mapped. In this PDF format, the maps can be made available on the World Wide Web.

The 1994 summary ESI maps of Cook Inlet/Kenai Peninsula will be reviewed by the Alaskan Sensitive Areas Working Group (ASAWG) to determine if any minor content updates are necessary. The ASAWG consists of all the state/federal natural resource agencies, the land management agencies, and the resource regulatory agencies. Also, primary data providers will be contacted, particularly for those databases that are regularly updated by management agencies. Examples include the USFWS digital database and colony status record files for seabird colonies and eagle nest sites, and the ADF&G catalog of waters important to anadromous fish.

Since NOAA has produced similar map products recently, we have good working relationships with all of the key data providers and technical experts who will be reviewing the maps. If any new data needs to be added or old data

modified NOAA has established protocols for obtaining the necessary data from each source and for the review process.

Description of Sensitive Resources that are Shown on the Seasonal Maps

ESI atlases are comprised of three general types of information:

- 1) Shoreline Habitat Classification – Shoreline habitats are ranked according to a scale relating to biological sensitivity, natural persistence of oil, and ease of cleanup.
- 2) Biological Resources – Includes oil-sensitive animals and non-shoreline habitats such as submerged aquatic vegetation.
- 3) Human-Use Resources – Specific areas that have added sensitivity and value because of their use by humans, such as high-use amenity beaches, parks, marine

The seasonal maps show a sub-set of the most sensitive resources. Thus, only the most sensitive shoreline types are shown, namely:

- ESI 5 Exposed Tidal Flats
- ESI 8 Sheltered Rocky Shores
- ESI 9 Sheltered Tidal Flats
- ESI 10 Marshes

NOAA has developed a standard biological scheme which identifies seven major biological elements, based on major taxonomic and functional groupings. Each element is divided into groups of species, or sub-elements, with similar taxonomy, morphology, life-history, and/or behavior relative to oil spill vulnerability and sensitivity. Table 1 lists the biological resources that are included on the seasonal sensitivity maps for Cook Inlet. Table 2 lists the human-use resources to be included on the maps. This list will be reviewed based on meetings with community representatives, natural resource trustees, and response organizations.

TABLE 1. Biological resources to be included on the seasonal sensitivity map series for Cook Inlet/Kenai Peninsula.

Data element	Sub-element	Areas/Sites to be mapped
Marine Mammal concentration areas	Pinniped (harbor seal)	and northern sea lion)
		Haulouts,
Terrestrial Mammal concentrations	Sea otter	Concentration areas
	Whale	Migratory or other concentration areas
	Deer	Intertidal concentration areas
Bird concentration areas	Small mammal	(river otter) Aquatic fur-bearer
	Seabirds	(see list in text) Nesting colonies;
Fish occurrences	Raptor (bald eagle)	Nesting sites; concentration areas
	Shorebird	Migratory concentration areas
	Waterfowl	Wintering and migratory concentrations
	Passerine	Threatened/endangered or rare
Shellfish	Anadromous fish	Spawning streams
	Bivalve	Pacific herring
Habitat/Rare Plant		Spawning areas
	Rare plant	Harvest areas; abundant beds
		Threatened/endangered or rare species
		or communities
	SAV	Submerged aquatic vegetation

TABLE 2. Human-use resources to be included on the seasonal sensitivity map series for Cook Inlet.

Data element	Sub-element	Comments
Recreation/Access	Marina	Site
	Landing strip	Site
Management Area	National Park	Boundary
	State Park	Site
	National Forest	Boundary
	National Wildlife Refuge	Boundary
Resource Extraction	State Critical Habitat Area	Boundary
	Aquaculture site	Hatcheries
	Commercial fishery	Set-net sites

	Subsistence fishing	Designated key harvest sites
Cultural Resources	Archaeological site	Water-, coastal-, wetland-associated
	Historical site	Water-, coastal-, wetland-associated
Other Features	Oil facilities	
	Port facilities	
	Communities	
	Political boundaries	Boroughs
	Roads	
	Dispersant pre-approval zones	
	Annotation	

Final output products will consist of one hundred (100) CD's containing the updated digital map products for the summary Cook Inlet/Kenai Peninsula ESI maps.

C. Cooperating Agencies, Contracts, and Other Agency Assistance

Cooperating agencies who will provide information and review the digital map products include:

Alaska Department of Fish & Game

Alaska Department of Natural Resources

U.S. Fish & Wildlife Service

National Marine Fisheries Service

Communities of Tyonek, Nanwalik, Seldovia, Nikiski, Kenai, Soldotna, Homer and Seward

Cook Inlet Regional Citizens Advisory Council

Also, in-kind contributions have been obtained from a wide range of partners involved in oil spill planning and response.

Alyeska will provide access to their natural-resource databases for the Outer Kenai Peninsula and Lower Cook Inlet.

Alaska Department of Conservation has agreed to provide funding so that the state resource agencies can budget adequate time to review the existing ESI data for Cook Inlet/Kenai Peninsula and provide updates as necessary.

SCHEDULE

A. Measurable Project Tasks for FY 02 (October 1, 2001 - September 30, 2002)

The project schedule is outlined below.

October 1: Review content of 1994 summary ESI maps of Cook Inlet/Kenai Peninsula and provide any new or updated data to NOAA

January 31: Finalize the digital files of the Cook Inlet/Kenai Peninsula summary ESI maps

April 1: Finalize the updated digital files into the four standardized digital map products

June 1: Prepare and review CD's of the above

July 31: Distribution of final CD of the updated digital data of the Cook Inlet/Kenai Peninsula summary ESI maps

B. Project Milestones and Endpoints

The milestones and endpoints for this project are straightforward: a digital database and CD's, completed within one year. The schedule is shown above.

C. Completion Date

The updated digital databases will be completed during FY02.

PUBLICATIONS AND REPORTS

There are no planned publications or reports, outside of the 100 CD's with the updated digital data map files and the associated metadata.

PROFESSIONAL CONFERENCES

None anticipated.

NORMAL AGENCY MANAGEMENT

Although NOAA HAZMAT is in the normal business of making ESI maps throughout the United States, updating the digital format of the Cook Inlet/Kenai Peninsula summary ESI map series would not normally receive attention until much later. The last edition was developed in 1994 and, as a result, retains adequate accuracy for use in oil spill response. Also, since 1989, Alyeska has developed a Graphical Resource Database (GRD) of the biological and human-use resources of a large portion of the Cook Inlet/Kenai Peninsula area that was last updated in 2000. This digital-only product has been made available to all the resource agencies in a read-only version (the files are in a rather proprietary, arcane format that makes that virtually inaccessible). In Alaska, NOAA is currently involved in a four-year program to complete the ESI mapping of Alaska's coastline, namely all of the western coastline. Nationally there is a drive to update and convert ESI maps to a digital format, and NOAA HAZMAT is heavily involved in this effort.

Considering the vast amount of sensitive Alaska and U.S. coastline and the present status of the Cook Inlet/Kenai Peninsula resource data, NOAA would not be undertaking this digital ESI update of Cook Inlet/Kenai Peninsula as part of its normal activities in the near future. Yet we recognize the need for EVOS Restoration to make information from the EV spill area as available and accessible as possible to decision makers, stake holders, resource managers, and the public.

This ESI summary mapping project will allow us the unique opportunity to display all this data in several digital formats that are consistent and uniform, thus making the information more accessible to a much larger audience.

#### COORDINATION AND INTEGRATION OF RESTORATION EFFORT

There will be a high degree of coordination among Trustee and management agencies in all phases of this project: initial summary map content review, gathering updated data, and reviewing the digital products. Interaction will be initiated with the principal investigators of pertinent EVOS projects to ascertain new information that has been developed on locations and areas of concentrations of biological species that populate the Cook Inlet/Kenai Peninsula area. Since much of this data is not expected to change from the 1994 compilation, much of this project will be an internal computer exercise. Once digital prototypes of the final map products become available, a strong effort will be made to have resource managers and EVOS principal investigators "test out" the clarity, usefulness, and accuracy of these presentations.

#### PROPOSED PRINCIPAL INVESTIGATOR

John Whitney, Ph.D, NOAA HAZMAT, Anchorage, Alaska

#### PRINCIPAL INVESTIGATOR QUALIFICATIONS

Dr. Whitney is the NOAA Scientific Support Coordinator for Alaska. He has managed the last six seasonal sensitivity mapping projects conducted by NOAA and the U.S. Coast Guard, namely Kodiak Island/Shelikof Strait, the Prince William Sound ESI update, the Beaufort Sea, S.E. Alaska, the Aleutian Islands, and the Pribilof Islands.

#### OTHER KEY PERSONNEL

Robert Pavia, Ph.D, Acting Chief of NOAA HAZMAT and head of all NOAA HAZMAT ESI projects

Jill Petersen, HAZMAT Geographic Information System Specialist

Budget Category:	Authorized FY 2001	Proposed FY 2002																					
Personnel		\$3.0																					
Travel		\$1.0																					
Contractual		\$30.0																					
Commodities		\$0.0																					
Equipment		\$0.0																					
Subtotal	\$0.0	\$34.0						Estimated															
General Administration		\$2.6						FY 2003															
Project Total	\$0.0	\$36.6																					
Full-time Equivalents (FTE)		0.1																					
Other Resources			Dollar amounts are shown in thousands of dollars.																				



<b>Contractual Costs:</b>		Proposed
Description		FY 2002
Data collection, compilation, and digitization		15.0
Digital Map Preparation and Production		15.0
When a non-trustee organization is used, the form 4A is required.		
<b>Contractual Total</b>		<b>\$30.0</b>
<b>Commodities Costs:</b>		Proposed
Description		FY 2002
<b>Commodities Total</b>		<b>\$0.0</b>



