

**OUTER COASTAL WASHINGTON
ENVIRONMENTAL SENSITIVITY
DATA
METADATA**

September 1996

**National Oceanic and Atmospheric Administration
Hazardous Materials Response and Assessment Division
7600 Sand Point Way, NE
Seattle, Washington 98115**

FILE DESCRIBES: Digital Environmental Sensitivity data for Outer Coastal, Washington compiled by the National Oceanic and Atmospheric Administration, Seattle, Washington in 1996.

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FILE CREATED ON: 199609

COMMENTS: Information was developed using the U.S. Federal Geographic Data Committee's Content Standards for Digital Geospatial Metadata, June 8, 1994. The numbering scheme matches the Metadata Standard in order to facilitate referencing definitions of the elements. The items in **bold** are required elements and the others are optional elements. The Spatial Data Transfer Standard (SDTS), ver. 03/92, was referenced to properly identify the geographic entities.

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1.0. IDENTIFICATION INFORMATION

1.1. CITATION

1.1.1. ORIGINATOR:

National Oceanic and Atmospheric Administration (NOAA), Office of Ocean Resources Conservation and Assessment, Hazardous Materials Response and Assessment Division, Seattle, Washington 98115.

1.1.2. PUBLICATION DATE:

199609

1.1.4. TITLE:

Outer Coastal Washington—Environmental Sensitivity Data

1.1.5. EDITION:

First

1.1.6. GEOSPATIAL DATA PRESENTATION FORM:

Maps

1.1.7. SERIES INFORMATION

1.1.7.1. SERIES NAME:

None

1.1.7.2. ISSUE IDENTIFICATION:

Outer Coastal Washington

1.1.8. PUBLICATION INFORMATION

1.1.8.1. PUBLICATION PLACE:

Seattle, Washington

1.1.8.2. PUBLISHER:

NOAA, Office of Ocean Resources Conservation and Assessment, Hazardous Materials Response and Assessment Division

1.1.9. OTHER CITATION DETAILS:

Prepared by the Hazardous Materials Response and Assessment Division, NOAA, Seattle, Washington for NOAA; U.S. Coast Guard, Seattle, Washington; and Washington Department of Fish and Game.

1.1.11. LARGER WORK CITATION:

None

1.2. DESCRIPTION

1.2.1. ABSTRACT:

This data set comprises the Environmental Sensitivity Index (ESI) maps for the shoreline of Outer Coastal Washington. These data characterize coastal environments by their sensitivity to spilled oil. The data include information for shoreline habitats.

1.2.2. PURPOSE:

The data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources

1.3. TIME PERIOD OF CONTENT

1.3.1. TIME PERIOD INFORMATION

1.3.1.3. RANGE OF DATES/TIMES:

The intertidal habitats were mapped during aerial and ground surveys conducted in 1984. The dates for these data vary and are documented in Section 2.5.1

1.4. STATUS

1.4.1. PROGRESS:

Complete

1.4.2. MAINTENANCE AND UPDATE FREQUENCY:

None planned

1.5. SPATIAL DOMAIN

1.5.1. BOUNDING COORDINATES

1.5.1.1. WEST BOUNDING COORDINATE:

-124.77°

1.5.1.2. EAST BOUNDING COORDINATE:

-122.63°

1.5.1.3. NORTH BOUNDING COORDINATE:

48.30°

1.5.1.4. SOUTH BOUNDING COORDINATE:

46.32°

1.6 KEYWORDS

1.6.1. THEME

1.6.1.1. THEME KEYWORD THESAURUS:

None

1.6.1.2. THEME KEYWORD:

Sensitivity maps; coastal resources; oil spill planning; and coastal zone management

1.6.2. PLACE

1.6.2.1. THESAURUS:

None

1.6.2.2. PLACE KEYWORD:

Outer Coastal Washington

1.7. ACCESS CONSTRAINTS:

None

1.8. USE CONSTRAINTS:

DO NOT USE ESI MAPS FOR NAVIGATIONAL PURPOSES.

Besides the above warning, there are no use constraints on this data.

Acknowledgment of NOAA and other contributing sources would be appreciated in products derived from these data.

1.11. DATA SET CREDIT:

This project was supported by NOAA's Hazardous Materials Response and Assessment Division, Robert Pavia, Project Manager.

Shoreline and habitat data were digitized by Marine Spill Response Corporation (MSRC).

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Research Planning, Inc. provided overlays and guidance to MSRC for the habitat digitization.

Data were processed by NOAA to derive a topologically clean data set and assign additional shoreline attributes.

Genwest Systems, Inc. checked the shoreline types against the hard copy atlas.

2.0. DATA QUALITY INFORMATION

2.1. ATTRIBUTE ACCURACY

2.1.1. ATTRIBUTE ACCURACY REPORT:

The attribute accuracy is estimated to be “good” given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks. There has been no quantitative accuracy assessment.

2.2. LOGICAL CONSISTENCY REPORT:

The data were originally digitized by MSRC using a CAD system. NOAA converted these data to ARC/INFO[®] coverages and cleaned up the data to obtain a topologically clean shoreline cover. Shoreline arcs were assigned a source_id to indicate whether the arc was retained from the MSRC data set, or whether they were extensions added to obtain closure. Additionally, arcs were assigned a line type based on whether they represented a shoreline, hydrography or pier feature. Polygons were assigned an attribute water_code to differentiate between land and water features. Using a series of algorithms and arcedit functions, arcs digitized in the ESI cover were matched to the shoreline and the ESI value was transferred to the corresponding segment of the shoreline cover. In dealing with polygonal features such as flats and marshes, arcs corresponding to the shoreline side were deleted and the actual shoreline was utilized instead. This is to insure that the shoreline presented in the ESI cover is a replica of the shoreline given in the hydro cover.

Data was run through a translator to an independent mapping program. The translator has checks that assure all data items are of the proper type and that they have a valid value assigned. Computerized maps were then compared to the hard copy atlases for correctness and completeness. Any discrepancies were corrected on the ARC/INFO[®] coverage. Final checks for topological correctness and data completeness were then performed.

2.3. COMPLETENESS REPORT:

The maps were intended to provide a regional overview of the environmentally sensitive shoreline habitats of Outer Coastal Washington.

Shoreline Habitat Mapping:

Prediction of the behavior and persistence of oil on intertidal habitats is based on an understanding of the dynamics of the coastal environments, not just the substrate type and grain size. The vulnerability of a particular intertidal habitat is an integration of the following factors:

- 1) Shoreline type (substrate, grain size, tidal elevation, origin)
- 2) Exposure to wave and tidal energy
- 3) Biological productivity and sensitivity
- 4) Ease of cleanup

All of these factors are used to determine the relative sensitivity of intertidal habitats. Key to the sensitivity ranking is an understanding of the relationships between: physical processes; substrate; shoreline type; product type; fate and effect; and sediment transport patterns. The intensity of energy expended upon a shoreline by wave action, tidal currents, and river currents directly affects the persistence of stranded oil. The need for shoreline cleanup activities is determined, in part, by the slowness of natural processes in removal of oil stranded on the shoreline.

These concepts have been used in the development of the ESI, which ranks shoreline environments as to their relative sensitivity to oil spills, potential biological injury, and ease of cleanup. Generally speaking, areas exposed to high levels of physical energy, such as wave action and tidal currents, and low biological activity rank low on the scale, whereas sheltered areas with associated high biological activity have the highest ranking.

2.4. POSITIONAL ACCURACY

2.4.1. HORIZONTAL POSITIONAL ACCURACY

2.4.1.1. HORIZONTAL POSITIONAL ACCURACY REPORT:

The ESI data uses USGS 1:24,000 topographic quadrangles as the base map. It is estimated that the ESI has a minimum mapping unit of 50 feet.

2.5. LINEAGE

2.5.1. SOURCE INFORMATION:

Coverage or theme name: ESI

2.5.1.1. SOURCE CITATION

2.5.1.1.1 Originator	2.5.1.1.2 Publication Date	2.5.1.1.4 Title	2.5.1.1.6 Geospatial Data Presentation Form	2.5.1.1.8 Publication Information	2.5.1.2 Source Scale Denominator	2.5.1.4 Source Time Period
NOAA and Research Planning, Inc. (RPI)	1985	Sensitivity of coastal environments and wildlife to spilled oil atlas, Oregon and Washington	Hard copy, maps	NOAA, Office of Ocean Resources Conservation and Assessment, Seattle, WA, 55 maps.	1:24,000	1984
Michel, J. and J. Dahlin, RPI	1993	Guidelines for Developing Digital Environmental Sensitivity Index Atlases and Data-bases	Hard copy, text	Hazardous Materials Response and Assessment Division, NOAA, Seattle, WA, 43 pp. + appendices	N/A	1993
MSRC	1994	Digital ESI data	Digital CAD files	Unpublished	1:24,000	1984
NOAA	1996	Digital ESI data	Digital polygons and chains	N/A	1:24,000	1984
Albright, R., R. Hirschi, R. Vanbianchi and C. Vita	1980	Coastal zone atlas of Washington, land cover/land use narratives	Hard copy, text	Wetlands, exposed and other lands, Dept. Ecol., Wash, Vol. 1, pp. 449-887 + appendices, glossary, index	N/A	Unknown
Proctor, C. M., et al.	1980	An ecological characterization of the Pacific Northwest coastal region	Hard copy, text	U. S. Fish and Wildl. Serv., FWS/OBS 79/11-79/15, Vol. 5	N/A	Unknown
Seliskar, D. M. and J. L. Gallagher	1983	The ecology of tidal marshes of the Pacific Northwest coast: a community profile	Hard copy, text	U. S. Fish and Wildl. Serv., FWS/OBS 82/32, 65 pp.	N/A	Unknown
U. S. Army Corps of Engineers.	1975	Washington environmental atlas	Hard copy, map	Environ. Resources Sect., Seattle Dist. Seattle, Washington, 115 pp.	Unknown	Unknown

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U. S. Fish and Wildlife Service	1981	Pacific coast ecological inventory-- 1:250,000 scale maps, Cape Flattery (No. 48124-A1-E1-250), Copalis Beach (No. 47124-A1-E1-250), Cape Disappointment (No. 46124-A1-E1-250) and Hoquiam (No. 46122-A1-E1-250)	Hard copy, maps	U. S. Fish and Wildlife Service, Washington, D.C.	1:250,000	Unknown
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2.5.1. SOURCE INFORMATION:

Coverage or theme name: Hydro

2.5.1.1. SOURCE CITATION

2.5.1.1.1 Originator	2.5.1.1.2 Publication Date	2.5.1.1.4 Title	2.5.1.1.6 Geospatial Data Presentation Form	2.5.1.1.8 Publication Information	2.5.1.2 Source Scale Denominator	2.5.1.4 Source Time Period
U.S.G.S.	Varies	7.5 minute topographic maps	Hard copy, maps	U.S.G.S., Reston, VA	1:24,000	Varies
MSRC	1994	Digital versions of U.S.G.S. quads	Digital CAD files	N/A	1:24,000	Varies
NOAA	1996	Digital U.S.G.S. quads	Digital polygons and chains	N/A	1:24,000	Varies

2.5.1. SOURCE INFORMATION:

Coverage or theme name: Index

2.5.1.1. SOURCE CITATION

2.5.1.1.1 Originator	2.5.1.1.2 Publication Date	2.5.1.1.4 Title	2.5.1.1.6 Geospatial Data Presentation Form	2.5.1.1.8 Publication Information	2.5.1.2 Source Scale Denominator	2.5.1.4 Source Time Period
NOAA	1996	Index for Outer Coastal Washington ESI maps	Digital polygons	N/A	1:24,000	1984

2.5.2. PROCESS STEP**2.5.2.1. PROCESS DESCRIPTION:**

The data were originally digitized by MSRC using a CAD system. NOAA converted these data to ARC/INFO[®] coverages and cleaned up the data to obtain a topologically clean shoreline cover. Shoreline arcs were assigned a source_id to indicate whether the arc was retained from the MSRC data set, or whether they were extensions added to obtain closure. Additionally, arcs were assigned a line type based on whether they represented a shoreline, hydrography or pier feature. Polygons were assigned an attribute water_code to differentiate between land and water features. Using a series of algorithms and arcedit functions, arcs digitized in the ESI cover were matched to the shoreline and the ESI value was transferred to the corresponding segment of the shoreline cover. In dealing with polygonal features such as flats and marshes, arcs corresponding to the shoreline side were deleted and the actual shoreline was utilized instead. This is to insure that the shoreline presented in the ESI cover is a replica of the shoreline given in the hydro cover.

Data was run through a translator to an independent mapping program. The translator has checks that assure all data items are of the proper type and that they have a valid value assigned. Computerized maps were then compared to the hard copy atlases for correctness and completeness. Any discrepancies were corrected on the ARC/INFO[®] coverage. Final checks for topological correctness and data completeness were then performed.

2.5.2.3. PROCESS DATE:

199608

2.5.2.6. PROCESS CONTACT**2.5.2.6.1. CONTACT PERSON PRIMARY****2.5.2.6.1.1. CONTACT PERSON:**

Jill Petersen

**2.5.2.6.1.2. CONTACT ORGANIZATION:
NOAA HMRAD**

**2.5.2.6.3. CONTACT POSITION:
GIS Manager**

2.5.2.6.4. CONTACT ADDRESS

**2.5.2.6.4.1. ADDRESS TYPE:
Physical Address**

**2.5.2.6.4.2. ADDRESS:
7600 Sand Point Way N.E.
Bin C15700**

**2.5.2.6.4.3. CITY:
Seattle**

**2.5.2.6.4.4. STATE OR PROVINCE:
W A**

**2.5.2.6.4.5. POSTAL CODE:
98115**

**2.5.2.6.7. CONTACT FACSIMILE TELEPHONE:
(206) 526-6329**

**2.5.2.6.8. CONTACT ELECTRONIC MAIL ADDRESS:
jill_petersen@hazmat.noaa.gov.us**

3.0. SPATIAL DATA ORGANIZATION INFORMATION**3.2. DIRECT SPATIAL REFERENCE METHOD:**

Vector

3.3. POINT AND VECTOR OBJECT INFORMATION**3.3.1. SDTS TERMS DESCRIPTION:****3.3.1.1. SDTS POINT AND VECTOR OBJECT TYPE, and****3.3.1.2. POINT AND VECTOR OBJECT COUNT:****BASEMAP**

Theme	Universe Polygon	GT-Polygons	Area Points	Complete Chains	Line Segments	Label Points	Entity Points	Nodes
ESI	1	627	627	2,288	83,970	0	0	2,095
Hydro	1	372	372	825	70,555	0	0	809
Index	1	28	28	71	89	0	0	44

4.0. SPATIAL REFERENCE INFORMATION

4.1. HORIZONTAL COORDINATE SYSTEM DEFINITION

4.1.1 GEOGRAPHIC

4.1.1.1 LATITUDE RESOLUTION:
0.00005

4.1.1.2 LONGITUDE RESOLUTION:
0.00005

4.1.1.3 GEOGRAPHIC COORDINATE UNITS:
Decimal Degrees

4.1.4. GEODETIC MODEL

4.1.4.1. HORIZONTAL DATUM NAME:
North American Datum of 1927

4.1.4.2. ELLIPSOID NAME:
Clark 1866

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5.0. ENTITY AND ATTRIBUTE INFORMATION

5.1. DETAILED DESCRIPTION: ESI

The Coverage ESI contains polygonal (GT-Polygons) and arc (Complete Chains) features for the ESI shoreline classification. The classification of the features is based upon *Environmental Sensitivity Index Guidelines* (NOAA, 1995, NOAA Technical Memorandum NOS ORCS 92, Hazardous Materials Response and Assessment Division, NOAA, Seattle, Washington). The ESI classification was performed in 1984.

5.1.1. ENTITY TYPES:

5.1.1.1. ENTITY TYPE LABEL:	5.1.1.2. ENTITY TYPE DEFINITION:
<u>Complete Chain</u>	ESI character LINE character SOURCE_ID integer
<u>GT-Polygons</u>	ESI character WATER_CODE character

5.1.2. ATTRIBUTES:

5.1.2.1. ATTRIBUTE LABEL:

ESI

5.1.2.2. ATTRIBUTE DEFINITION:

The item ESI contains values according to the ESI ranking of the shorelines and polygons. The ESI rankings progress from low to high susceptibility to oil spills. The Outer Coastal Washington shoreline types are listed below. In many cases, the shorelines are also ranked with multiple codes, such as 10/7. The first number is the most landward shoreline type, marshes, with exposed sandy tidal flats being the shoreline type closest to the water.

5.1.2.3. ATTRIBUTE DEFINITION SOURCE:

NOAA

**5.1.2.4.1.1.
ENUMERATED
DOMAIN VALUE:**

**5.1.2.4.1.2.
ENUMERATED DOMAIN
VALUE DEFINITION:**

1	Exposed rocky shores and vertical seawalls
2	Wave-cut platforms and exposed pier structures
3	Fine-grained sand beaches
4	Medium- to coarse-grained sand beaches
5	Mixed sand and gravel beaches
6	Gravel beaches and exposed riprap
7	Exposed sandy tidal flats
8	Sheltered rocky shores and coastal structures
9	Sheltered tidal flats
10	Marshes
U	Undefined

**5.1.2.4.1.3. ENUMERATED DOMAIN VALUE
DEFINITION SOURCE:
NOAA**

**5.1.2.5. ATTRIBUTE UNITS OF MEASUREMENT:
Ordered**

**5.1.2.1. ATTRIBUTE LABEL:
LINE**

**5.1.2.2. ATTRIBUTE DEFINITION:
Type of geographical feature**

**5.1.2.3. ATTRIBUTE DEFINITION SOURCE:
NOAA**

**5.1.2.4.1.1. ENUMERATED
DOMAIN VALUE:**

**5.1.2.4.1.2. ENUMERATED DOMAIN
VALUE DEFINITION:**

H	Hydrography or stream features
S	Shoreline
F	Flat
P	Pier or breakwater
B	Breakwater

**5.1.2.4.1.3. ENUMERATED DOMAIN VALUE
DEFINITION SOURCE:
NOAA**

5.1.2.5. ATTRIBUTE UNITS OF MEASUREMENT:

nominal

5.1.2.1. ATTRIBUTE LABEL:

SOURCE_ID

5.1.2.2. ATTRIBUTE DEFINITION:

Data source for ESI

5.1.2.3. ATTRIBUTE DEFINITION SOURCE:

NOAA

5.1.2.4.1.1. ENUMERATED DOMAIN VALUE:

5.1.2.4.1.2.

ENUMERATED DOMAIN VALUE DEFINITION:

1

MSRC digital data (corrected as needed to match original hard copy atlas)

5.1.2.4.1.3.

ENUMERATED DOMAIN VALUE DEFINITION SOURCE:

NOAA

5.1.2.5. ATTRIBUTE UNITS OF MEASUREMENT:

nominal

5.1.2.1. ATTRIBUTE LABEL:

WATER_CODE

5.1.2.2. ATTRIBUTE DEFINITION:

Specifies a polygon as either water or land

5.1.2.3. ATTRIBUTE DEFINITION SOURCE:

NOAA

5.1.2.4.1.1. ENUMERATED DOMAIN VALUE:

5.1.2.4.1.2.

ENUMERATED DOMAIN VALUE DEFINITION:

W
L

Water
Land

5.1.2.4.1.3.

ENUMERATED DOMAIN VALUE DEFINITION SOURCE:

NOAA

5.1. DETAILED DESCRIPTION: HYDRO

The Coverage HYDRO contains polygonal water and land features as well as linear features for rivers/streams that are tidally influenced.

5.1.1. ENTITY TYPES:

5.1.1.1. ENTITY TYPE LABEL:	5.1.1.2. ENTITY TYPE DEFINITION:
<u>GT-Polygons</u>	WATER_CODE character
<u>Complete Chains</u>	LINE character
	SOURCE_ID character

5.1.2. ATTRIBUTES:**5.1.2.1. ATTRIBUTE LABEL:**

WATER_CODE

5.1.2.2. ATTRIBUTE DEFINITION:

Specifies a polygon as either water or land.

5.1.2.3. ATTRIBUTE DEFINITION SOURCE:

NOAA
5.1.2.4.1.1. ENUMERATED
DOMAIN VALUE:

5.1.2.4.1.2. ENUMERATED DOMAIN
VALUE DEFINITION:

W	Water
L	Land

**5.1.2.4.1.3. ENUMERATED DOMAIN VALUE
DEFINITION SOURCE:**
NOAA

5.1.2.1. ATTRIBUTE LABEL:

LINE

5.1.2.2. ATTRIBUTE DEFINITION:

Type of geographical feature

5.1.2.3. ATTRIBUTE DEFINITION SOURCE:

NOAA

5.1.2.4.1.1. ENUMERATED DOMAIN VALUE:	5.1.2.4.1.2. ENUMERATED DOMAIN VALUE DEFINITION:
H	Hydrography or stream features
S	Shoreline
P	Pier or breakwater
I	Index
B	Breakwater

5.1.2.4.1.3. ENUMERATED DOMAIN VALUE DEFINITION SOURCE:
NOAA

5.1.2.5. ATTRIBUTE UNITS OF MEASUREMENT:
nominal

5.1.2.1. ATTRIBUTE LABEL:
SOURCE_ID

5.1.2.2. ATTRIBUTE DEFINITION:
Data source for HYDRO

5.1.2.3. ATTRIBUTE DEFINITION SOURCE:
NOAA

5.1.2.4.1.1. ENUMERATED DOMAIN VALUE:	5.1.2.4.1.2. ENUMERATED DOMAIN VALUE DEFINITION:
11	As digitized by MSRC
15	Added to obtain topologically closed cover or an index segment

5.1.2.4.1.3. ENUMERATED DOMAIN VALUE DEFINITION SOURCE:
NOAA

5.1.2.5. ATTRIBUTE UNITS OF MEASUREMENT:
nominal

5.1. DETAILED DESCRIPTION: INDEX

The Coverage INDEX has no attributes associated with it. It is simply a visual reference for comparison to original hard copy U.S.G.S quad delineations.

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6.0. DISTRIBUTION INFORMATION

6.1. DISTRIBUTOR

6.1.1. CONTACT PERSON PRIMARY

6.1.1.1. CONTACT PERSON:

Robert Pavia

6.1.1.2. CONTACT ORGANIZATION:

NOAA

6.1.4. CONTACT ADDRESS

6.1.4.1. ADDRESS TYPE:

Physical Address

6.1.4.2. ADDRESS:

7600 Sand Point Way N.E., Bin C15700

6.1.4.3. CITY:

Seattle

6.1.4.4. STATE OR PROVINCE:

W A

6.1.4.5. POSTAL CODE:

98115

6.1.7. CONTACT FACSIMILE TELEPHONE:

(206) 526-6329

6.1.8. CONTACT ELECTRONIC MAIL ADDRESS:

robert_pavia@hazmat.noaa.gov.us

6.2. RESOURCE DESCRIPTION:

Outer Coastal Washington—Environmental Sensitivity Data

6.3. DISTRIBUTION LIABILITY:

Although this data has been processed successfully on a computer system at NOAA, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.

6.5. CUSTOM ORDER PROCESS

Contact NOAA for distribution options (see 6.1.1.).

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7.0. METADATA REFERENCE INFORMATION

7.1. METADATA DATE:

199609

7.2. METADATA REVIEW DATE:

199609

7.4. METADATA CONTACT

7.4.1. CONTACT PERSON PRIMARY

7.4.1.1. CONTACT PERSON:

Jill Petersen

7.4.1.2. CONTACT ORGANIZATION:

NOAA HMRAD

7.4.3. CONTACT POSITION:

GIS Manager

7.4.4. CONTACT ADDRESS

7.4.4.1. ADDRESS TYPE:

Physical Address

7.4.4.2. ADDRESS:

7600 Sand Point Way, N.E., Bin C15700

7.4.4.3. CITY:

Seattle

7.4.4.4. STATE OR PROVINCE:

Washington

7.4.4.5. POSTAL CODE:

98115

7.4.7. CONTACT FACSIMILE TELEPHONE:

(206) 526-6329

7.4.8. CONTACT ELECTRONIC MAIL ADDRESS:

jill_petersen@hazmat.noaa.gov.us

7.5. METADATA STANDARD NAME:

Content Standards for Digital Geospatial Metadata

7.6. METADATA STANDARD VERSION:

19940608