

# Pacific Northwest Marine Ecoregional Assessment

## Large Format Maps

### **Note:**

The large format maps included in this pdf file are designed to print on an 11" X 36" page using a large format plotter. These maps can be viewed full size on a computer screen, allowing one to scroll up or down the map without any need to move the map horizontally. Each 11" X 36" map contains the same image that is displayed across four 8.5 X 11" pages of maps which are included in that version of the report formatted for printing on standard printers.

### **Recommended Citation:**

Vander Schaaf, D., K. Popper, D. Kelly and J. Smith. 2013. *Pacific Northwest Marine Ecoregional Assessment*. The Nature Conservancy, Portland, Oregon. All maps created by Aaron Jones, The Nature Conservancy.

### **Updates and Digital Version of Assessment:**

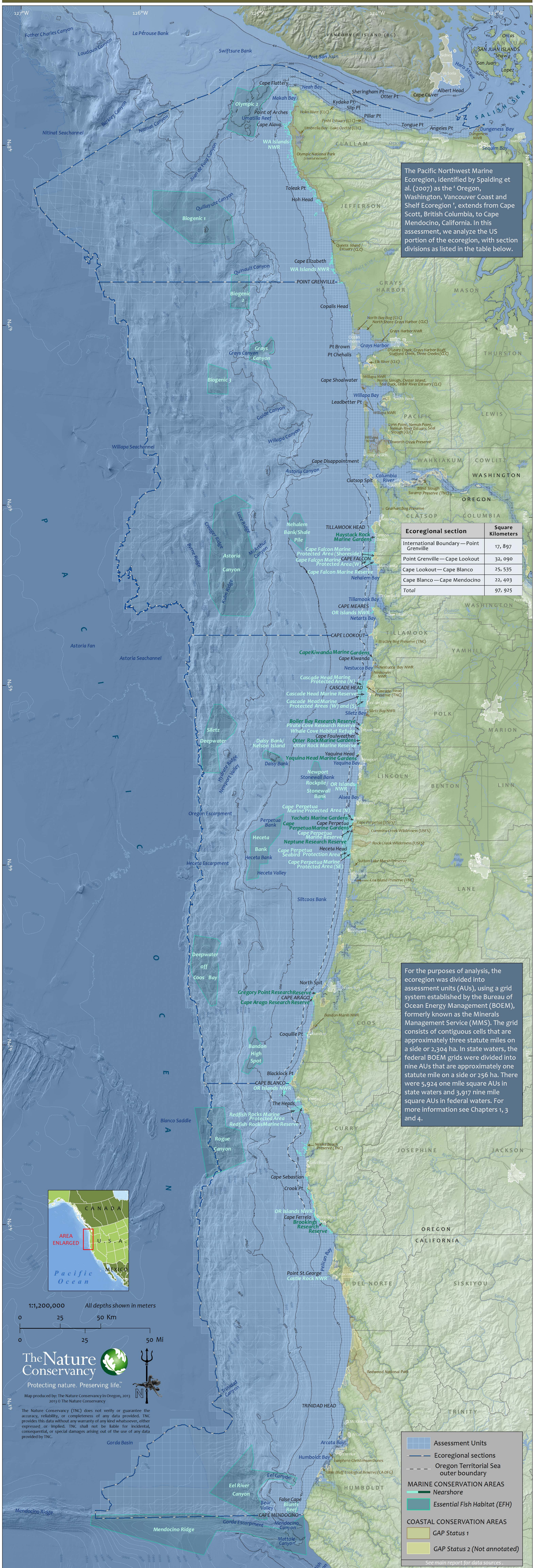
This Ecoregional Assessment is available on the Web at:

<https://www.conservationgateway.org/ConservationPlanning/SettingPriorities/EcoregionalReports> Maps, text and Appendices can be printed from downloadable Web-based files. Any published updates to the Assessment will be made available at the same Website.

Prepared by  
The Nature Conservancy  
2013

# Pacific Northwest Marine Ecoregional Assessment

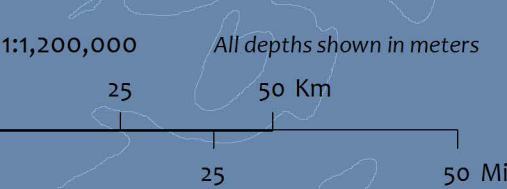
## Map 1. Assessment Units and Protected Areas



The Pacific Northwest Marine Ecoregion, identified by Spalding et al. (2007) as the 'Oregon, Washington, Vancouver Coast and Shelf Ecoregion', extends from Cape Scott, British Columbia, to Cape Mendocino, California. In this assessment, we analyze the US portion of the ecoregion, with section divisions as listed in the table below.

Ecoregional section	Square Kilometers
International Boundary—Point Grenville	17,897
Point Grenville—Cape Lookout	32,090
Cape Lookout—Cape Blanco	25,535
Cape Blanco—Cape Mendocino	22,403
<b>Total</b>	<b>97,925</b>

For the purposes of analysis, the ecoregion was divided into assessment units (AUs), using a grid system established by the Bureau of Ocean Energy Management (BOEM), formerly known as the Minerals Management Service (MMS). The grid consists of contiguous cells that are approximately three statute miles on a side or 2,304 ha. In state waters, the federal BOEM grids were divided into nine AUs that are approximately one statute mile on a side or 256 ha. There were 5,924 one mile square AUs in state waters and 3,917 nine mile square AUs in federal waters. For more information see Chapters 1, 3 and 4.



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**Assessment Units**  
 Ecoregional sections  
 Oregon Territorial Sea outer boundary

**MARINE CONSERVATION AREAS**  
 Nearshore  
 Essential Fish Habitat (EFH)

**COASTAL CONSERVATION AREAS**  
 GAP Status 1  
 GAP Status 2 (Not annotated)

See main report for data sources.

# Pacific Northwest Marine Ecoregional Assessment

## Map 2. Conservation Targets - Benthic Habitats



This map represents the distribution of the 64 modeled benthic habitats, some of the 'coarse filter' conservation targets used to guide conservation area selection for the ecoregional assessment. The benthic habitat layer is developed from three physical variables: bathymetry (depth), lithology (substrate) and geomorphology. For a full list of habitats and methods, see Chapter 2 for more information.

**BENTHIC HABITATS**  
(Topographic position by substrate type)

Mud, Gravel, Cobble, Shell, or Mixed

9.77% Basin	14.63% Slope
8.77% Ridge	43.16% Flats

Rock

0.04% Basin	0.56% Slope
0.60% Ridge	2.55% Flats

Sand

0.03% Basin	0.44% Slope
0.59% Ridge	18.86% Flats

Depth classes (meters)

- 700
- 200
- 40

— Ecoregional sections

— Assessment Units

**MARINE CONSERVATION AREAS**

— Essential Fish Habitat (EFH)

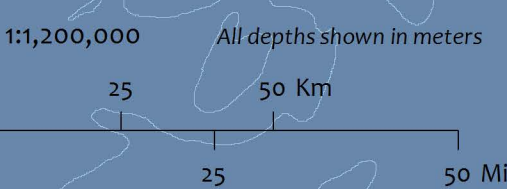
*See main report for data sources.*

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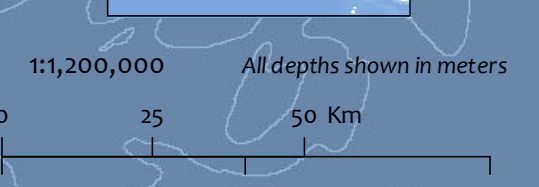
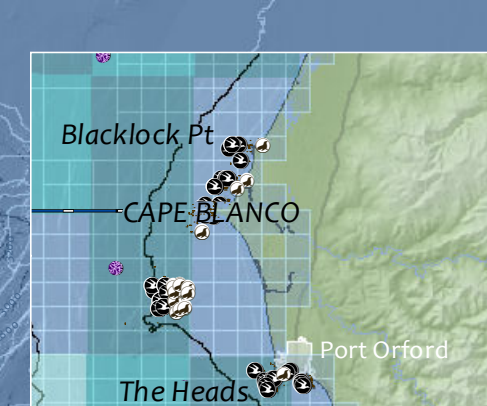
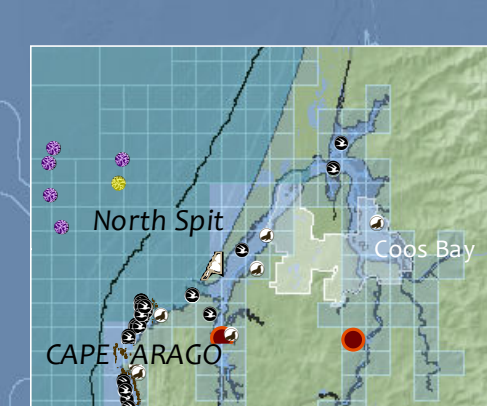
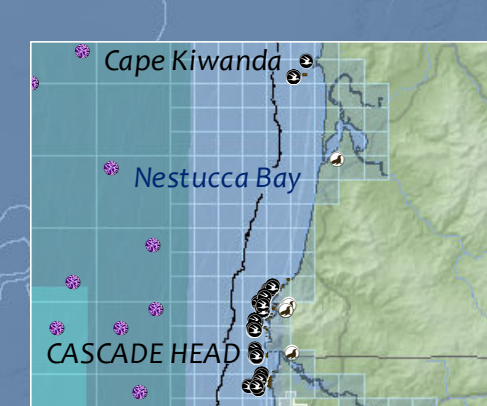
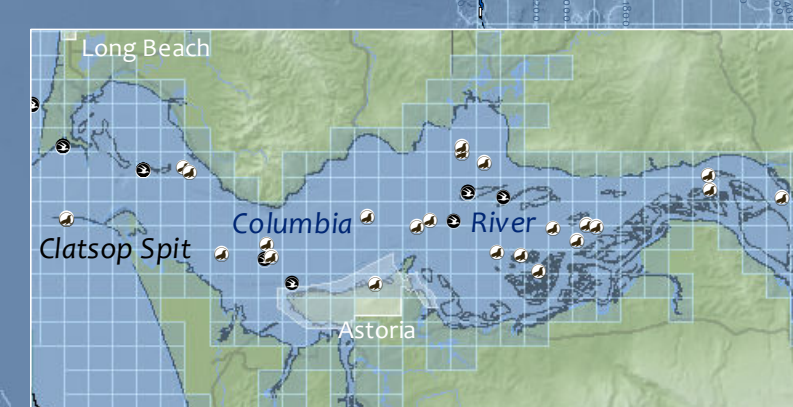
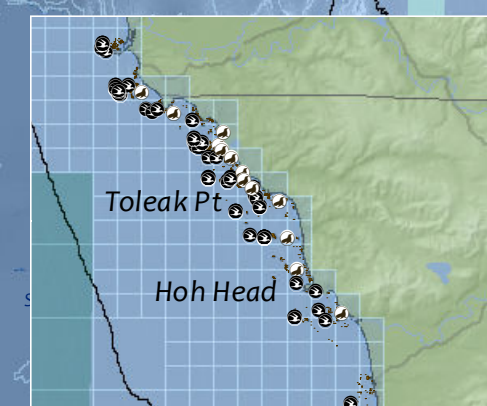
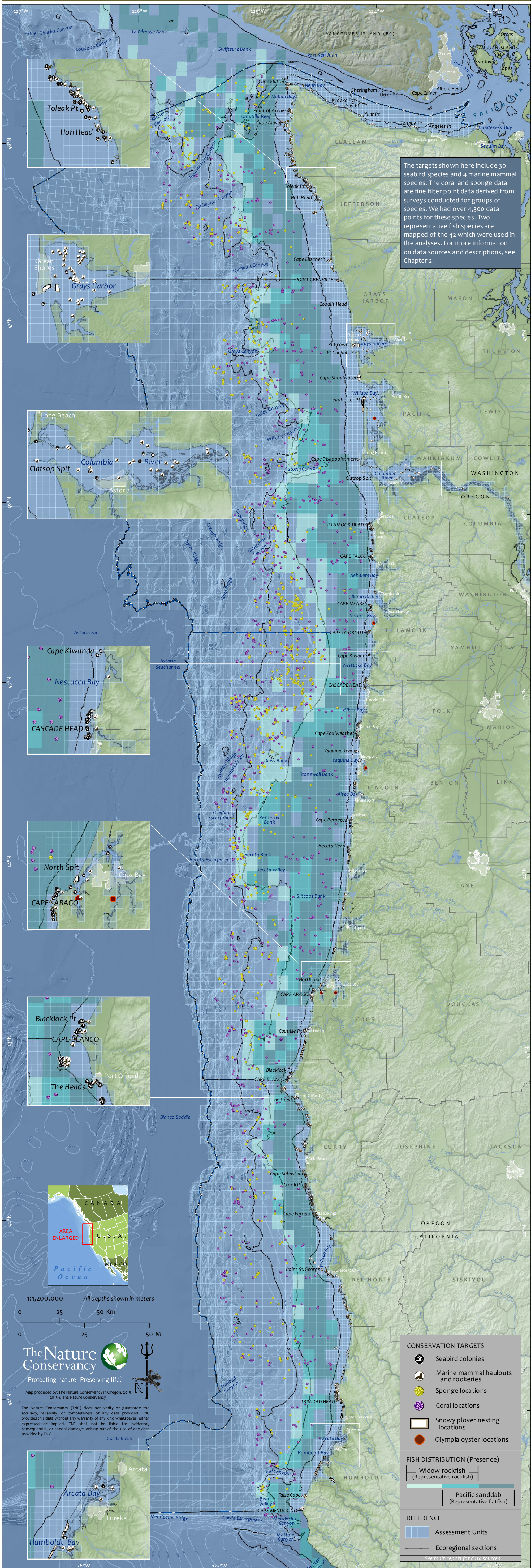
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Source: NOAA

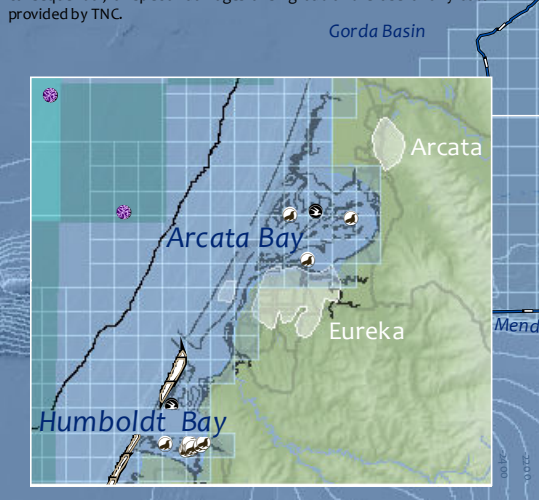


# Pacific Northwest Marine Ecoregional Assessment

## Map 3. Conservation Targets - Species

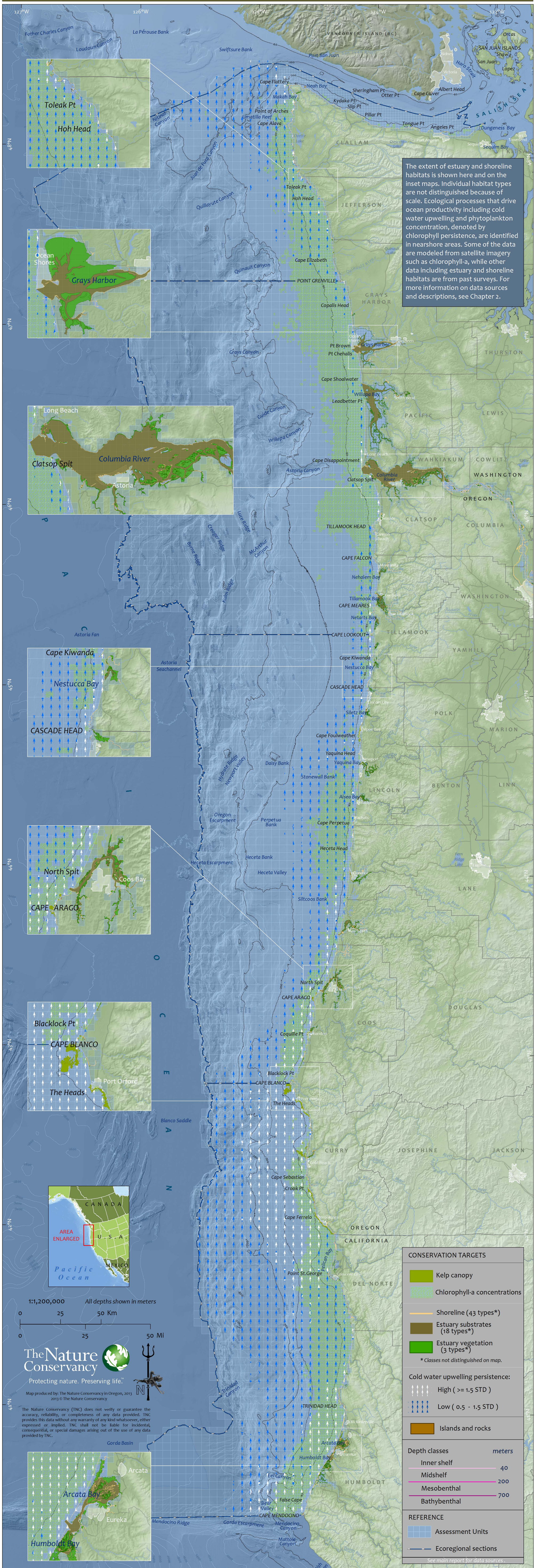


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# Pacific Northwest Marine Ecoregional Assessment

## Map 4. Conservation Targets - Habitats and Processes



The extent of estuary and shoreline habitats is shown here and on the inset maps. Individual habitat types are not distinguished because of scale. Ecological processes that drive ocean productivity including cold water upwelling and phytoplankton concentration, denoted by chlorophyll persistence, are identified in nearshore areas. Some of the data are modeled from satellite imagery such as chlorophyll-a, while other data including estuary and shoreline habitats are from past surveys. For more information on data sources and descriptions, see Chapter 2.

**CONSERVATION TARGETS**

- Kelp canopy
- Chlorophyll-a concentrations
- Shoreline (43 types\*)
- Estuary substrates (18 types\*)
- Estuary vegetation (3 types\*)

\* Classes not distinguished on map.

**Cold water upwelling persistence:**

- High ( $\geq 1.5$  STD)
- Low (0.5 - 1.5 STD)

**Islands and rocks**

Islands and rocks

**Depth classes meters**

- Inner shelf 40
- Middshelf 200
- Mesobenthic 700
- Bathybenthic

**REFERENCE**

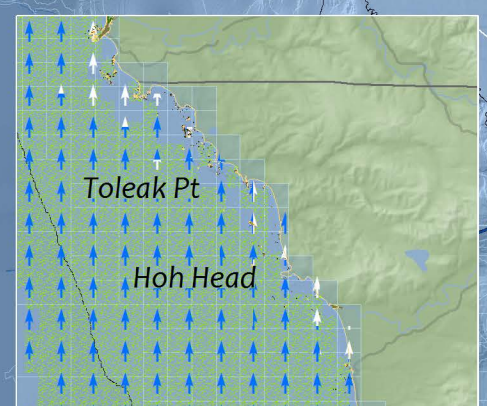
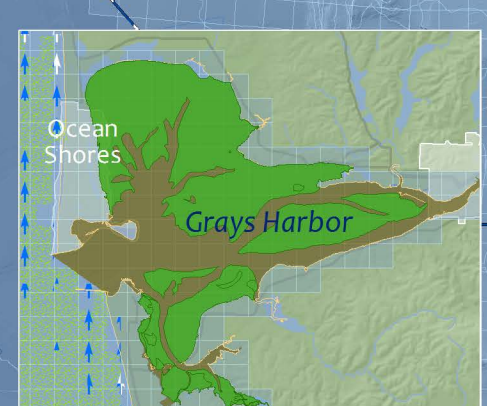
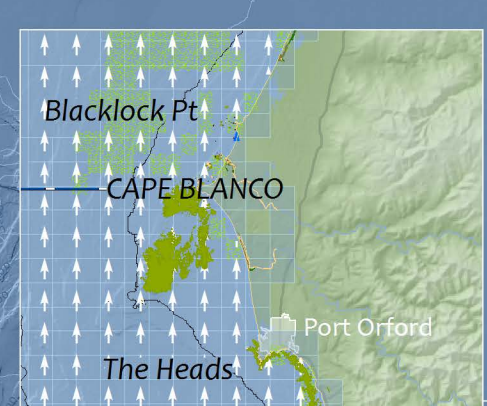
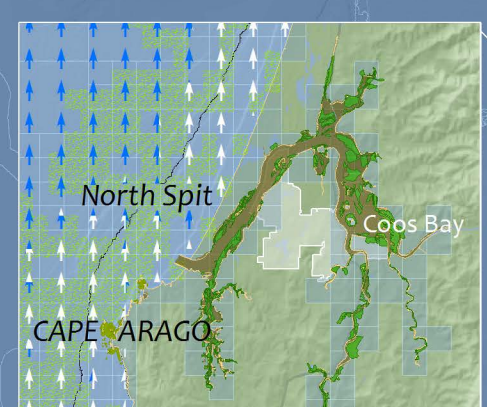
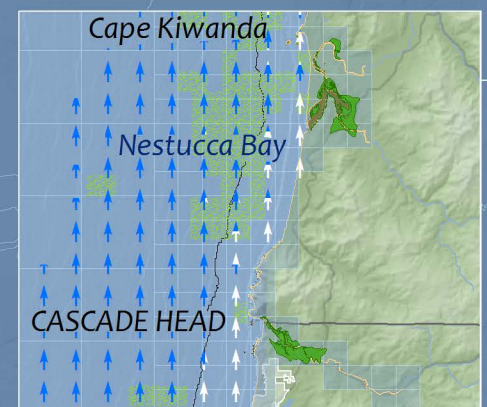
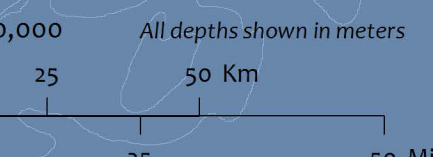
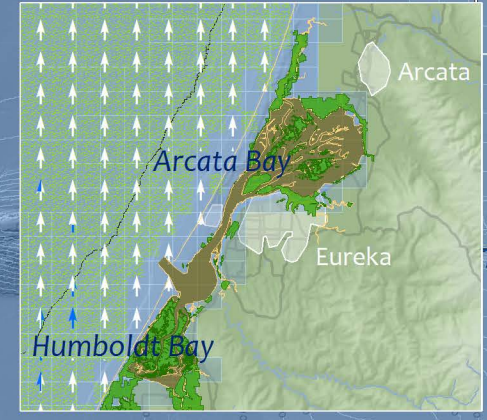
- Assessment Units
- Ecoregional sections

See main report for data sources.

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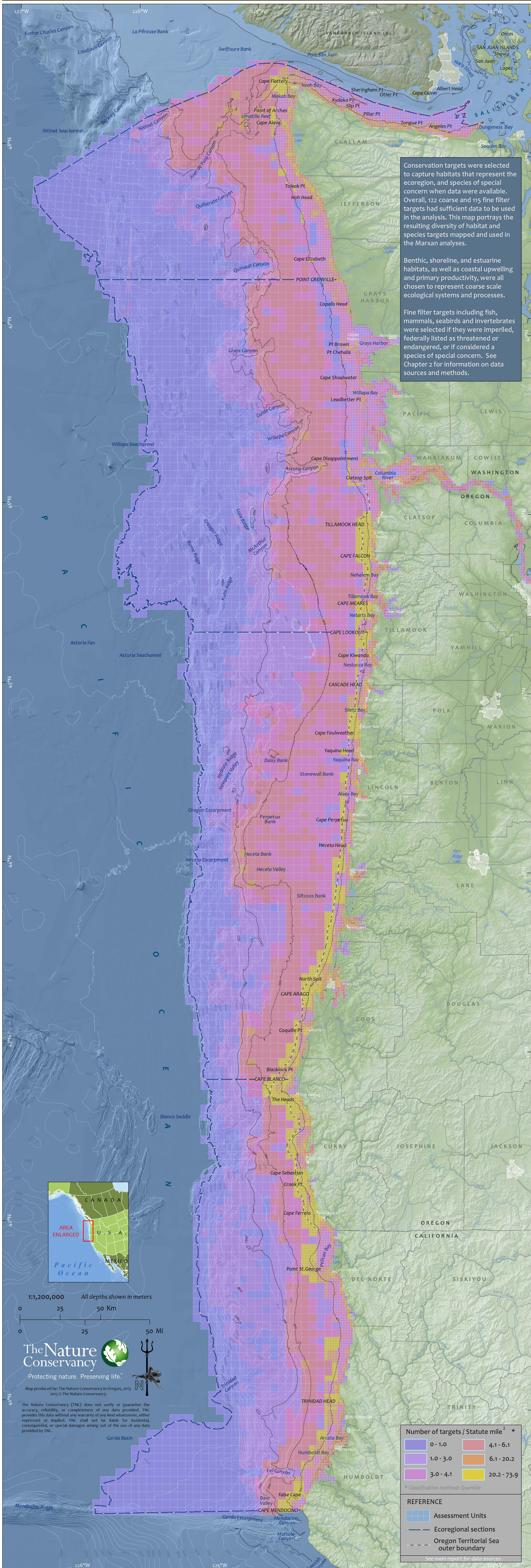
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# Pacific Northwest Marine Ecoregional Assessment

## Map 5. Target Data Diversity



1:1,200,000 All depths shown in meters  
 0 25 50 Km  
 0 25 50 Mi

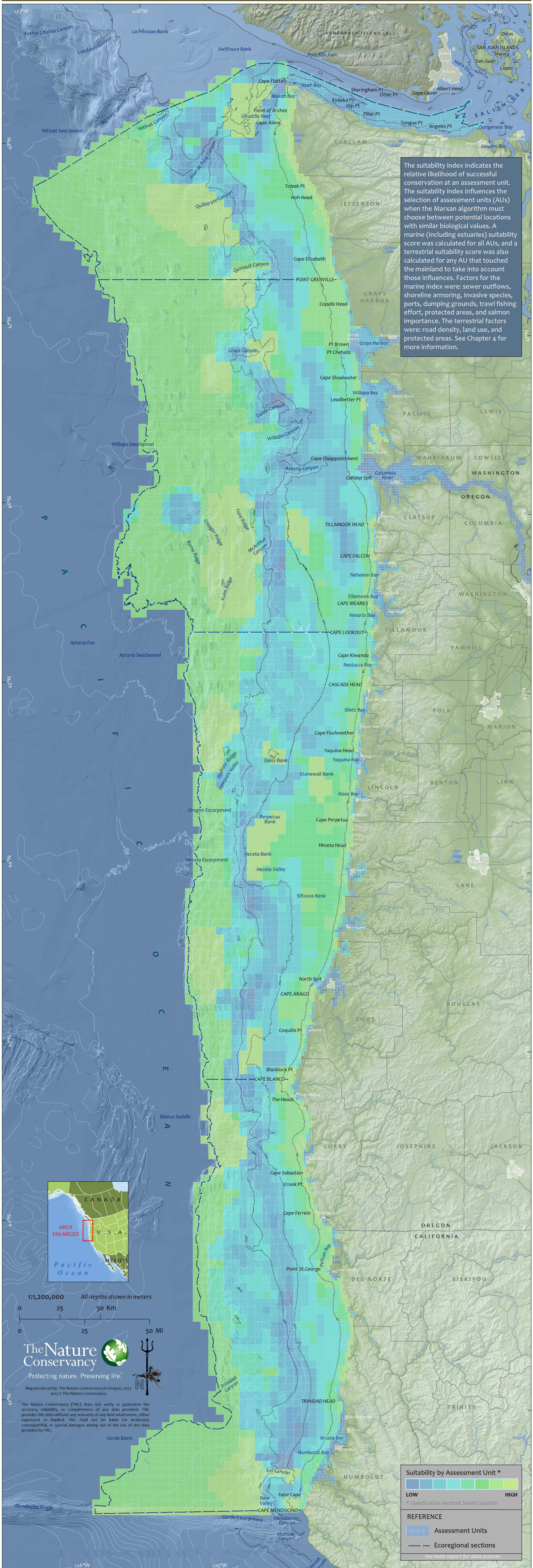


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# Pacific Northwest Marine Ecoregional Assessment

## Map 6. Conservation Suitability



The suitability index indicates the relative likelihood of successful conservation at an assessment unit. The suitability index influences the selection of assessment units (AUs) when the Marxan algorithm must choose between potential locations with similar biological values. A marine (including estuaries) suitability score was calculated for all AUs, and a terrestrial suitability score was also calculated for any AU that touched the mainland to take into account those influences. Factors for the marine index were: sewer outflows, shoreline armoring, invasive species, ports, dumping grounds, trawl fishing effort, protected areas, and salmon importance. The terrestrial factors were: road density, land use, and protected areas. See Chapter 4 for more information.

**Suitability by Assessment Unit \***

LOW HIGH

\* Classification method: Smart Quantile

**REFERENCE**

- Assessment Units
- Ecoregional sections

See main report for data sources.



1:1,200,000 All depths shown in meters

0 25 50 Km

0 25 50 Mi

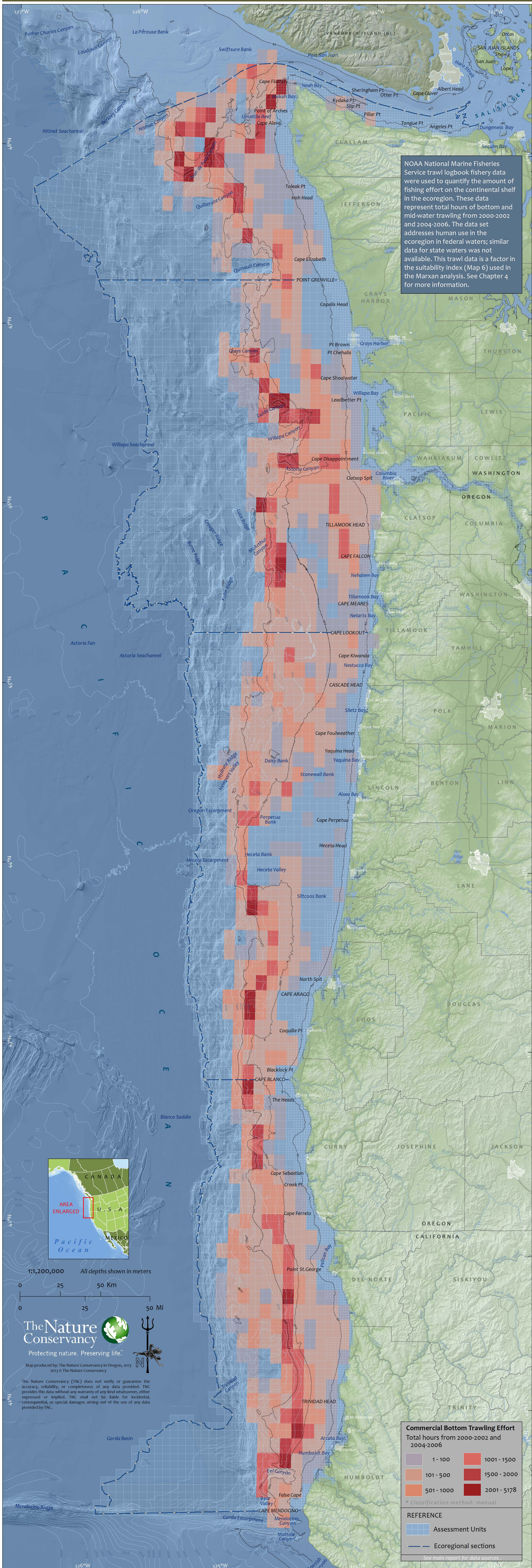


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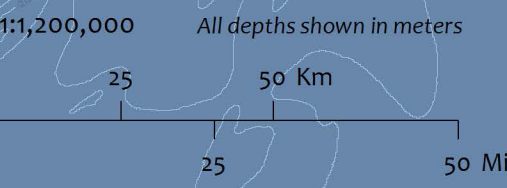
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## Map 7. Commercial Trawling Effort



NOAA National Marine Fisheries Service trawl logbook fishery data were used to quantify the amount of fishing effort on the continental shelf in the ecoregion. These data represent total hours of bottom and mid-water trawling from 2000-2002 and 2004-2006. The data set addresses human use in the ecoregion in federal waters; similar data for state waters was not available. This trawl data is a factor in the suitability index (Map 6) used in the Marxan analysis. See Chapter 4 for more information.



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**Commercial Bottom Trawling Effort**  
Total hours from 2000-2002 and 2004-2006

1 - 100	1001 - 1500
101 - 500	1500 - 2000
501 - 1000	2001 - 5178

\* Classification method: manual

**REFERENCE**

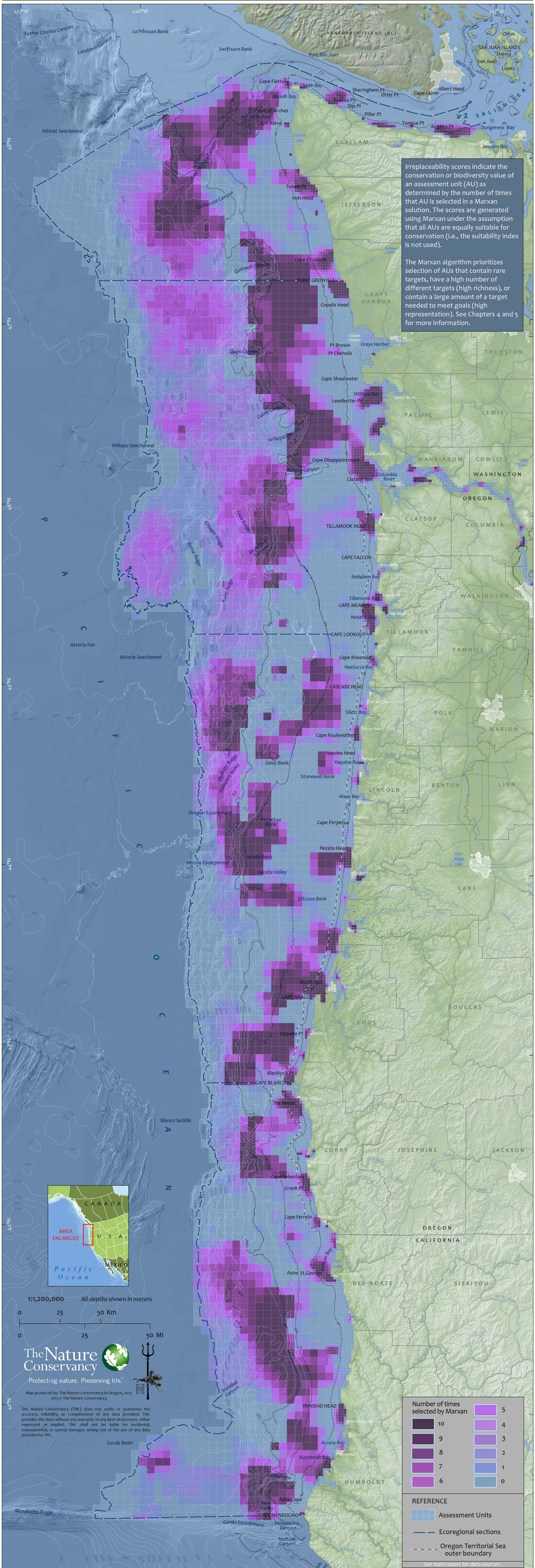
- Assessment Units
- Ecoregional sections

See main report for data sources.



# Pacific Northwest Marine Ecoregional Assessment

## Map 8. Marxan Irreplaceability Results



Irreplaceability scores indicate the conservation or biodiversity value of an assessment unit (AU) as determined by the number of times that AU is selected in a Marxan solution. The scores are generated using Marxan under the assumption that all AUs are equally suitable for conservation (i.e., the suitability index is not used).

The Marxan algorithm prioritizes selection of AUs that contain rare targets, have a high number of different targets (high richness), or contain a large amount of a target needed to meet goals (high representation). See Chapters 4 and 5 for more information.

Number of times selected by Marxan	
10	5
9	4
8	3
7	2
6	1
	0

**REFERENCE**

- Assessment Units
- Ecoregional sections
- Oregon boundary

See main report for data sources.



1:1,200,000 All depths shown in meters

0 25 50 Km

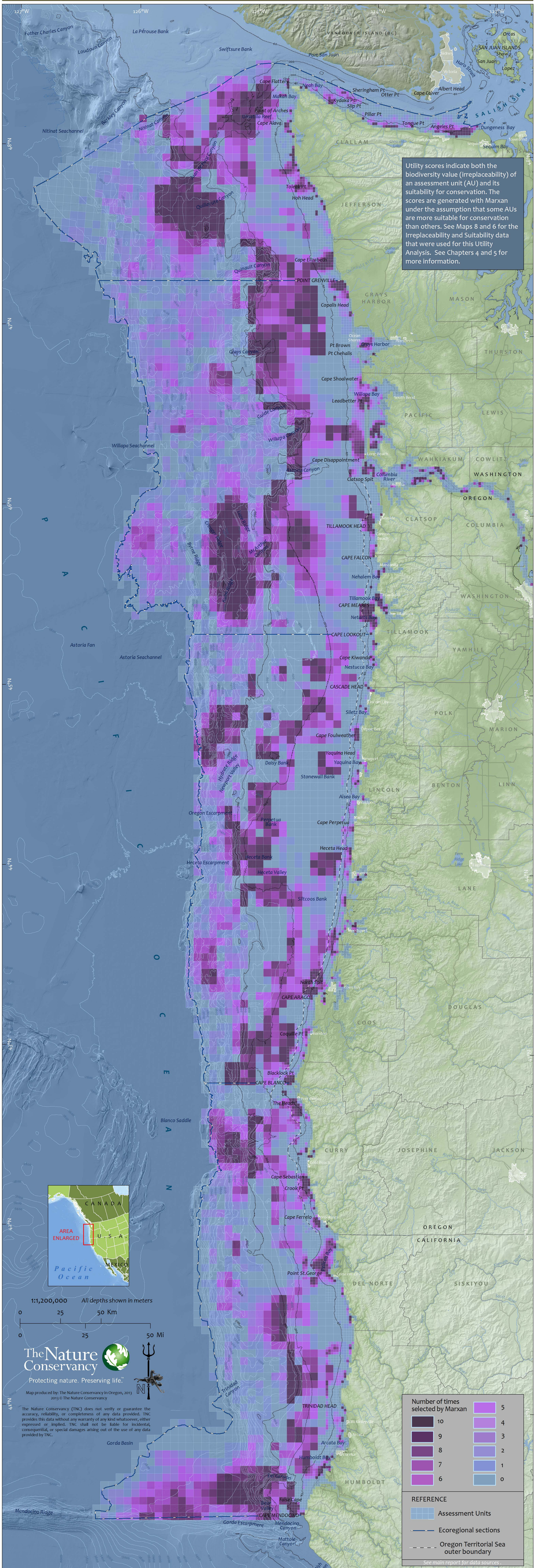
0 25 50 Mi



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Map 9. Marxan Conservation Utility Results



Utility scores indicate both the biodiversity value (irreplaceability) of an assessment unit (AU) and its suitability for conservation. The scores are generated with Marxan under the assumption that some AUs are more suitable for conservation than others. See Maps 8 and 6 for the Irreplaceability and Suitability data that were used for this Utility Analysis. See Chapters 4 and 5 for more information.



1:1,200,000 All depths shown in meters  
 0 25 50 Km  
 0 25 50 Mi



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Number of times selected by Marxan	
	10
	9
	8
	7
	6
	5
	4
	3
	2
	1
	0

REFERENCE	
	Assessment Units
	Ecoregional sections
	Oregon Territorial Sea outer boundary

See main report for data sources.