STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
910 State Office Building, Portland, Oregon 97201

OPEN-FILE REPORT O-85-3

A SURVEY OF OREGON OFFSHORE MAPPING

State Agencies' Needs
State and Federal Agency Programs and Products

by
Glenn W. Ireland
State Resident Cartographer
September 19, 1985

TABLE OF CONTENTS

	Page
Introduction	1
Oregon State Agencies Offshore Requirements	2
Offshore Map Products of State, Federal and Other Sources	3
State agencies needs	
Department of Environmental Quality	6
Department of Energy	6
Department of Fish and Wildlife	7
Department of Geology and Mineral Industries	8
Oregon State Marine Board	10
Division of State Lands	11
Department of Land Conservation and Development	12
Oregon State University	
Hatfield Marine Science Center	13
School of Oceanography	14
Department of Transportation	15
Department of Revenue	15
Federal Agencies programs and map products	
U.S. Coast Guard	16
Defense Mapping Agency	16
Army Corps of Engineers	17
U.S. Fish and Wildlife Service	18
U.S. Geological Survey	
Geologic Division	19
National Mapping Division	20
Mineral Management Service	23
National Oceanic and Atmospheric Administration	
National Geophysical Data Center	24
National Ocean Service	25
National Marine Fisheries Service	28
National Oceanographic Data Center	28
Office of Oceanic and Atmospheric Research	29
Other sources of programs and map products	
Joint Oceanographic Institutions, Inc.	30
Lawrence Berkeley Laboratory	30

INTRODUCTION

As we stand on the beach and look westward, we are like the pioneers of 140 years ago looking toward a territory into which very few have ventured, and to a fine detail, is still unmapped. The area west of the Oregon coast is such a territory. We have only begun to explore the ocean relative to what we will know in 140 years.

The Survey of Oregon Offshore Mapping is intended to identify state agencies' needs and to identify what is available from both the State and Federal sectors in programs and products. This Survey will allow the user to focus on offshore maps needed for a specific project. It will also allow the mapping planners to determine gaps between programs.

This Survey was requested by the Chairman of the State Mapping Advisory Committee. A previous survey in 1982 surveyed only state agencies bathymetric needs. In the intervening time, it has become apparent that a more complete study was needed.

In this Survey, offshore includes the entire marine environment. This marine environment consists in part of the estuary, beach zone, shore, tidelands, near-shore, continental shelf, continental slope, deep sea, and various ridges, rises and fracture zones.

The State Resident Cartographer wishes to thank the participants in this Survey. Their willingness to share information is greatly appreciated.

OREGON STATE AGENCIES' OFFSHORE REQUIREMENTS

	Scale	Interval	Area	Special Features	Purpose
Department of Energy	1:24,000	2 - 5 meters	Continental shelf within 3 mile limit	Bottom obstructions Shore features Jetties	Offshore pipelines mapping & monitoring
Department of Environmental Quality	1:24,000 1:40,000	1 meter 5 meter	1 mile or less offshore Estuaries	Currents Bottom sediments Harbor jetties	Monitor industrial waste discharge Oil spill response
Department of Fish and Wildlife	1:24,000 1:250,000	10 meter 100 meter	Gordo Ridge Continental shelf	Bottom sediments Obstructions	Whale habitat Fishing industry studies
Department of Geology and Mineral Industry	1:24,000 1:100,000 1:250,000	2 meter 10 meter 100 meter	Exclusive Economic Zone Mineral Areas Near-shore	OCS Protraction Grid Geologic Interpretation Bottom sediments	Mineral exploration Oil & gas leasing
Division of State Lands	1:4,800 1:12,000 1:24,000	2 ft from 0 to 10 ft 5 ft from 10 to 100 ft	Rivers Estuaries Coastline	Tide lines Shipping lanes Tide gauges	Leasing minerals Dredge permits Waterway leasing
Department of Land Conservation and Development	1:24,000 1:100,000	1 meter 10 meter	20 major estuaries Continental shelf	OCS Protaction Grid Digital format Marine habitat Orthophotography	Coastal conservation and development
State Marine Board	1:6,000 1:10,000	1 meter	Coastal bars Harbors	Jetties Bars	Serving commercial and sport boaters

OFFSHORE MAP PRODUCTS OF OREGON STATE AGENCIES

Agency Products	Scale	Interval	Area	Special Features	Purpose
Dept. of Geology and Mineral Industry					
Mineral Resources Map, Offshore Oregon	1:500,000	100 meter	Exclusive Economic Zone	Offshore mineral resources	Mineral development
Division of State Lands					
Offshore Leasing Diagram	1:62,500	None	Coast to 3 - Mile Limit	State leasing OCS Protraction Grid	Offshore leasing
Dept. of Transportation					
Ocean Shores Photo Mosaic Series	1:2,400	None	Beach to ¼ mile inland	Photo image Ocean Shores Zone	Beach protection

OFFSHORE MAP PRODUCTS OF FEDERAL AGENCIES

Defense Mapping Agency					
World Navigation Chart	1:8,000,000 1:2,000,000	Fathom soundings	Global	Navigation information	Navigation
Great Circle Sailing Chart Series	1:4,400,000	None	Global	Sailing information	Navigation
World International Chart Series	1:10,000,000 1:3,500,000	1000 meter 200 meter	Global	Navigation information	Navigation
Army Corps of Engineers					
Dredging Charts	1:5,000	40' dredge line Soundings in feet	Harbors and channels	Navigation channels Docking facilities	Dredging Harbor maps
Dredge Material Disposal Site Maps	as required	one fathom	1 mile of shore	None	Dredge material disposal
US Fish & Wildlife					
National Wetlands Inventory	1:24,000 1:65,500 1:100,000	10 - 40 foot 10 - 40 meter	National	Classification of wetlands	Wildlife management
Pacific Coast Ecological Inventory	1:250,000	None	Coastal	Habitat of plants, animals and fish	Wildlife management

OFFSHORE MAP PRODUCTS OF FEDERAL AGENCIES (Cont.)

Agency Products	Scale	Interval	Area	Special Features	Purpose
US Geological Survey Marine Geology					
Offshore Topography of Western United States	1:800,000 ±	100 meter	Coast to 130° longitude	Feature names	Multi-purpose
Continental Margin Map Series	1:1,000,000	100 meter	Exclusive Economic Zone	Digital format Geologic information	Geographic Infor. Systems
US Geological Survey Nat'l Mapping Division					
Topographic/Bathymetric	1:24,000	1 meter	Columbia River Coos Bay in progress	& Names of underwater features	Multi-purpose
Topographic/Bathymetric	1:25,000	1 meter	None in Oregon	Topo. in metric	Multi-purpose
Topographic/Bathymetric	1:100,000	2 meter 10 meter	8 Ore. maps in production	OCS Protraction Grid 3 Mile Limit	Multi-purpose
Topographic/Bathymetric	1:250,000	10 meter 50 meter	Coastal	OCS Protraction Grid 3 Mile Limit	Multi-purpose
Atlas of the EEZ	1:500,000	100 meter	Exclusive Economic Zone	Image map Geologic interpretation	Multi-purpose
Land Use & Land Cover	1:100,000 1:250,000	None	National	Land use classification Digital format	Multi-purpose
Minerals Management Service					
OCS Official Protraction Diagram	1:250,000	None	Exclusive Economic Zone	OCS Protraction Grid	Leasing & Minerals management
Nat'l Oceanic and Atmospheric Admin. Nat'l Ocean Service					
Bathymetric Maps	1:250,000	10 meters 50 meters	Coastal	Available in bathy, magnetic & sediment	Multi-purpose
Topographic/Bathymetric	1:100,000 1:250,000	2 meter 50 meter	Coastal	Co op of USGS & NOS	Multi-purpose
Bathymetric Fishing Maps	1:100,000	2 meter 10 meter	None in Oregon	Loran-C Sediment types	Coastal fishing
Geophysical Maps	1:250,000 1:1,000,000	100 meter	Continental shelf	Magnetic map Sediment map	Scientific investigation

OFFSHORE MAP PRODUCTS OF FEDERAL AGENCIES (Cont.)

Agency Products	Scale	Interval	Area	Special Features	Purpose
Nat'l Oceanic and Atmospheric Admin. Nat'l Ocean Service					
Nautical Charts	1:20,000 to 1:600,000	Soundings in feet & fathoms	Coastal	Navigation aids Hazards Landmarks	Navigation
Nat'l Estuarine Atlas	1:1,500,000	None	Major estuaries	Estuary statistics	Multi-purpose

OFFSHORE MAP PRODUCTS FROM OTHER SOURCES

	Joint Oceanographic Institutions, Inc. Ocean Margin Drilling Program Regional Atlas	1:2,000,000	100 meter	Western continental margin	Geological and geophysical data	Mineral, oil & gas development
	Lawrence Berkeley Laboratory Oceanographic Data 40° - 49°	1:775,000 ±	100 meter	West coast	Earthquake epicenters Sediments Gravity anomalies Surface temperature	Scientific investigation

OREGON DEPARTMENT OF ENERGY

The Department of Energy has jurisdiction over any pipelines which might be established between the coast and the Three Mile State-Federal Limit. If there were oil or gas development off the coast and pipelines were needed, the Department would have to have detailed bathymetric contour maps of the ocean bottom. Bathymetric contours would need to have a 2- to 5-meter interval. The scale of the maps should be 1:24,000.

Contact Person: Scott Smith
Resource Development Division
Department of Energy
102 Labor and Industries Building
Salem, OR 97310
(503) 378-4163

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

The State Department of Environmental Quality monitors the ocean outfalls or industrial waste discharges which take place along the coast. These ocean outfalls are generally within 1,000 - 5,000 feet of shore. Currently there are five outfalls being monitored.

To adequately monitor the ocean outfalls a 1:40,000 scale is needed with 5 meter bathymetric contours. These maps should be concentrated around the harbor jetties as that is where most of the outfalls occur. These maps should indicate patterns of currents and bottom sediments.

The agency does not have any lead action in the leasing of minerals, oil or gas. A member of the department serves on the task force formed by the lead agencies and are able to contribute their expertise through the task force.

Estuaries are of particular interest to the Department of Environmental Quality. Oil Spill Response Plans have been formulated for the critical estuaries. To combat estuarine oil spills, it is necessary to have maps of at least 1:24,000 scale with one meter bathymetric contours. These should be merged with the USGS Topographic Series to show access to the beaches and shore facilities.

Contact Person: Glen Carter
Principal Environmental Analyst
Department of Environmental Quality
522 SW. Fifth
Portland, OR 97204
(503) 229-5358

OREGON DEPARTMENT OF FISH AND WILDLIFE

The State Department of Fish and Wildlife is primarily concerned with the study of marine mammals and fish and the impact the marine environment has on these resources.

The Department is involved in a cooperative study with LCDC, Washington Department of Fish and Game, and the Washington Department of Ecology to develop an Interstate Marine Resource Information Development Program. This Program will evaluate the existing information concerning living marine resources. It is important to understand at what points in the life cycle of marine mammals, fish and plants they are sensitive to changes or pollution. There will also be an assessment of research required to fill the gaps in information concerniing the marine environment if there were near-shore or offshore developments. The study is scheduled to be completed in the spring of 1987.

Some of the Department's work is being conducted from the Marine Science Center, Newport, Oregon. At the Center, studies are being conducted two to three miles off shore, concentrating on marine mammals, specifically harbor seals and sea lions.

Maps to support these marine mammal studies need to be of a higher resolution than the far offshore maps. Within the three-mile limit, maps should be at a 1:24,000 scale with five meter bathymetric contours.

If the Gordo Ridge area were to be developed, studies would be needed concerning the whale population. For this level of study, maps should be at the 1:250,000 scale with 100-meter bathymetric contours. These maps are needed to show the whale feeding grounds and habitat.

Another Department mapping requirement calls for maps of the continental shelf to serve the fishing fleet industry. To better manage the fisheries resource, 1:24,000 scale maps with 10 meter bathymetric countour intervals is needed. Bottom sediment composition is also necessary.

Bio-mass studies are occasionally conducted offshore to determine the concentratioon of fish by species, by gross weight, and by location. The above mentioned 1:24,000 10 meter map series would simplify these studies.

Contact Persons:

Neal Coenen
Environmental Management Sec.
Dept. of Fish and Wildlife
506 SW Mill Street
Portland, OR 97201
(503) 229-5678

Dale Snow
Assistant Regional Supervisor
Oregon Dept. of Fish & Wildlife
Marine Science Drive
Newport, OR 97365
(503) 867-4741

OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

The offshore mapping requirements for the Department of Geology and Mineral Industries are governed by: (1) the needs of land and resource management agencies as they direct their attention to offshore issues, (2) private enterprise as it addresses economic opportunities offshore, and (3) national interests as offshore resources relate to offshore policy formulation and national security both economically and strategically.

The mapping requirements for the Department include the completion of a family of topographic and bathymetric maps of varying scales in a cooperative multiagency program guided by a diversity of needs over a longer time frame.

On a longer time frame Oregon offshore mapping requirements also include a "family" of topographic and bathymetric maps of appropriate scale:

a) At the scale of 1:250,000 bathymetric maps should be completed oceanward from the area of presently available maps to the 200-mile limit for general decision making and data plotting purposes. The small scale set is required for conflict resolution as we look to increased interest in offshore renewable and non-renewable resource interest in future decades in a competitive worldwide arena.

b) At a scale of 1:100,000 bathymetric mapping is a requirement for generic areas of diverse resource interest. These include areas off the mouths of major streams, on the continental shelf, and directly over the sea floor rise where mineral deposits from fan deposition, neritic processes, or volcanic exhalations respectively are present.

   Additionally, the coastal areas of most intense cultural activity (mouths of streams and rivers) require intermediate 1:100,000 scale mapping to guide harbor management, engineering and planning. Safety, recreation, and environmental management are other considerations.

c) At a scale of 1:24,000 a "topo/bathy" series of maps is needed to link up with the 1:24,000 onshore mapping of the USGS onshore and to provide sufficient base map resolution for problem solving in near shore and coastal areas. This is particularly true for estuarine areas.

   The coastal area is subject to a wide variety of coastal and near shore management programs on the federal, state and county levels of which basic mapping responsibility is not assigned.

   Further, the maps are needed to facilitate the resource recovery, fishing, recreation, construction and other needs or private industry and private individuals. Most significant are the port areas of Coos Bay, Newport, and Astoria.

The priority of the above requirements is guided by national security, relevance of the mapping to possible analogous later efforts in select other states, and the opportunity of rapid delivery of a tangible product. Additional considerations include the availability of alternate data and the volume of demand. Thus, the various map products are listed in order of decreasing priority as follows:

Family of maps:

a) 1:250,000 bathymetric to 200-mile limit.

b) 1:24,000 topo/bathymetric in priority coastal areas.

c) 1:100,000 topo/bathymetric in coastal areas and over the seafloor rise.

The programs of the DOGAMI are designed to provide the greatest amount of information in a timely manner for a multitude of users. The Department has recently completed the Mineral Resources Map, Offshore Oregon.

The four-color Mineral Resources Map, Offshore Oregon was produced at a scale of 1:500,000. It graphically depicts known mineral resources from the crest of the Coast Range to about 300 nautical miles beyond Oregon's coast line.

The area covered by the map extends almost 100 nautical miles beyond the EEZ and includes parts of the active sea-floor spreading centers known as the Gorda Ridge and the Juan de Fuca Ridge. Shades of blue on the map indicate water depths down to 4,600 meters.

Offshore mineral resources shown and discussed include black sand (magnetite and chromite), cobalt-rich manganese crusts, glauconite and phosphorite, manganese nodules, petroleum and natural gas, polymetallic sulfides, and sand and gravel.

Other programs in progress include an Oregon Offshore Geology Map. This 1:500,000 scale map is being produced in cooperation with Oregon State University and is scheduled for publication in 1986.

Another project involves the compilation of a Bibliography of Offshore Research. This publication is scheduled for September, 1986.

Contact Person: Dr. John D. Beaulieu
Dept. of Geology and Mineral Industries
910 State Office Building
1400 SW Fifth Avenue
Portland, OR 97201
(503) 229-5580

DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT

The Department of Land Conservation and Development is extremely involved with the investigation, monitoring and policy determination for estuaries, near-shore and offshore.

To satisfy the most urgent needs, maps are needed of the continental shelf. The continental shelf is defined by Land Conservation and Development Commission as the area out to the 200-meter depth line. Within the continental shelf line, maps are needed at a scale of approximately 1:100,000 scale with 10-meter bathymetric contours.

LCDC has identified 20 estuaries which should be mapped, monitored and declared critical habitat. These estuaries are:

- Youngs Bay
- Necanicum River
- Nehalem Bay
- Tillamook Bay
- Netarts
- Sand Lake
- Nestucca Bay
- Salmon River
- Siletz Bay
- Depoe Bay
- Windchuck River
- Yaquina Bay
- Alsea Bay
- Siuslaw River
- Umpqua River (Winchester Bay)
- Coos Bay
- Coquille River
- Sixes River
- Elk River
- Rogue River
- Pistol River
- Chetco River

To adequately map these estuaries, scales of 1:6,000 with 1-meter bathymetric contours are needed. Habitats of wetland species would need to be portrayed. Orthophotography with imagery taken at low tide would be beneficial.

LCDC has a requirement to digitize several layers of information. These layers would be the most basic for a geographic information system.

o The State Department of Lands Offshore Leasing Diagram needs to be digitized. This digitizing would include the oil and gas lease area protraction lines as well as the shoreline and coastal rocks.

o The Oil Spill Response Plan needs to be a part of a digital data base. This data would include the critical habitats of the indiginous species, roads to the beach, access to shore facilities, population density, and frequency of public or private use. The data base should also include the characteristics of the coast, i.e., sandy, rocky, vegetation.

o The marine habitat classification system needs to be digitized. This would allow for better planning in the event of emergencies.

o The offshore leasing blocks as defined by the Minerals Management Service needs to be digitized.

A study is being conducted by LCDC with the cooperation of the Oregon State University School of Oceanography and the University of Oregon Law School. The study will focus on An Analysis of Institutional Capability to Conduct a Near-Shore Response Plan. The study will investigate the response plans which relate to offshore mining, kelp harvesting and oil and gas leasing. The U of O Law School will study the regulations which pertain to response planning.

The Department is producing The Oregon Oceanbook. This book will detail the marine environment of the Oregon coast and ocean. This book is scheduled to be published in October 1985.

Contact Person: Robert Bailey
OCS Coordinator
Department of Land Conservation and Development
320 SW. Stark, #530
Portland, OR 97204
(503) 229-6068

OREGON STATE MARINE BOARD

Of particular interest to the State Marine Board is the up-to-date mapping of the coastal bars at the entrance to the State's River Systems. These shift periodically and are a hazard to commercial and sport boaters. The entrance to harbors should be mapped at a 1:10,000 scale with 1-meter bathymetric contours. These maps need to be updated every 3 years. Also needed in this 3-year update would be any changes of the harbor jetties.

Within harbors, a scale of 1:6,000 with 1-meter bathymetric contours are needed for greater detail. These harbor maps would need to show the various tide lines, shipping lanes, and tideland ownership.

Contact Person: Webb Terwilliger
Deputy Director
State Marine Board
3000 Market Street NE, #505
Salem, OR 97310
(503) 378-8587

OREGON DIVISION OF STATE LANDS

The Division of State Lands is responsible for the leasing of mineral, gas or oil rights within the Three-Mile Limit. To support this responsibility, the Division of State Lands has drawn an Offshore Leasing Diagram at 1:62,500 scale. This diagram shows the shorelines plus the oil and gas lease block numbers and locations. The oil and gas lease block configuration is based on the State plane coordinate position. Currently, the Offshore Leasing Diagram is on a roll of paper approximately 30 feet long. There is a need to have this diagram digitized as part of a geographic information system or reproduced in a more convenient format.

The existing grid shown on the Offshore Leasing Diagram is for oil and gas leasing. There is a need to develop a grid for mineral leasing. The mineral leasing grid would have a different configuration from the oil and gas grid. Maps to support this mineral leasing would need to show the larger underwater features. Generally the lessees are required to supply accurate maps along with their application.

The DSL is also concerned with the ownership of the tidelands. They are responsible for the dredge permit program, the leasing of sand and gravel, and waterway leasing. To monitor these programs, DSL needs a variety of map products. Scales of 1:24,000, 1:12,000 and 1:4,800 would be needed. The bathymetric contour would need to be in 2-foot increments from 0 - 10 foot depth, and 5-foot increments from 10 - 100 foot depth. These maps should be of the rivers, estuaries and coastline. Special features would include the high tide line, mean low water, mean lower low water line, shipping lanes, harbor lines, river mileage, and all agencies gauges. An orthophoto map with imagery taken at a low tide would also be important.

Contact Person: Ron Yockim
Assistant Director for Natural Resources
Division of State Lands
1445 State Street
Salem, OR 97310
(503) 378-3805

OREGON STATE UNIVERSITY
HATFIELD MARINE SCIENCE CENTER

The Marine Science Center, as part of Oregon State University, conducts its own research projects, but also functions as host to several other agencies and institutions within the same facility. The other agencies conducting marine research from the Science Center include the Marine Resource Research Division, NOAA; National Marine Fisheries Service, NOAA; U.S. Environmental Protection Agency; and Oregon Department of Fish and Wildlife.

The Marine Science Center focuses on biological marine processes. Other research programs involve deep sea ecology studies using the submersible research vessel ALVIN, bio-medical research, biology of estuaries, and various studies of fish habitat and life cycle. The Science Center also conducts an educational program offering graduate and undergraduate studies on oceanography as part of the Oregon State University School of Oceanography curriculum.

The Continental Margins Study Group (CONMAR) has concentrated its research on the structure and makeup of the continental margins. These margins were at one time the edges of the great crustal plates that make up the surface of the Earth.

The data acquired by the CONMAR researchers will lead to a fundamental understanding of plate tectonics, fault zones, earthquake activity and geologic history. This knowledge can then be applied to analysing oil and gas potential, understanding fault motions and defining the shape and gravimetric pull of the Earth.

The Marine Resource Research Division, NOAA, is conducting a program called VENTS, which studies the sea floor spreading process and the associated biota. The VENTS program utilizes SeaBeam, a high resolution multi-beam sonar. The mapping resulting from SeaBeam has indicated complicated volcanic structures much more geologically active than previously realized. The MRRD is also involved in a time series study in which the same area is mapped on a one year cycle to determine geologic activity.

Contact Persons:

Dr. Lavern Weber
Director
Hatfield Marine Science Center
Newport, OR 97365
(503) 867-3011

Dr. Stephen Hammond
Director
Marine Resources Research
Division, NOAA
Hatfield Marine Sci. Center
Newport, OR 97365
(503) 867-3011

OREGON STATE UNIVERSITY
SCHOOL OF OCEANOGRAPHY

Oregon State University School of Oceanography has several concerns relating to offshore maps, mapping and data collection.

- Many agencies are collecting data through independent systems. To correlate this diverse data, it is necessary to consider the equipment used, the corrections applied to the data, and the projections used to plot the data. Much of the data collection is through digital systems, therefore correlation is possible.

- Equipment and methods of obtaining position are rapidly improving. Satellite technology now permits 10-meter positional accuracy. This is as accurate as ocean positioning needs to be. When drilling or collecting minerals at thousands of meters of depth, the 10-meter positional accuracy is sufficient. Bottom transponders may be used in small areas to recover exact positions on the ocean bottom.

- Standards vary from nation to nation in the use of map projections. The United States generally uses a mercator projection offshore. This projection allows accurate measurement of direction, but distorts the area in northern latitudes. Canada prefers a conic projection that yields accurate area, but requires corrections to the direction. Near-shore mapping uses Lambert Polyconic projections as developed by the U.S. Geological Survey for the Topographic Series.

- Discrepencies may result in the plotting of the 3-mile line for regulatory purposes unless there is common agreement on the definition of the Three Mile State/Federal Boundary. It is unclear whether the Three Mile Limit is measured from the high water mark, low water, or mean lower low water. The technology now exists for determining the boundary closer than the definition permits.

Contact Persons:

Dr. LaVerne D. Kulm
Oregon State University
School of Oceanography
Corvallis, OR 97331
(503) 754-2296

Dr. Dick Couch
Oregon State University
School of Oceanography
Corvallis, OR 97331
(503) 754-4430

OREGON DEPARTMENT OF REVENUE

The jurisdiction of the Department of Revenue includes navigable streams and estuaries for the purpose of determining ownership and taxation. The ownership of tidelands is a particular concern to the Department.

To satisfy the ownership concerns, the Department has specific requirements as to mapping. The three primary scales needed are 1:24,000, 1:4,800, and 1:1,200. The two larger scales should contain bathymetric contour of one or two foot intervals out to ten feet below mean low tide. Special features needed on the maps are the mean high tide line, mean low tide line, and the Ocean Shores Zone Line. At the two larger scales, the public land survey system should be accurately plotted.

Contact Person: Bob Mead
Mapping Unit Manager
Oregon Department of Revenue
955 Center Street NE
Salem, OR 97310
(503) 378-3381

OREGON DEPARTMENT OF TRANSPORTATION

The Department of Transportation might need bathymetric maps on as-yet-unplanned projects. Specific requirements would depend on the project.

The Department produces the Ocean Shores Photo Mosaic Series. These semi-controlled aerial photography mosaics of the Oregon coast were produced to identify the legislated Ocean Shores Zone Line. This Zone Line depicts the boundary of the state protected beach along the entire coast. Some mosaics were produced in 1967 at 1:1,200 scale. Others were produced in 1974 and 1978 at 1:2,400 scale. The coast of Clatsop, Tillamook, Lincoln and Lane Counties were completed in 1984 at a scale of 1:2,400. There are 42 sheets for the entire Oregon coast coverage.

Contact Person: Jim Ulven
Chief Photogrammetrist
State Transportation Building
Salem, OR 97310
(503) 378-6513

DEPARTMENT OF COMMERCE
UNITED STATES COAST GUARD

The U.S. Coast Guard is a lead agency in the Oil Spill Response Plan. NOAA charts and USGS topograpphic map series are generally used in oil spill recovery. An oil spill protection plan has been formulated which uses the NOAA River Cruising Atlas. This special format of the River Cruising Atlas delineates the wildlife, fish, and plant habitats.

Also used by the U.S. Coast Guard is a portfolio of aerial photography at 1:24,000 scale which portray the river channel and surrounding country. With a plastic overlay feature names, transportation and facilities are delineated.

Contact Person: Charley Strohm
Petty Officer First Class
Marine Environmental Protection
U.S. Coast Guard
6767 North Basin Avenue
Portland, OR 97217
(503) 240-9319

UNITED STATES DEPARTMENT OF DEFENSE
DEFENSE MAPPING AGENCY

The Defense Mapping Agency, San Diego Office, distributes map products to State and Federal agencies. The public may obtain map products through the local dealers. Products distributed through this office include the NOAA navigation charts, bathymetry and topo-bathy charts, and other NOAA products. U.S. Navy bathymetric surveys are incorporated into the NOAA charts.

Defense Mapping Agency ocean navigation charts include:

World General Navigation Chart Series
This series is at 1;8,000,000 and 1:2,000,000 scales on a Mercator projection with fathom soundings.

Great Circle Sailing Chart
This series is at 1:4,400,000 without bathymetric contours or depth soundings.

World International Chart Series
This series is at 1:10,000,000 and 1:3,500,000 scales on a Mercator projection with bathymetric contours at 30 and 200 meter interval to a depth of 1,000 meters; thence, at 1,000 meter interval to maximum depth.

Contact Person: Lt. Mary K. Librizzi
DMA Office, Building 654
Naval Air Station, North Island
San Diego, CA 92135-5111
(619) 437-6231

UNITED STATES DEPARTMENT OF DEFENSE
ARMY CORPS OF ENGINEERS

The Army Corps of Engineers is involved in a program to develop and maintain offshore dredge material disposal sites. These disposal sites are generally located within one mile of shore. The Columbia and Coos Bay disposal sites are located three and three and one half miles offshore. There are 16 sites off the Oregon coast. Future plans require the mapping of candidate disposal sites which will be ten nautical miles from the mouth of the Columbia.

Surveys for dredge material disposal sites and dredging charts are conducted by the Hydrographic Surveys Branch. Dredge material disposal site maps detail the area with one fathom bathymetric contours at a scale in proportion to the disposal area.

Dredging charts produced by the Hydrographic Surveys Branch portray the ship channels and harbors at generally 1:5,000 scale. Scales of select dredging areas can range between 1:500 to 1:20,000. The dredging charts are an orthophotographic image base. The 40 foot dredge line is the only bathymetric contour shown. Depth soundings are in feet. Navigation channels are also shown.

The dredging charts along the Oregon coast substitute for harbor maps. To also serve as harbor maps, the dredging charts additionally portray docking facilities, berth numbers, and dry dock locations.

Contact Persons:

Jim Reese
Senior Environmental Specialist
Oregon Dredge Material Disposal
US Army Corps of Engineers
319 SW Pine
Portland, OR 97204
(503) 221-6401
FTS 423-6401

Juris Jurisons
Chief Hydrographic Surveys
US Army Corps of Engineers
319 SW Pine
Portland, OR 97204
(503) 221-6302
FTS 423-6302

UNITED STATES FISH AND WILDLIFE SERVICE

The U.S. Fish and Wildlife produces the National Wetlands Inventory. The NWI involves classifying the nations wetlands, producing wetland maps and statistics on the present status of wetlands in each state. The classification system is hierarchical and structured around a combination of ecological, hydrological, and substrate characteristics. It consists of five systems which include marine (open ocean and associated coastline) and estuarine (salt marshes and brackish tidal water). The classification system is displayed on the 1:100,000 scale and the 1:24,000 or 1:62,500 scale map series.

The U.S. Fish and Wildlife Service also produces the 1:250,000 scale Pacific Coast Ecological Inventory. These map products locate the habitat of aquatic and terrestrial organisms. Along the coast and within the Three Mile Limit, species with special protective status are highlighted in red.

Jurisdiction for offshore fisheries management is the responsibility of Oregon Department of Fish and Wildlife and the National Marine Fisheries Service.

Contact Person: Dennis Peters
Regional Wetlands Coordinator
U.S. Fish and Wildlife Service
500 NE Multnomah
Portland, OR 97232
(503) 231-6154
FTS 429-6154

UNITED STATES GEOLOGICAL SURVEY
GEOLOGIC DIVISION
OFFICE OF ENERGY AND MARINE GEOLOGY

Offshore Topography of the Western United States

This two-map series was published in 1981 as USGS Open File Map Number 81-443. Coverage is between 32° and 49° north latitudes. The southern map is published at 1:864,518 at 38° latitude, and the northern map is published at 1:776,073 at 45° latitude. Both maps are on the Mercator Projection. Bathymetric contour interval is 100 meters. Primary authors are T.E. Chase, P. Wilde, W.R. Normark, C.P. Miller, B.A. Seekins, and J.D. Young.

Continental Margin Map Series (CONMAP)

A series of standardized maps and digital data bases displaying geologic and geophysical data on the U.S. continental margin is being established by the Geologic Division of the USGS. The map bases will be digitized at a scale of 1:1,000,000 (or other scale determined by the data being compiled) on an Albers Conic Equal Area Projection with standard parallels of 29.5 degrees north and 45.5. degrees north. This is the same projection as the National Atlas (1970), the Geologic Map of the United States (1974), and the tectonic map of the United States. Data bases in this series will include contoured magnetic and gravity data, contoured isopachs of various sedimentary units, track charts of seismic data, location charts for geologic samples, tectonic and structural maps, paleoenvironment maps, distribution of geohazards, bathymetry and morphology, etc. The data will cover onland as well as marine areas of the maps.

Maps for an individual area will be published in the MF series first as they are completed. When the complete series for an area is complete,, the series will be turned over to the National Mapping Division for publication of an atlas. Offshore maps will be published at 1:1,000,000 scale, coastal maps will be published at 1:250,000 scale.

The CONMAP data base will allow rapid updating of information and the integration of other data bases. This series is intended to be a coastal margin geographic information system.

The Branch of Pacific Marine Geology, Menlo Park, California, is currently working on an atlas of image maps off the California, Oregon, Washington coast. These image maps will depict the axial region of the Juan de Fuca Ridge, the Blanco Fracture Zone and the Gorda Ridge. The image maps are produced using the SEAMARK II side scanning sonar system. The maps will be produced at a 1:50,000 scale. Publication is scheduled for May 1986.

Contact Person: David Howell
Chief, Branch of Pacific Marine Geology
U.S. Geological Survey, M/S 999
345 Middlefield Road
Menlo Park, CA 94025
(415) 323-8111 X 7141
FTS 467-7141

U.S. GEOLOGICAL SURVEY
NATIONAL MAPPING DIVISION

The National Mapping Division has been cooperating with other divisions and agencies to produce several offshore mapping products. Details of the products and programs as they relate to Oregon are listed below.

1:24,000 Scale Topographic-Bathymetric Map Series

Product:

This series is made in cooperation with National Ocean Service. Bathymetric data is added to the USGS 1:24,000 scale map series by National Ocean Service. This information is scribed and published by the USGS. Bathymetric contours are generally two meters with supplemental 1-meter contours. The bathymetric datum is mean lower low water.

Program:

The 1:24,000 scale topo-bathy program started in production in 1978. On the west coast there are nine maps published. There are 20 maps available in a preliminary ozalid copy format. On the Oregon coast there are eight quadrangles available at the mouth and estuary of the Columbia River and five quadrangles at the mouth and estuary of Coos Bay. These Coos Bay and Columbia River maps are currently only in the ozalid copy format.

1:25,000 Scale Metric Topographic-Bathymetric Map Series

Product:

This map series is similar to the 1:24,000 scale topo-bathy series except for the scale difference and the 15-minute wide x 7.5-minute high format.

Program:

The only 1:25,000 scale metric topo-bathy maps on the west coast are five quadrangles published in the Seattle area. This scale will be used for bathymetry only when the USGS 1:25,000 scale bases are available. There are no 1:25,000 scale map bases in Oregon.

1:100,000 Scale Metric Topographic-Bathymetric Map Series

Product:

This map series is published in cooperation with the National Ocean Service. The bathhymetric data is added to the USGS 1:100,000 scale map series by National Ocean Service. This information is scribed and published by the USGS. Bathymetric contours are generally 10 meters with supplemental 2-meter contours to the 200-meter depth. Thence, 50-meter contour interval with supplemental 10-meter contours to maximum depth. Bathymetric datum is mean lower low water.

The offshore protraction grid as administered by the Minerals Management Service for Federal leasing purposes is shown in red. The Three Mile State-Federal jurisdiction limit is also shown.

Program:

The 1:100,000 scale metric topo-bathy series was started in 1980. One map (Point Estero) in California has been published. Other west coast maps are in production and are available in an ozalid copy format. Eight of the ten Oregon coastal 1:100,000 scale maps are in production. The Newport and Waldport quadrangles are not yet scheduled for production.

1:250,000 Scale Topographic-Bathymetric Map Series

Product:

Bathymetric and shoreline compiled by the National Ocean Service. Bathymetric contour interval is generally 10 meters to the 200-meter depth, 50 meters to the maximum depth. Bathymetric datum is mean lower low water. The offshore protraction grid as administered by the Minerals Management Service for Federal leasing purposes is shown in red. The Three-Mile State-Federal jurisdiction limit is also shown.

Program:

The Salem 1:250,000 scale quadrangle is the only one of that series available portraying the Oregon coast in a topo-bathy format. The Coos Bay and Cape Blanco quadrangles are in production. National Ocean Service has added the bathymetric contours. The Rocky Mountain Mapping Center is authorized to reformat the quadrangle and perform the scribing in preparation for publication. The reformatting will involve converting a 1° wide by 2° high quadrangle into two 2° wide by 1° high quadrangles.

The Cape Disappointment quadrangle portraying the mouth and the area west of the Columbia River is available in an ozalid copy format. This quadrangle has not yet been authorized for topo-bathy publication.

Atlas of the Exclusive Economic Zone, Western Conterminous United States

Product:

The Atlas will consist of 36 two degree quadrangles at 1:500,000 scale on a Transverse Mercator Projection. The area of coverage of this Atlas is the West Coast EEZ beyond the 500 meter depth. The quadrangles will consist of (1) a GLORIA (Geological Long Range Inclined Asdic) digital image reproduced photographically, (2) a bathymetric contour overlay with 100-meter contours, and (3) a geologic and seismic interpretation of the ocean bottom prepared by the Branch of Pacific Marine Geology. The Western Conterminous United States Edition is due to be published in September 1985.

Program:

This Atlas is a cooperative program between the Geologic Division, and the National Mapping Division of the USGS. The USGS has contracted with the Institute of Ocenaographic Sciences (IOC) to collect the GLORIA digital data. NMD is to develop various methods to display the sonar data. The 100-meter bathymetric contour informatiion will be supplied by the National Ocean Service. The current Atlas schedule calls for the West Coast to be published in 1985; the Gulf Coast in 1986; the East Coast in 1987; the Alaskan Coast in 1988; and Hawaii in 1989.

Digital Program, Continental Margin Map Series (CONMAP)

Product:

The digital program of the CONMAP consists of digitizing the 1:1,000,000 scale regional maps produced by the National Ocean Service. Inland topographic data will be produced from the 1:250,000 scale Digital Terrain Tapes.

Program:

The digital program of the CONMAP is designed to prepare map products of the EEZ and to support a number of scientific studies. NOS will supply the 1:1,000,000 scale graphic data. The Mid-Continent Mapping Center will digitize the data. The first effort in this program is to digitize and publish the Baltimore Canyon Sheet in fiscal year 1985. The East Coast and the Gulf Coast are scheduled to be completed in 1986. Five digitized sheets will cover the East Coast and two sheets will cover the Gulf Coast. The digitizing of west coast data has not yet been scheduled.

Land Use and Land Cover Series

Product:

This digital and graphic data portrays 23 classes of land use and land cover. Polygons of the various classes must be a minimum of 10 acres in all urban or built up areas. Outside urban areas LU/LC polygrams have a minimum of 40 acres. Along the Oregon coast the area south of 43°30' consists of 1:100,000 scale LU/LC maps. North of 43°30' the information is at 1:250,000 scale.

Program:

The graphic LU/LC maps along the Oregon coast were obtained from 1972 to 1976 aerial photography. To digitize the LU/LC maps for the National Digital Cartographic Data Base has been a goal of the USGS. To support the National Coastal Pollution Discharge Inventory Program of the EPA and NOAA, the NMD accelerated the digitizing of the west coast LU/LC maps. The Oregon LU/LC coastal maps are completely digitized. The LU/LC map series is being used in the National Estuarine Atlas which is scheduled for publication this fall by the Ocean Assessments Division of the National Ocean Service.

Contact Person: Glenn W. Ireland
National Mapping Division
U.S. Geological Survey
847 NE 19th, Suite 300
Portland, OR 97232
(503) 231-2019
FTS 429-2019

UNITED STATES MINERAL MANAGEMENT SERVICE

Of the maps held by the Mineral Management Service, 95 percent are proprietary. These maps are the property of exploration companies involved in oil and gas investigations. These maps cannot be released to the public.

The Mineral Management Service produces the Official Protraction Diagrams which are used in the offshore lease determination. Official Protraction Diagrams have been completed for the entire West Coast EEZ. The boundaries of the grid blocks are defined in terms of X and Y coordinates of the Universal Transverse Mercator Grid System based on the Clarke Spheroid of 1866.

The Protraction Diagrams are being entered into the MOSS Geographic Information System.

Contact Person: William E. Grant
Regional Director
Mineral Management Service
1340 West 6th Street
Los Angeles, CA 90017
(213) 894-2048

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL GEOPHYSICAL DATA CENTER

National Geophysical Data Center is responsible for acquiring, processing, storing, and disseminating data that result from international and national programs such as the International Decade of Ocean Exploration (IDOE), the Outer Continental Shelf Environmental Assessment Program (OCSEAP), Deep Ocean Mining Environmental Study (DOMES), and the Marine Eco-Systems Analysis program (MESA).

NGDC holds and disseminates data for other Government agencies and academic institutions. Examples of other agencies data are related to hazardous geological structures, other constraints to drilling in OCS Lease Sales, areas and well logs and common depth point (CDP) seismic reflection data collected by the U.S. Geological Survey and Minerals Management Service. Digital hydrographic data collected by the NOAA National Ocean Survey (NOS) is also on file.

NGDC has also been designated the national repository for all marine bathymetric and geological/geophysical data collected under the joint U.S. Geological Survey - National Oceanic and Atmospheric Administration program to investigate, survey, evaluate, manage, and protect the U.S. Exclusive Economic Zone (EEZ).

Marine geophysical data consist of measurements of bathymetry, magnetic field, and gravity in digital form, and seismic reflection and side-scan sonar data on 35-mm microfilm.

Bathymetric/hydrographic data bases include a near-complete set of digital hydrography from U.S. coastal water collected over the years by the National Ocean Service (formerly the U.S. Coast and Geodetic Survey), and a worldwide gridded bathymetry data base (5-minute grid) compiled by the U.S. Naval Oceanographic Office.

A description of NGDC's marine holdings may be found in KGRD-14, "Marine Geology and Geophysics Data Services and Publications." Copies are available on request at no charge.

Contact: National Geophysical Data Center
NOAA E/GC 3
325 Broadway
Boulder, CO 80303
(303) 497-6487
FTS 320-6487

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

The National Ocean Service (NOS), NOAA, Department of Commerce in 1975 entered into a cooperative Topographic/Bathymetric (topo/bathy) Mapping Program with the United States Geological (USGS), Department of The Interior, to map coastal (land-water) areas of the United States. At the same time NOS accelerated its production of 1:250,000 scale bathymetric maps to support the Department of The Interior's Minerals Management Services (MMS) offshore natural resources development program. Since 1975 over 300 bathymetric and topo/bathy maps have been produced. Additionally, NOS has provided USGS bathymetric manuscripts to publish another 130 topo/bathy maps at 1:24,000, 1:100,000 and 1:250,000 scale.

Bathymetric Maps

Topographic maps of the sea floor. The bathymetric map serves as the basic tool for performing scientific, engineering, marine geophysical, and marine environmental studies that are required in the development of energy and marine resources. Bathymetric maps overprinted with Minerals Management Service Outer Continental Shelf (MMS) Protraction Diagram data are identified on the bathymetric index.

These maps are produced generally at a 1:250,000 scale with a bathymetric contour interval of 10 meters to the 200 meter depth, thence 50 meters to maximum depth. Datum is mean lower low water. A geophysical map at the same scale provides magnetic gravity or surficial bottom sediment.

Topographic/Bathymetric Maps

These detailed multipurpose maps show both the NOS bathymetry and the USGS land topographic information. These maps are cooperatively produced by NOS and USGS to support the Coastal Zone Management and Energy impact Programs and the offshore oil and gas program. All 1:250,000 and 1:100,000 scale topo/bathy maps are overprinted with the Minerals Management Service's OCS Protraction Survey data.

The 1:100,000 scale topo/bathy maps along the Oregon coast are in production. The bathymetric data is available in ozalid copy form. The Coos Bay and Cape Blanco 1:250,000 scale topo/bathy along the Oregon coast are in production.

Bathymetric Fishing Maps

Topographic maps of the sea floor designed primarily for use by commercial and sport fishermen. This series of maps produced at a 1:100,000 scale contain the Loran-C rates, distribution and identification of bottom sediment types, and known bottom obstructions in addition to the basic information found on the standard bathymetric map. The product is intended to aid fishermen and other users in the identification of seafloor features and the bottom of potential fishing grounds.

The bathymetric fishing map is a new series. A few have been produced for the east coast. None are yet available for the west coast.

Geophysical Maps

Each consists of three sheets (a base bathymetric map, a magnetic map, and a gravity map), and where practicable a sediment overprint. There are two series of geophysical maps. The 1::250,000 scale series contains the geophysical data for the Continental Shelf and slope. The SEAMAP Series at a scale of 1:1,000,000 covers geophysical data gathered in the deep-sea area, sometimes including the adjacent Contiinental Shelf and Slope.

The SEAMAP Series at 1:1,000,000 scale along the Oregon coast have magnetic and gravity data.

Nautical Charts

Nautical charts depict the territorial waters of the United States and its territories and possessions. The charts show depths, navigation aids and hazards, shorelines, key landmarks, and cultural features necessary for safe navigation. Scales vary according to the purpose of the chart, ranging from harbor charts at 1:20,000 to sailing charts at smaller than 1:600,000.

Nautical Chart Catalogs

Nautical chart catalogs provide descriptions, prices, and ordering information for charts and related publications. The catalogs also list authorized nautical chart agents for the sale of charts and related publications. Catalogs are published annually.

Catalog No. 2 - Pacific Coast, including Hawaii, Guam, and Samoa Islands
Catalog No. 3 - Alaska, including the Aleutian Islands
Catalog No. 5 - Bathymetric Maps and Special Purpose Charts (includes geophysical maps and data, marine boundary maps and charts, and marine weather service charts.

Publications related to nautical charts include Tide Tables, Tidal Current Tables, and Tidal Current Charts.

National Estuarine Atlas

This Atlas details the 112 major estuaries of the United States based on fresh water inflow. The data for each estuary are shown on individual maps and in separate land use tables. For each estuary, estimates are included for: the dimensions and boundaries of estuarine waters; flow rates; tidal parameters; stratification; surface area; and 25 categories of land use in the portions of drainage basins directly affecting the estuary.

Along the Oregon coast the Columbia, Winchester Bay, Coos Bay, Rogue River, and Chetco River Estuaries were selected for inclusion. Due to selection parameters, the Tillamook and Yaquina Estuaries were not included in the Atlas.

Original Ocean and Coastal Surveys

Hydrographic surveys of the ocean and coastal waters have been used in nautical charts since 1835. Over 26,000 individual surveys are on file. The original surveys represent a unique and comprehensive record of the coastline and the adjacent waters by showing conditions existing at the date of the survey and providing a detailed record of the changes that have occurred from both natural and human causes. Indexes are available showing the type of information obtained and the area of coverage.

Ocean and Coastal Resource Management

The National Ocean Service, working closely with coastal states, administers the Coastal Zone Management Program, the National Estuarine Sanctuary Program, the Coastal Energy Impact Program, and the Ocean Minerals and Energy Program.

Coastal Zone Management

The Coastal Zone Management Act established a national program in 1972 to provide financial assistance, technical assistance, and policy guidance to state governments to balance the often competing demands to develop and use the coastal resources. NOS provides assistance emphasizing special area management planning, coastal hazards, mitigation, cost-effective coastal management, and the simplification of permit processes for coastal activities.

Ocean Minerals and Energy

Under the Ocean Minerals and Energy Program, the National Ocean Service is the focal point in NOAA for facilitating the private sector's establishment of new industries to develop ocean minerals and ocean energy resources, including hard minerals on the ocean floor and ocean thermal energy conversion (OTEC). This role includes establishing the necessary legal framework and a simplified licensing system to reduce regulatory obstacles and legal uncertainties in this newly emerging industry of ocean mineral and energy development.

The Biennial Report describes NOAA's progress in implementing the Deep Seabed Hard Minerals Resources Act and its continued development of the deep seabed mining program in a legally sound and environmentally sensitive manner. The report includes NOAA's efforts in the negotiation of agreements with foreign nations to facilitate reciprocating State agreements.

Contact:

For Charts & Maps:

Chart Sales Office N/MOPx4
Pacific Marine Center, NOS
1801 Fairview Avenue East
Seattle, WA 98102
(206) 442-7657
FTS 399-7657

For Programs & Policies

Northwest Ocean Service Center
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
(206) 526-NOAA
FTS 392-6622

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

The National Marine Fisheries Service (NMFS) conducts programs to conserve and manage living marine resources and their habitats. NMFS manages all fishery resources except tuna within the U.S. Fishery Conservation Zone. The Fishery Conservation Zone extends from the three nautical mile seaward boundary of the coastal states to 200 nautical miles from shore.

NMFS develops and coordinates habitat conservation programs including the preparation of comprehensive plans for protection and enhancement of marine and anadromous fishes in nearshore and estuarine habitats.

NMFS provides fishery protection recommendations on all federally funded, licensed or permitted water development proposals. Activities include federally funded and constructed water development projects, navigation improvements, port developments, Corps of Engineer Sec. 10/404 permits, Federal Energy Regulatory Commission licenses and exemptions, Nuclear Regulatory Commission licenses, and Environmental Protection Agency permits.

Contact Person: Dale R. Evans
Chief, Enviromental & Technical Services Division
Northwest Region, NMFS
847 NE 19th Avenue, Suite 350
Portland, OR 97232
(503) 230-5424, FTS 429-5424

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEANOGRAPHIC DATA CENTER

The National Oceanographic Data Center (NODC) maintains the world's largest usable collection of marine data. NODC acquires, archives, and disseminates global oceanographic data collected by federal, state, and local government agencies, universities and research institutions, and industry. NODC holds physical, chemical, and biologiical oceanographic data and environmental assessment data collected primarily on the U.S. outer continental shelf. NODC also acquires data from foreign sources and operates World Data Center-A for Oceanography.

NODC manages the central office for the Ocean Pollution Data and Information Network, which coordinates the dessemination of data and information resulting from federal marine pollution programs.

The publication National Oceanographic Data Center Users Guide (Key to Oceanographic Records Documentation No. 14) provides information on NODC data files, data inventories, and computer-generated data products.

Contact: Northwest Liaison Office, NODC
NOAA Northwest Ocean Service Center N/OS14
7600 Sand Point Way NE
Bin C 15700
Seattle, WA 98115
(206) 526-6263, FTS 392-6263

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH

The Office of Oceanic and Atmospheric Research (OAR) operates a nationwide network of research laboratories to investigate oceanic and atmospheric processes and their interactions, the coastal environment, solar-terrestrial and upper air atmosphere dynamics, and weather modifications. OAR also studies geophysical events such as hydrothermal venting, severe local storms, hurricanes, and tsunamis, and develops remote sensing devices and computer models of environmental processes.

Pacific Marine Environmental Laboratory

The Pacific Marine Environmental Laboratory (PMEL) conducts research in oceanography, marine meteorology, and related disciplines for the Pacific Ocean and adjacent coastal regions. Studies improve understanding of the environmental processes in coastal and open-ocean systems to support programs for wise development and rational conservation of ocean resources, as well as for monitoring and predicting weather and environmental conditions.

PMEL research produces environmental information and predictive models. Research results are disseminated as scientific papers, technical reports, and presentation to other researchers and interested local and federal agencies. The PMEL Annual Report lists publications and provides detailed information on individual research programs.

The effect of hydrothermal venting on the marine environment is the focus of PMEL's marine resources program called VENTS. Hydrothermal venting, which occurs along sea floor spreading centers, respresents a basic input of heat and materials into the oceans. Current studies of hydrothermal venting have focused on the Gorda and Juan de Fuca ridges. Main activities of the PMEL Marine Resources Research Division are centered at the Mark O. Hatfield Marine Science Center in Newport, Oregon.

Research efforts have been specifically designed to define and quantify the chemical, geological, and physical oceanographic processes evolving from the venting of hydrothermal fluids.

Contact: Pacific Marine Environmental Laboratory R/E/PM
OAR
7600 Sand Point Way NE
Bin C 15700
Seattle, WA 98115
(206) 526-6800
FTS 392-6800

JOINT OCEANOGRAPHIC INSTITUTIONS, INC.

Joint Oceanographic Institutions, Inc., is an association of ten universities including Oregon State University School of Oceanography and Woods Hole Oceanograpphic Institution. The JOI Science Advisory Committee in 1984 published the Ocean Margin Drilling Program REGIONAL ATLAS SERIES.

Each regional atlas synthesizes geological and geophysical data from one of 13 areas in the ocean margins where deep drilling is likely to occur. Each atlas displays maps on a Mercator projection at 1:2,000,000 scale except for the Gulf of Mexico on 1:3,000,000 and the Antarctic on 1:6,000,000 Polar Stereographic projection. The maps have bathymetry, gravity and magnetics in each area followed by geologic, tectonic, and lithofacies maps with added cross sections and seismic reflection sections.

Contact: Marine Science International
1420 Statler Office Building
20 Park Plaza
Boston, MA 02116
(617) 426-5246

LAWRENCE BERKELEY LABORATORY

The Lawrence Berkeley Laboratory has produced a set of three oceanographic data plates. The three plates are:

Oceanographic Data off Northern California - Southern Oregon, 40° to 43° North including the Gorda Deep Sea Fan.
Published November, 1978.
Scale: 1:815,482 at 42° N latitude

Oceanographic Data off Oregon, 43° to 46° North including the Astoria Deep Sea Fan.
Published July, 1979
Scale: 1:776,073 at 45° N latitude

Oceanographic Data off Washington, 46° to 49° North including the Nitinat Deep Sea Fan.
Published November, 1977
Scale: 1:748,602 at 47° N latitude

The bathymetric contours of this series are at a 100 meter interval. The maps are on a Mercator projection. Other information on the plates include geographic feature names, earthquake epicenters, bottom sediments and heat flow stations, gravity anomalies, magnetic lineations, monthly surface currents by degrees and sea surface temperatures.

Contact: Lawrence Berkeley Laboratory
Energy and Environment Division
University of California
Berkeley, CA 94720
(415) 486-4000