BOARD OF SUPERVISORS

COUNTY OF SANTA CRUZ

GOVERNMENTAL CENTER

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JANET K. BEAUTZ FIRST DISTRICT | WALTER J. SYMONS SECOND DISTRICT | MARDI WORMHOUDT THIRD DISTRICT | RAY BELGARD FOURTH DISTRICT | JEFF ALMQUIST FIFTH DISTRICT

AGENDA: 11/10/98

October 28, 1998

BOARD OF SUPERVISORS
County of Santa Cruz
701 Ocean Street
Santa Cruz, CA 95060

RE: OIL SPILL PROTECTION/VESSEL MANAGEMENT PROPOSAL

Dear Members of the Board:

The Board has received a letter from William J. Douros, Superintendent of the Monterey Bay National Marine Sanctuary, requesting that our Board take a position in support of the vessel traffic management measures included in the attached Vessel Management Workbook. This workbook is the product of monthly meetings held over the past year and a half by a work group which included representatives of federal, state and local governments, environmental groups, and the shipping industry to review existing practices and risks and recommend a package of strategies for public review. Thereafter, Sanctuary staff, working on behalf of the National Oceanic and Atmospheric Administration and District 11 of the United States Coast Guard, conducted a series of public workshops to discuss options to reduce the risk of major spills, thereby protecting the extraordinary marine life within the Sanctuary while maintaining the economic viability of the region's important maritime commerce.

As indicated in the Executive Summary of the Vessel Management Workbook, of the roughly 4,000 coastal transits of the Sanctuary each year by large vessels, approximately 20 percent of these transits are crude oil tankers. However, spills can potentially occur from any transiting vessel carrying crude oil, bunker fuel or other hazardous materials. Therefore, these proposed measures have been designed to ensure safe, effective, and environmentally sound vessel traffic management in the Sanctuary region and throughout Central California, and could offer similar protections nationwide.

I believe that the proposed package provides the means to ensure that adequate measures are in place to both protect our natural resources and sustain the navigational safety and economic viability of the region's critical maritime commerce. Accordingly, I recommend that the Board direct the Chairperson to write to the Navigation Safety Advisory Council and encourage the United States Coast Guard to pursue full implementation of the measures contained in the Vessel Management Workbook at both the domestic and international levels.

Sincerely,

JANET K. BEAUTZ, Chairperson
Board of Supervisors

JKB: ted
Attachments

cc: William Douros, Monterey Bay National Marine Sanctuary
Planning Department

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Monterey Bay National Marine Sanctuary
299 Foam Street, Suite D
Monterey, California 93940

October 16, 1998

Jan Beautz
Chair, Board of Supervisors
County of Santa Cruz
701 Ocean St., Room 500
Santa Cruz, CA 95060

Dear Chairperson Beautz:

I am writing to ask for your support in reducing the risk of a catastrophic oil spill in the Monterey Bay National Marine Sanctuary. The Sanctuary is home to an extraordinarily diverse array of marine mammals, sea birds, fishes and invertebrates, including many species which are particularly sensitive to the impacts of spilled oil. Approximately 4000 large vessels, including oil tankers, towed barges, container ships, and bulk product carriers pass through the Sanctuary each year. Major spills can potentially occur from any transiting vessel carrying crude oil, heavy "bunker fuel" which the ships use to power themselves, or any other hazardous material.

For the past year and a half, the Sanctuary and the United States Coast Guard (USCG) have sponsored a series of monthly meetings with a work group to evaluate and recommend vessel management measures to reduce the risk of major spills, while maintaining the economic viability of the region's important maritime commerce. The work group included key representatives from federal, state and local government, the oil and shipping industry, environmental groups and the public.

The proposal developed by this group includes organizing and strengthening current informal patterns of vessel traffic, moving vessels further offshore where necessary, alteration of the approach lanes for San Francisco Bay and the Santa Barbara Channel, increased vessel reporting, establishment of a rescue tug network, and increased education. The overall package of strategies is intended to work together to ensure safe, effective, and environmentally sound vessel traffic management in the Sanctuary region and throughout Central California. We are particularly impressed that the proposed package was developed and supported by many factions of the shipping industry, disparate environmental groups and all relevant regulatory and resource management agencies.

The vessel management proposal is described in more detail in the enclosed Vessel Management Workbook. The proposal was presented by the Sanctuary and the USCG at a series of public hearings in June, 1998, and public comment was nearly unanimously in support of the recommendations.

The next step for the proposed package of strategies is to obtain approval by the Navigation Safety Advisory Council (NAVSAC) of the USCG at their meeting in Monterey on November 21, 1998. We ask for your help in the form of a letter from your Board to the Executive Director of NAVSAC, The letter should indicate the importance of reducing risks from oil spills on the Central Coast, outline your support for the vessel management

proposal, and stress the importance of following through with implementation. A sample letter is enclosed which could be modified to reflect your views. These letters should he sent as soon as nossible. but no later than November 12 in order to reach the NAVSAC panel prior to their meeting.

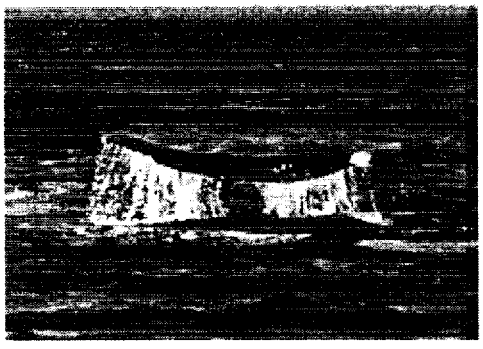
Please contact me at (83 1) 647-420 1 or Holly Price of my staff at (83 1) 647-4247 if you we can provide any additional information. Thank you for your help in protecting the resources of the Central Coast.

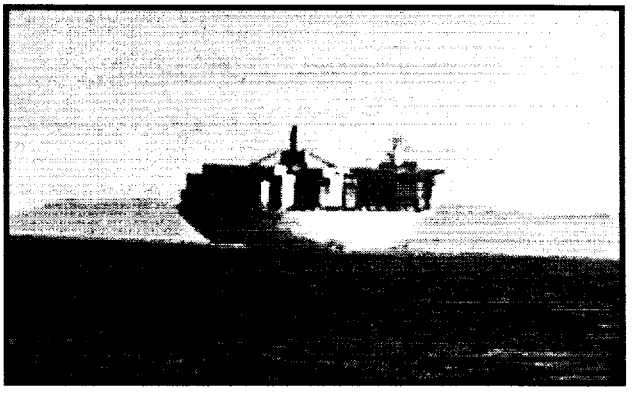
Sincerely

William J. Douros
Superintendent

cc: Alvin James, Planning Director

Monterey Bay National Marine Sanctuary
Vessel Management Workbook
for June 1998 Public Workshops





Public Workshop Schedule:

June 17th, 1998 Half Moon Bay, CA

June 18th, 1998 Oakland, CA

June 29th, 1998 Santa Cruz, CA

June 30th. 1998 Monterev. CA

09 June 1998

Monterey Bay National Marine Sanctuary
Vessel Management Workbook
for June 1998 Public Workshops

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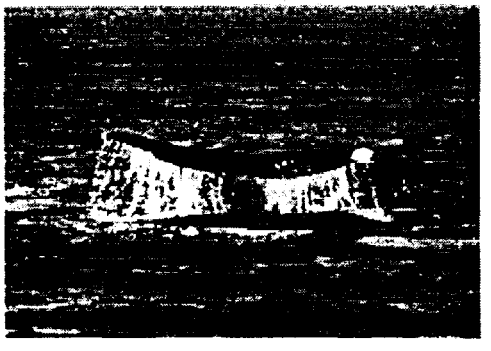

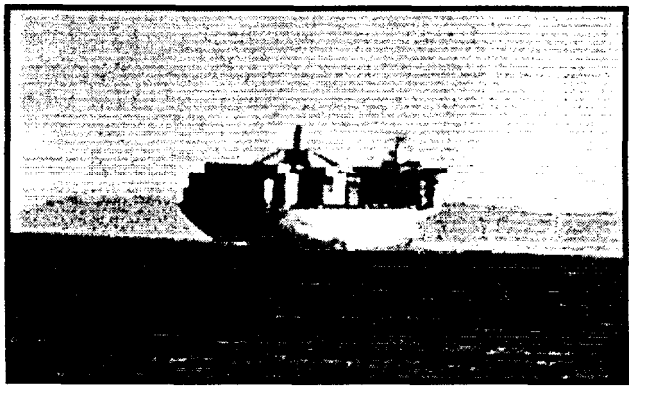

Public Workshop Schedule:

June 17th, 1998 Half Moon Bay, CA

June 18th, 1998 Oakland, CA

June 29th, 1998 Santa Cruz, CA

June 30th, 1998 Monterey, CA

09 June 1998

Monterey Bay National Marine Sanctuary Vessel Management Workbook Content and Public Workshops

This document contains background information on biological resources within the Monterey Bay National Marine Sanctuary (MBNMS), existing vessel traffic patterns, and existing management measures, It also includes a detailed summary of the new package of proposed strategies developed by the Vessel Management work group, and a brief description of alternative strategies which the group considered.

The workbook intends to provide participants at the public workshops with the information needed to help provide comments or additional information on the proposed strategy package or alternatives, or to pose questions to the work group members.

The schedule and locations of the public workshops are shown below. For all workshops, doors open at 6:30 P.M. with sign-ups for comments/questions. The vessel traffic presentation begins at 7:00 P.M., followed by public comments. The meetings will end by 10:00 P.M., or sooner when all public comments have been received.

June 17th, 1998 Half Moon Bay, CA
Ted Adcock Community Center/Senior Center, 535 Kelly Ave.

June 1 8th, 1998 Oakland, CA
Port of Oakland, 2nd Floor Board Room, 530 Water Street

June 29th, 1998 Santa Cruz, CA
Cocoanut Grove Hotel, 2nd Floor, 400 Beach Street

June 30th, 1998 Monterey, CA
Doubletree Hotel DeAnza Ballroom; intersection of Del Monte Ave. and Alvarado St.

Oral presentations of comments/questions are encouraged to promote an open forum with opportunities for exchange with work group members. However, if interested parties are unable to attend the workshops, written comments will be accepted and must reach the Eleventh Coast Guard District Aids to Navigation and Waterways Management Branch on or before July 14, 1998. The mailing address for written comments is: Commander (Pow); Eleventh Coast Guard District; Building 50-6; Coast Guard Island; Alameda, CA 94501; ATTN: MBNMS Public Comment.

Following the public workshops and the receipt of written comments, the work group will reconvene to incorporate public input and finalize a proposed package of strategies for implementation. For measures which require regulatory action, the public at large will have additional opportunities to provide input through the Federal Rulemaking process.

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EXECUTIVE SUMMARY

The Monterey Bay National Marine Sanctuary (MBNMS) is the largest marine protected area in the United States. It includes over 5000 square miles of water off central California, spanning over 350 miles of coastline from Cambria to the Marin Headlands. The area was given sanctuary protection by Congress in 1992 in recognition of its national environmental importance and its unique, sensitive and abundant biodiversity. The Sanctuary is home to an extraordinarily diverse array of marine mammals, sea birds, fishes and invertebrates, including many species that are particularly sensitive to the impacts of spilled oil. The Sanctuary is also located in an area of critical importance to the conduct of maritime commerce, which is a major component of the regional and national economy.

Vessel traffic within the Sanctuary was a major issue of concern raised during the Sanctuary designation process. The historical record of spills for the Pacific Coast indicates that the total number of spills from transiting vessels is relatively small in number, but the potential impacts can be significant given the volume of these vessels and the potential size of a spill. Congress directed the Secretaries of Commerce and Transportation to evaluate potential threats from spills of oil or other hazardous materials to Sanctuary resources and possible ways to reduce those threats. The United States Coast Guard and the National Oceanic and Atmospheric Administration established a work group of key stakeholders in the issue, including federal, state and local governments, environmental groups and industry to review existing practices and risks, and recommend a package of strategies which could be presented for public review. The work group's goal is to provide a vessel traffic management system that maximizes protection of Sanctuary resources while allowing for the continuation of safe, efficient and environmentally sound transportation.

There are approximately 4,000 coastal transits of the Sanctuary each year by large vessels. Approximately 20% of these transits are crude oil tankers. The majority of the remainder are large commercial vessels (LCVs) such as container ships and bulk product carriers. Recognizing that spills can potentially occur from any transiting vessel carrying crude oil, bunker fuel, or other hazardous material, the work group focused its review on four major categories of vessels: a) laden tankers carrying crude oil, black oil or other persistent liquid cargo in bulk; b) Hazmat ships carrying hazardous materials in bulk, including petroleum products; c) barges carrying oil or hazardous materials in bulk; and d) LCVs greater than 300 gross tons.

The work group's recommended set of strategies reflects a balance of factors combined to provide protection for the Sanctuary, reduced risk of vessel groundings and collisions, and efficient vessel operation, while minimizing the economic burden to industry. The distances offshore are in part based on an analysis of the anticipated response time for existing rescue

vessels. That is, if a vessel that follows the routing measures loses power or steering capabilities, it will almost certainly be reached by a rescue vessel before it drifts ashore and creates a spill. The comprehensive package is outlined below:

1) Distance from Shore: Recommended distances offshore of **Point** Sur and **Pigeon Point** strengthen informal patterns of current practices, and where necessary, shift vessels further offshore to reduce the level of threats to resources:

Tankers--50 nautical miles (nm)
Barges --25 nm
Hazmat Ships--25 nm
LCV-- 12.7 nm northbound/l6 nm southbound off Pigeon Point
15 nm northbound/20 nm southbound off Point Sur
Note: Inm = 1.15 statute mile

Implementation of these distances would be through Recommended Routes approved by the International Maritime Organization and marked on nautical charts for LCVs and Hazmat Ships, and by development of an industry agreement with domestic barge companies. Implementation of the distance offshore for tankers would involve negotiation of an industry agreement covering all foreign and domestic carriers of crude oil, building on the existing WSPA agreement covering the Alaskan trade.

2) Traffic Separation Schemes (TSS): Modifications are recommended for two TSSs, the systems which help organize vessels as they approach major ports. The "southern approach" of the San Francisco TSS would shift slightly to the west to reduce risk of groundings along the San Mateo coastline and to improve north-south alignment with the proposed Recommended Route for LCVs. Implementation of an 1 8-mile extension to the Santa Barbara Channel is also recommended to aid navigation of vessels. These two shifts were pre-approved by the International Maritime Organization in 1990 and 1985, respectively, but require domestic implementation by the USCG.

3) Monitoring and Reporting: Voluntary radio call-ins by vessels within 25 nm of shore are recommended to report the position of vessels at three points--at Pt. Arguello, Point Sur and the existing check in/check out of the San Francisco Vessel Traffic Service. This reporting system would enhance abilities to respond quickly to an accident or vessel breakdown, assist in evaluating the effectiveness of routing measures, and provide an opportunity to infonn mariners of the sensitivity of the Sanctuary's resources. Timely implementation of an Automated Information System (AIS), an electronic system that reports a vessel's position, is also recommended. International implementation of AIS would reduce the need for some of the intermediate radio call-in points.

4) Rescue Vessel Network: Development of a Rescue Vessel Network would enable response agencies to more quickly identify and direct the nearest potential rescue vessel to the location of a distressed vessel. This system would include identification of tugs or other vessels capable of rescue, and tracking of their positions through the existing system of check-in with the Vessel Traffic Service, through the proposed voluntary reporting system, and when operational, through AIS.

5) Near-miss Reporting: Timely implementation is recommended for a national "near-miss" reporting system which is currently being planned by the USCG, the Maritime Administration, and industry groups. This system would provide valuable insight into dangerous conditions before they precipitate an accident.

6) Education: The overall vessel management package should include a strong education campaign for mariners to provide information on the sensitivity of Sanctuary resources, details on the new management measures and the importance of compliance.

The overall package of strategies intends to work together to ensure safe, effective, and environmentally sound vessel traffic management in the Sanctuary region. The USCG, NOAA and the other work group members welcome comments on any aspects of the proposed package. Following the public workshops in June, 1998, the work group will evaluate potential improvements to the package based on public comments and develop a detailed implementation plan. Significant additional review for several of the measures will also occur at the national and international levels.

CHAPTER 1
INTRODUCTION

The Monterey Bay National Marine Sanctuary (MBNMS) is the largest marine protected area in the United States, and includes over 5000 square miles of water off the central California Coast. It spans over 350 miles of coastline from Cambria to the Marin Headlands, and extends as much as 53 miles offshore (Fig. 1). The area was given sanctuary protection by Congress in 1992 in recognition of its dramatic underwater geology and topography, the diversity of its unique plants and animals, its abundant commercial fishery, and its standing as an important research site.

The Sanctuary is an area of outstanding environmental importance due to its unique, sensitive and abundant biodiversity. It is also located in an area of critical importance to the conduct of maritime commerce. The major ports on San Francisco Bay are accessible only by transiting the Sanctuary, and vessel traffic of all types operates in and around the Sanctuary. Although the vast majority of these vessels pass safely through the Sanctuary region, this vessel traffic represents a significant risk of damage to Sanctuary resources due to the potentially catastrophic consequences of a major oil spill.

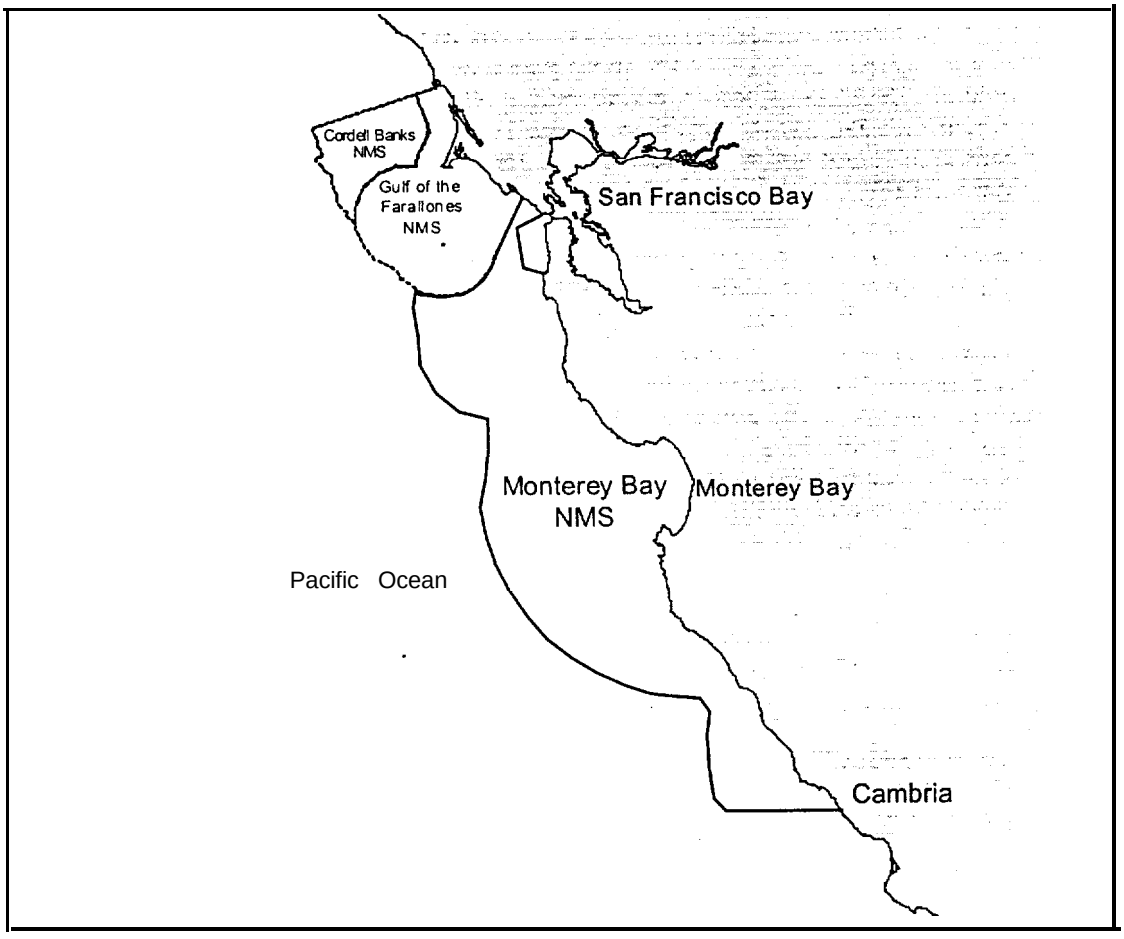


Fig. I--Monterey Bay National Marine Sanctuary

Vessel traffic within the Sanctuary was a major issue of concern raised during the Sanctuary designation process, and identified as a topic for further evaluation of potential threats to resources and possible ways to reduce those threats. Specifically, Congress directed the Secretaries of Commerce and Transportation to develop "measures for regulating vessel traffic in the Sanctuary if it is determined that such measures are necessary to protect Sanctuary resources."

The Department of Transportation, through the U.S. Coast Guard (USCG) and the Department of Commerce, through the National Oceanic and Atmospheric Administration (NOAA), jointly studied the issue and prepared a Report to Congress on Regulating Vessel Traffic in the Monterey Bay National Marine Sanctuary, released in January, 1997. The report provided background information on vessel traffic in the Sanctuary and the sensitive biological resources at risk. It also directed the agencies to conduct public workshops to assist in the formulation of public policy on the issue.

To meet this mandate, the USCG and NOAA developed the MBNMS Vessel Management Work group. The work group includes key stakeholders involved in this issue, representing federal, state and local governments, environmental groups and industry (see Table 1). The group constitutes a "Panel" under the Navigation Safety Advisory Council (NAVSAC). The goal is to provide a vessel traffic management system that maximizes protection of Sanctuary resources while allowing for the continuation of safe, efficient and environmentally sound transportation. Members met monthly over the past year to review information, evaluate options and develop a package of potential strategies addressing vessel traffic management. The work group's efforts to develop the strategies coupled with the input gathered on these strategies at the four public workshops intend to develop effective, economically viable means for addressing vessel traffic in the region. Recommendations stemming from this regional work group and public workshops will also receive significant additional review and input at the national and international levels prior to implementation.

The work group focused on the management of commercial vessels in coastal transit, and those calling on ports within the MBNMS region. The primary area of concern is the traffic between San Francisco to the north and the western end of Santa Barbara Channel to the south. While there is significant activity from recreational vessels in the Sanctuary, its management is beyond the immediate scope of this process. The group also recognized that prevention of spills of oil or other hazardous materials is the key goal, and focused its efforts around measures to prevent vessel groundings and collisions, rather than measures to clean-up spills. Spill clean-up is addressed through other processes such as the Coast Guard's Area Contingency Plans. However, vessel routing measures addressing distance from shore can also impact spill response by allowing more time for mobilization of spill response efforts, changes in condition of the oil, etc.

Table 1. Members of the Monterey Bay National Marine Sanctuary Vessel Traffic Work Group

Affiliation of Work Group Members
American Watenvays Operators; Assemblyman Fred Keeley, Assemblyman Ted Lempert, California State Assembly; California Association of Port Authorities; California Coastal Commission; California Office of Spill Prevention & Response; Center for Marine Conservation; Congressman Sam Farr, U.S. House of Representatives; Friends of the Sea Otter; Mayor of Half Moon Bay; MBNMS Advisory Council; National Oceanic and Atmospheric Administration; Natural Resources Defense Council; Pacific Coast Federation of Fishermen's Associations; Pacific Merchant Shipping Association; San Francisco Bar Pilots; Save Our Shores; Council of American Master Mariners; U.S. Coast Guard; U.S. Fish and Wildlife Service; U.S. Navy; Western States Petroleum Association.

CHAPTER 2
BACKGROUND

The Sanctuary region is important in terms of the abundance of its natural resources, and its location as a major thoroughfare for shipping on the West Coast, particularly for vessels in transit between key ports in the Bay Area and Los Angeles/Long Beach. A basic understanding of these issues and existing vessel management measures was necessary before the work group began its consideration of potential new vessel management strategies. This section provides background information on a variety of topics, including an overview of biological resources and shipping activity in the Sanctuary region, and their associated economic values. It also discusses oil spill risks, current vessel traffic patterns and management measures in the region, management measures in other marine sanctuaries, and military operations.

a. Sanctuary Resources

Biological resources

Congress designated the Sanctuary as a marine environment of special national significance, to be protected for generations to come. This special designation was decided based on the biodiversity of the region, the presence of special status species, and the economic and human value associated with this area.

The MBNMS boasts the greatest biodiversity in temperate regions of the world. This diversity of life is caused largely by high productivity associated with upwelling of cold, nutrient rich water; the central location between cold and warm biogeographical provinces, combined with endemic species restricted to the area; the presence of deep water near the coast (i.e., the Monterey Bay Canyon); diversity of environments (e.g., estuaries, rocky coastlines, sandy beaches, subtidal reefs and soft bottoms, pelagic waters, deep sea); and complex oceanographic patterns. The MBNMS has 27 species of marine mammals, 94 species of seabirds, 345 species of fish, 4 species of turtles, more than 450 species of marine algae and 3 1 phyla of invertebrates. Within a dozen steps on the rocky shore, one may walk over 90 species of invertebrates associated with upper intertidal red algae and over 300 invertebrate species associated with a mussel bed.

Within the MBNMS there are more than 50 species on government special status lists, perhaps the most prominent being the sea otter. The historical population was driven to near extinction through commercial exploitation. By the early 1900's, only 50 animals remained and they lived on the Big Sur coast. In 1977, the California sea otter was listed as a threatened species under the Endangered Species Act. It receives considerable attention through the media, "friends groups," educational activities and conservation efforts. The population has now increased to roughly 2,400 individuals. Because of the fear of a large oil spill (the area of the *Exxon Valdez* oil spill would have covered the entire range of the California sea otter), considerable state and federal funds have been spent on developing techniques to translocate populations and on building sea otter cleaning facilities. Scientific debate continues over the effectiveness of these strategies for saving large numbers of animals.

From the largest animal on earth, the blue whale, to communities of meiofauna living between grains of sand *on a* beach, the species and habitats of the MBNMS are linked internationally and between habitats in unique fashions. The MBNMS supports some of the highest densities of seabirds in the world, and many of the birds are winter visitors from as far away as New Zealand and Arctic regions. Like the blue whale, they come to feed in the highly productive waters. Dramatic migrations of shorebirds also visit the Elkhom Slough estuary, one of the largest

wetlands in California and a key stop for weight gain before birds continue on the "Pacific flyway." The Elkhom Slough is also a key nursery ground for fishes. Another conspicuous migrant is the gray whale, since nearly their entire population passes within 2 nautical miles (nm) of the Monterey coast biannually.

Linkages within habitats also indicate the MBNMS offers diverse ecosystems that could suffer significant impacts if one or more of the links were broken due to an oil spill or other marine accident. The simple barnacle in the intertidal and shallow subtidal is an example. The barnacle is food for sea stars, which may in turn be eaten by birds and sea otters. The larvae of the barnacles are swept off-shore by currents where they may be food for pelagic creatures such-as jelly fish and anchovy. If the currents allow, the barnacle larvae return to shore and may pass through expansive kelp beds. These beds modify the currents and harbor rockfish that feed on the larvae, creating "shadows" of low barnacle densities on the shore. Thus, a simple example illustrates links through the food web and across habitats. Scientists only know a few of these intricate links. In fact, whole new communities of species are still being discovered.

Economic values

The MBNMS also promotes wise multiple use of resources because of their human and economic value. Coastal recreation is a broad descriptor that includes bird watching, diving, swimming, recreational boating, surfing, whale watching, kayaking, and tide pooling. These activities are all increasing in popularity. While it is beyond the scope of this document to critically assess monetary values of these activities and the broader category of all coastal tourism. A few examples will illustrate their importance. One estimate compiled from local coastal plans indicates that expenditures on "nature appreciation" and "visiting scenic areas" in San Mateo, Santa Cruz, and Monterey counties were $63.2 million dollars in 1988. Dive shops from Monterey Bay to Santa Rosa (north of MBNMS) earned $14 million in retail sales in 1994, and about $5 million in associated revenues such as lessons and boats. Approximately 95% of this revenue was generated in the Monterey Bay area. According to California Research Bureau estimates, the total economic value of coastal based tourism and recreation in the counties bordering the MBNMS totaled $2.3 billion in 1992. The same natural resources that promote recreation have resulted in a Monterey Bay consortium of research institutions that had combined budgets of $110 million and employed 1,600 people in 1995. Finally, mariculture facilities for abalone, kelp harvested to make products for daily human use, and $33 million worth of commercial fish in Monterey Bay ports alone (1995 figures) are significant economic values that need to be protected.

A more detailed description of the Monterey Bay National Marine Sanctuary resources can be found on the MBNMS web page (http://bonita.mbnms.nos.noaa.gov/sitechar/index.html) and in the NOAA/Monterey Bay Aquarium book *A Natural History of the Monterey Bay National Marine Sanctuary*.

b. Shipping Activity

Types of vessels and cargo

Shipping activity in the region includes virtually all types of vessels: tankers, container ships, bulk carriers, chemical carriers, military vessels, research vessels, cruise ships, tugs and tows, registered fishing vessels, and other types of vessels used for commercial purposes. These vessels are both of U.S. and foreign registry, and may be calling on ports in or outside of the Sanctuary, or may be simply transiting the Sanctuary. The ports in or near the Sanctuary that support commercial vessel traffic are: Morro Bay/Estero Bay/Avila, Monterey, Moss Landing,

Santa Cruz, Pillar Point Harbor (Half Moon Bay) and the ports of the San Francisco Bay Area. By far, the greatest amount of vessel activity (cargo, military, passenger, tug and tow, etc.) takes place in the ports of San Francisco Bay. Oil and oil products are transported in and out of San Francisco Bay and the Morro Bay area. All remaining ports are predominately used to support fishing and pleasure craft activity. To the south, the major ports of Long Beach and Los Angeles also rely on commercial vessels which transit Sanctuary waters.

There are approximately 4,000 coastal transits of the Sanctuary each year by large vessels. Although this figure includes vessels which pass through the region without calling on a port, a majority of the vessels call on, or leave, the Bay Area bound for Los Angeles/Long Beach. Approximately 20% of the 4000 transits are crude oil tankers (Office of Spill Prevention and Response (OSPR), 1995). The majority of the remainder are large commercial vessels (LCVs) greater than 300 gross tons, including container ships and bulk product carriers. For comparison, a 300 gross ton vessel is typically 150 to 200 feet long, comparable in size to a large passenger ferry. The work group defined four categories of vessels operating in the region which would be the focus of its review:

- Tankers: Any self-propelled laden tank vessel carrying crude oil, black oil, or other persistent liquid cargo in bulk.
- Hazmat Ships: Any self-propelled vessel carrying hazardous materials in bulk, including explosives/munitions, ore concentrates, chemicals, liquefied natural gas, distillates or other non-persistent liquid cargo.
- Barges: Any tank barges (and their associated tug) carrying oil or hazardous material cargoes in bulk.
- LCVs: Large commercial vessels defined as those over 300 gross tons including, but not limited to container ships, vehicle carriers, bulk carriers, freighters, passenger ships, and tankers with non-hazardous cargoes.

Economic values

Commercial maritime traffic is a critical element of the regional and national economy. For example, the Port of Oakland's maritime activity is directly and indirectly responsible for creating more than 10,800 jobs, with a combined annual payroll of $7 16 million. The Port's total annual economic impact to the San Francisco Bay Area economy generated by business revenue from companies that are associated with international shipping activity is over $1.3 billion. This includes companies and individuals involved with trucking, stevedoring, import and export management, ship handling, finance, insurance and many other related jobs that are required to move international cargo through this major northern California port.

The major ports of Long Beach and Los Angeles, although outside of the immediate Sanctuary area, also rely on vessels transiting through the Sanctuary. Through direct and indirect trade-related employment, the two ports generate approximately 500,000 jobs in Southern California. Additional revenues and jobs are generated by other smaller ports which rely on traffic through the Sanctuary such as San Francisco, Alameda, Richmond, Stockton, and Sacramento.

c. Oil Spill Risks

Although a large number of commercial vessels pass through the Sanctuary region each year, these coastal transits have a history of safe operation in the region. Oil spill statistics for California and the United States confirm that the probability of a large oil spill is low in comparison to the amount shipped. Although the probability of a spill is low, should one occur it could have catastrophic consequences. Major historical spills in the immediate Sanctuary region include the collision of the Oregon *Standard* and the *Arizona Standard* under the Golden Gate Bridge, the explosion of the *Puerto Rican* in the Gulf of the Farallones, and the leaking of oil from the barge *Apex Houston* along much of the Central Coast.

During the past 30 years, there have been 14 vessel oil spills greater than 20,000 gallons along the Pacific Coast, excluding spills within harbors, bays and sounds (USCG, 1996). The total volume spilled in these events was 3.9 million gallons, estimated to be less than one-thousandth of 1 percent of the total volume of oil transported in the 30 year period. The threat of spills is not limited only to tankers--major spills on the west coast have included spills from all four of the categories of vessels defined above. Although many of these spills occurred in port approaches, the statistics do indicate the possibility of major spills from all vessel types.

Non-tank vessels such as LCVs carry and use large amounts of bunker fuel which they use for propulsion. Bunker fuel is an extremely heavy oil, similar in many respects to crude oil. Fuel capacity per vessel runs from around 10,000 gallons to 1.2 million gallons. The total number of spills from both tankers and LCVs are relatively small in number, but the potential impacts are significant given the number of these vessels and the potential size of a spill.

Spilled oil can cause wide-spread fatalities in sea bird populations, with losses from previous spills off California ranging into thousands of animals. High fatalities are also a potential for the sea otter population, which relies on pockets of air trapped in its fur to retain body warmth. As noted above, impacts of oil are of particular concern for the southern sea otter population due to its small population size and limited geographic range on the Central Coast. Detailed summaries of historical spills and the sensitivity of Central Coast organisms to oil can be found in a variety of publications (CMC, 1994; Ford and Bonnell, 1995; OSPR, 1995; USCG, 1996; USCG and NOAA, 1997).

d. Current Vessel Traffic Practices In and Around the Sanctuary

Evaluation of potential management measures to reduce risk of spills must begin with an understanding of current vessel traffic practices within the region. These practices are outlined briefly below.

Current patterns of transit distance from shore

The normal practice of navigation along the central coast has produced a pattern of traffic flow at various distances from shore, with some degree of separation by transit direction, vessel type and/or cargo (Fig. 2). These practices have evolved over time as a function of mariners' responsibilities to identify navigation risks and their practice of prudent seamanship.

Tankers:

Operators of tankers carrying crude oil from Alaska who are members of Western States Petroleum Association (WSPA) have voluntarily kept laden vessels a minimum of 50 nm from

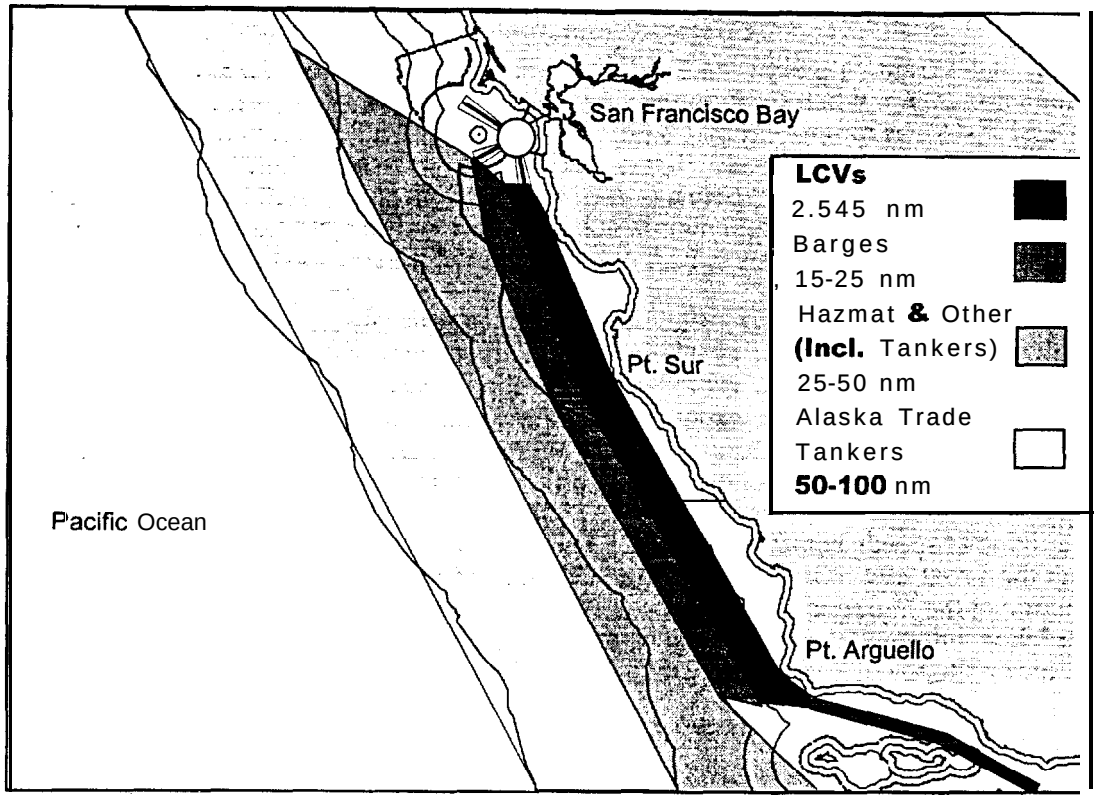


Fig 2 --Current vessel traffic practices within the Monterey Bay National Marine Sanctuary region. Bands represent approximate operating areas for each category of vessel

shore, per industry agreement announced in 1990. In Operation Crystal Ball, the Coast Guard conducted spot checks on all tanker movements along the coastline. Although the WSPA agreement does not apply to foreign tankers, over 90% of all crude oil tankers are complying voluntarily. The small percentage of crude oil carriers which were not seaward of 50 nm tended to be vessels that pass through the Sanctuary without entering a regional port. This includes tankers transiting from South American ports to ports in Oregon, Washington and Canada. These vessels have generally been staying at 25 nm or more from the coast.

Hazmat Ships:

Hazmat vessels, including tankers with non-persistent cargoes (i.e., gasoline, MTBE, chemicals, etc.) have been voluntarily staying 25 nm or more from shore (with some exceptions), although there is no formal agreement to do so. Ships carrying hazardous materials in bulk generally operate at speeds between 10 and 15 knots.

Barges:

Slower-going ocean tank barges currently transit the coast approximately 15-25 miles from shore to minimize their interaction with speedier container ships closer in and the oil tankers further out. Tugs and their barges also do not travel further offshore in order to minimize transit distances, and to minimize their exposure to weather and sea conditions which may have an adverse effect on these smaller vessels.

Large Commercial Vessels (LCVs):

In general, LCVs transiting between California ports remain about 5 nm off Point Sur when northbound and 10 nm when southbound. An informal sample of vessels taken by the work group found distances ranging from 2.5 nm to 10 nm for most northbound vessels, and 7 nm to 15 nm for most southbound vessels. These distances reflect measurements from points of land with straight courses followed between points, so due to the curvature of the coastline they represent minimum distances from shore. The conventional separation of north and south traffic followed by most of these vessels enhances safety for meeting or overtaking vessels.

LCVs operate closer to shore than other vessel types in order to minimize transit distances and transport cargo in as short a time as possible. Port stays for these vessels often involve mooring, offloading cargo, onloading new cargo, and departing within the same day and under constraints imposed by tidal cycles. Their current distance from shore is also a function of navigational safety related to their ability to obtain an accurate radar position fix, since most radars are only suitably accurate for navigational purposes within 20-25 miles of the coast.

LCVs navigate at speeds between 10 and 25 knots off the coast. Bulk carriers and older vessels operate at the lower end of the speed range. Container ships, vehicle carriers, and passenger ships operate at the high end of the speed range, usually within the confines of pre-scheduled times for labor, intermodal connections, and tide or current restrictions. Their transit schedules and turn-around times in port are generally much tighter than for other categories of vessels.

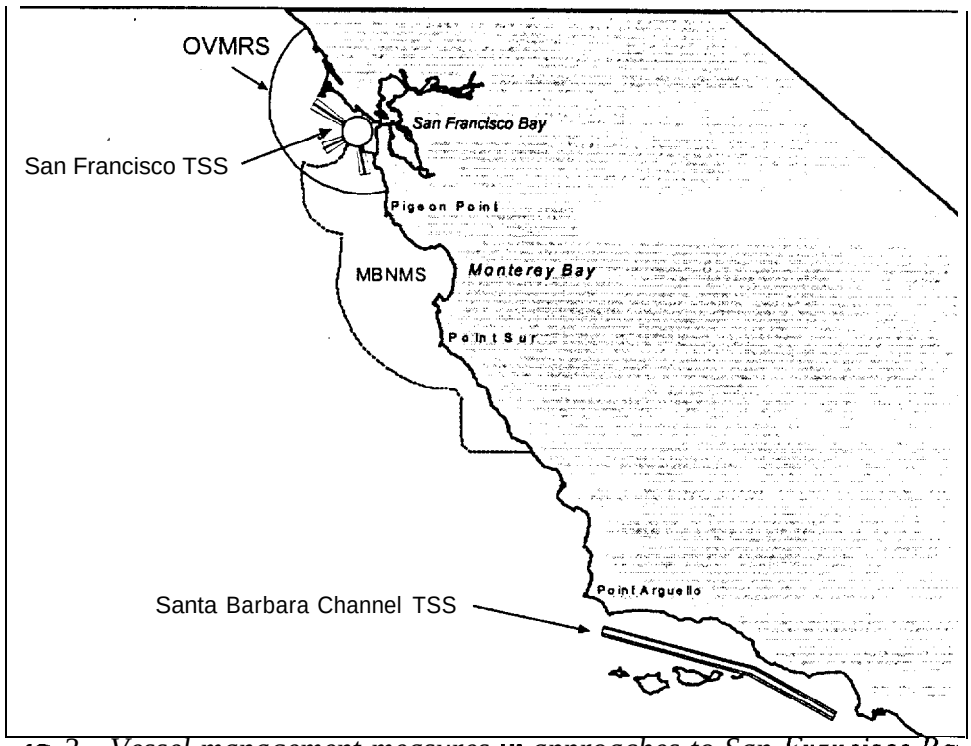
e. Current Vessel Management Measures

The Ports and Waterways Safety Act (PWSA) provides the Secretary of Transportation with limited authority to implement vessel management measures to control or supervise vessel traffic or to protect navigation and the marine environment. Under this authority, Vessel Traffic Service Systems were developed in San Francisco Bay and Los Angeles (which extends through the Santa Barbara Channel) to organize the traffic flow for large vessels entering and departing a port.

Current vessel management measures in the approaches to San Francisco Bay

The San Francisco Traffic Separation Scheme (SF TSS) is designed to organize the vessel's approach to the Bay, and provide locations for the boarding of the vessel by a local pilot who then guides the vessel through the Golden Gate and into port. The SF TSS reduces risk of collision by distributing vessel traffic between three approach lanes, and separating opposing streams of traffic in each lane (Fig. 3).

The existing SF TSS also includes a circular precautionary area, and a single approach into and out of the Bay. It is formally recognized by the International Maritime Organization (TMO), a body under the United Nations, and marked on NOAA's nautical charts. The entire area is managed by the USCG's San Francisco Vessel Traffic Service (VTS), using VHF radio communications and reporting throughout, and direct radar surveillance of all but the seaward portions of the offshore approaches. The VTS monitors vessel movement and shares that information with other participating vessels in the area. Additional details describing the TSS approaches can be found in Appendix A.



ig. 3 --Vessel management measures in approaches to San Francisco Ba and the Santa Barbara Channel, indicating Traffic Separation Schemes (TSS) and San Francisco Offshore Vessel Movement Reporting System (0 VMRS)

There are approximately 6000 vessel transits through the TSS each year, including arrivals and departures. According to VTS statistics, each offshore approach carries approximately the same volume of traffic, with different types of vessels using each approach (Appendix A). The three-tiered system, which includes TSS traffic distribution, VTS oversight, and pilot queuing, provides effective vessel traffic management through the transition from ocean voyage to port entry. In particular, the three approach system ensures traffic density remains low until local pilots get aboard, reducing the burden on vessel masters, most often foreign, unfamiliar with the unique navigation challenges present in the greater San Francisco Bay.

Vessels that enter the TSS in San Francisco are required to communicate with the VTS. Upon contacting the VTS, vessels are informed of other ships they may meet as they transit through the VTS coverage area. The VTS makes periodic announcements to update vessel positions. The VTS also monitors vessel traffic via radar. The VTS maintains this watch 24 hours a day, seven days a week.

VTS has radio coverage in the northern third of the Sanctuary, and radar coverage of the water area east of the Farallon Islands. Vessels are monitored to and from Pigeon Point via the Offshore Vessel Movement Reporting System (OVMRS) shown in Fig. 3. Within the OVMRS, tugs and large commercial vessels out to approximately 30 nm from the San Francisco Sea Buoy contact the VTS and report their position, course, and speed at regular intervals. Depending on their size, vessels may be tracked by radar at a distance of approximately 24 nm.

Vessel management measures in the MBNMS

As noted above, the TSS , VTS, OVMRS and local pilotage are key vessel management measures already in place in the region which guide mariners in their approach to San Francisco

Bay. Once vessels leave the established TSS and the OVMRS, there are no additional requirements for routine communications within the Sanctuary, and the mariner is free to navigate independently, selecting course and speed. There is no current monitoring system throughout the entire Sanctuary area that vessels must comply with. However, vessels have a variety of communications capabilities which they can use to report to shore-based authorities, and they are required to report in the event of navigational/equipment difficulties which could endanger their safe passage or marine resources.

The Coast Guard has published information concerning the Sanctuary in the Local Notice to Mariners. The notice urges all vessels carrying oil or hazardous materials as cargo, or those carrying large volumes of bunker fuel, to transit as far from shore as weather and operations permit. All vessels transiting in or near the Sanctuary are urged to navigate with particular caution with due regard for the devastating consequences of spilled oil in the Sanctuary.

A variety of rescue vessels located to the north and the south of the Sanctuary are available to assist large vessels if they become disabled, losing power or steering capabilities within the Sanctuary. A USCG survey of ocean-capable tugs and other rescue vessels found at least ten such vessels in the Bay Area that are available to respond on 20 minutes to two hours notice to serve as rescue vessels or for vessel stabilization. In addition, four other offshore supply vessels capable of ocean rescue are present at various points in and around the Santa Barbara Channel. These rescue vessels traveling from the north or south may take up to 12 hours from the time of notification to reach a vessel which becomes disabled off the Big Sur coastline.

In addition to the measures mentioned above, there are numerous other national initiatives aimed at reducing the risk of mishaps that could result in spilled oil. While these measures are not specific to the Sanctuary, they improve the overall safety of navigation for vessels operating in the region. Details on these national initiatives are provided in Appendix B.

Vessel management measures in the Santa Barbara Channel

There is also a Traffic Separation Scheme to the south of the MBNMS through the Santa Barbara Channel (Fig. 3). This TSS lies north of the Channel Islands National Marine Sanctuary, and currently extends from Point Vicente to Point Conception. It consists of 1 nm wide eastbound and westbound lanes with a 2 nm wide separation zone between them.

f. Vessel Management Measures in Other Sanctuaries

The National Marine Sanctuaries Act (NMSA) provides the Secretary of Commerce the authority to regulate vessel traffic within Sanctuaries to protect resources. Sanctuaries are intended to accommodate a variety of multiple uses provided those uses are compatible with the primary goal of resource protection. Where Sanctuary boundaries extend beyond U.S. territorial waters (generally 12 nm), vessel routing is also governed by the International Maritime Organization (IMO). The IMO evaluates proposed vessel management measures to carefully ensure the benefits justify the degree of intrusion on freedom of navigation.

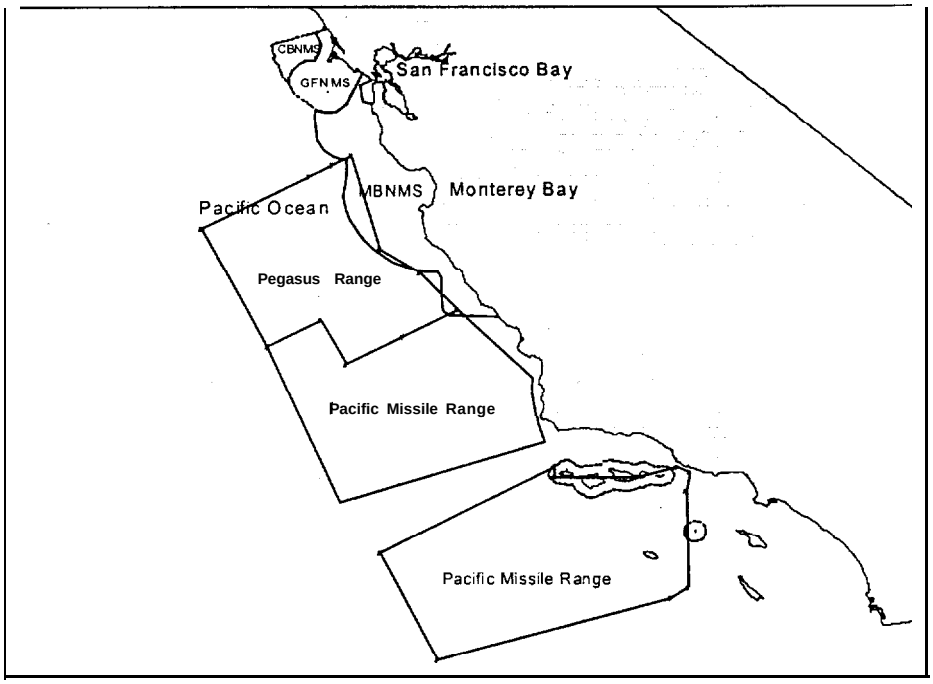
A variety of routing measures affecting the operation of vessels exist in other National Marine Sanctuaries (Appendix C). Some have been established through the individual Sanctuary regulations, some through routing measures approved by the International Maritime Organization or Congress, and others through agreements, cooperative ventures, and established government activities. There is no overarching regime of vessel management regulations that applies to all Sanctuaries. The regulations implementing the National Marine Sanctuaries Act leave specific

measures to be determined and enacted as necessary within the individual Sanctuaries, working in cooperation with other authorities as appropriate.

In several of the Sanctuaries, the U. S. Coast Guard provides enforcement resources, both waterborne and airborne. These resources are available subject to other tasking, and often conduct Sanctuary enforcement in conjunction with their other missions (e.g., fisheries law enforcement, counter drug operations, marine environmental protection overflights, or Search and Rescue). NOAA also has access to other enforcement resources, including their own aircraft and vessels, and vessels and aircraft of other authorities, particularly state Fish and Game or wildlife enforcement agencies.

g. Military Operations in the Sanctuary Region

In addition to existing vessel traffic practices and management measures, routing measures must also consider locations and activities of current military ranges. Much of the MBNMS shares a boundary with, and in some instances includes active military ranges which run from the southern Sanctuary boundary to Pigeon Point (Fig. 4). Types of range uses include fleet exercises, missile launches and testing, and air operations. Vandenberg Air Force Base relies on these ranges for military satellite launches. A growing commercial space launch industry is operated out of Vandenberg. Military operations specifically described in the Sanctuary's Final Environmental Impact Statement /Management Plan (FEIS/MP) are a recognized use in the Sanctuary regulations (15 CFR 922.132.(c)(1)), which provide for their continuation. However, all Department of Defense activities within the Sanctuary "are to be carried out in such a manner that avoids to the maximum extent practicable any adverse impacts on Sanctuary resources and qualities." Vessels transiting through the military ranges receive daily activity information from radio broadcasts and weekly and monthly Notice to Mariners publication. This information allows military operators and transiting vessels to coordinate their schedules, if necessary to avoid conflicting interactions.



Fig, 4 -- Military ranges in the Sanctuary region

CHAPTER 3
STRATEGY DEVELOPMENT AND EVALUATIONS

After gathering and reviewing the types of background information outlined in Chapter 2, the work group began its consideration of potential vessel management measures. This Chapter outlines the general process of strategy development and evaluation, and outlines some of the general issues the group considered in weighing various potential strategies.

a. Structure of Evaluations

Potential vessel management strategies for the work group's initial consideration were derived from a variety of sources, among them: a) the USCG's Evaluation of Oil Tanker Routing; b) the USCG's Port Access Route Study; c) the USCG/NOAA Report to Congress on Regulating Vessel Traffic in the MBNMS; d) the Center for Marine Conservation's Safe Passage study; e) the Western States Petroleum Association's letter rebuttal to Safe Passage; and f) the Office of Oil Spill Prevention and Response's Coastal Protection Review.

Ideas from these sources were combined and put into a standard "What, Why, How" format for each strategy, and details were added to allow evaluation at the work group meetings. Additional potential strategies and modifications were added to this initial list based on suggestions from work group participants, and were developed into a similar written format. The standard format helped facilitate evaluation and comparison of the strategies as the group worked towards identifying the components of a preferred package.

Work group participants examined the potential strategies using a structured "Integrated Coastal Management" approach used by NOAA in developing a Water Quality Protection ptogram for the Sanctuary. This approach is designed to systematically draw out and consider a broad range of information in assessing strategies, taking into account the interests of a variety of stakeholders. Consideration of new strategies was preceded by an overview and evaluation of sensitive biological resources, existing traffic patterns, and existing government and industry programs and practices related to vessel traffic. This step ensured that all work group participants had a common understanding of current conditions.

Strategy evaluations were conducted using a standardized set of criteria defined jointly with group members. Evaluation categories included: a) effectiveness in preventing oil spills; b) social and economic impacts; and c) feasibility for responsible institutions. After the evaluation process and consideration of the linkages between strategies, work group participants identified a smaller package of preferred strategies to be presented at public workshops for additional review and comment. Following the public workshops, public comments will be evaluated to potentially improve the package and the work group will ultimately develop a detailed implementation plan. The work group will also add descriptions of scheduling goals for implementation and recommend responsible leads for implementation steps.

Throughout this process of strategy evaluation, prioritization and revision, work group participants were asked to maintain regular contact with the management of their own agency/organization and initiate outreach efforts with their interested constituent groups. Ongoing communication and exchange of ideas with a broad array of interested parties intend to ensure that the product of these workshops will be effective in protecting natural resources and ensuring safe and economically viable marine transportation.

b. Selected Issues Considered by the Work Group

The work group considered a wide variety of issues in evaluating strategies. Examples of some of the issues are outlined below.

Balancing risks and economics

The work group recognized that although the risk of a vessel accident occurring is very low, there are catastrophic results if a spill does occur. As indicated above in Chapter 2, these biological risks include potential widespread fatalities among seabirds and sea otters, as well as major impacts on the diversity of life within Sanctuary waters. There are also enormous economic impacts of major spills to local communities, and to the shipper. However, ongoing vessel transits in the Sanctuary region are a critical part of the regional, state and national economies, and access must be provided to the ports of San Francisco Bay. Further, the local shipping industry has an excellent safety record. Thus keeping all vessels out of the Sanctuary was not considered a feasible means to reduce risk.

Major additions to the length of time required to transit between ports due to new routing measures would have economic impacts on industry due to additional operating costs. Also, since vessels like LCVs are normally on fairly tight schedules with short turn-around times in ports, seemingly minor additions to transit times could force a ship to miss a favorable tide cycle or stevedore shift, potentially reducing the competitiveness of local ports. The work group kept these biological and economic factors in mind when considering various alternative routing measures.

Vessel drift and rescue times

One of the key issues considered was whether a grounding or other accident might result from a vessel that becomes disabled or loses steering ability. Under these conditions, a rescue tug or other vessel would be dispatched to the scene to stabilize or tow in the disabled vessel. Obviously, such a rescue vessel should be able to reach the disabled vessel before it drifts ashore, thereby averting a spill. The Coast Guard and the Navy conducted an analysis for the work group which compared the time it would take a rescue vessel to reach various locations throughout the Sanctuary with the estimated rate of drift of a disabled vessel under a "worst case" scenario of very strong (20kt) sustained onshore winds and the absence of any mitigating measures by the disabled vessel. Analysis of historical wind data indicates that these "worst case" conditions are extremely rare on the Central Coast, occurring just four times over the last 15 years, and that the majority of the time the winds are much weaker and would blow a vessel along the coast or offshore. Details of the assumptions made in the drift analysis and the historical survey of "worst case" weather conditions are given in Appendix D.

The analysis led to the resultant vessel drift/response contours shown in Fig. 5. The concentric circles represent the locations of rescue tugs at one hour intervals traveling from San Francisco Bay or from Port San Luis south of Morro Bay. The contour lines represent the modeled location of the disabled vessel as it drifts shoreward. The resultant heavy line marks the intersection of these drift and rescue components. If vessels were at this distance or further out at a time when they lost power or steering ability, a rescue tug from a nearby port would be able to arrest the drift before the vessel ran aground, even under the "worst-case" conditions. This analysis was important as the group considered the most appropriate offshore distances for LCVs, barges and Hazmat ships.

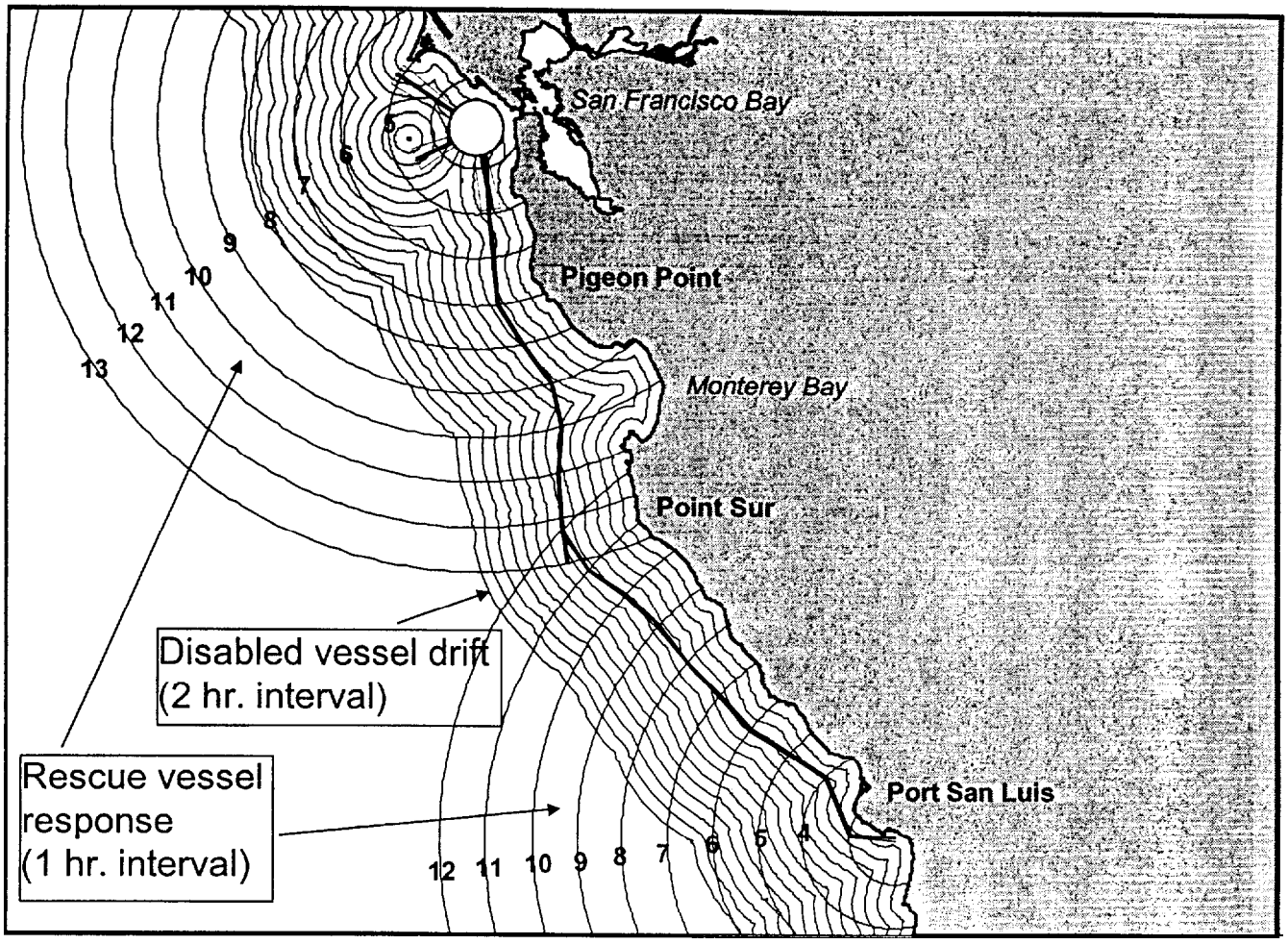


Fig. 5 -- Comparison of vessel drift rates and tug response times

Military zones

The group also considered activities in existing military zones and the military's request that shifts in vessel routing not require large numbers of ships such as LCVs to transit through the existing military training ranges, particularly in those portions of the ranges which are further offshore. Increased vessel traffic in these exercise areas could hinder military training operations vital to national security. The military also desired that offshore routing measures include some degree of flexibility to allow maneuvering around military operations when necessary.

Feasibility at national and international levels

Evaluation of the feasibility of various measures included assessments of the institutional acceptance, capabilities and funding for implementing various strategies. Many of the alternatives considered involved routing or monitoring measures which would need substantial additional review and approval at both the national and international levels. United States enjoys considerable jurisdiction over vessels within the territorial seas of the United States (which extends to 12 nm from shore in most cases.) Jurisdiction extends out as far as 200 nm for fisheries, minerals and marine mammal protection regulations. Implementing vessel management measures on the high seas, which are generally defined as waters beyond 12 nm,

requires review and approval by the International Maritime Organization (IMO.) The IMO is a highly technical, specialized body composed of representatives of all of the major shipping nations. IMO would review the proposal to ensure encroachment into high seas freedoms are navigationally and environmentally justified. The work group's evaluation of strategies included consideration of what IMO would be likely to accept given its past history of discouraging overly constraining or mandatory routing and monitoring arrangements.

Additional more specific issues considered by the work group are discussed below relating to the group's evaluation ofparticular strategies.

CHAPTER 4
VESSEL MANAGEMENT MEASURES

a. Proposed Strategy Package

Through the discussion of background information and the process of systematically evaluating the strategies individually, a preferred list of vessel routing and management measures percolatea to the top of a long list of strategies. Other strategies, upon closer scrutiny, became obviously infeasible to the work group. While the systematic evaluation provided valuable information on each individual strategy, the work group members also needed to view the potential strategies as a package because many of the strategies were interrelated. Thus, a package of strategies arose from discussions about what might provide the best protection to the environment while not unduly burdening the shipping industry.

The text below describes the components of the package and outlines the rationale for selecting each measure.

Vessel routing measures

As noted above, one of the work group's main challenges was to identify a distance offshore that vessels should travel to provide adequate protection for sensitive marine resources of the Sanctuary without imposing undue economic stress to the shipping industry. Yet, depending on the distance from shore and the types of vessels expected to use those routes, the entrance to Traffic Separation Schemes at San Francisco and the Santa Barbara Channel could be affected. So, the work group had to review these two types of strategies -- distance from shore and Traffic Separation Schemes -- together.

Distance from Shore

The work group ultimately recommended the following transit distances offshore of Point Sur and Pigeon Point, which are the two most prominent westerly points of land in the MBNMS:

Tankers--50 nm
Barges --25 nm
Hazmat Ships--25 nm
LCV-- 12.7 nm northbound/l 6 nm southbound off Pigeon Point
15 nm northbound/20 nrn southbound off Point Sur.

These transit distances are mapped in Fig. 6.

As mentioned above, most of the tankers operated by domestic companies are already operating at 50 nm offshore under the WSPA agreement. By moving all laden tankers carrying crude oil, black oil or other persistent liquid cargo in bulk out to this distance, vessels that contain the largest quantities of the most damaging type of oil can be moved the farthest from sensitive marine resources. Also, at this distance from shore, tankers would be separated from the bulk of the other vessels, reducing the risk of ship-to-ship collision.

Barges carrying oil or other hazardous material in bulk need to be offshore as well; however, pushing them farther than 25 nm adds additional risk to their operations. The approach with Hazmat ships is to also move them a reasonable distance offshore, and due to their relatively low number and the relatively lower consequences of a spill from these vessels, the work group concluded it was not necessary for them to be as far offshore as crude oil tankers. Lastly, all

vessel types transiting at this distance could be reached by tug or other tow-capable vessels before drifting to shore if they lost power or steering ability under the "worst-case" scenario of wind conditions (Fig. 5).

Large commercial vessels (LCVs) operating closer to shore pose a threat to the Sanctuary due to the large amounts of bunker fuel they carry, which under the wrong environmental circumstances and wind conditions can cause significant environmental damage if spilled. However, if LCVs operated in the same areas as barges, hazmat ships or tankers, they would add to the risk of a ship-to-ship collision because there are over 3,000 LCV transits through the Sanctuary each year. Also, the vessel drift analysis in Fig. 5 indicated that due to the additional time required for rescue vessels to reach a disabled vessel off of Point Sur, vessels transiting that stretch of the coastline should stay further offshore than when they are closer to San Francisco Bay, where rescue tugs are readily available. Finally, since LCVs are constrained by tight schedules and turn-around times in port, industry desired to minimize the transit times added to their existing routes.

Based on all of these considerations, a set of two recommended routes is proposed for LCVs, which would provide recommended tracklines connecting the TSSs in San Francisco and Santa Barbara Channel, at approximately 12.7 nm for ships northbound and 16 nm for ships southbound off Pigeon Point. Further south, LCVs would be recommended to stay 15 nm northbound and 20 nm southbound off Point Sur. Currently, most vessels follow an informal transit pattern where northbound traffic travels closer to shore than southbound traffic to facilitate the desired port to port passing situations required by the rules of the road (international and domestic navigation regulations) for meeting situations. Moving the LCVs to this distance offshore would provide a safety buffer between the vessel and the sensitive coastline should an accident occur, while limiting the additional transit distances required per trip to approximately 6 nm for northbound ships and 8 nm for southbound ships between the San Francisco TSS and Santa Barbara Channel TSS.

The distances listed above for all categories of vessels represent minimum distances from shore since they are measured from projecting points of land. Due to the curvature of the coastline vessels would actually be transiting at greater distances from shore for most of their route.

Traffic Separation Schemes

The recommended package includes changes to the Traffic Separation Schemes (TSS) off San Francisco and the western end of the Santa Barbara Channel (Fig. 6). The "southern approach" of the San Francisco TSS would be shifted slightly to the west to reduce risk of groundings along the San Mateo coastline and to improve north-south alignment with the proposed recommended route for LCVs. In fact, the final recommended distances off Pigeon Point were determined by charting a course using the adjusted TSS for San Francisco. This shift in the TSS would produce a true north-south alignment of the lane, and would increase the closest point of approach to shoal water off Point Montara, north of Pigeon Point, from 2 nm to 4 nm. An additional benefit is that this shift was pre-approved by the IMO in 1990, although it has not yet been implemented.

Domestic implementation would require that the Coast Guard issue a Notice of Proposed Rulemaking in the Federal Register to provide opportunity for public comment, and send a letter to IMO specifying the intent to implement the pre-approved change. This would be followed by notification and advertisement of the change, including notices in the Local Notice to Mariners, VTS advisories, revisions in nautical charts, advertisements in trade publications, etc.

In addition, the work group recommends immediate implementation of an 1 8-mile extension of the Santa Barbara Channel traffic lanes to Point Arguello (Fig, 6). This extension was previously adopted by the IMO in 1985, but has not yet been implemented. The extension would connect

with the proposed recommended route for LCVs across the Sanctuary's southern boundary, and aid mariners in tracking a course offshore of Point Sur.

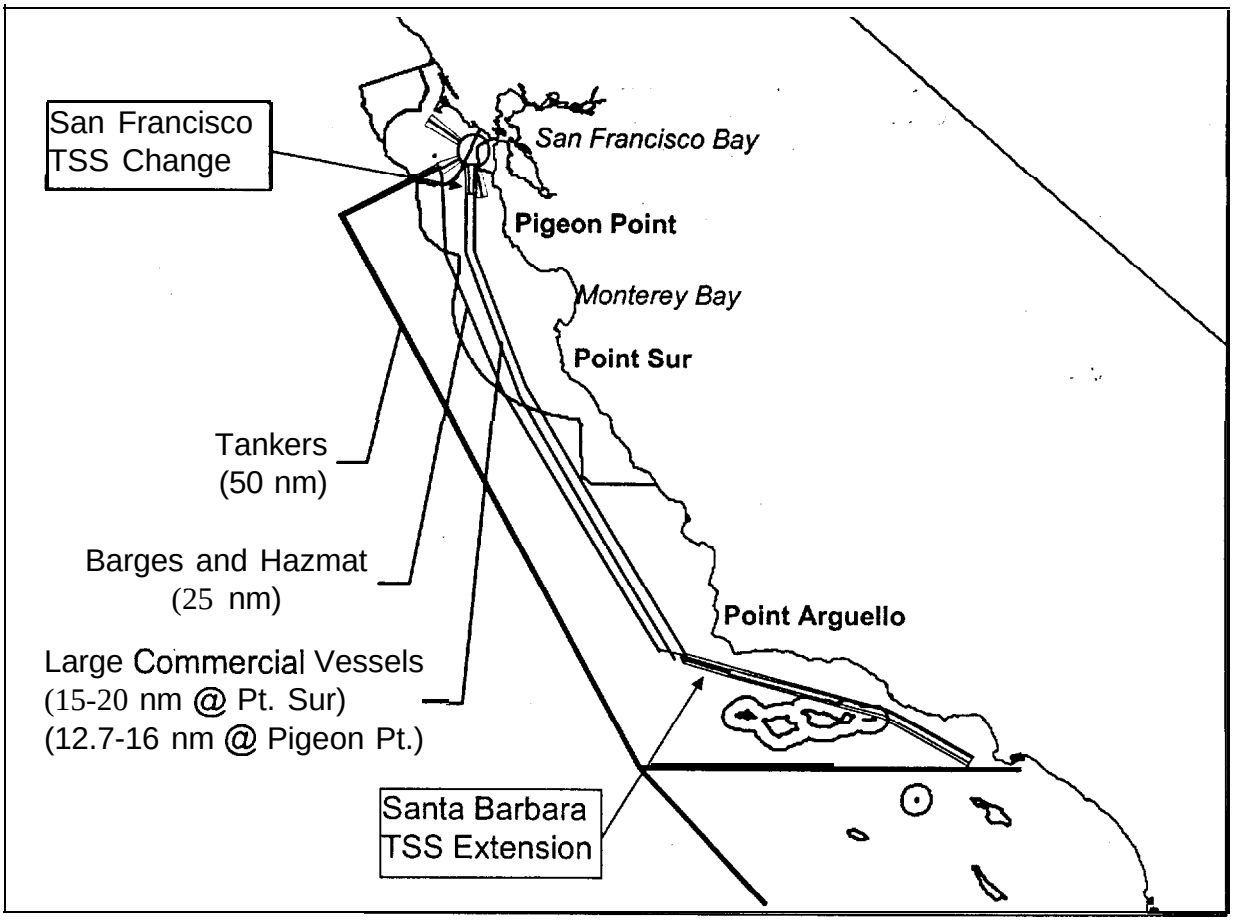


Fig 6 -- Proposed routing measures and TSS modifications

Implementation mechanisms for routing

Recommended Routes for LCVs and Hazmat Ships
The minimum transit distances from shore for LCVs and Hazmat vessels would be implemented by establishing internationally recognized and domestically approved Recommended Routes between the San Francisco and Santa Barbara TSSs. The routes would facilitate vessels' navigation at the specified distances from selected prominent points of land within the Sanctuary, and provide for traffic to flow in a north/south direction on those routes. The routes would be marked on NOAA nautical charts and, for LCVs, identify tracklines approximately five nm apart. (Once vessels approach San Francisco, the separation between the tracklines begins to shrink to accommodate the TSS.)

North-south routes are recommended for LCVs because of the relatively large number of these vessels and the higher speeds at which they operate. The defined routes would establish a safer traffic flow pattern by providing a safety margin between similar types of vessels moving north and south, somewhat comparable to cars moving on a freeway. Such a pattern would not only reduce the risk of collision, because vessels are traveling in the same direction, but could also

minimize the damage resulting from collision for the same reason. A five mile separation between northbound and southbound vessels will allow sufficient sea room for vessels meeting and overtaking. In addition to reducing the risk of groundings of disabled vessels,. the risk of collision would be significantly reduced by affording organization and predictability to the flow of traffic along the coastline.

Because Hazmat vessels do not transit the area as frequently as LCVs, the work group did not recommend that they be routed in north-south tracklines. Rather, if the vessels stay 2.5 nm offshore, they will be able to safely identify and then navigate around any other vessels at that distance from shore. In effect, they will be at least 5 nm from southbound LCVs, and will be 25 nm from tankers. They will only have other Hazmat ships and barges in their area, which are relatively uncommon. Also, since many of the Hazmat vessels are operated by countries other than the United States, the group felt that in order to ensure broad compliance, it was important that the IMO approve the routes.

Because these routing measures occur on the high seas (outside U.S. territorial seas), domestic authority is limited. Therefore, the process for implementing the recommended routes must include development of a detailed proposal package for the IMO. The proposal would include detailed descriptions of resources at risk, specifications of the routes, details on the types of vessels involved, linkages to the TSS, and the specific rationale for how the measures. will increase safety and environmental protection. The IMO scrutinizes such proposals carefully to ensure the need justifies the intrusion into freedom of navigation on the high seas. This package should be developed by the USCG and NOAA, with support from DOD and DOS. The package would then be submitted and reviewed in turn by a series of IMO committees, including Safety of Life at Sea (SOLAS) Interagency Working Group, the Subcommittee on Safety of Navigation (SUBNAV), and the Maritime Safety Committee (MSC). A measure approved by the MSC can be effective 6 months later.

Concurrent with the IMO review, the Coast Guard would initiate the Federal Rulemaking Process to gather public comments. International and domestic approval would be followed by revision of the NOAA nautical charts and outreach efforts to mariners to notify them of the change. Outreach would include notices in the Local Notice to Mariners, VTS advisories, revisions in nautical charts, advertisements in trade publications, educational brochures, etc. Although the Recommended Routes would technically be voluntary, internationally-approved routes marked on nautical charts are widely upheld by mariners. Therefore the work group anticipates a high level of compliance.

Industry Agreements for Tankers and Barges:
Industry agreements will be negotiated with American Waterways Operators, the domestic towboat industry group, to create written agreements to formalize and implement a routing strategy for barges 25 nm offshore. This would involve the participation of both the state (OSPR) and federal government (USCG) in developing and implementing the agreements with industry.

For tankers, the U.S. Coast Guard and OSPR would initiate a revised industry agreement to keep tanker traffic at 50 nm in order to broaden participation beyond the current WSPA agreement . This revised agreement would include negotiations with other industry groups such as Intertanko, and would cover all domestic and foreign carriers of crude oil, black oil, or other persistent liquid cargo in bulk.

Coast Guard involvement should facilitate the use of various diplomatic channels, if necessary, to gain agreement with countries whose crude oil tankers transit the coast but are not bound by the WSPA agreement. This includes the small percentage of tankers carrying crude oil from South America, Mexico, or through the Panama Canal, who transit the coast at approximately

25 nm or more on their way to ports in Oregon, Washington, and Canada. Diplomatic measures could include a letter of demarche from the U.S. State Department to appropriate countries of registry requesting that they stay at 50 nm or more offshore, as well as informal communications with their representatives at IMO.

Any industry agreement would need to allow vessel operators to transit closer to shore when weather or other safety concerns arose. The agreements should also recognize the need to schedule transit around active military testing operations when necessary, as has been successfully conducted under the existing WSPA agreement.

Monitoring and Reporting

Active Call-ins
The work group recommended employing voluntary radio call-ins by vessels within 25 nm of shore to report the position of vessels at three points--at Point Arguello, Point Sur and the existing check-in/check out of the San Francisco VTS. Vessels, which include LCVs, barges, Hazmat ships, and any tankers (unladen) closer than their area 50 nm from shore, would report:

- ship's name, call sign, IMO identification number, if applicable,
- their current position;
- destination;
- course and speed.

During their first call-in, vessel operators would also receive information from the shore authority alerting them to the sensitive nature of the resources in the area and the need to exercise particular caution during transit of Sanctuary waters. Some of this information is already provided to ships by Coast Guard staff at the San Francisco VTS.

The proposed monitoring would accomplish the following objectives:

- increase the protection for the Sanctuary by providing accurate and timely information of the presence, movement and patterns of shipping in the area thereby enhancing the ability to respond more quickly to an incident;
- provide more systematic information on vessel traffic in the area so that the effectiveness of vessel management measures can be evaluated;
- increase the awareness of mariners to the sensitivity of the Sanctuary resources;
- assist mariners with information when necessary regarding conditions of hazards in the area.

Also, because the shore-based authorities would be aware of the vessels in the area, the system would provide an incentive for mariners to comply with existing measures and information to assist in the enforcement of such measures.

Mandatory reporting was not selected because of the difficulty other mandatory reporting proposals have faced in the United States. The Department of Defense has not supported use of mandatory reporting because of concerns about foreign military use of the information regarding vessel locations and transit plans. The group did not want to pursue a strategy that had little or no likelihood of being adopted. Further, other voluntary check-in systems have had very high compliance from mariners. The San Francisco VTS found that when it went from voluntary to mandatory participation, it received little increase in vessel notification, implying that compliance was very high when voluntary.

Implementation of reporting would involve development of a proposal package for the IMO defining the objectives of the system, categories of participants, call-in points, format of report, and other relevant information. This proposal would be submitted to and reviewed in turn by the various IMO-related committees, including the SOLAS Interagency Working Group, NAV, and MSC. A proposal adopted by the MSC can be effective six months later.

Automated Information System

The work group also supports the timely development of an Automated Information System (AIS) for ships which is currently being addressed by the IMO for international implementation. AIS is an automatic, electronic system that reports a vessel's position. It employs a positioning device aboard the ship which feeds the real-time position of the ship into a transmitter. This information can be transmitted to a shore-based station such as the Vessel Traffic Service. Many of the advantages noted above for reporting also apply to the implementation of AIS. Its further benefit is that it is automatic and provides information constantly without the requirement for a human to call in the information.

Other measures

The work group developed and recommends strategies other than routing measures that will further improve the safety of vessel operations offshore of and within the Monterey Bay National Marine Sanctuary.

Rescue

Because there is a risk, albeit a small one, to Sanctuary resources from disabled vessels grounding on the rocky shoreline, timely response from one or more appropriate rescue vessels could make the difference between an environmental disaster and an insignificant event. A Rescue Vessel Network is recommended that would consist of an active register of tugs and other vessels capable of towing which are operating around or near the central California coast. This network would be maintained, if necessary, by the Coast Guard and/or OSPR, and would enable response agencies to identify, inform and direct, if necessary, the nearest appropriate rescue vessels to the location of a distressed vessel.

Implementation of a Rescue Vessel Network would begin with a determination of the density and make up of the tug traffic or other vessels that would be available to assist distressed vessels (e.g., type of tugs, horsepower, bollard pull, etc. or other vessels that may be appropriate for participation). OSPR and the Coast Guard already have much of this information along with contact phone numbers for most of these vessels.

Near Miss Reporting

The work group also included as part of its package the timely implementation of a national "near miss" reporting system which is currently being planned by the U.S. Coast Guard, the Maritime Administration, and industry groups. A near miss is defined by the Harbor Safety Committees as "an incident in which the master, pilot, or person directing the movement of a vessel, successfully takes action of a non-routine nature to avoid a collision with another vessel, structure, or aid to navigation, or a grounding of the vessel, or damage to the environment." A coordinated system to collect, analyze, and disseminate information on these incidents would provide a valuable opportunity to gain insight into dangerous conditions before they precipitate a catastrophic event. It would provide useful information to review the efficacy of existing regulations and programs, and would help identify potential needs for further review. Such a system would most likely employ a neutral "third party" similar to that used in the airline industry to ensure full participation in the reporting system without fear of recriminations.

Education and Outreach

Finally, the overall vessel management package should also include a strong education campaign for mariners to provide information on the sensitivity of Sanctuary resources, details on the new management measures and the importance of compliance. Likewise, the outreach should seek to inform the general public about the nature and composition of the local shipping industry, the various safety provisions it follows (both regulated and self-imposed), domestic jurisdictional restrictions, and the value of the industry to the state and national economy. Venues for distribution of this information include the IMO Routing Guide, Notice to Mariners, Coast Pilot, Fleet Guide, VTS, trade newsletters and mailings, etc. The overall package of strategies is intended to work together to ensure safe, effective, and environmentally sound vessel traffic in the Sanctuary region.

Table 2 briefly outlines the work group's preferred package.

Table 2: Package of Recommended Strategies

Strategy	Implementation	Compliance
DISTANCE FROM SHORE		
• Tankers -- Recommended distance from shore 50 nm	• Expand current "WSPA" agreement to cover all crude carriers • Diplomatic efforts, including international letters of demarche	• Use of AIS when available
• Hazmat -- Recommended route 25 nm	• Approved through IMO	• Voluntary reporting • Use of AIS when available
• Barges -- Recommended distance from shore 25 nm	• Develop agreement with domestic barge operators	• Voluntary reporting • Use of AIS when available
• LCVs -- Recommended routes Pigeon Pt.-- 12.7 nm (north); 16 nm (south) Pt. Sur -- 15 nm (north); 20 nm (south)	• Approved through IMO	• Voluntary reporting • Use of AIS when available
TSS LANES		
• San Francisco TSS -- Shift "southern approach" to the west, pointing due north-south	• This shift was previously approved by IMO • USCG initiates domestic implementation	• Vessels must contact San Francisco VTS by radio
• Santa Barbara Channel TSS -- Immediate implementation of 18 mile extension of western end	• This shift was previously approved by IMO • USCG initiates domestic implementation	• Establish call-in mechanism
RESCUE		
• Develop Rescue Vessel Network to identify and track closest tugs or other vessels that could come to aid of disabled vessels	• USCG and OSPR develop system based on existing and proposed reporting requirements and update to database	• Existing reporting to VTS and proposed voluntary reporting • Report to distressed vessel if directed by Coast Guard
NEAR MISS REPORTING		
• Report and analyze near misses to provide insight into potentially dangerous conditions	• Coast Guard implements reporting system it is currently developing at national level	• Dependent on measures in final national plan
EDUCATION AND OUTREACH		
• Explain sensitivity of Sanctuary resources and new vessel management strategies	• Coast Guard, NOAA, OSPR develop and distribute materials	• Information only

b. Other Strategies Considered by Work Group

Many other strategies were identified and evaluated by work group participants, but for a variety of reasons were not included as part of the proposed package. These strategies were rejected either because they did not warrant approval based on their own merit, or because they conflicted with other key strategies of the proposed package. These alternative strategies are outlined below:

Alternative Distance from Shore Options

A variety of options were considered for distance from shore, including packages of distances which were closer to shore, and packages which were further from shore:

a) LCVs 10nm North, 15nm South; Barges & Hazmat 25nm; Tankers 50nm
b) LCVs 15nm North, 20nm South; Barges & Hazmat 25nm; Tankers 50nm
c) LCVs 15nm North, 20nm South off Point Sur and 10nm North, 15nm South off Pigeon Point; Barges & Hazmat 25nm; Tankers 50nm
d) LCVs 20nm North, 25nm South; Barges & Hazmat 301-u-n; Tankers 50nm
e) Barges 25nm; LCVs & Hazmat 30nm North, 35nm South; Tankers 80nm

These combinations of routing measures were ultimately not chosen due to a variety of factors, including:

- lack of adequate environmental protection
- poor linkages with the San Francisco TSS lanes
- unnecessary economic constraints to industry
- inclusion of distances which were not warranted by the vessel drift/rescue time analysis, and/or
- impacts on military ranges

Area To Be Avoided

One other routing implementation mechanism which the group considered was the development of Areas to Be Avoided (ATBA's) encompassing specified areas of the Sanctuary. The IMO definition of an ATBA is "a routing measure comprising an area within defined limits in which either navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships, or certain classes of ships." An ATBA would minimize vessel transit by specified classes of vessels through environmentally sensitive areas of the Sanctuary. An ATBA was not ultimately included in the package of implementation options for several reasons. For vessels such as LCVs which are relatively numerous, it does not provide for the necessary active management of traffic via development of north and south routes, and could actually result in a dangerous "clumping" of vessels along the boundary line of the ATBA as they try to minimize their transit times. For less populated categories of vessels further offshore, it was recognized that inclusion of an ATBA would not be accepted by IMO due to the large water area involved and due to likely strong opposition to combining additional offshore measures with Recommended Routes for LCVs and Hazmat Ships.

Alternative San Francisco Traffic Separation Schemes

The group considered two other options for modifications of the San Francisco TSS involving shifts in both the southern and the western approach lanes, rather than in the southern lane only.

The shift of the southern lane was proposed to move traffic further away from the San Mateo Coast and to align with the proposed LCV routes, while the shift of the western lane was intended to move vessels further away from the Farallon Islands. One of these strategies proposed that the southern approach lane be shifted to a north-south orientation as pre-approved by IMO, and combined with a shift of the western lane to a distance of 5 nm from the Farallones. The other strategy proposed that the shift of both the southern and western lanes be plotted so as to make best use of the available water. Ultimately neither of these options were included in the proposed package because the shifting of both lanes would result in a narrowing of the distance between the southern and western approach, and could potentially lead to an increase in collision risk.

Expansion of radar coverage

The group also considered expanding the radar coverage area of VTS to include the outermost reaches of the San Francisco TSS. This would allow for complete monitoring of vessel transits through the entire TSS. Although the group felt this could be an effective addition, it was ultimately not included in the package because the Coast Guard did not consider it feasible to implement. The costs of adding additional coverage were considered prohibitive, particularly since the Coast Guard is looking towards reduced reliance on radar for vessel tracking as AIS moves closer to implementation. For similar reasons, the group did not consider expansion of radar coverage to the entire Sanctuary to be a feasible or cost-effective option. Instead, OSPR and the Coast Guard were encouraged to explore satellite coverage which could monitor vessel traffic in the region.

Aerial Monitoring

The group also considered a strategy in which air assets would be used to patrol the Sanctuary area and report positions and activities of vessels. The intent of the patrols would be to identify' potential problems for VTS, monitor and expand compliance with routing measures, and gather data on traffic patterns. However, the group felt that these flights would never be frequent enough to provide useful data, and that the costs involved in developing a systematic survey were prohibitive.

Emergency Rescue Vessel

The group also considered a strategy to stage a dedicated Emergency Rescue Vessel (ERV) within the MBNMS to respond to and assist disabled vessels. A dedicated rescue vessel located near the midpoint of the MBNMS could increase the likelihood that an ERV would be available to assist a disabled vessel in the event of a casualty to prevent it from drifting ashore. This strategy was ranked poorly by the group since the costs for having a, dedicated vessel and available crew would be extremely high and there would be minimal/no alternative uses for the vessel. The current demands for response vessels are met by the existing network of tug and response vessels.

Particularly Sensitive Sea Areas (PSSA)

A PSSA is defined by the IMO as "an area which needs special protection because of its significance for recognized ecological, socioeconomic or scientific reasons and because it may be vulnerable to damage by maritime activities." Designation of a PSSA by IMO must be accompanied by specified vessel management measures (such as those outlined above). It is intended to raise awareness of an area in the international shipping community, and would result in additional boundaries marked on international nautical charts.

As of today, there are only one or two such areas, including the Great Barrier Reef off Australia. The United States is still assessing its overall international posture relative to PSSAs and their potential impacts on national interests. However, U.S. designation of marine sanctuary boundaries is similar to PSSA designation in identifying environmentally sensitive and significant areas. The combination of the work group's proposed vessel management package and the existing Sanctuary designation would meet many of the goals intended by PSSA adoption. Therefore the work group defers the issue of a final recommendation on PSSAs until the U.S. has further defined its position on the issue, because, at this point, many of the goals are effectively met.

c. Conclusion

As is clear from review of the proposed strategy package, the work group recommended strategies that balance the many demands and competing values -- environmental protection, mariner safety, economic impacts, ability to gain international approval, and maintenance of those systems that work effectively. The package includes a balance of new strategies -- recommended routes for LCVs, organized transit areas for vessel classes -- along with maintaining and strengthening existing approaches -- keeping tankers at 50 nm offshore, barges at 25 nm offshore.

Also, many of the strategies rely upon industry members to comply with the requirements voluntarily. There is much to be gained by the industry overall by voluntarily compliance. The Coast Guard and NOAA both prefer to rely upon education and contact with users rather than raw enforcement to gain compliance with regulations. Non-compliance by industry could result in mandatory regulations being adopted. It could also result in marine accidents which could have devastating impacts on the California coast and the nation's largest marine sanctuary, impacts which no one in either industry or the environmental community wants. Ultimately, the package anticipates compliance by providing practical strategies to ensure protection of marine resources, while minimizing the economic burden to industry.

The Coast Guard, NOAA and the other work group members welcome comments and questions on any aspects of the proposed strategy package outlined above or alternatives considered.

REFERENCES

California Office of Spill Prevention and Response, 1995. *Coastal Protection Review.*

Center for Marine Conservation, *1994. Safe Passage: Preventing Oil Spills in Our Marine Sanctuaries.*

Ford, G. and M. Bonnell, 1995. *Potential impacts of oil spills on the Southern Sea Otter population.* U.S. Fish and Wildlife.

International Maritime Organization, *199* 1. *Ships Routeing (Sixth Edition).*

National Research Council, 1994. *Minding the Helm: Marine Navigation and Piloting; National Academy Press.*

U. S. Coast Guard and National Oceanic and Atmospheric Administration, 1997. *Report to Congress on Regulating Vessel Traffic in the Monterey Bay National Marine Sanctuary.*

U. *S.* Coast Guard, 1996. *Port Access Route Study, California Coast,*

U.S. Coast Guard, 1996. *Evaluation of Oil Tanker Routing.*

Western States Petroleum Association, 1994. Letter rebuttal to *Safe Passage.* .

ABBREVIATIONS

ADS	Automated Dependent Surveillance
ADSSE	Automated Dependent Surveillance Shipboard Equipment
AIS	Automated Information System
AtoN	Aids to Navigation
ATBA	Area to Be Avoided
AWO	American Waterways Operators
BNM	Broadcast Notice to Mariners
CAMM	Council of American Master Mariners
CFR	Code of Federal Regulations
CMC	Center for Marine Conservation
COTP	Captain of the Port
DGPS	Differential Global Positioning System
FEIS/MP	Final Environmental Impact Statement/Management Plan
GPS	Global Positioning System
HSC	Harbor Safety Committee
IMO	International Maritime Organization
INTERTANKO	International Association of Independent Tanker Owners
ITOS	International Tug of Opportunity System
LCV	Large Commercial Vessel
LNM	Local Notice to Mariners
MBNMS	Monterey Bay National Marine Sanctuary
MSO	Marine Safety Office
NAVSAC	Navigation Safety Advisory Council
NM (or nm)	Nautical Miles
NOAA	National Oceanic and Atmospheric Administration
NOSR	Notice of Study Results
NPRM	Notice of Proposed Rulemaking
OCNMS	Olympic Coast National Marine Sanctuary
OPA 90	Oil Pollution Act of 1990
OSPR	Office of Spill Prevention and Response
OVMRS	Offshore Vessel Movement Reporting System
PARS	Port Access Routes Study
PCFFA	Pacific Coast Federation of Fisheries Associations
PSSA	Particularly Sensitive Sea Area
PTP	Prevention through People
PWSA	Ports and Waterways Safety Act
RTCM	Radio Technical Commission for Marine Services
TSS	Traffic Separation Scheme
USCG	United States Coast Guard
VHF	Very High Frequency
VTC	Vessel Traffic Center
VTIS	Vessel Traffic Information Service
VTS	Vessel Traffic Service
WSPA	Western States Petroleum Association

Appendix A San Francisco TSS Approach Lanes

The existing San Francisco TSS consists of three offshore approaches, a circular precautionary area, and a single approach into and out of the Bay. Details of these components are provided below.

The precautionary area has a radius of six nautical miles, with a center located by a buoy 8.75 nautical miles west southwest of San Francisco Bay entrance. The pilot boat cruising area is approximately a mile from the buoy.

Each of the three approach lanes is tapered, the wider portion at the seaward end, and consists of a pair of opposing traffic lanes divided by a separation zone. The approaches terminate at the precautionary area and have buoys marking the center of the separation zone. At the boundary of the precautionary area, the inbound lane, separation zone, and outbound lane of each approach are one nautical mile in width (3 nautical miles total). Each flares out to 1.7 nautical miles at the end of the lanes (5.1 nautical miles total).

The northern approach runs between the Farallon Islands and Point Reyes. It is about 15.4 miles in length and is configured to direct coastwise traffic away from Cordell Bank (about 20 nm to the NW). The edge of the outbound traffic lane is about 2.3 nm off Point Reyes. This lane is used by container, bulk and tug/tow traffic heading to or from ports to the north or by vessels proceeding to the Far East.

The western approach (presently labeled Main Traffic Lane) is about 9 nm in length. This lane is used primarily by oil tankers and trans-Pacific trade vessels. It is also used by Hazmat ships and some of the barge traffic. The outbound lane passes about 1.7 nm south of shoal water off the Farallon Islands.

The southern approach is about 13 nm long. The inbound traffic lane passes about 2 nm from shoal water off Point Montara. This lane is used by container, bulk, and tug/tow traffic heading to or from ports to the south.

Each of the three approaches is oriented so as to provide a minimum of 4 nm separation from adjacent approaches. This allows reasonable sea room for maneuvering on approach to the pilot station.

Appendix B National Vessel Management Initiatives

A variety of vessel management initiatives are underway at the national level which increase the overall safety of navigation, and are applicable to vessels operating within the Sanctuary. These include mandatory participation in Vessel Traffic Services, requirements for each vessel to have licensed engineers and deck watch officers, and prohibitions on the use of an autopilot unless a qualified helmsman is present and prepared at all times to assume manual control. An autopilot must not be used if the vessel is operating in a TSS, a shipping safety fairway, an anchorage ground, or is within one-half nautical mile of any U.S. shore.

Regulatory initiatives are also underway which focus on issues such as suspension and revocation of existing licenses and testing license applicants for drug use. Manning standards for foreign tank vessels will also be developed in the future.

There are other regulatory initiatives relating to vessel construction, equipment, and operating procedures aimed at preventing oil spills; including tank vessel hull requirements, equipment requirement inspections, tank level or pressure monitoring devices, and establishment of double hull standards for vessels carrying oil in bulk.

The Coast Guard also has an active Port State Control program. The aim of this program is to identify and eliminate the operation of substandard ships in U.S. waters. This program uses historical inspection and accident data to target certain ships for inspections. Ships which do not meet standards are required to take corrective actions prior to operating in U. S. waters.

Recognizing that the vast majority of marine accidents are caused by some failure in the human system, the Coast Guard has initiated its “Prevention Through People” (PTP) Program. This program strives to link regulators with industry to identify improvements in vessel operation, maintenance, and management practices which will prevent accidents before they occur.

A more complete description of the measures listed above is provided in USCG/NOAA Report to Congress on Regulating Vessel Traffic in the Monterey Bay National Marine Sanctuary.

Appendix C Specific Management Measures in Other National Marine Sanctuaries

A variety of measures affecting the operation of vessels exist in other National Marine Sanctuaries. Some are established through the individual Sanctuary regulations, some through IMO approved routing measures, and others through agreements, cooperative ventures, and established government activities. Details of measures in place within other Sanctuaries are provided below.

Channel Islands NMS (Southern California)

Sanctuary Regulations: "Except to transport persons or supplies to or from an Island, no person shall operate within one nautical mile of an Island any vessel engaged in the trade of carrying cargo, including but not limited to tankers and other bulk carriers and barges, or any vessel engaged in the trade of servicing offshore installations. In no event shall this section be construed to limit access for fishing (including kelp harvesting), recreational, or research vessels."
[15 CFR 922.71(a)(4)]

Traffic Separation Scheme (TSS): There is a TSS north of the Channel islands (through the Santa Barbara Channel) adjacent to the Sanctuary which extends from Point Vicente to Point Conception, consisting of 1 run wide eastbound and westbound lanes with a 2 nm wide separation zone between them. The northern boundary of the first ATBA described above is the southern boundary of the eastbound traffic lane.

Area to be Avoided (ATBA): Two ATBAs are in place, as described by the IMO:

"In order to avoid risk of pollution in the area designated as the Channel Islands National Marine Sanctuary, all ships, except those bound to and from ports on one of the islands within the area, engaged in the trade of carrying cargo, including but not limited to tankers and other bulk carriers and barges, should avoid the following areas:"

One ATBA encompasses San Miguel, Santa Rosa, Santa Cruz and Anacapa Islands. It ranges from 1 nm to 11 nm off the coast of the islands. The northern boundary of the ATBA (i.e., in the Santa Barbara Channel) is colinear with the southern boundary of the eastbound traffic lane for vessels transiting the Santa Barbara Channel. The other ATBA is described by a circle with a radius of 7.5 nm centered on a point near the center of Santa Barbara Island.

Vessel Traffic Service (VTS): Some offshore rigs in the Santa Barbara Channel have private VTS-like systems to monitor and warn large shipping as well as coordinate support vessel traffic.

Cordell Bank NMS (Northern California)

Sanctuary Regulations: None for vessel traffic.

TSS: Although the TSS in the approaches off San Francisco does not extend into the Sanctuary, the Northern Approach of the TSS tends to affect vessel traffic in the Sanctuary using that approach. (see Appendix A)

VTS: The Offshore Vessel Movement Reporting System (OVMRS) of VTS San Francisco covers almost the entire Sanctuary. See Fig. 3.

Florida Keys NMS (Florida)

Sanctuary Regulations: None for vessel traffic.

ATBA: There are four ATBAs in place in the vicinity of the Sanctuary, as described by the IMO:

"In order to avoid risk of pollution and damage to the environment of these sensitive areas, all ships carrying cargoes of oil and hazardous materials and all other ships greater than 50 meters in length should avoid the following areas:"

The first ATBA is an area in the vicinity of the Florida Keys extending roughly 15 nm offshore, stretching from approximately Key Biscayne to just east of Key West. The second is in the vicinity of Key West Harbor, roughly south of the harbor entrance. The third surrounds the Marquesas Keys and is approximately 30 nm long (east-west) and 20 nm wide (north-south). The fourth surrounds the Tortugas Keys, and is roughly 12 nm is diameter. The ATBAs are configured to allow passage through waters in the area west of Key west. They also allow access to Key West Harbor.

Grays Reef NMS (Georgia)

Sanctuary Regulations: None for vessel traffic.

Other Measures: The Southeast Right Whale Implementation Team, comprised of NOAA's National Marine Fisheries Service (NMFS), the U.S. Navy, the USCG, New England Aquarium, and port personnel, is working to lessen the number of right whale fatalities resulting from collisions with vessels. Measures include encouraging vessel operators to voluntarily reduce speed in the sanctuary during the calving season, training of bridge personnel in the identification of right whales, use of a Navy-developed protocol for avoidance, and overflights during the calving season to relay location of these endangered whales to vessels transiting the area.

Gulf of the Farallones NMS (Northern California)

Sanctuary Regulations: "Except to transport persons or supplies to or from islands or mainland areas adjacent to Sanctuary waters, within an area extending 2 nm from the Farallone Islands, Bolinas Lagoon, or any ASBS, operating any vessel engaged in the trade of carrying cargo including but not limited to tankers and other bulk carriers and barges, or any vessel engaged in the trade of servicing offshore installations. In no event shall this section be construed to limit access for fishing, recreational or research vessels." [15 CFR 922.82(a)(4)]

TSS and VTS: See descriptions in main document and Appendix A

Hawaiian Islands Humpback Whale NMS (Hawaii)

Sanctuary Regulations: None for vessel traffic

Other Measures: Federal regulations prohibit a vessel or person to approach within 100 yards of any Humpback Whale. A variety of educational programs and materials are used to educate recreational users, researchers, and the general public on the whales and regulations, including workshops, guidebooks, posters, videos, etc.

Monitor NMS (North Carolina)

Sanctuary Regulations: The regulations of this first Sanctuary limit vessel activities in an area 1 nm in diameter over the wreck of the USS MONITOR. Specifically, vessels may not anchor or conduct operations affecting the wreck and the area around it.

Olympic Coast NMS (Washington)

Sanctuary Regulations: None for vessel traffic.

TSS: There is a TSS at the entrance to the Strait of Juan de Fuca, consisting of two approaches; one from the west and one from the southwest. The TSS extends inside the Strait.

ATBA: An ATBA is in place which covers part of the Sanctuary, addressing vessels carrying cargoes of oil or hazardous materials, including barges. The boundaries of the ATBA are intended to be compatible with previously established voluntary vessel traffic management measures. The ATBA extends from Cape Flattery in the north to Grays Harbor in the south, and extends to a maximum distance of 29 nm off La Push, WA.

VTS: Almost the entire area of the Sanctuary is covered by the U.S./Canadian Cooperative Vessel Traffic Service (CVTS). The offshore portion is managed by the Canadian Coast Guard's Tofino Vessel Traffic Center. Just east of Cape Flattery, inbound vessels are handed off to the U.S. Coast Guard's Vessel Traffic Service Puget Sound, which has radio and radar coverage of the entrance to the Strait.

Other Measures: A program called the International Tug of Opportunity System (ITOS) is in place in the area off Cape Flattery. ITOS consists of a monitoring system for tugboats operating in the vicinity of the Strait of Juan de Fuca, using Automated Information System equipment installed on tugs. In the'event of a casualty to a large commercial vessel, the nearest and most capable tug can be identified and dispatched to assist.

An agreement has been in place since 197 1 between crabbers and tugboat operators. This "gentlemen's agreement" identifies towing lanes for tugs and barges along a major portion of the West Coast, including most of the Washington coast.

Stellwagen Bank NMS (Massachusetts)

Sanctuary Regulations: None for vessel traffic.

TSS: A TSS is in place that consists of an approach to Boston and a Precautionary Area just east of Boston. The approach is made up of westbound (inbound) and eastbound (outbound) traffic lanes 2 nm wide, separated by a 1 nm wide separation zone. The TSS runs through the center of the Sanctuary.

Appendix D Vessel Drift, Rescue Time and Weather Conditions

Drift/rescue contours

The vessel drift/tug rescue time analysis shown in Fig. 5 made the following assumptions for a "worst-case" scenario based on USCG investigation of wind conditions, tug capabilities and vessel drift:

- worst case wind direction for blowing a vessel onshore is from the southwest
- worst case winds are 20 knots, sustained over time
- vessel drift is directly onshore
- rescue tugs travel at 10 knots, with l-2 hours for notification of need for tugs and departure
- one hour on-scene time needed to hook up to disabled vessel
- disabled vessel cannot undertake repairs or alter drift rate/direction
- no assistance is provided by transiting vessels

Vessel drift was calculated using a formula derived from the National SAR manual, applicable only offshore: Wind speed x 0.07. Given 20 kt winds, this equals a drift rate of 1.5 kts. Vessel drift was assumed to be directly onshore. Existing currents were not taken into account, since the drift of large vessels depends primarily on wind.

"Worst-case" weather conditions

The Naval Research Lab in Monterey searched an approximately 15-year data base of hourly wind observations from four buoys off San Francisco, Half Moon Bay, Monterey and San Martin to determine all data points where the wind speed was greater than 20 knots, and blowing onshore within an arc of 210-270 degrees. The search indicated that:

- Winds of any speed are from the southwest (i.e., blowing onshore) only 12% of the time. The remainder of the time they would blow a vessel along-shore or offshore.

- Only 0.10% of all observed winds met the "worst-case" search criteria of greater than 20 kts and between 2 1 O-270 degrees.

Narrowing the search further, the record indicated that these worst-case winds are generally not sustained over long periods of time. For the San Francisco Buoy, in 15 years of data, 1 sustained worst-case wind event which met the above criteria lasted more than 24 hours, 4 events lasted more than 12 hours, and 7 events lasted more than 6 hours. This event frequency was slightly reduced for the buoys further south.

Analysis of the weather data indicates that the probability of sustained (greater than 12 hours), strong (greater than 20 knots) southwest winds is extremely small, and that the USCG use of 20 knot winds in Fig. 5 accurately depicts "worst-case" conditions for driving a disabled vessel onshore along the Central Coast.