OIL SPILL PREVENTION AND RESPONSE: THE U.S. INSTITUTIONAL SYSTEM IN THE COAST OF CALIFORNIA

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MAIN PAGE

BACKGROUND & OBJECTIVES OF THE STUDY.

Nowadays, the marine environment is subject to a wide range of human activities and potential threats that cause alterations on the status of its structure and functions. Key issues for environmental authorities are the management of environmental pressures associated with a large and expansive tourism industry, the increase of commercial maritime transport, and recreational fisheries, urban coastal development, and the downstream effects of land agricultural use.

TABLE 1: OCEAN THREATS

OCEAN THREATS
Fishing (bottom trawling of seamounts highlighted as a particularly destructive activity)
Illegal, unreported and unregulated (IUU) fishing
Shipping
Land-based sources of marine pollution
Artificial modification of the marine environment, including the effects of climate change
Impacts of marine scientific research
Minerals extraction;
Bioprospecting
Submarine cables and pipelines
Marine debris
Military activities
Transportation of hazardous substances;
Lack of an agreement over the duties of flag States in the exercise of their jurisdiction and effective control over ships flying their flag
Alien invasive species, including from ballast water discharge
Noise pollution
Lack of awareness of the diversity of high seas species and the potential impacts of exploitation activities
Whaling, particularly the lack of coordination between the International Whaling Commission and other relevant organizations.
Lack of political and commercial willingness to better conserve high seas biodiversity.

Source: Based on Alonso García, E. (2004). Yellow cells highlight the ocean's threats related with the marine transport sector.

The cumulative impacts of all these environmental threats highlight the critical importance on integrated management approaches when compared with the lack of effectiveness of the classic sectoral approaches, such as the management of shipping.

On the one side, a new development has been the establishment of Marine Protected Areas [The most wide-ranging definition of MPA is: "*any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment" (IUCN* 1998).]

In this sense, as significant harm to the world's ocean ecosystems becomes more evident, Marine Protected Areas (MPAs hereinafter) are receiving increasing attention from government leaders, policymakers and scientists. This growing support for the establishment of MPAs as a key tool for resource management and biodiversity conservation, is highlighted in decisions adopted in 1995, the so-called "Jakarta Mandate", by the Conference of the Parties (COP) of the Convention on Biological Diversity (CBD) and the Plan of Implementation adopted in September 2002 at the World Summit on Sustainable Development. The latter commits governments to develop a representative global network of MPAs by 2012. This commitment was further elaborated in Kuala Lumpur, at the CBD COP-7 in 2004 (Dec. VII/5 and VII/28) and recently in Curitiba, at the CBD COP-8 in 2006 (Dec VIII/24).

Close to the MPA concept, there is also the multiple use concept. "Multiple use" is described, by the Australian Marine Governance, as the management regime whereby:

- resources are used in a manner which, collectively, is in the best overall long-term community interest;
- collective and cumulative uses do not endanger environmental values, ecological processes and social, cultural or amenity values; and
- there may be areas or periods for which some or all uses are excluded.

Generally, the multiple use concept is underpinned by four fundamental principles: maintenance of ecosystem integrity, wealth generation, equity among users and generations, and participatory framework for decision-making.

Both concepts of multiple use and MPAs come together with the multiple use or multi-purpose MPAs paradigm that represents a way to accommodate multiple users in areas where coastal populations, tourism, and resource use conflicts are on the rise (Agardy, 1995).

In hindsight, this vanguard notion suggests that the Ocean is "asking" for the creation of an administrative-legal framework where the authority in charge will be able to subordinate the different uses in order to achieve the protection of the resources (natural, cultural, economic) of the area.

TABLE 2: USES OF THE OCEAN

USES OF THE OCEAN
Disposal of Waste from Land
Energy
Fisheries and Aquaculture
Human Settlements on the Coast
Marine Biotechnology
Non-Consumptive Uses
Ocean Dumping and Ship Wastes
Offshore Oil, Gas and Mining
Recreation and Tourism
Transportation and Telecommunication

Source: UN Ocean Atlas, www.oceansatlas.org

FIGURE 2: ECOSYSTEM APPROACH FOR THE GULF OF MEXICO

Source: NOAA website

Arguments supporting zoning within multiple-use MPAs include those offered by Pressey and McNeill (1996), who consider broad-area integrated management (i.e., multiple-use MPAs) more effective than a series of small, isolated highly protected areas. Integration of "no-take" zones [where all extraction of resources is prohibited, including fisheries] within larger multiple-use MPAs should also have lower infrastructure and administrative costs per spatial area than a series of separate small no-take MPAs and multiple use MPAs.

On the other side, the shipping sector is one of those historic sectors that has to be readapted to the twenty first century management paradigms (such as, for example,

marine biodiversity conservation) in order to respond to the current public demands. As Table 1 has shown, marine transport is one of the vectors responsible for the alteration of marine ecosystems since it is the origin of a range of potential threats that can cause alterations in the structure and function of the component of ecosystems. Within this range of threats, oil pollution originated by shipping is an issue of major concern from the standpoint of its impacts on the health of the marine environment and its socio-economic uses. This is why in some specific geographical areas, the social pressure for a better protection of the world's marine ecosystems created during years, has achieved a reduction of the threat of oil spills through the implementation, both by the private sector and the public administrations, of continuous improved prevention mechanisms and response actions, based on sound scientific principles.

Nevertheless, and without underestimating this particular triumph, anyone who has considered pollution problems knows the field is very broad and quite complex. This is due, in part, to the vast number of different kinds of compounds, organic and inorganic, that can be lost or improperly discharged to the marine environment. This complexity is also due to the broad spectrum of vulnerabilities experienced by all the various members of the plant and animal kingdoms (see Section 1, below, for an overview of the sources of marine oil pollution).

Despite this fact, we will show with detail in Section 4, below, how the United States (and California, within its areas) have been one of the most active nations of the world both in preventing and responding to the threat of pollution to U.S waters through the engagement of the private sector and through the implementation of institutional mechanisms specifically designed for this purpose (see Ronald Mitchell, 1993).

In addition, California has been selected, as a significant representative example of the United States institutional system, for several reasons:

- California’s extraordinary marine biological diversity is a vital asset to the state and nation. The productivity, wildness, and beauty of its coast and ocean are central to California’s identity, heritage, and economy (See for example, this influence of nature in Steinbeck´s or the Beat Generation literature). At the same time, however, the impacts of coastal development, water pollution, certain modern fishing practices, and other human activities have altered and degraded

its coastal and marine environment (for example, the sardine population fished in California has still not recovered to pre-1940's levels following a crash in the 1940's and 1950's).

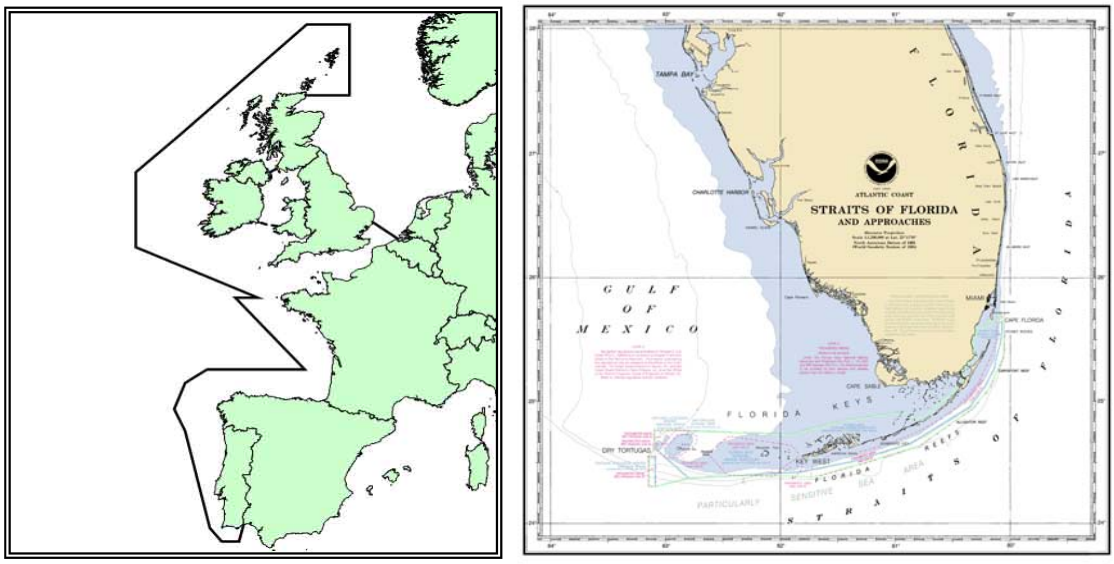
- California has a high risk of oil pollution within its boundaries. It is the 8th economy of the world as well as one of the largest worldwide importers of oil (According to the California Energy Commission Californians use 75.6 million gallons- 1.8 million barrels- of oil every day). The coast of California suffers heavy maritime traffic and has two major world ports (San Francisco-Oakland and Los Angeles-Long Beach). On the other hand, the California Coast is also one of the United States richer areas for oil drilling and it has several oil refineries in its territory.
- California shares boundaries with Mexico, a country with an emergent economy and with less developed pollution control systems.
- California has developed a very specific institutional system for facing these risks. The International Oil Spill Conference has rewarded several times its Office of Spill Prevention and Response as the lead world Agency.
- Finally, California has a solid nature conservation public institutional system (we will see, later, its well developed Marine Protected Areas Network), a well based Public Interest Groups & NGOs network, and a solid citizen conscience in ocean conservation.

However and despite its apparent achievements, new business tools or mechanisms are being incorporated to keep improving this complex system. One of these emergent mechanisms that are being developed is the acknowledgement of one form or another of MPA specifically devised to confront oil pollution and/or transportation problems (see, as an example, the figure of "*water quality protection areas*" in California law.) Usually, although MPAs are established for purposes other than pollution control, their management practices have, in some cases, contributed to the reduction of marine pollution (see as an example Monterey Bay National Marine Sanctuary).

The idea of creating a specific category of MPA to prevent pollution from ships was first formally introduced by the International Maritime Organization (here in after IMO). The IMO introduced Special Areas (SAs) ["*sea area where for recognized*

technical reasons in relation to its oceanographical and ecological conditions and to the particular character of its traffic, the adoption of special mandatory methods for the prevention of sea pollution by oil, noxious liquid substances, or garbage, as applicable, is required"] and Particular Sensitive Sea Areas (PSSAs) [*"area that needs special protection through action by IMO because of its significance for recognized ecological, socio-economic, or scientific reasons and because it may be vulnerable to damage by international shipping activities*"] [see. E.g., figure 3] to indicate the essential combination of environmental sensitivity and risk of pollution from ships. Generally speaking, they are flexible tools that enable the enforcement of more stringent management measures and regulations according to the ecological, social and economic characteristics of the area. Subsequently, there have been some national efforts and approaches to further develop this concept such as for example, the category of "*Marine Environmental High Risk Area"* in the United Kingdom.

FIGURE 3: WESTERN EUROPE AND FLORIDA KEYS PSSAs



SOURCE: www.imo.org

SOURCE: NOAA

In the case of California, neither SAs nor PSSAs have been established, but its state legislation has created a special type or category of MPA focused on these objectives, and the use of mechanisms similar to those used to manage PSSAs (in particular, the deployment of traffic lanes far from the coast, to offshore areas) have been successfully implemented.

This paper will revise the institutional and cultural setting put in place in the West Coast of US for the prevention and response to oil spills, tracking its conjunction with the marine conservation initiatives; it will also study the available and emergent mechanisms of the system and examine those that have been more effective for both preventing pollution and protecting sensitive marine habitats.

The main page of this paper has been structured in four sections.

- The **first section** presents an overview of the sources of marine oil pollution.
- The **second section** presents a brief description of the key actors regulating International Maritime safety.
- The **third section** reviews both the U.S. and California general institutional organizations for pollution control and its key working programs. It is important to mention, that this section can produce certain feeling of repetition due to the fact that both systems, United States and California, will be explained separately; as it would be described, both systems have common points since the California system conforms to a national format standard. But, furthermore, the State of California developed a very complete system that in some cases overlaps with the federal system. However, this overlap is an intentional result since the state government was seeking a high standard for the protection of the territory against this particular risk (there was a very high social demand). It might also produce certain feeling of confusion because several mechanisms, programs and agencies will be described, but in the end, and this is the essential component of this research, we will describe how everything fits together.
- Finally, and once the general U.S-California structural-model for planning oil spill prevention and response has been understood, **section four** reviews some particular management tools.

The first purpose of this research project is to explain to the reader the complex framework associated with the prevention, preparedness and response of oil spills and the specific arrangements, mechanisms and efforts made to introduce within the complex system, the marine nature conservation organisations and stakeholders.

In addition, a second purpose for this project would be to inspire policymakers as well as other stakeholders to initiate a dynamic on going policymaking process aimed at preserving the marine environment while engaging the marine transportation sectorial activity. To accomplish with this last purpose and although no final recommendations will be presented in this report, the research project provides a selection of importance building blocks that are essential to create an environmentally sound framework for the shipping industry.

Map of Monterey Bay National Marine Sanctuary

SECTION 1. BRIEF OVERVIEW OF THE SOURCES OF MARINE OIL POLLUTION.

Oil enters into the marine environment from a number of sources both *anthropogenic* and *naturally* occurring. On the other hand, inputs can be classified as *point-source* (originating from a specific location) and as a *non-point-source* (longer term, nonspecific location). For the specific overview presented in this section, we consider the following categories of sources of oil spills:

1. Vessel spills (including accidental spills and operational discharges from all vessels).
2. Oil and gas production (including accidental spills from offshore platforms, operational discharges from platforms, spills from marine and land-based pipelines and spills and discharges from land-based production facilities).
3. Land-based sources including point sources (spills and discharges from industrial facilities and municipal treatment plants) and non-point sources (coastal and urban runoff).
4. Natural sources of oil pollution.
5. Air emissions.

We focus our attention on vessel inputs as they have been the main concern of this research project due to the fact that until today, the vessel source spills are the primary focus of the United States Coast Guard (USCG hereafter) Oil Spill Prevention and Response Program and the target of the more aggressive program initiatives. Available spill statistics are presented briefly, on number and volume of spills from each source. The data were compiled carefully from a variety of sources, although the main source has been the U.S National Academy of Sciences Report (NAS 2002 hereafter). Since 1975, the National Academy of Sciences (NAS) has periodically summarized the *Inputs, Fates and Effects of Oil Spills in the Marine Environment* (NAS, 1975, 1985, 2002). The last two ones, 1985 and 2002 have been extended used for the purpose of this section.

All oil spill statistics presented here are provided in terms of minimum and maximum "best estimates". It is important to remark at this point that all international oil spill statistics must be read with certain precaution due to the assumptions undertaken in each case of study. Another important remark is that the breakdown of spill sources on a worldwide basis, does not necessarily reflect what happens in a regional basis.

1.1 TOTAL INPUTS FROM ALL ANTHROPOGENIC SOURCES

Estimates for total inputs from all anthropogenic sources, spill and discharges, range from 242.09 thousands of tonnes to 6132.2 thousands of tones per year (TABLE 3). The "best estimate" is calculated to be 606.86 thousand tones per year. A breakdown of the data by source categories indicates that, by best estimates, vessel source spills far exceed the inputs from production and land-based sources combined, representing over 68% of total input. The next largest source is land-based sources (23%), with production representing the smallest input by volume (9%). Application of the maximum estimates yields completely different results: land-based sources represent the largest input (82%), followed by vessel source (17%) and lastly, production (2%). (Sally Ann Lentz and Fred Felleman.2003)

TABLE 3. AVERAGE, ANNUAL RELEASES (1990 - 1999) OF PETROLEUM BY SOURCE (IN THOUSANDS OF TONNES).

Source Category	NORTH AMERICA			WORLD WIDE		
	Best Estimate	Minimum	Maximum	Best Estimate	Minimum	Maximum
Vessels Total	12.32	7.36	22.8	413.1	207.5	1020.8
Tank vessels	5.3	4.0	6.4	100	93	130
Operational (cargo washing)	Na	Na	Na	36	18	72
Operational (100 GT)	0.10	0.03	0.30	270	90	810
Operational(<100GT)	0.12	0.03	3.0	Nd	Nd	nd
Non-tank vessels	1.2	1.1	1.4	7.1	6.5	8.8
Recreational vessels	5.6	2.2	9	Nd	Nd	nd
Production and Transportation Total	6.66	5.65	8.18	53.76	27.79	111.4
Platforms	0.16	0.15	0.18	0.86	0.29	1.4
Produced waters	2.7	2.1	3.7	36	19	58
Pipelines	1.9	1.7	2.1	12	6.1	37
Coastal Facilities	1.9	1.7	2.2	4.9	2.4	15
Runoff Total	54	2.6	1900	140	6.8	5000
TOTAL	**72.98**	**15.61**	**1930.98**	**606.86**	**242.09**	**6132.2**

Source: NAS 2002. North America refers only to United States Waters.

In general terms and although, on a worldwide average, and extreme tanker spill happens every 8 months at present times, it could be said that accidental spills are less

frequent than other categories of oil spills but typically involve large volumes of spilled oil relative to other kinds of oil spills. Even during the 4 months in which this research was conducted there were two major oil spills in the US Coast. The Delaware River near Philadelphia in November 2004, and the Selendang Ayu in the Aleutians Islands of Alaska in December 2004.

It should not be ignored the fact that although these extreme spills garner extensive media attention, it is surprising, how frequent smaller spills are. For example, during the years of 1985-1997, there were at least 620 oil spills of over 200L in California Coastal areas. (Gary W. Allison *et. al.* 2003). We have only raw data for 2004, but over 6500 spills of all sizes were reported in California marine waters (from small sheens upward), and the smaller spills can significantly impact marine reserves if they are not reported and properly mitigated.

1.2 VESSEL SOURCE SPILL AND DISCHARGES

Inputs from vessel source, fall into one of these two categories:

1. **Accidental spills** (e.g., spills caused by collisions, equipment failures, fires and explosions, groundings, sinkings and capsizing, and structural failures, etc.)
2. **Operational discharges** (e.g., at-dock discharges, bilge/ballast discharges, bunkering/loading/lightering discharges, in-transit discharges, offshore stationary discharges, and repair/maintenance discharges).

The NAS 2002 “best estimate” for worldwide average annual inputs from vessel sources is 107,000 tonnes for accidental spills and 312,000 tonnes for operational discharges. Therefore, roughly 34% of vessel input comes from accidental spills, while 66% comes from operational discharges. This finding is important given the relative resources devoted to prevention of accidental spills and operational discharges, although it was well know since long time ago (See Ronald Mitchell, 1993) .

TABLE 4 VESSEL OIL SPILLAGE BY SPILL CAUSE IN U.S. WATERS, 1990–2000.

1GALON = 3, 785 LITRES

Spill Cause	Total Gallons Spilled	Annual Gallons Spilled	Number of Spills (1 gal and up)	Average Spill Size (gal)
Underway Spills				
Allision/collision	1,249,582	113,598	156	8,010
Equipment failure	61,913	5,628	434	143
Fires/explosion	1,175,901	106,900	147	7,999
Grounding	1,253,696	113,972	297	4,221
Sinking/capsizing	500,025	45,457	1,180	424
Structural failure	1,775,342	161,395	427	4,158
Transfer Operation Spills				
At-dock discharges	522,222	47,475	5,068	103
Bilge/ballast discharges	5,099,156	463,560	5,359	952
Bunkering/loading/lightering	1,139,576	103,598	4,897	233
In-transit discharges	2,091,513	190,138	404	5,177
Offshore stationary discharges	92,457	8,405	118	784
Repair/maintenance discharges	14,868	1,352	536	28
Other/Unknown	1,966,892	178,808	29,191	67
Total	16,943,143	1,540,286	48,214	351

Source: NAS 2002.

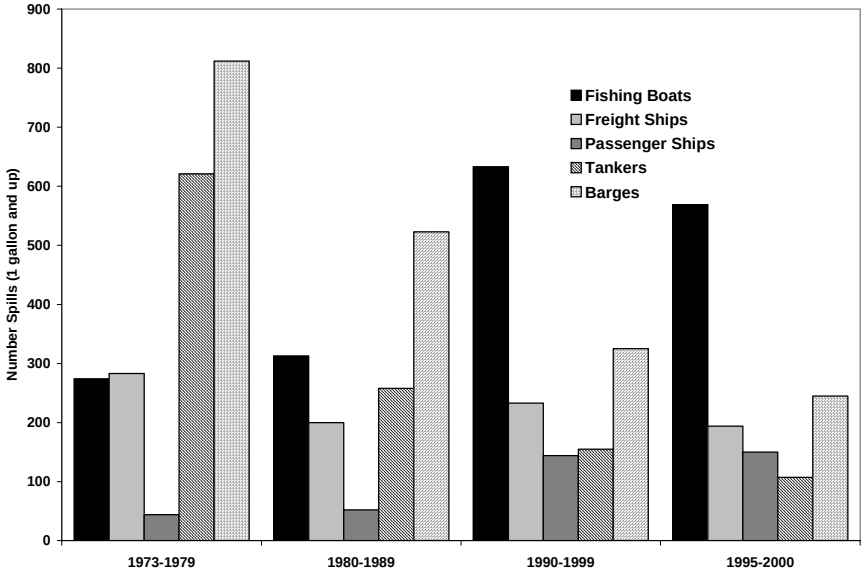
On the other hand, vessel source inputs can be divided into the following categories according to the vessel category where they come from:

- ✓ tankers;
- ✓ barges;
- ✓ non-tankers (freight ships, container ships, bulk cargo ships, etc.);
- ✓ fishing vessels;
- ✓ passenger vessels;

In addition, there are also:

- ✓ recreational vessels;
- ✓ sunken vessels.

FIGURE 4 ANNUAL NUMBER OF OIL SPILLS BY VESSEL TYPE IN U.S. WATERS, 1973–2000.



Source: NAS 2002.

Next, an overview of the oil inputs coming from the tankers and non-tank vessels is presented as they represent the major threats. Recreational and sunken vessels data are also revised as they are two growing emergent threat categories.

A. TANKER SPILLS

Tankers constitute a significant percentage of vessel source oil spills as compared to non-tankers. [US Code Section 2101 (39) defines a “tank vessel” as a vessel carrying oil or hazardous materials in bulk or residue including a tanker as defined in section 2101 (38). US Code Section 2101 (38) defines “tanker” as a self-propelled tank vessel that has been constructed or primarily adapted to carry oil or hazardous material in bulk in the cargo spaces. This vessel is a subclass of tank vessel, which is defined in section 2101 (39). This subclass definition is necessary because certain statutory minimum requirements that are consistent with internationally accepted standards are solely applicable to these vessels]

Historically, tankers have accounted for over 50% of the total number of recorded vessel spills, as compared to barges and all other vessels. However since the passage of the U.S. Oil Pollution Act of 1990, a significant and consistent decrease in the total volume spilled has occurred for the U.S. as compared to the rest of the world.

On the other hand, although large oil spills happen all around the world, oil spills happen more frequently in certain parts of the world. In this sense, The Oil Spill Intelligence Report (Cutter, 1997) identified the following 'hot spots' for oil spills from vessels: the Gulf of Mexico (267 spills); the northeastern U.S. (140 spills); the Mediterranean Sea (127 spills); the Persian Gulf (108 spills); the North Sea (75 spills); Japan (60 spills); the Baltic Sea (52 spills); the United Kingdom and English Channel (49 spills); Malaysia and Singapore (39 spills); the west coast of France and north and west coasts of Spain (33 spills); and Korea (32 spills).

Concerning operational discharges, NAS 2002 found that, worldwide, operational discharges resulting from cargo washings constitute 36,000 tonnes per year; as noted above operational spills constitute a significant input according to these data. Although it is not the purpose of this study, it should be noted that a key ingredient of compliance with operational discharge requirements is the availability of reception facilities to receive the vessel’s oily waste. In this sense, the International Tanker Owners Association (Intertanko) has repeatedly raised the issue of inadequate shoreside reception facilities within IMO as a major weak point in the MARPOL international regime is the lack of adequate shoreside reception facilities for shipboard waste as well as a lack of consistency in the pricing mechanisms specified by the reception facilities that are available.(see Ronald Mitchell, 1993)

B. NON TANK VESSEL ACCIDENTAL SPILLS

NAS 2002 report estimates that accidental spills from non-tank vessels (100 gross tones and above) input an average of 7,100 tones of oil per year worldwide into the marine environment. Many of the large non-tank vessels, including freighters, container ships, and bulk cargo carriers, carry as much oil as bunker fuel as some of the smaller tank vessels. A number of such spills have occurred in recent years (see for example New

Carissa-1999, Kure-1997, etc.), raising serious questions about the less stringent standards to which these vessels are held.

On the other hand, non-tank vessels also contribute at least 270,000 tones of oil per year in operational discharges. Machinery space bilge oil, fuel oil sludge, and oily ballast constitute the primary sources of operational discharges from non-tank vessels.

C. RECREATIONAL VESSELS.

Recreational boats generate large quantities of operational oil discharges from the operation of two-stroke engines in outboard motor boats and personal watercraft. These types of discharges of oil are created by the simultaneous operation of the lubrication and combustion systems, resulting in discharges of the unburned lubricating oil being discharged with the exhaust. Apparently, as much as 25% of fuel and lubricating oil used by a two-stroke engine is discharged unburned directly into the water or atmosphere (*Everything you need to know…*, Environment, Health and Safety Online). In this sense, the large numbers of recreational watercraft worldwide indicate a significant contribution by this source, although the total figure is not known as the worldwide population of recreational boats is not available.

D. SUNKEN, GROUNDED OR ABANDONED SHIPS

Finally, we would like to highlight that leakages from sunken, grounded or abandoned ships is another potential source of oil to the marine environment. These can be merchant or military vessels that have sunk to the bottom of the sea, generally due to an accident but sometimes also as the result of a deliberate action to get rid of them freely and with an insurance reward. These abandoned vessels become potential sources of oil pollution, from either chronic leaks or a large release once oil storage areas fail. From an oil pollution perspective, wrecks sunken during and since World War II pose the greatest risk because of the presence of residual fuels. -- World War II wrecks are of particular concern because they can contain large volumes of oil, and corrosion after

nearly 60 years underwater can lead to chronic leaks and the potential for catastrophic releases.

ABANDONED SHIP IN SANTA CRUZ (CALIFORNIA).

SOURCE: Ana Tejedor (August 2004)

1.3. OIL AND GAS PRODUCTION

According to the NAS 2002, offshore oil and gas exploration and production inputs account for between 27,000 and 111,000 tonnes of oil input per year worldwide. The NAS 2002 best estimate is 54,000 tonnes. This represents about 9% of the total annual inputs.

Included in these production sources are offshore oil exploration and production platforms, marine pipelines that transport the oil from the platforms to the shore, and floating production, storage and offloading systems.

1.4. LAND-BASED SOURCES

Land based facilities may be divided into point source and non-point source categories. Point sources include production related facilities (e.g., manufacturing, industrial, utility). Non-point sources include those which cannot be easily identified (e.g., urban and coastal runoff, atmospheric deposition and air-sea exchange, etc.).

NAS 2002 estimates that worldwide spills from point-source facilities that are not from vessels or oil and gas exploration and production facilities (including crude oil pipelines) amounts to between 2,400 and 15,000 tons per year.

NAS 2002 estimates worldwide oil input from non-point, land-based sources to be between 161,000 and 6,132,000 tons of oil annually. Its best estimate is 606,000 tons. However, the individual point sources contributing to this input are difficult to identify and even more difficult to mitigate. Regulatory measures and pollution prevention programs addressing coastal and urban runoff are just now starting to be implemented.

1.5. NATURAL SOURCES OF OIL POLLUTION.

Crude oil and natural gas seeps from fissures in the ocean seabed and eroding sedimentary rock. The total amount is estimated to exceed 600,000 tons (180,000,000 gallons) globally, each year. Natural processes are therefore, responsible for over 45 percent of the petroleum entering the marine environment worldwide. However an important remark to this figures is that, apparently, the ecological impacts of this large input appear to be limited in area, suggesting that the slow rate of release allows biota to acclimate to polycyclic aromatic hydrocarbons and other toxic compounds in the releases (NAS 2002).

1.6. AIR EMISSIONS.

In addition to the spill sources we have discussed thus far, oil enters the environment from air emissions from oil and gas exploration and production activities (production,

transport and refining) and vessel operations (loading, crude oil washing and in transit) in the form of Volatile Organic Compounds (VOCs). A portion of these VOCs eventually enters the marine environment. NAS 2002 estimates that over 53,000 tons of petroleum is released annually as a result of atmospheric deposition.

SECTION 2. BRIEF DESCRIPTION OF THE KEY ACTORS REGULATING INTERNATIONAL MARITIME SAFETY

This section reviews the main players in the business of ensuring safe carriage of oil by sea.

The International Maritime Organization (IMO). The IMO, a specialized United Nations Agency composed of 164 countries, is the international statutory body responsible for measures to improve the safety and security of international shipping and to prevent marine pollution from ships through International Conventions, advisory bodies and education. It has a number of international legal instruments and conventions which specifically address the issue of prevention of pollution of the marine environment stemming from ships and port facilities. Once the conventions are adopted and ratified, it is the responsibility of national governments worldwide to enforce the requirements of the Acts on ships sailing under their national flag of registry, or foreign ships operating within their jurisdictional waters.

The IMO's main technical work is carried out by various committees which are Maritime Safety, Marine Environment Protection, Legal, Technical Co-operation and Facilitation Committees.

Ship owners. The ship owner is the person in control of the vessel, and has responsibility for its operation, maintenance and manning.

Flag State. The Flag State is the State where a ship is registered. The states exercise direct control over their national fleets and their crews. Most flag states carry out their regulatory responsibility through classification societies.

Classification societies. Classification societies are independent private companies who verify the condition of a ship and issue a "class certificate" to reflect compliance with IMO's standards for ship design and seaworthiness. This certificate enables the ship owner to obtain the required insurance for the ship hull and machinery.

IACS

INTERNATIONAL ASSOCIATION
OF CLASSIFICATION SOCIETIES

Dedicated to safe ships and clean seas, IACS makes a unique contribution to maritime safety and regulation through technical support, compliance verification and research and development. More than 90% of the world's cargo carrying tonnage is covered by the classification design, construction and through-life compliance Rules and standards set by the ten Member Societies and one Associate of IACS

Port State. Port States are the countries that receive foreign ships in their ports. Due to poor controls of certain flag states, coastal states increasingly exercise their right to inspect incoming vessels. Because of this right, if a vessel does not meet the minimum international (and additional regional/national) requirements, a coastal state is allowed to detain the vessel until it complies with the minimum requirements.

It is worthy to mention, that a number of Port States have cooperated on this particular task by making regional agreements known as Memoranda of Understanding (MoU). Through these MoUs, port states carry out inspections of vessels which visit their ports,

to ensure they comply with international regulations and to identify substandard ships in a regional cooperation framework.

The oil and shipping industry. Both are the charters of the ships. Essentially, because the cargo owners have also a direct interest in making sure that the cargo reaches its final destination safely, companies are selective over the ships they use in order to be ensure the ships are operated properly.

In this sense, it is worthy to mention that in California the vast majority of companies in the oil transport chain recognize that good environmental performance is good business, and they have worked very hard to create a safety and environmental ‘culture’ in their organizations.

SECTION 3. AGENCIES AND ORGANISATIONS WHICH BEAR RESPONSABILITIES FOR THE CONSERVATION OF THE MARINE ENVIRONMENT THROUGH THE PREVENTION AND RESPONSE TO OIL SPILLS. AN OVERVIEW OF UNITED STATES MECHANISMS THROUGH THE CALIFORNIA PRISMA.

The institutional structure established for preventing, planning and response to oil pollution threat in United States takes into account both public (federal & state) and private-sector resources.

Hence, while the **US Coast Guard (USCG)** has authority to represent and protect federal government interest for incidents within federal waters, which includes all navigable waters of the United States, the States have authority to represent and protect the State's interest for incidents within State waters (all States have jurisdiction on State-owned shoreline and near-shore waters out of the 3-mile limit, see the section on Guiding Students Discussion).

The **private sector** has also its duties and specific mechanisms to take action because of the "polluter pays" principle stated at the US Oil Pollution Act (OPA-90, in 33 USC 2702 to 2761). This principle emphasizes that it is the polluter who has the responsibility for leading the response. In this sense, and in order to be able to provide a prompt response, the Coast Guard issued regulations requiring each vessel and facility that transports, stores or handles oil of any kind to have a "spill response plan" in place along with the designation of qualified individuals based in the US to assume direction of the response effort on the owner/operators' behalf. The required response plans must provide evidence that each plan holder (i.e., each vessel and facility) has in place sufficient equipment to respond to and clean up any spill that may occur.

To comply with this requirement, the private sector put in place a multibillion-dollar network of more than 105 privately owned oil spill response organizations around the United States. These response organizations have the responsibility for providing the response equipment in the event of any incident, wherever it may occur in U.S waters (Debra Scholz, 1998).

On the other hand, OPA-90 states that all tankers in US waters must be able to prove that they have financial responsibility for the maximum amount of liability to which they could be subject. Although this financial amount of liability varies depending of the vessel gross tons, tankers must have $1 billion insurance coverage to fund any response to a spill and adequate compensation of damage to natural resources, real or personal property, subsistence use of natural resources, revenues, profits and earning capacity and public services. Any tankers, which are found not to have sufficient financial cover, are subject to seizure by and forfeiture to the US. OPA-90 also increased the fines for failing to notify the discharge of oil (from $10,000 to $250,000 for an individual and $500,000 for an organization) and the maximum prison sentence (increased from 1 year to 5 years).

In California, the oil companies were very pro-active in assuming these requirements. In general terms, they quickly recognized that their good environmental performance was a good business. This conclusion was reached probably because of two main factors: the high pollution risk that they were facing in California and the pressure put on them by the U.S-California citizens who have a high ocean conservation culture. Despite this general trend, some oil companies were unable to assume the action required and left the State.

We will review, first, the U.S. general institutional organization for the planning and management of oil spills and, second, the more relevant programs of work developed by two of the most historically proactive agencies of the world: the United States Coast Guard & the California Spill Prevention and Response Office.

3.1.-U.S. GENERAL INSTITUTIONAL ORGANIZATION FOR PLANNING & RESPONSE TO OIL SPILLS. CONTINGENCY PLANS, RESPONSE TEAMS & THE INCIDENT COMMAND STRUCTURE.

The U.S general institutional organization for planning and managing the responses to oil spills is regulated in Title 40 of the Code of Federal Regulatiions (“Protection of Environment”).

3.1.1 Planning Structure

One of the most important aspects of oil spill response is planning. It includes contingency planning, training of personnel and organizations, and ensuring that the infrastructure and information are available to facilitate decision making and resource management when a spill occurs. Following the Exxon Valdez spill, planning and management were identified as a key focus area where improvements were needed, particularly in dealing with larger, more complex spills (similar conclusions were achieved in Spain, 20 years later, after the Prestige spill accident in 2002).

The **Contingency Plans** are the fundamental instruments to prepare and to respond to oil spills in U.S. These instruments describe, with the detail required, the organizational structure to face the pollution risk, the procedure to follow, and the resources available to accomplish the work.

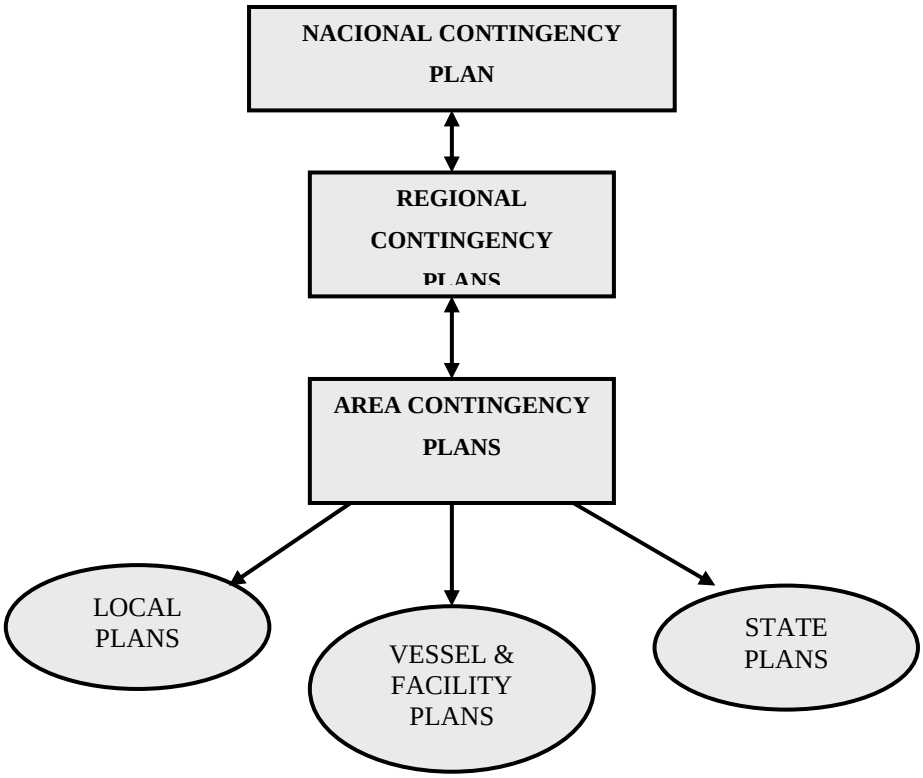
In the U.S. there are six planning and response organizations:

1) the National Response Team, responsible for its National Contingency Plan;
2) the ten Regional Response Teams responsible for their Regional Contingency Plan (see Figure 8 below);
3) the fifty Area Committees responsible for their Area Contingency Plans. The areas of responsibility may include several local planning districts, or parts of such districts, and can be in water or in land;
4) the States, with their State Emergency Response Commissions;
5) the Local Committees, with their local emergency response plans. Each State Emergency Response Commission has to designate emergency planning districts, appoint Local Emergency Planning Committees, supervise and coordinate their activities, and review local emergency response plans; and,
6) each tank vessel and each offshore or onshore facility that could be expected to cause substantial harm to the environment by discharging oil, with their plan for responding a worse case discharge.

Although there are some variations between individual Area Plans to accommodate special local conditions, the overall format for each one conforms to a national format

standard (see below, figure 5). In this way, the Area Plans for each Region constitute the Regional Response Plan, and the several Regional Response Plans together constitute the National Contingency Plan.

FIGURE 5. RELATIONSHIP AMONG CONTINGENCY PLANS.



SOURCE: Extracted from the code of Federal Regulations. Title 40 Protection of Environment.

Next, the three first levels (National, Regional and Area Committees) of contingency planning and the three organizational elements created to perform these activities (National & Regional Response Teams and Area Committees) under the national response system are described below.

3.1.1.1.The National Contingency Plan and The National Response Team.

The *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP), is the federal government's blueprint for responding to both oil spills and hazardous substance releases. [The NCP is required by section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter CERCLA), of 1980, 42 U.S.C. 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and by section 311(d) of the Clean Water Act (CWA), 33 U.S.C. 1321(d), as

amended by the OPA-90.] Amendments to the NCP are coordinated with members of the National Response Team (NRT) prior to publication for notice and comment.

The NCP provides the guidelines and procedures needed to respond to releases and potential releases of hazardous substances, pollutants, or contaminants and it is the result of the efforts made to develop a national response capability and to promote overall coordination among the hierarchy of responders and contingency plans.

The first U.S National Contingency Plan was developed and published in 1968 in response to a massive oil spill from the oil tanker *Torrey Canyon* off the coast of England (see Section on Guiding Students Discussion). Since then, the U.S Congress has broadened the scope of the National Contingency Plan over the years. As required by the Clean Water Act of 1972, the NCP was revised to include a framework for responding to hazardous substances spills as well as oil discharges. Following the passage of Superfund legislation (see Section on Guiding Students Discussion) in 1980, the NCP was broadened to cover releases at hazardous waste sites requiring emergency removal actions.

Over the years, additional revisions have been made to the NCP to keep pace with the enactment of legislation taking other spills as a learning process. The latest revisions to the NCP were finalized in 1994 to reflect the oil spill provisions of the OPA-90 itself a direct consequence of the reactions triggered by the Exxon Valdez oil spill in Prince William Sound, Alaska.

The current NCP, from 1994, applies to and is in effect for:

- ✓ Discharges of oil into or on the navigable waters of the U.S., on the adjoining shorelines, the waters of the contiguous zone, into waters of the exclusive economic zone, or that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the U.S.
- ✓ Releases into the environment of hazardous substances, and pollutants or contaminants which may present an

imminent and substantial danger to public health or welfare of the U.S.

Three fundamental kinds of activities are performed pursuant to the NCP:
1) Preparedness planning and coordination for response to a discharge of oil or release of a hazardous substance, pollutant, or contaminant;
2) Notification and communications; and
3) Response operations at the scene of a discharge or release.

The organizational elements created to perform these activities are the National Response Team (NRT), the Regional Response Team (RRT), and the Area Committees (see bellow, figure 6).

The **National Response Team** is responsible for the elaboration, revision and coordination of the NCP. The NRT is also responsible for national response and preparedness planning, for coordinating regional planning, and for providing policy guidance and support to the Regional Response Teams (RRTs).

NRT membership consists of representatives from different agencies. Among the agencies that are representative for oil spills are:

- **The United States Coast Guard** (USCG). Until March 2003 an agency in Department of Transportation, except when operating as an agency in the United States Navy in time of war, and now transferred to the newly-formed Department of Homeland Security, it provides the NRT vice chair, co-chairs for the standing RRTs, and predesignated On-Scene Coordinator (OSC) for the coastal zone, as described in Code of Federal Regulations. [Title 40 Protection of Environment Sec. 300.120 (a) (1)]

On the other hand, the USCG, provides rapid response support in incident management, site safety, contractor performance monitoring, resource documentation, response strategies, hazard assessment, oil spill dispersant and in-situ burn use, operational effectiveness monitoring, and high capacity lightering & offshore skimming capabilities, through the National Strike Force. This Strike Force also train Coast Guard units in environmental pollution response, test and evaluate pollution response equipment, and interact with response agencies within their areas of responsibility. (See below further details on the USCG and Strike Teams duties)

- **The Environmental Protection Agency** (EPA). EPA chairs the NRT and co-chairs, with the USCG, the standing RRTs; provides predesignated OSCs for all inland areas for which an Area Contingency Plan is required under section 311(j) of the Clean Water Act and for discharges and releases occurring in the inland zone. EPA also provides expertise on human health and ecological effects of oil discharges or releases of hazardous substances, pollutants, or contaminants; ecological and human health risk assessment methods and environmental pollution control techniques.

- **The Department of Commerce** (DOC). DOC, through the National Oceanic and Atmospheric Administration (NOAA), provides scientific support for response and contingency planning in coastal and marine areas, including assessments of the hazards that may be involved, predictions of movement and dispersion of oil and hazardous substances through trajectory modelling, and information on the sensitivity of coastal environments to oil and hazardous substances and associated clean-up and mitigation

methods; provides expertise on living marine resources and their habitats, including endangered species, marine mammals and National Marine Sanctuary ecosystems; provides information on actual and predicted meteorological, hydrological, ice, and oceanographic conditions for marine, coastal, and inland waters, and tide and circulation data for coastal and territorial waters and for the Great Lakes.

Other key representative agencies for oil spill are: the **Department of Interior** (with its bureaus and offices such as the United States Fish and Wildlife Service, the Bureau of Land Management, the Minerals Management Service, the National Park Service and the Bureau of Indian Affairs), the **Federal Emergency Management Agency**, the **Department of Defense** (with the U.S. Army Corps of Engineers and the U.S. Navy Supervisor of Salvage branches), the **Department of Health and Human Services,** the **Department of Justice,** the **Department of Transport**, the **Department of State, and** the **General Services Administration**.

FIGURE 6. OIL CONTINGENCY PLANNING UNDER THE NATIONAL RESPONSE SYSTEM.

Source: Extracted from the Code of Federal Regulations. Title 40 Protection of Environment

3.1.1.2 Regional Contingency Plans and Regional Response Teams.

The Regional Contingency Plans (RCPs) are developed by the Regional Response Teams (RRTs), for each standard federal region, Alaska, Oceania in the Pacific, and the Caribbean (see figure 7 below). The RRT agency membership parallels that of the NRT, but it also includes state and local representation.

The two main components of the RRT mechanism are:

- ✓ The *standing team*, which consists of designated representatives from each participating federal agency, state governments, and local governments (as agreed upon by the states).
- ✓ The *incident-specific teams* formed from the standing team when the RRT is activated for a response. Participation by the RRT member agencies on incident-specific teams, will relate to the technical nature of the incident and its geographic location.

The main purpose of the RCPs is to coordinate timely and effective response by various government agencies and other organizations to discharges of oil or releases of hazardous substances, pollutants, or contaminants. For this purpose, RCPs include information on all useful facilities and resources in the region, from government, commercial, academic, and other sources. RCPs follow the format of the NCP and are coordinated with state Emergency Response Plans, Area Contingency Plans, and Local Emergency Response Plans.

FIGURE 7: STANDARD REGIONAL BOUNDARIES FOR TEN REGIONS.

Source: Code of Federal Regulations. Title 40 Protection of Environment

3.1.1.3 Area Contingency Plans.

At a National level, a major OPA 90 change was to require federal, state and local officials to develop a comprehensive Area Contingency Plan (ACP) in each port area to coordinate activities of all parties during spills of all sizes up to and including the worst case scenario. The areas of responsibility may include several local planning districts, or parts of such districts.

ACPs are now in place in all USCG port areas and provide for a well coordinated response that is integrated and compatible, to the greatest extent possible, with all appropriate response plans of state, local, and non-federal entities, and especially with local emergency response plans.

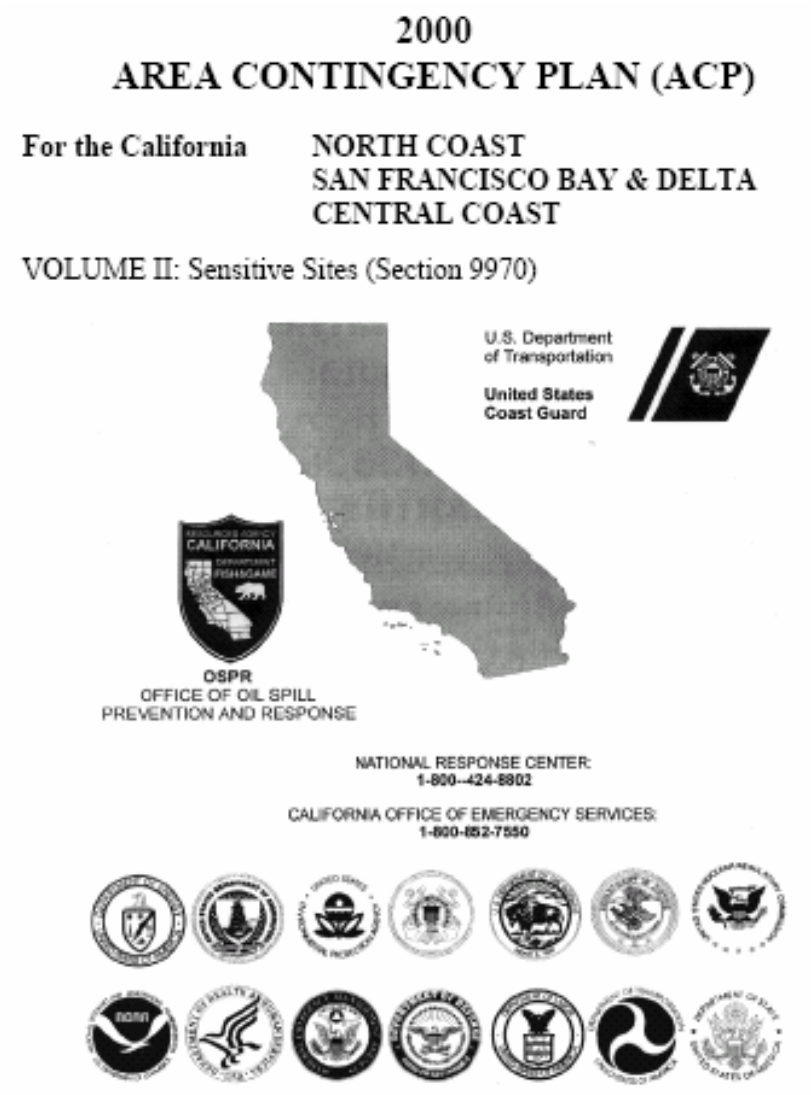
For example and as we will see further below, the **California's** planning and response structure is built upon the federal model and is so configured to make the State a full partner in prevention, planning and spill response. In this sense, the USCG and California Department of Fish and Game - Office of Spill Prevention and Response (OSPR) agreed to joint preparation of area contingency plans through co-chairing the three Port Area Committees for Contingency Planning. This planning process was open to all stakeholders and involved representatives from over 50 agencies, including environmental groups, city and county planners, California State agencies, the Federal government, and Industry.

The three California Port Area Committees are:

- **San Francisco Oil Spill Contingency Plan**: northern California coastal counties – Del Norte, Humboldt, Mendocino, Sonoma, Marin, Napa, Solano, Yolo, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Francisco, San Mateo, Santa Cruz, and Monterey.

- **Los Angeles / Long Beach Oil Spill Contingency Plan**: central and southern California - San Luis Obispo, Santa Barbara, Ventura, Los Angles, and Orange counties including the Channel Islands.
- **San Diego County Oil Spill Contingency Element**: San Diego County including San Clemente Island.

FIGURE 8. NORTH COAST ACP COVER.



SOURCE : CALIFORNIA ACP.

In words of Jim Hardwick, the senior OSPR specialist charged with the development of this procedure, “Area Contingency plans are key tools because they establish practical plans of action for all types of oil spills so that, when spills do occur, a quick response can minimize the damage. In California, the three Port Area Contingency Plans provide guidance for the first 24 hours of response. Stakeholders and involved representatives came together to produce a landmark comprehensive planning document that serves as a "one stop" marine pollution response plan”.

Regardless of the geography or the size of an area, contingency plans normally include:

- Identification of authority and a chain of command.
- Identification of the area of responsibility, area spill history, sensitive resources and fisheries and wildlife.
- A list of trained spill personnel and organizations that must be immediately informed of a spill;
- An inventory of available spill response equipment;
- Health and safety guidelines and strategies.
- Protection strategies for sensitive environmental areas (see bellow Box I, on the “California Oil Wildlife Plan”).
- Area-appropriate strategies for mechanical recovery.
- Chemical countermeasure application jurisdictions.
- Protection, rescue, and rehabilitation of fisheries and wildlife
- Cleanup strategies for various shoreline habitats.

Box I

THE WILDLIFE RESPONSE PLAN FOR CALIFORNIA. A WORLDWIDE EXAMPLE OF OPERATIVELY.

Text extracted from “Wildlife Response Plan for California”. The entered text can be found entirety on the CDFG-OSPR web site at http://www.dfg.ca.gov/Ospr/index.html.

The Federal Oil Spill Pollution Act of 1990 (OPA- 90) requires the development of a Fish and Wildlife and Sensitive Environment Plan, as part of the National Contingency Plan for oil spills. This Plan must be elaborated by the USCG in consultation with the U.S. Fish and Wildlife Service (USFWS), NOAA, and other interested parties, including state fish and wildlife agencies and must include "immediate and effective protection, rescue, rehabilitation of, and the minimization of risk of damage to fish and wildlife resources and habitat that are harmed or that may be jeopardized by a discharge.”

On the other hand, the fish and wildlife provisions of California's Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (OSPRA) states that the Administrator of the California Department of Fish and Game-Office of Spill Prevention and Response (DFG-OSPR) must develop contingency plans for the protection of fish and wildlife, assess injuries to natural resources, establish rescue and rehabilitation stations for marine wildlife, and require restoration plans for wildlife resources including habitat following

Box I

To address these charges in California, both USCG and OSPR-CDFG developed with the inputs of the other interested parties The Wildlife Response Plan for California.

This Plan provides the necessary information and procedures to immediately and effectively respond to discharges that may adversely affect fish and wildlife and their habitat and sensitive environments, including provisions for a response to a worst case discharge. The Plan provides these tasks by different actions. Among these, the following ones are highlighted:

- Identifying and establishing priorities for fish and wildlife resources and their habitats and other important sensitive areas requiring protection from any direct or indirect effects from discharges
- that may occur. These effects include, but are not limited to, any seasonal or historical use, as well as all critical, special, significant, or otherwise designated protected areas.
- Providing a mechanism to be used during a spill response for timely identification of protection priorities of those fish and wildlife resources and habitats and sensitive environmental areas that may be threatened or injured by a discharge.
- Identifying potential environmental effects on fish and wildlife, their habitat, and other sensitive environments resulting from removal actions or countermeasures, including the option of no removal. The Plan establishes also the priorities for application of countermeasure and removal actions, the methods to minimize the identified effects on fish and wildlife because of response activities and the identification of the areas where the movement of oiled debris may pose a risk to resident, transient, or migratory fish and wildlife, and other sensitive environments.
- Providing for pre-approval of application of specific countermeasures or removal actions that, if expeditiously applied, will minimize adverse spill-induced impacts to fish and wildlife resources, their habitat, and other sensitive environments.
- Providing monitoring plans to evaluate the effectiveness of different countermeasures or removal actions in protecting the environment.
- Identifying and providing for required fish and wildlife handling and rehabilitation permits necessary under federal and state laws.
- Providing the minimum required OSHA and EPA training for volunteers, including those who assist with injured wildlife.

3.1.2 Management structure

Apart from this planning structure, the U.S. has also designed a specific response management structure to promote effective and quick coordination during oil spill responses. The basic framework for the response management structure is the **Incident Command Structure (ICS)**.

ICS provides a comprehensive framework for managing emergency and non-emergency events improving coordination of response efforts. The ICS organization is built around five major management sections: 1) Incident Commander structure; 2) Planning section;

3) Operations section; 4) Logistics section; and 5)Finance section. (See bellow, figure 9).

1) Unified Command and Incident Command structure.

The unified command (UC) is a unified team which manages an incident by establishing a common set of incident objectives and strategies. On most incidents, a single Incident Commander carries out the Command activity, however, an IC organization may be expanded into a UC for complex responses with cross jurisdictional boundaries or involve multiple agencies with geographic or functional jurisdiction.

The UC brings together the functions of the Federal government, the State government, and the responsible party to achieve an effective and efficient response, where the On-Scene Coordinator (OSC) maintains authority.

On a real case, UC makeup for a specific incident will be determined on a case-by-case basis taking into account: 1) the specifics of the incident; 2) determinations outlined in the ACP; 3) decisions reached during the initial meeting of the UC. The makeup of the UC may change as an incident progresses. However, in most of the cases, the UC will typically include:

- The pre-designated Federal On-Scene Coordinator (FOSC),
- The State On-Scene Coordinator.
- The Incident Commander for the responsible party.
- The On-Scene Coordinator (OSC).

The UC is responsible for overall management of the incident and directs incident activities. As a component of an ICS, the Unified Command facilitates and coordinates the effective involvement of various agencies and responders creating an integrated response team. In all cases UC members retain their authority to resolve issues, in this way, the participation occurs in a cooperative fashion but without any agency abdicating responsibility or accountability . In this sense, it is important to note that most oil spills specialists and responders have recognized that a strong Command is essential to an effective response.

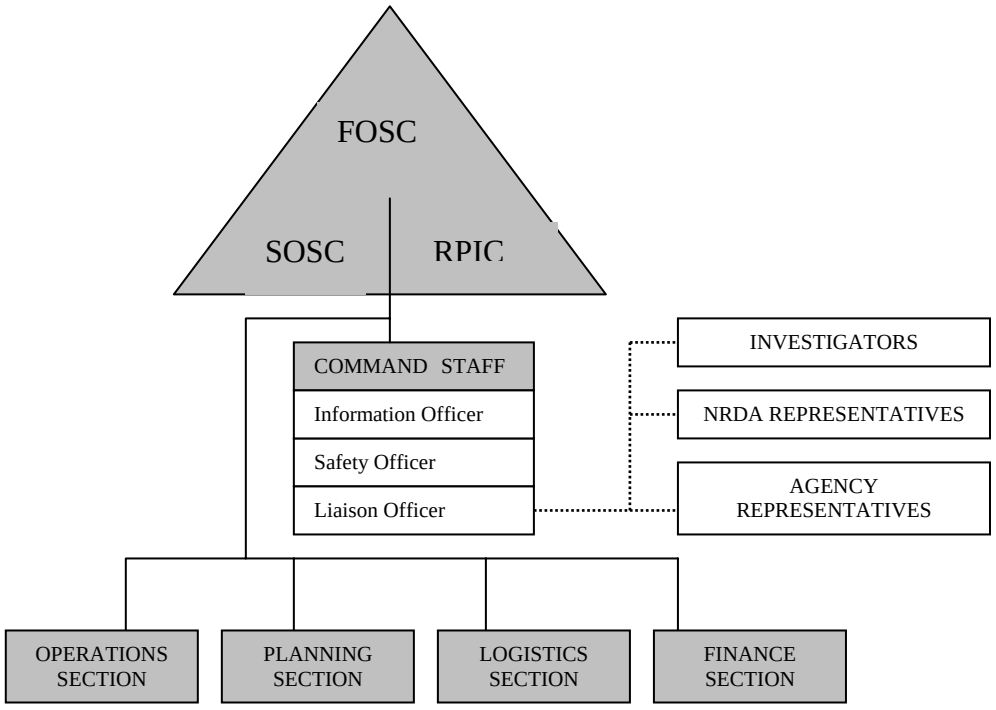
In addition of the OSCs , the safety, liaison, and information functions are assigned to command staff officers that report directly to the ICS (see Figure 9 below). In this way, assisting or cooperating agencies that are not part of the Unified Command can also participate through the Liaison Officer. Agency Representative are assigned to an incident from an assisting or cooperating agency with delegated authority to make decisions on matters affecting that agency's participation at the incident.

Box 2

What if your agency is not a part of the Unified Command?

- Provide input to your agency or company representative, who has direct contact with the Liaison Officer who is responsible for gatherings the concerns of agencies affected by the incident and communicating that information to the IC or UC.
- Provide stakeholder input to the Liaison Officer (for environmental, economic, or political issues).
- Serve as a Technical Specialist in the Planning Section (reassigned,

FIGURE 9: UNIFIED COMMAND STRUCTURE/INCIDENT COMMAND SYSTEM



SOURCE: Extracted from the Incident Management Handbook . ICS-OS-420-Standard Form.

2) Planning section.

The planning section develops the Incident Action Plan (IAP), since every incident must have an oral or written incident action plan prepared for each operational period. The operational period is a period of time chosen based on the nature of the incident, typically a half day, a day, or several days. For further details consult the section “How does everything fits together?”. The IAP is designed to accomplish the objectives categorized by the UC, collects and evaluates information, tracks resource status, and documents the response effort. To further understand how nature conservation paradigms are included at the response planning branch, see below Box 3 : “Tasks of the Environmental Unit within the Planning section”

3) Operations section

The operation section conducts tactical exercises to carry out the IAP, develops the tactical objectives and organization, and directs all resources needed. Usually it is composed of fours branches: the Recovery and Protection Branch, the Emergency Response Branch, the Air Operations Branch and the Wildlife Branch. See below, the Box 4 dedicated to describe the tasks and organization of the Wildlife Operation Branch.

Box 3

"TASKS OF THE ENVIRONMENTAL UNIT WITHIN THE PLANNING SECTION"

Within the Planning section, the Environmental Unit is responsible for environmental matters associated with the response, including strategic assessment, modelling, surveillance, and environmental monitoring and permitting. In addition, the Environmental Unit must prepare environmental data for the planning section situation unit and work in close coordination with the Wildlife Operations Branch (see bellow the Box 4 dedicated to describe the wildlife operations branch).

Environmental Unit Technical Specialists generally include a Scientific Support Coordinator, a Sampling Specialists, a Response Technologies Specialists, a Trajectory Analysis Specialists, a Weather Forecast Specialists, a Resource at Risk Technical Specialists, a Shoreline Cleanup Assessment Specialists, a Historical/Cultural Resources Technical Specialists, and a Disposal Technical Specialists.

Some distinguished Environmental Unit tasks are:

- Participate in Planning Section meetings.
- Identify sensitive areas and recommend response priorities.
- Following consultation with natural resource trustees, provide input on wildlife protection strategies (e.g., removing oiled carcasses, preemptive capture, hazing, and/or capture and treatment).
- Determine the extent, fate, and effects of contamination.
- Acquire, distribute, and provide analysis of weather forecasts.
- Monitor the environmental consequences of cleanup actions.
- Develop shoreline cleanup and assessment plans. Identify the need for, and prepare any special advisories or orders.
- Identify the need for, and obtain, permits, consultations, and other authorizations including Endangered Species Act (ESA) provisions.
- Following consultation with the FOSC's Historical/Cultural Resources Technical Specialist identify and develop plans for protection of affected historical/cultural resources.
- Evaluate the opportunities to use various response technologies.
- Develop disposal plans.
- Develop a plan for collecting, transporting, and analyzing samples.

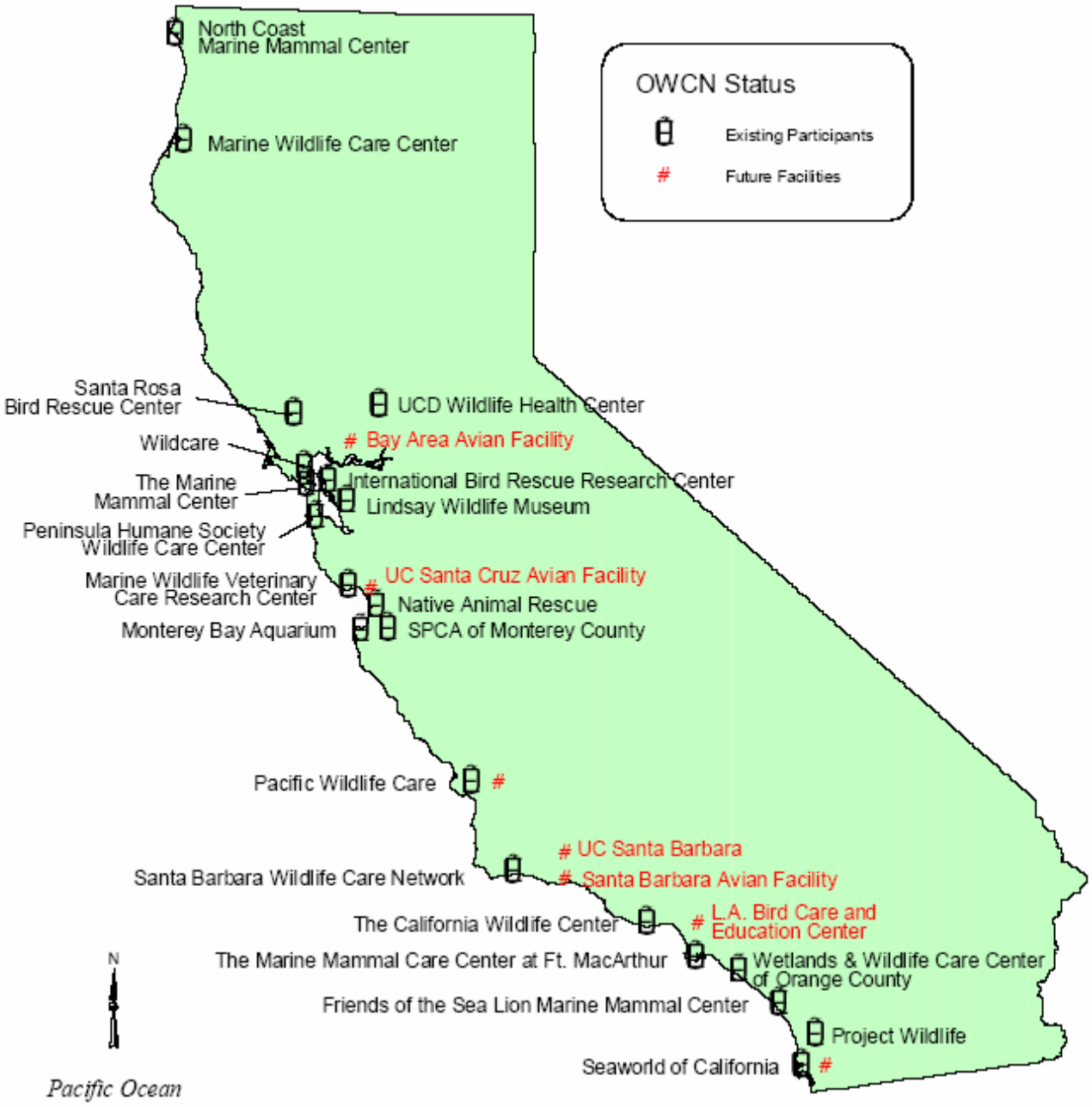


FIGURE 10 Participating Organizations in Oiled Wildlife Care Network

Box 4 (1)

OPERATION SECTION: WILDLIFE OPERATIONS BRANCH.

Wildlife Operations (WO) consist of gathering spill information through wildlife reconnaissance and prepare the sections related to wildlife of the Incident Action Plan for the Planning Section. A first requirement for this purpose is to quickly fulfil its own Branch with pre-trained experts (e.g. veterinarians, rehabilitation staff, processing staff, capture experts, volunteers). The fact that all WO personnel should have received specialized training, such as animal handling training, is an important fact to be remarked because of the great sensitivity of wildlife and habitat resources and the potential dangers of working with wild animals.

The WO Branch is organised in five groups: Wildlife Reconnaissance Group, Hazing Group, Recovery and Transportation Group, Processing Group, and Veterinary Services Group.

This branch must work in close coordination with the Resources at Risk Specialist located in the Planning Section's Environmental Unit. A key example of the need of these interactions is the fact that the Wildlife Branch Director helps the Planning Section to evaluate environmental tradeoffs from different response strategies through the identification of known wildlife concerns (e.g., areas containing listed species) and the use of available wildlife reconnaissance data (e.g. identification of large flocks of pelagic birds) in order to improve with high levels of nature conservation the planning schemes.

Habitually, the Department of Fish and Game (DFG) takes the lead in the implementation of the California WO Branch. This decision is based on the fact that the DFG is the lead state trustee agency for wildlife resources and also because of the knowledge and wide experience in issues during wildlife response of its OSPR biologists. Therefore, during a spill, OSPR will bear significant responsibility for informed and timely decisions about the allocation and deployment of specialized wildlife protection, rescue, and rehabilitation resources. This includes decisions regarding staff, equipment, and contractors, in coordination with the trustees.

To complete the system, the Oil Wildlife Care Network (OWCN), a state-wide cooperative system of specialized wildlife health centres set up by legislative mandate (see Government Code § 8670.37.5), is integral to WO Branch. The OWCN maintains a corps of professionally trained volunteers, paid staff and veterinarians. In this way, when California wildlife are affected by an oil spill, the OWCN's personnel retrieve the oiled animals, evaluate the animals' need for treatment, and remove the toxic products from the animals. OCWN personnel then rehabilitate impacted animals, locate suitable release sites, release animals, and monitor post-release survival. To fulfil this tasks OWCN has instituted 24 permanent wildlife care participant facilities along the California coast (see Figure 10) for use during a spill.

In addition to the OSPR structure, the PRP may activate their own wildlife care contractors and/or designate staff to WO Branch positions.

Box 4 (2)

Furthermore, WO personnel may include pre-identified, trained volunteers and/or "convergent" volunteers, who are not pre-identified and whose training may range from highly skilled to completely untrained. Most volunteers are provided by and/or coordinated through the OWCN. Volunteer management efforts for tasks unrelated to the OWCN volunteers (*e.g.* pre-impact beach assessments, post-spill economic impact surveys) are coordinated instead by the OSPR Statewide Volunteer Coordinator.

Other State and Federal trustee agencies that are most likely to participate in WO decisions and response activities are as follows:

Federal: Department of the Interior (National Park Service and U.S. Fish and Wildlife Service), Department of Commerce (National Oceanic and Atmospheric Administration, National Marine Sanctuaries, National Marine Fisheries Service), Department of Defence, the U.S. Coast Guard and/or the U.S. Environmental Protection Agency (although they are not natural resource trustee agencies, they are the lead federal agencies in a spill and also participate fully in WO decisions).

4) Logistics section.

Logistics provides support to meet incident needs, provides resources and all other services needed to support the incident response. Box 5 below See below Box 5, on the list of specialized Wildlife Operation Branch Equipment.

5) Finance section.

Finance monitors costs related to the incident provides accounting, procurement, time recording, and cost analysis.

Box 5

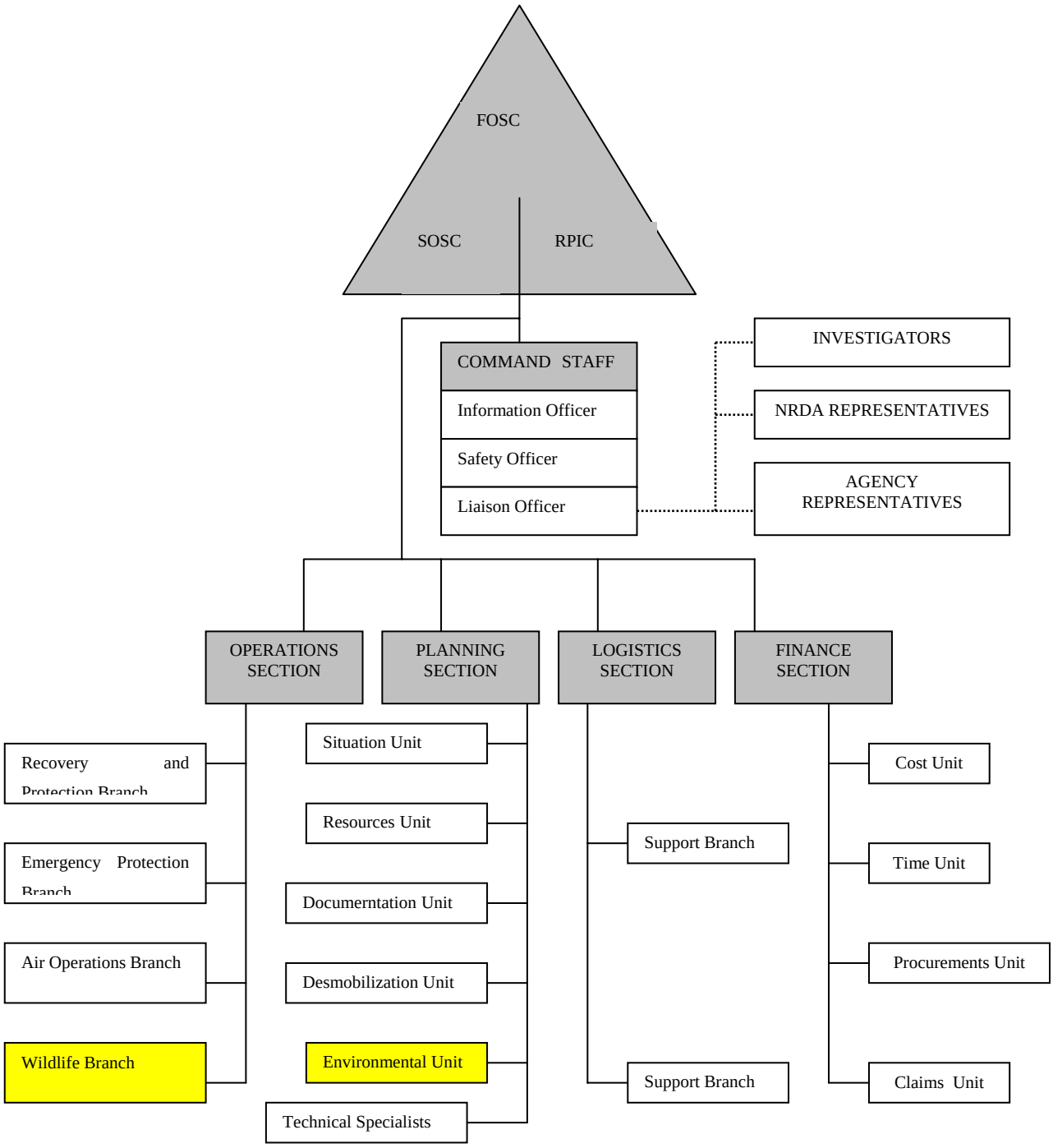
SPECIALIZED WILDLIFE OPERATION BRANCH EQUIPMENT.

Although some of the equipment used within the Operations Section (e.g., booms, skimmers, and shallow water vessels) will serve the mission of the WO Branch,. some equipment, however, is specialized for WO and dedicated specifically to that purpose. The amount of specialized equipment deployed for WO can vary from a relatively small core of items to a full-scale deployment. Among the equipment the OSPR has dedicated for immediate deployment are:

- Air boats (1);
- All-terrain vehicles (ATVs) (3);
- Capture boats (4);
- DFG fixed wing airplane (1);
- Hazing equipment and capture equipment (various);
- Mobile vet lab (2);
- One-ton wildlife truck (1);
- Vet truck (1);
- Wildlife care trailer (2);
- Wildlife supplies trailers (4) (contain hazing, capture, and transportation equipment);
- Wildlife transport trailer (1).

Additional equipment can be obtained from the CDFG and from other government agencies, the OWCN,

FIGURE 11: INCIDENT COMMAND SYSTEM ORGANIZATION CHART



NOTE: Essentially, the Incident Command issues orders, Operations carries them out, Logistics provides personnel, material, and equipment, Finance keeps track of expenditures, and Planning develops recommendations for the operational period, which, if adopted, become the Incident Commander's order for the next day.

SOURCE: Extracted from the Incident Management Handbook . ICS-OS-420-Standard Form.

3.2-ILLUSTRATION OF PROACTIVE APPLICATIONS OF THESE RESPONSABILITIES: FEDERAL USCG-NSF AND CALIFORNIA OSPR PROGRAMS.

3.1.3.- The United States Coast Guard as a Federal Unit held responsible for prevention and response to oil spills.

The USCG´s responsibilities in the field of oil pollution can be traced back as early as 1924, although the Oil Pollution Act passed that year required penalties only for **deliberate** discharge of oil into coastal navigable waters of the U.S., in order to ensure that seafood, health and navigation were not harmed by discharge of oil.

Beyond these measures, the laws regulating oil pollution remained much the same until the 1970s when in 1967 the Torrey Canyon vessel accident illuminated the environmental devastation that resulted, as well as the unsuccessful methods used by authorities to deal with the catastrophe. Since then, and catapulted by the Exxon Valdez grounding in 1989, the Coast Guard has been at the forefront of the oil pollution problem in the United States and, in many senses, the pioneer of prevention, preparedness and response achievements at the international level.

At the legal sphere, the Federal Water Pollution Control Act (also known as the Clean Water Act -CWA, 33 USC Sections 1251 to 1387-) and the Ports and Waterways Safety Act (33 USC Sections 1221 *et sequel*) gave the Coast Guard significant authority to deal specifically with pollution enforcement. The CWA also founded the USCG´s Oil Spill Prevention, Preparedness and Response (OSPPR) Program and established the National Strike Force in 1972. Apart from these both Acts, the enactment of OPA-90 is highlighted because it expanded the scope and intensity of the USCG's OSPPR by mandating a broad array of regulations and federal initiatives to be implemented and enforced by it as well as by other federal agencies, and by providing funding to significantly bolster the USCG's capabilities to prevent and respond to spills. In addition, the USCG administers the $1 billion Oil Spill Liability Trust Fund (for further details see the Box 6 dedicated to describe liability trust funds), which can be used to pay for oil spill cleanup and to restore the environment when a spiller is unwilling or unable to respond effectively.

Box 6

LIABILITY TRUST FUNDS

In order to guarantee that those who have to conduct prevention, clean-up and restoration operations or suffer damage as a result of an oil spill will receive adequate compensation the international community and the oil and shipping sector have developed a complex scheme of liability.

This international system was created after the Torrey Canyon incident in 1967 and it is based on two international Conventions (the 1969 Civil Liability Convention and the 1971 Fund Convention). These convention have been amended several times. Two main amendments were made after the Erika and the Prestige incidents in 2000 and 2003 respectively. The Exxon Valdez accident paralyzed the U.S. commitment to participate in the global system. Later on a 1992 Protocol was negotiated by all the Parties to both Conventions and the U.S. finally became a Party when the liability was raised to the limit of 3.8 million US $. A 2000 Protocol increased the amount of liability to be paid by the Fund in case of accident to 5.78 US $.

In May 2003 the Protocol on the Establishment of a Supplementary Fund for Oil Pollution Damage was adopted and the total amount of compensation payable for anyone incident was raised to just over 1.000 million US $.

As a result of these laws, different programs and units were set up as part of the USCG´s mandate. The first one is the development and implementation of **spill prevention and preparedness techniques, measures, and procedures.**

Prevention techniques developed by the involvement of the USCG, include improvements in cargo vessel safety, control and navigation devices (i.e. emergency steering standards or back-up radar for collision avoidance for oil tanks in 1977), and improved oil loading and offloading methods (i.e. required crude-oil washing as a method of cleaning cargo tanks for certain tank vessel categories back as early 1979). The USCG has also been active in a wide variety of measures and procedures to prevent occurrence of oil spills through the training of officers and crew for such contingencies. Among these measures are licensing, drug and alcohol testing of crew and officers, implementing vessel-safety programs and spill-prevention training, developing terminal

and cargo-transfer manuals, improving piloting procedures, and mandating traffic-control systems and vessel-speed limitations.

The USCG also issues and enforces regulations requiring each vessel and facility that transports, stores or handles oil of any kind to have a "spill response plan" in place along with the designation of qualified individuals to assume direction of the response effort on the owner/operators' behalf. A special mention may be given also to the efforts made from the USCG for the development of The National Oil and Hazardous Substance Contingency Plan and the development of Area Contingency Plans to better coordinate response efforts at the regional and local level.(see section 3.1.1.1 on the NRT).

Other preparedness initiatives include the implementation of a Classification Program for Oil Spill Removal Organizations (OSROs), augmentation of the Oil Spill Liability Trust Fund, revitalization of the federal oil spill Research and Development (R&D) Program, adoption of the Incident Command System and the performance of Annual Drill Exercises.

Secondly, the set of regulations made to the U.S. Coast Guard accountable for different **response features**. Basically, it could be said that USCG infrastructure has been designed to form the spinal cord of the national response mechanisms. A wide variety of efforts were and are made to achieve this milestone.

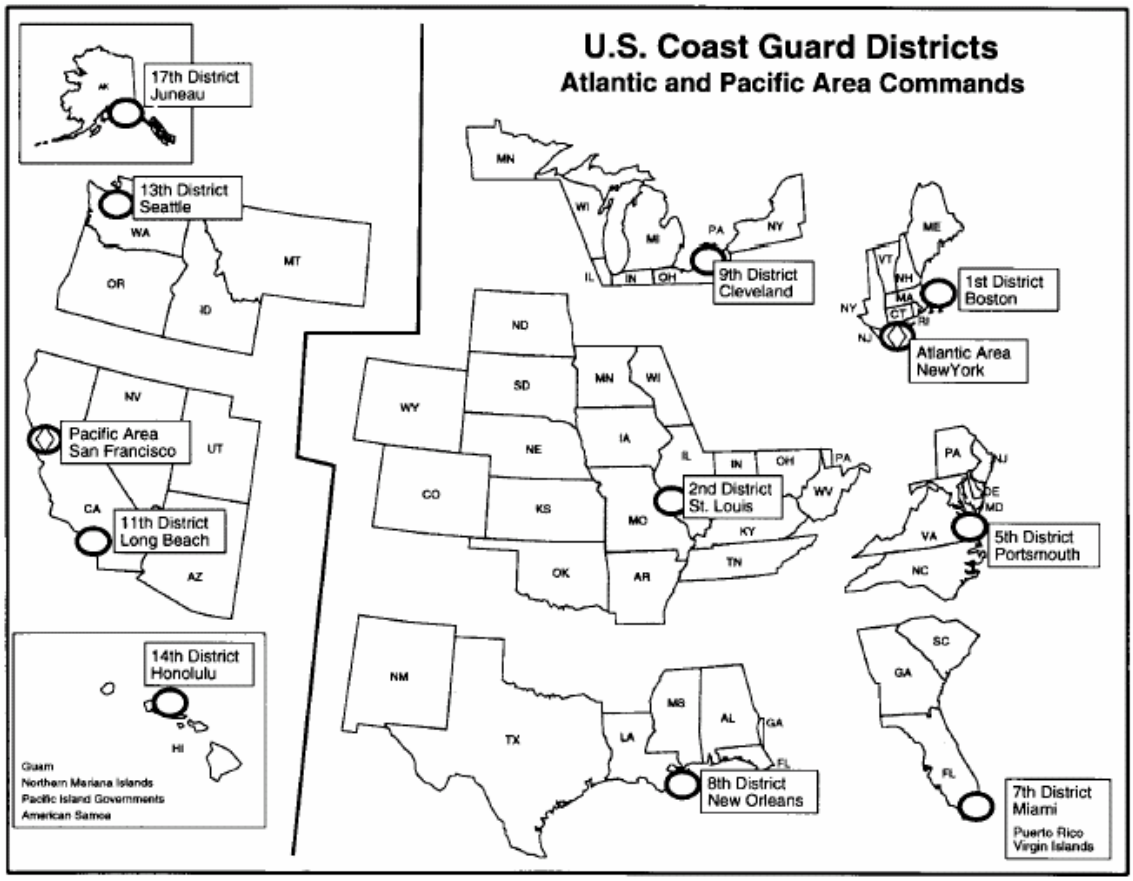
On the one side, USCG has been instrumental in the development of *cleanup techniques and equipments* (see for example, the development of computer-based decision tools to facilitate contingency planning and response management, the improvements on oil spill remote sensing systems or the development of techniques for recovering oil in fast-current environments).

Alternatively, the Coast Guard maintains response equipment at **19 sites** around the nation to supplement private efforts, as well as the **National Strike Force** (NSF), made up of specialized equipment and specially trained personnel capable of responding quickly to oil and hazardous substance incidents (see below the Box 7 on the NSF's role and responsibilities). In this way, every State has a department or agency that houses

federal dedicated spill response personnel (around 1,200 specific personnel assigned to its strike teams and to the approximately 50 units around the nation whose task is to be ready to respond to spills of oil and hazardous substances). All this personnel receives both classroom and field training in spill response.

In addition, the National Oceanic and Atmospheric Administration (NOAA) provides personnel to advise the USCG on scientific and technological matters related to response. Other natural resources trustee agencies in the Departments of Commerce and of the Interior have also personnel trained in pollution emergencies.

FIG 12: US COAST GUARD ATLANTIC AND PACIFIC AREAS



Source: Code of Federal Regulations. Title 40 Protection of Environment

Box 7

THE NATIONAL STRIKE FORCE ROLES AND RESPONSIBILITIES.

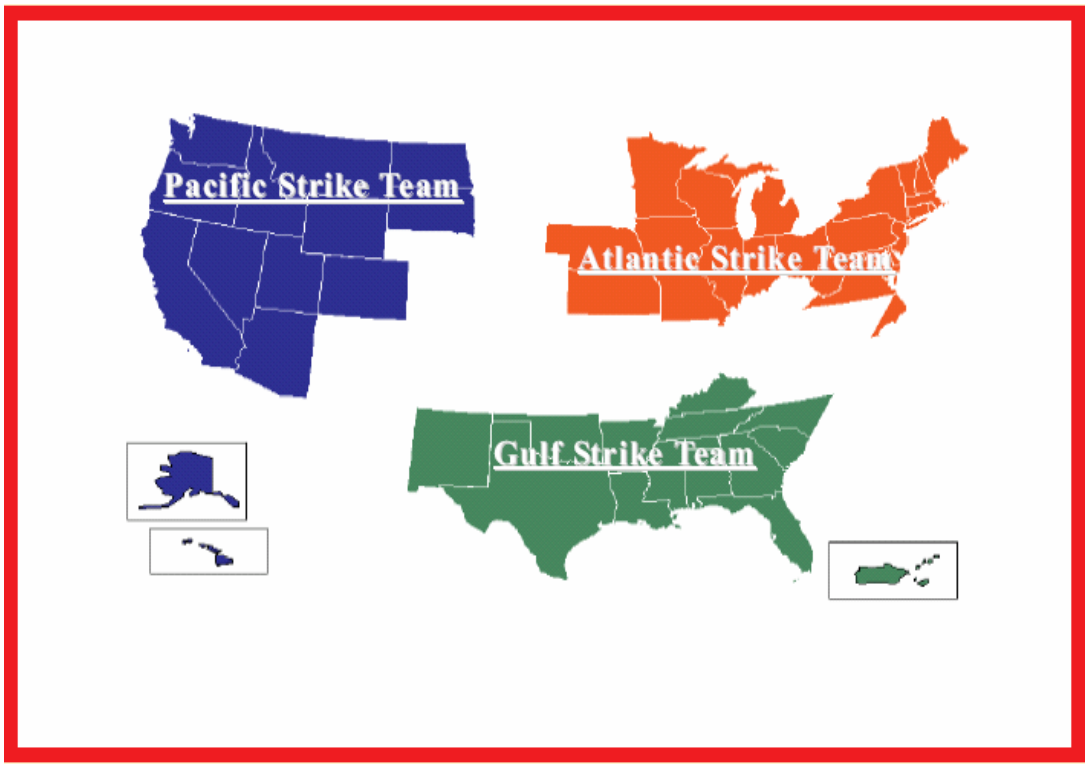
National Strike Force (NSF) was established in 1973 as a direct result of the Federal Water Pollution Control Act of 1972. Since then, its roles and responsibilities in supporting the National Response Team duties (see section 2) have been expanded under subsequent major environmental legislation approval, including the Clean Water Act of 1977 and the Oil Pollution Act of 1990.

inally comprised of three 17-member Strike Teams, today's National Strike Force totals over 200 active duty, civilian, and reserve personnel and includes the National Strike Force Coordination Center (NSFCC); the Atlantic Strike Team; the Gulf Strike Team; the Pacific Strike Team; and the Public Information Assist Team (PIAT) located at the NSFCC.

Strike Teams have been designed to overview and provide, in cases where it is needed, rapid response support in incident management, site safety, contractor performance monitoring, resource documentation, response strategies, hazard assessment, oil spill dispersant and *in situ* burn use, operational effectiveness monitoring, and high capacity lightering & offshore skimming capabilities. The Strike Teams also train Coast Guard units in environmental pollution response, test and evaluate pollution response equipment, and liaise with response agencies within their areas of responsibility. PIAT provides crisis media relations support to Federal On- Scene Coordinators (FOSCs) during major incidents such as oil or chemical spills, hurricanes, floods and other disasters.

ddition, the NSFCC provides conducts at least six major government-led spill response exercises each year under the National Preparedness for Response

FIGURE 13: STRIKE TEAM AREAS OF RESPONSIBILITY.



Source: http://www.uscg.mil/hq/nsfweb/index.html

PHOTOGRAPH 2: MATERIAL PALLETIZED, AND READY FOR IMMEDIATE DEPLOYMENT BY TRUCK OR AIRCRAFT STRIKE TEAM EQUIPMENT. Source: Ana Tejedor

PHOTOGRAPH 3: EXAMPLE OF TECHNICAL EQUIPMENT. Source: Ana Tejedor

PHOTOGRAPH 4: EXAMPLE OF A NATIONAL DRILL . Source: Ana Tejedor

3.2.2.-CALIFORNIA´S OFFICE OF SPILL PREVENTION AND RESPONSE (OSPR).

Nowadays, the California Department of Fish and Game (DFG) is the responsible agency for protecting the State's fish, wildlife, and their habitats. Within its structure, the genuine State Office of Spill Prevention and Response (OSPR), a division of the Department of Fish and Game, is the lead State Agency in charge of oil spill prevention and response.

As it happens with most of the prevention and response systems, California´s OSPR is a consequence of the legislative changes introduced after the Exxon Valdez spill and the 1990 American Trader spill (it was an oil tanker which ran over its anchor, puncturing its hull and spilling an estimated 416,598 gallons of crude oil in Huntington Beach, in southern California). OPA-90 at the federal level and California's Lempert-Keene-Seastrand Act dramatically changed how the federal and the state governments dealt with spilled oil in the early 1990s.

Before those days there was no clear-cut mandate for spill response despite stewardship responsibilities for living natural resources legally-defined and assigned to California´s Department of Fish and Game (DFG). This meant managers could refuse to send personnel to spill responses if they determined their own programs were more important. Second, there was no budget for spill-response activities. In a department with a chronic history of under-funding, there was no source of funds to use for materiel expended nor equipment used for responses. DFG had to rely on litigation for cost recovery, litigation that could last for years. Third, there was no specific training for spill response (other than experience) and no response structure.

The consequences were large-scale oil spills, such as the *Apex Houston*, a barge that lost a hatch cover while being towed from the Shell Oil refinery in Martinez to Long Beach, spilling an estimated 25,800 gallons of crude oil along offshore Marin, San Francisco, San Mateo, Santa Cruz, and Monterey Counties in 1986, or the T.V. Puerto Rican, which exploded, then eventually broke up outside the Golden Gate; apart from the smaller spills which received little or no attention.

The Lempert-Keene-Seastrand Oil Spill Prevention and Response Act of 1990 established OSPR, and provided its Administrator with substantial authority to direct spill response, clean-up, natural resource damage assessment, and restoration activities. At the same time, the DFG-OSPR administers the Fish and Wildlife Pollution Account, and the State Oil Spill Liability Trust Fund, either of which may be used to pay for immediate spill response needs. Whenever possible, the party responsible for the spill incident will be identified, and billed for all clean-up related costs, including State employees' time spent working on the incident.

OSPR's total staffing is relatively small – about 150 people. Managers and support functions are headquartered in Sacramento. In addition there are seven field offices located in Eureka, San Francisco, Monterey, Morro Bay, Santa Barbara, Los Alamitos (near Long Beach) and San Diego; wardens, biologists and Oil Spill Prevention Specialists (OSPS) are based on these seven field offices. Wardens, biologists and OSPS are formed into HAZWOPER training and Incident Command System so they can assume any of the major roles defined in the U.S Institutional System described before. [Hazardous Waste Refresher (HAZWOPER) training requirement under 29 CFR 1910.120; FRT members have 40-hour HAZWOPER training, so they know how to respond to hazardous materials incidents, including oil spills (which are defined by law as hazardous materials). Apart from this initial training, there is a 8 hour annual refresh course every year].

OSPR which was funded and is maintained by a tax on oil imported into the State and by a tax on oil transported within the state (the tax amount was, in 2005, 5 cents by barrel) has the following branches and programs:

1. <u>Financial Programs and Administrative Branch.</u>

This branch is sub-divided in four major Units or programs:

- ✓ ***Information Technology Service Unit***; this unit provides support services to the overall OSPR staff.

  The Administrative Services and Cost Recovery Unit. The administrative personnel serve as liaison positions with Department of Fish and Game Headquarters staff. They provide a variety of essential services in the areas of Budgets, Personnel and Training, Contracts, Business Services and Procurement.

- ✓ ***The OSPR Public Information and External Affairs program.***
- ✓ ***The Financial Responsibility and Administrative Service***. OSPR is mandated to seek reimbursement of all costs incurred in responding to spill incidents. This includes response, containment, cleanup, and natural resource damage assessment activities.

2. Enforcement Branch.

In order to accomplish its mission, OSPR enforces the laws designed to prevent, respond and investigates spills in California Waters in close cooperation with the USCG (see next section "How does everything fits together"). Department of Fish and Game wardens have the authority to enforce the criminal statutes contained in the Act and for this reason, wardens conduct spill investigations, and gather and prepare evidence (photos, interviews, mineral and chemical samples, necropsies, etc.) which is an essential element in any court case.

In addition, the enforcement program is also in charged of designing and conducting comprehensive OSPR drills and exercises.

3. Legal Branch.

The OSPR program includes legal staff, who provide confidential advice to the Administrator regarding legal affairs such as Administrative Appeals, Natural Resource Damage Assessment, Statutory Interpretation and Litigation.

The Legal resources currently available are contained in the California Government Code and Public Resource Code. As it has been already mentioned they are collectively referred to as The Lempert-Keene-Seastrand Oil Spill Prevention and Response Act.

4. Marine Safety Branch.

The Marine Safety Branch consists of four units. They are the **Maritime Safety Unit** located in Sacramento which focuses on prevention of oil spills; the **Readiness Unit** located in Sacramento which focuses on preparation for an oil spill; the **Field Operations Unit** with offices in Cordelia and Los Alamitos which perform on site

inspections, monitoring and response; and the **Regulations Unit**, in Sacramento, which drafts regulations for all of OSPR.

The Marine Safety Branch (MSB) is responsible for the review and approval of oil spill contingency plans submitted to OSPR. The MSB ensures also that those vessels entering California State waters that are required to have California oil spill contingency plans, have approved plans.

MSB staff consists mainly of Oil Spill Prevention Specialists (OSPS). These professionals have technical backgrounds essential to the OSPR's spill prevention and response programs, such as monitoring of oil transfers, working with the **Education Outreach Program**. They respond to oil spills by providing technical assistance with regard to initial site safety issues, spill cause determination, and technical input to the recovery/disposal effort. The Outreach Program Coordinator works with other organizations and agencies to develop and share information on pollution prevention products and techniques. These include such groups as California's five Harbor Safety Committees, the California Clean Boating Network, the Advisory Board for the Coastal Commission’s Boating, Clean & Green campaign, and the Pacific Oil Spill Prevention Education Team, which includes California, Oregon, Washington, Alaska, and British Columbia. Ideas are also generated by OSPR's participation in the State's—BC Oil Spill Task Force

On the other hand, the MSB and the USCG evaluate vessel traffic routing and other safety measures, statewide, to reduce pollution incidents off the California coastline. To that end, the OSPR has also helped to fund and has brought on line a Vessel Traffic Service system for Los Angeles and Long Beach Harbors and instituted a pilot Automated Information System (AIS) program in San Francisco Harbor. Additionally, the OSPR has created and funded Harbor Safety Committees for the State's five busiest ports. MSB staff assists these committees in developing harbor safety plans to reduce the risk of accidents near major harbor facilities.

Readiness Unit staff also assist in designing and evaluating all types of drills (e.g. equipment deployment, tabletop, etc.) with facility and vessel owner/operators, in coordination with the USCG.

5. Scientific Branch

When an oil spill occurs, the Scientific Branch participates in the response option decision process, determines and quantifies injury to the natural resources damaged by the spill, determines in consultation with other trustees the value of any damages or losses, and identifies appropriate restoration mitigation and compensation measures. To accomplish these duties, the scientific Branch has several subunits and branches. Among them are:

- ✓ ***The Field Services Unit***; this unit includes biologists familiar with wildlife in coastal environments and response techniques to protect it from spilled oil. These biologists interact with other agencies and interest groups to develop and refine Area Contingency Plans, and are the first-line responders during oil spills.
- ✓ ***The Response Assessment Unit***; this unit includes biologists and resource economists who must determine the extent and value of lost wildlife and habitats. They perform Natural Resource Damage Assessments used in any resultant litigations and/or settlements.
- ✓ ***The Response Support Unit***; this unit includes personnel who explore alternative technologies such as dispersants and in situ burning. It also includes a ***GIS Unit*** that goes to spill responses an provides graphical portrayals for spilled-oil movements and response results.
- ✓ ***The Laboratories Unit***; this unit includes the Water Pollution/Petroleum Chemistry Laboratory, the Marine Pollutions Studies Laboratory, the Pesticides Laboratory, and the freshwater Bioassessment Laboratory. In addition to laboratory and analytical services provided during oil spills, the Laboratories Unit provides a broad spectrum of analytical services, under contract, to a number of other state agencies. It also provides monitoring programs for various DFG programs, and, when needed, licensed pesticide applicators for control of invasive, non-native species.

Aside from actual response activities, the Branch also oversees the operation of a Coastal Network for Wildlife Rescue, Cleaning, and Rehabilitation in Response to a Spill.

In addition, it also coordinates the exotic species survey under the Ballast Water Management Act and operates the Marine Wildlife Veterinary Care and Research Center (founded as a result of the Sea Otter Recovery Plan [SEE THE CASE STUDY ON THE SEA OTTER RECOVERY PLAN, OF THE SAME SERIES OF CASE STUDIES TO WHICH THIS ONE BELONGS] in Santa Cruz that was designed to address oiled sea otters and perform wildlife rescue and rehabilitation.

Furthermore, the Scientific Branch is responsible for surveys and inventories of marine resources and habitats for environmental resource mapping and natural resource damage assessment purposes. In addition, the Branch evaluates the effects of new response techniques and provides scientific evaluations of various response options and reviews wildlife rehabilitation plans including habitat restoration that are submitted to the Director in response to a spill.

3.3. FINALLY: HOW DOES EVERYTHING "FITS" TOGETHER? WHAT HAPPENS WHEN THE ALARM RINGS

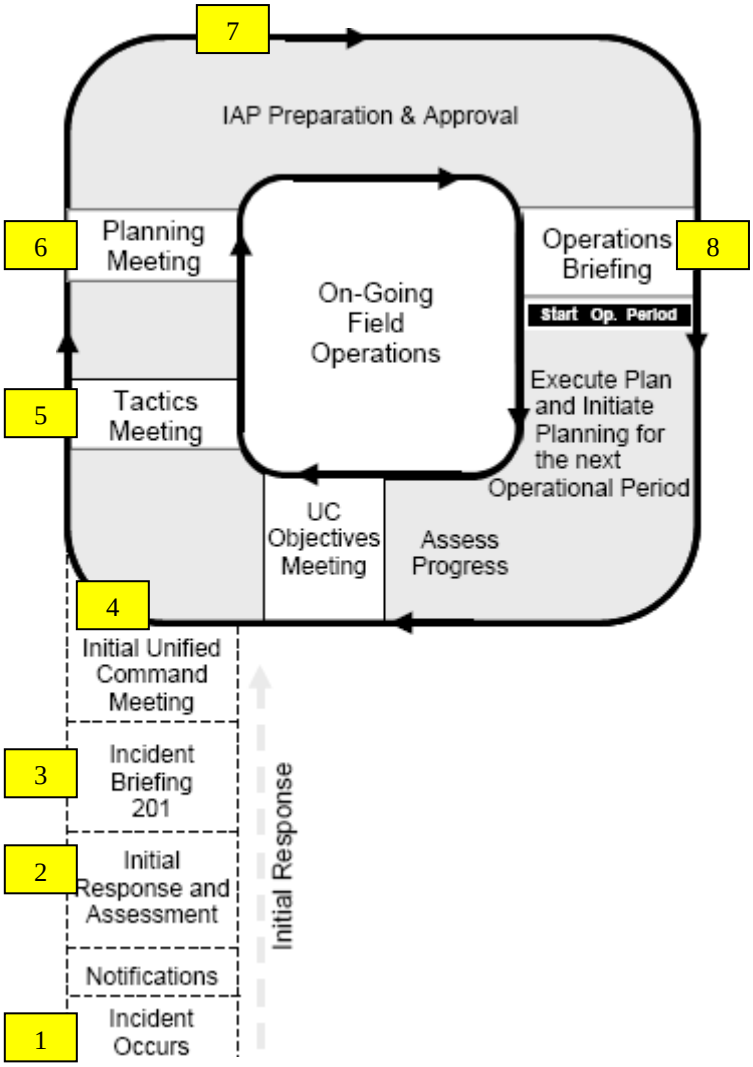
Harlan Henderson, a former OSPR Administrator (and USCG Port Captain), once characterized a spill response in the following way:

"Within 24-48 hours the state and federal governments, along with the Responsible Party assemble or establish a multi-million dollar corporation (because millions will be spent), operate it for six to eight weeks to clean up a spill, then dismantle it completely".

A constant factor in oil spill responses is that, in any case, the available window of time to respond would be always small. Because of this obvious fact agency coordination is critical to achieve an effective and efficient response.

It is really an in-house teamwork and interagency cooperation that successfully drives a spill response in California, the eight most relevant events pre-designed under the fix Operational Period Planning Cycle can be seen in Figure 14.

FIGURE 14: OPERATIONAL PERIOD PLANNING CYCLE .



Source: Extracted from FOG

INCIDENT OCCURS / NOTIFICATIONS

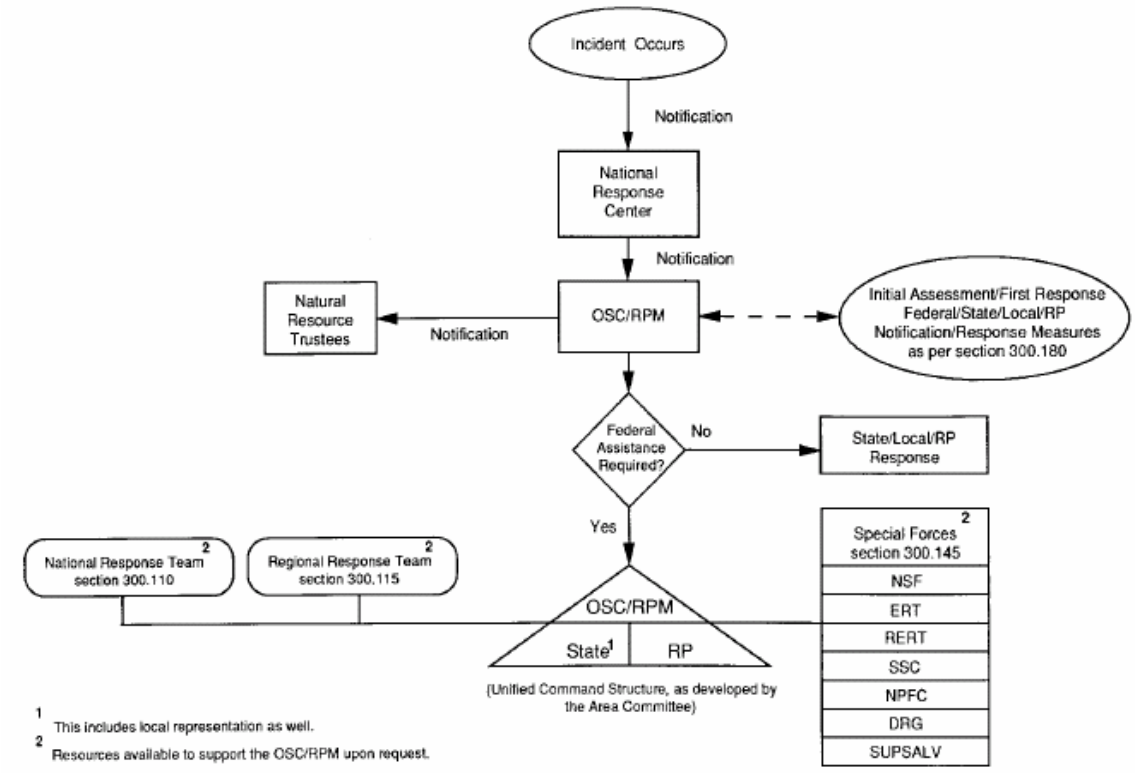
When a spill is notified, the office that has received the communication (i.e. the National Response Center or the California Dispatch Center) call the rest of the response members.

While the appropriate Federal, State, and Local agencies are reported the initial assessment and response actions start right away.

For small spills, the reporting party may have already dealt with the clean-up and the response actions would have finished. For large spills, the first responder will call the on-call duty officer (ODO), who then begins to mobilize personnel and equipment needed for large-scale response.

In any case, the first responder will work closely with the Communication Center to ensure that specific response partners, i.e. OSPR, USCG, EPA, USFWS, etc. are notified and are in route.

FIGURE 15. NATIONAL RESPONSE SYSTEM RESPONSE CONCEPTS.



Source: Code of Federal Regulations. Title 40 Protection of Environment

INITIAL RESPONSE AND ASSESSMENT

As we just mentioned, once the incident has been notified, one member will determine the level of response needed, usually by visiting the site.

At the State level, in both Northern and Southern California, a biologist, a warden and an Oil Spill Prevention Specialist are on-call 24 hours per day. This responsibility rotates among team members on a regular basis. In addition, there is an on-call duty officer in Sacramento.

Each OSPR field unit has a vehicle with a "go-kit", usually a footlocker full of equipment and materials that they know will be needed during a response. Also, every OSPR responder has his/her own go-kit, which includes clothing and supplies for two weeks in the field. This means OSPR's entire staff can mobilize to a specific location within a very short time.

At the Federal level, the USCG or EPA On Scene Coordinator (FOSC) will also be ready to respond with dedicated spill response personnel and, if it is necessary, the FOSC will calls the Strike Team for assistance. As it has been explained the USCG has 1,200 specific personnel assigned to its strike teams and to the approximately 50 units around the nation whose specifically task is to be ready to respond to spills of oil.

In case it is necessary, the Strike Team (Pacific Strike Team in California) will mobilize and deploy Strike Team equipment. Strike Team equipment is palletized, loaded, and ready for immediate deployment by truck or aircraft. The Pacific Strike Team is able to mobilize:

- ✓ 2 Strike Team members and 1 Public Information Assist member immediately.
- ✓ 4 Strike Team members and 1 Public Information Assist member within 2 hours.
- ✓ 12 Strike Team members within 6 hours.

Box 8 (1)

ACTIVATION OF WILDLIFE OPERATIONS

Under California's Oil Spill Prevention and Response Act, the OSPR has the mandate and the capacity to mobilize its wildlife protection resources immediately, if necessary, to provide the best achievable protection for the state's wildlife, in accordance with the state contingency plan and the ACP.

In these instances, OSPR's early Wildlife Operations will be guided by the ACP as the ACP is the primary guidance document regarding natural resource protection in a California spill (with preciseness, key portions of the Area Contingency Plan that will be used to identify wildlife and habitat protection concerns include "Sensitive Site Summaries and Strategies", the "Geographic Response Plans", and the "Oiled Wildlife Response Operations Plan and its related databases").

With this guide, the Wildlife Branch Director (WBD) must evaluate a rapidly changing situation and develop an initial action plan, often literally while on the way to the spill site. Often, all the only initial source of information is the Responsible Party initial report of product, amount, and location, or observations by land managers of oiled wildlife stranding on beaches.

Although in practice it may be accomplished in a matter of a few moments, capitalizing on the WBD's experience and prior knowledge of wildlife resources and protection strategies, some of the information and variables that the WBD must consider to create the Wildlife Branch and provide an effective response are:

- Available staff, equipment resources and deployment options within the context of the applicable ACP;
- Type of oil (including persistence and emulsification properties);
- Quantity of oil;
- Frequency of oil deposition and oiled wildlife stranding;
- Concentrations of wildlife in the spill area;
- Presence of threatened or endangered species and/or critical habitat;
- Potentially affected habitats/Environmental Sensitive Index Rankings;
- Wildlife resources at risk;
- Human health hazards (Site Characterization);
- Time of Year/Season (i.e., presence of migratory or breeding birds and mammals; and
- Weather and oceanographic conditions.

Using this information the WBD can formulate the initial wildlife operations action plan, which will include prioritized response objectives, an immediate call-out and implementation of personnel and equipment, and group and unit designations and task

Box 8 (2)

Recommended Tiered Level Response of Personnel and Equipment for Wildlife Operations

LEVEL I
(Incidents where WO projections are for at least dozens of marine birds impacted; typically a smaller geographic area with no marine mammals)

Staff and Contractors	Equipment
Wildlife Branch Director (1) OWCN Response Director/Veterinarian (1) Group Leader (1) OWCN Staff/Unit Personnel (6) OWCN Regional Facility	Mobile Vet Lab (1) Wildlife Care Trailer (1) Vet Truck (1) One-Ton Wildlife Truck (1) ATV (2) Capture/Reconnaissance Boat (1) Air boat (1) Wildlife Supplies Trailer w/various Hazing Equipment (1) GPS Receivers Cellular phones or radios

LEVEL II
(Incidents where WO projections are for up to low hundreds of marine birds, and a few marine mammals):
All of the resources shown in Level I **plus:**

Staff and Contractors	Equipment
Deputy Wildlife Branch Director (1) Group Leaders (2) Processing Group Team (5) OSPR & Contract Veterinarian (2) OWCN/CMMSN Staff (mammals) (6) Reconnaissance/Recovery/Vet Services Group Staff (15) OWCN Trained Volunteers (15) Specialized Wildlife Experts (contractors) (4) Wildlife Aerial Response Team (3) OWCN Regional Facility (as needed)	Mobile Vet Lab (1) Wildlife Care Trailer (1) ATV (2) Capture/Reconnaissance Boat (3) Wildlife Transport Trailer (1) Wildlife Supplies Trailer (2) Air boat (1) DFG Fixed Wing Aircraft (1) GPS Receivers Cellular phones or radios

LEVEL III
(Incidents where WO projections are for high hundreds or thousands of marine birds and tens to dozens of marine mammals):
All of the resources shown in Levels I and II **plus:**

Staff	Equipment
Contract Veterinarian (3) Group/Unit Personnel (6) Additional OWCN Facilities (as needed) OWCN staff and Trained Volunteers (90)	Capture Boat (4) Air boat (3) Wildlife Supplies Trailer (1) ATV (4) Helicopter Support

NOTE: *Despite of some exceptional accidents (e.g., a tanker grounding and rupture,) justify the activation of the Level II or III (highest), the most often cases refer to Level I.*

As soon as feasible, but in any event after the first 24 hours of a spill, the Wildlife Branch Director will direct the development of the wildlife operations element of the Incident Action Plan (IAP) for the review and approval of the Unified Command. Wildlife operations response activities should be described on the "Work Assignment Form" (ICS Form 204) and integrated into the daily IAP to be approved by the UC. The IAP will identify and authorize WO response actions for the duration of the spill.

It is important to remark, that before any spill response begins, there is a pre-defined priority for response actions. First is human health and safety. No one's health or safety will be subordinated to a spill response. Second, is the environment. The Public Trust Doctrine mandates the public interest supercedes private interest. Private interests have recourse through the courts to press any claims for loss or injury.

Under this logic the Staffs assuming command of the incident will start to prepare the Incident Briefing 201 in order to speed up the response.

3.3.3 INCIDENT BRIEFING (ICS 201)

The Incident Briefing 201 form is prepared under the direction of the Staffs assuming command of the incident for later presentation to the "official" Unified Command.

During the transfer of command process, this ICS 201 formatted briefing provides the incoming Incident Command / Unified Command (IC/UC) with basic information regarding the incident situation and the resources allotted to the incident. Most importantly, it is the de facto Incident Action Plan (IAP) for the initial response and remains in force and continues to develop until the response ends or the Planning Section generates the incident's first IAP (see Box 9 dedicated to describe what is an Incident Action Plan) . The Incident Briefing 201 form is also suitable for briefing individuals newly assigned to Command and General Staff, as well as needed assessment briefings for the staff.

3.3.4. INITIAL UNIFIED COMMAND MEETING

As it has been explained in previous sections, the basic framework for the response management structure is the **Unified Command System or Incident Command Structure.** It brings together the functions of the Federal government, the State government, and the responsible party to achieve an effective and efficient response, where the On-Scene Coordinator (OSC) maintains authority.

Once the UC is formed and solid, it will identify and prioritize objectives for the next operational period (it must also indicate the specific operational periods -e.g., 12 hour shifts, sunrise to sunset, 24 hour shifts etc.- that will conduct the response actions). While doing this the UC is completing the ICS 202 form.

The ICS 202 form or Incident Objectives form, describes the basic incident strategy, control objectives, and provides weather, tide and current information, and safety considerations for use during the next operational period. The Attachments list at the bottom of the form (Organization List, ICS 203-OS; Assignment List, ICS 204-OS; Communications List, ICS 205-OS; Medical Plan, ICS 206-OS; Incident Map(s); Traffic Plan; Resource at Risk Summary, ICS 232-OS) also serves as a table of contents for the Incident Action Plan.

The Incident Objectives form will be reproduced within the IAP and given to all supervisory personnel at the Section, Branch, Division/Group, and Unit levels.

Box 9

AREA CONTINGENCY PLANS Vs INCIDENT ACTION PLAN

It is well accepted that the first 24-48 hours of a spill response – the Storm and Form Phase – is the most chaotic time of the event. This is where the Area Contingency Plan (ACP) plays a key role. The ACP (see section 1.1.1 for further details on the ACP concept) tells responders what to do and where to go while others arrive, gather information, and plan for subsequent days' work – plans that depend on knowing what is actually happening

3.3.5 . TACTICS MEETING

This 30-45 minute meeting creates the blueprint for tactical deployment during the next operational period. It is prepared by the Planning Section Chief with the inputs made mainly by the Operation Section Chief, Logistic Section Chief, Resources Unit Leader, the Situation Unit Leader and the Environmental Unit Leader.

Box 10

RESPONSE OBJECTIVES, STRATEGIES AND TACTICS.

Incident objectives, strategies and tactics are essential prerequisites to any written or oral IAP. On a simple perspective, the **OBJECTIVES** respond to the question of *"What you plan to do in a priority order"*, **STRATEGIES** respond to the question of *"How you plan to accomplish objectives"* and **TACTICS** respond to the question of "*How you use resources during each operational period to implement strategies*".

An example may be:

OBJECTIVE:

- Maximize Protection of Environmentally Sensitive Areas.

ESTRATEGIES:

- Implement pre-designated response strategies.
- Identify resources at risk in spill vicinity.
- Track oil movement and develop spill trajectories.
- Conduct visual assessment (e.g., over-flights).

3.3.6 . PLANNING MEETING

This meeting defines incident objectives, strategies, and tactics and identifies resource needs for *the next operational period*. This meeting it is not longer than 45 minutes although this detail depends always on the complexity of the incident.

This meeting fine-tunes objectives and priorities, identifies and solves problems, and defines work assignments and responsibilities on a completed ICS Form 215 (Operations Planning Worksheet).

Box 11

DISPLAYS IN THE COORDINATION ROOM

Displays in the meeting room should include Objectives (ICS 202) for the next period, large sketch maps or charts clearly dated and timed, poster-size Operational Planning Worksheet (ICS 215), current resource inventory prepared by Resources Unit, and current situation status displays prepared by Situation Unit.

PHOTOGRAPH 5 & 6: ACP COORDINATION ROOM

SOURCE: Ana Tejedor

After the meeting, the ICS 215 is used by the Logistics Section Chief to prepare the off-incident tactical and logistical resource orders, and used by Planning Section Chief to develop IAP assignment lists.

3.3.7. INCIDENT ACTION PLAN PREPARATION AND APPROVAL.

Immediately following the Planning Meeting, the attendees prepare their assignments for the Incident Action Plan (IAP) to meet the Planning Section Chief deadline for assembling the IAP components.

Box 12

THE INCIDENT ACTION PLAN

An Incident Action Plan (IAP) contains general control objectives reflecting the overall incident strategy and specific action plans for the next operational period. When all attachments are included, the plan:

- specifies the objectives for the next operational period;
- defines the work assignments for the next operational period, including extracts of site-specific safety messages (Note: the Site Safety Plan is generally a stand-alone document and is not included in the IAP);
- defines the resources needed to accomplish the work order;
- depicts how all response personnel are to be organized;
- lists radio and telephone communications for all incident personnel;
- specifies a medical plan to follow in case of a responder emergency;
- identifies resources at risk.

The Unified Command, Command Staff, and General Staff develop together the IAP. Specifically, the Planning Section Chief compiles the IAP, with key tactical input from the Operations Section Chief and following each Planning Meeting.

Finally, the plan should be approved and signed by each member of the Unified Command.

3.3.8. OPERATIONS BRIEFING

This meeting conveys the IAP for the oncoming shift to the response organization. Shifts in tactics may be made to reallocate resources within a division or group to adapt to changing conditions. This meeting might happen about an hour prior to each shift and will be facilitated by the Planning Section Chief.

3.3.9.- RESPONSE

The specific measures that the response to oil spills require are beyond the content of this Case Study. Section 4 contains a summary of them. For a very general approach to oil spill technical responses see "Combating Oils Spills", IMO Publications, 2005.

3.3.10. INCIDENT RESPONSE CLOSING

The last step for the incident Commander once the incident response is closed, is to ensure four last measures are undertaken:

1. Personnel and equipment that have been involved are being decontaminated.
2. Restoration and recovery efforts are addressed.
3. The incident has been documented in logbooks.
4. A critique of the incident has been committed.

Once the incident has been closed, responders return to base and prepare for the next incident.

Box 13

EVALUATION OF THE INCIDENT RESPONSE

The success of a incident response is evaluated as a function of the achievement of certain key success factors such as:

- Human Health: No public injuries; no worker injuries.
- Natural Environment: Source of discharge minimized; sensitive areas protected; resources damage minimized.
- Economy: Economic impacts minimized.
- Public Communication: Positive media coverage; positive public perception.
- Stakeholders Support: Prompt handling of claims; positive meetings; minimize stakeholders' impact.
- Organization: Sufficient/Efficient resource.

SECTION 4. OTHER MANAGEMENT TOOLS

The following Box includes a compendium of the preparedness and response measure

BOX 14: COMPEDIUM OF MANAGEMENT MEASURES

PREVENTION:

1. Vessel crew licensing certification and training requirements (e.g., development of Standards of Training, Certification and Watch keeping (STCW)
2. Vessel management requirements (e.g., International Safety Management (ISM) Code and similar industry programs)
3. Port state control inspections
4. Refuge places.
5. Risk Based Decision Making.
6. Requirements of certificates and official forms.
7. Ship routing and other traffic Management.
8. The Marina Mapping Project.
9. Legislative and Regulation Changes.
10. The Cruiseship Environmental Task Force.
11. The Harbors Safety Committees.
12. Specific Business Proposals (Pollutant Management Information System (PDIS)).
13. Use of New technologies.
14. Databases and GIS Capabilities.
15. Oil transfer spill prevention requirement for vessels.
16. Double-hull requirements
17. Emergency response capabilities for towing vessels and barges

PREPAREDNESS:

1. Development of Specific Action Plans. Federal/state agency contingency planning (e.g., National, Regional and particularly Area Contingency Plans) and Agency Planning measures.
2. Responsible party response planning (e.g., Vessel Response Plans and Facility Response Plans)
3. OSRO classification program and Sensitive Site Strategy Evaluation Program.
4. PREP exercises. Drills and Exercises.
5. Incident Management Books.

RESPONSE:

1. National Strike Force augmentation.
2. National Incident Management System – Incident Command System response doctrine implementation.
3. Salvage and vessel countermeasures.
4. Augmented responsible party liability (criminal, civil).
5. Mechanical recovery advances (e.g., Vessel of Opportunity Skimming System [VOSS], and fast-water recovery systems)
6. Alternative countermeasures advances (e.g., in-situ burning [ISB], dispersants)
7. Shoreline cleanup advances (Shoreline Cleanup Assessment Team [SCAT], washing techniques, bioremediation)
8. Natural resource restoration (e.g., enhanced NRDA procedures, new technologies).
9. Wildlife Operations Plans.
10. Analytical Laboratories support Services.

OTHER ALTERNATIVE PREVENTION, PREPAREDNESS AND RESPONSE MEASURES

1. Establishing of memoranda of agreements.
2. Promoting public awareness of, and voluntary compliance
3. Assessing the state of preparedness of the relevant parts of the contingency plans as they relate to the Special Area.
4. Development of education campaign for mariners
5. Requirement of Special permits
6. Requirement of Special rates
7. Development of Spill Histories Database
8. Environmental and other audit systems.
9. Pre-approvals for controversial emergency actions.

LIST OF ABBREVIATIONS.

ACP Area Contingency Plan

AIS Automated Information System

CBD Convention on Biological Diversity

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

CFR Code of Federal Regulations

COFR Certificate of Financial Responsibility

COP Conference of the Parties

CWA Clean Water Act

DFG California Department of Fish and Game

DOI Department of Interior

DOJ Department of Justice

DOS Department of State

DOT Department of Transport

EPA Environmental Protection Agency

FOSC Federal On-Scene Coordinator

GIS Geographic Information System

GSA General Services Administration

HAZMAT Hazardous Materials

HHS Department of Health and Human Services

IC Incident Commander

ICS Incident Command System

IMO International Maritime Organisation

IMT Incident Management Team

ISM International Safety Management Code

MPAs Marine Protected Areas

MSB Marine Safety Branch

NAS National Academy of Science

NCP National Oil and Hazardous Substances Pollution Contingency Plan

NGOs Non governmental Organisations

NIC/RIC National/Regional Incident Command

NIIMS National Interagency Incident Management System

NOAA National Oceanic and Atmospheric Administration

NRDA Natural Resource Damage Assessment

NRS National Response System

NRT National Response Team

NSF National Strike Force

NSFCC National Strike Force Coordination Center

ODO On-call duty officer

OPA 90 Oil Pollution Act of 1990

OSC On-Scene Coordinator

OSPPR Coast Guard's Oil Spill Prevention, Preparedness and Response Program

OSPR Oil Spill Prevention and Response

OSPS Oil Spill Prevention Specialists

OSRO Oil Spill Removal Organization

PIAT Public Information Assist Team

PSSA Particularly Sensitive Sea Area

R&D Research and development.

RBDM Risk-based decision making

RCP Regional Contingency Plans

RPM Regional Environmental Officers

RRT Regional Response Team

RSPA Research and Special Programs Administration

IAP Incident Action Plan

SARA Superfund Amendments and Reauthorization Act

SAs Special Areas

SOSC State On-Scene Coordinator

SSSEP Sensitive Site Strategy Evaluation Program

UC Unified Command

UNCLOS United Nation Convention of the Law of the Sea.

USCG United States Coast Guard

VTS Vessel traffic services

OIL SPILL PREVENTION AND RESPONSE: THE U.S. INSTITUTIONAL SYSTEM IN THE COAST OF CALIFORNIA

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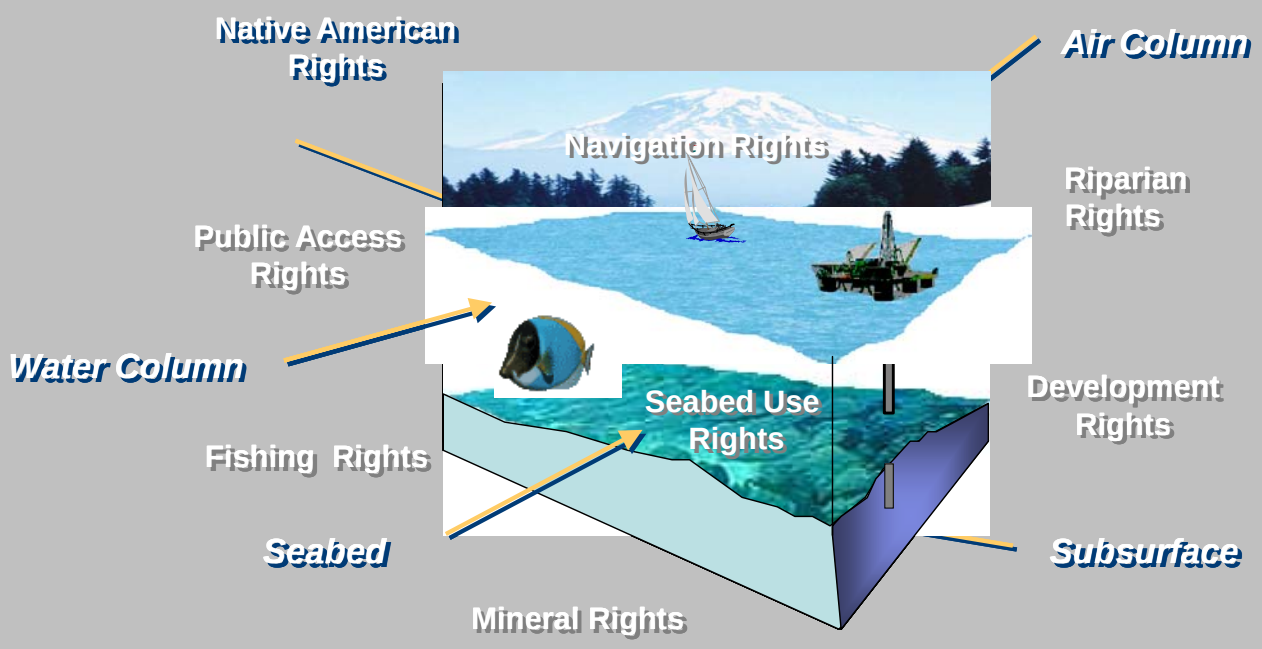
Scholars´ Debate

1.- Planning Ocean Science

Because of its specific characteristic (among them, the common property of the marine resources, the lack of knowledge about the marine ecological processes, the believe that the oceans are inexhaustible, the broad scale of the ocean threats and the lack of ocean governance, and, above all of them, the fact that the Oceans have multiple potential uses, many of them open to non-coastal states´ ships and other agents) the planning and management of marine ecosystems require the use of a different approach when compared to the usual management techniques used for terrestrial ecosystems.

Figure 1 includes a summary of the competing uses of the Oceans. How does this affect the management of Protected Areas? Is the management of coastal areas similar to the management of offshore MPAs?

FIGURE 1: COMPETING USES OF THE MARINE ENVIRONMENT & IT'S RESOURCES



2.- MPAs´ contribution.

Due to the fact that no regulatory entity is charged with oversight of the Ocean as a whole, much of the future progress in Ocean conservation could be done through the designation of existing and protected areas that could embrace and enhance this multi-use management concept.

Taking these considerations into account and assuming also that the marine transportation sector is an important stakeholder (specially in the high seas), do you think the MPAs designated for pollution control, such as the IMO´s SAs ans PSSAs , or

theCalifornia Water Quality Marime Areas should play an active role on this 2012 MPAs global network?

In developing countries, where public institutional systems such as the one operating in California are not feasible because of their costs, do you think the cases might be more clear since MPAs provide an additional feasible framework for oil spill management?

Figures 2A and 2B include the recent proposal of MPAs in central California. Figure 2C contains the MPAs proposed for protection as part of the European Natura 2000 Network of Protected Areas in North Western Spain and how were they impacted by the 2002 Prestige oil spill. Knowing the an oil spill is still the main threat that central California coast faces (since an oil spill would Extinguish the population oF sea otters and they are a keystone species [SEE CASE STUDY ON THE SEA OTTER RECOIVERY PLAN , OF THESE SAME SERIES OF CASE STUDIES], would the establishment of such networks of MPAs contribute to the prevention and response to oil spills in both the eastern Atlantic and Pacific Oceans?

Figure 2A

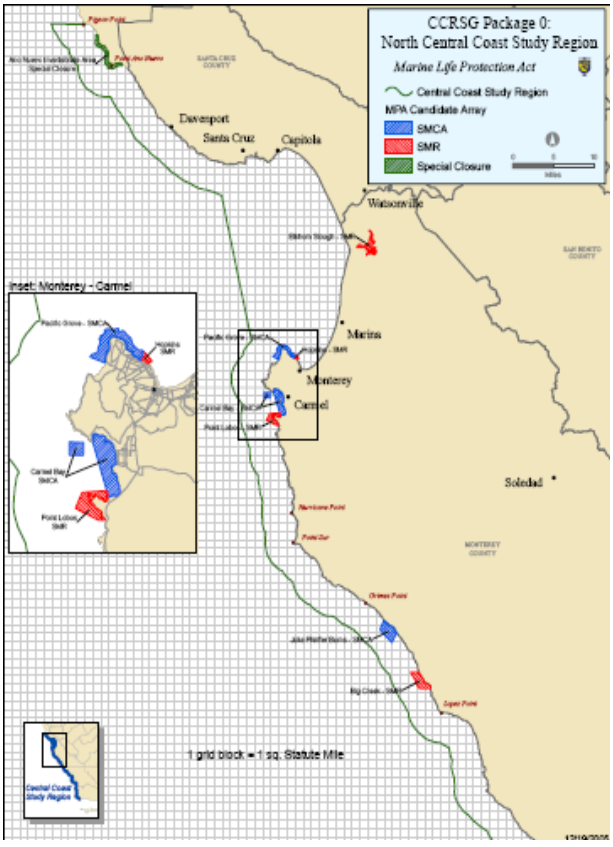


Figure 2B

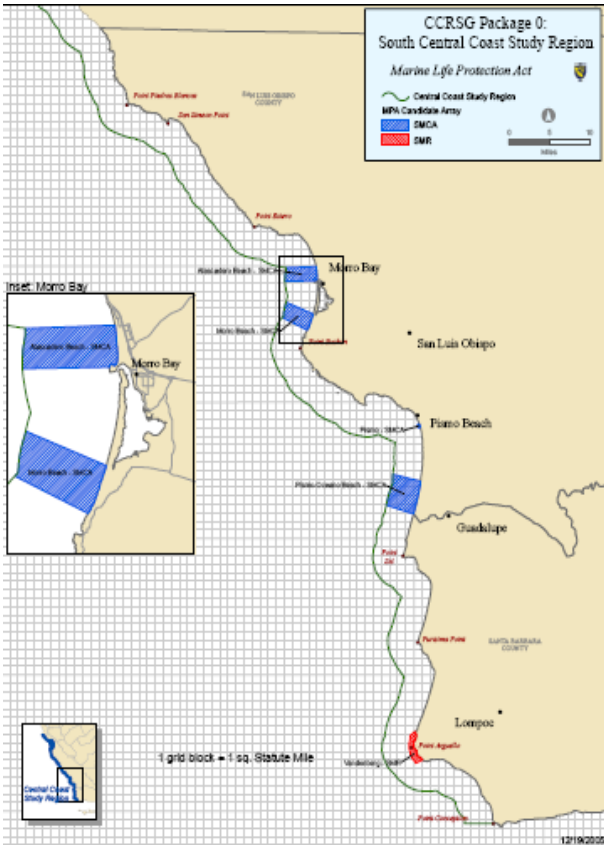
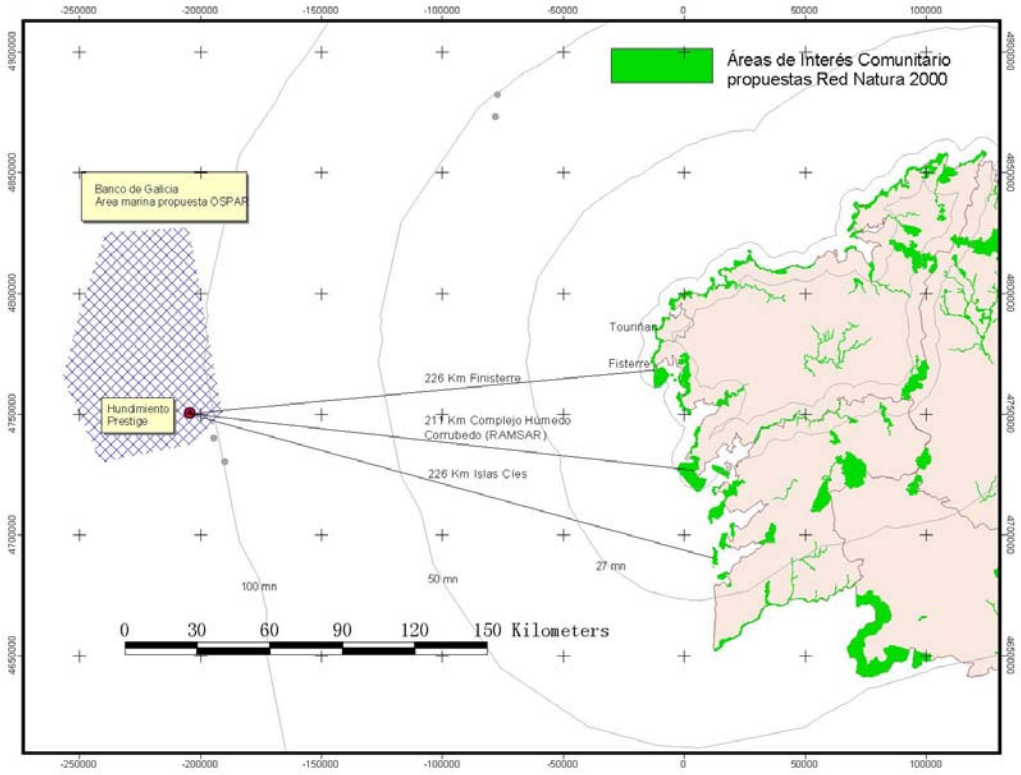


Figure 2C: Prestige oil spill in the North West of Spain (2003)



Source: Spanish Ministry of the Environment

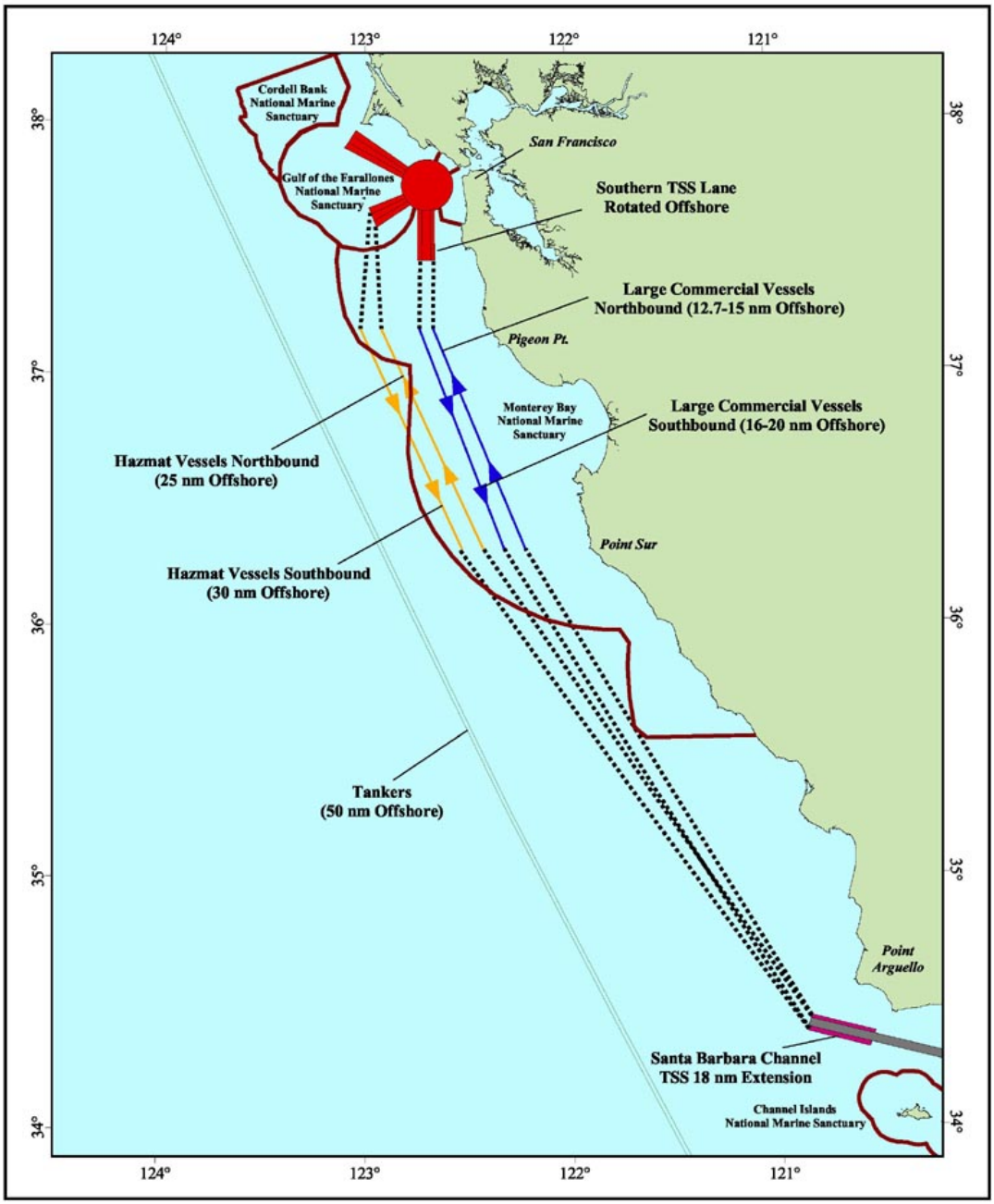
3.- Ships´ Routeing

Traffic separation schemes and other ship **routeing** systems have now been established in most of the major congested areas of the world for reasons of safety.

Figure 3A shows the routeing imposed on vessels on the coast of Central California. The 3B series shows the same idea for the traffic entering and leaving the Mediterranean via the strait of Gibraltar. 3C shows the same in the waters of the United Kingdom.

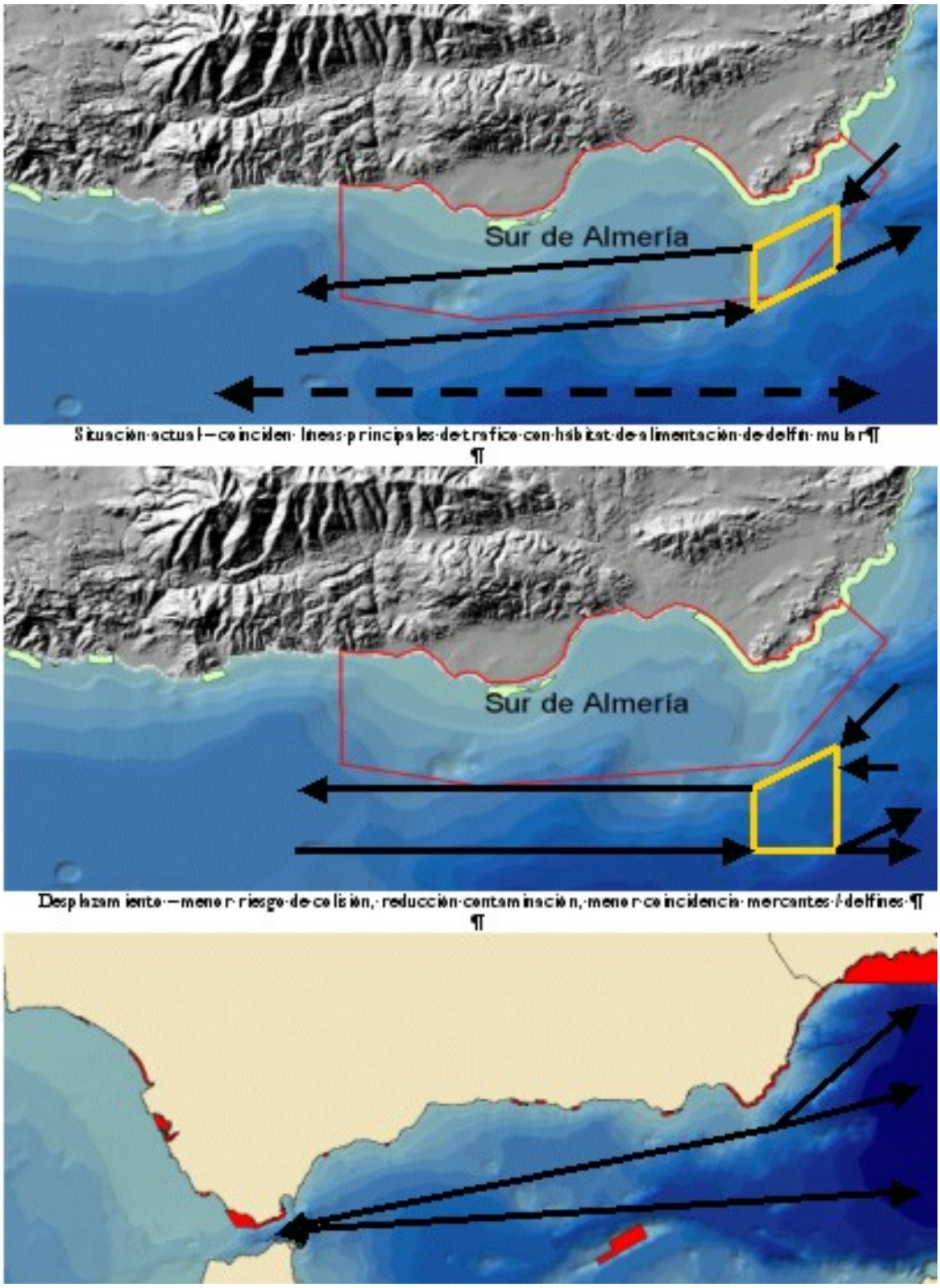
Aren´t all these waters (territorial sea –up to 12 miles-, Exclusive Economic Zone –up to 200 miles- and high seas) totally open to innocent passage by ships of any State of the international Community? How could these schemes be approved? Was their main purpose to save human lives, increasing safety by decreasing the number of collisions between vessels?

FIGURE 3A. ROUTEING MEASURES ADOPTED IN CALIFORNIA.



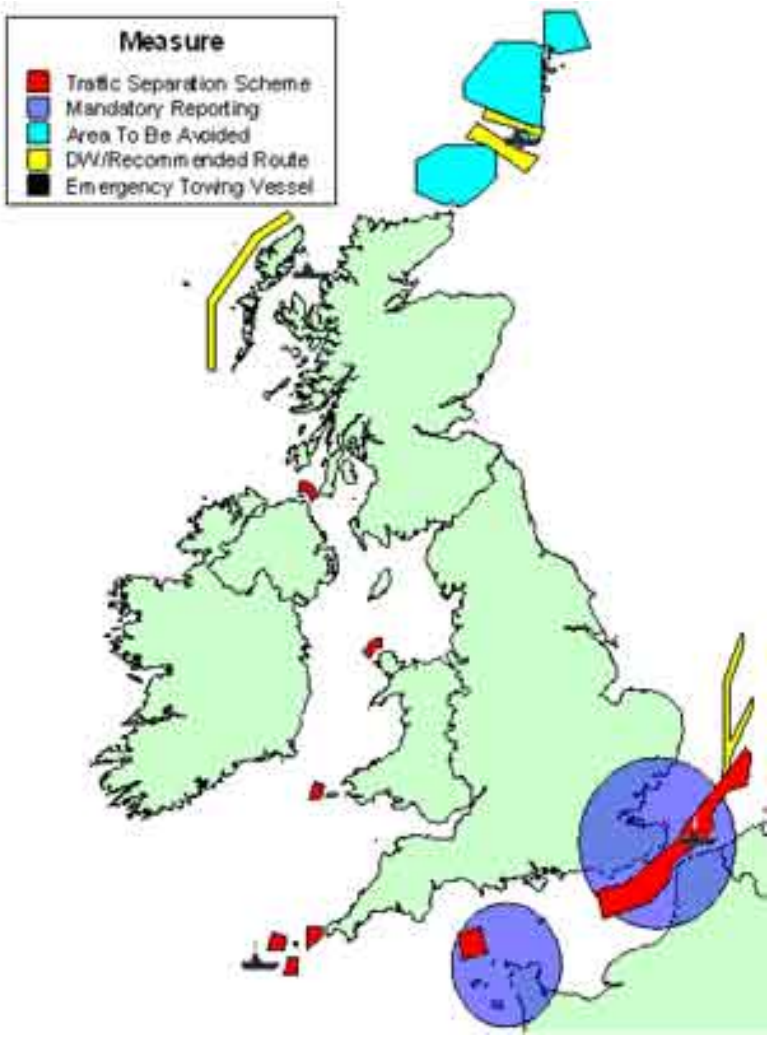
SOURCE: http://www.montereybay.noaa.gov

FIGURE 3B. ROUTEING ADOPTED IN SOUTHERN SPAIN



Source: Sociedad Española de Cetáceos

FIGURE 3C. ROUTEING MEASURES ADOPTED IN UNITED KINGDOM



SOURCE. Donaldson. Safer Ships, Cleaner Seas

4.- Is it the Wild West in the high seas?

There is clear consensus in the world scientific community that an important percentage of the MPAs that would make the 2012 MPAs global network should be high seas MPAs.

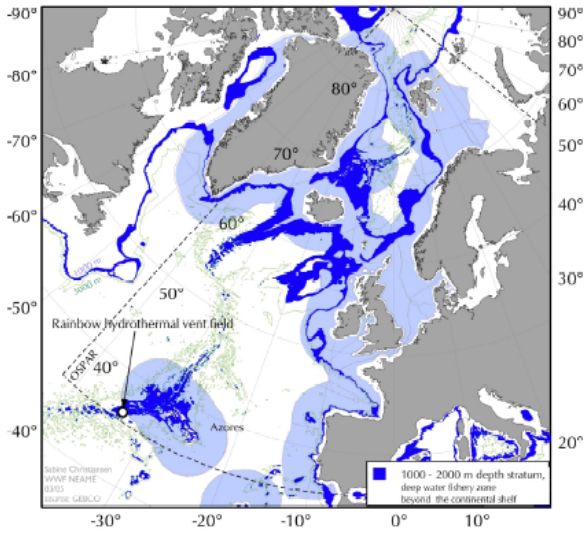
Since the *Mare Liberum* 13th Century doctrine, the Oceans beyond the Exclusive Economic Zone (usually between 200-250 nautical miles from the state's coasts) are a global common. As other common resources the high seas also suffers from the tragedy of the commons. In addition, this space is recognized as the 21st Century Wild West since there is a lack of specific biodiversity conservation law (apart from the broad-spectrum given by the United Convention of the Law of the Sea –UNCLOS- and the personal jurisdiction based on flag state sovereignty).

The official legal establishment disputes the idea itself that MPAs could be established in areas beyond national territorial jurisdiction at all.

Figures 4A and 4B show examples of such MPAs. How is it that they were established? Are there other mechanisms for the establishment of other MPAs?

Liguria Sea MPA in international waters of the Mediterranean

Rainbow Thermal Vent MPA in the middle of the Atlantic



5.- "Mystery" oil spills

Between 1992 and 1999, more than 25 "mystery" oil spills (with an unknown source) hit California's coast, costing the State $1,562,876 for response and clean-up. Apart from old war vessels, with other intentional cases might be related with this "mystery" oil spills? Which are the costs of vessel recycling?

6.- Unilateral *versus* Multilateral policies

Despite the figures that show substantive decreases in the size and frequency of petroleum spills mainly because of the U.S initiatives undertaken as a consequence of OPA-90 for the prevention, preparedness and response of spills, the potential for a large spill is still significant, especially in regions without stringent safety procedures and maritime inspection practices. If we consider this risk and the risks associated to the fact that the centers of oil production will continue to migrate towards the Middle East and Russia; do you think the USCG should expand efforts to work with ship owners domestically, and internationally through the IMO, in order to develop and enforce effective international regulatory standards that have contributed to the decline in oil spills and operational discharges in a worldwide scale?

Would it be better to work at the regional scale? The U.S. has been actively involved in some regional agreements for spill prevention, preparedness and response such as the MEXUPAC or the British Columbia Task Force. Can these examples be considered significant to the assertion that the US oil spill prevention and response policies are multilateral?

7.- Voluntary Agreements

According to OSPR data, since 2001 vessels over 300 tons (this covers most cargo ships) will cruise at least 15 miles offshore when northbound and 22 miles southbound.

In addition, ships carrying hazardous materials must stay at least 29 miles offshore, and oil tankers will continue to sail at least 58 miles from the coast. This voluntary action gives spill responders and rescue tugs more time to reach a spilling or damaged vessel, before spilled pollutants can reach near-shore ecosystems. Is a voluntary agreement enough? In your opinion, since this voluntary agreement approach seems to have been a success in California's coast, could it be extended worldwide?

8.- Oiled Wildlife Impact & Natural Resource Damage Assessment Techniques

Although natural resources damage assessment techniques have become increasingly sophisticated during the last decade of the 20th Century, the effects of major oil spills and chronic oil pollution on marine wildlife are still difficult to assess. Which ones are the main needs to improve the assessment of the damage (wildlife casualties) during future spills?

A good student exercise could be to compare the definitions of damage included in the original 1969 Brussels Convention on Liability and that of the 1992 protocol and which are included below. Which of them is more inclusive? What is the damage insured by each of them?

1969 Text:

"Pollution damage" means loss or damage caused outside the ship carrying oil by contamination resulting from the escape or discharge of oil from the ship, wherever such escape or discharge may occur, and includes the costs of preventive measures and further loss or damage caused by preventive measures. "Preventive measures" means any reasonable measures taken by any person after an incident has occurred to prevent or minimize pollution damage.

1992 Text:

"Pollution damage" means (a) loss or damage caused outside the ship by contamination resulting from the escape or discharge of oil from the ship, wherever such escape or discharge may occur, provided that compensation for impairment of the environment other than loss of profit from such impairment shall be limited to costs of reasonable measures of reinstatement actually undertaken or to be undertaken; (b) the costs of preventive measures and further loss or damage caused by preventive measures "Preventive measures" means any reasonable measures taken by any person after an incident has occurred to prevent or minimize pollution damage.

Examples of traditional damage assessment (for example, for the Puerto Rico wetland impacted by the *SS Zoe Colocotroni* oil spill) and more post-modern contingent valuation techniques (such as the one used in the *Exxon Valdez* spill) should be compared, so that the students get familiarized with both techniques.

9.- Risk assessment.

Oil spill risk assessment is most of what the 2003 Final Revised Recovery Plan for the Southern Sea Otter is all about (Recarte Ana, 2004).

The IMO PSSAs and SAs accomplish also the need for risk assessment. In this sense, it is recommended to each SA to conduct a specific Oil Spill Risk Assessment in order to report:

- Marine Environment High Risk Areas;
- Details of the legislative and management programs in place to manage oil spills;
- Rankings of the causal hazards and ensuing risks of oil spills;
- Recommendations for strategies aimed at preventing or reducing the risks and impacts of oil spills.

Risk assessment should take into account factors such as distribution of lengths of shoreline affected by spills over given time period, navigational difficulty, accident history and environmental vulnerability of the overall area affected by oil spills in a particular region.

Navigational difficulty includes three types of considerations:

Issues considered contributory under navigational difficulty include: Close proximity to shore and shoals, restricted sea room, shallow water depths, nature of seabed, confinement of water way, strong tidal streams (particularly cross streams), strong trade winds (even cyclones at times), heavy rain squalls and resultant restricted visibility, traffic density and congestion (particularly a high concentration of fishing

vessels), choke points for traffic, the length of time to undertake a passage through a particular hazard.

Coastal contributory factors included: Number of vessel movements, traffic density, navigational hazards, transit time through area.

Port contributory factors included: Number of vessel movements, traffic density, navigational hazards, transit time through area, amount of oil imported and exported, number of oil transfer operations, number of bunkering operations.

At the same time, the relative importance of the different marine ecosystems or zones within the area that is being analyzed should be considered. This "area importance factor" should include factors such as uniqueness or rarity of the area, presence of critical habitats, interdependence of the biota within a local ecosystem, to which extent it is representative of the area, diversity of the area, productivity, integrity, vulnerability, biogeographic importance, human dependency, time needed for recovery, etc.

It is also important to take into account, when assessing risk, the synergism among perturbations to marine communities already stressed due to chronic pollution, invasive species pressures, or climate extremes, such as El Niño or La Niña, events that will likely make them more susceptible to disturbance and recover much more slowly than unstressed communities (Gary W. Allison et al. 2003).

Finally, the possibility for influences on neighboring areas outside the MPA boundaries should be clearly highlighted. For example, this influence might be maximized when a corridor between two or more MPAs could be established. Or, for example, if an MPA manager forces oil vessel traffic to avoid a specific area, it can benefit neighboring areas just because the vessels will not change course again, especially if in a relative short distance they will have another area to avoid.

The amount and quality of data needed to complete a risk assessment, will require a good and extensive spatial monitoring system. However, MPA designers should be aware that spatially extensive monitoring systems might be hard to put in place, considering the resources (economics, educational, technology, enforcement and

surveillance…) that would be needed but that many countries lack, especially in remote areas. Perhaps a solution to solve these difficulties could be a proposal from the international community to the transportation sector to establish and pay for a monitoring system that serves both MPA and industry needs (costs internalising).

It must be said, that despite these difficulties, countries with good monitoring systems have been identified. This is the case, for example, of the United States, where the USCG has been compiling data on all point-source oil spills over ~200 L for many areas within U.S waters since the early 1970's (U.S. Coast Guard 1998). These data include volume, type, and location of the materials spilled.

Furthermore, some previous studies have shown that, when specific values for disturbance and recovery rates are not available for a given region, extrapolation from well studied areas and/or similar types of disturbances can provide useful guidelines to increasing the effectiveness of reserves. (Gary W. Allison et al. 2003).

Finally, MPA designers should be aware of the importance of the difference between small spills and very large spills when these considerations are taken into account for particular areas. Regular small spills imply more chronic conditions and perhaps a higher long-term risk of future events than occasional large spills. Large spills may be require careful considerations of reserve spacing to prevent an entire network from being affected by a single event (Gary W. Allison et al. 2003).

Thus, the applicability of MPA management schemes for this measure could be rated as "medium". The presence of an MPA may contribute to risk assessment by drawing attention to the uniqueness of the area that led to its set-aside and the definition of its boundaries. To the extent that data are gathered for natural resource management, and to the extent that the volume and usefulness of those data increase, they will contribute to refinements of risk assessments.

OIL SPILL PREVENTION AND RESPONSE: THE U.S. INSTITUTIONAL SYSTEM IN THE COAST OF CALIFORNIA

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Guiding Students´ Discussion

1.- Other oil spills that are not large marine tankers spills

Although the original focus of this research has been large marine tankers spills, the evolution of the scenario makes clear the need of pay attention to other sources of frequent spills.

For example, we have seen figures that suggest that major improvements should be made in reducing the more routine spills, which are significant both in number and volume contribution. In this sense, NAS 2002 found that worldwide, operational discharges resulting only from cargo washings constitute 36,000 tons per year.

MARPOL regulates these discharges. Which are the main reasons for the lack of compliance with the international law? Which are the monitoring systems? What are the requirements to take polluter to court? Could any authority bring before its courts of law the captain or owner of any ship that is known to have spilled oil, when cleaning its tanks, in the high seas? What if it happens in territorial sea of the coastal state, or in its Exclusive Economic Zone? Is there any sort of regional cooperation?

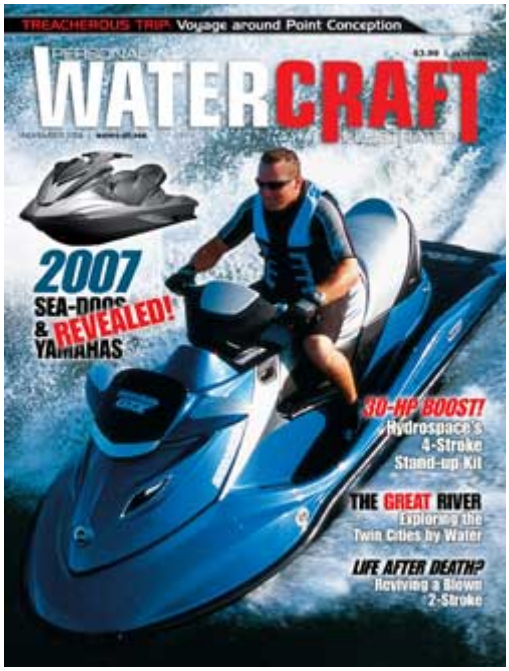
2.- Should the consumer have voice?

As we have noted on the text, in addition to reportable spills from recreational boats, there is growing concern about the amount of oil entering the environment from the operation of two-stroke engines in outboard motor boats and personal watercraft (PWC). These engines discharge oil into the water because the lubrication and combustion cycles within the engine are accomplished simultaneously, with the unburned lubricating oil being discharged with the exhaust. Although there is generally no visible environmental damage associated with these discharges such as with accidental oil spills, they are a potentially significant source of oil pollution. It is estimated that approximately 25% of fuel and lubricating oil used by a two-stroke engine is discharged unburned directly into the water or atmosphere (See *Everything You Need to Know About Spills*…Environment, Health and Safety Online). When this annual discharge from a single engine is multiplied by the two-stroke marine engine population of the U.S., the overall contribution becomes significant.

Reduction of this input will undoubtedly involve stricter design requirements on manufacturers issued by the government but, is this another case where the consumer has a in his hands the solution? Are the consumers being informed? Would you buy a PWC boat for recreation? Have you asked friends or colleagues that have recreational boats if they are aware of these issues?

PWC are considered by the USCG to be inboard boats under 16 feet in length. They are usually powered by a 2-stroke gasoline engine (the same basic engine type which is found in most outboard motors), but there are also 4-stroke gasoline engines, the same

engine type used in cars. The engine drives a jet pump that draws water from the bottom of the craft into an impeller (a type of propeller fitted into a surrounding "tunnel"), which pressurizes the water and forces it out a nozzle at the rear of the craft. It is this jet of pressurized water that propels and steers the craft when the throttle is engaged. New off-throttle steering technology offers personal watercraft users increased maneuverability when the throttle is disengaged.



Do you think that a certification or label should be put in place making it mandatory to explain these facts to the potential buyer? What about putting in place a voluntary scheme? Have you heard about FSC for wood or furniture or energy star for PCs and appliances?

FSC FOREST STEWARDSHIP COUNCIL
Because forests matter

energy
ENERGY STAR

3.- The importance of an Ocean Culture.

As the main pages suggests, California has a solid citizen conscience in Oceans conservation. In your opinion, do all the coastal communities have such a level of involvement on ocean conservation issues? Do you live near the sea? Are you active on Oceans conservation issues?

The most prominent scholars, such as those working at the Scribbs Research Institute, La Jolla, California, say that the state of the Oceans is so bad that we are increasingly seeing a large portion of coastal areas destroy all sorts of life. Comparisons are made between how those areas look now and how they looked in the Pre-Cambrian geological era, when only slime and jellyfish could be seen. Is it something that only coastal communities should be worried about?

Are you familiar with logos, T-Shirts or other parafernalia calling for action such as those of some California communities displayed below?

EXAMPLES OF SOME CALIFORNIA GOVERNMENTAL & NGOs LOGOS AND CULTURAL REPRESENTATIONS

4.- What is the biggest problem in rehabilitating oiled wildlife?

According to International Bird Rescue Research Centre, there is not just one but inadequate or no facilities to properly care for the animals has historically been one of the biggest and consistent problems. Do you think the huge amount of budgets that they need to be maintained is justified?

Do you know how wildlife is taken care of during oil spills? Have you heard about the mission of global NGOs such as IFAW (see www).

During the *Exxon Valdez* oil spill (Alaska, 1989) some NGOs took it seriously and treated some marine mammals as if they were to be saved at all cost, so that the companies would not pay less than the REAL damage they do cause (instead of "sacrificing" them using the argument that it is unreasonable to save some animals if their veterinarian treatment costs too much). Do you know how much would the REAL RESTORATION of the REAL ANIMALS affected by an oil spill could cost?

5.- Size of oil spills.

Point 3.1.1.1. on "The National Contingency Plan and The National Response Team", of the Main Page talks about the March 18th 1967 *Torrey Canyon* disaster. It struck Pollard's Rock in the Seven Stones reef between the Scilly Isles and Land's End, England. The oil leaked from the ship (31,000,000 gallons) and spread along the sea between England and France. Was it the largest? Would you measure the size of oil spills by size or area affected or by the value of the affected ecosystem?

The students could look at the different spills and describe/compare some of them in any of the databases in
http://oils.gpa.unep.org/facts/oilspills.htm

6.- Who should do the cleanup?

Greenpeace´s policy on oil spills opposes having volunteers in oils spill cleanups since it says they should be paid by the companies involved in the accident; that volunteers ultimately are benefiting them because it saves them money since volunteers are not paid.

Others think that only if mass movements take place, the authorities and companies realize how many people are really touched by the destruction of coastal and marine ecosystems and how much they may loose (in votes or in support from consumers) if people get outraged. It could be that even the judges, seen the reaction, become more ready to take seriously real compensation. For example, the amount of compensation covered by the international system (the 1969/1971 Brussels Convention on Liability and on the Fund) has been increased several times but only when there was straight and clear reaction against the insufficient amount fixed by the Treaty.

Which of those two policies would you recommend: no volunteers or massive participation in cleanups.

Spanish volunteers cleaning the oil from the Prestige, 2002.

7.- What happens in an oil spill?

When crude oil is spilled, it is first dispersed. Many other physical and chemical processes start immediately to take place. Since almost all the components of crude oil are less dense than water and insoluble in it, they float in the water forming a layer. The fractions of oil which are heavier than water sinks to the bottom of the ocean, where it can form a coat and destroy bottom-dwelling microorganisms and other live-forms. The most volatile components in the floating layer (around 25%) usually evaporate into the atmosphere. Wave action breaks up the less dense ones into droplets that are dispersed in the water. When they are near the shore, the droplets adsorb onto the suspended sand and silt particles and sink to the bottom. Offshore, the wind and waves whip the oil and form an oil-in-water mousse. The oil washed ashore and the one that stays near the surface of the ocean is gradually decomposed by bacteria and photoxidation. As the mousse breaks up, tar balls form and are washed ashore.

In some ecosystems, such as wetlands and sandy beaches it may take from two to three years to decompose. In rocky shores exposed to strong waves cleanup is quick. Since hydrocarbons are insoluble in water they reach the fatty tissues of marine animals. Fish can usually metabolize and excrete them, but shellfish remain contaminated and cannot be eaten for a long time. Birds and marine mammals are specially affected.

Oiled sea otters. **Courtesy of Mike Murray. Chief Vet from the Monterey Bay Aquarium**

Once these facts are explained, the students could be divided into groups so that they can put in place a contingency plan for an oil spill if an imaginary coastal zone is devised by the professor. An additional emergency drill could be added.

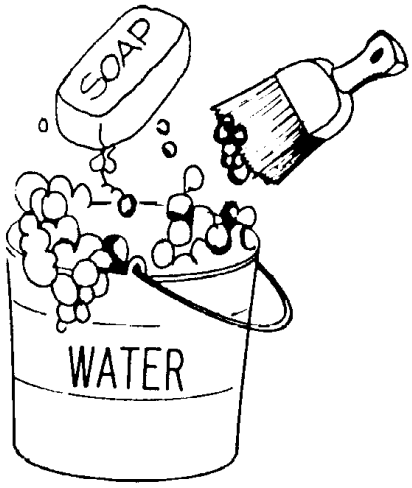
8.- Birds and chemistry.

Why are birds so much affected by oil spills?

Although many people think that they die because of the toxicity of oil in contact with their bodies, they really die of hypothermia (of cold temperature). Their insulation and buoyancy disappears. Why is it so? Have you ever heard about the chemical reaction called saponification and about the polar and nonpolar structures oil molecules?

The name saponification literally means "soap making". The root word, "sapo", is Latin for soap. The Italian word for soap is “sapone”. Soap making as an art has its origins in ancient Babylon around 2500 - 2800 BC.

Could you think of chemical reaction on our daily lives in which a similar process takes place? Did your grandmother tell you stories about the “lye soap”?



What is the chemical reaction of soap and oil? Is it similar to what takes place with the oil of the crude and the fatty acids which insulate birds from cold weather?

Courtesy of Mike Murray. Chief Vet from the Monterey Bay Aquarium

OIL SPILL PREVENTION AND RESPONSE: THE U.S. INSTITUTIONAL SYSTEM IN THE COAST OF CALIFORNIA

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