



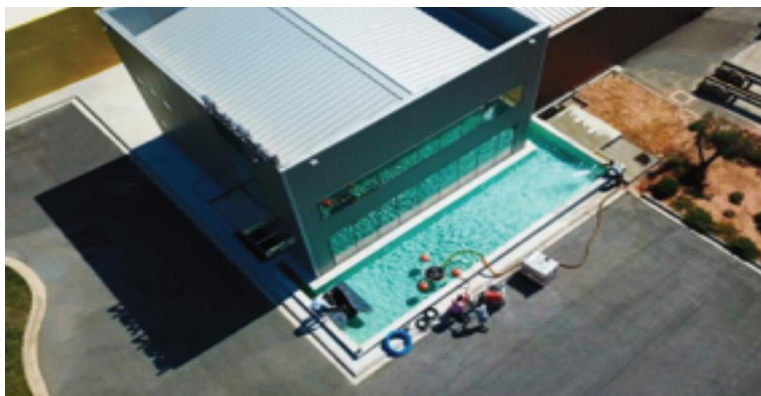
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**Marine Oil Spills:
Overview of causes, Prevention, Surveillance, and Response within East Med.**

Introducing new online technologies for interactive training



NGP Training Center has been developed by the Alliance of **Green Bow Maritime Ltd** and **New Naval Ltd** based on the collective experience of our companies, in the oil spill and marine casualties response.



NGP Training Center, has recognized the problems associated with implementing and delivering oil spill response training for personnel working in the relative industries.

Getting trainees and trainers to the same place at the same time can be challenging when work schedules are prone to change at short notice or safety priorities are jeopardized by the absence of personnel for training, like crews of vessels.

Introducing new online technologies for interactive training



Because we believe that training is a core value in every aspect of life our goal is to use modern technologies to offer training solutions that:

- will succeed to **save Money, Time and Resources**, normally spend for training
- will **provide easy-to-access training by Experts** thus enhancing prevention and response.



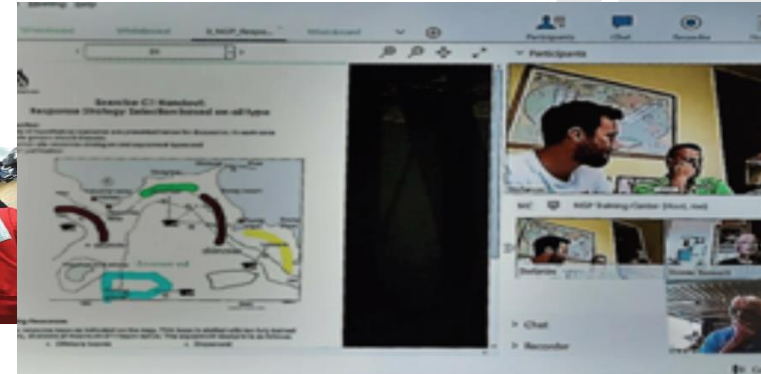
Introducing new online technologies for interactive training



The way we learn will not look the same as it does today.

With the rising transportation and infrastructure costs, Universities, Governments and private enterprise are all recognizing the enormous benefits of online training and learning.

Thus, the “classroom” for delivering the courses can be a laptop in the meeting room of a company with an internet connection and a TV screen connecting interactively teams and individuals around the World.



Live / interactive annotations on table-top exercise - Chat privately between each-other or the presenter,

Keep notes on the screen - Record the sessions for future reference

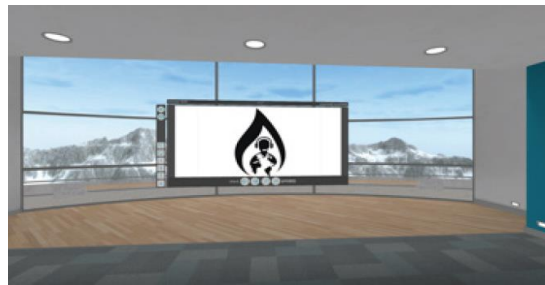
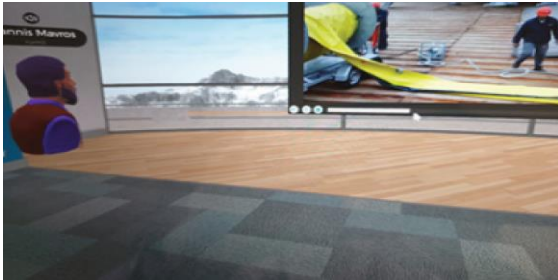
Participation in polling questions and tests online – Refresher Courses at any time, any place

Introducing new online technologies for interactive training



The future looks really promising and challenging at the same time since our intention is to change the present mindset for training and make another step forward as we are investing in ;

- Virtual Reality - Augmented Reality - Holographic telepresence

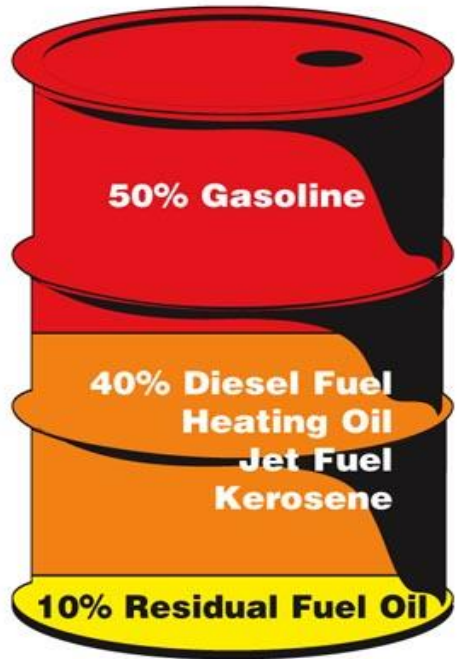


At the same time communication technology is advancing to provide internet around the World



Oil (Hydrocarbons)

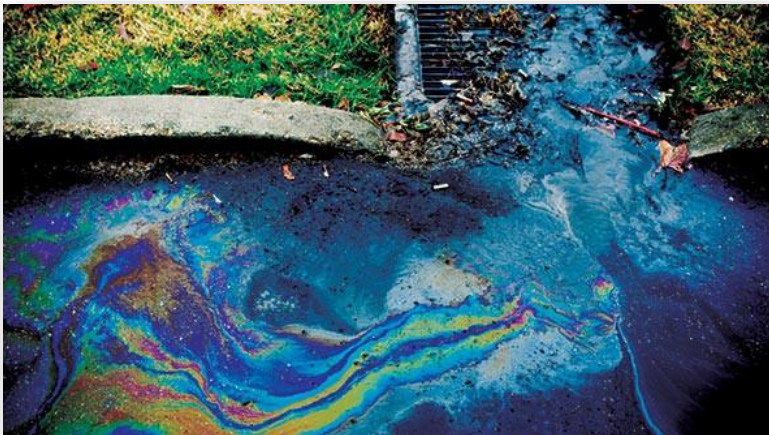
Typical U.S. Refinery Yield from
a Barrel of Crude Oil



- Oil has been used since antiquity.
- Various categories and sub-categories of oil:
 - Gasoline
 - Jet fuel
 - Kerosene
 - Diesel
 - Heavy fuel oil, etc.
- When leaked to the sea, oil products in general form a slick which spreads quickly aided by winds, sea currents and tide.

Sources of Marine Oil Pollution

1. **Land Based** (industrial and urban runoff) 37%
2. **Atmospheric** 9%
3. **Vessels** (operations and tanker accidents) 33% & 12%
4. **Natural Seeps** 7%
5. **Exploration & Production** (rigs) 2%



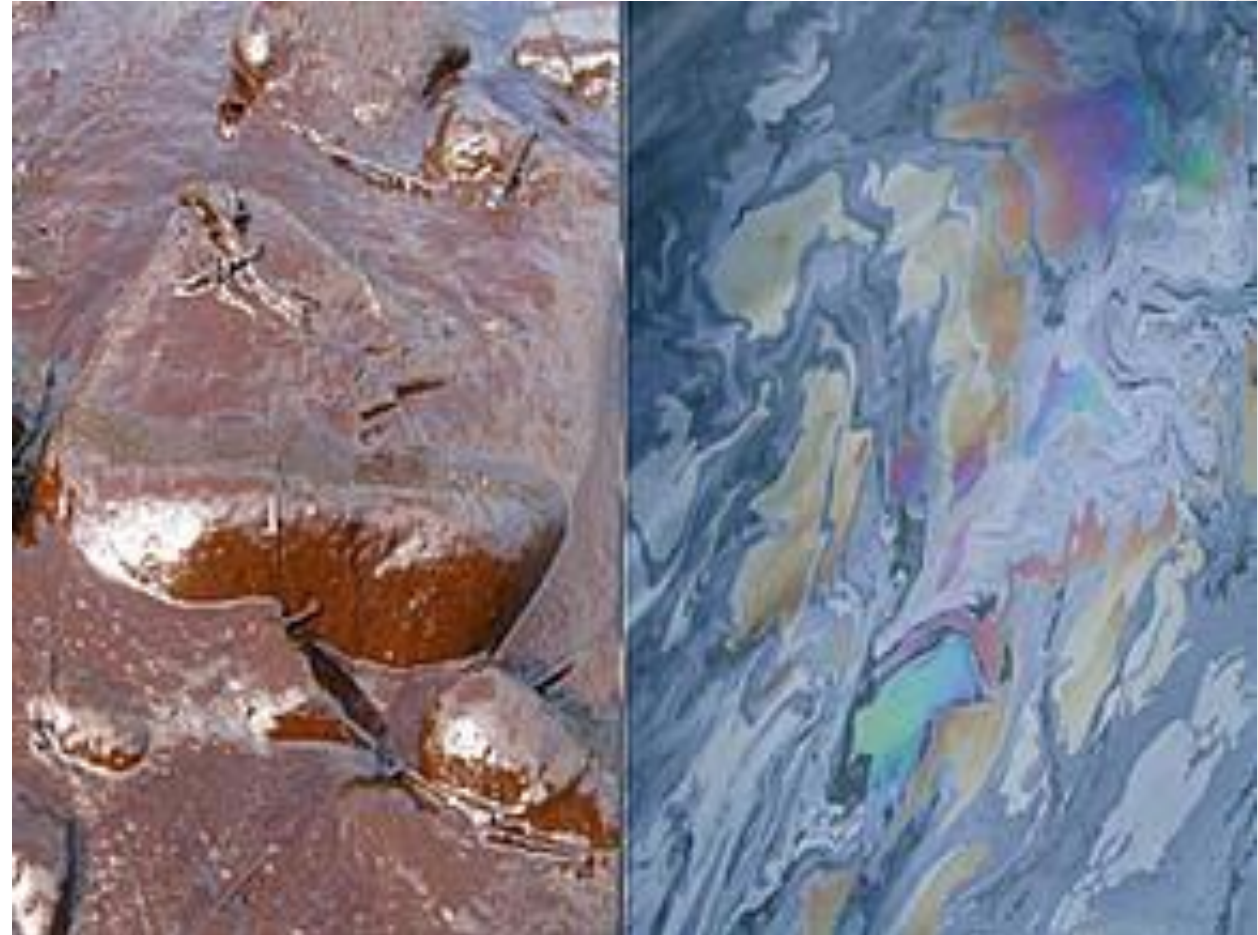
Pollution Sources: Offshore Rigs

1. Oil leaks from oil rigs
2. Explosions (blowouts) on rigs
3. Ship collisions with installations
4. Damage to the underwater piping



Persistence of Spilled Oil

- When considering the fate of spilled oil at sea, a distinction is frequently made between
- persistent oils
and
- non-persistent oils.





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Persistent Oil

- As a rule, persistent oils break up and dissipate more slowly in the marine environment and usually require a clean-up operation. Persistent oils typically include crude oils, fuel oils, lubricating oils and heavier grades of marine diesel oil. These oils pose a potential threat to natural resources when released, in terms of impacts to wildlife, smothering of habitats and oiling of amenity beaches.

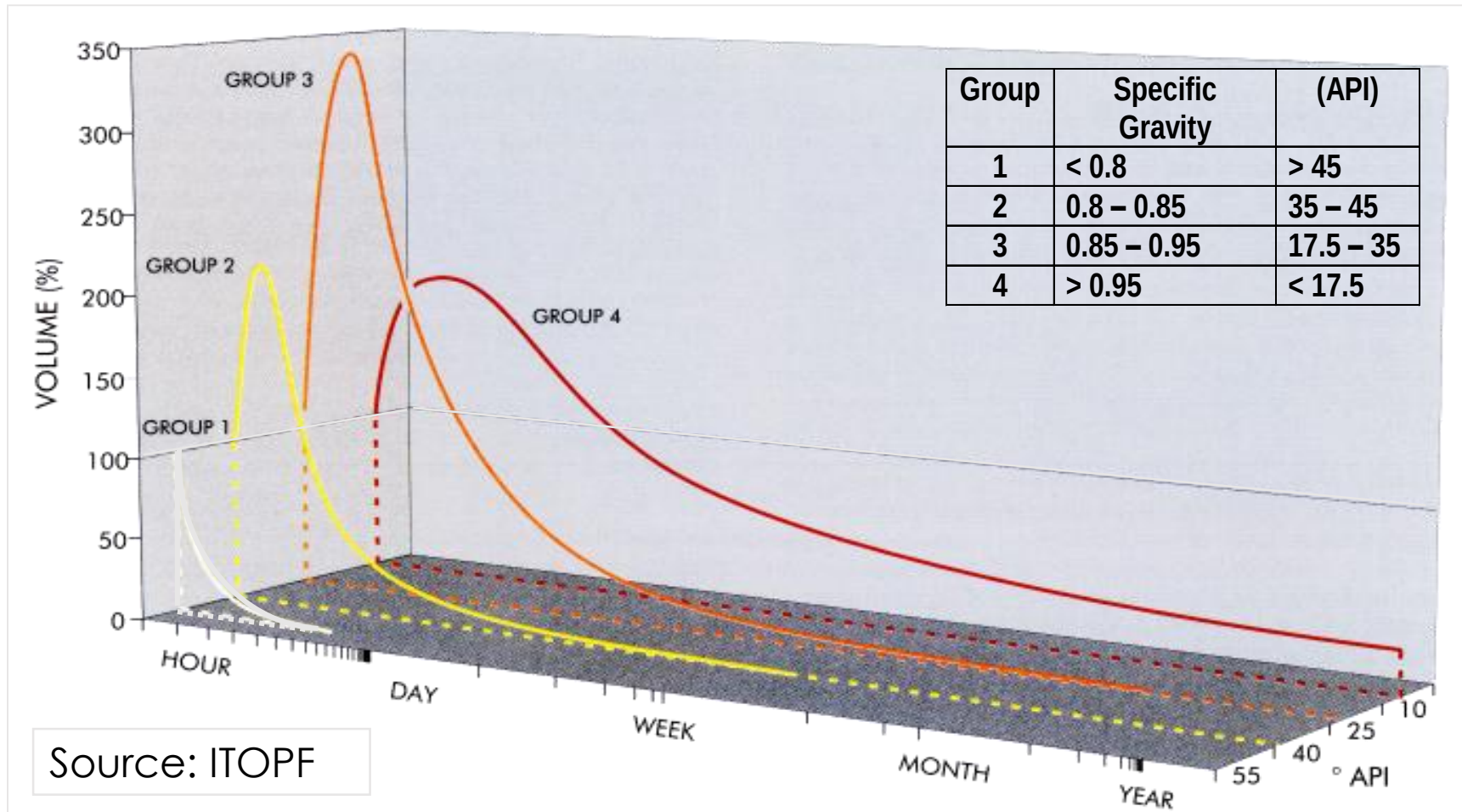


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Non- Persistent Oil

- In contrast, non-persistent oils will dissipate rapidly through evaporation. As a result, spills of these oils rarely require an active response. Non-persistent oils include gasoline, light diesel oil and kerosene.
- Impacts from non-persistent oils may include effects on paint coatings in marinas and harbors and, at high concentrations, acute toxicity to marine organisms.

Persistence of Spilled Oil



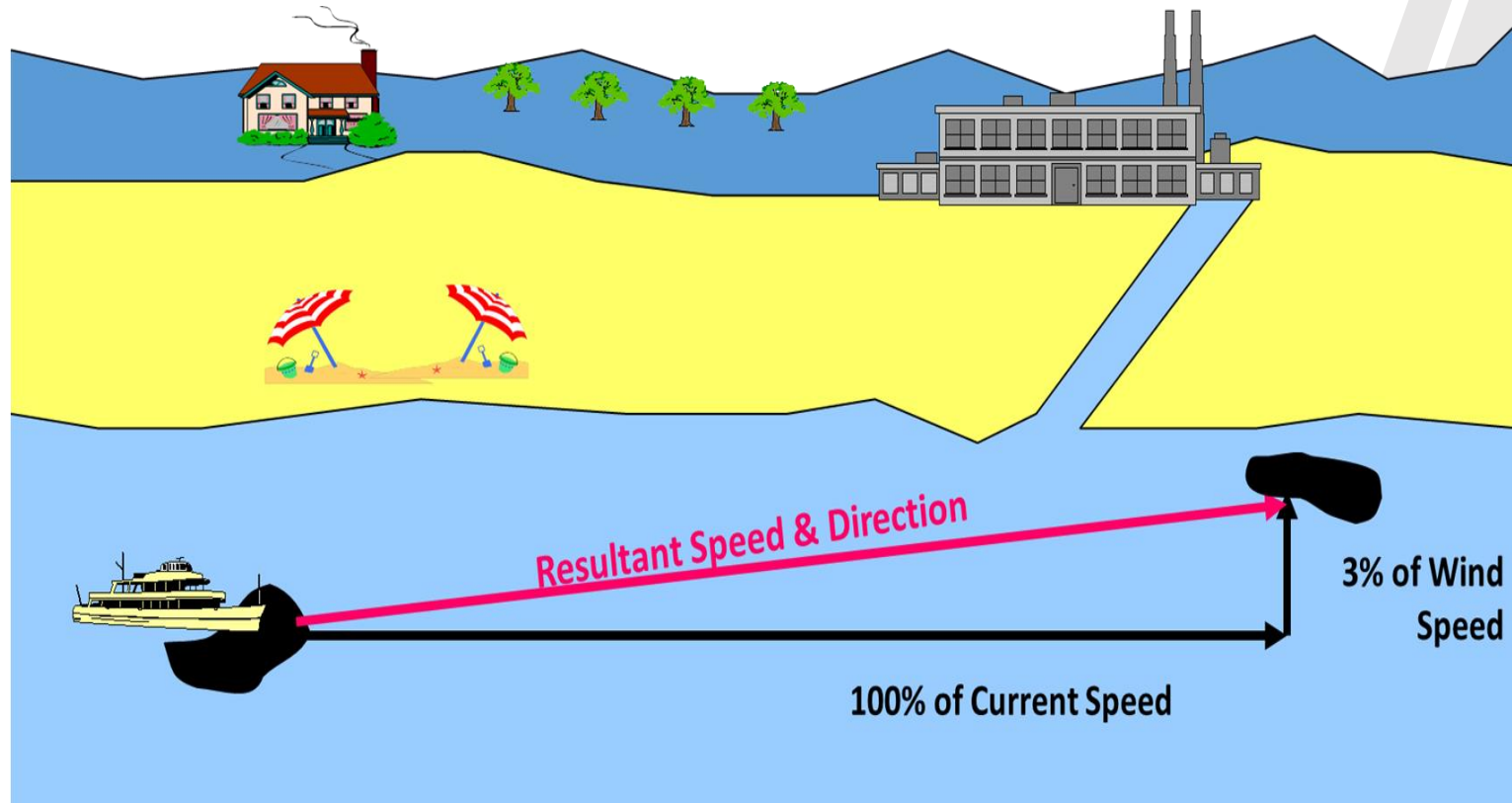
Behavior of Spill Oiled

- Oil spreads very quickly on water
- Forms thin layer
- Covers a large area
- High rate of spreading at first
- Rate gradually slows down



Movement - Rule of Thumb

- 100% surface current speed and direction
- Combined with 3% of wind speed and direction



Basis for Response

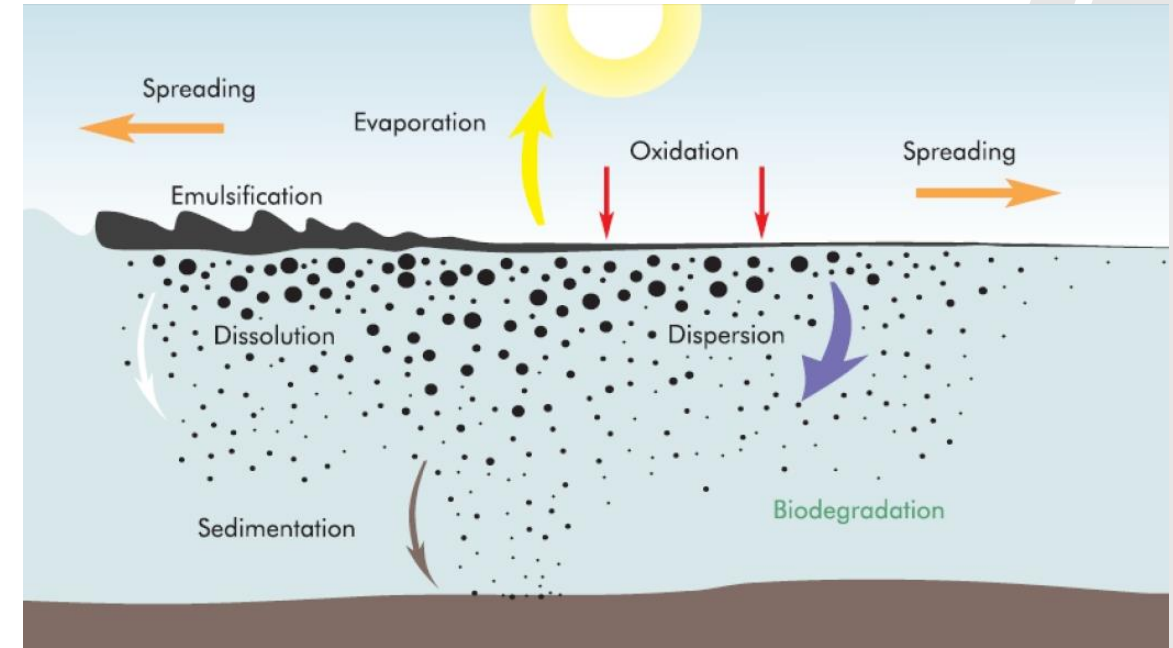
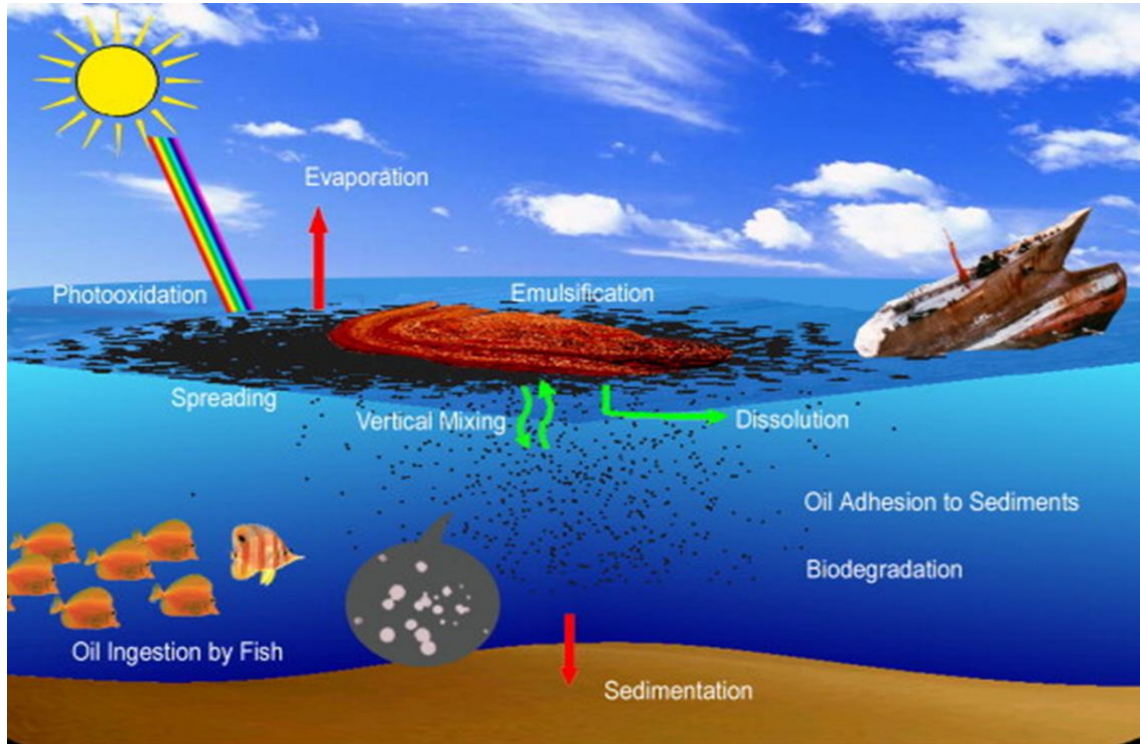


Time and the spreading process both detract from the efficiency of the response



Rapid response is vital for effective results

Combined Weathering Processes



1. Spreading

Spreading rate depends on:

- Oil properties
- Volume
- Temperature
- Wind velocity
- Waves and current



Factors Affecting the Impact of Oil



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- Type of oil and degree of weathering
- Biological characteristics of the area
- Geographic location
- Degree of oiling
- Oceanographic conditions
- Season
- Clean-up techniques

Effects On Coastal Activities

- Recreational activities / Tourism
- Industry
- Fisheries and mariculture

Effects can be classified as:

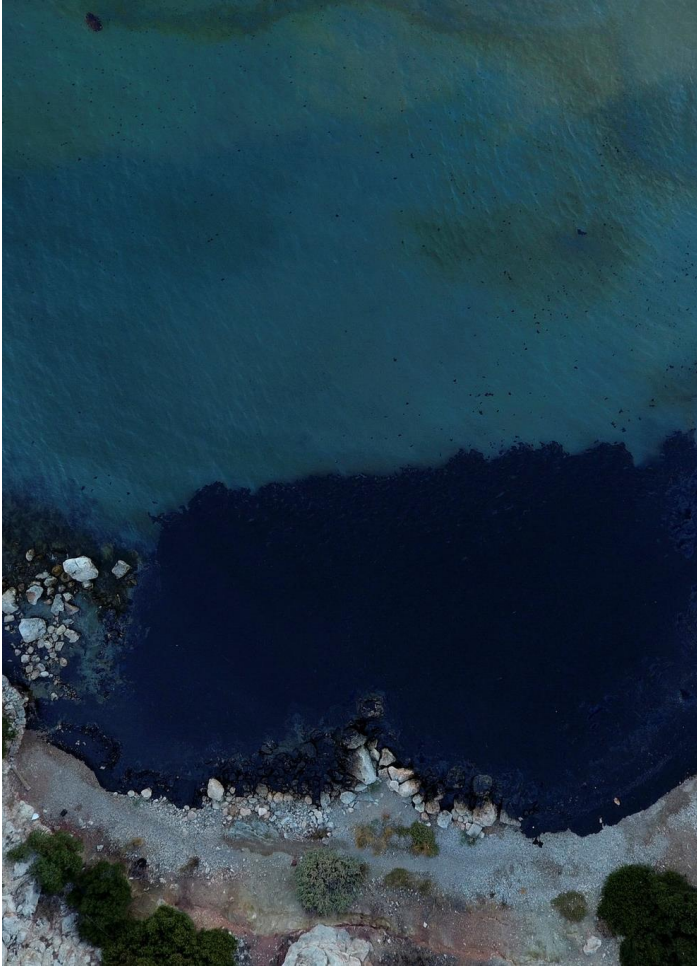
- Toxic effects
- Physical effects



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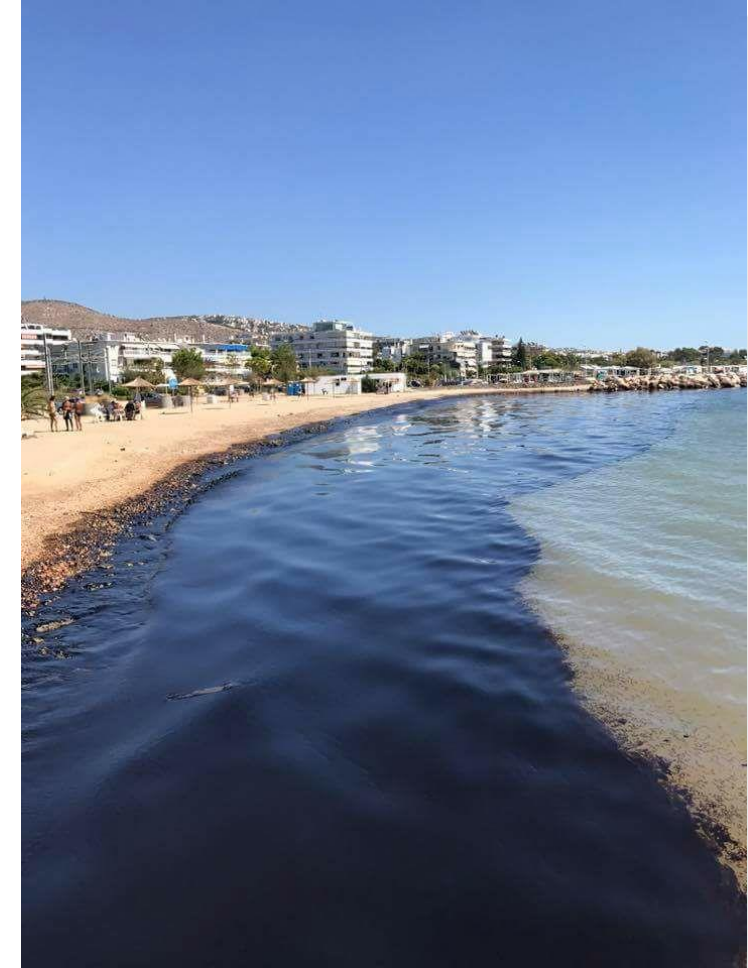


But in Greece there is a vital determining negative effect



**That of the importance of the
touristic activity into the
National Economy**

Athens Riviera (2017)



Contingency Planning

~~UNPREPARED~~



OPRC Convention 1990

International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990

- To develop national response systems
- To facilitate international co-operation and mutual assistance



OPRC 1990 Article 6 (1)



National and Regional Systems for Preparedness and Response

Each party shall establish a national system for responding promptly and effectively to oil pollution incidents. This system shall include as a minimum:

- A Competent **National Authority**, National operational **contact point**, an authority entitled to act on behalf of the state **to request or to render assistance**
- A National Contingency Plan

Why have a contingency plan?



"He who fails to plan is
planning to fail"
- Sir Winston Churchill

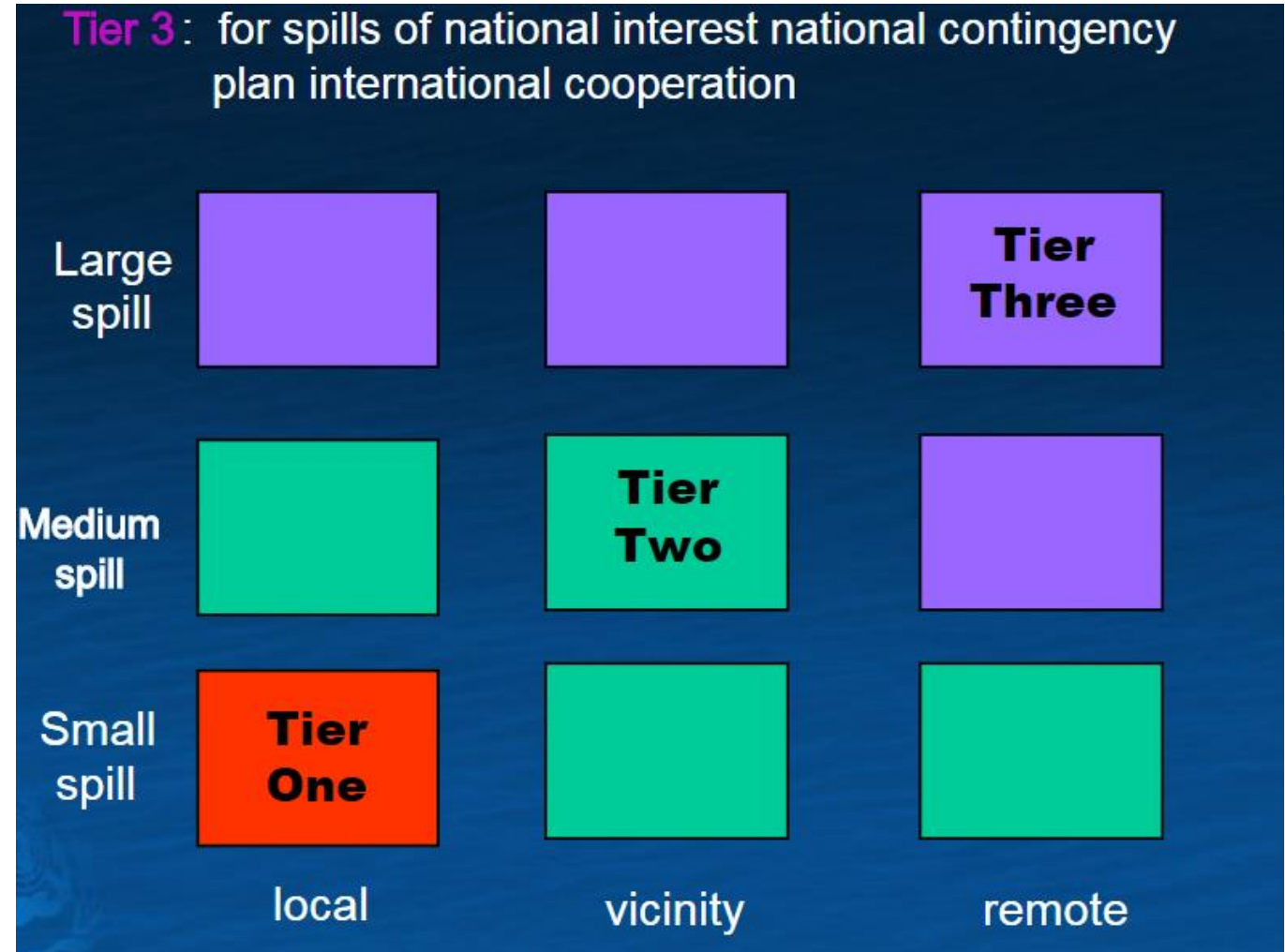
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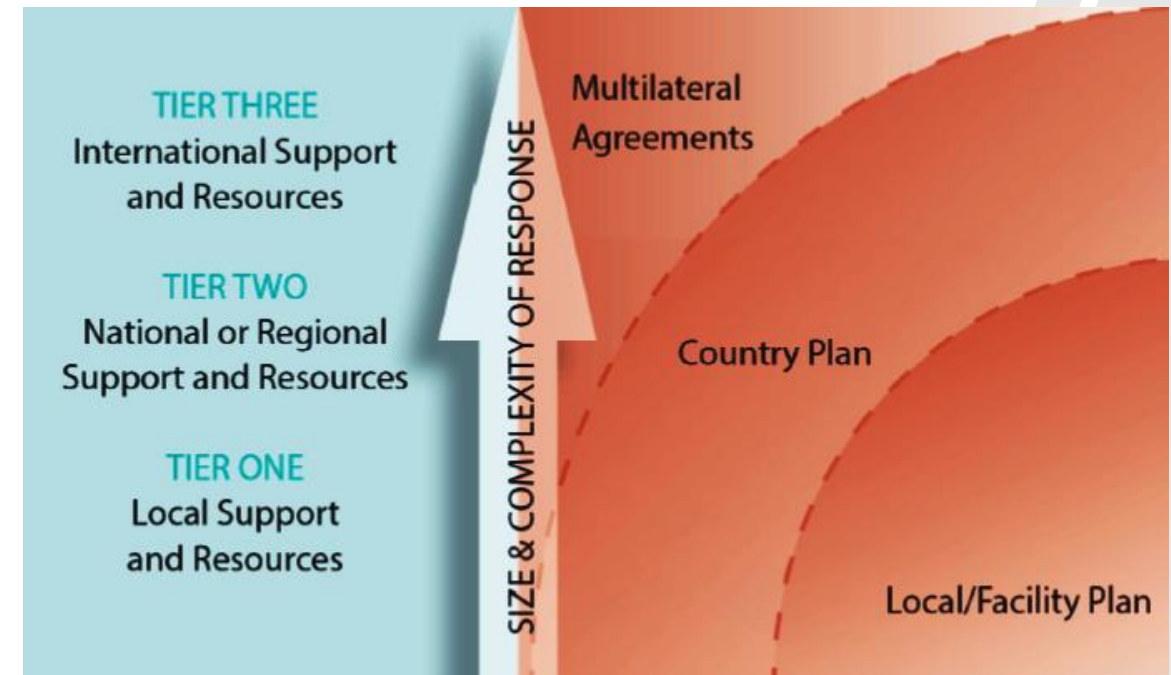
- Legal requirement (international, national, company policy)
- Defines the RISKS and prepares solutions and response measures in a calm, non-emergency environment free from pressure
- Prior liaison and organization before an incident occurs
- Agreed by all involved
- Identify competent individuals, equipment and other assets
- Increases confidence and skills of response teams, media relations
- Assess Gaps

Tiered Response

Tier Level = *Having the response capacity in place or identified in relation to response risk*



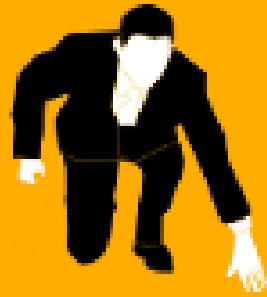
Levels of Response



Structure of a Contingency Plan

1. Risk Assessment
2. Policy or Strategy section
3. Operational Procedures and Technical Guidelines
4. Information Directory

+ System for revisions and updates



**KEEP
CALM
AND
BE
PREPARED**

Save



+



Response Strategies



Monitor and Evaluate

Dispersants



Contain and Recover

Protection



In-situ burning

Shoreline Clean-up

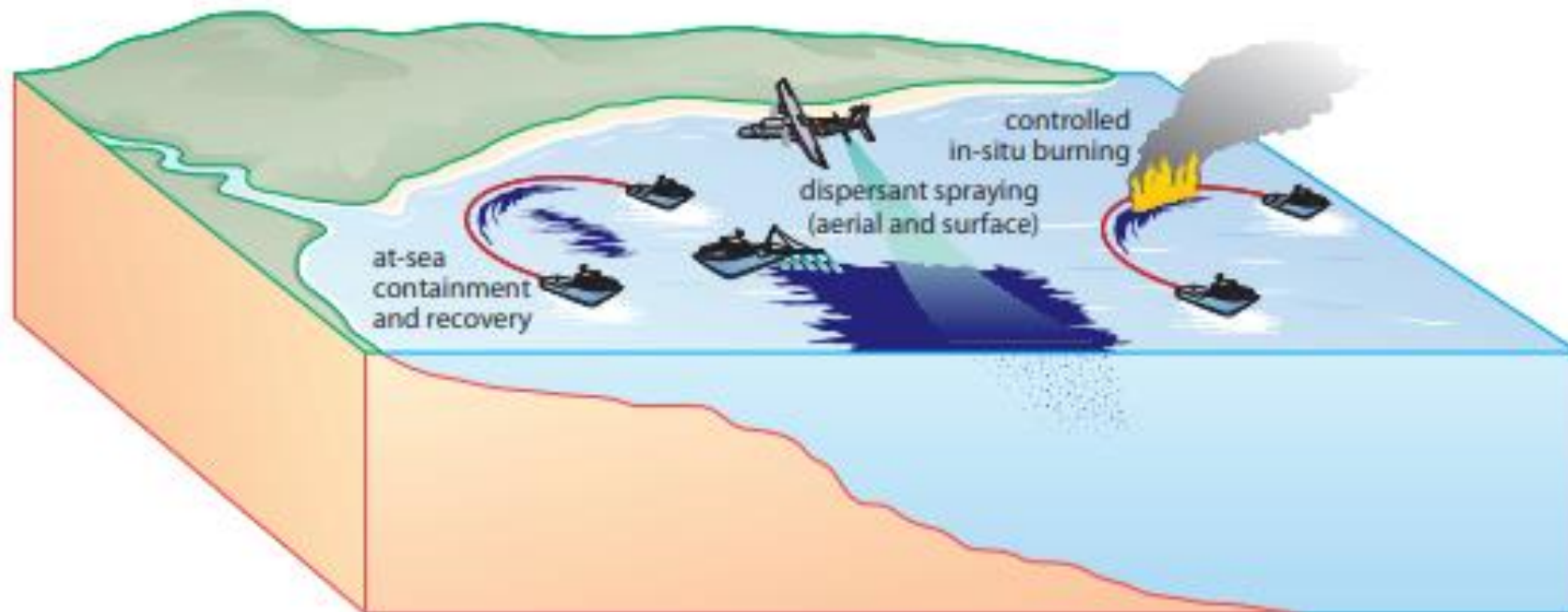


Response Operations

- # 20 On water / At sea strategies
- # 21 Completion of on-water/at sea operations
- # 22 Shoreline Response Programme
- # 23 Completion of Shoreline operations
- # 24 Waste management

On Water Objectives

- Reduce the volume of spilled oil to minimize the effects
- Protect sensitive and vulnerable resources at risk



Monitor and Evaluate

- Safety
- Natural weathering; the fate of the oil is a function of oil type and environmental conditions (winds, waves and currents)
- Monitor the movement, behaviour and fate of the oil
 - aerial surveillance and tracking
 - computer modelling forecasts
- Prepare to take appropriate action if it becomes necessary to respond (for example, if safety considerations improve or a change in the direction of oil transport)

Contain and Recover - Advantages

- Oil can be contained at source
- Reduces the amount of oil stranding on the coast, so reducing the amount of shoreline cleanup that is required
- Physically removes oil from the marine environment



Limitations

- Depends on weather conditions and sea state
- Depends on relative velocity of current to boom
- Depends on viscosity of oil
- Impossible to contain all oil with one line of booms except in very calm conditions
- Effective area coverage needs enough booms and vessels: small swath width
- Reduced capacity of “nameplate” recovery expectations of skimmers to 20 % (U.S.)

Limitations

- Historically poor overall success rate: 5 – 15%
- Heavy expensive equipment
- Experienced personnel
- Needs temporary storage facilities
- Further treatment or landfill for recovered oil
- Quantity may be 4 or 5 times amount of oil spilled due to emulsification

Chemical Treatment – Dispersants

- Objectives is to increase the surface area of the oil to accelerate biodegradation
- Success rate: 30%-60%
- Often quickest response option, particularly away from populated areas with support infrastructure
- Reduces wind effect on slick movement
- Reduces oil impact on birds and mammals
- Inhibits water-in-oil emulsions
- No need for oil storage or further treatment

Dispersants - Pre-Use Considerations



- Regulations/permission to use
- Effectiveness
- Environmental conditions
- Encounter rate
- Is the strategy pre-approved in the contingency plan?
- Logistics, including dispersant availability

Chemical Treatment – Dispersants

- Effectiveness depends on oil type and degree of weathering



Dispersants - Advantages

- Quick response
- Reduces the risk of:
 - shoreline oiling
 - potential fire hazard
- Reduces risk to birds etc.
- Inhibits formation of emulsions
- Less effort/support required compared to mechanical recovery due to reduced logistics requirements



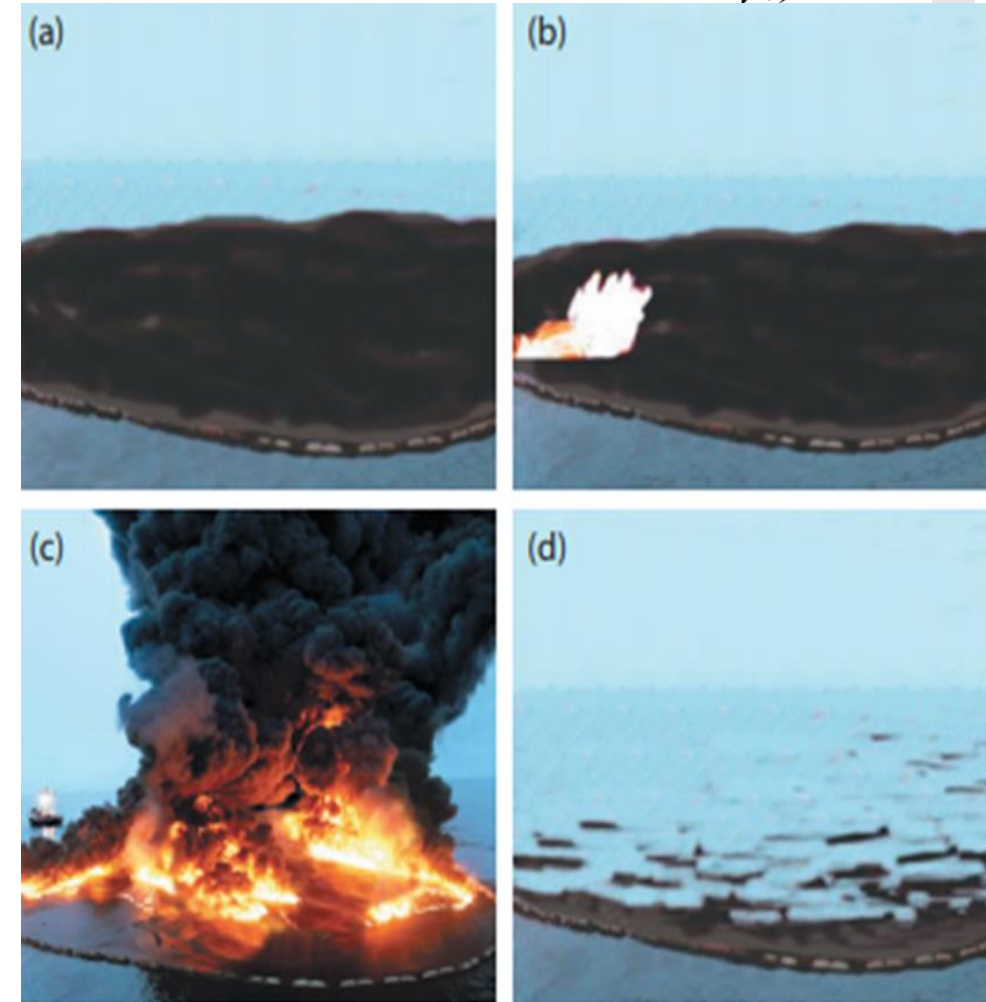
Dispersant - Disadvantages

- Oil is not removed - accelerates the biodegradation of the oil
- Potential temporary affects to the local marine ecology
- May upset other strategies – reduce recovery capability

Controlled Burning

Advantages

- Success percentage is 60%-90%
- Reduces shoreline oiling
- No heavy equipment
- No storage of oil or further treatment



Requirements for On Water Burning



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- Ignition source
- Slick thickness >
- Fire-resistant booms:
 - Water-cooled
 - Stainless steel
 - Thermally resistant

Limitations - 1

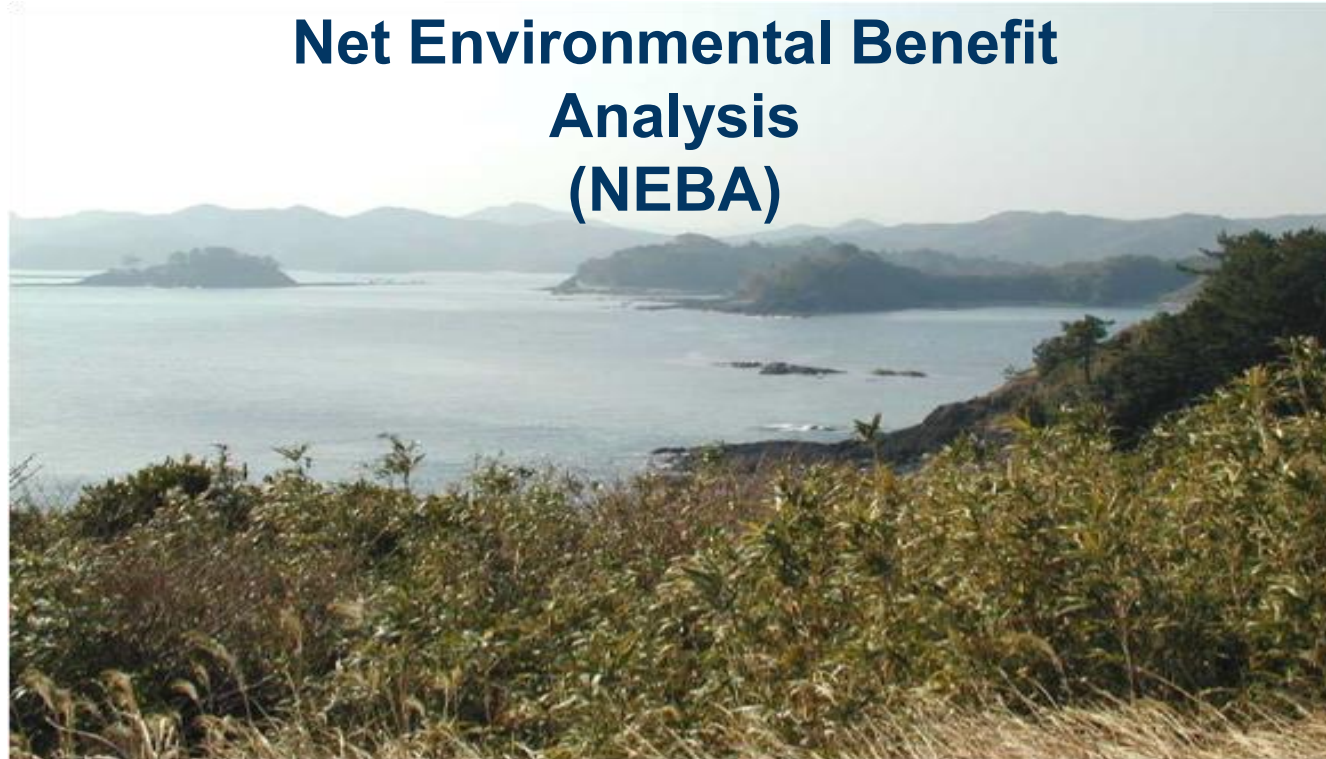
- Minimum oil thickness ~3 mm
- Fire-proof or water cooled booms
- Approvals
- Difficulty of ignition (gel igniter by helicopter)
- Cooling/Heat Sink effect from sea puts out fire
- Water in oil emulsions are difficult to ignite
- Depends on oil type and surrounding environment

Limitations - 2

- Residuals (tar balls) and partly burned oil have to be recovered
- Highly specialized tactic
- Risk of explosion (flash back)
- Transfer of contaminants to the nearby air
- Narrow window of opportunity
- Legislative requirements

Choosing Spill Response Options to Minimise Damage

Net Environmental Benefit Analysis (NEBA)



What is NEBA?



Net Environmental Benefit Analysis = NEBA

In the event that a spill occurs NEBA is a process put into place to minimize impact to the environment and the surrounding community.

What is NEBA?

- Balancing the advantages & disadvantages of different response options with the aim of minimising the overall impact on environmental and economic resources
- Common sense

What isn't NEBA?

- Not new
- Not complicated
- Not a means of calculating the net environmental or economic benefit (i.e. not a "cost-benefit" analysis)
- Not a scientific analysis

NEBA Considerations

Previous incidents have provided experience of:

- Time-scale for natural cleaning (no response)
- Ecological and economic effects of oil
- Efficiency and consequences of different clean-up strategies



NEBA in Practice

- Evaluation of the options includes:
- Reference to:
 - previous information on the area (contingency plans)
 - relevant oil spill case histories and experiments
- Consideration of threatened resources:
 - the shoreline sensitivity
 - ecological resources
 - economic resources

NEBA in Practice

***ALL PARTIES MUST ACCEPT THAT
SOME COMPROMISE MAY BE NECESSARY***

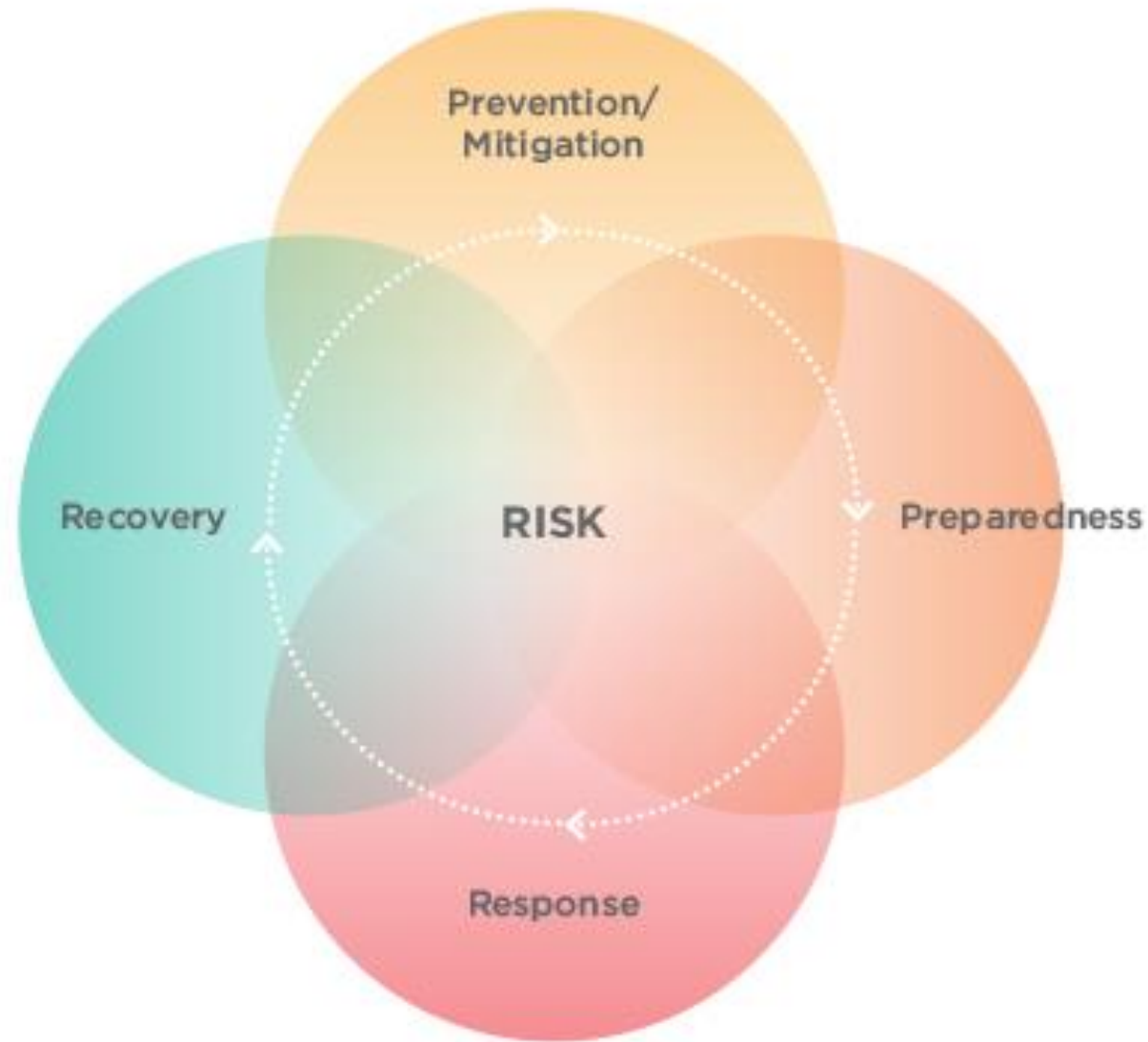
NEBA → SIMA

SIMA = Spill Impact Mitigation Analysis

- NEBA implies a “benefit” - whereas really it is a trade-off that evaluates the least harmful options
- “Environmental” implies ecological - whereas really it is the full range of socio-economic and ecological implications of mitigating actions

Sources of Oil Spill Prevention

- Legislation
- Contingency Planning
- Ship / Rig / facility arrangements
- Inspection process
- Training & competency of oil spill responders
- Environmental awareness
- Effective response equipment





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