New Horizons?

Dealing with Major Oil Spills from Non-Tanker Sources

Petroleum Association of Japan (PAJ)
Oil Spill Workshop 2011
Tokyo, Japan, March 2nd

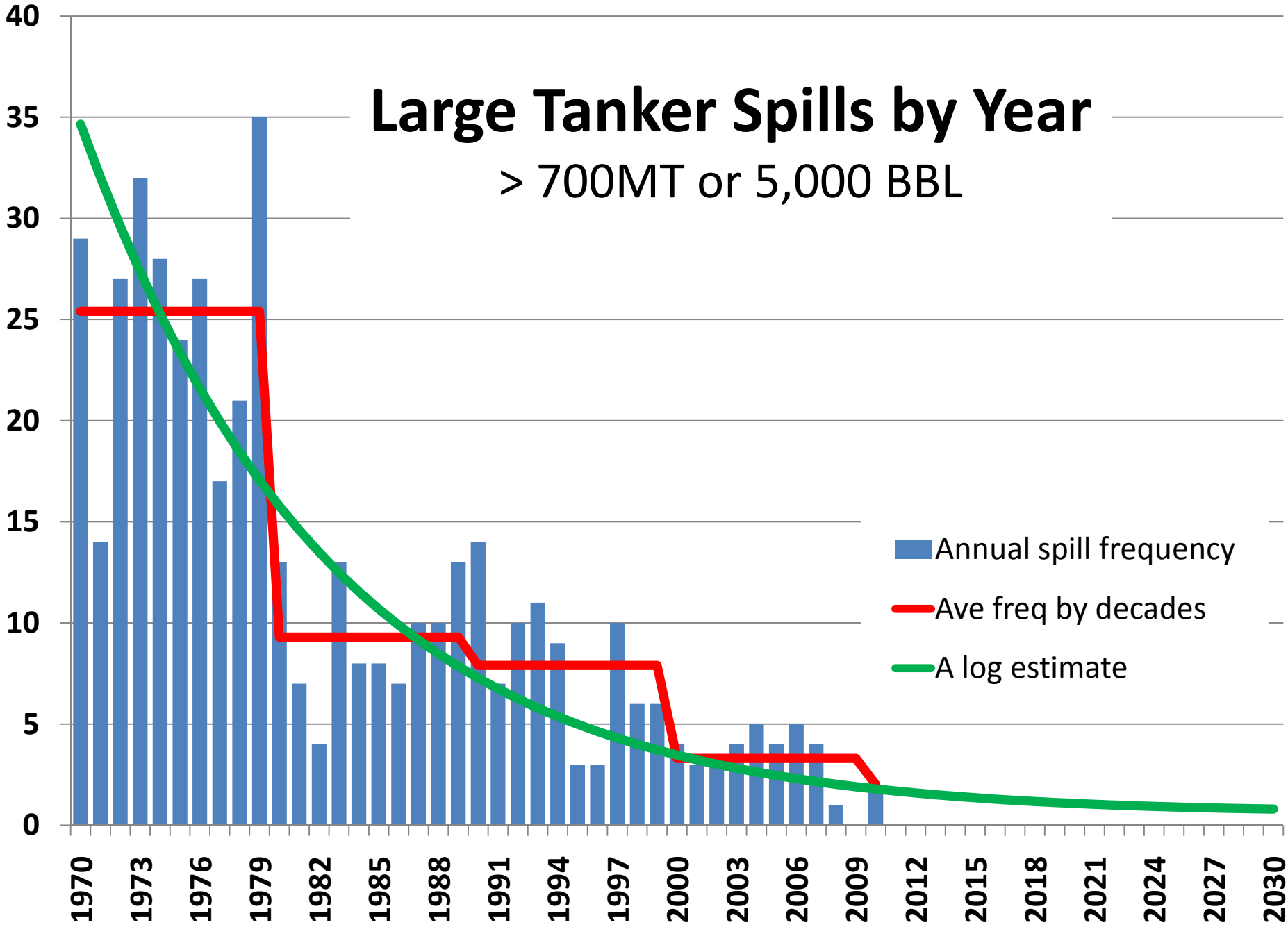
Dr. Michael O'Brien,
International Tanker Owners Pollution Federation, Ltd.

Outline

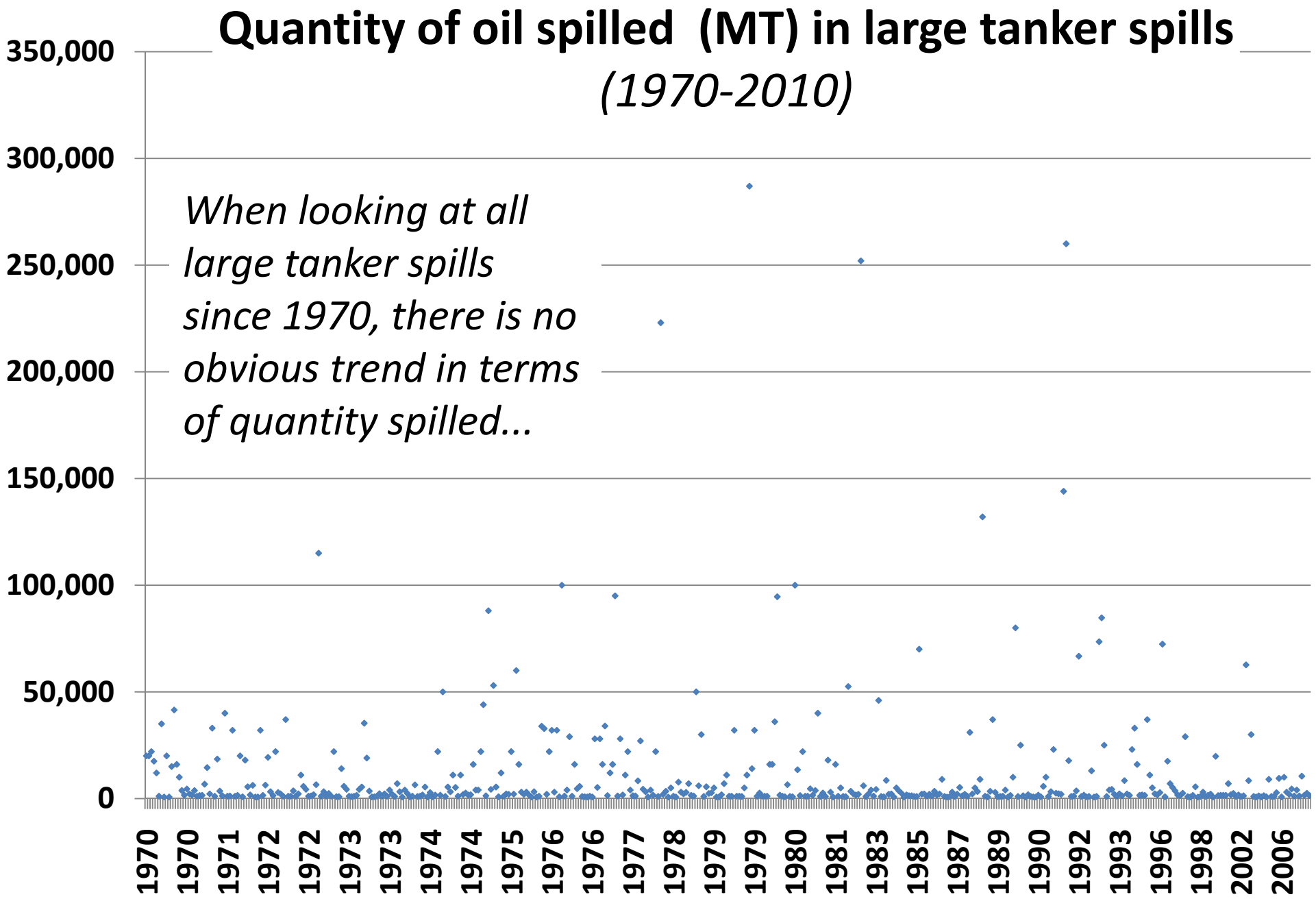
1. Tanker spill trends / ITOPF work with non-tanker spills
2. “Non-tankers” and “Major”/ “Large”
3. New dimensions with response to non-tanker spills?
4. Marine oil spill response: main issues, needs, R&D

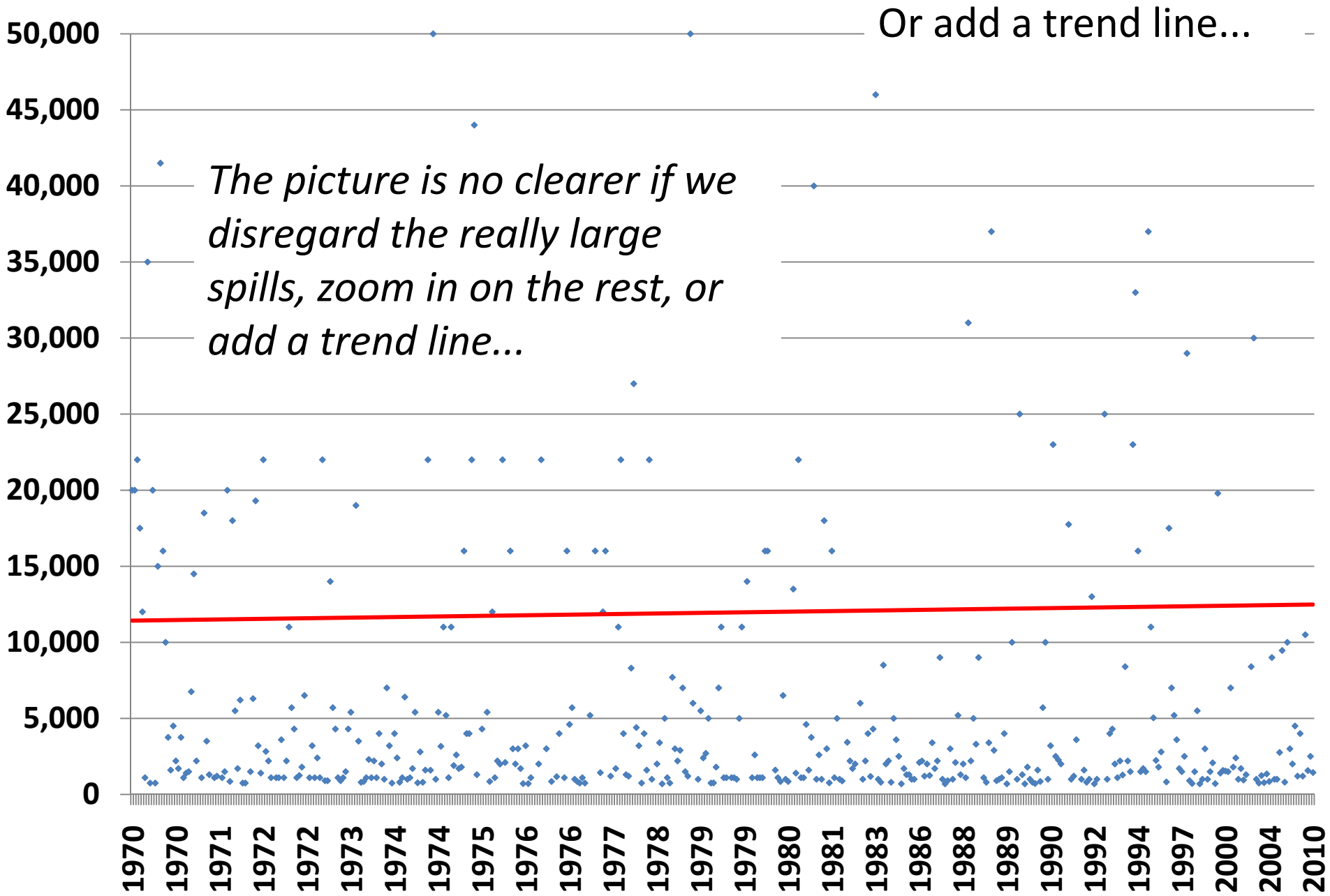


1.1 Trends in large tanker incidents?


Large Tanker Spills by Year
> 700MT or 5,000 BBL
40
35
30
25
20
15
10
5
0
1970
1973
1976
1979
1982
1985
1988
1991
1994
1997
2000
2003
2006
2009
2012
2015
2018
2021
2024
2027
2030
Annual spill frequency
Ave freq by decades
A log estimate

1.2 Trends in volume spilled in ‘large’ tanker incidents?


Quantity of oil spilled (MT) in large tanker spills
(1970-2010)
When looking at all large tanker spills since 1970, there is no obvious trend in terms of quantity spilled...
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
1970
1970
1971
1972
1972
1973
1973
1974
1974
1975
1976
1976
1977
1978
1979
1979
1980
1981
1983
1985
1987
1989
1990
1992
1993
1996
1998
2002
2006


Or add a trend line...
The picture is no clearer if we disregard the really large spills, zoom in on the rest, or add a trend line...
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1970
1970
1971
1972
1972
1973
1974
1974
1975
1976
1976
1977
1978
1979
1979
1980
1981
1983
1986
1988
1989
1990
1992
1994
1997
2000
2004
2010

1.3 Trends in ITOPF activity


Ro Ro's


Bulkers


General Cargo vessels


Container Vessels


Cruise ships/ pass. ferries

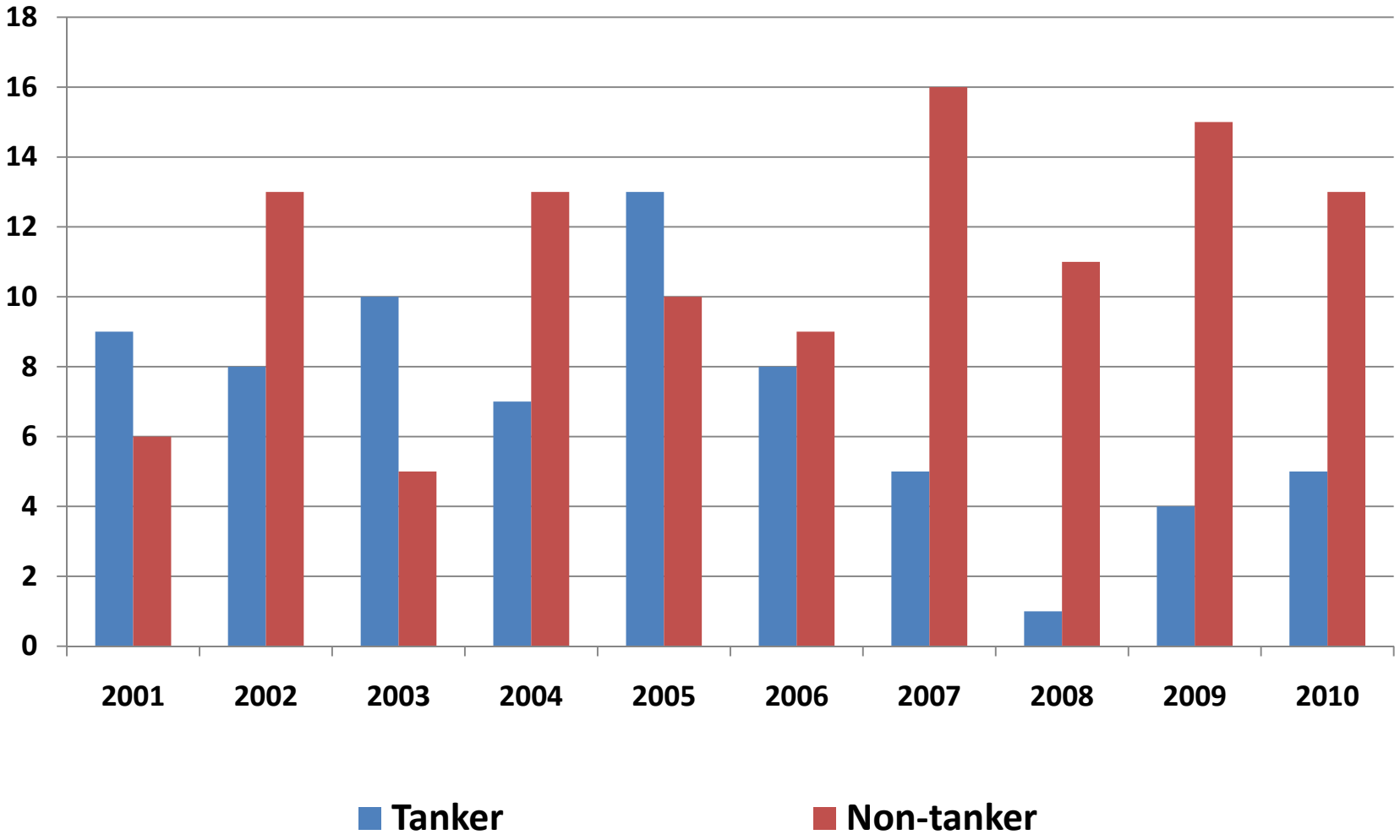

Car carriers


Fishing boats


Floating storage units

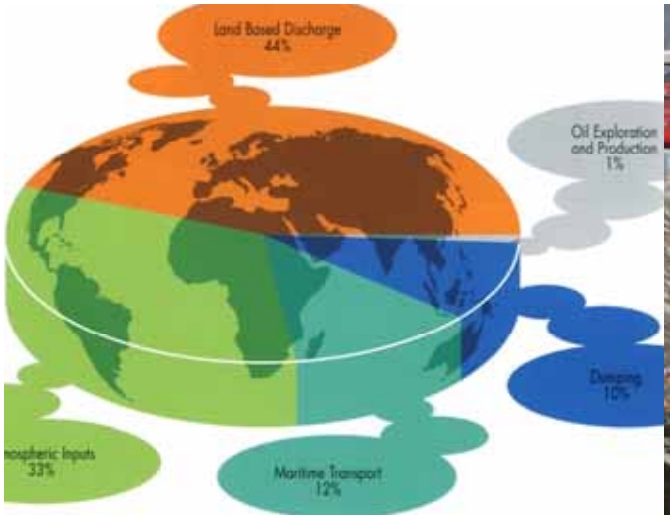

Reefers

ITOPF Site Attendance

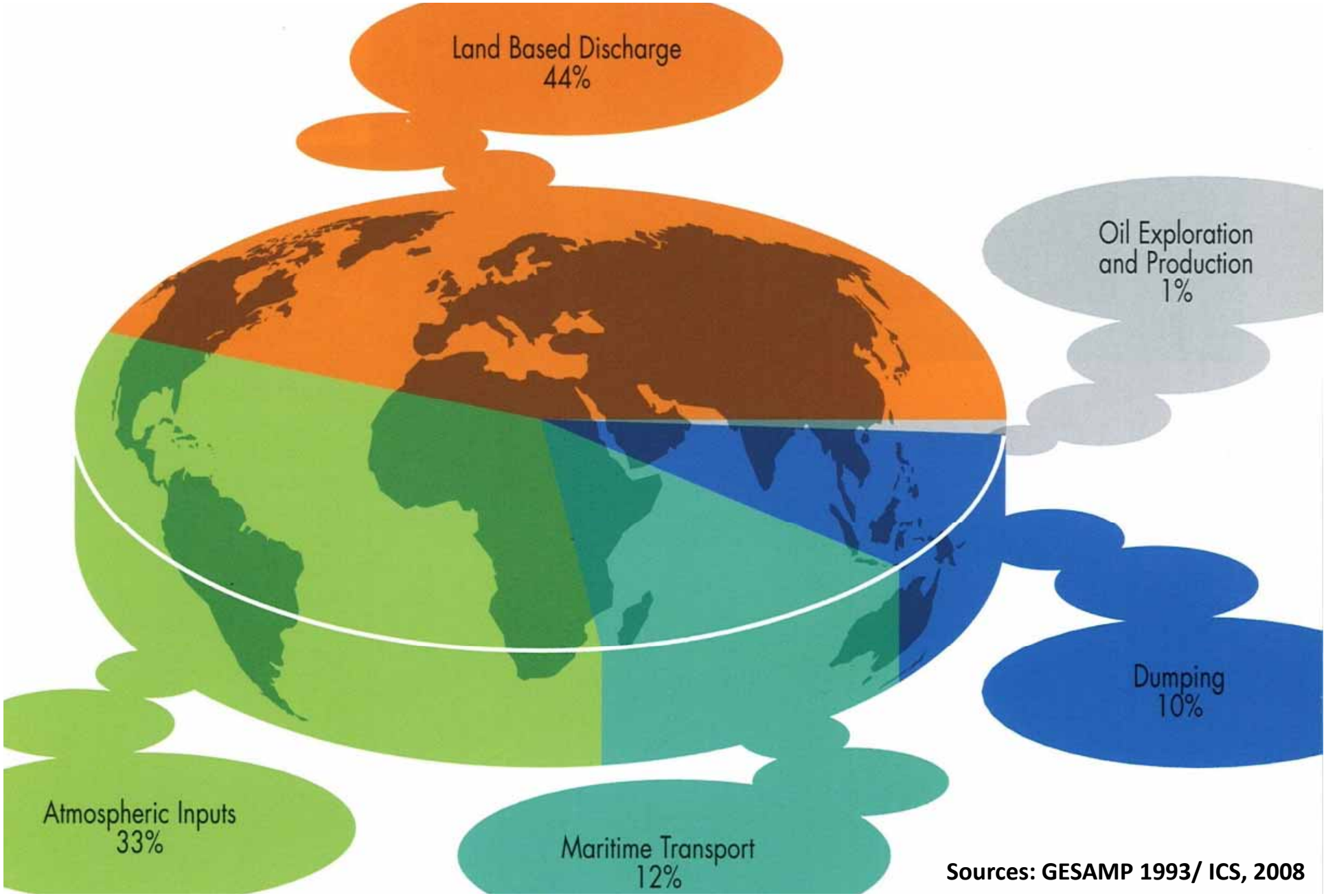


2.0 Definitions

“non-tanker”, “large”/ “major”



2.1 Overall sources of Marine Oil Pollution



Sources: GESAMP 1993/ ICS, 2008

2.2 Oil pollution from sea-based activities

Shipping

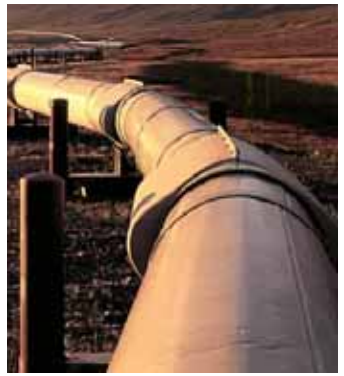
- **Tanker accidents**
- **Non-tanker accidents**
- Operational discharges
- Dry-docking/ recycling

Exploration & Production

- **Drilling/ rig accidents**
- Operational discharges

Other Sources

- **Facilities** (refineries, terminals,
- Fuel dumps from aircraft
- Small craft activity
- Natural oil seeps



2.3 Definition: “Major”/ “Large”

Impact is a function of:

- Quantity spilled *(ceteris paribus!)*
- Type of oil *(weathering persistence vs. acute toxicity)*
- Location & direction *(towards/ away from shore)*
- Sensitivity of location *(Environ., mariculture, commerce)*
- Spill profile *(instantaneous vs. on-going release)*

2 examples…

(Very) Large spill with no measureable impact

Immediate release of 5700 MT of white product

MINDORO c/w JORK RANGER

12/10/2010 off Netherlands


(Very) small spill with significant impacts
Slow, yet continual release of bunkers from sunken wreck
GOLD LEADER c/w OCEAN PHOENIX & No. 5 EISU MARU
5/3/2008 Akashi Strait (Kobe)

3.0 New Dimensions with Response to Oil Spills from Non-Tankers?


Photo: NOAA


Photo: BP


Photo: Internet

Non-Tanker (Vessel) Accidents

(Bunker spills from bulkers, Cont. vessels,...)

- Persistent fuel oils
- Oil release at depth often slow & continual
- Smaller worst case release scenarios

Non-Tanker (Vessel) Accidents

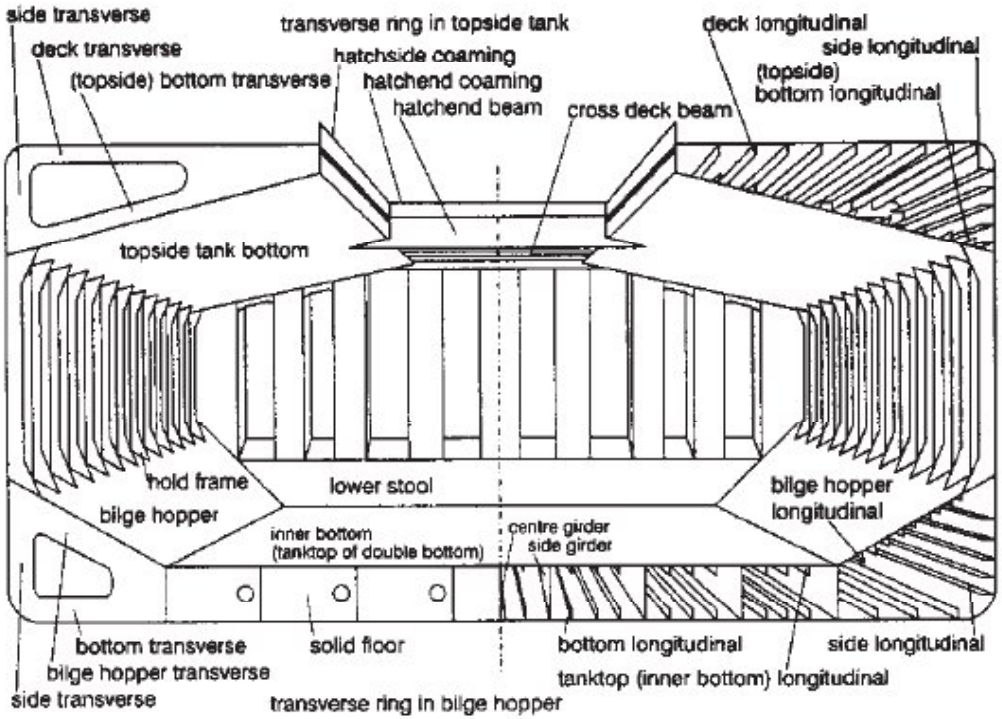
(Bunker spills from bulkers, Cont. vessels,...)

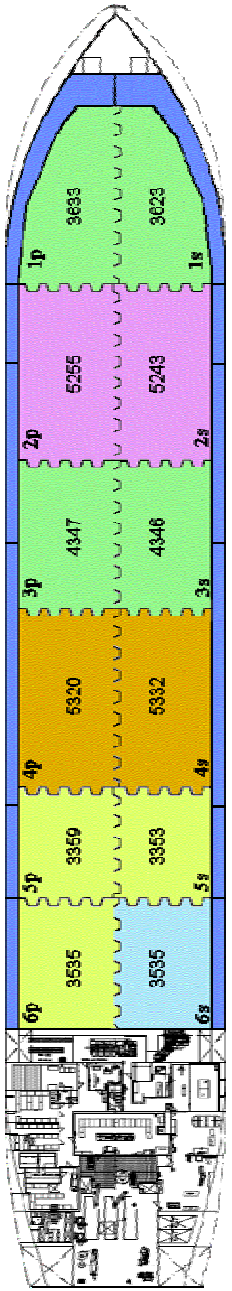
- Persistent fuel oils
  - *Large spills tend to be HFO (diesel stored in smaller tanks)*
  - *HFO always requires response if oil strands*
  - *HFO evaporates less, produces more waste...*

Non-Tanker (Vessel) Accidents

(Bunker spills from bulkers, Cont. vessels,...)

- Oil release at depth slow, continual, long
  - *Multiple small tanks, piping, internal structures*
  - *Smaller bulk quantities to target in recovery ops*





Non-Tanker (Vessel) Accidents

(Bunker spills from bulkers, Cont. vessels,...)

- Smaller worst case release scenarios
  - *Overall F.O. capacity much lower than with tankers*
  - *BUT, tanker might loose only one tank...*

Rig/well releases

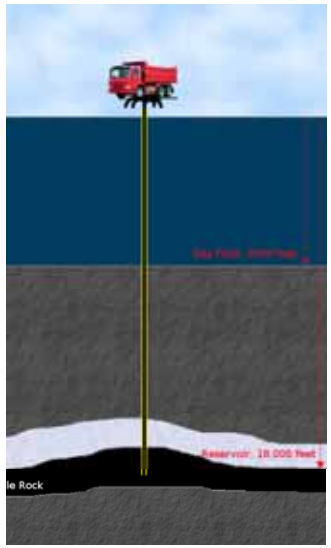
- More complicated surface activity
- Oil release at depth **under pressure**!
- Much larger worst-case release scenarios
- *fixed location and known oil type*

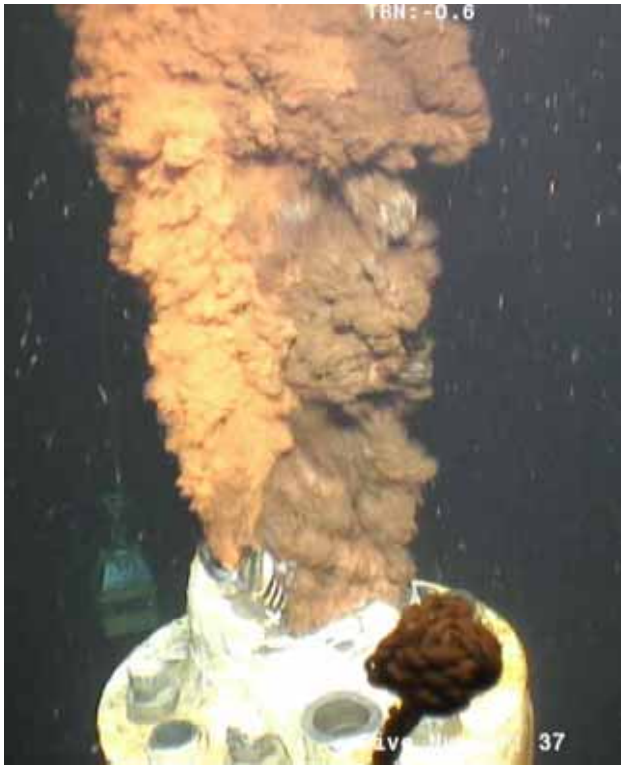
Rig/well releases

- Complicated surface activity
  - *Hindrance to recovery/ dispersing ops.*
  - *H&S issues with surface ops in oil*

Rig/well releases

- Oil release at depth **under pressure**!
  - *Sub-surface dispersion/ plumes*
  - *Opportunities for dispersant injection*





Rig/well releases

- Much larger worst case release scenarios
  - *Tanker capacity vs. oil reservoirs...*
    - → *DWH: 87 day @ 7,500+ MT/day = 662,000+ MT*
  - *Potential scope for in situ burning*

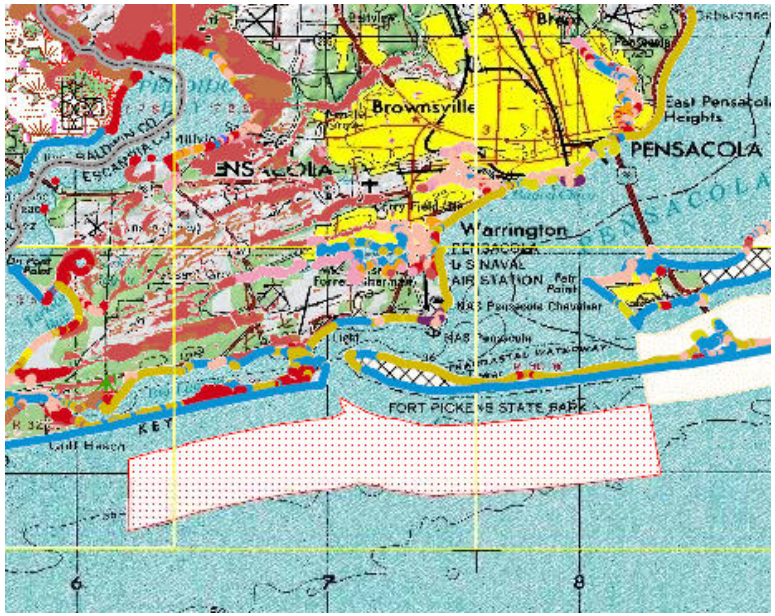
Photo: Resolve Marine Group

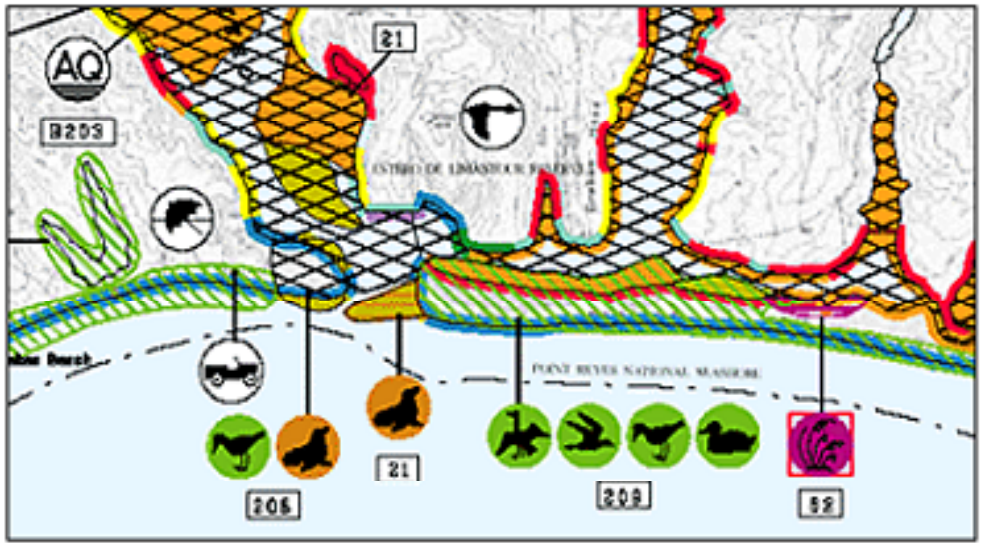
***DWH Flow Rate* Technical Group (FRTG)**

	BBL	**MT**
total	4,900,000	662,181
days	87	87
daily	56,322	7,611

Rig/well releases

- *Fewer site variables (fixed location and oil type)*
  - *Oil behaviour is known (pre-selection of equipment)*
  - *knowledge on local currents, sensitivities...*
  - *Plans, responsibilities known*





Shorelines on ESI maps are color-coded by sensitivity to oil. Symbols mark localized areas for biological and human-use resources.

Shore-based/ pipeline releases

- Response
  - *More likely to include shoreline clean-up*
  - *Containment on rivers especially problematic*
  - *Sub-surface release possible (with pipeline)*
  - *Buried oil on land may be an important issue*
  - *Facility losses more likely to be refined products*
- Large worst case release scenarios
  - *Storage tank capacity vs. probability of reaching water...*
  - *Terminal losses very similar to ship accidents at berth*

4.0 Marine oil spill response: Main issues, Preparedness, R&D

Basic Elements of Oil Spill Response

- Stop outflow
- Deal with floating oil
  - Dispersants
  - Contain & collect
  - Monitor (evaporation/ drifting)
- Shoreline clean-up
- Waste management

Key Issues

Always the same thing...

- Adequate planning
- Regular training & exercises
- Meaningful, timely, dependable communication
- Efficient use of appropriate equipment and materials
- Environmentally sound and economic waste disposal
- Objective damage assessment

R&D topics *for all marine spill work*

- Real-time tracking (visual and remote) of slick **thickness** & **movement**, rather than modelling
- Increased skimming efficiency & encounter rates in rougher seas (i.e. more oil & less water)
- More accurate measurement of operational success, e.g. MT "pure oil" delivered by recovery units, burned, dispersed, etc.
- R&D on effects of large/ underwater dispersant use
- More integrated resource tracking and communication
- Greater availability of environmentally sound oil recycling opportunities

Things to avoid

- Reliance on complicated procedures/ machinery
- High expectations for “magic” chemicals/ solutions
- Inventions proposed at time of incident
- Inefficient use of materials
- Political meddling
- Doing to be see doing...



Future Issues

Between spills...

- Keeping intelligent responders adequately occupied
- Bridging financial gap
- Keeping ever-more sophisticated equip. Maintained

5.0 Conclusions

In all spill response work:

- Consistently do what we already know how to do.
- Project the correct, confidence-inspiring image of professionals at work to the public and politicians
- Promote productive, balanced, spill-specific R&D
- Base decision on the balance of true cost with true gains *(e.g. carbon neutrality).*
- Maintain/strive for scientific and technical integrity