

OCEAN USERS NOW AND THE FUTURE

*“Prediction is very difficult
especially about the future”*

Niels Bohr



1. Fishing



Fishing expected to change – some examples:

- stock depletion forces fishing to more distant/deeper grounds;
- closure of seabed to bottom trawling;
- expansion of aquaculture – now 50% of consumed fish;
- fuel prices may offset distant fishing;
- ocean change affecting stocks.

Trawled seabed & cable damage Sources:
NIWA & Seaworks/Transpower

2. Shipping



Vessels off Singapore 2009, with others in international waters where cables damaged by anchors.

Risk from shipping will vary with

- expansion merchant fleet – 40,000 ships & 880 M dwt in 2005: 43,000 ships & 1 B dwt in 2007;
- trade routes respond to global economy, e.g. ore from Australia, Brazil for China's expanding steel industry or ships lay-up under present downturn.

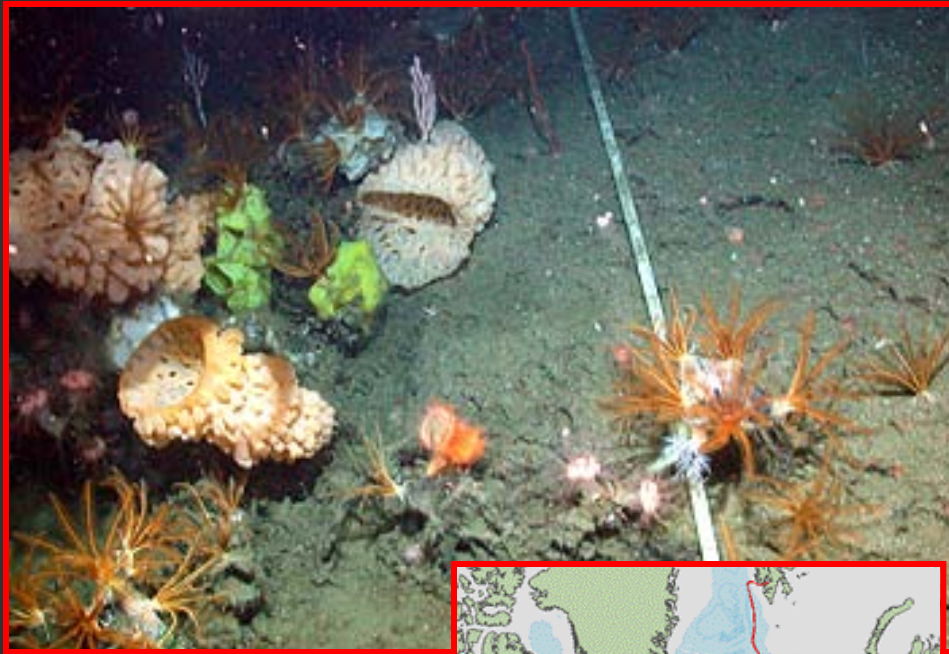
3. Offshore renewable energy



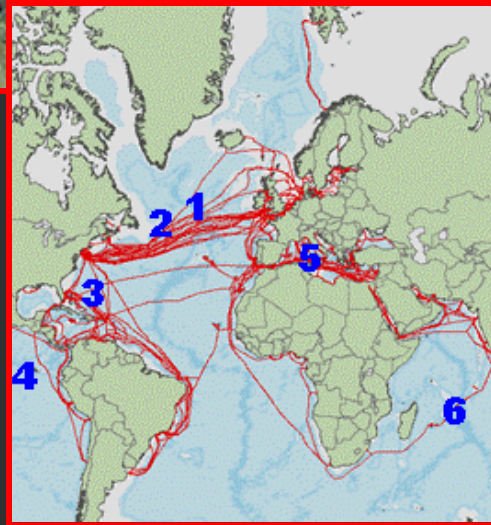
- more energy projects (wind, tide & wave power) in coastal seas;
- such changes reflect need for cleaner & more secure energy supply & to meet demand;
- increased congestion of the continental shelf seabed – *Ocean Sprawl*

Offshore wind farm, Middelgrunden, Denmark. Source © to LM Glasfiber.

4. Marine Protected Areas



Cable off Monterey Bay. Source: © Monterey Bay Aquarium & Research Institute.



- Areas of national waters, but also of high seas, are either planned to be or are protected;
- protection may involve regulation of cable activities, but that must be viewed in the context of UNCLOS;
- cables have a neutral to benign environmental effect.

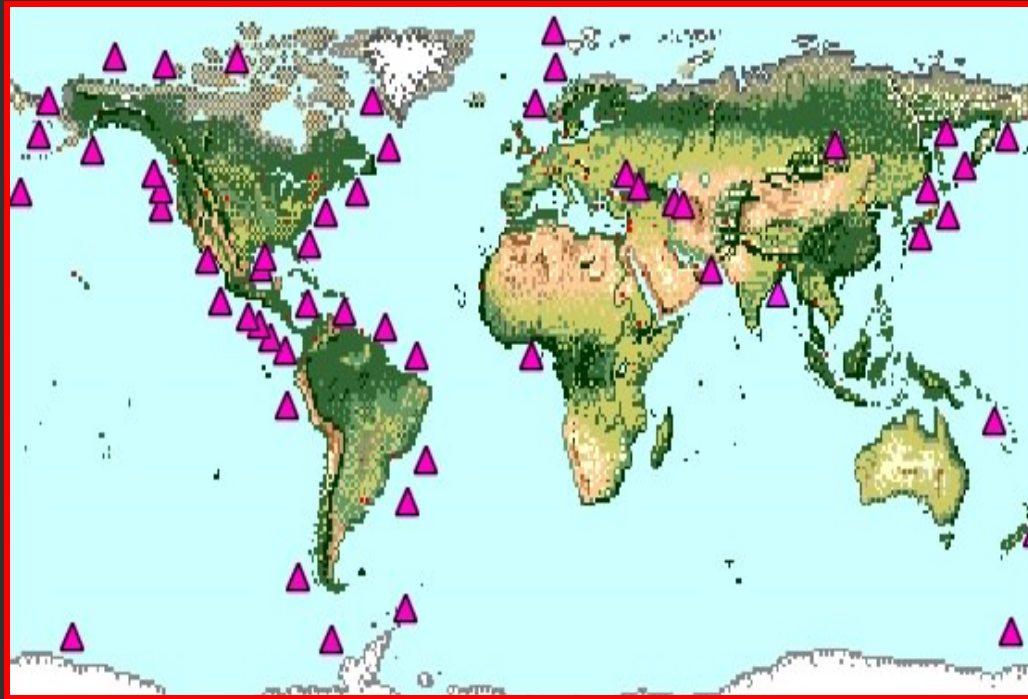
Protection - a case study of complexity



Blocks dropped near Sylt Outer Reef.
Image Greenpeace.

- Sylt Outer Reef, Germany, part of *Natura 2000*, MPA network;
- trawling continued near reef;
- conservationist dropped 150, 2-3 tonne blocks in trawlers' path;
- close to fibre-optic cables.

5. Hydrocarbon exploration/production



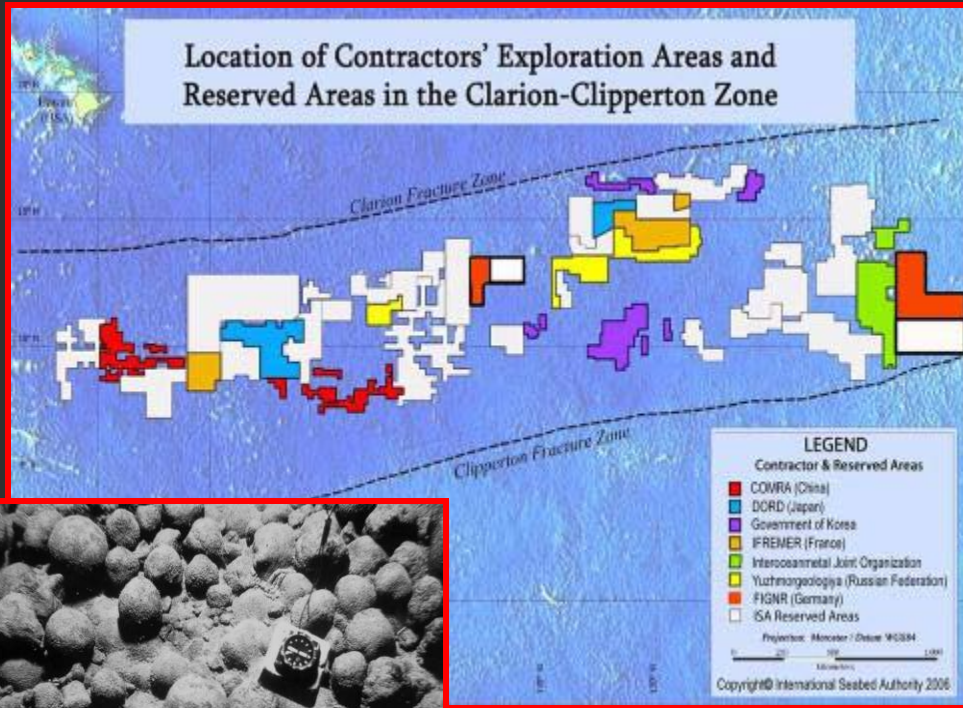
Some locations of methane hydrate deposits. US Navy.

Oil & gas supplies inadequate & demand may exceed accessible sources by 2015.

- More offshore production + exploration into deeper water;
- methane clathrates possible alternative;
- extensive deposits of these ice/gas mixtures on continental shelf/slope.

6. Offshore minerals

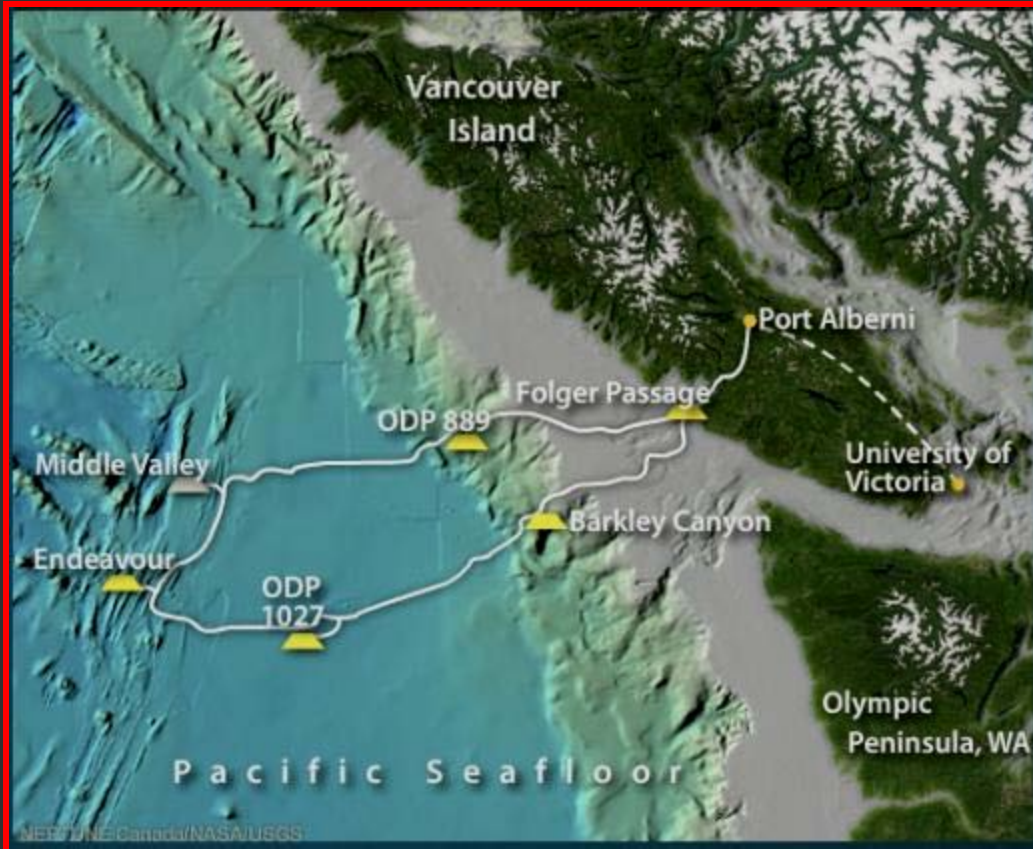
Onshore deposits declining or uneconomic - explore ocean.



Polymetallic nodules with copper, zinc, nickel & manganese

- sand/gravel, diamonds & other minerals mined in some coastal waters;
- interest in deep ocean for polymetallic nodules, metal sulphides;
- high seas minerals regulated by International Seabed Authority via UNCLOS.

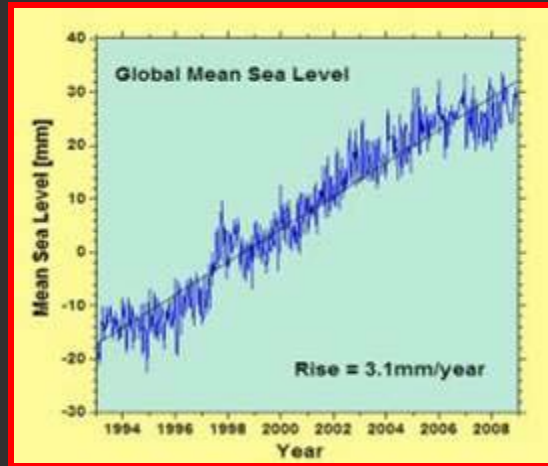
7. Ocean Research and Observatories



NEPTUNE Observatory has 800 km fibre optic and power cable to run experiments & transfer data to shore in real time.
Source: Neptune Canada

- More ocean research due to climate change, harm to environment & technological advances.
- major initiatives well underway, e.g. *Census of Marine Life*;
- small & temporary observation sites around for several decades;
- now, large, permanent (~20yr) observatories will monitor all aspects of the ocean & seabed.

8. Climate change – primary effects

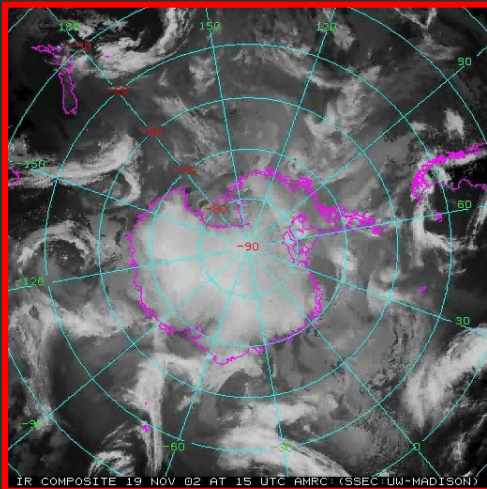


- sea level rising due to thermal expansion & >> ice melt;

- changing weather systems may alter wave & currents

- more precipitation moves sediment offshore to form density flows;

- more intense storms >> damage at coast & offshore.



ALL ABOVE VARY IN SPACE & TIME.