OCEAN USERS
NOW AND THE FUTURE

“Prediction is very difficult especially about the future”
Niels Bohr

Lionel Carter, Marine Environmental Advisor, ICPC
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

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.

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

- 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

- 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

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.

Some locations of methane hydrate deposits. US Navy.
6. Offshore minerals

Onshore deposits declining or uneconomic - explore ocean.

- 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.

Polymetallic nodules with copper, zinc, nickel & manganese
7. Ocean Research and Observatories

- 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.

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