University of Sao Paulo
School of Advanced Science on Ocean
Interdisciplinary
Research and Governance

Ocean governance: Millennium Ecosystem Assessment the Regular Process, and Sustainable Developmental Goals

Alan Simcock

(Session 2)

The Assessment Process

Four issues:

- How has the First World Ocean Assessment gone?
- What does it show?
- How does it relate to current policy issues?
- What next?

How has the First Cycle gone?

- Reminder of why we have a Regular Process and how it has been organized
- What are the main conclusions?
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Why a Regular Process?

What business does not check on the state of 7/10ths of its assets? Or even 9/10ths of its assets!

2002 World Summit on Sustainable Development recommended a “Regular process for global reporting and assessment of the state of the marine environment, including socioeconomic aspects”

The UN General Assembly consequently agreed on a process to produce:

- an integrated assessment of the ocean
- agreed priority cross-cutting thematic issues such as food security
- a baseline for future global assessments.

How has it been organized?

- Ad Hoc Working Group of the Whole
  - Terms of Reference and Working Methods
  - Outline of the first global integrated assessment
  - Guidance for contributors
- Group of Experts of the Regular Process
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10 Main Themes (1)

A. Manifold problems linked to climate change and linked issues
B. Marine biota – higher mortality, lower reproductive success
C. Food security and safety is at risk
D. Biodiversity hotspots are magnets for human activities
E. Increased and conflicting demands for ocean space

10 Main Themes (2)

F. Excessive inputs of harmful material
G. Cumulative impacts are key issue
H. Uneven distribution of benefits from the ocean
I. Integrated management is essential – and that needs more and better information
J. Lack of knowledge about integration should not lead to delay in implementing known solutions

A. Climate Change

Changes:

Sea-surface temperature; sea-level rise; salinity; stratification; circulation; storms; as well as acidification; UV radiation

Implications:

Seasonal life-cycles; loss of sea ice; plankton; fish-stock distribution; seaweeds; shellfish productivity; low-lying coasts; coral reefs; submarine cables; eutrophication problems; Arctic shipping

B. Marine biota

Challenges

- Higher mortality – less successful reproduction
- Over-fishing
- Changes in breeding and nursery areas
- Bycatch
- Hazardous substances and eutrophication
- Noise
- Recreational fisheries

Implications

- Food security
- Species structure of highly productive areas

World Ocean Assessment I

C. Food security and safety

1. Importance of sea-based food
2. Importance of livelihoods
3. Importance of small-scale fisheries
4. Significance of aquaculture and fish-stock propagation
5. Compromised food safety
6. Problems of subsidies
7. Role of women
8. Importance of food safety

D. Patterns of biodiversity

Patterns of marine biodiversity

Importance of temperature

Significance of capture fisheries

Lack of knowledge

Implications

- Biodiversity hotspots and ecosystem services
- Biodiversity hotspots and economic activities

E. Use of ocean space

Challenges

Population and urbanization; aquaculture and marine ranching; cables and pipelines; offshore hydrocarbons; offshore mining; offshore renewable energy; fisheries management areas; marine protected areas

Implications

Too many demands to meet them all

Need to develop ways of managing them

F. Inputs of harmful material

Challenges

Land-based inputs (sewage; fertilisers; hydrocarbons; heavy metals; persistent organic pollutants; endocrine disruptors); solid waste disposal; marine debris; shipping; offshore hydrocarbon industries; offshore mining

Implications

Human health; food safety; food security; marine biodiversity

Plymouth

G. Cumulative impacts

Fisheries, demand for ocean space, inputs of harmful materials, noise, non-native species have a cumulative effect:

In all main marine regions

In the open ocean

On top predators

On vulnerable habitats – corals reefs, mangroves, kelp forests and seagrass meadows, seamounts, salt marshes, estuaries

On tourism and cultural values

H. Distribution of ocean benefits

1. Changes in fish and seafood: lower consumption in poorer areas: diversion to richer areas
2. Employment and income from fisheries
3. Maritime transport
4. Changes in universal benefits
5. Offshore energy
6. Tourism
7. Offshore mining
8. Marine genetic material

I. Integrated management

There are constraints in assessing only the oceans

But

We have reached the end of the time when human impacts are small in relation to the vastness of the ocean

Many interactions (eg sewage, ship pollution, plastic debris, excessive nutrient inputs, overfishing, acidification) emphasise the problems caused by the absence of integrated management

J. Urgency for action

Some problems – such as those flowing from climate change and acidification – can only be dealt with at a global level

Many problems have more local causes and are only global problems because they occur in many places

Known solutions exist for many of these locally caused problems

Not implementing those solutions imposes environmental, social and economic costs

Overall Conclusion

"The greatest threat to the ocean comes from a failure to deal quickly with the manifold problems that have been described above. Many parts of the ocean, including some areas beyond national jurisdiction, have been seriously degraded. If the problems are not addressed, there is a major risk that they will combine to produce a destructive cycle of degradation in which the ocean can no longer provide many of the benefits that humans currently enjoy from it".

Information gaps

1. Physical structure of the ocean
2. Waters of the ocean
3. Biota of the ocean
4. Human interactions:

   Shipping, land-based inputs, offshore hydrocarbons, solid waste disposal, marine debris, ICZM, cultural values

Capacity-building 1

- Effective management of human impacts on the ocean requires good, consistent knowledge
- Filling the knowledge gaps and applying that knowledge in management requires:
  - The *material* – research vessels, scientific equipment, remote observation systems, etc
  - The *personnel* – experts with the training and skill to operate the equipment, analyze the results and translate them into effective policies
  - The resources to support all this

Capacity-building 2

- How to promote dialogue between managers and scientists?
  - Need to explain and show relevance
- Framework for integration
  - How to standardize? How to compare?
- How to measure overall progress?
  - How to link different fields?
- More linkage to socioeconomic aspects
  - What difference does it make to people?

One expert's view

- Unclear (and hence variable) scope and content
  - Many co-authors, and lacked unified content and style
- Lack of coordination between chapters
  - Hence considerable revision required after completion of the drafts
- Review process unclear
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Having detailed all these manifold points, what is the overall view of the ocean given by World Ocean Assessment I?

World Ocean Assessment

The Ocean – vast and unknown

World Ocean Assessment

Just how vast and unknown?

- The ocean covers 7/10ths of our planet
- The ocean contains 97% of the water on the surface of the Earth
- The ocean is about 90% of the Earth's biome
- The ocean's **average** depth is 4 km
- Less than 0.0001% of the deep ocean has been studied

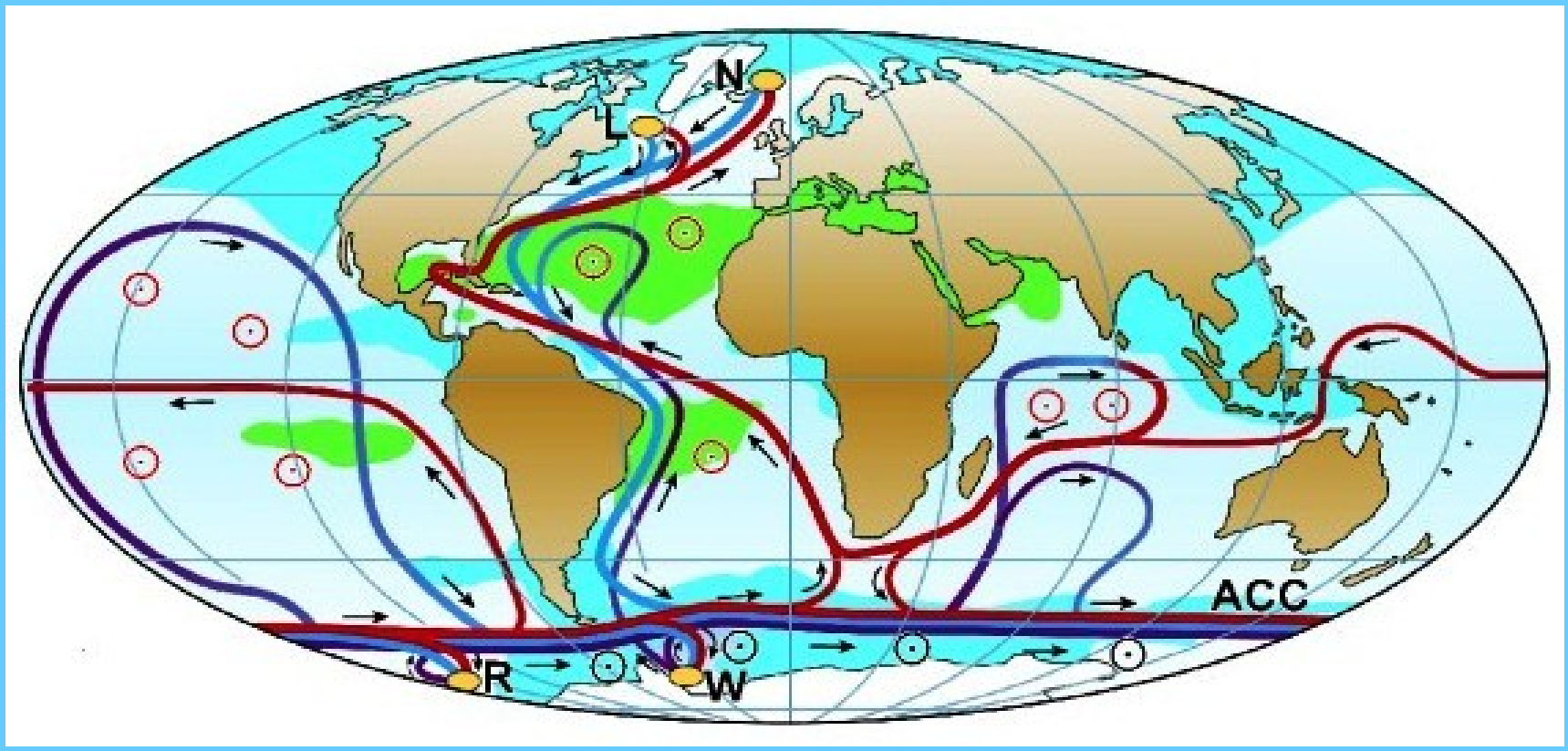
World Ocean Assessment

Mid-Ocean Ridge(s)

The mid-ocean ridge(s) where up-welling magma is forcing the tectonic plates apart

World Ocean Assessment

Meridional Overturning Circulation



Warm water (red) flows north in the Atlantic, cools, becomes more salty as ice forms, sinks and (blue) flows south and around the world, until it warms again and returns to the Arctic.

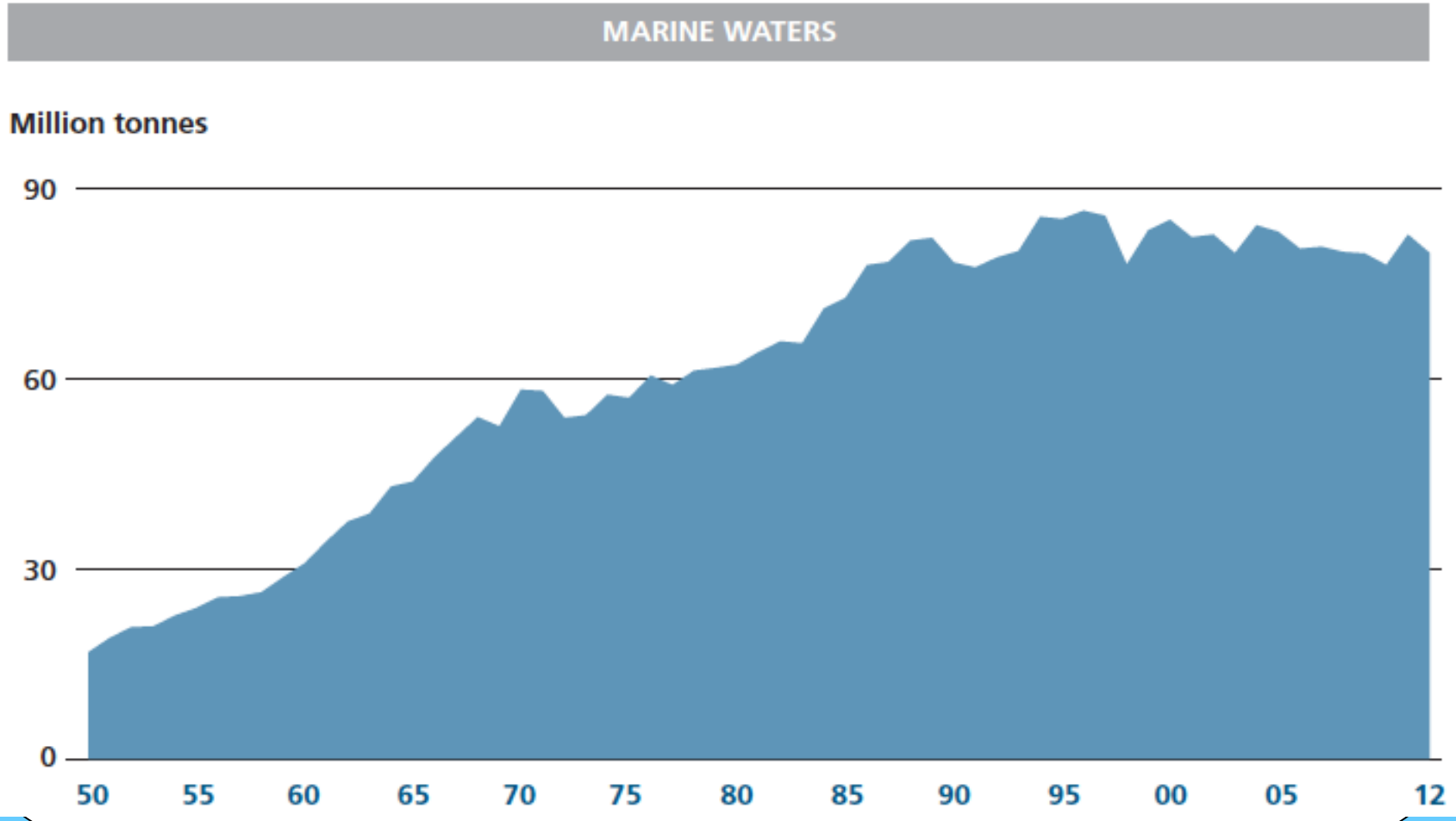
World Ocean Assessment

Major pressures on the ocean

- Climate change
- Overfishing
- Excessive by-catch of non-target species
- Inputs of harmful material & excessive nutrients (especially nitrogen)
- Coastal development
- Noise

World Ocean Assessment

Global fish catch



Food from the sea

- Global average human diet has 17% of animal protein from the sea – up to 33% in low-income, food deficient countries
- 90% of fishing employment is in small-scale fisheries – at risk if commercial fisheries take more of the catch
- Aquaculture is growing at 9% a year
- Problems with food safety, subsidies and recognition of the role of women

Pollution

Where is it coming from?

- Land-based inputs (sewage; fertilisers; oil; heavy metals; persistent organic pollutants)
- Sea-based inputs (shipping; offshore hydrocarbon industries; offshore mining)
- Solid waste disposal
- Marine debris

Inputs that upset ecosystems

Sewage, fertilisers, traffic, chronic oil spills – all provide nutrients (nitrogen) to algae

Algae grow until nutrients are exhausted and then die

Dead algae decay and oxygen is taken from the seawater

Consequences: Green tides, red tides, dead zones, poisonous shellfish

Eutrophication
Green tides - Marées vertes

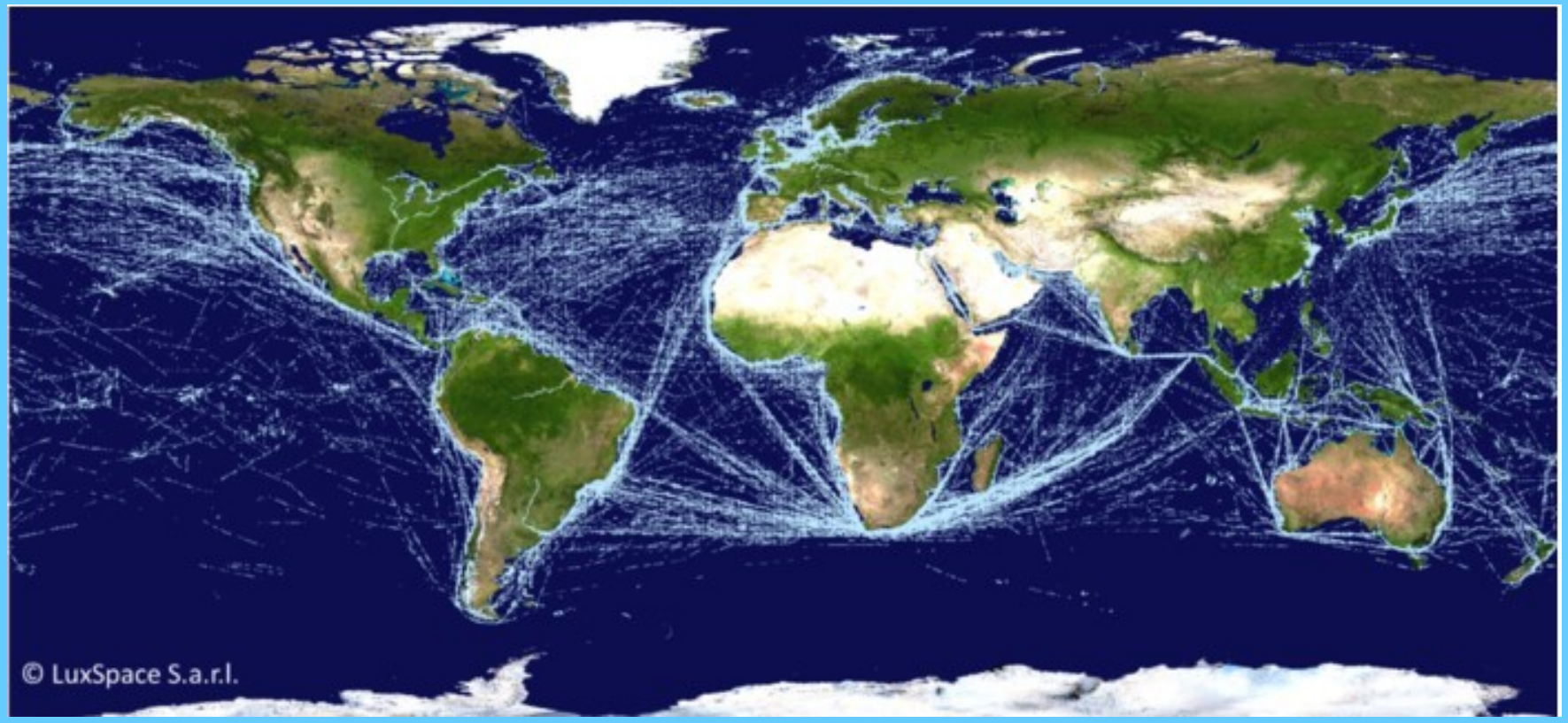
Dead Zones and Hypoxic Areas

Marine débris

80% of marine débris is from badly managed waste-disposal on land; 20% from ships and offshore platforms

Ocean currents make floating débris collect in the gyres in the centres of the ocean basins.

World Shipping Routes



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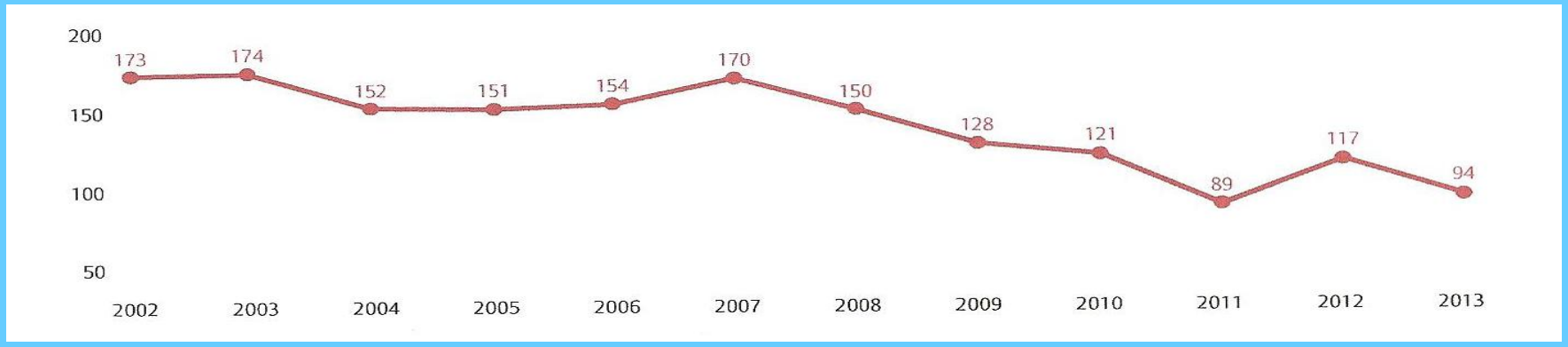
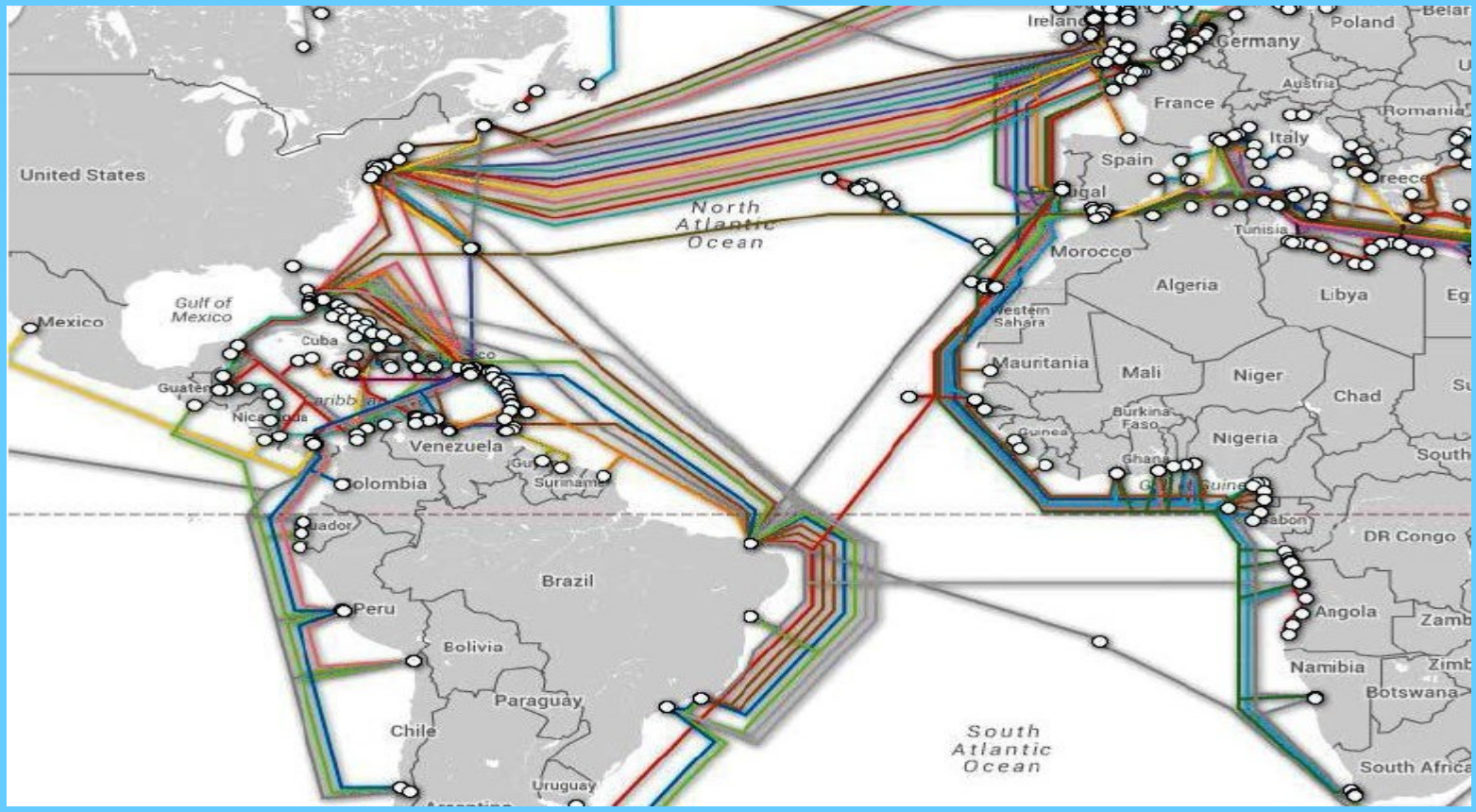


Submarine cables - Atlantic

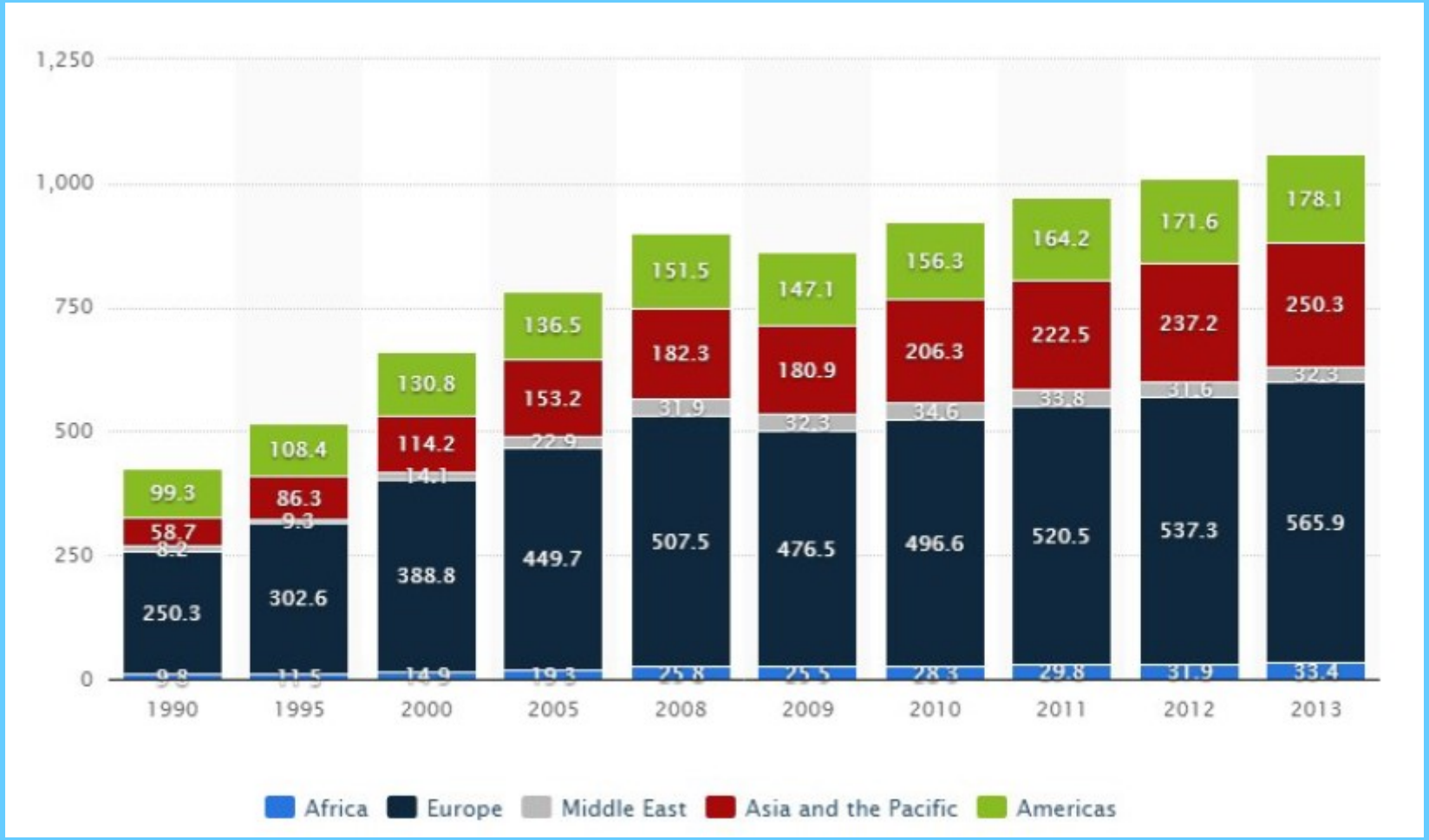


Submarine cables carry 95% of intercontinental internet traffic

Seaside Tourism

Tourists flock to the sea

World Tourism



Where tourists come from

World Ocean Assessment

Coastal development – hotels, marinas, housing, ports

Cumulative Impacts

Climate Change + Overfishing + Demand for ocean space + Coastal development + Pollution + Noise =

OVERLOAD

In combination, worse than the sum of the individual impacts

Why? They reduce resilience

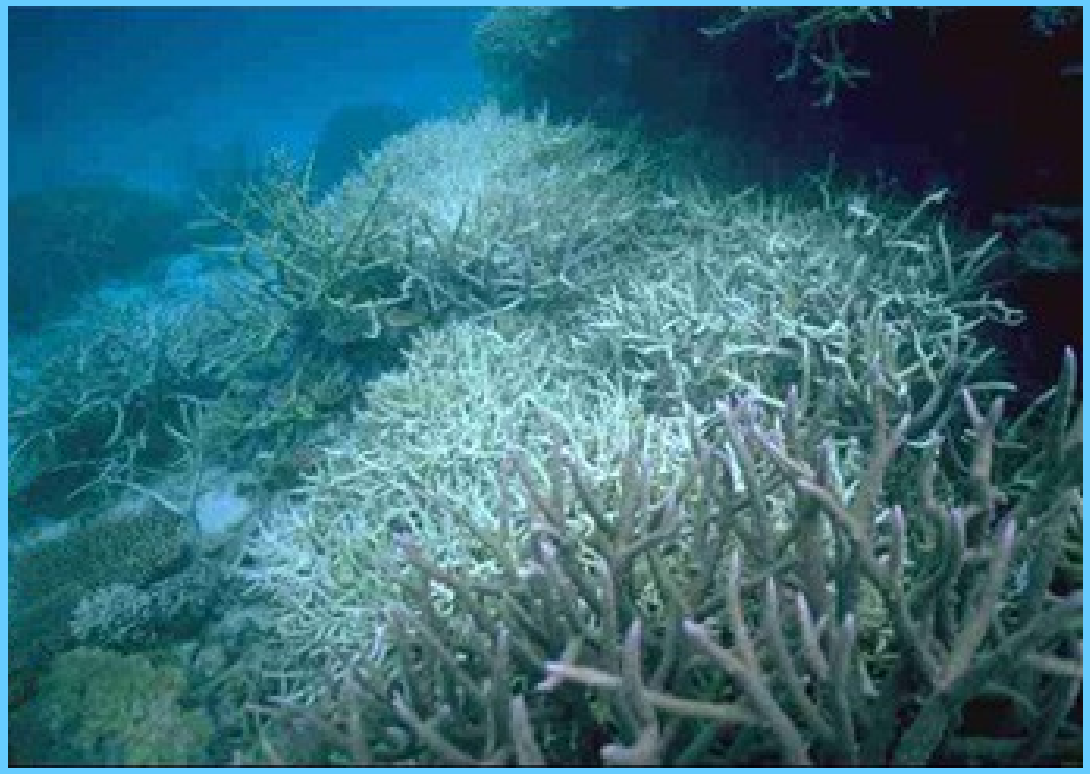
World Ocean Assessment

An example of the need for integration – Caribbean coral reefs

How we like to think of them

World Ocean Assessment

Problem: Ocean warming Bleaching



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World Ocean Assessment

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World Ocean Assessment

Problem: Physical damage

Physical damage from cruise ships' anchors

World Ocean Assessment

All the pressures interact

Every ecosystem is subject to a range of pressures.

At present, these pressures are usually managed sector by sector, without regard to each other.

Without integrated management, the problems of cumulative impacts cannot be solved.

World Ocean Assessment I

UNGA Conclusion

"The world's ocean is facing major pressures simultaneously with such great impacts that the limits of its carrying capacity are being, or, in some cases, have been reached."

UN General Assembly resolution 71/257

Where now?

- Second cycle has started – to look at what has happened since 2010
- Outline approved
- Currently building the writing teams
- First complete draft by July 2019
- Peer review: August – October 2019
- Revised draft sent to States for comment – New Year 2020
- States' review: January February 2020, followed by processing and translation – 3 April 2020
- Final version – 17 July 2020


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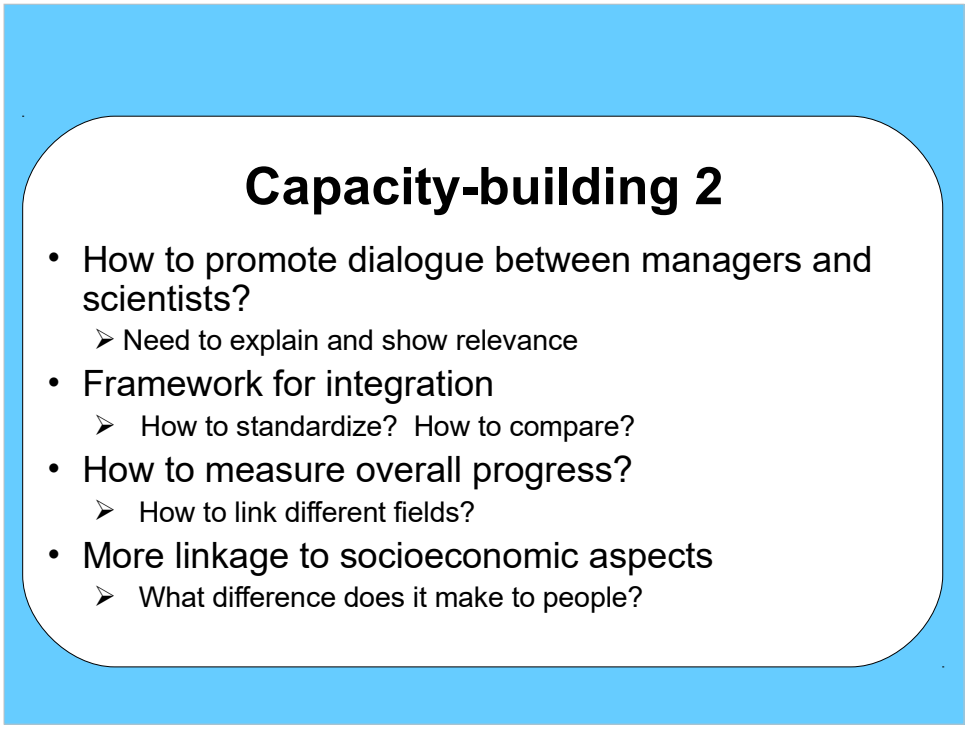

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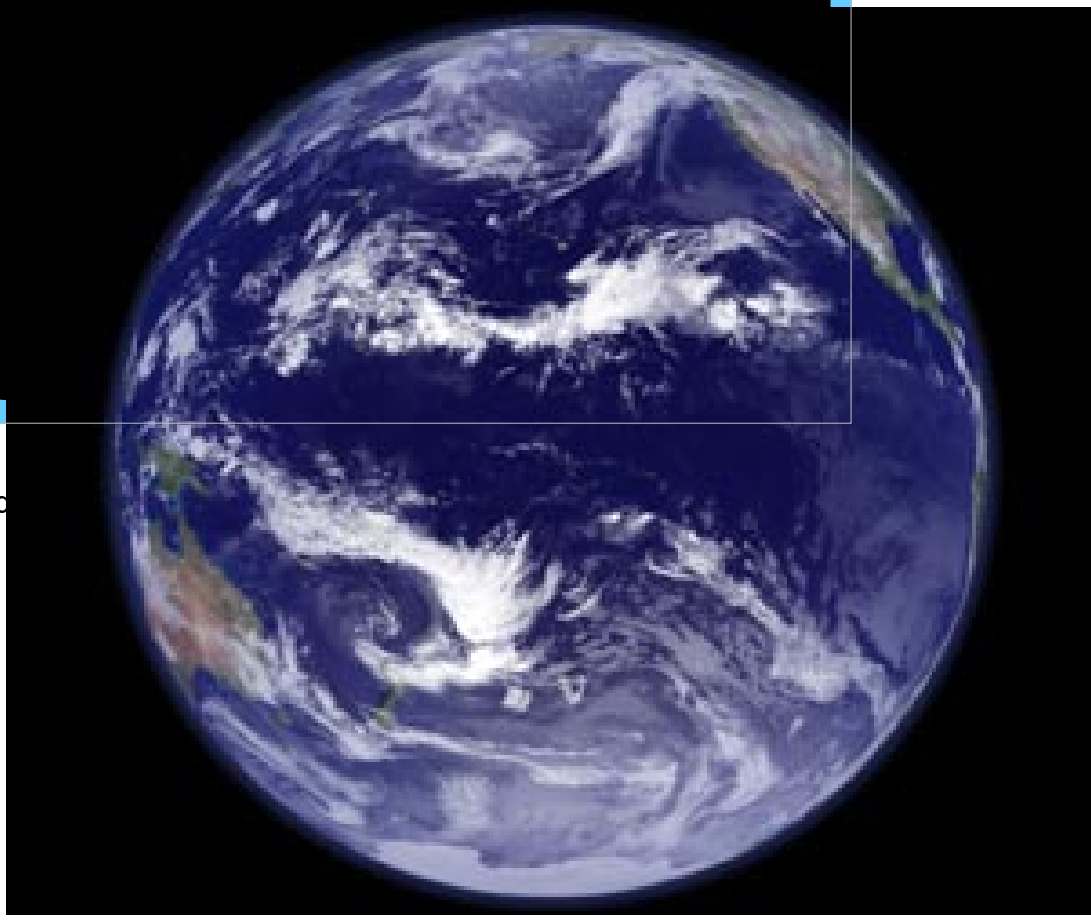

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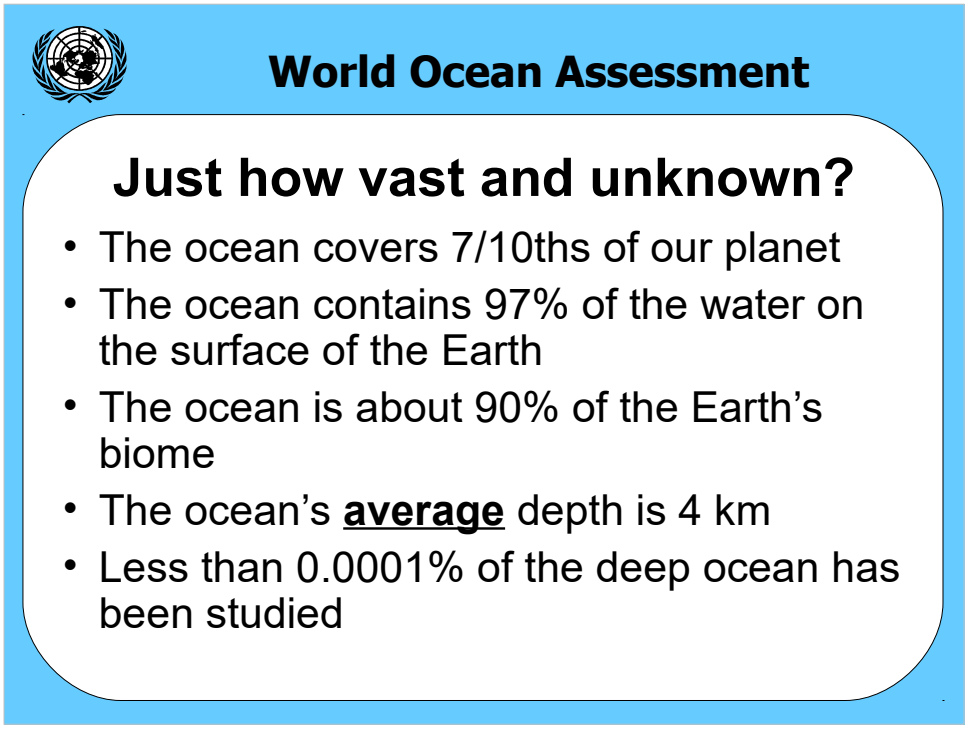

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World Ocean Assessment

Mid-Ocean Ridge(s)

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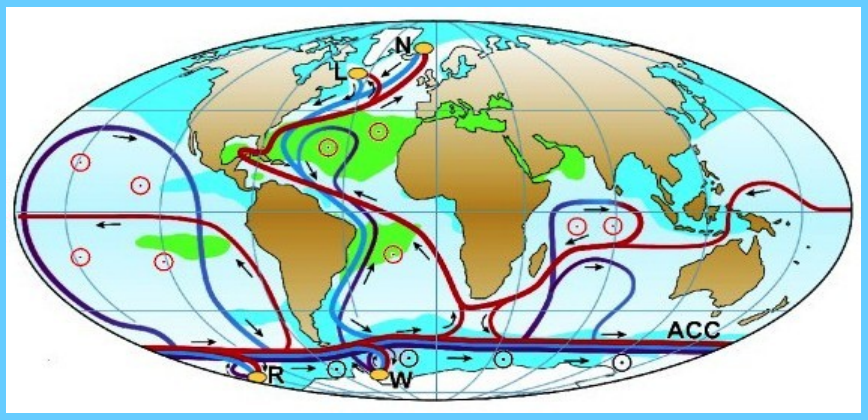

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World Ocean Assessment

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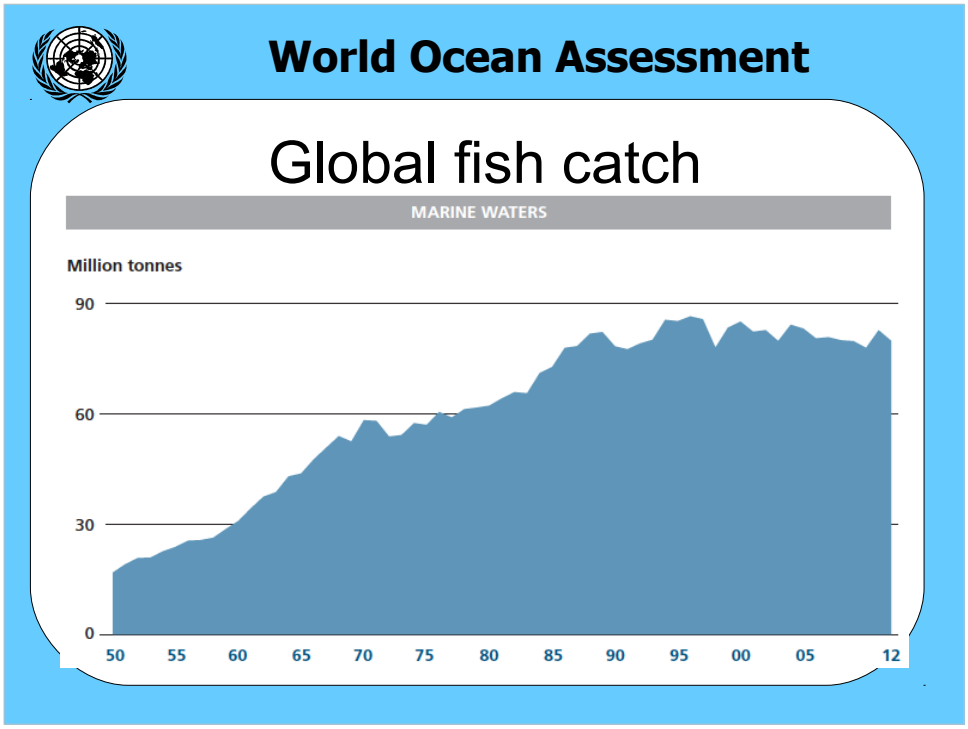

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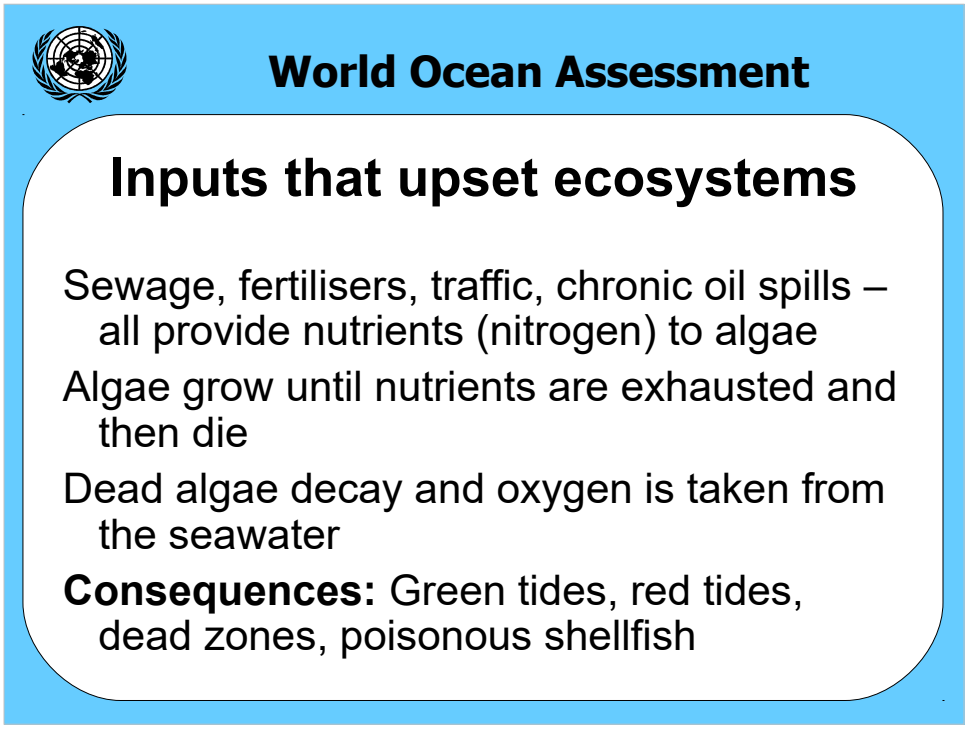

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Eutrophication
Green tides - Marées vertes

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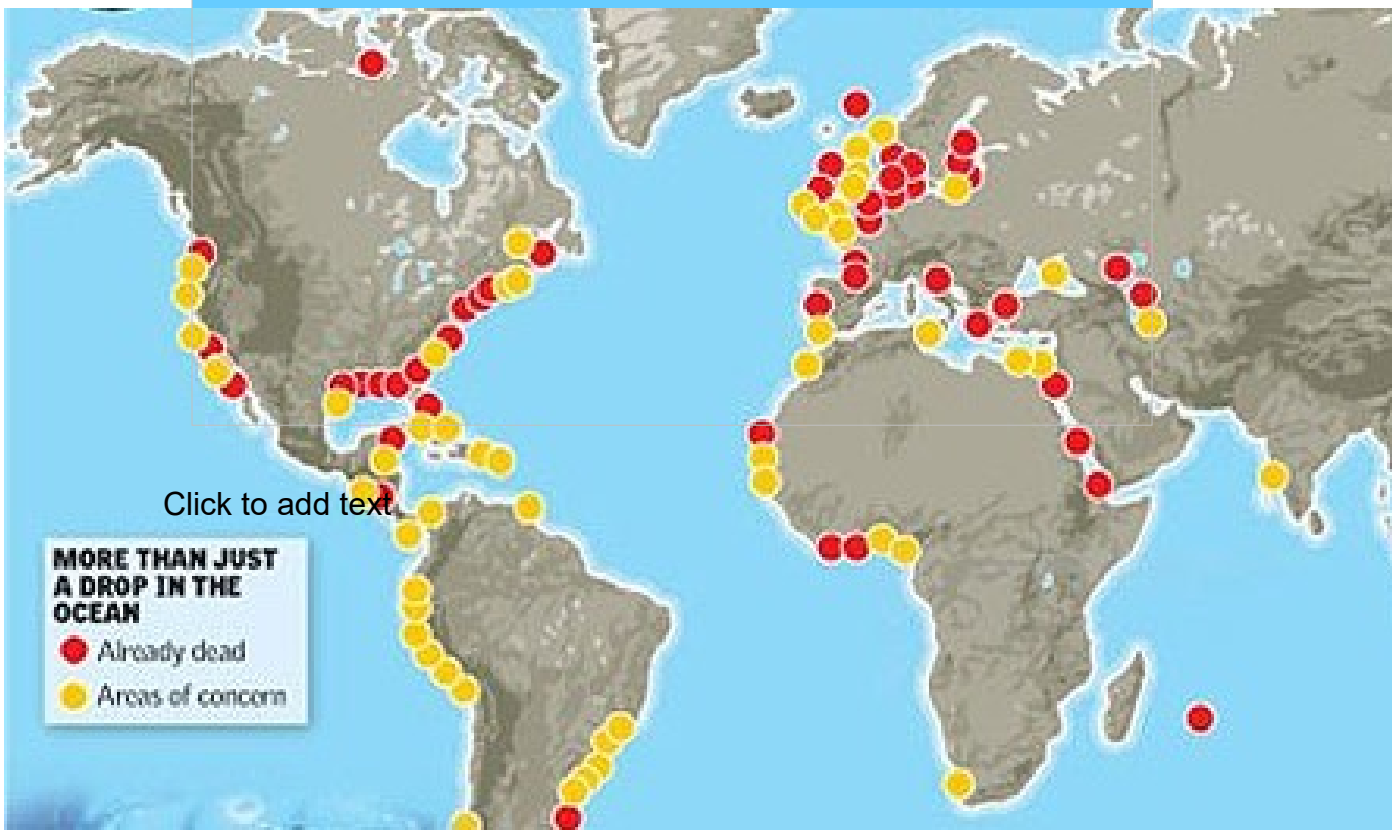
Dead Zones and Hypoxic Areas



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World Shipping Routes

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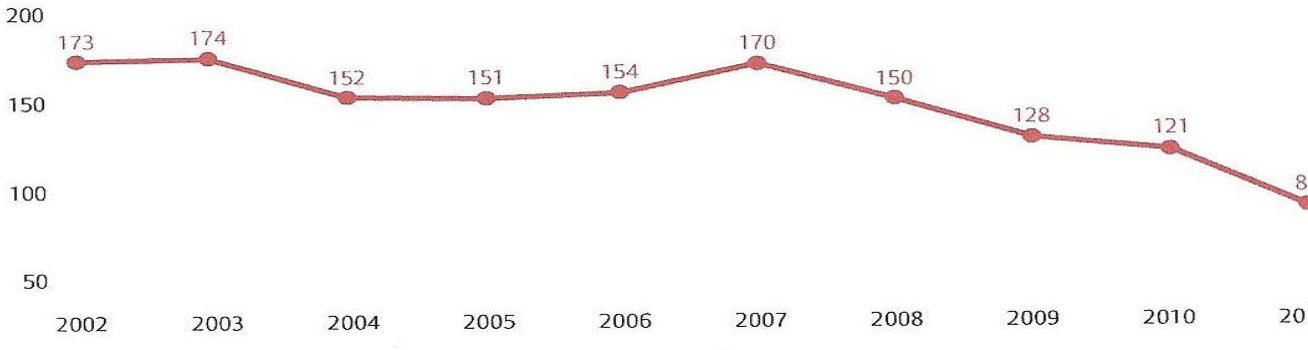

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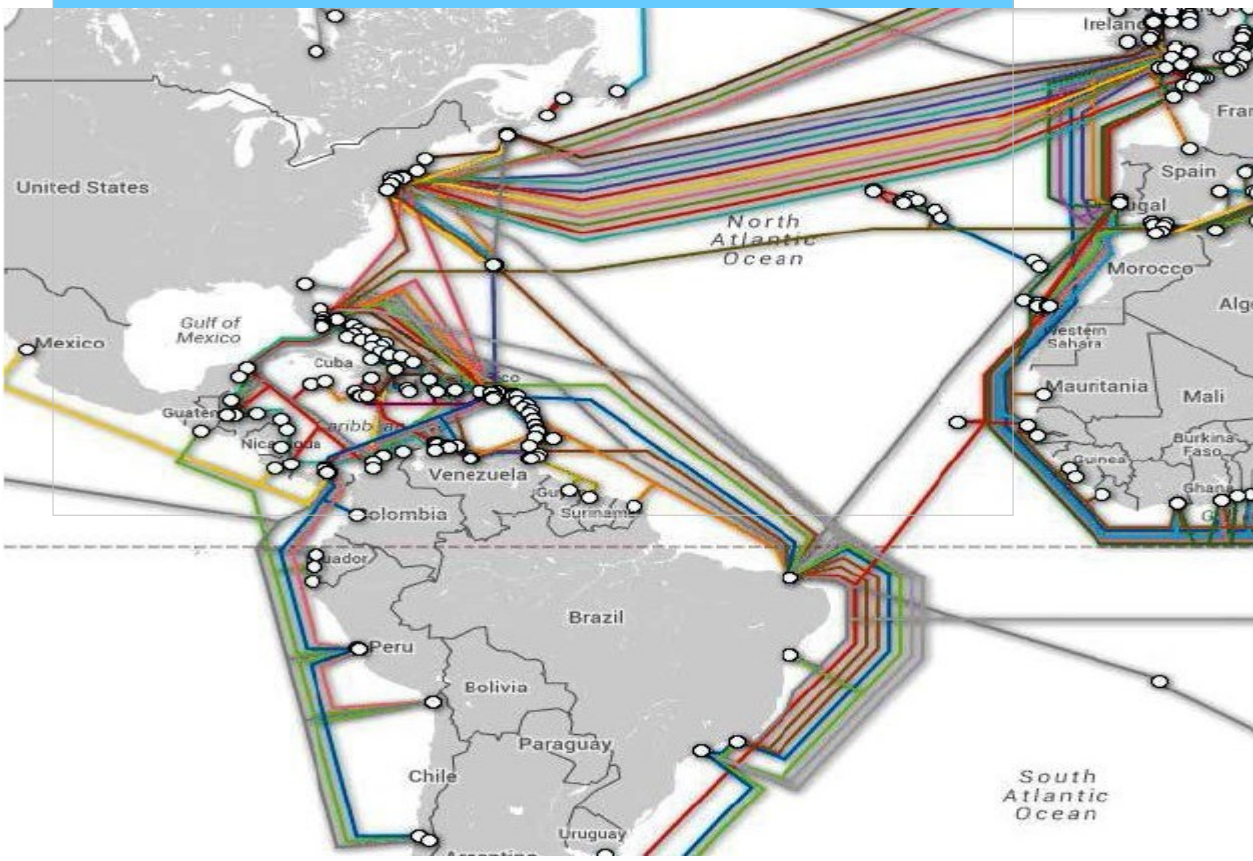

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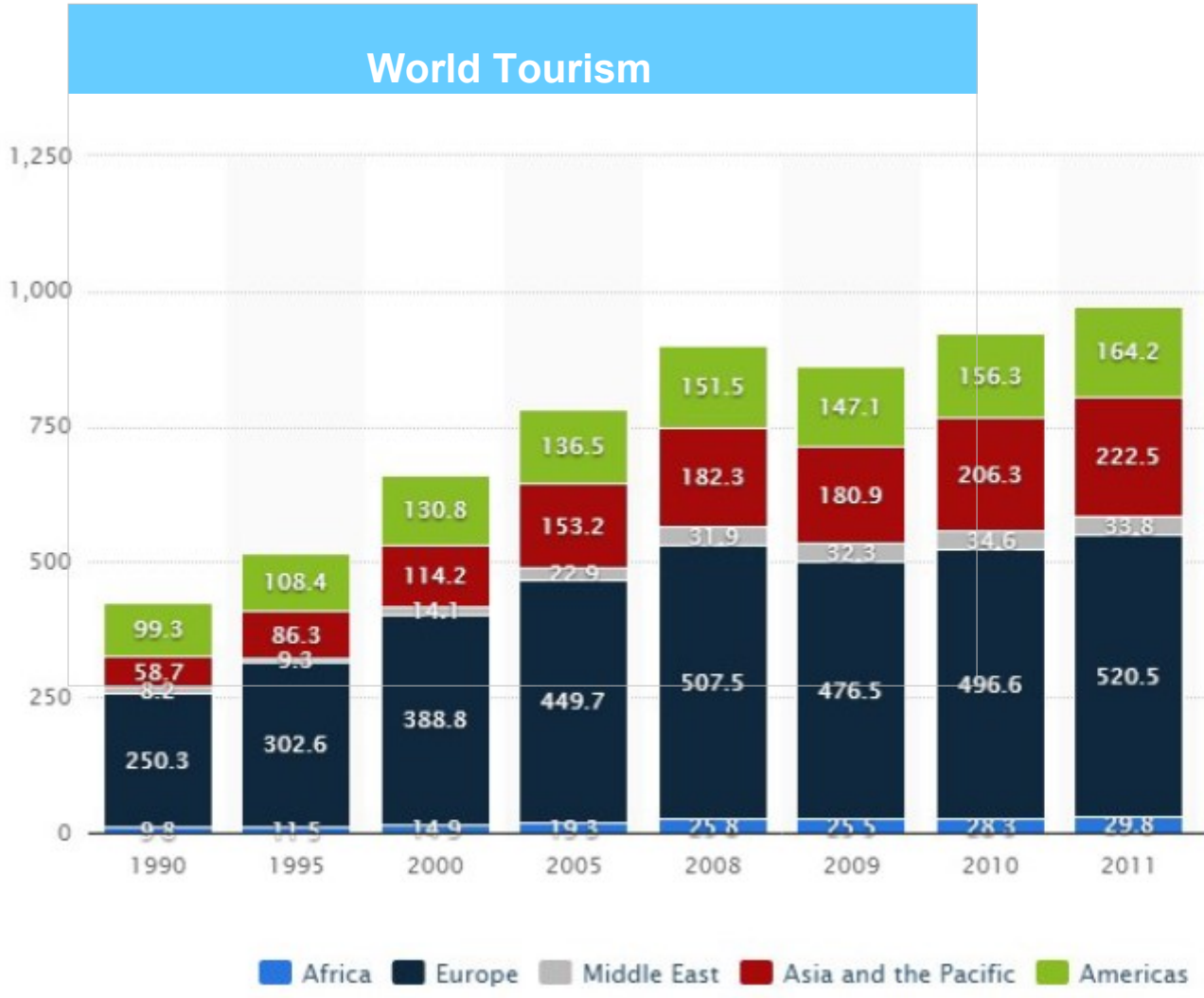
Tourists flock to the sea


World Tourism
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130.8
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Africa
Europe
Middle East
Asia and the Pacific
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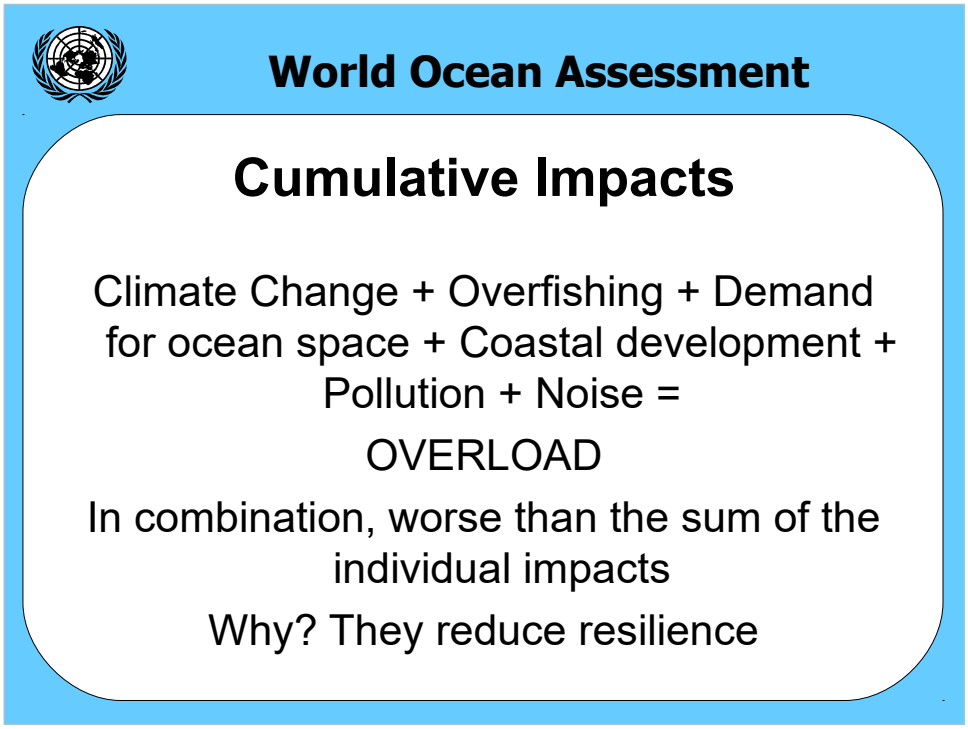
World Ocean Assessment

Coastal development – hotels, marinas, housing, ports



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World Ocean Assessment

An example of the need for integration – Caribbean coral reefs

World Ocean Assessment

Problem: Ocean warming Bleaching

If the seawater temperature is over 20°C , corals loose the symbiotic algae that give them their colour and some of their nutrients.

Click to add text

World Ocean Assessment

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At present, these pressures are usually managed sector by sector, without regard to each other.

Without integrated management, the problems of cumulative impacts cannot be solved.

World Ocean Assessment I

UNGA Conclusion

“The world’s ocean is facing major pressures simultaneously with such great impacts that the limits of its carrying capacity are being, or, in some cases, have been reached.”

UN General Assembly resolution 71/257

Where now?

- Second cycle has started – to look at what has happened since 2010
- Outline approved
- Currently building the writing teams
- First complete draft by July 2019
- Peer review: August – October 2019
- Revised draft sent to States for comment – New Year 2020
- States' review: January February 2020, followed by processing and translation – 3 April 2020
- Final version – 17 July 2020