

The Ocean as Earth's Life Support System



- 80% of life on Earth
- Critical nutrition for over 3 billion people
- Modulates the weather (temperature, CO2 mitigation)
- Creates >50% oxygen
- Absorbs 90% extra atmospheric heat
- Provides energy
- Central to identity and cultures of people around the world

The Ocean a Foundation for Vibrant Economies

- Fisheries and aquaculture sector supports the livelihoods of 10-12% of the world's population
- Goods and services from the ocean generate about \$2.5 trillion each year
- Seventh largest economy in the world today
- Supports multiple industries and jobs, including global transportation, ports, tourism, fishing, aquaculture, mining, construction, and energy generation
- Emerging sectors: blue C, restoration, renewable energy, biotechnology, sustainable seafood

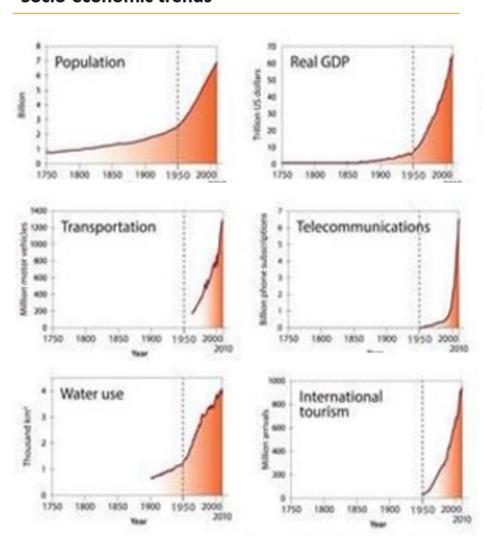


PROJECT Stanford University

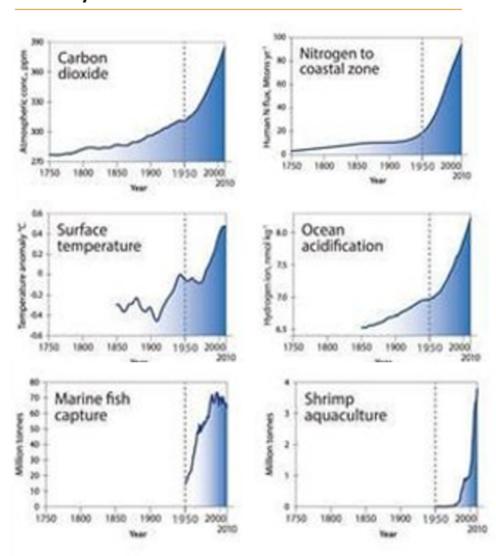


Urgency-- Ocean Pressures

Socio-economic trends



Earth system trends



High Level Panel for a Sustainable Ocean Economy



Enhancing humanity's relationship with the ocean

Harnessing the latest ocean knowledge

Working with diverse stakeholders

Bridging ocean health and wealth

Developing an action agenda for transitioning to a sustainable ocean economy



Principles for a Sustainable Ocean Economy



A global commons, a common approach

- New system of ocean governance
- Recognizing intrinsic linkages between ocean, climate, and all other ecosystems
- 4 opportunities for action





An Imperiled Ocean System

Weak, fragmented governance

System-wide impacts















Food scarcity

Economic instability

Inequity in ocean resource sharing

Biodiversity loss

Increased threat from climate change



LANDSCAPE PRESSURES GHG • acidification • warming • rising sea levels • declining biodiversity • overfishing pollution • urbanisation • demographic change • technological innovation **Pre-transition culture** Post transition culture Values.frames and worldviews of Values.frames and worldviews of consumerism, marketisation, well-being, sustainability and (national) self interest and growth global commons CULTURE **Unsustainable current** economic system Dominant political, economic & social institutions innovations mature into sustainable ocean economy Novel approaches emerging in the ocean commons, as a result of top-down and bottom-up governance innovation, new knowledge commons, justice and stewardship. TRANSITION TO A SUSTAINABLE OCEAN ECONOMY OVER TIME

LEVELS OF CHANGE

Dynamics of system-level change in the ocean economy

Brodie Rudolph et al. 2020 *Nature Communications*

Solutions & Opportunities



GLOBAL

Open platforms, shared aims, guiding principles, coordinated responses-- to scale innovation



Local innovation fuels action; globally agreed-upon principles, integrated policies

Science & policy reinforce legitimacy, equity, support local innovation



LOCAL

Information sharing, fostering innovation, inputs to knowledge commons



3 Key Shifts:

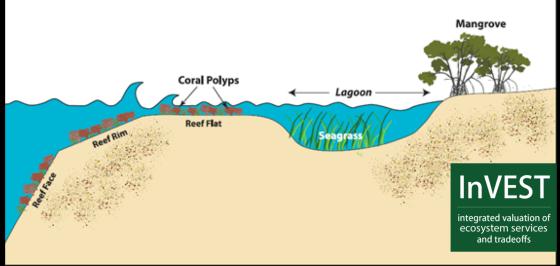
- Our relationship with the Ocean
- Our relationships with each other
- The relationships between nations



Innovative example: Co-Developed Sustainability Plan in Belize

- Integrated development plan
- Implementation \$ from IDB
- Reef removed from UNESCO World Heritage Risk site
- New ministry
 - The Ministry of Agriculture, Fisheries, Forestry, the Environment, and Sustainable Development
- Improved local capacity
- Keen interest by infrastructure businesses, climate financers





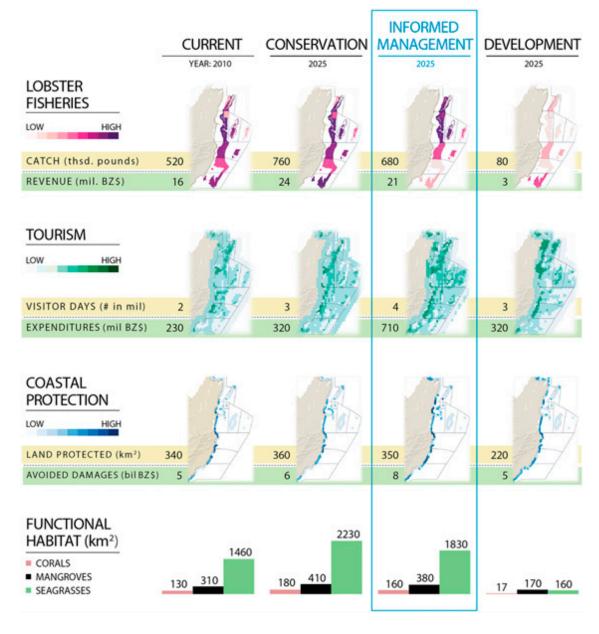
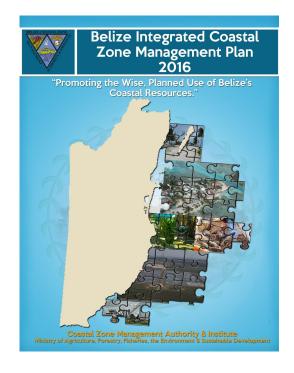


Fig. 2. Biophysical and economic values for three ecosystem services and the area of habitat capable of providing services under the Current and three future scenarios for the ICZM Plan for Belize.

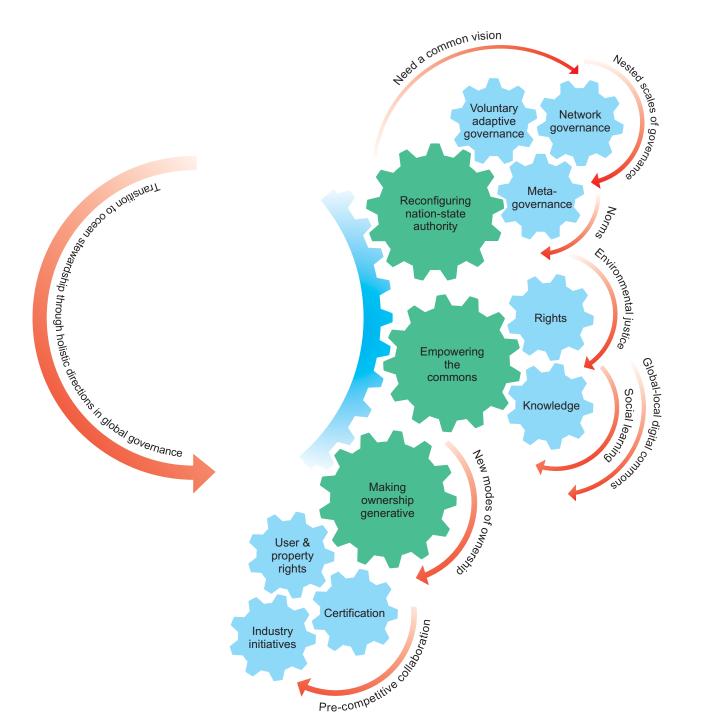
Spatially quantified diverse values of marine ecosystems in multiple currencies of value



Arkema et al. PNAS, 2015; CZMAI 2016; Verutes et al. 2017

Changing Decisions--Valuing Economic Contributions of Ocean Natural Capital to Human Wellbeing

- Data, science co-developed with decision makers to incorporate ocean ecosystem values in policies, investments
- Social, political, financial tradeoffs weighed by stakeholders
- Governance and other institutional changes needed
- Private sector role is crucial—financing, job creation
- Capacity building supports durability of solutions
- Ongoing science-policy processes needed for learning, adapting, inclusion



Elements of a governance transition to ocean stewardship