

Symposium, USSEE 2009 Conference, May 31-June 3 2009:

Pathways and Policies toward Sustainable Fisheries and Marine Ecosystems

Conveners: Glenn-Marie Lange, Karin Limburg, Rashid Sumaila

SYMPOSIUM ABSTRACT: Modern fisheries constitute a quintessential ecological-economic problem, wherein 60 years of “rational” management has led to unimaginable erosion of fish stocks along with their habitats, food webs, and ecosystems. Unless fishing behaviors are altered, we face an unprecedented, global collapse of a critical source of protein for an increasing human population. In this symposium, we expose the pathologies of current practices, and explore approaches that will restore, revive, and sustain ecosystem support for fisheries.

There will be 6 presentations in 2 sessions. Each speaker (in **boldface** below) will have 25 minutes, and following the third speaker in each session, there will be 15 minutes for discussion.

Part I: Diagnosis of the problems

- (1) U.R. **Sumaila**: Managing fishery resources for all generations
- (2) G.-M. **Lange**: Economic value of marine ecosystem services in Zanzibar: implications for marine conservation and sustainable development
- (3) K.E. **Limburg** & J.R. Waldman: Dramatic declines in diadromous fishes: How socio-economic pathologies lead to lost ecosystem services

Discussion

Part II: Prescriptions for sustainable fisheries and marine ecosystem management

- (4) K. **Kellehar**: Recovering the sunken billions
- (5) M. **Schulter** and H. Leslie: Managing tradeoffs in the use of aquatic ecosystem services
- (6) T. **Agardy**: Brave new worlds in marine fisheries management

Discussion

Abstracts follow on the next pages...

(1) Managing fishery resources for all generations

U. Rashid Sumaila

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Session: SYMPOSIUM: Pathways and Policies toward Sustainable Fisheries and Marine Ecosystems

Format: Oral presentation

I argue that managing fishery resources for all generations implies managing them sustainability through time. I follow this up with a discussion of how current management practices undermine our ability to manage fisheries resources sustainably. In particular, I highlight how negative economic incentives such as subsidies distort the market and encourage overcapacity and overexploitation of the world's fishery resources. Finally, I provide suggestions on how we can get onto a path that will restore, revive, and sustain marine ecosystems for the benefit of both current and future generations.

(2) Economic value of marine ecosystem services in Zanzibar: implications for marine conservation and sustainable development

Glenn-Marie Lange, World Bank, Washington, DC

Session: SYMPOSIUM: Pathways and Policies toward Sustainable Fisheries and Marine Ecosystems

Format: Oral presentation

Marine ecosystem services are seriously undervalued, resulting in under-investment in conservation and lost opportunities for economic growth & poverty reduction. Economic valuation provides a powerful tool for sustainable development by showing how dependent the economy is on an ecosystem and what would be lost if the ecosystem is not protected. This paper estimates the value of marine ecosystem services in Zanzibar, links the values to the national income accounts, and quantifies how the benefits from each ecosystem service are distributed among five different stakeholder groups. Marine ecosystem services contribute 30% of GDP, yet the ecosystem is seriously degraded due to both human and natural causes. The paper explores the reasons for this, focusing on the distribution of benefits and the (dis)incentives this creates for conservation, especially among local communities that steward the marine ecosystem.

(3) Dramatic declines in diadromous fishes: How socio-economic pathologies lead to lost ecosystem services

Karin E. Limburg, SUNY College of Environmental Science and Forestry, Syracuse, NY and **John R. Waldman**, Biology Department, Queens College, Flushing, NY

Session: SYMPOSIUM: Pathways and Policies toward Sustainable Fisheries and Marine Ecosystems

Format: Oral presentation

We examined the status of diadromous (marine-freshwater migrating) fishes within the North Atlantic basin, a region of pronounced declines in fisheries for many obligate marine species. Data are sparse for these 22 species except for a few high value forms. For most of these species, abundances have declined to 1 to 5 percent of historic levels. Many populations do persist but at sharply reduced levels. All species had suffered population extirpations and many are now classified as threatened or endangered. Habitat loss (especially by damming), overfishing, pollution, and increasingly, climate change can all be regarded as “socioeconomic pathologies” that have all contributed to declines in this group. We show that where data exist, populations have decreased dramatically from original baselines. We discuss the consequences of these declines in terms of lost ecosystem services.

(4) Recovering the Sunken Billions

Kieran Kelleher, Fisheries Team Leader, World Bank, Washington, DC

Session: SYMPOSIUM: Pathways and Policies toward Sustainable Fisheries and Marine Ecosystems

Format: Oral presentation

The presentation will summarize the findings of a recent World Bank study "The Sunken Billions: The Economic Justification for Fisheries Reform." It will map the next steps envisaged by the Bank to build political willingness for fisheries reform. The presentation will consider the axes of reform, the roles of both public and private actors, and will outline a range of sustainable fisheries initiatives being undertaken by the World Bank at country, regional and global levels. These initiatives provide a range of practical challenges for environmental economists focused on the political economy of reforms in natural resources management.

(5) Managing tradeoffs in the use of aquatic ecosystem services

Maja Schlüter, Department of Ecology and Evolutionary Biology, Princeton University, Princeton, NJ; **Heather Leslie**, Department of Ecology and Evolutionary Biology, Brown University, Providence, RI

Session: SYMPOSIUM: Pathways and Policies toward Sustainable Fisheries and Marine Ecosystems

Format: Oral presentation

Aquatic ecosystem services are under various, often interacting anthropogenic pressures, which affect their production and the ecosystems that sustain them. Assessing tradeoffs in the production and use of multiple services provided by a particular ecosystem can help to mitigate impacts of human activities and to better balance user demands for their exploitation. However, in many cases little is known about the interactions between multiple services and how management and natural perturbations influence their provision. We use simple dynamic models to investigate the tradeoffs between different ecosystem services that depend on a common resource provided by an aquatic ecosystem and the impact of key management strategies on their dynamics and overall system performance. Our first case focuses on the Gulf of California, where a marine fish population is exploited by two different economic sectors, the artisanal fisheries and sportsfishing-based tourism. The other case concerns an inland fishery in a semi-arid river basin in Central Asia, where multiple demands on the freshwater resources of the river affect the viability of wetland fish populations. We use the models to explore the characteristics and dynamics of the tradeoffs and their significance for the overall productivity and resilience of the respective social-ecological systems. In both cases, clear tradeoffs among the sectors and services become apparent as well as the influence of the type and magnitude of the linkages between the fish populations, the ecosystems and the dependent human communities.

To assess the resilience of these coupled systems to environmental variability, we also investigate the robustness of ecosystem service provision to key perturbations, e.g. of fish reproduction due to El Niño events or to increasing river flow variability caused by management interventions or climate change. The ecosystem services show differential responses to the disturbances, with some affected more than others. For example, in the semi-arid river case, the fish population can buffer variability in water flows providing valuable services when other water-related services fail. However, this capacity needs to be built up and maintained through institutions that promote integrated water and fisheries management and enable adaptation to changing water flow conditions in the river basin. In the case of the marine fish population, changes in population size affect the artisanal fisheries more strongly than the tourism sector because of a time lag in the response of the recreational fisheries. The results of both case studies illustrate the value of understanding the diverse ways in which humans influence and are influenced by marine and freshwater ecosystems and the services they produce.

(6) Brave new worlds in marine fisheries management

Tundi Agardy, Sound Seas 6620 Broad St Bethesda MD 20816

Session: SYMPOSIUM: Pathways and Policies toward Sustainable Fisheries and Marine Ecosystems

Format: Oral presentation

The tacit failures of conventional marine fisheries management appear to be unrelated to the sophistication of the underlying science, the resources available for management and enforcement, or the desire of government agencies to get overfishing and destructive fishing under control. Instead, spiraling overexploitation and overcapitalization seems tied to an unwillingness to develop the foundations for ocean stewardship, along with new incentive structures for conservation. Comprehensive ocean zoning – a form of spatial management that is a natural outgrowth of the kind of zoning we practice on land the world over – allows managers to highlight ecologically important areas as well as ecosystem vulnerabilities and sensitivities. In addition, zoning that clarifies use (and in some cases, property) rights in the marine environment creates the foundation for true stewardship. Ocean zoning which is coupled to innovative financing mechanisms for fisheries management, such as Payments for Ecosystem Services (PES) markets, may well be the change in fisheries management that we have all been seeking.