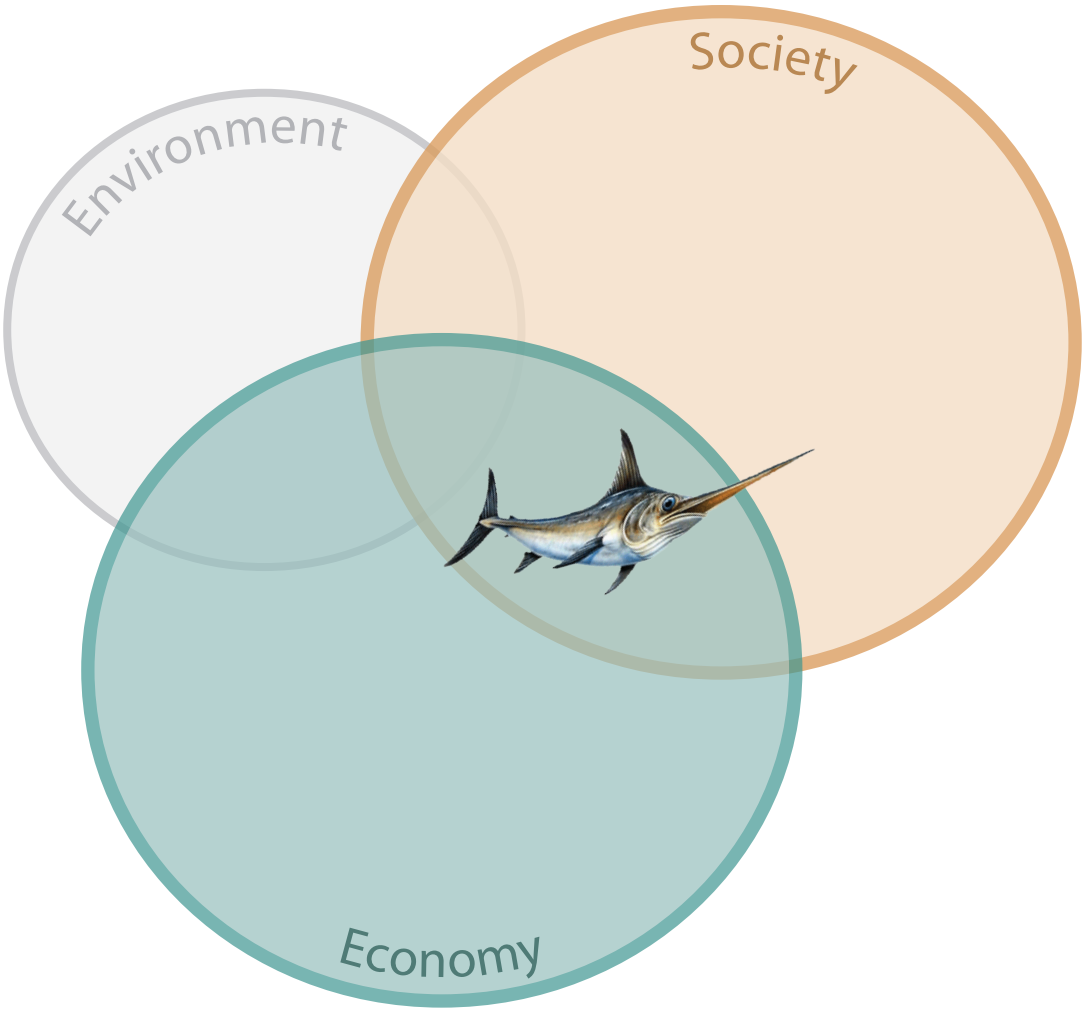


Social and Economic Factors:
Influences on the Fishery and Coastal Communities

This session focused on key socio-economic factors impacting the fishery and coastal communities, including likely economic impacts to the United States from swordfish imports; the prevailing view that current regulations on the U.S. fishery only transfer and magnify sea turtle bycatch problems elsewhere; and the impact of a declining fisheries sector on west coast ports and coastal communities.

Session Speakers

Dr. Dale Squires is a senior scientist at the NMFS Southwest Fisheries Science Center and an adjunct professor of economics at the University of California, San Diego, and on the Scientific Committee of the International Seafood Sustainability Foundation. Squires has worked on fisheries management for over 25 years, was co-chair of the Pacific Fishery Management Council's Highly Migratory Species (HMS) Fishery Management Plan (FMP) Development Team and HMS Management Team, has worked with the World Bank, Organization for Economic Development, Food and Agriculture Organization, WorldFish Center, Western Pacific Fishery Management Council, and other organizations. He is the author of about 80 peer-reviewed publications and co-author of six books, including the forthcoming Conservation of Pacific Sea Turtles (with Peter Dutton and Mahfuz Ahmad).

Dr. Carrie Pomeroy, a marine advisor with the California Sea Grant Extension Program and a Research Associate with the University Of California Santa Cruz Institute of Marine Sciences, is an applied social scientist whose work focuses on the social, cultural, and economic aspects (the human dimensions) of fisheries and fishing communities. Through her work, she seeks to build information and understanding of the human systems associated with fisheries, and how these systems interface and interact with the ecological systems on which they depend. Carrie serves on local, state, and regional advisory committees, and holds a M.A. in Marine Policy from the University of Miami and a Ph.D. in the Human Dimensions of Fisheries from Texas A&M University.

Dr. Steve Stohs is an industry economist at NMFS Southwest Fisheries Science Center who currently serves as Chair to the Pacific Fishery Management Council's Highly Migratory Species Management Team. His research is currently focused on the economic impact of regulation on commercial HMS fisheries. He holds a Ph.D. in Agricultural and Resource Economics from the University of California, Berkeley.

Transfer Effects and Economic Welfare

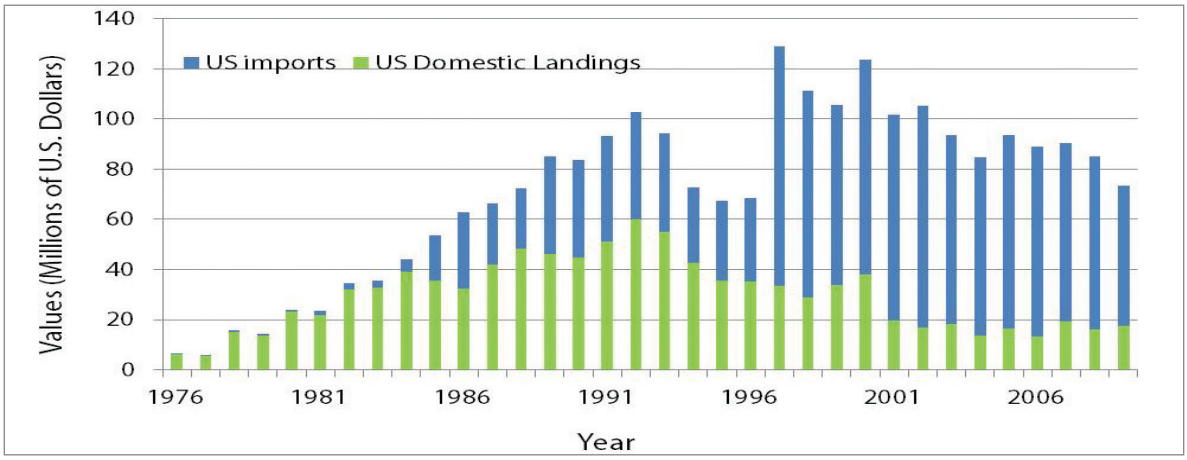
Dale Squires, NMFS, Southwest Fisheries Science Center

Consumption of swordfish is rising worldwide. Catch by the U.S. west coast fleet, however, is declining despite increased demand and an abundant swordfish stock. The NMFS Southwest Fisheries Science Center (SWFSC) is conducting research on the implications of this divergence between the U.S. supply and global demand for swordfish. They are investigating the effects on U.S. consumer and producer welfare, employment, and communities; whether local harpoon-caught swordfish alone can fill the consumption gap; and whether this results in net gains or net losses for the United States, including effects on Pacific Basin sea turtle mortality.

Imports are supplying the majority of the U.S. swordfish demand. Fifty-five percent of swordfish imports are frozen, thus do not provide the local and fresh quality desired by many U.S. consumers. Hawaii-caught swordfish fills some of the consumption gap. At the same time, west coast fishermen are experiencing a loss in employment and profits, and some coastal communities and ports are experiencing reduced viability; lower west coast-origin swordfish landings could potentially contribute to this situation.

The net impact on sea turtle mortality of a reduced west coast swordfish fishery is a conservation benefit only if the net fishery interactions with sea turtles have not been transferred to other fleets and increased as a result. Both the U.S. west coast and Hawaii fleets operate in compliance with required U.S. measures to prevent and minimize impacts to sea turtles, but the foreign fleets do not. In addition, leatherback sea turtle populations are much lower and closer to extinction in the eastern Pacific Ocean than in the western central Pacific Ocean. Consequently, this population is more fragile and vulnerable to constant or increased fishing pressures. Forty percent of the swordfish imported to the United States is caught by foreign fleets in the eastern Pacific Ocean. In 2008, Singapore, Panama, and Canada were the top three sources of U.S. imports, representing 58 percent of the swordfish imports by product weight. Brazil, Mexico, and Chile contributed another 15 percent. The net impact to sea turtles is unknown, but there is reason to caution that the transfer effect may have resulted in more interactions between foreign fishing fleets and sea turtles throughout their range in the Pacific.

Net gains to the United States of a reduced west coast fleet are unlikely. Lower west coast landings fail the cost-benefit test for U.S. gains unless they result in a net decline in sea turtle mortality throughout the Pacific and unless there is a gain in the existence value of sea turtles that offsets any U.S. consumer and producer welfare losses. Restricting imports could result in further losses for the United States if: (1) a net gain in sea turtle existence value does not offset the effect of reduced fish availability in U.S. markets, (2) foreign fleets do not reduce their sea turtle mortality, and (3) foregone U.S. imports are redirected to other growing markets. The net gains question hinges on the size and direction of transfer effects.



U.S. swordfish landings values and imports values.

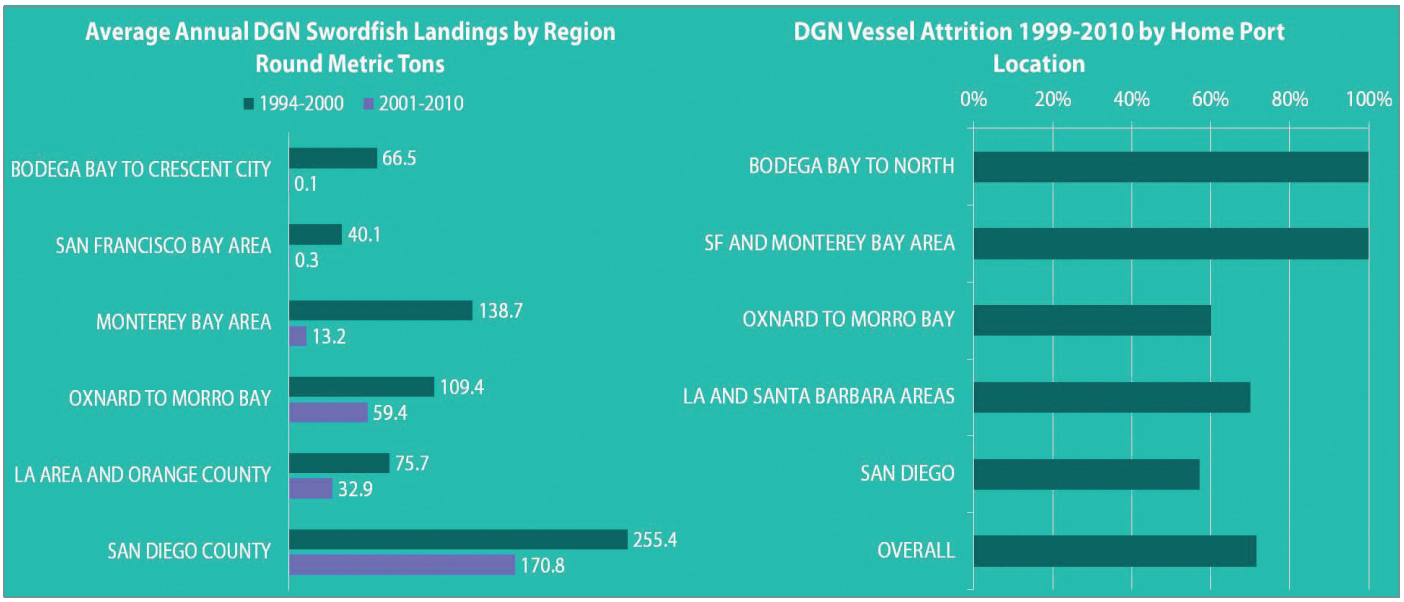
Overview of the Drift Gillnet Fishery and Regulation

Stephen Stohs, NMFS, Southwest Fisheries Science Center

The DGN fishery developed in the late 1970s to target common thresher shark. In the mid-1980s, the fleet switched targets to swordfish and has experienced steady attrition ever since. The history of regulations has, among other factors, contributed to a decline in fishery participation. Attrition is defined as permanent exit from participation in the DGN fishery. Following the establishment of the large time-area closure (i.e., PLCA) in 2001, attrition was severe.

Over time, the permits and regulations became increasingly restrictive. In 1980, while under state management, a limited entry permit system was established by the California Department of Fish and Game. A permit moratorium was implemented in 1982. A 75-mile area closure was established in 1986 to protect common thresher sharks. In 1990, concerned about bycatch of marine mammals, NMFS began placing observers on the fishing vessels pursuant to MMPA authority. In subsequent years, collaborative work between the fishery scientists, managers, and fishermen on the Pacific Offshore Cetacean Take Reduction Team led to innovative gear and operational changes to reduce bycatch. After changes proved effective, the use of pingers, 36-foot extenders, and mandatory skipper workshops became requirements for the fishery in 1997. In 2001, the PLCA was implemented off of central California to minimize the fishery's interactions with leatherback turtles. Regulations were established in 2003 to implement a time-area closure in the Southern California Bight depending on oceanographic conditions, but this closure has never been implemented.

The 2001 PLCA closure served as an implicit control for the effect of regulating effort on attrition. The attrition rate was largely explained by home port proximity to the PLCA . Other factors considered included skipper age, the date a vessel entered the fleet, vessel-level landings, revenue, and participation in other HMS fisheries. Post-2001 attrition was 100 percent in Northern California ports, including the San Francisco Bay area; it ranged between 55-75 percent in ports to the south of the PLCA.

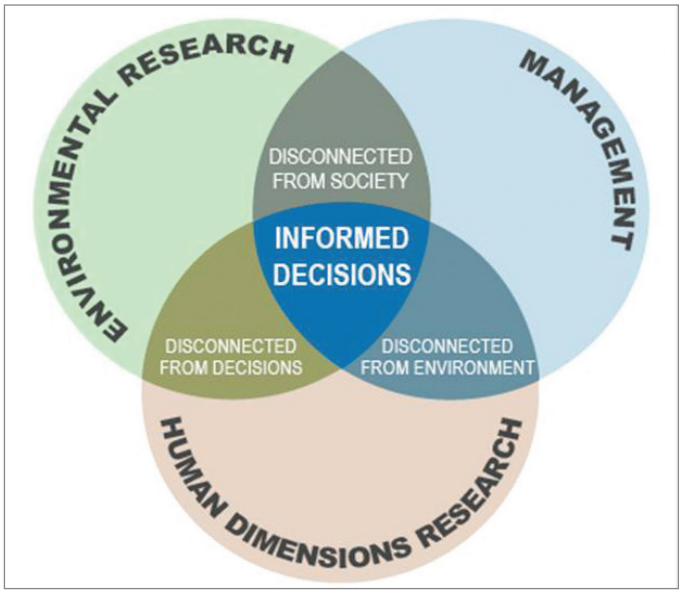


Reduced participation in the drift gillnet fishery denoted by a decline in swordfish landings by region (left) and attrition by home port location (right).

Socio-economic Factors Influencing West Coast Fishing Communities

Carrie Pomeroy, California SeaGrant

Fisheries are integrated social-ecological systems. Their social or human dimensions include people and practices, social and economic activity and relationships, community structure and organization, perceptions and beliefs, governance processes, etc., and how these features are connected and interact with the ecological system. Moreover, it is important to understand these connections and interactions within and across scales (local to international), and their context.



The three components of integrated and informed resource management (Adapted from Michigan Sea Grant, 2005).

The MSA requires that social and economic factors be considered in fishery management decisions. Specifically, National Standard 8 requires that management consider the importance of fishery resources to fishing communities in order to provide for their sustained participation in fisheries and to minimize the adverse economic impacts on those communities. NEPA further requires that federal actions be assessed for their social and economic, as well as their broader environmental impacts. This is important for achieving social and economic goals, but also for avoiding negative, unintended consequences for ecological and social systems.

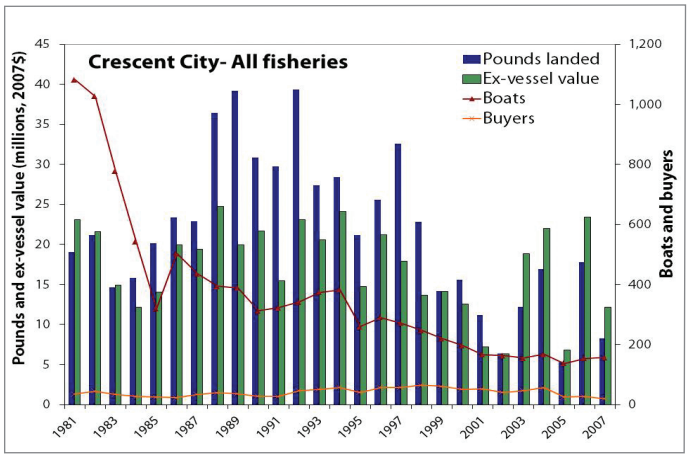
The NMFS National Standard 8 Guidelines define *fishing communities*, in part, as place-based entities (e.g., the San Diego fishing community). However, the reality in fisheries is that they are also defined in terms of occupation and/or interest. For example, the California swordfish fishing community comprises places, fishermen, buyers, processors and others business operators who support and depend on swordfish fishery activities. Moreover, fishing communities often span multiple localities and operate on multiple scales from the local to the global. The interplay of scale and context require careful consideration in designing management actions affecting fishing communities and measuring the impacts .

Local, place-based fishing communities and their key components in spatial context.

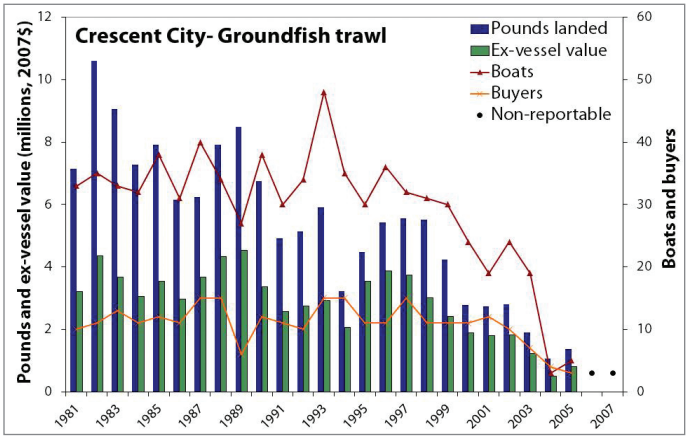
In a project focusing on California's North Coast fishing communities, with collaborators NMFS economist Cindy Thomson and research assistant Melissa Stevens, we started with the concept of place-based communities, and characterized their key features and connections within and beyond those places in terms of occupation and interest. Focusing on Crescent City, California as an example, and using a few common indicators of fishing activity, one can see that local and statewide trends differ (see graphs on the following page). For example, landings at Crescent City were higher in the early 1990s than for the rest of the 1981-2007 period, and even as statewide landings were among their lowest. Moreover, trends differ markedly among fisheries – and for different, though at times inter-related, reasons.

We then identified key factors – social, economic, environmental, regulatory, and more – that affect communities, and used this information to build historically grounded profiles of those communities. Decisions or actions taken in one part of the social system (within or beyond a given community) can have far-reaching effects, producing different outcomes in different communities and at different scales. The resulting information describes and explains how and why things have changed, and provides insights into how future regulatory, economic, environmental, or other events are likely to affect the community both individually and cumulatively. This information is intended to support management and better position fishing communities to proactively and effectively address challenges (e.g., reduced activity at a given port) and opportunities (e.g., growing interest in locally caught seafood). In the case of Crescent City, local conditions coupled with broader scale regulatory and economic factors, have created particular challenges to the maintenance of infrastructure, as has occurred at many California ports (and elsewhere in the United States). The community has a history of meeting diverse challenges, but the cumulative effect of historic and future challenges likely will test the community's resilience and adaptability.

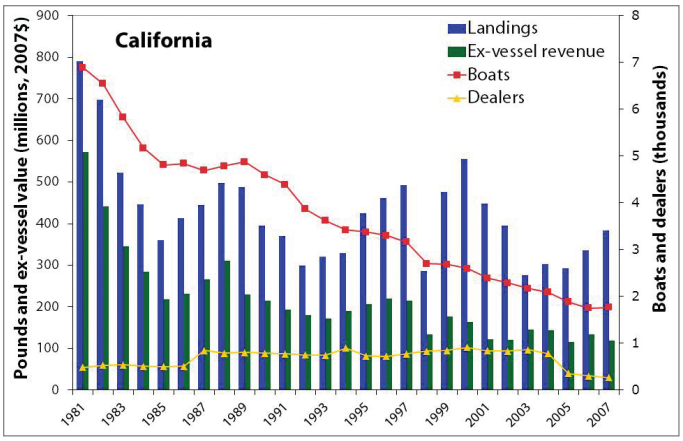
Given their history and context, as California fishing communities look forward, they are or soon will need to address important human dimensions and fisheries system questions, including: What does a viable fishery look like? What does a viable fishing community (or communities) look like? How do you get there? Finally, who decides?



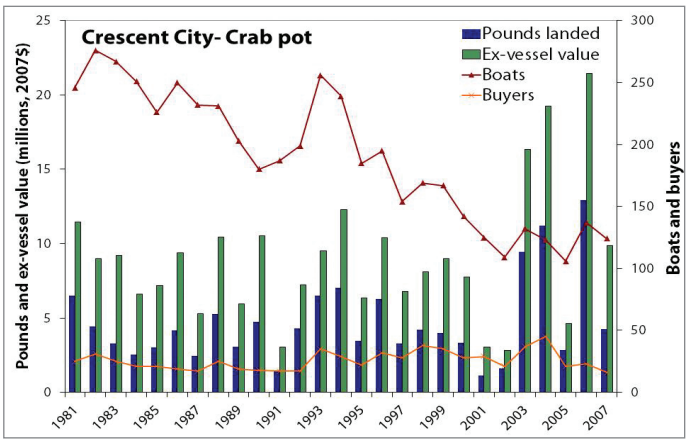
Commercial fishery activity in Crescent City, CA, 1981-2007 (PacFIN data; Pomeroy et al. 2010) .



Commercial groundfish trawl fishery activity in Crescent City, CA, 1981-2007 (PacFIN data; Pomeroy et al. 2010).



Commercial fishing activity in California, 1981-2007 (PacFIN data; Thomson 2009).



Commercial crab pot fishery activity in Crescent City, CA,1981-2007 (PacFIN data; Pomeroy et al. 2010).

Session Summary

Key points made by presenters in this session included:

- Seafood imports represent a significant portion of the U.S. seafood market. The majority of swordfish consumed in the United States is imported. Landings by the U.S. west coast swordfish fishery are dropping while global consumption is on the rise.
- The west coast PLCA appears to be a major factor in the decline of the U.S. west coast swordfish fishing effort. Caps on DGN permits and restrictions in the fishery, combined with higher fuel costs and other regulatory measures, also likely contributed to this decline.
- The potential to expand the local supply of harpoon-caught swordfish is limited due to the need for calm seas and the inefficiency of targeting swordfish on the surface with a handheld spear. Harpoon-caught swordfish also serves a distinct market segment of individuals willing to pay a higher price for premium quality. Therefore, it cannot serve as a feasible substitute for DGN or longline gear to meet demand.
- A reduced U.S. supply of swordfish to the domestic market allows foreign sources to fill the gap with a product that is less sustainably harvested than U.S. caught swordfish.
- A transfer of swordfish effort from U.S. domestic producers to foreign producers, due to regulatory limits on U.S. effort, could reduce the economic benefits of the fishery to U.S. consumers, producers, fishing communities, and conservationists, and harm endangered and threatened sea turtle populations, through the following channels:
    - decreased U.S. fishing effort reduces producer surplus due to lower domestic swordfish fishing profits;
    - reduced spillover benefits from domestic fishing activity and profits results in lost production value to U.S. ports;
    - increased domestic reliance on foreign imports to meet domestic swordfish demand reduces U.S. consumer surplus through some combination of reduced product availability, lower product quality, or higher prices of imports compared to domestic product prices; and
    - effort transferred to less regulated foreign fisheries increases endangered and threatened sea turtle mortality, reducing non-market economic value of sea turtles due to their population decline.

  A net decrease in U.S. economic benefits of the swordfish fishery results if the sum of these effects is negative.
- Fisheries are integrated social-ecological systems. There are critical legal and practical needs for understanding and considering fisheries' social – or human – dimensions. Historically grounded and integrated understanding of fisheries and associated communities, as well as the connections within and among them and across multiple scales, is needed to inform management decisions, avoid unintended consequences, and support adaptation to change.
- Fishing communities are dynamic, requiring a complex set of inter-connected economic and social activities to insure their viability and vibrancy. Greatly diminished fishing opportunities and other changes present significant challenges, but also opportunities.
- As fishing communities and managers look forward, bearing in mind a new reality of limited landings, fewer participants, and the involvement and/or consideration of more diverse interests compared to past decades, they must address important social questions about how to achieve viable fisheries and communities.