Report on SLUTH Workshop

Workshop May 28-29, 2008

Swordfish and Leatherback Use of Temperate Habitat
What is SLUTH?

• Proposed inter-disciplinary research program to improve scientific knowledge for fisheries management and leatherback conservation.
• First in a series of workshops to identify elements necessary for this research program.
• Establish broad-based and cooperative research process.
  • Includes scientists, managers, industry, NGOs
What are the Underlying Issues?
Population Status

• Pacific leatherback populations are endangered and declining

• Multiple sources of mortality include
  • Nesting site threats
  • Coastal fisheries around Pacific
  • High seas fisheries from multiple nations across Pacific
Transboundary & International Issues

• Leatherbacks are transboundary
• Nest in Western Pacific but migrate to multiple foraging areas around Pacific
  – Includes U.S. West Coast
• Interact with multiple fishing fleets throughout their migration
• Minimal conservation measures around Pacific
Distribution of longline catches of swordfish in the Pacific reported for 2004 and movements of western and eastern Pacific leatherback turtles 2005-2008

Source: Benson et al. unpublished; Shillinger 2008, modified from PFMC 2009.
U.S. West Coast Swordfish Fishery

• Declining revenue
• Declining vessel numbers
• Impact not just on fishers
  • 1) Includes processors, ports, service industries
  • 2) Reduced availability of fresh, locally caught product for consumers
U.S. Swordfish Demand (Imports and Landings), 1989-2006

Restricted local swordfish filled by imports
U.S. Conservation

- U.S. has taken the lead on conservation measures
- Endangered Species Act
- Magnuson-Stevens Act
- Marine Mammal Protection Act
- U.S.-type conservation is rare in the Pacific
SLUTH Research Recommendations

Inter-disciplinary research program to improve scientific knowledge for fisheries management and leatherback conservation.
Science Research Elements

• Two Ways to Minimize Bycatch Mortality:
  • 1. Fish where there are no turtles
  • 2. Change gear, bait, and practices
• What are environmental costs of swordfish consumption in the U.S.?
  • Both domestic and foreign sources
Reduce Encounter Rates

• Is there separation between sea turtles and swordfish that allows more fine-tuned management?

• Requires Knowing:
  • What are the spatial and temporal patterns in habitat use for swordfish and sea turtles?
  • Vertical or horizontal separation
  • Ecosystem and life history context
  • Foraging areas, migration patterns, oceanographic influences on movements
Reduce Encounter Rates

• Explore feasibility of model-based adaptive management
  • Real-time response by fishers to dynamic environment
  • E.g. a web-based tool to predict probability of turtle encounters by area
Minimize Entanglement and Entrapment

• Are there gear and/or operational modifications that can potentially minimize bycatch?
SLUTH and Sustainable Fishing

- SLUTH spearheads scientifically based leatherback population recovery.
- Allows U.S. fishers to be at the forefront of global sustainable fisheries.
- Export lessons learned to rest of the world.
Economic Research Questions

• Transfer effects hypothesis
• Demand and import analysis
• Spillover effects onto other species & ecosystems
• Least-cost conservation alternatives
  • Orders of magnitude difference between nesting site and at-sea protection
• Economic viability of alternative gears and bycatch reduction measures
Thank You!
Transfer Effects Hypothesis

Unregulated High Seas

Increase turtle mortality?

Transfer effort

Regulated EEZ

No technology transfer

Swordfish imports replace locally caught

Restrict swordfish catch
Distribution of longline catches of swordfish in the Pacific reported for 2004 and movements of western and eastern Pacific leatherback turtles 2005-2008

Source: Benson et al. unpublished; Shillinger 2008, modified from PFMC 2009.
U.S. Swordfish Demand
(Imports and Landings), 1989-2006

Reduced local swordfish filled by imports

Year

Metric tons

Imports

Landings

1989 1991 1993 1995 1997 1999 2001 2003 2005
Decline of Pacific Leatherback Turtles

- **Malaysia** 1988–94
  - Source: Spotila et al. 1996

- **Mexiquillo, Mexico** 1984–95
  - Source: Sarti et al. 1996

- **Las Baulas, Costa Rica** 1988–98
  - Source: Spotila et al. 2000
CTD profile

Leatherback dive profile → Foraging within thermocline

Foraging behavior

29 September 2005
Shaded Bars denote night time. Note the diel vertical behavior and the infrequent basking events.

It is only during basking that swordfish are accessible to the harpoon fleet. Swordfish are taken in surface waters by the DGN fleet at night.
Final Remarks

• SLUTH is a science-based research process to address information gaps and inform public policy

• Contributes to
  • healthy U.S. swordfish fishery,
  • the recovery of leatherback populations,
  • the supply of fresh, locally caught fish.

• First step in an on-going, inclusive scientific research process