Cost-Benefit Analysis of DGN Swordfish Time-Area Closure

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Organization

- 1. Purpose and General Approach
- 2. Impact Channels
- 3. Empirical Results
- 4. Concluding Remarks

1. Purpose and General Approach

General Purpose

- Measure gains and losses in consumer and producer benefits and bycatch due to closure
  - Measure “transfer effect”
  - Standing: PFMC states
- Calculated over two time frames:
  - 25 years (lots of extrapolation beyond counterfactual models)
  - 2001 through 2010 (11 years)
- Place dollar value on most impacts: net present value
  - $2012

With and Without Comparison

- Requires comparison of “with” closure to “without” closure
- “Without” closure requires economic models that estimate the counter-factual or what would have happened without closure

Local Harpoon Landings

- Harpoon landings assumed unaffected by DGN closure (very small landings, appear “flat”)
- Local harpoon and DGN/longline swordfish landings in separate markets
  - No substitution
- Local harpoon swordfish luxury good
- Local DGN & longline swordfish normal good

No Formal Counterfactual Model Foreign Production

- But analysis of global swordfish data shows increased production throughout time period of concern.

2. Impact Channels

Local DGN Vessels and Prices

- 1. Producer benefit loss from fewer DGN vessels
  - Some vessels exit altogether and others switch to other fisheries
  - Calculated two extremes: all exit and all switch
- 2. Higher price for fresh, locally caught swordfish and shark
  - Gain in producer benefits remaining DGN vessels
  - Loss in consumer benefits
  - Cancel each other out (transfer of benefits from consumers to producers)

Consumer & Producer Losses from Lower DGN Landings Swordfish & Sharks

- 3. Loss in consumer and producer supply chain benefits from lower landings of fresh, locally caught swordfish and shark

Increased Imports Swordfish

- 4. Gain in consumer and producer benefits throughout supply chain from increased swordfish imports from foreign producers
  - Predominately frozen imports, some fresh
  - Substitute for reduced local, fresh landings

Increased Local Longline Swordfish 2001-2004

- 5. Gain in consumer and producer supply chain benefits from increased landings of fresh, local, longline-caught swordfish
  - Substitute for reduced DGN landings
- 6. Loss in longline producer benefits from increased landings of fresh, local, swordfish
  - Loss, not gain, because longliners Hawaii vessels
  - Producer benefit not enjoyed by PFMC states, but by Hawaii
  - “Production leakage”

Sea Turtle Bycatch

- 7a. Gain in consumer benefits from lower DGN sea turtle bycatch
- 7b. Loss in consumer benefits from higher foreign producer sea turtle bycatch with increased swordfish production and imports
- 7c. Net effect is “transfer effect”

Hawaii Swordfish “Imports”

- 8. Cannot measure increased swordfish “imports” from Hawaii to replace reduced local swordfish landings
  - Affects consumer and supply chain benefits
  - Does not affect overall sea turtle bycatch and bycatch mortality because HI longline fishery ESA regulated

3. Empirical Results

Impact Channel	Consumer/Producer Change 2001-2010 (NPV)	Consumer/Producer Change 25 years (NPV)
All DGN vessels exit (-) $	-11,423,381	-15,479,999
All DGN vessels switch (-) $	-10,066,574	-14,028,528
Consumer and supply chain loss lower local swordfish and shark (-) $	-30,707,102	-73,332,166
Consumer and supply chain gains imports (+) $	14,748,017	33,114,154
Consumer and supply chain gains increased local longline caught swordfish (2001-2004) (+) $	6,386	6,316
Producer (vessel) losses increased local longline caught swordfish (2001-2004) (Leakage to Hawaii) $	-94,836	-93,924
Total net benefits all DGN vessels exit (-) $	-27,470,916	-55,785,620
Total net benefits all DGN vessels switch (-) $	-26,114,109	-54,334,149
DGN bycatch after closure (numbers of animals)	45	84
Foreign bycatch afer closure (numbers of animals)	1,457	3,901

4. Conclusions

Conclusions

- Loss in US PFMC Region consumer and producer benefits from DGN closure
  - Consumers prefer local, fresh swordfish and shark
  - Consumers lose consumer benefits
  - Local, fresh swordfish replaced by predominately frozen swordfish
    - No local harpoon-caught replacement
  - Local fishers and supply chain lose producer benefits
  - Increase in net sea turtle bycatch due to higher foreign bycatch rate

Thanks! Questions?

What are Consumer and Producer Benefits?

- Consumer benefits (losses) are technically gains (losses) in compensating variation
- Producer benefits (losses): some are gains (losses) in compensating variation and others are gains (losses) in producer surplus (profits)