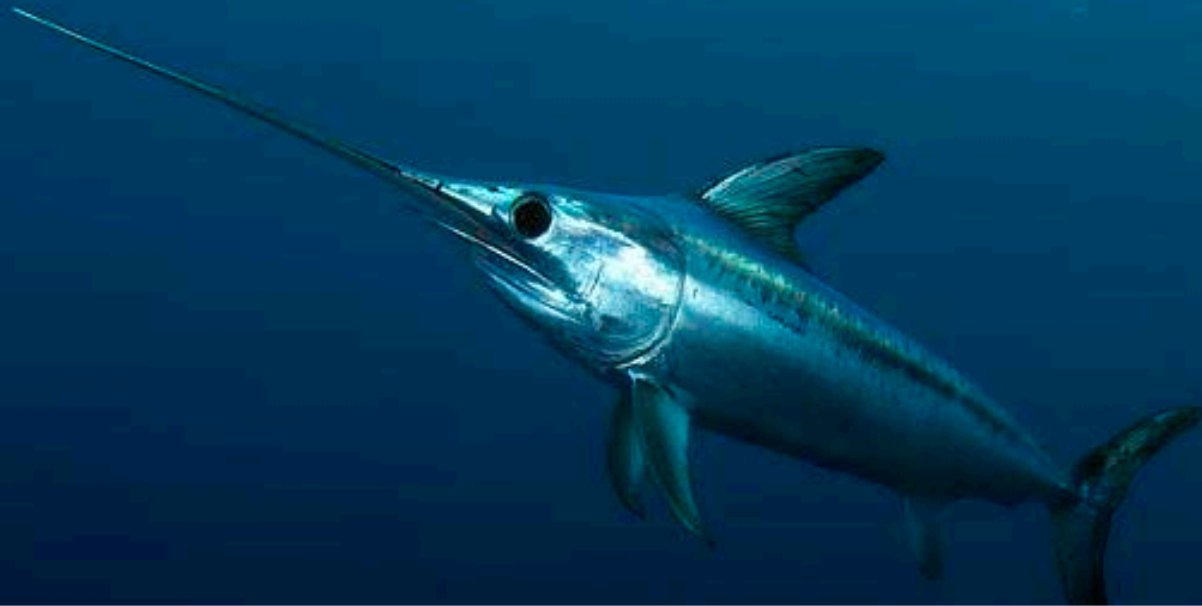


Agenda Item H.4.c  
Supplemental Public Comment 3  
March 2015



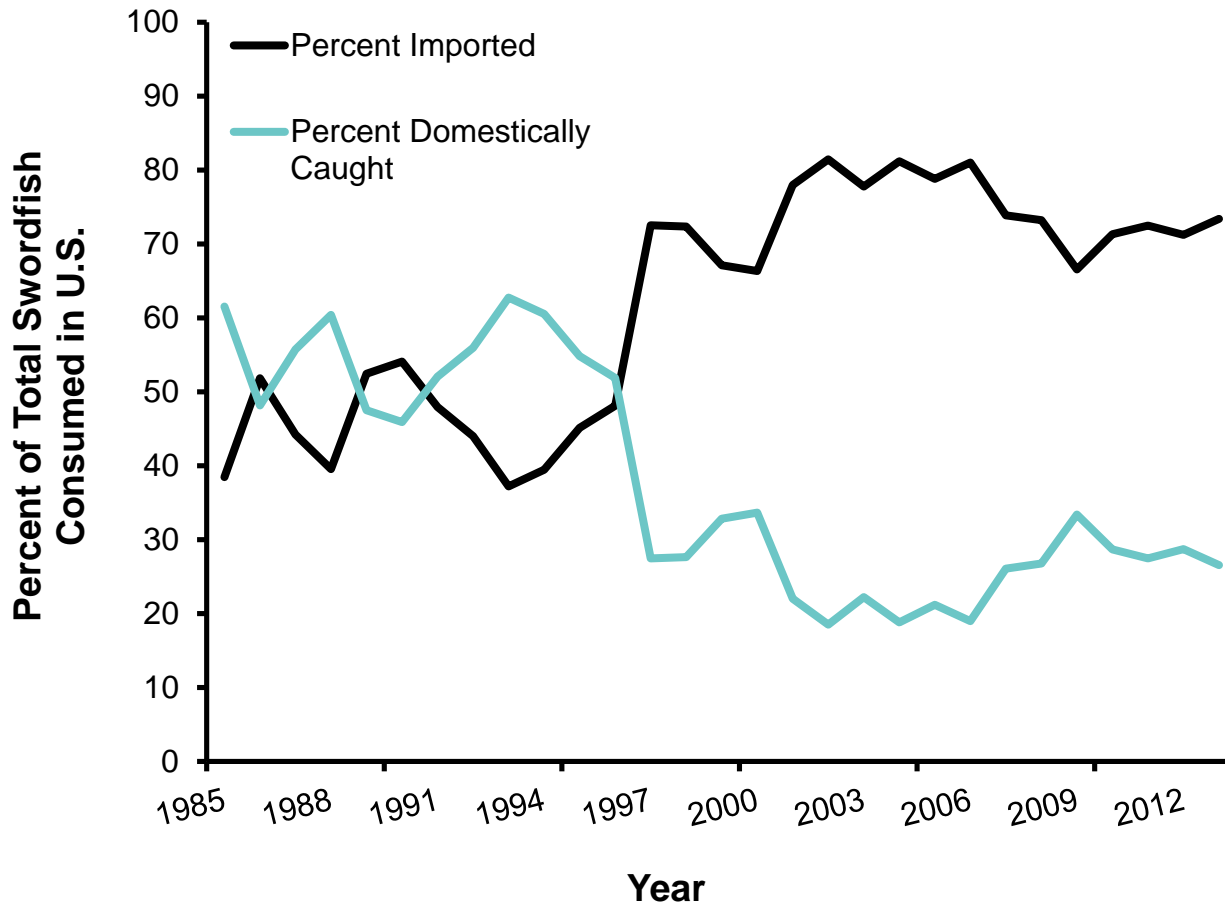
# Exploring management scenarios to revitalize the California commercial swordfish fishery

Paige Berube, Jennifer Couture, Miguel Gomez, Lexi Journey, & Aliya Rubinstein

Clients: NOAA & The Nature Conservancy



# Imports to Meet Consumer Demand

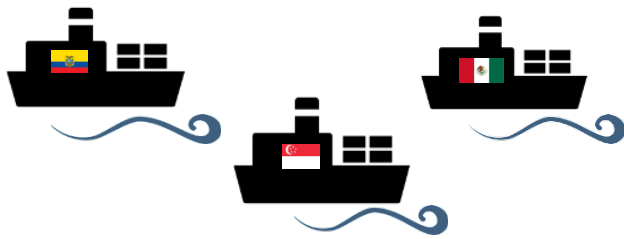


- Top Import Countries**
1. Ecuador 25%
  2. Canada 15%
  3. Singapore 11%
  4. Costa Rica 11%



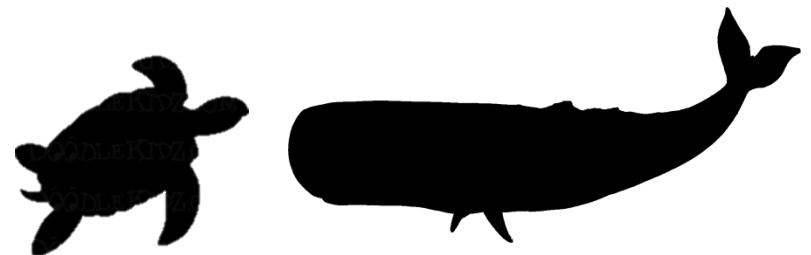
# Project Motivation

How to increase domestic  
California swordfish supply



And decrease reliance on  
foreign swordfish imports

In order to decrease the  
impact to sensitive  
species



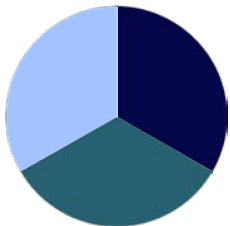


# Project Objective

**Model a range of management scenarios that result in different swordfish catch, profit, and bycatch**

## Gear Effort

# of vessel days



- Harpoon
- Drift gillnet
- Longline

+

## Space



=

Catch



Profit

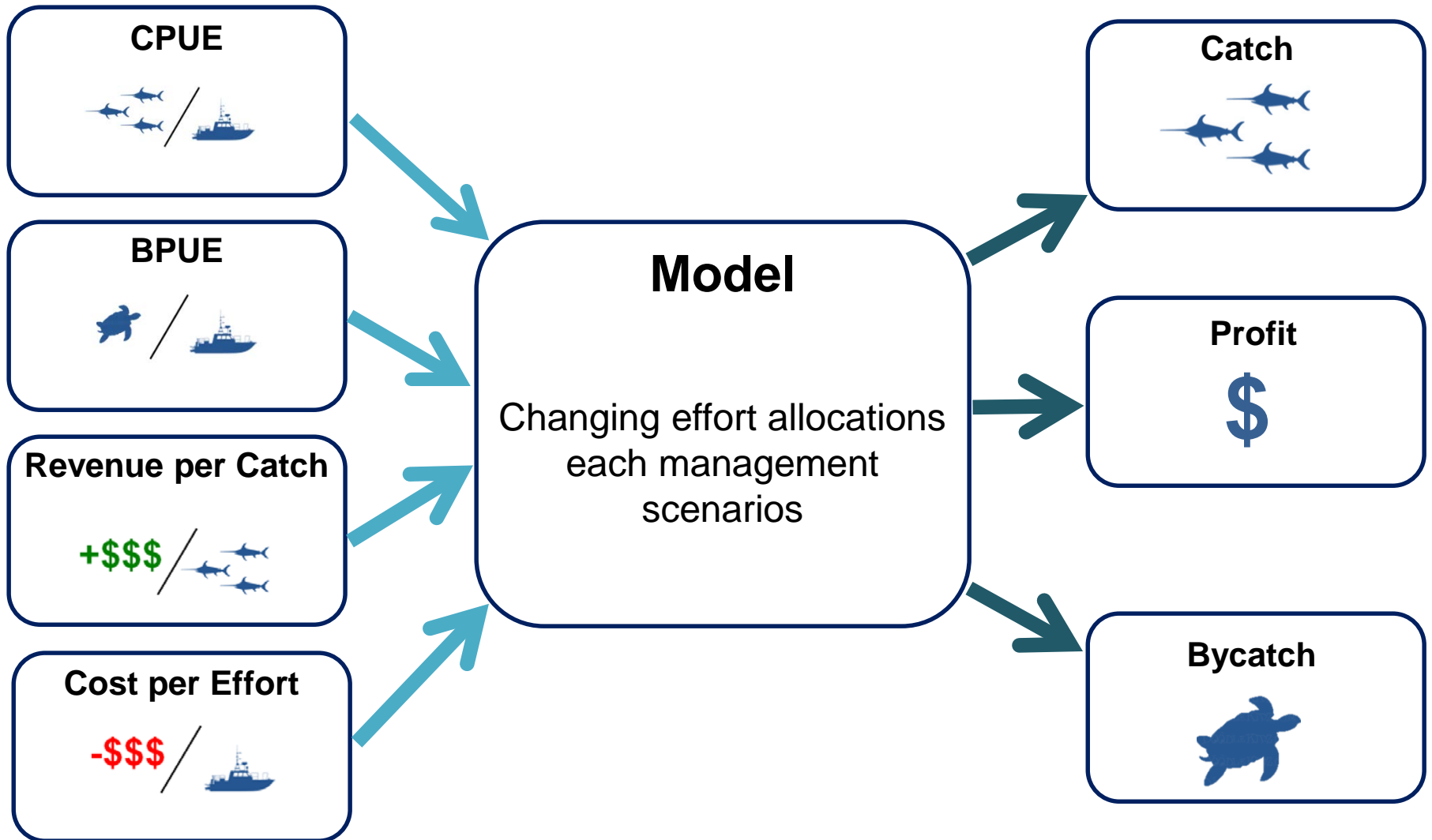


Bycatch

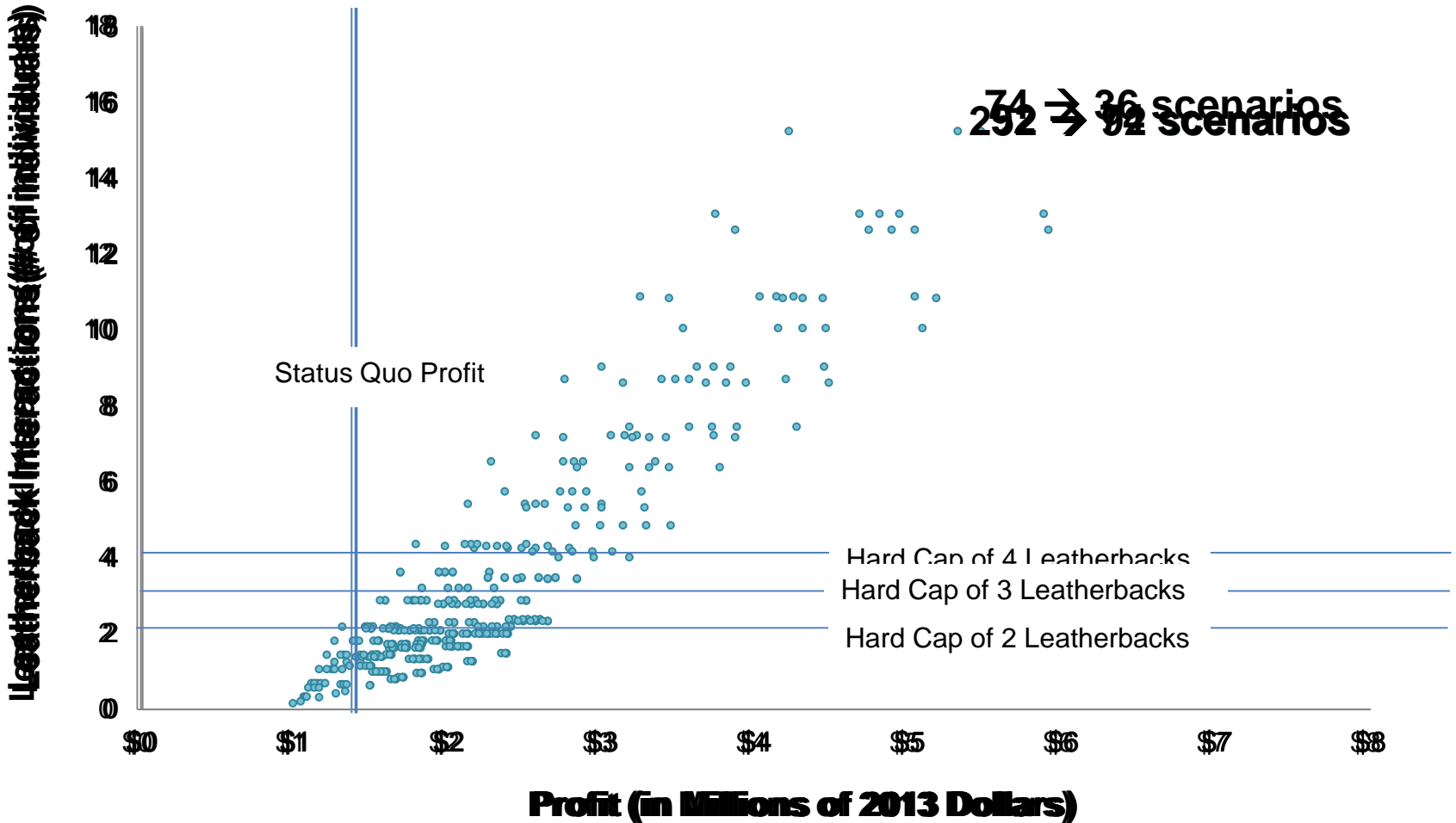




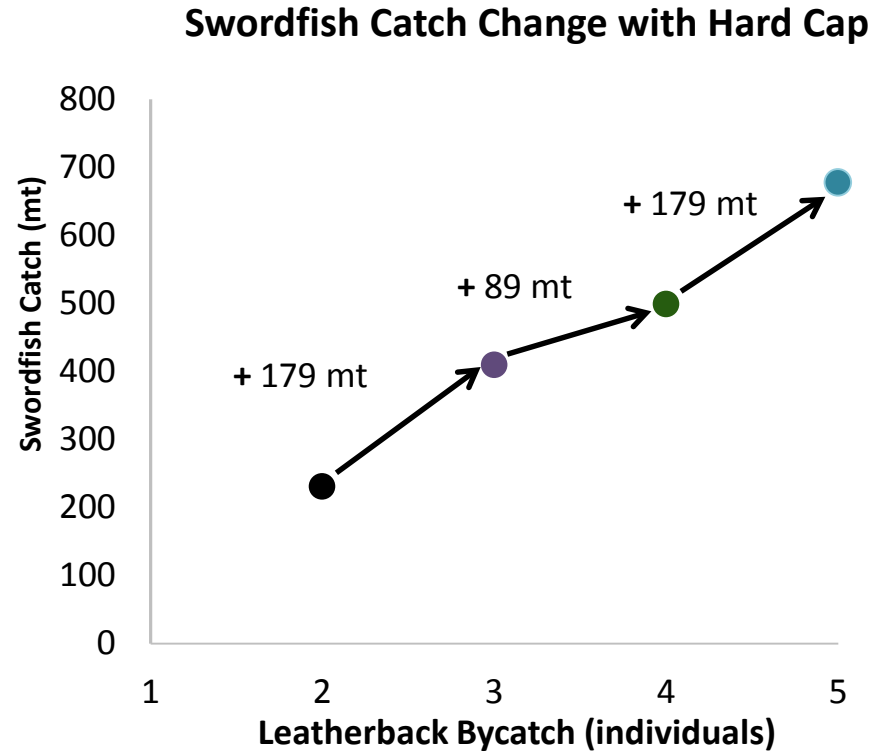
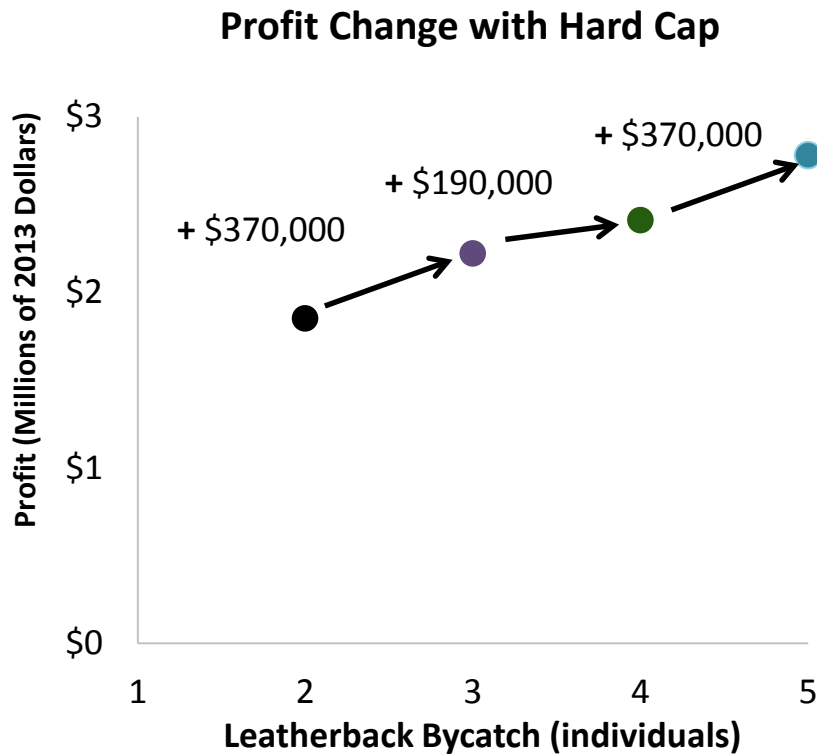
# Model



# Conservation and Economic Constraints on Scenarios

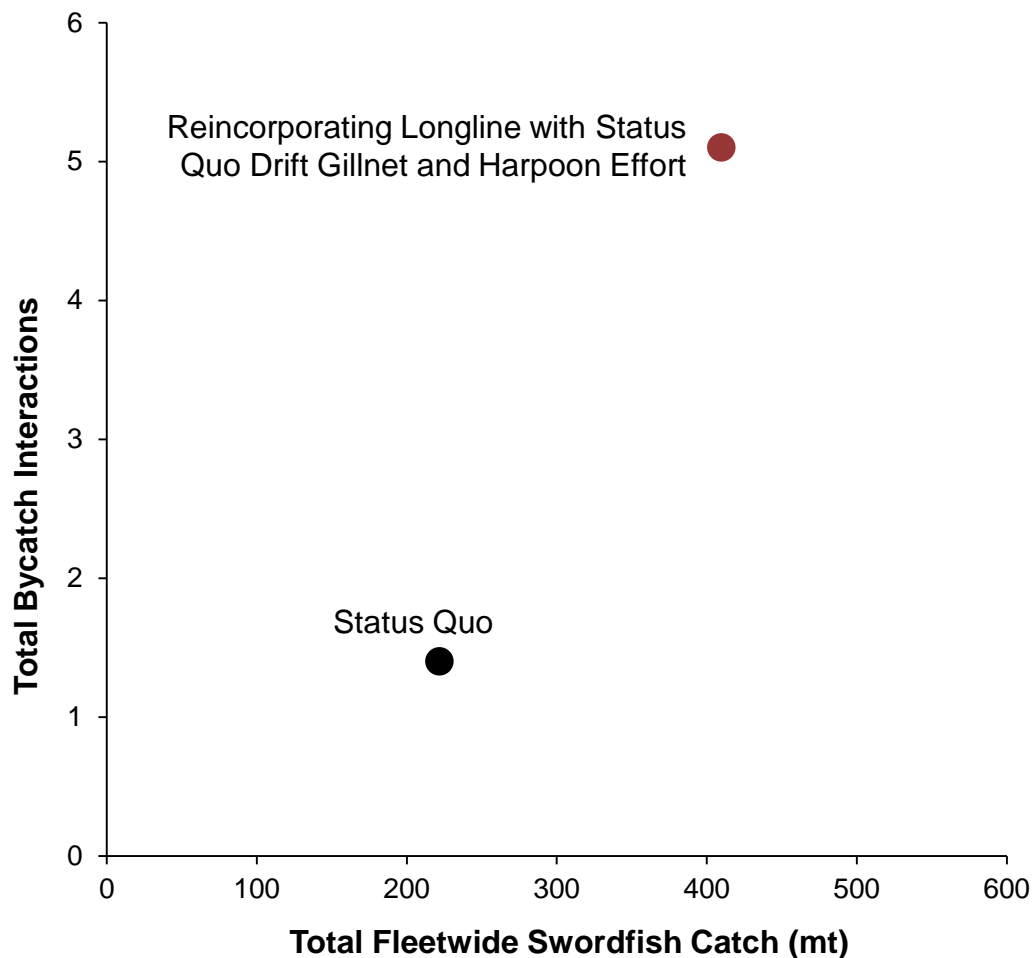


# How do different bycatch hard caps impact swordfish catch and fleetwide profit?



- *Same color dot represents leatherback hard caps ranging from 2 – 5 under the same management scenario*
- *Overall, increasing the hard caps increases the profit and the swordfish catch potential for the fishery*

# Explore potential outcome of approving longline EFPs under a bycatch hard cap



## Status Quo (average 2006-2013)

Drift Gillnet: **35** vessels

Harpoon: **24** vessels

Longline: **0** vessels

Profit: \$1.48 million

Catch: 222 metric tons

## Reincorporating Longline

Drift Gillnet: **+ 0** vessels

Harpoon: **+ 0** vessels

Longline: **+ 7** vessels



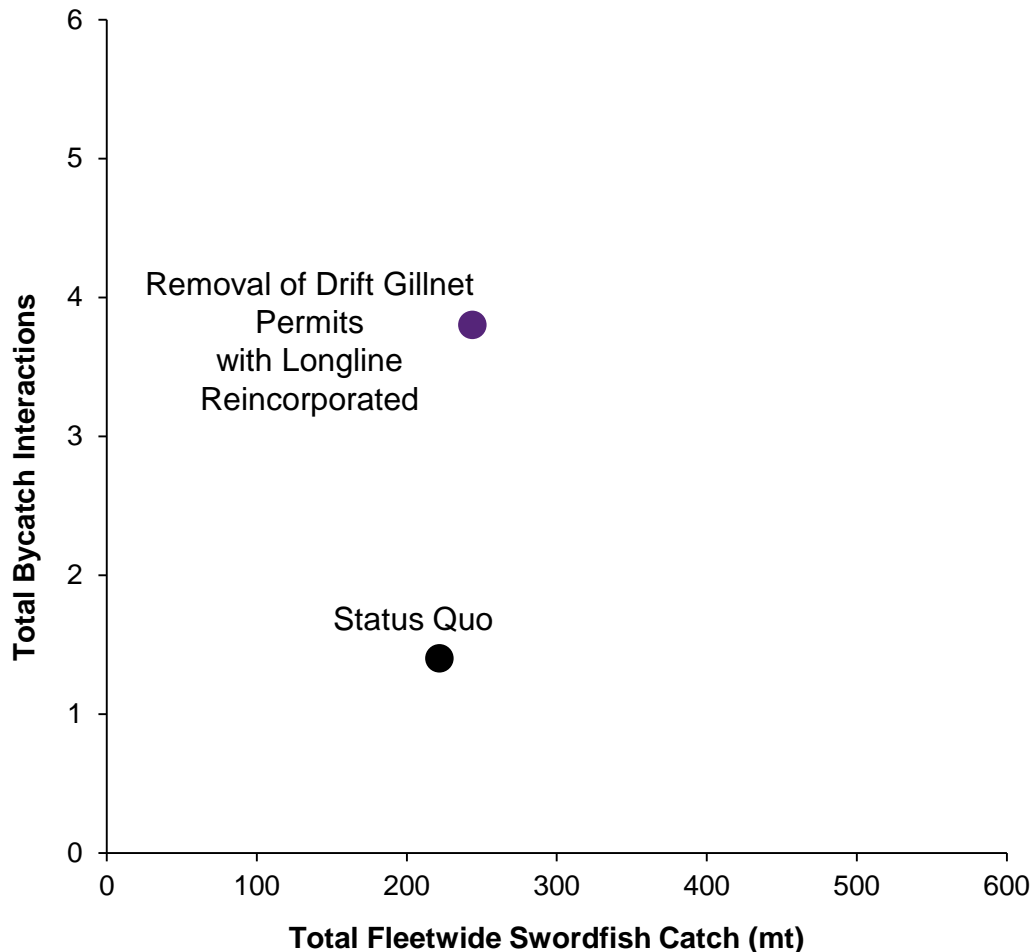
Profit by \$740,000

Catch by 188 metric tons

- Not 2015 Status Quo (average effort: 2006-2013)
- Bycatch interactions not based on mortality
- Hawaii longline landings to California data
- Difference in average vessel days per vessel
  - Drift gillnet 22
  - Longline 42
- Exploring the reintroduction of longline into the California swordfish fishery



# Explore potential outcome of removing drift gillnet permits under a bycatch hard cap



## Status Quo (average 2006-2013)

Drift Gillnet: **35** vessels

Harpoon: **24** vessels

Longline: **0** vessels

Profit: \$1.48 million

Catch: 222 metric tons

## Removal of Drift Gillnet Permits

Drift Gillnet: **- 35** vessels

Harpoon: **+ 0** vessels

Longline: **+ 7** vessels

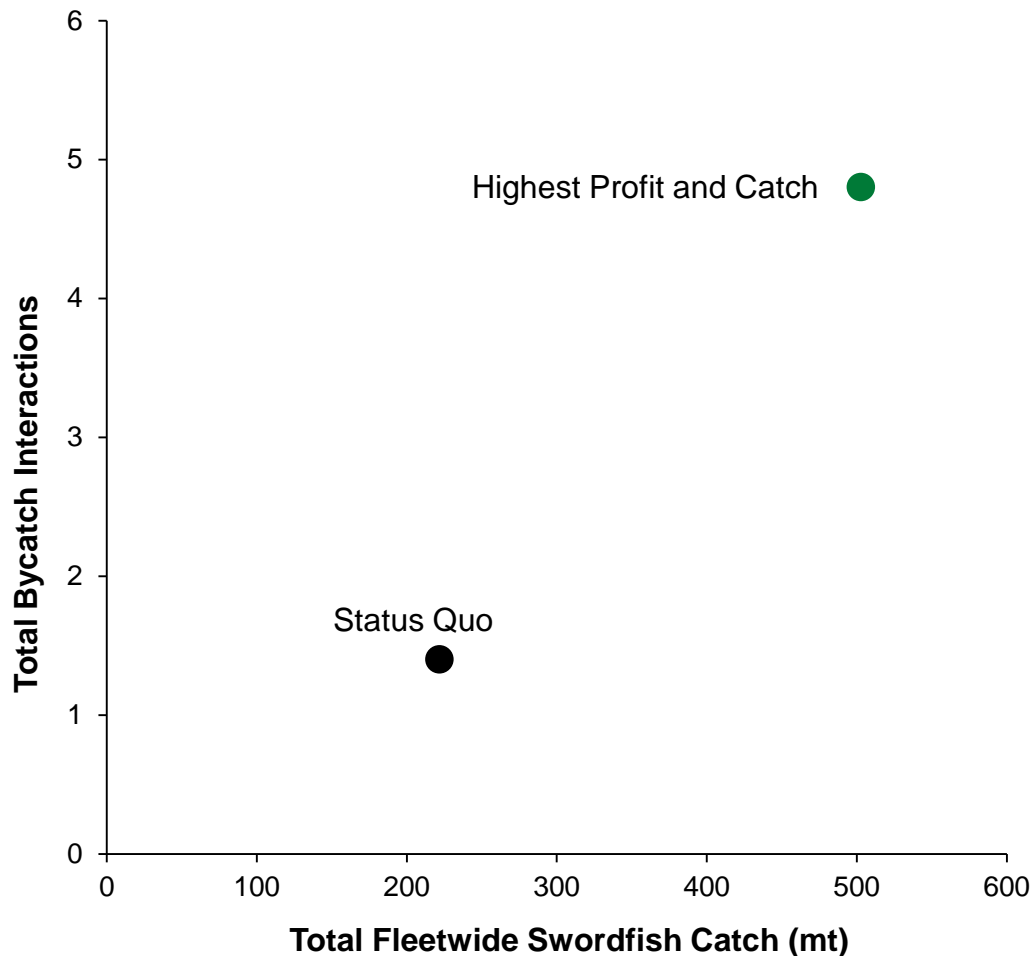


Profit by \$20,000

Catch by 22 metric tons

- Not 2015 Status Quo (average effort: 2006-2013)
- Bycatch interactions not based on mortality
- Difference in average vessel days per vessel
  - Drift gillnet 22
  - Longline 42
- Exploring catch, profit, and bycatch interactions associated with the removal of the drift gillnet permits with the reincorporation of longline

# Explore the highest profit and catch model scenario under a bycatch hard cap



## Status Quo (average 2006-2013)

Drift Gillnet: **35** vessels

Harpoon: **24** vessels

Longline: **0** vessels

Profit: \$1.48 million

Catch: 222 metric tons

## Top Profit and Catch

Drift Gillnet: **+ 41** vessels

Harpoon: **+ 0** vessels

Longline: **+ 3** vessels



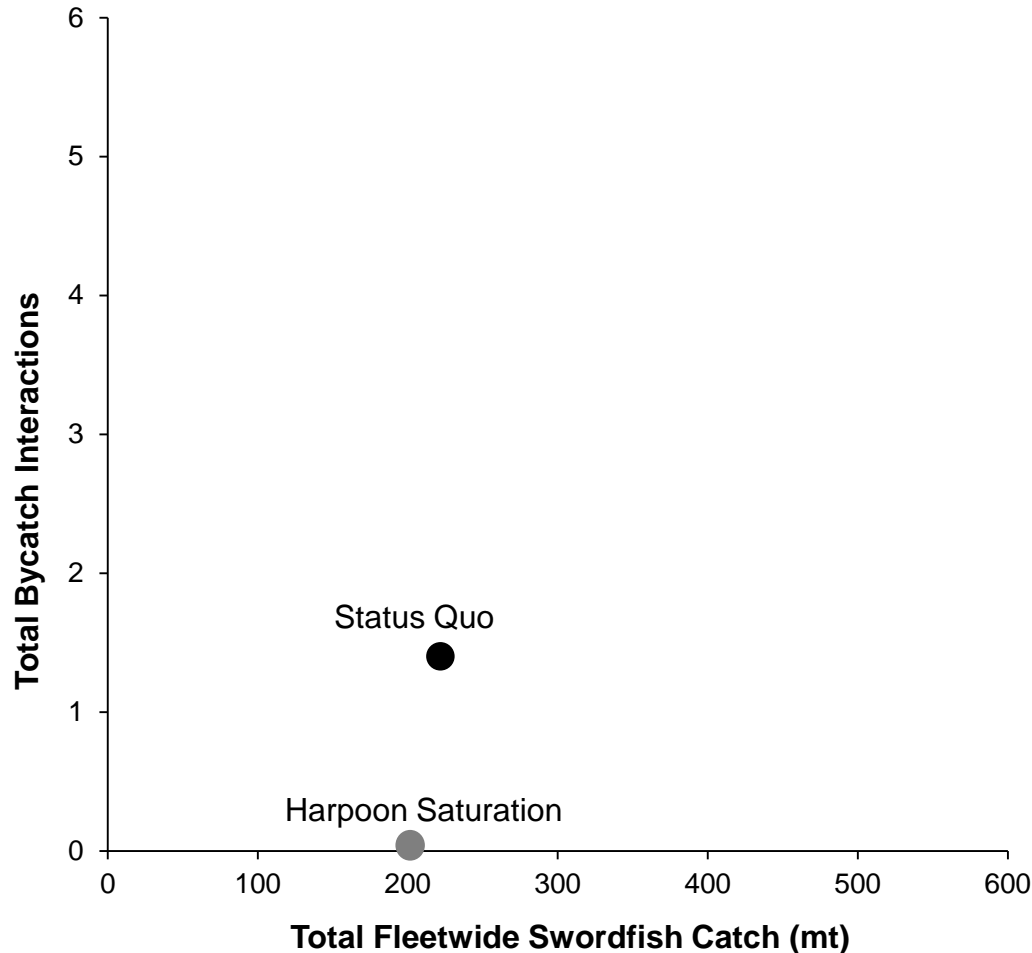
Profit by \$1.16 million

Catch by 281 metric tons

- Not 2015 Status Quo (average effort: 2006-2013)
- Bycatch interactions not based on mortality
- Difference in average vessel days per vessel
  - Drift gillnet 22
  - Longline 42
- Due to lower bycatch interactions in drift gillnet data (with 20% observer coverage), the highest profit and catch scenario under a hard cap had increased drift gillnet vessels
- Other market species are incorporated for drift gillnet and longline

*\*Hypothetical model scenario*

# Explore the infeasibility of a harpoon-only fleet



## Status Quo (average 2006-2013)

Drift Gillnet: **35** vessels

Harpoon: **24** vessels

Longline: **0** vessels

Profit: \$1.48 million

Catch: 222 metric tons

## Saturate Harpoon Market

Drift Gillnet: **- 35** vessels

Harpoon: **+ 71** vessels

Longline: **+ 0** vessels

Profit by \$0.95 million

Catch by -18 metric tons

- Not 2015 Status Quo (average effort: 2006-2013)
- Historical max. harpoon catch in 1986 – 204 mt
- A thought experiment to determine the profit and catch associated with a harpoon-only fleet
- Infeasible because harpoon effort is constrained by weather conditions and swordfish behavior not regulation

*\*Hypothetical model scenario*

# Conclusions & Recommendations

- Created a tradeoff analysis tool that can be adapted for other gear types and different effort levels, while considering bycatch interactions
  - Other gear types: Deep-set buoy gear & deep-set longline
- We recommend the Council consider a gear portfolio that reincorporates longline
  - Would increase domestic swordfish catch and fleetwide profits
- Harpoon is not a viable gear type to increase catch on a commercial scale
- Attention should be paid to fishery participation and overall domestic catch when considering the implementation of hard caps as an additional regulation
- Transition to 100% observer coverage through a combination of observers and electronic monitoring based on capacity of vessels and given innovations that allow electronic monitoring to be feasible on vessels
- Thought experiment: completely replacing imported swordfish with domestic swordfish has the potential to reduce global sea turtle interactions by **almost 9,000** individuals