Dive Fisheries
in Southeast Alaska

2018 Report to the Alaska Board of Fisheries

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by

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Topics

- Focus on major issues of dive fisheries proposals

- Orientation of fisheries

- Pertinent management plan elements

- Population surveys and GHLs (Proposals 86,88,89,90)

- Closed waters – sea cucumbers (Proposal 87)

Southeast Dive Fisheries Overview

- ## Dive fisheries
  - Sea cucumber – throughout much of the region
  - Geoduck – in southern part of region and Sitka area
  - Red sea urchin – only in southern part of region around Ketchikan

- ## Management
  - Require diving/hand picking; GHLs by area; may have short fishery openings (a day or two per week) or trip limits
  - Fishery areas managed by rotation
  - Stock assessment surveys required
  - Southeast Alaska Regional Dive Fisheries Association (SARDFA)

- ## Challenges
  - Sea otter recolonization greatly impacting species and fisheries
  - Sparse data about life history and uncertainty of biomass estimates in Southeast Alaska warrant conservative management approach
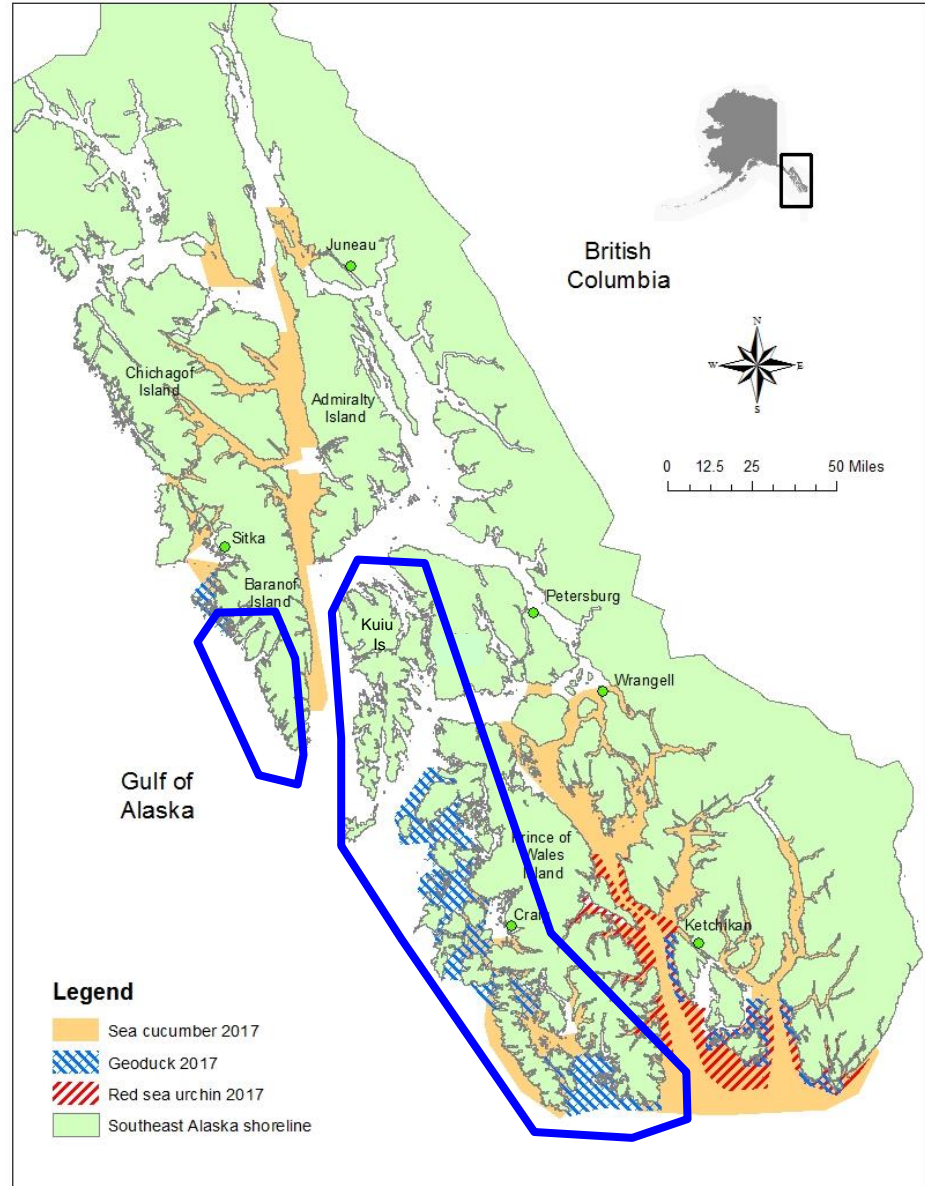
Fishery locations and sea otters

Historical Fishery Areas
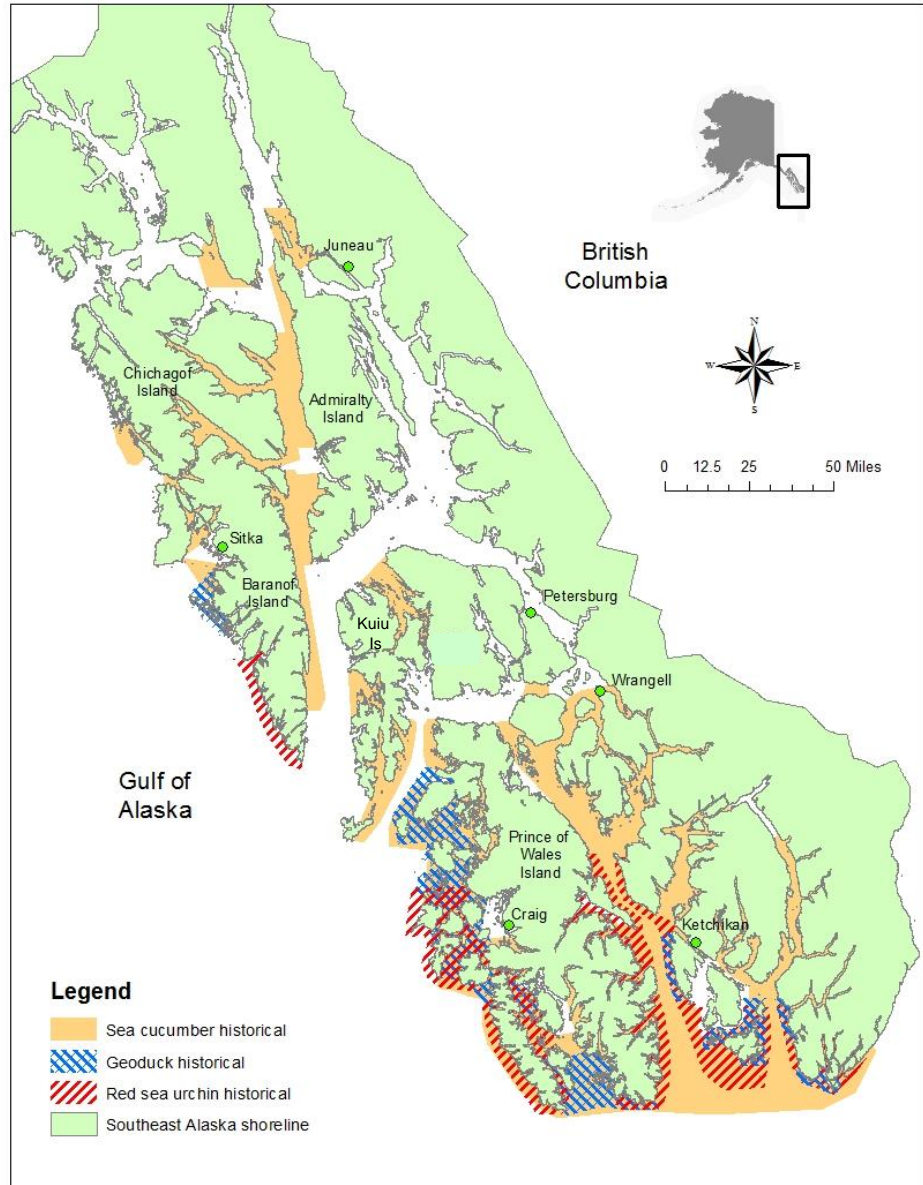
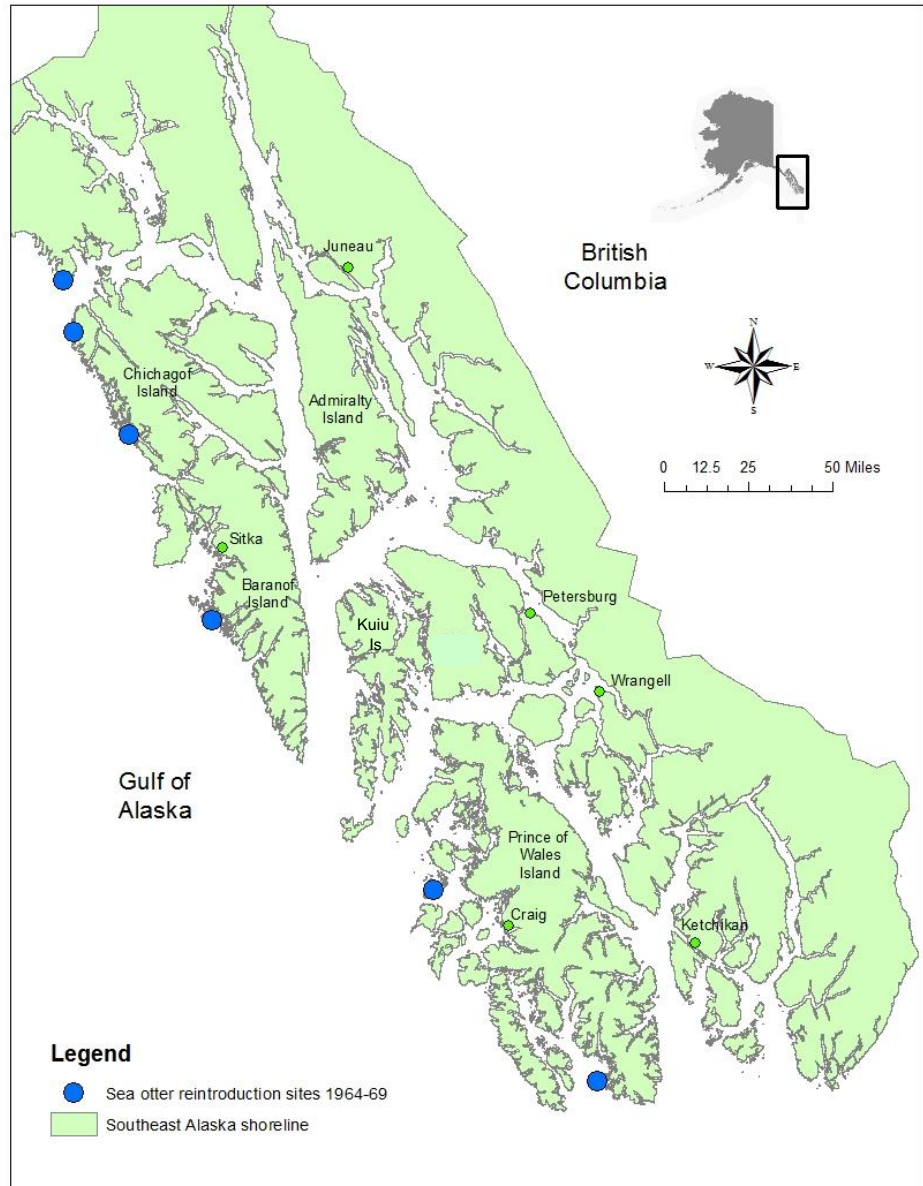# Fishery locations and sea otters

Active Fishery Areas

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Fishery locations and sea otters

Sea otter translocation sites 1965-1969

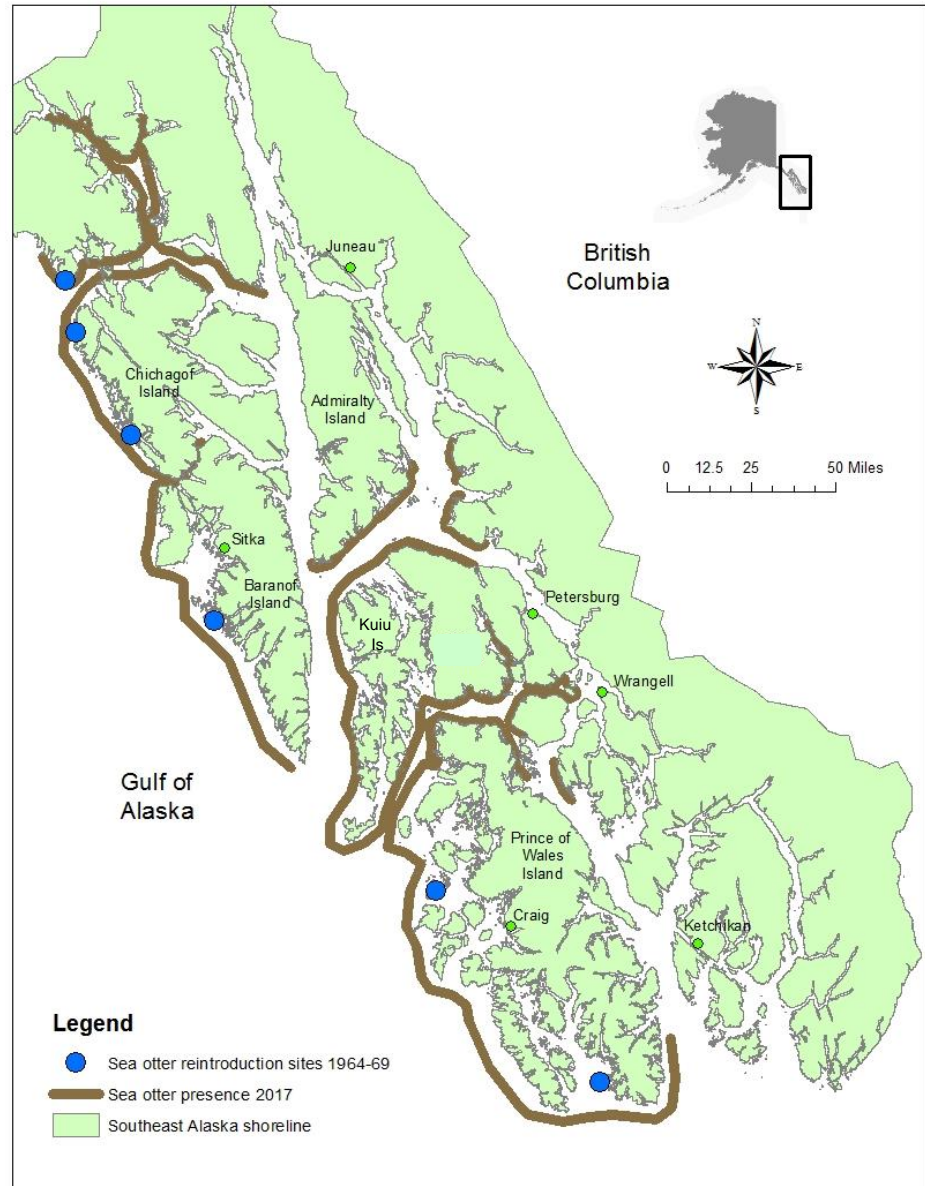Total of about 400 otters

Fishery locations and sea otters
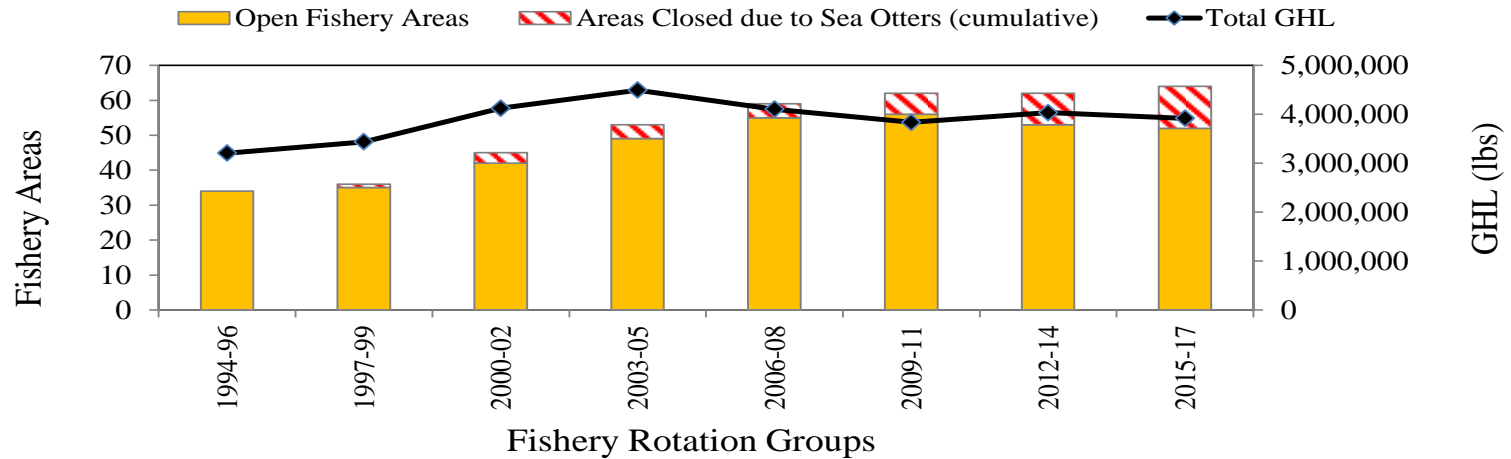
Sea otters numbers -
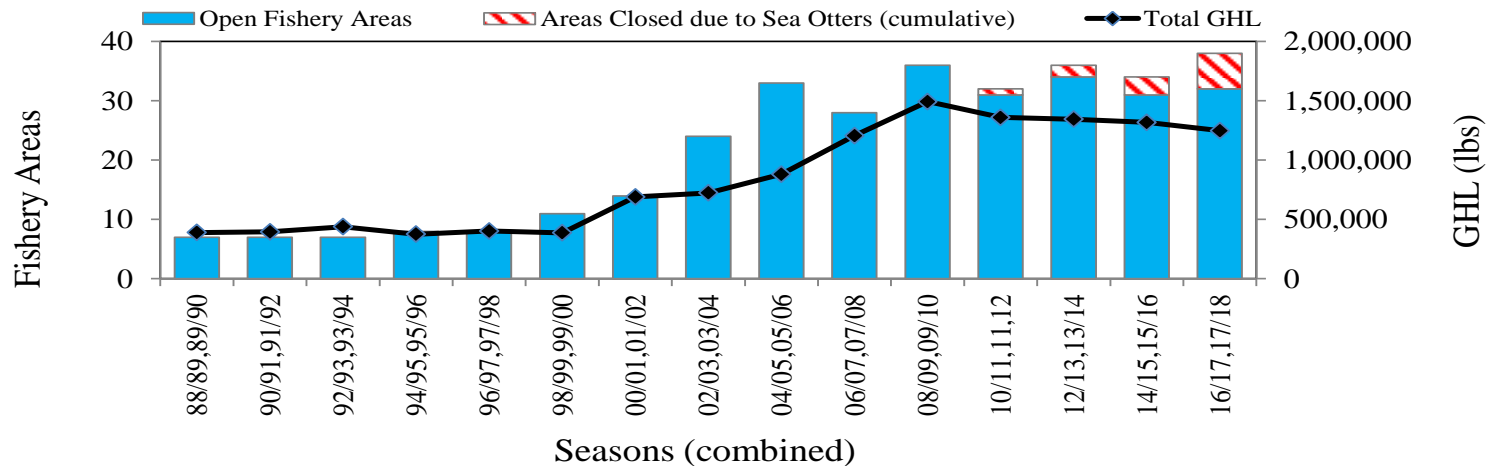
1994: 9,000

2017: 25,000+

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Sea Otter Impacts

Sea Cucumber GHL and Fishery Areas, 1994 - 2017

Geoduck GHL and Fishery Areas, 1988 - 2017

Biomass Estimates

- Biomass estimates required for every individual management area

- Population monitoring limited to observed density and weight

- Uncertainty around observed biomass estimates

- Confidence intervals and use of lower bound provides a way to increase confidence that true estimate is greater than what is used to calculate the GHL.

Example of Spatial Variability

Patchy distribution
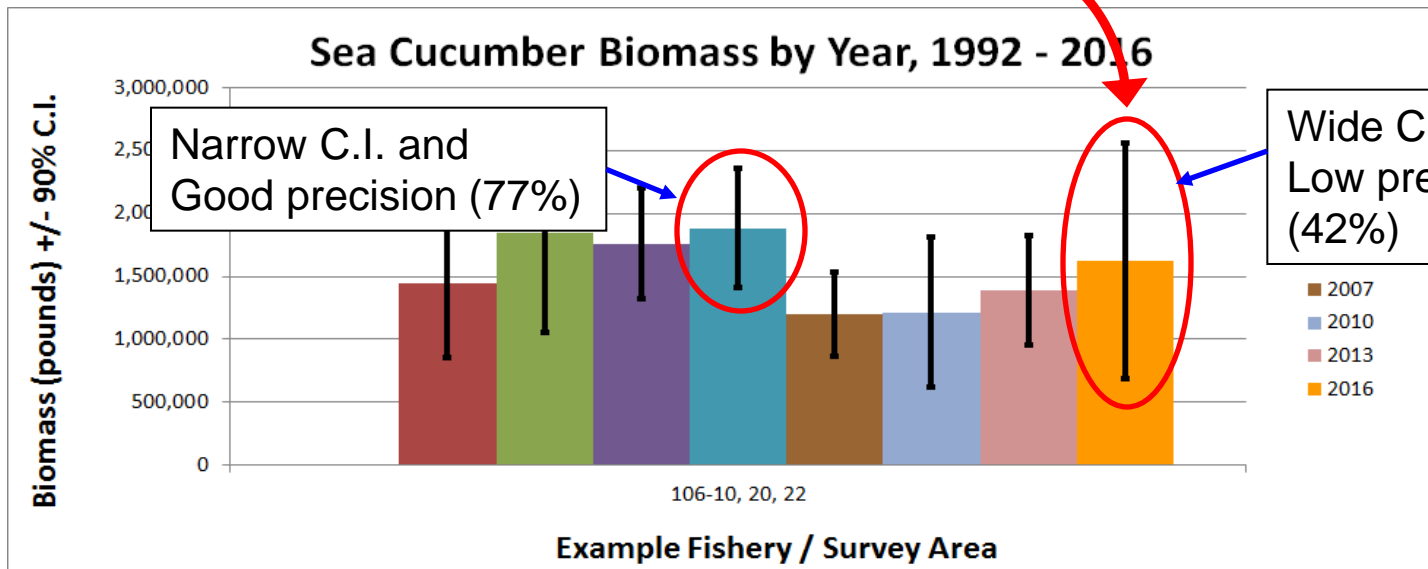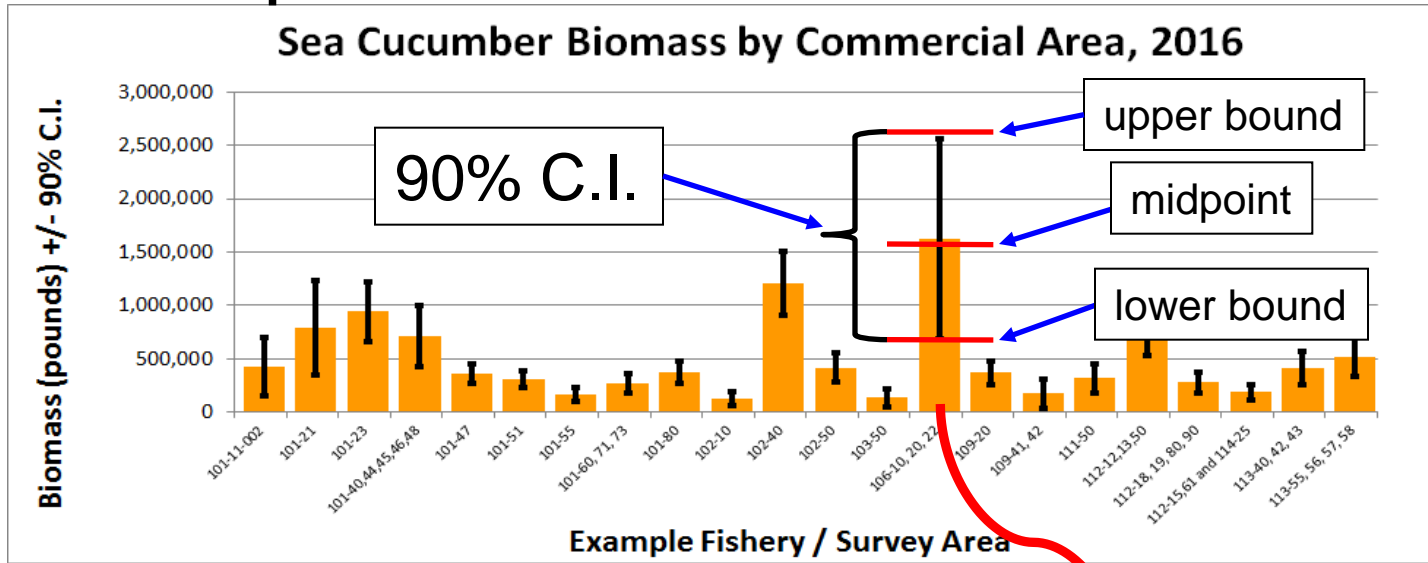(wide C. I.)
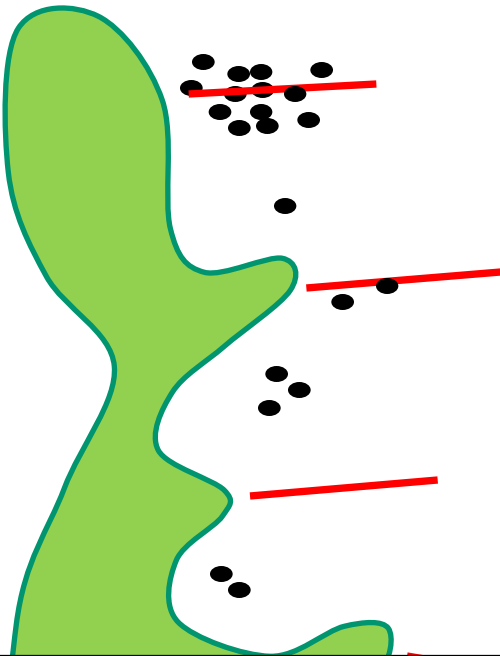
Uniform distribution
(narrow C. I.)
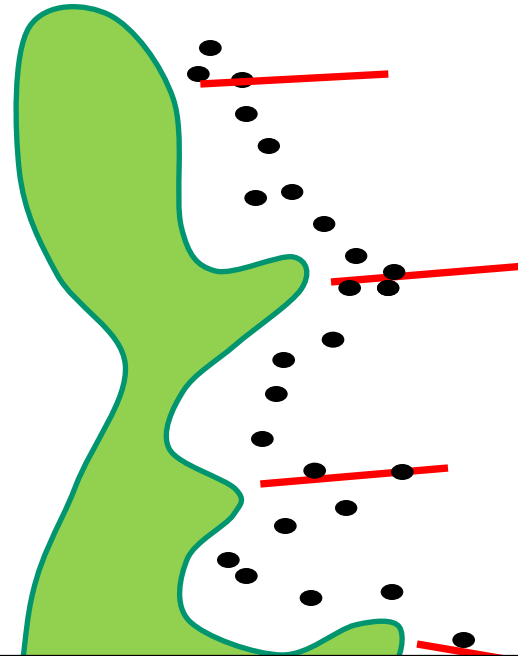
The true distribution and density is unknown -
We only see transect results and so depend on those
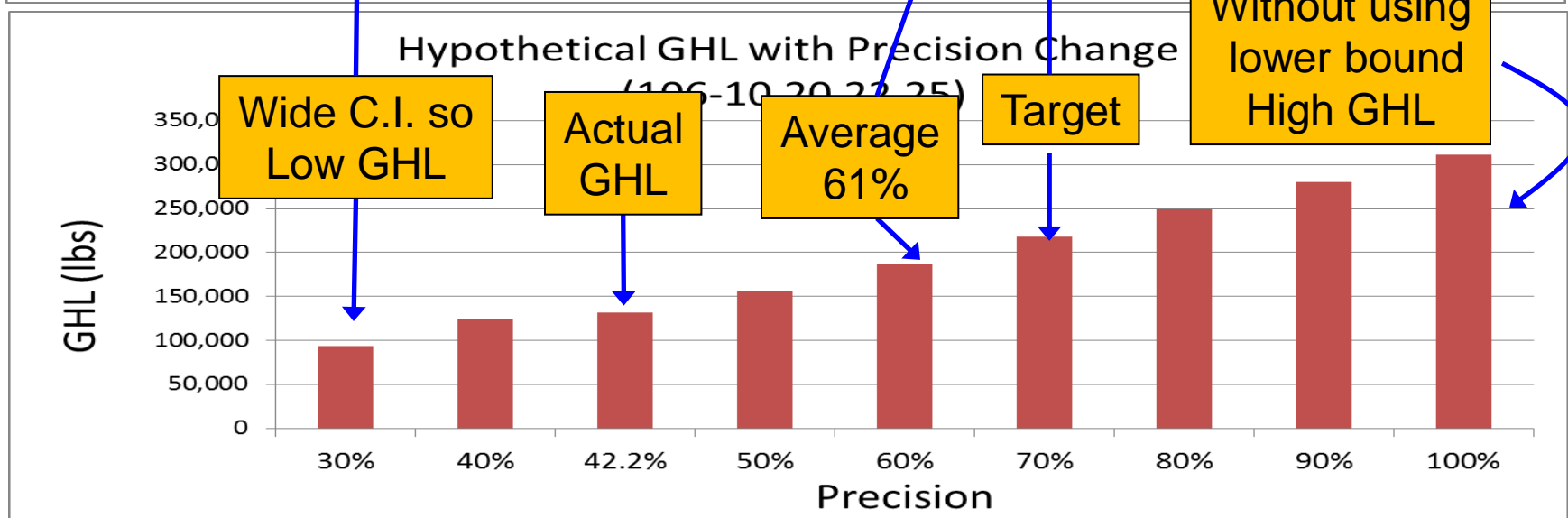to predict the non-sampled areas

Confidence Intervals (88,89)

- Harvest rate is applied to biomass value at the lower bound of the 90% confidence interval instead of the midpoint estimate

- A narrow confidence interval is the goal and it means:
  - Less uncertainty and narrower +/- around the midpoint estimate
  - Higher GHL, because lower bound is closer to the midpoint estimate

- Have some control over width of confidence interval by:
  - Setting a precision goal of at least 70% (i.e. lower bound is at least 70% of midpoint estimate)
  - Adding transects, using area-based survey method, stratification

Example of 90% Confidence Interval

Sea Cucumber Biomass by Commercial Area, 2016

90% C.I.
upper bound
midpoint
lower bound

Sea Cucumber Biomass by Year, 1992 - 2016

Narrow C.I. and Good precision (77%)

Wide C.I. and Low precision (42%)

Example of Varying Confidence Interval
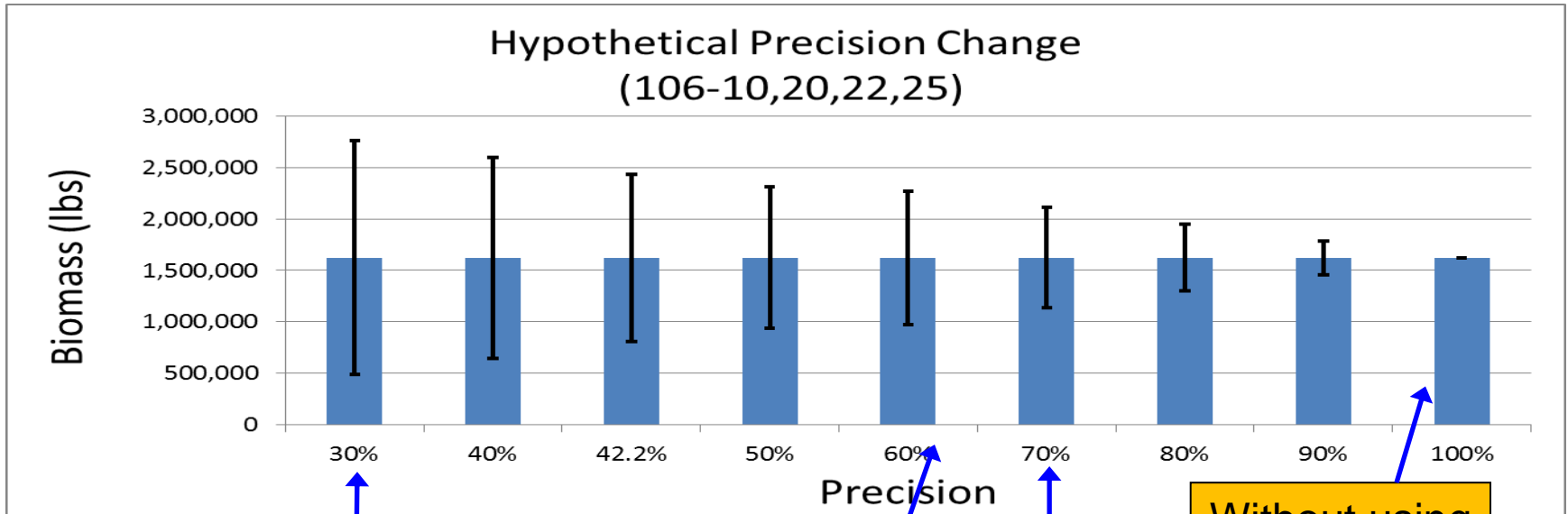
Geoduck Fishery Expansion (90)

- Current process for expanding fishery to new areas:

    - Reconnaissance surveys, conducted by paid or volunteer geoduck divers

- Exploratory fisheries without biomass surveys:

    - Not allowed under current regulations
    - Poor data quality expected
    - Removes ability to obtain pre-fishery population density
    - Still requires ADF&G survey afterward to estimate biomass

Waters Closed to Sea Cucumber Fishery (87)

- **Fishery areas**
  - Active areas in orange

- **Closed waters**
  - 17 areas total
  - 5 control areas
  - 9 very low abundance (blue ovals)
  - Goals to protect subsistence and provide refuge sites
  - Several areas near communities where subsistence uses may exist

Legend
- Areas closed by state regulation, not control areas
- Control Areas
- Active Commercial Areas