

The Fishery Interaction Team (FIT)

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Fishery Interaction Team (FIT)

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Groundfish species

- Walleye pollock (*Theragra chalcogramma*)
- Pacific cod (*Gadus macrocephalus*)
- Atka mackerel (*Pleurogrammus monopterygius*)



Walleye pollock

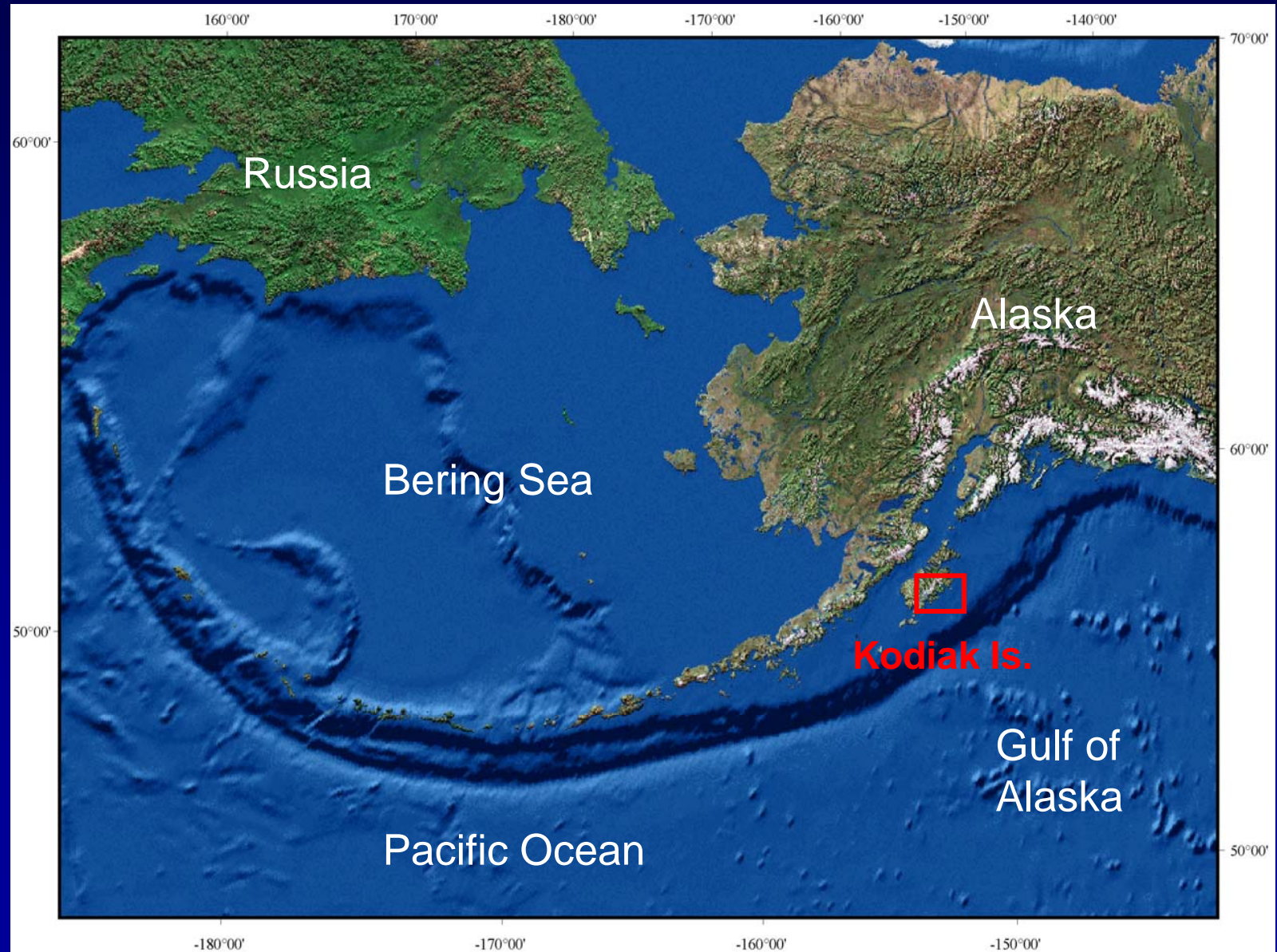


- Family Gadidae
- 73% of groundfish catch in the E. Bering Sea and Aleutian Islands (1999-2001)
- Large portion of SSL diet year round in Aleutian Islands and Gulf of Alaska

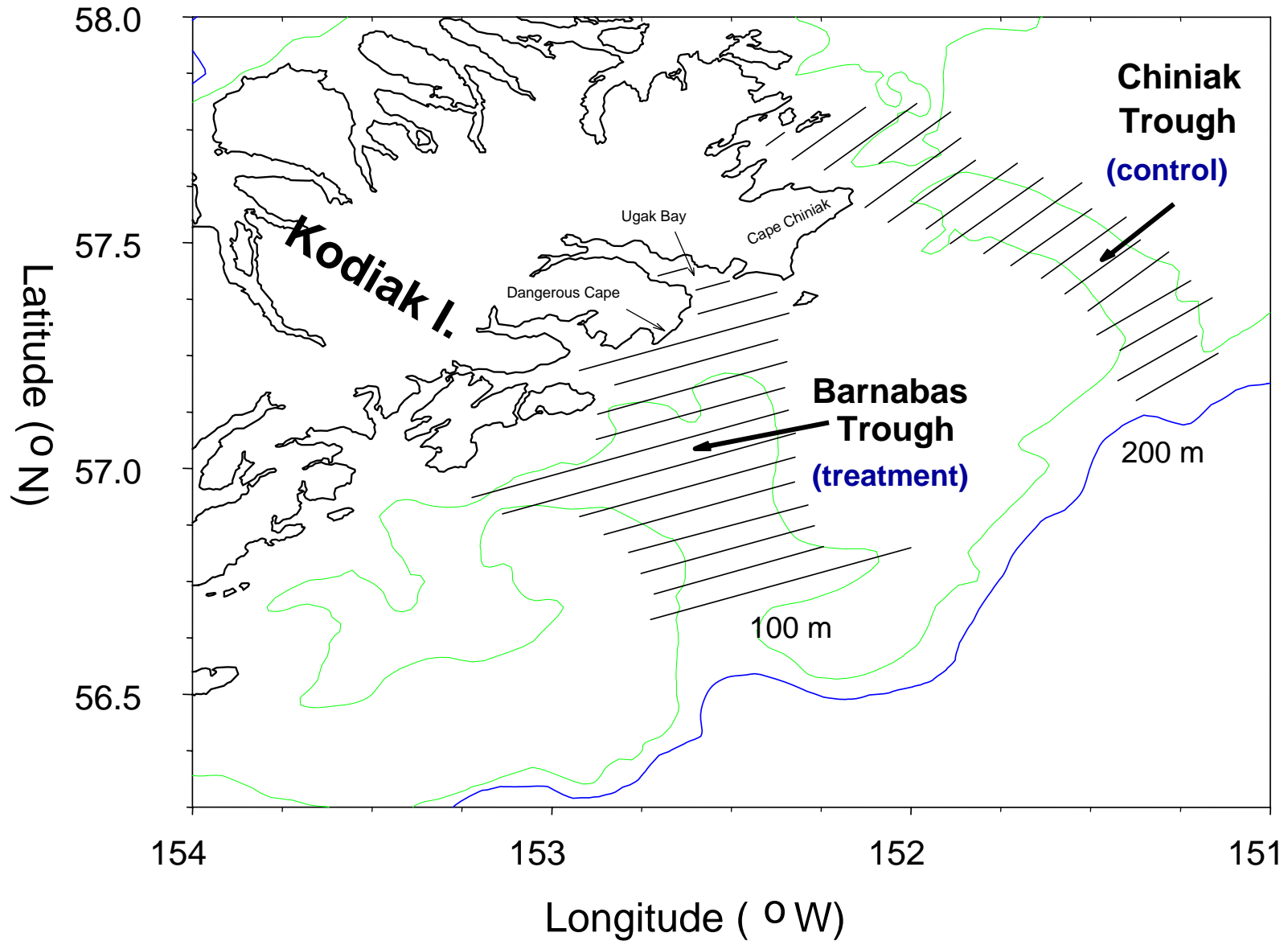
Walleye pollock Kodiak project overview

- P.I.s
 - Chris Wilson (RACE)
 - Anne Hollowed (REFM)
- At-sea experiment
- Localized depletion or disturbance of prey fields due to fishing
- Measure physical oceanographic characteristics of habitat
- Measure biological characteristics of fish

Pollock – Study area

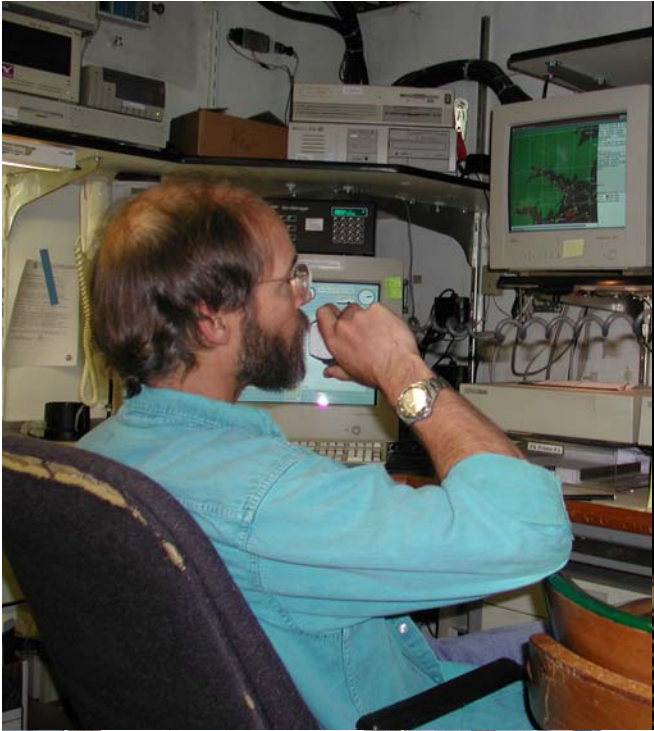


Pollock – Study site



Methods

- Echo integration-trawl (EIT) methods
 - Acoustics to assess distribution and abundance of fish
 - Trawls to confirm species, size and age
- Multiple surveys (“passes”) before and after the start of commercial fishing in late August
- Sites open (treatment) and closed (control) to fishing
- Physical oceanography
 - CTD, XBT, MBT
 - Moorings
 - Drifters



Walleye pollock – Project history

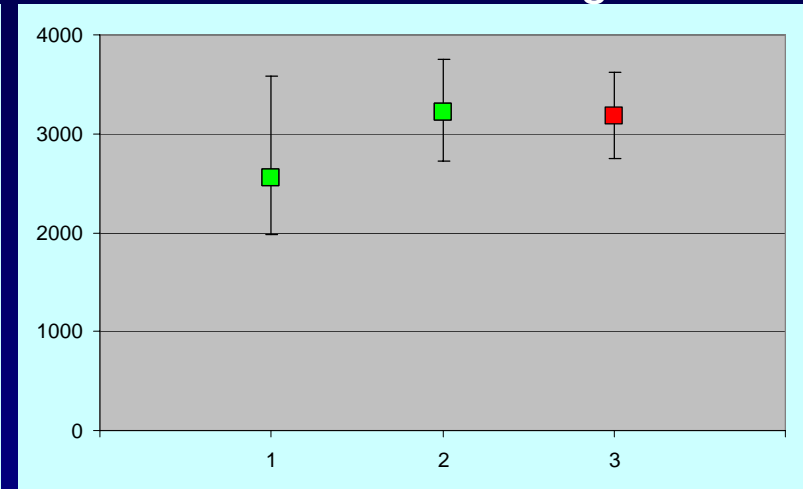
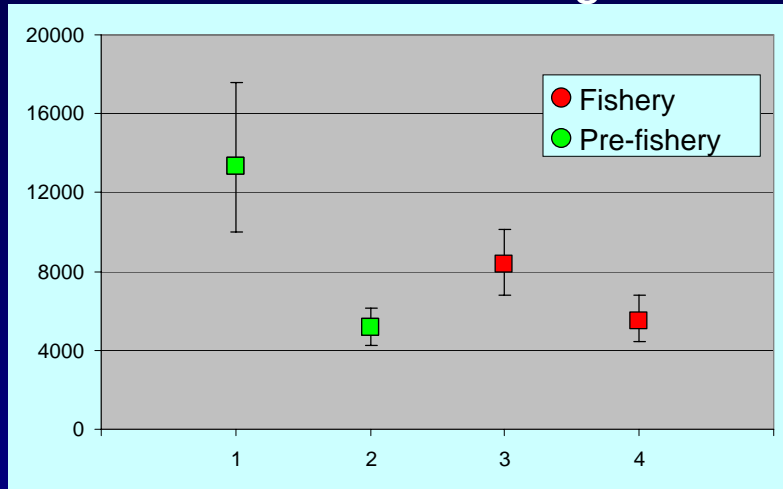
- 2000 feasibility study (fishery closed)
- 2001 full survey, fishery removals 2853 mt
- 2002 full survey, virtually no fishing effort (300 mt)
- 2004 full survey, fishery removals 1723 mt
- 2006 full survey, fishery removals 750 mt

2001 and 2004

Fished trough

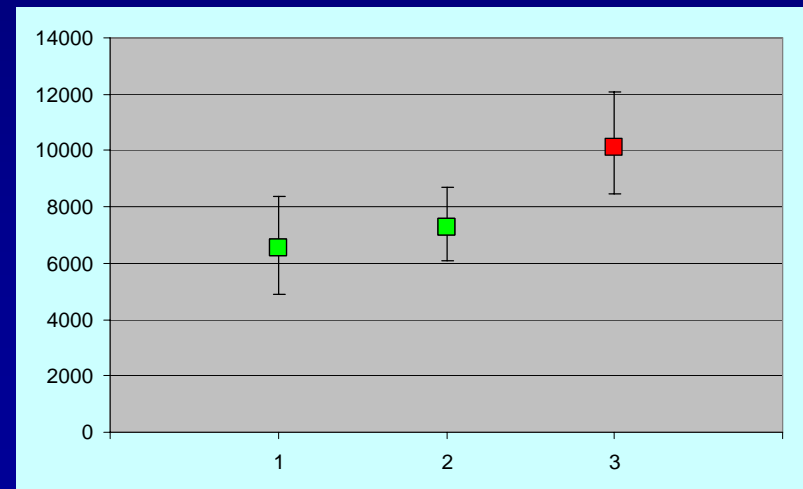
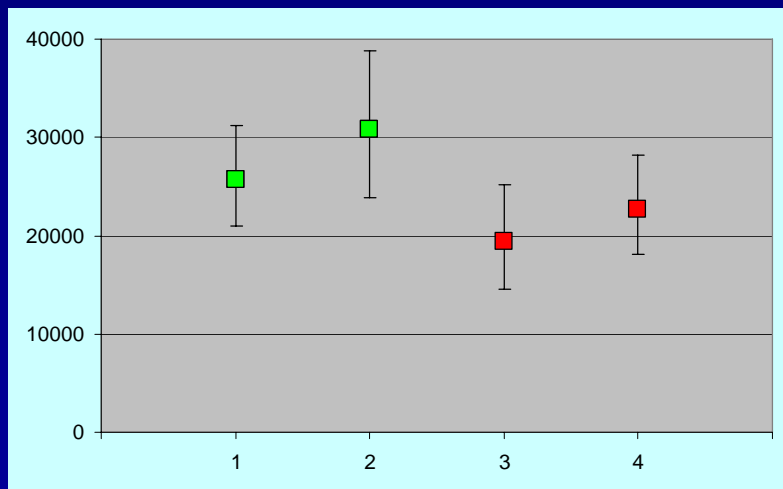
Un-fished trough

2001



Biomass (metric tons)

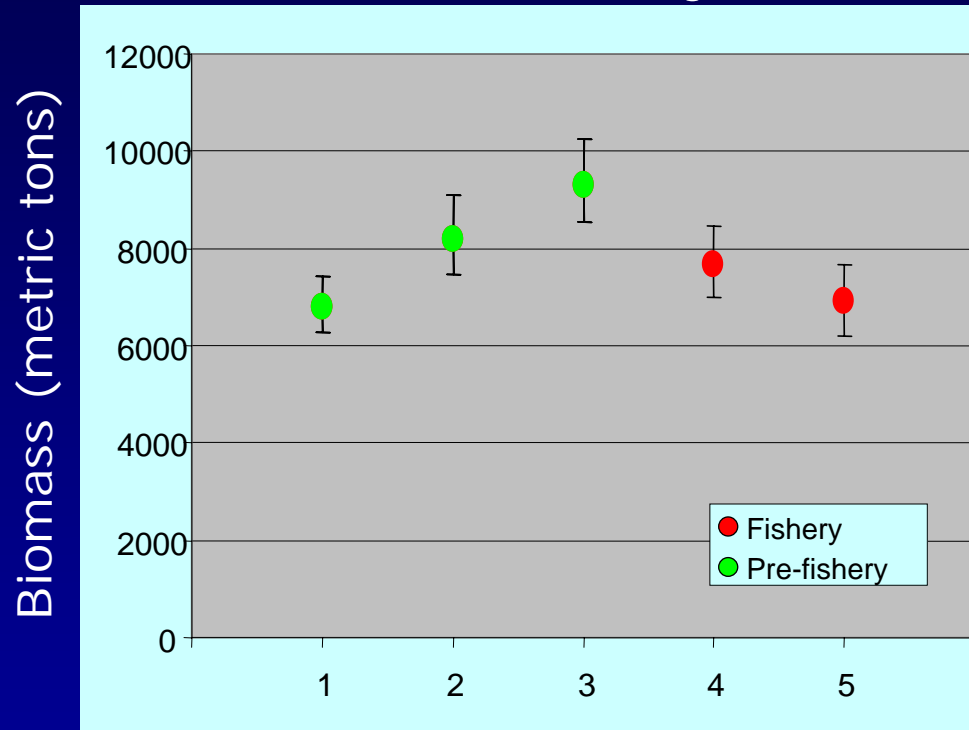
2004



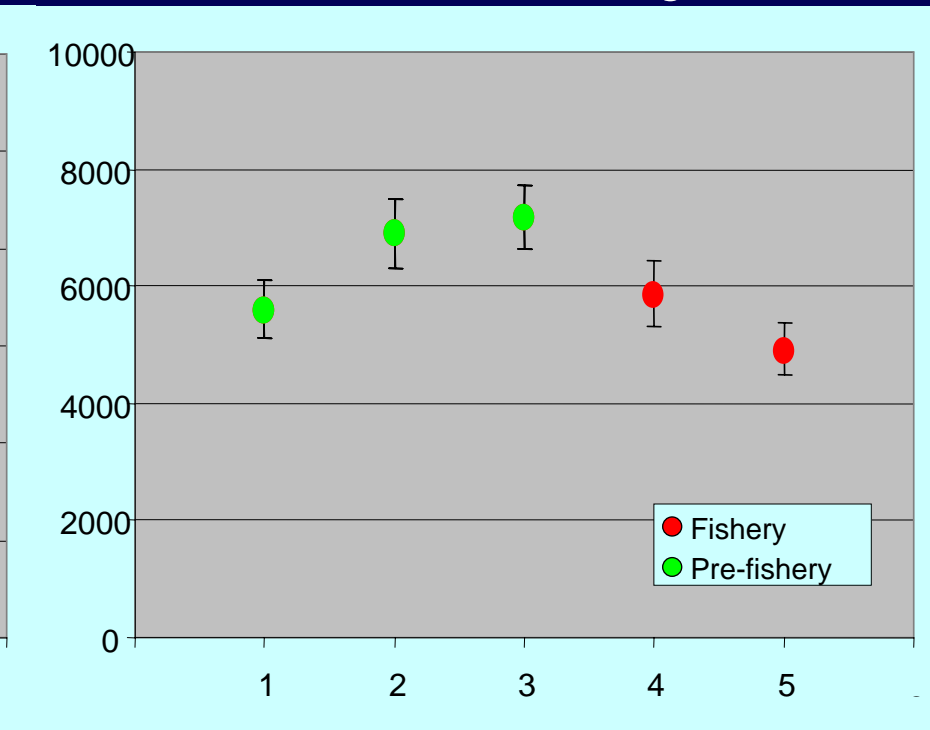
Pass

2006

Fished Trough



Un-fished trough



Pass

Conclusions

- Adult abundance estimates for Barnabas Trough in 2001 exhibited high variability, but not in response to fishing.
- Response to fishing could explain the decrease in abundance of adult pollock observed between the pre-fishing and fishing periods in 2004.
- Abundance was not significantly lower during fishing in either trough in 2006. Fishery removals were substantially lower than 2001 and 2004
- NOAA Vessel availability for Kodiak work uncertain

Walleye pollock

Aleutian Islands project overview

- P.I.
 - Steve Barbeaux (REFM)
- Acoustic surveys of pollock in Aleutian Islands
- Before, during and after commercial fishing
- Inside sea lion no-trawl zones
- Cooperative with Aleut Corporation and industry vessels
- Experimental Fishing Permit

F/V Muir Milach




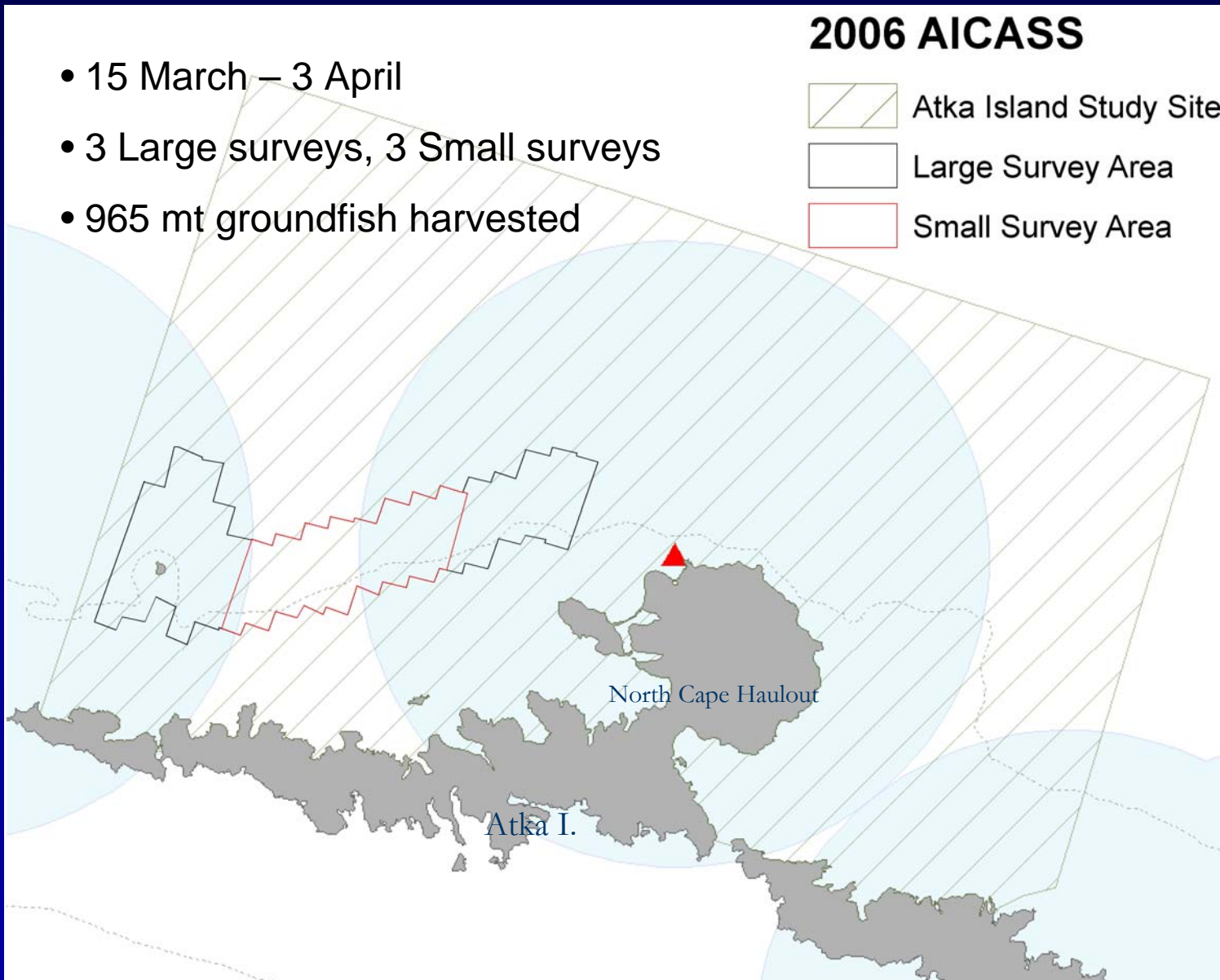
- 32 meter stern trawler
- ES 60 echosounder with a 38kHz transducer

Aleutian Islands pollock 2006

- 15 March – 3 April
- 3 Large surveys, 3 Small surveys
- 965 mt groundfish harvested

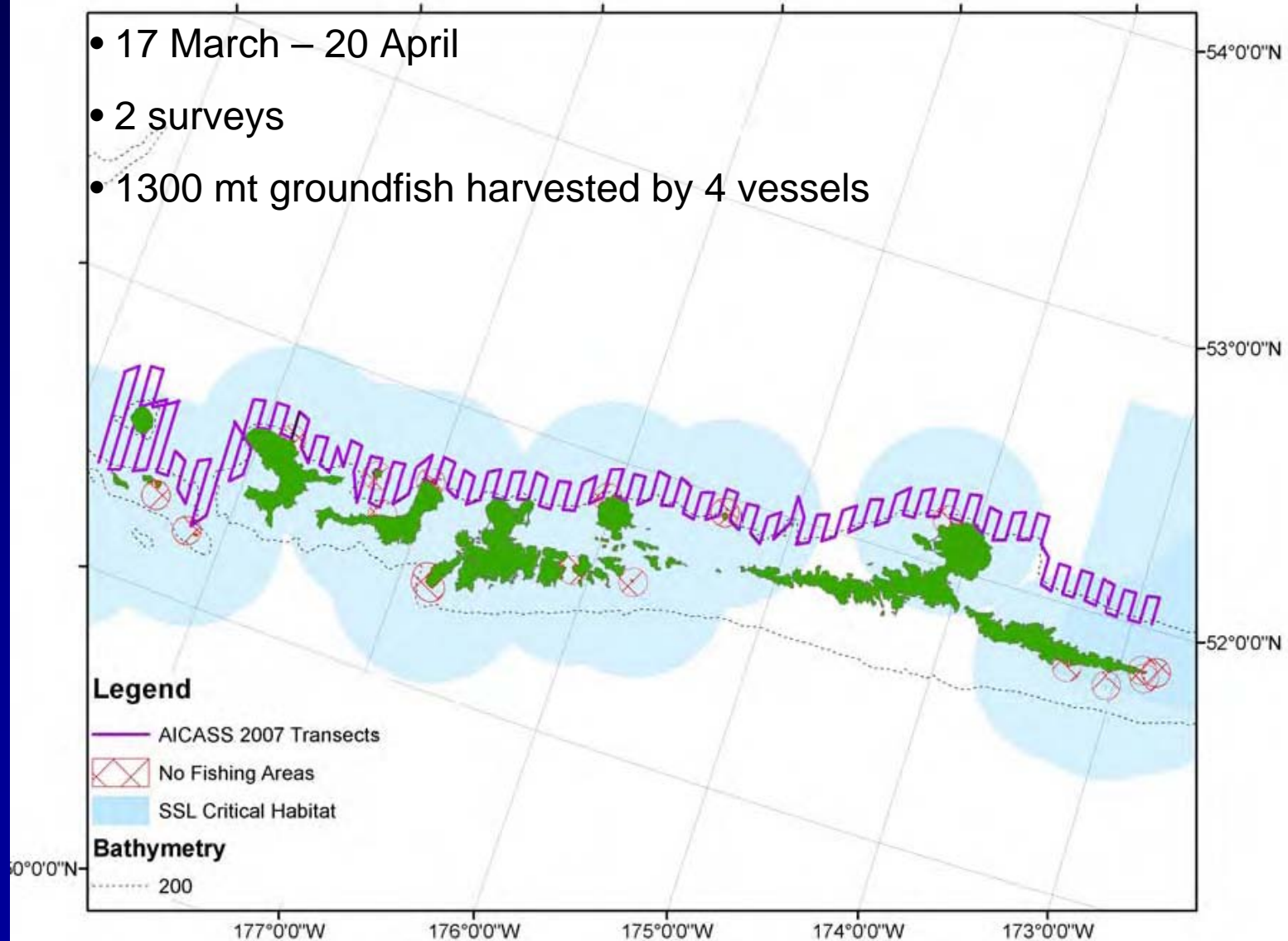
2006 AICASS

-  Atka Island Study Site
-  Large Survey Area
-  Small Survey Area



Aleutian Islands pollock 2007

- 17 March – 20 April
- 2 surveys
- 1300 mt groundfish harvested by 4 vessels



Cooperative Research

- Aleut Corporation, Adak Fisheries, Sandra Moeller, and Dave Fraser.
- Captain Dave Wilmore and crew of the F/V Muir Milach.

Atka mackerel



- Greenling Family (Hexagrammidae)
- One of the most abundant groundfish in the Aleutian Islands
- Large portion of SSL diets during summer and winter

Atka mackerel

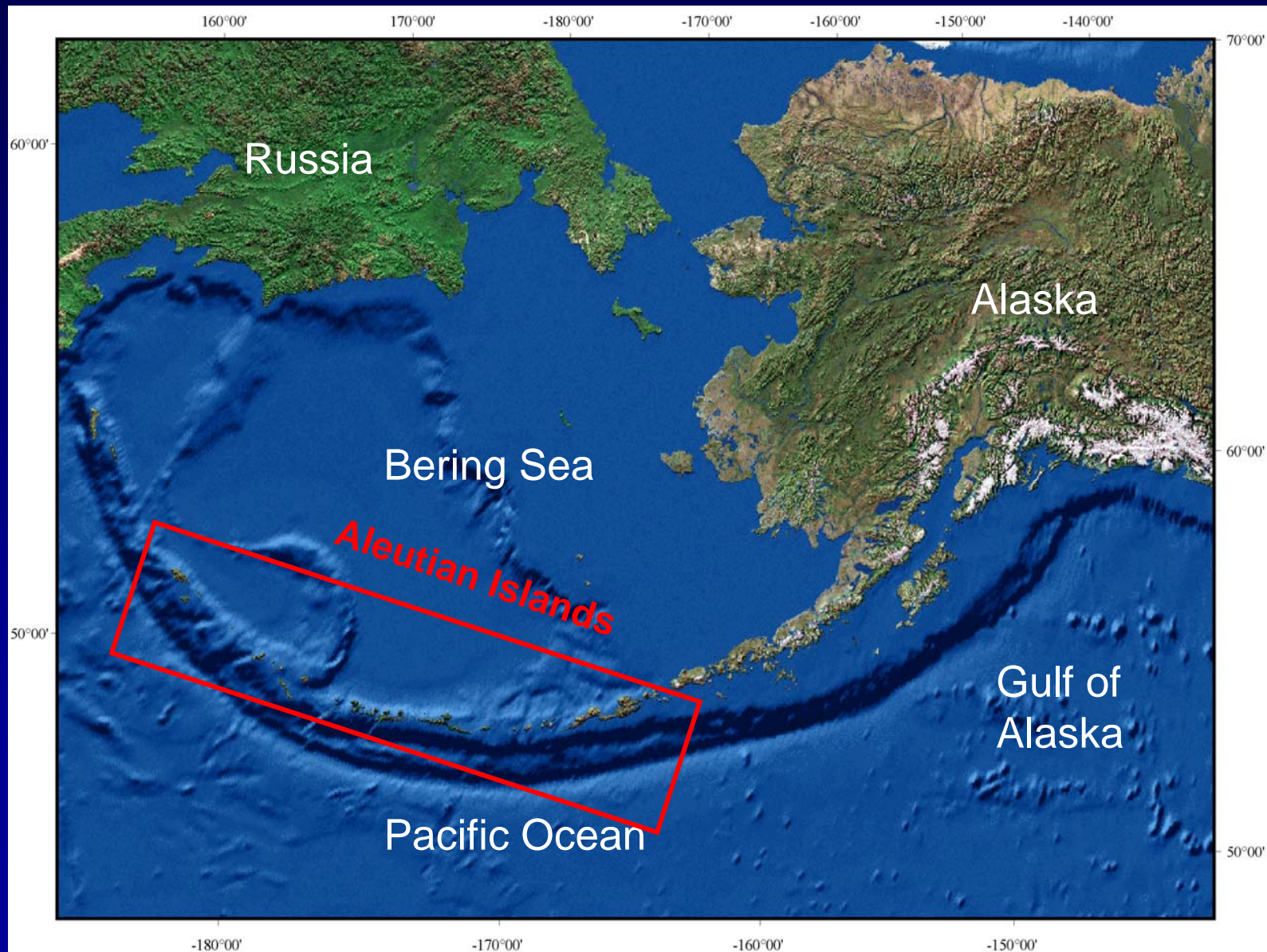
- Spawning
 - July to November
 - Demersal eggs in nests
 - Guarded by males, bright yellow coloration
- Feeding
 - Copepods and euphausiids
 - Myctophids
 - Egg cannibalism

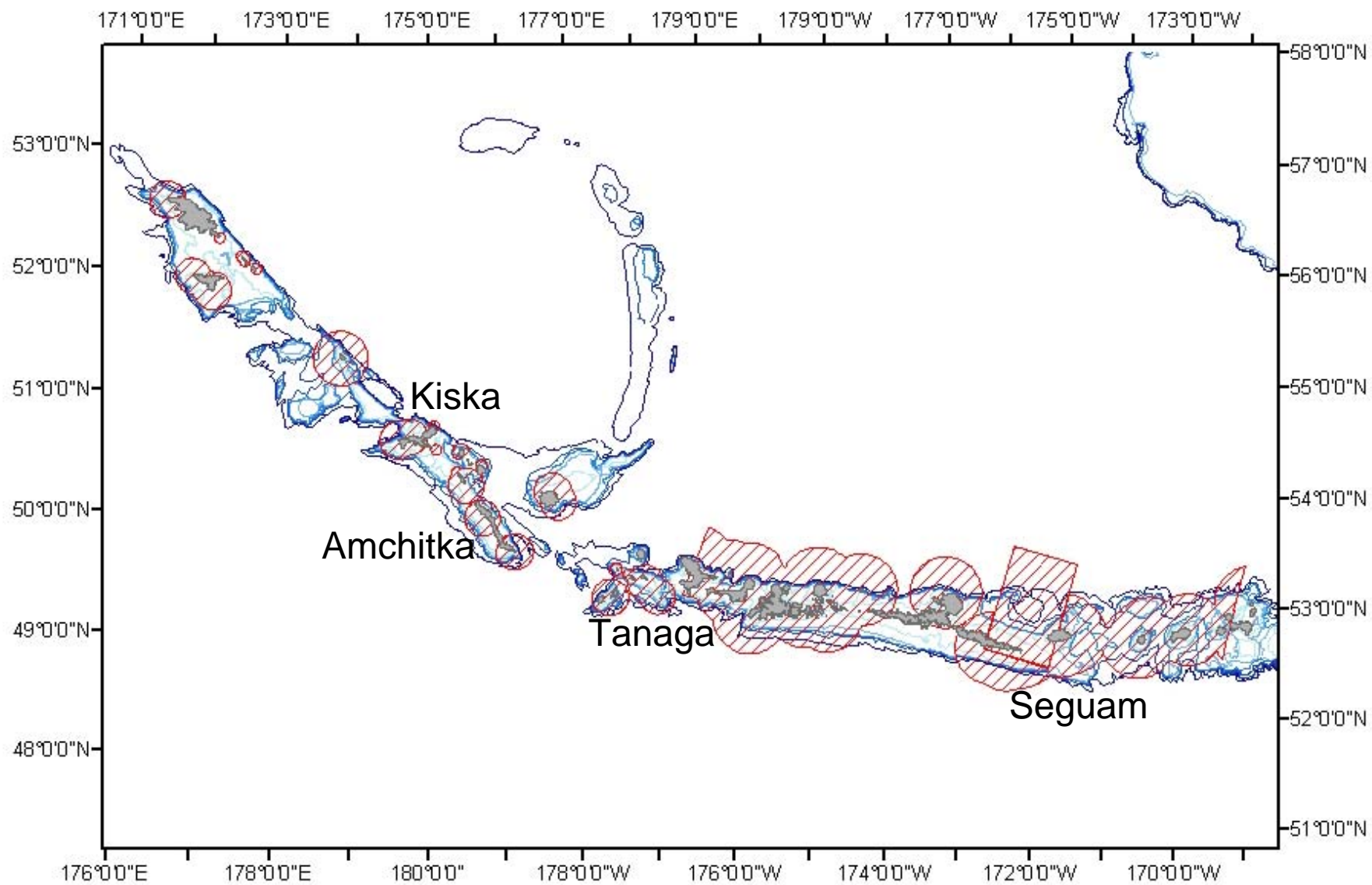


Atka mackerel Project overview

- P.I.s
 - Susanne McDermott and Libby Logerwell
- Evaluate efficacy of trawl exclusion zones
 - Do fish move from inside to outside?
 - What is the abundance of fish inside?
- Auxiliary studies
 - Physical oceanographic characteristics of habitat
 - Food habits
 - Reproductive biology
 - Zooplankton sampling

Atka mackerel – Study area





Atka mackerel – Methods

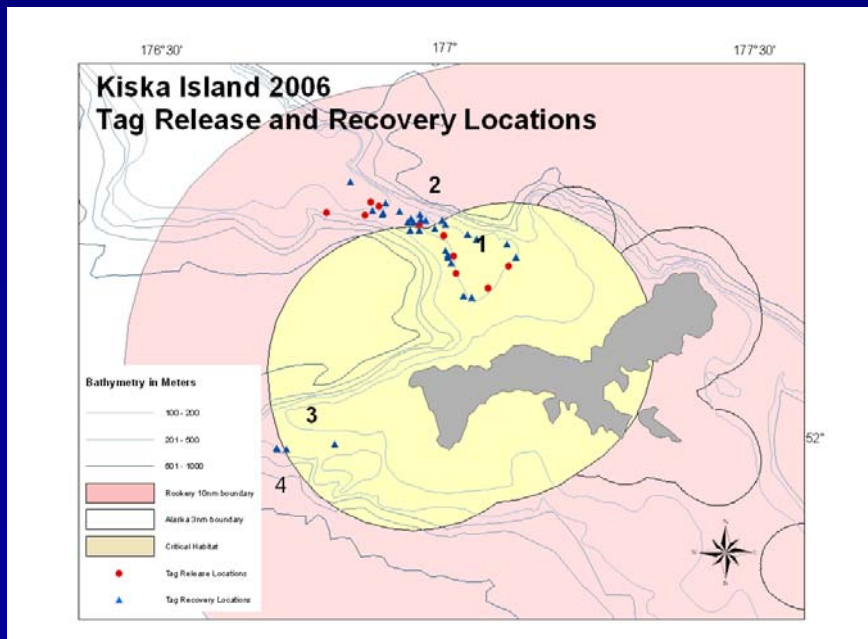
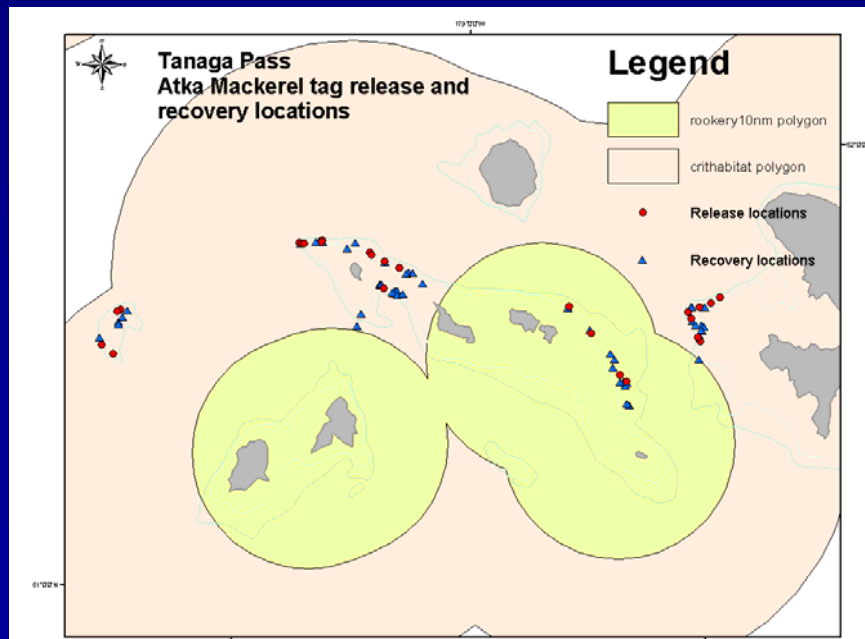
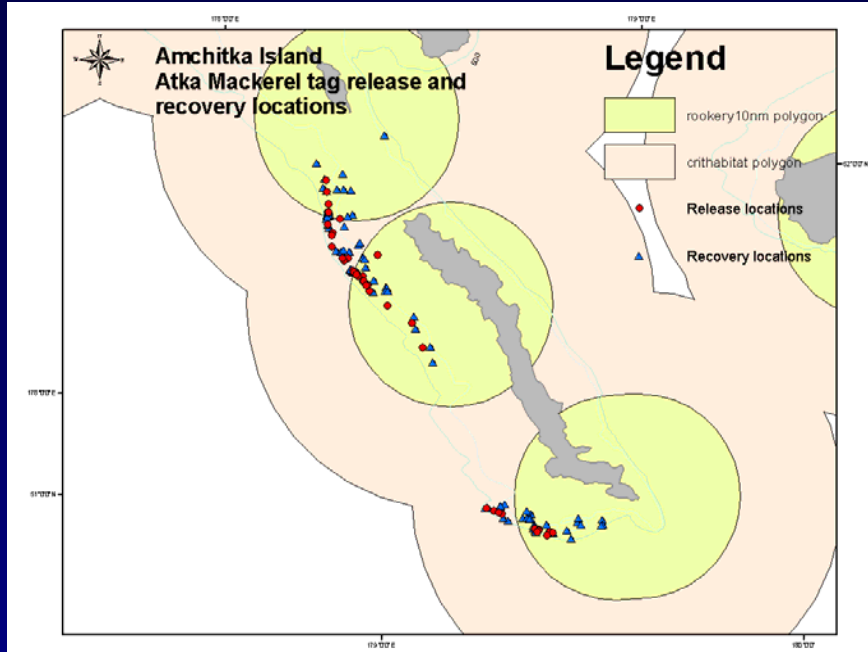
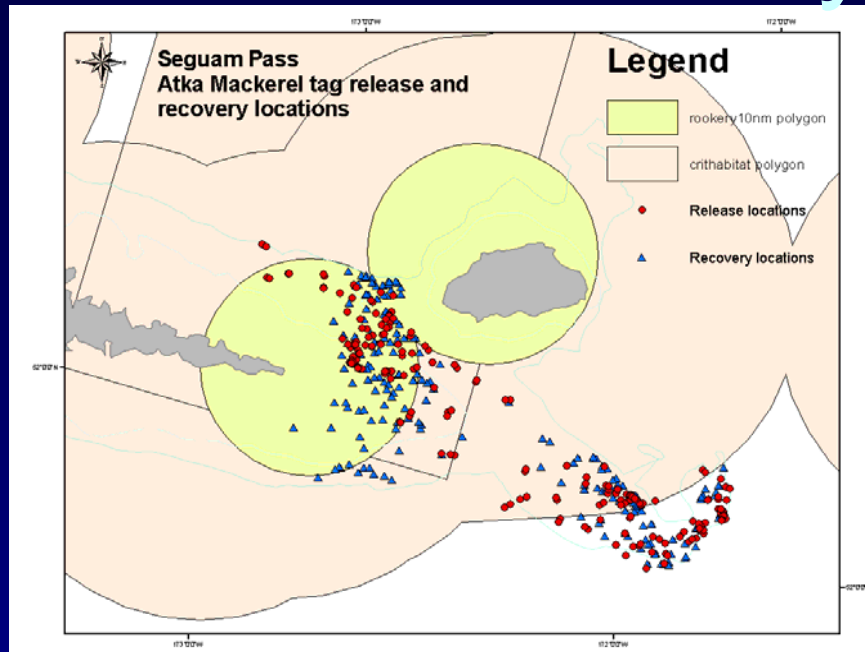
- Mark-recapture
 - Inside and outside trawl exclusion zones
 - Fish tagged and released in June-July
 - Fish recovered in September-October
 - Commercial vessels outside zones
 - Chartered vessel inside and outside zones
- Tagging model
 - Maximum likelihood
 - Estimates
 - Population size
 - Probability of moving from in- or outside zones



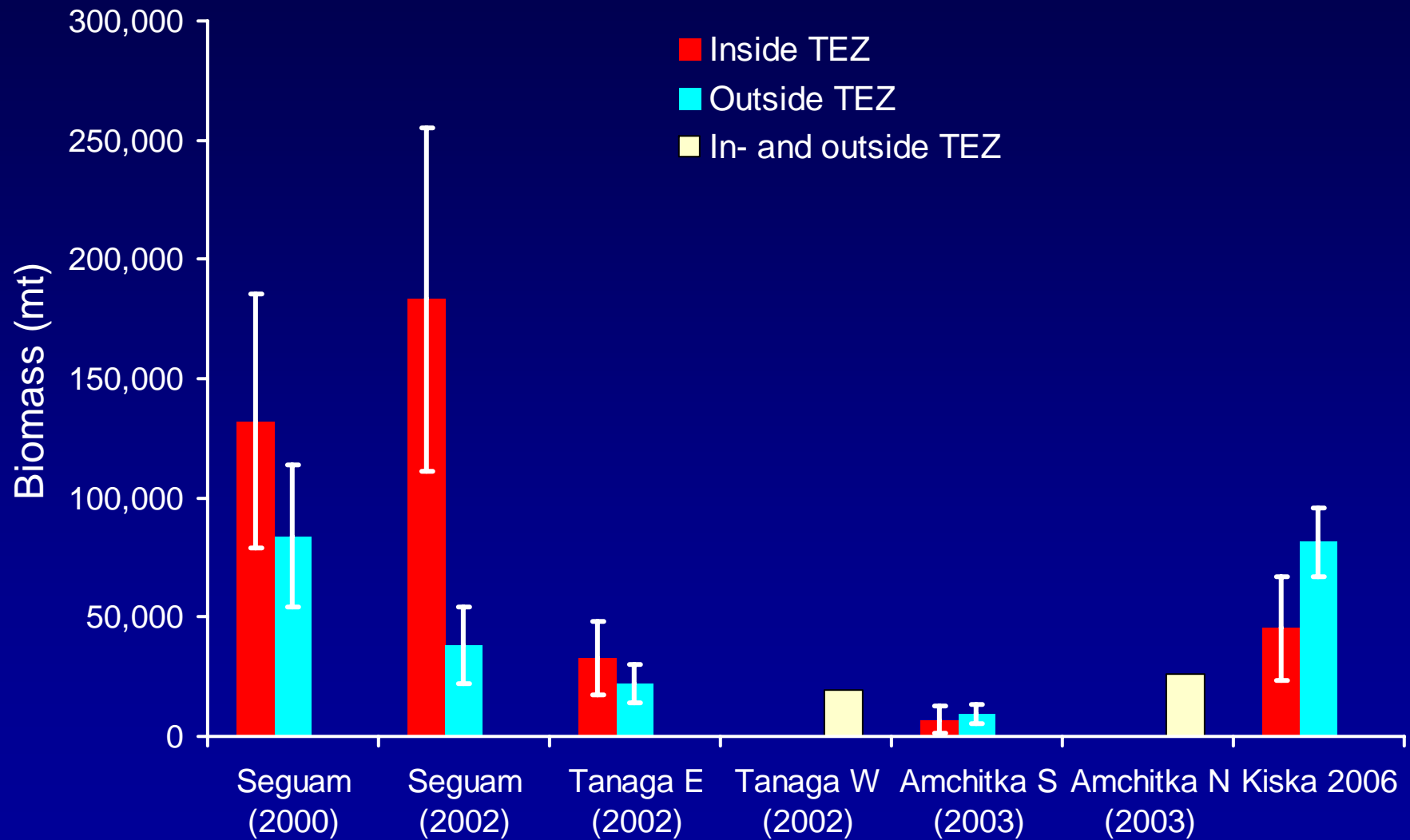
Atka mackerel – Project history

- 1999 pilot study Seguam Pass
 - 1,375 fish tagged
 - 5.5 million fish examined for tags
 - 50 tagged fish recovered
- 2000 Seguam Pass
 - 8,773 fish tagged
 - 4.3 million fish examined for tags
 - 94 tagged fish recovered
- 2002 Seguam and Tanaga Passes
 - 36,319 fish tagged
 - 3.5 million fish examined for tags
 - 122 tagged fish recovered
- 2003 Amchitka Island
 - 14,596 fish tagged
 - 14.1 million fish examined for tags
 - 766 tagged fish recovered
- 2006 Kiska Island and Seguam Pass
 - 15,253 fish tagged
 - 1.8 million fish examined for tags
 - 59 tagged fish recovered

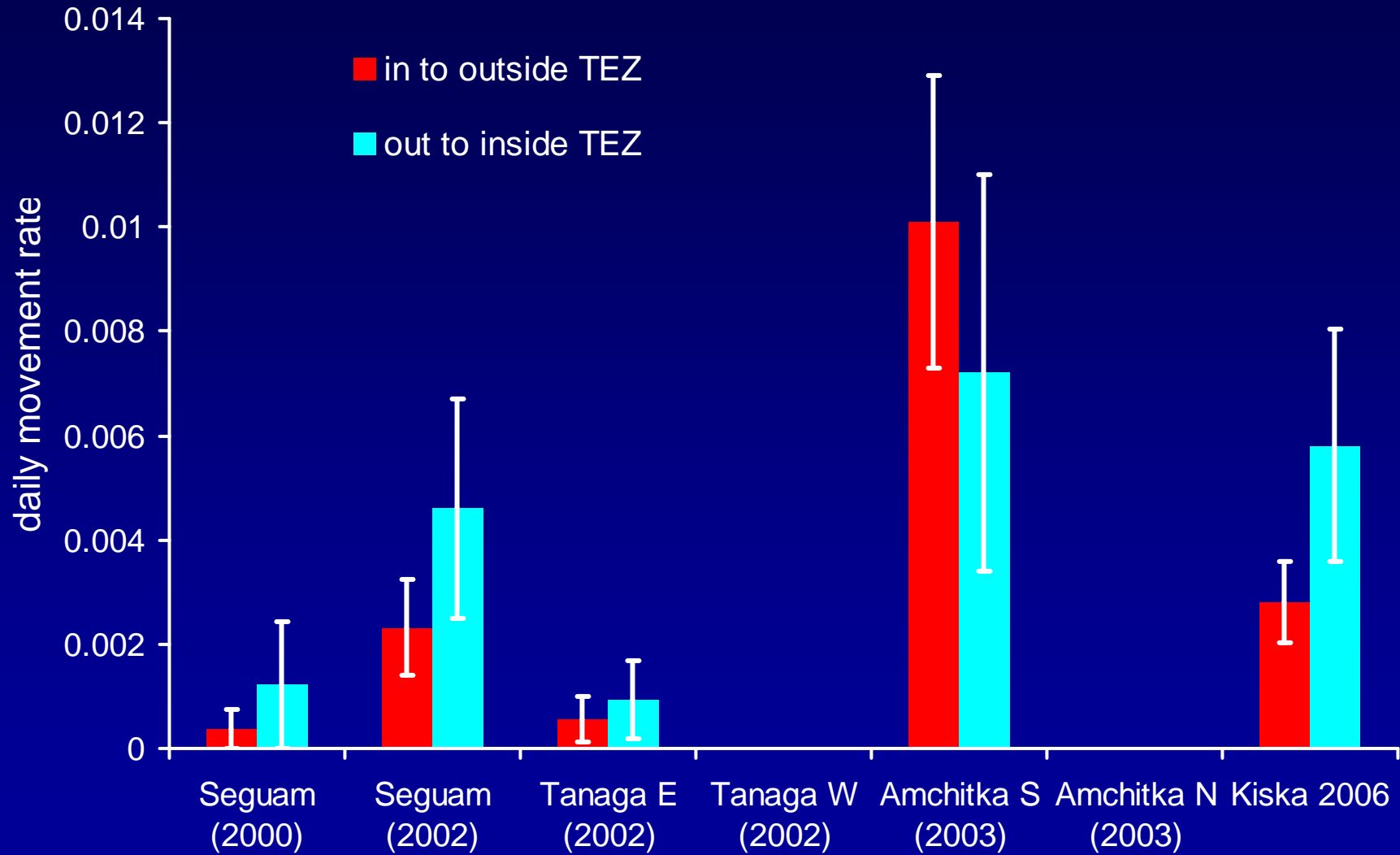
Study Areas



Biomass estimates



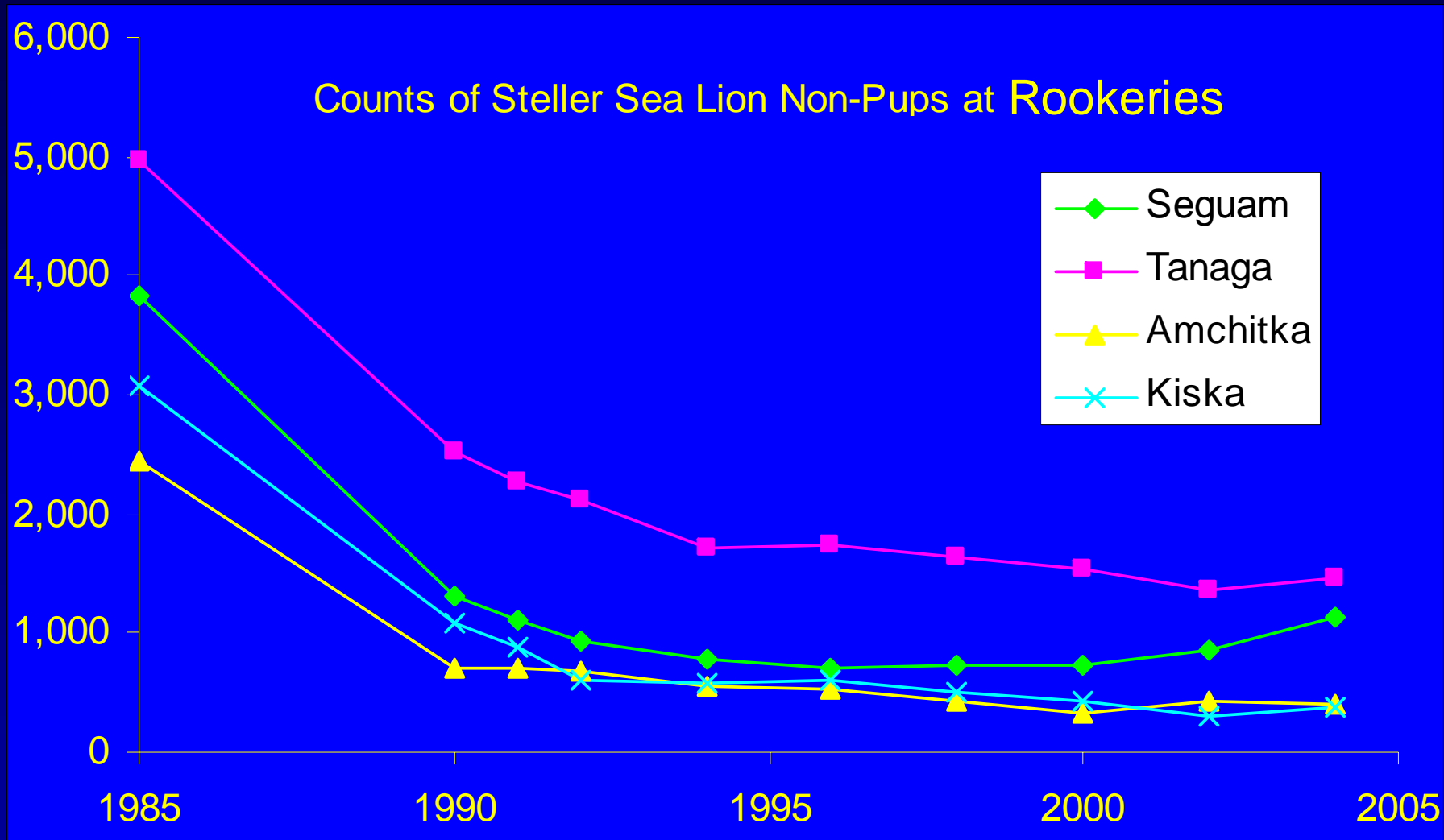
Movement rate



Conclusions

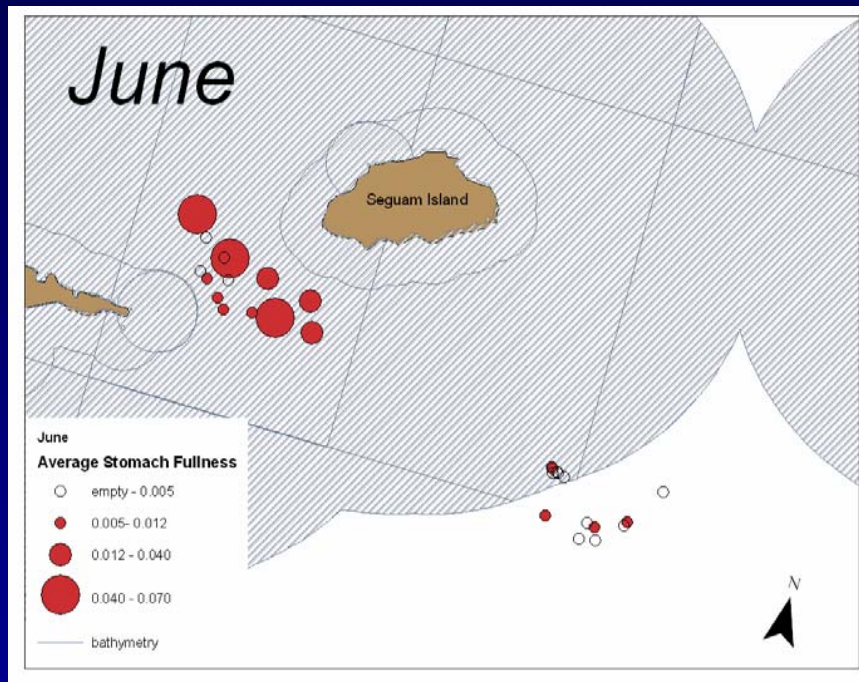
Efficacy of trawl exclusion zones at mitigating competition between sea lions and commercial fisheries varies geographically

- Do fish move from inside to outside?
 - Small movement at Seguam, Tanaga and Kiska
 - Large movement at Amchitka
- What is the abundance of fish inside?
 - Large biomass at Seguam, Tanaga and Kiska
 - Small biomass at Amchitka

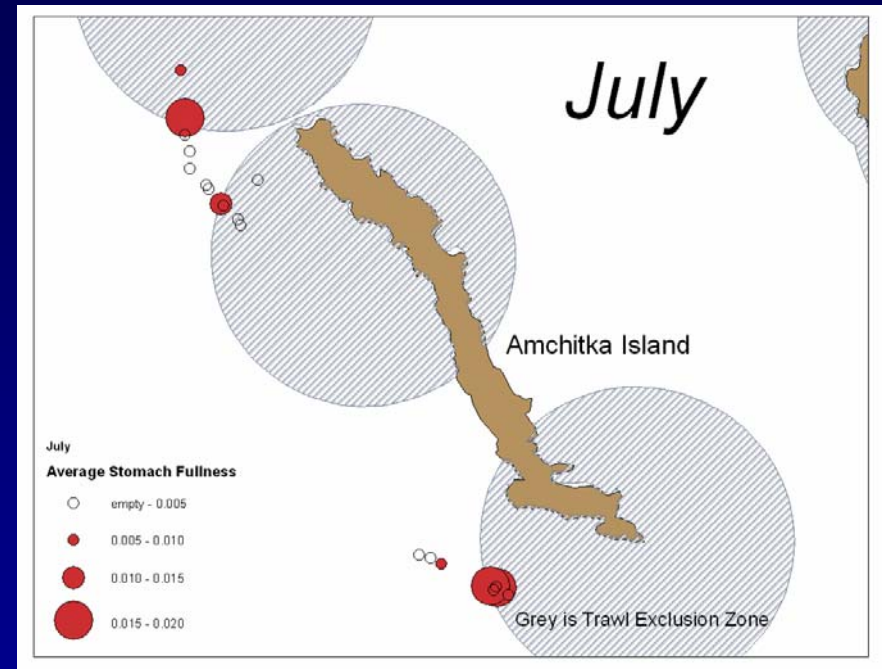


(Lowell Fritz, pers. comm.)

Stomach fullness (% body weight)



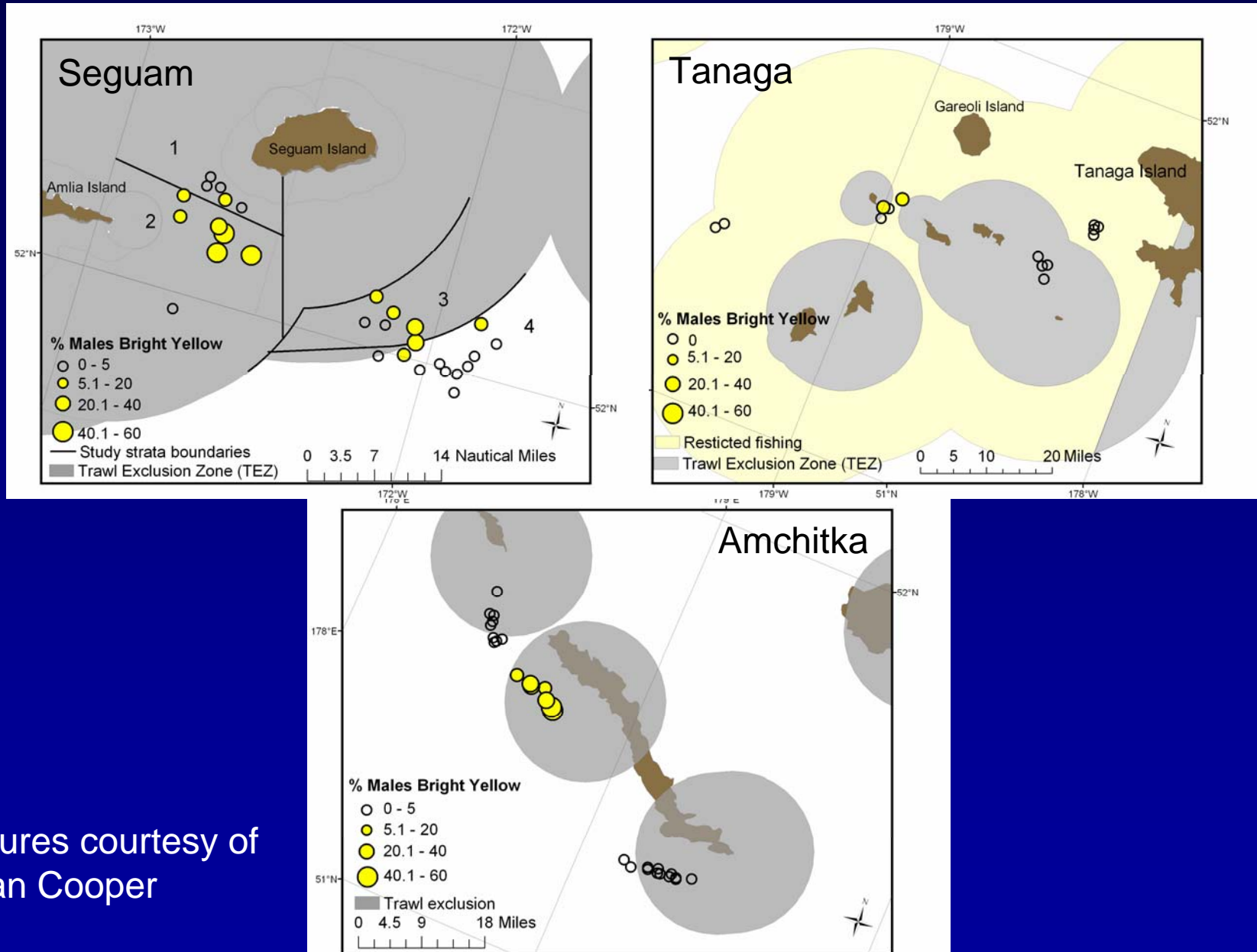
Seguam



Amchitka

figures courtesy of
Kim Rand

Spawning males (October)



figures courtesy of
Dan Cooper

Contact information

<http://www.afsc.noaa.gov/refm/stocks/fit/FIT.htm>

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extra slides