2014 BiOp on proposed AI Groundfish Fishery Steller Sea Lion Protection Measures

Presented to the North Pacific Fishery Management Council

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Alaska Region

Background

Impetus for new BiOp:

New proposed action resulting from Court-ordered EIS on the 2011 Interim Final Rule (RPA from 2010 BiOp)

Per section 7(a)(2) of the ESA, NMFS must ensure that the proposed action is not likely to jeopardize the continued existence of the WDPS of Steller sea lions or destroy or adversely modify designated critical habitat

“jeopardize the continued existence of”

to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers or distribution of that species (51 FR 19926).

Adverse modification

a reduction in the conservation value of critical habitat to the point it no longer functions to meet the intended conservation purpose.

Relationship of 2014 BiOp to the FMP BiOp

- The 2010 FMP BiOp remains the FMP-level coverage for aspects not addressed in the RPA and for all other species except the WDPS of SSL.
- The 2014 BiOp evaluates the effects of proposed changes to the AI Atka mackerel, Pacific cod, and pollock fisheries on the WDPS of SSL and its designated critical habitat (CH)

Presentation Objectives

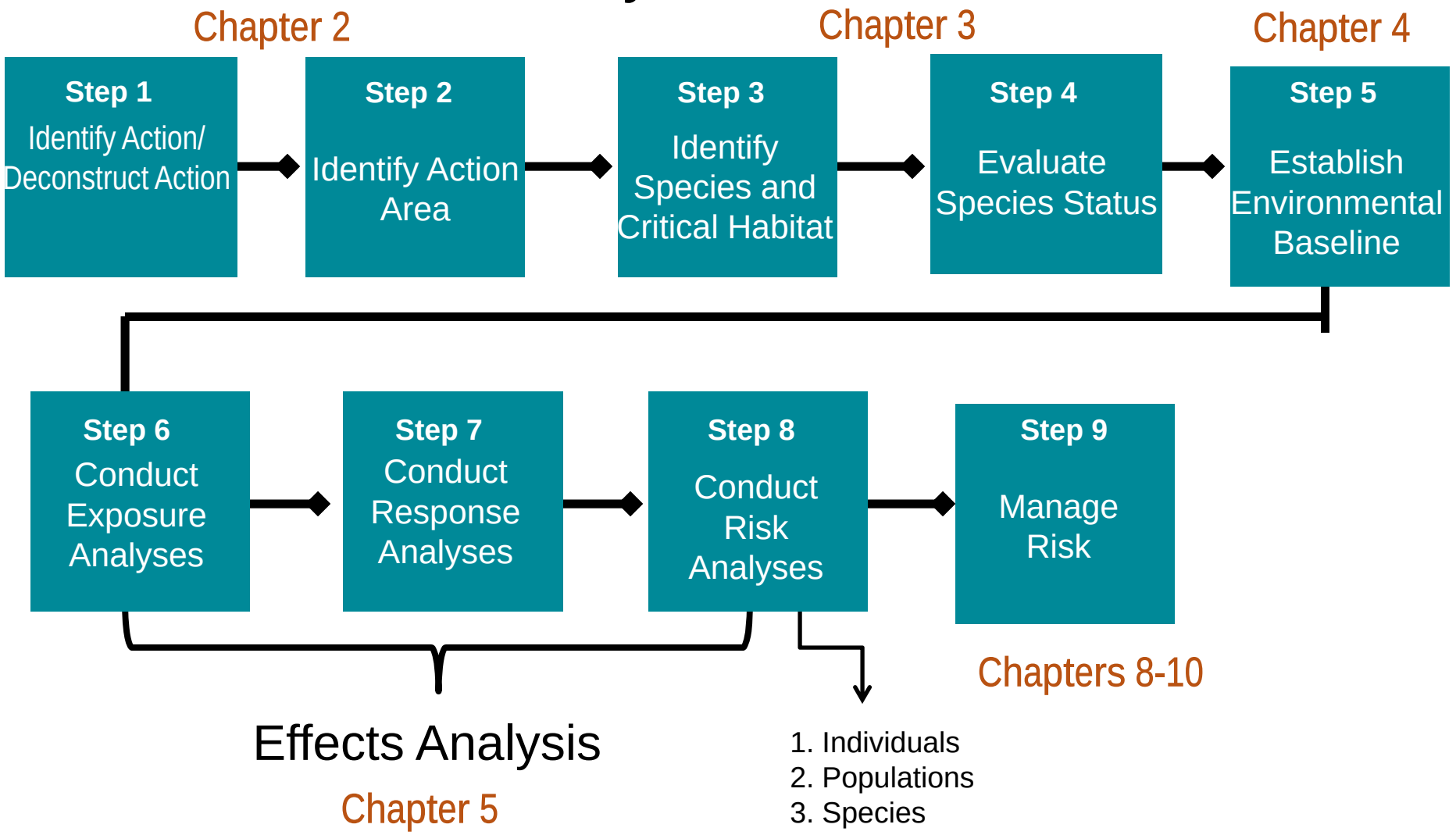
- Summarize the changes to the proposed action relative to the action in the 2010 FMP BiOp
- Present new information available since the 2010 FMP BiOp including information developed in response to the external reviews
- Describe the effects analysis of the proposed action on the WDPS of Steller sea lions and critical habitat
- Present NMFS's Conclusions

Chapter 1: Background Information and Consultation History

Summary of the external reviews of the 2010 FMP BiOp

- Panel findings from States of Alaska and Washington Scientific Review (Bernard et al. 2011)
- Perspectives of the 3 CIE reviewers

The Analytical Framework

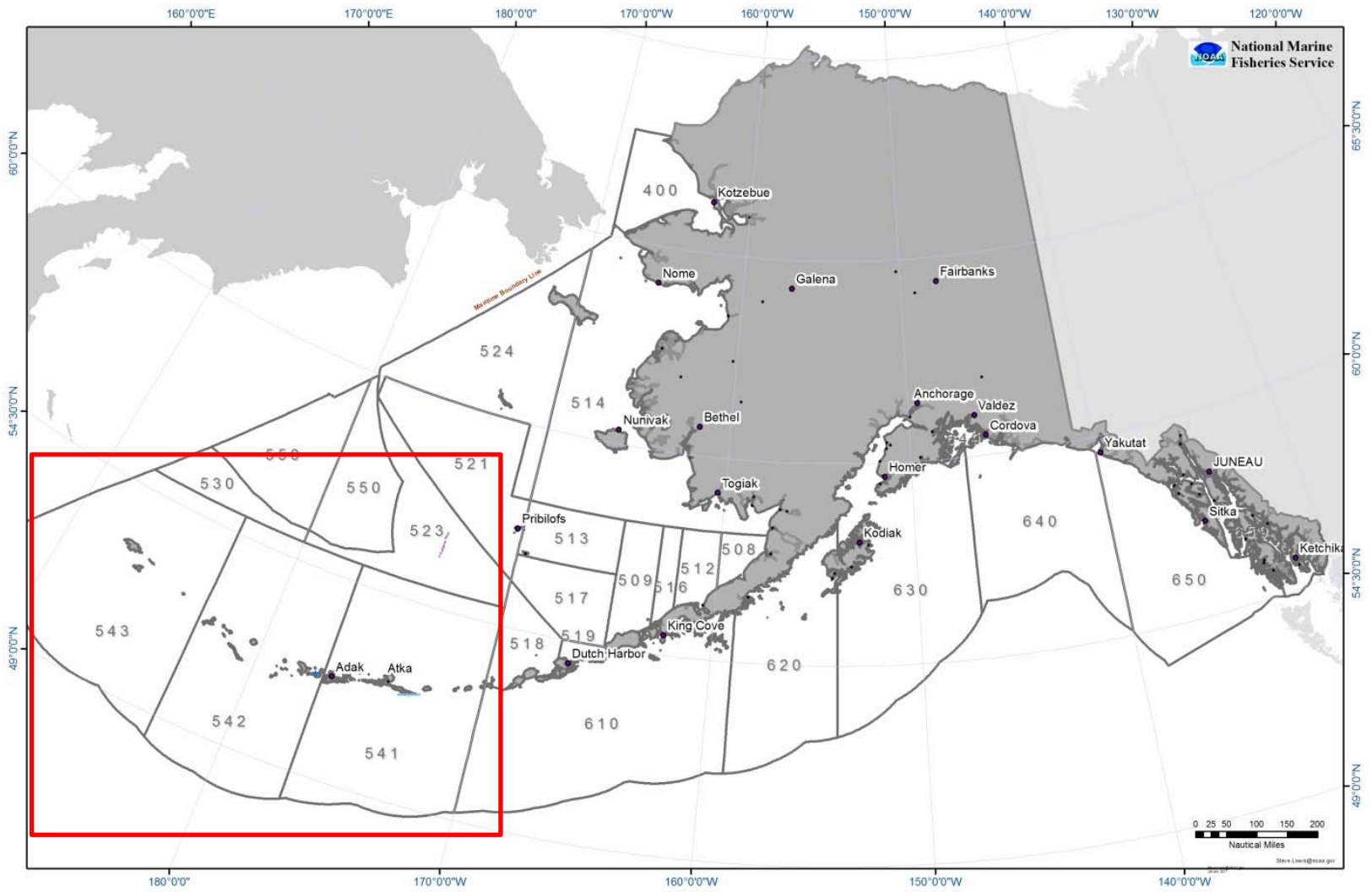


Chapter 2:Description of the Proposed Action

Two primary components:

1. Suite of measures to control the location, gear type, timing, and harvest amount for Atka mackerel, Pacific cod, and pollock fishing in the Aleutian Islands (fishery component)
2. Research on groundfish abundance and distribution and movement of Atka mackerel (research component)

Chapter 2: Action Area



Chapter 2: Modifications to the Proposed Action

- Close Kanaga Island/Ship Rock to all groundfish fishing 0-3 nm
- *Restructured Observer Program*

Atka Mackerel

- Remove the Harvest Limit Area Management Structure
- Modify trawl gear season dates to temporally disperse catch
- Prohibit rolled-over A season TAC from harvest inside CH

Chapter 2: Modifications to the Proposed Action

Atka Mackerel (cont'd)

- Modify closure from 0-15 nm to 0-10 nm at Buldir Island rookery
- Limit Area 543 TAC to 65% of Area 543 ABC
- Area 542: close CH to Atka mackerel fishing between 178°E and 180°(increases protection at 5 rookeries and 6 haulouts relative to 2010)
- Prohibit directed fishing with trawl gear in the Bering Sea to resolve MRA accounting issues

Chapter 2: Modifications to the Proposed Action

Pacific cod

- *Bering Sea and Aleutian Islands TAC split*
- Area 543 catch limit based on the proportion of estimated Area 543 biomass
- Extend C season date for Amendment 80 and CDQ trawl vessels to December 31

Chapter 2: Modifications to the Proposed Action

Pollock

In Area 543:

- Open a portion of CH outside 3 nm from all 3 haulouts
- Limit A season catch to 5% of AI pollock ABC

In Area 542:

- West of 178°W: open a portion of CH outside 3 nm from 3 haulouts and outside 10 nm from 1 rookery and 1 haulout
- East of 178°W: open a portion of CH outside 3 nm from 3 haulouts
- Limit the A season catch to 15% of the AI pollock ABC

Chapter 2: Modifications to the Proposed Action

Pollock (cont'd)

In 541:

- Open outside of CH from rookeries and from 3 to 20 nm from haulouts
- Limit the A season catch to 30% of the AI pollock ABC

Chapter 2: Research Component

- Capture, tag and release and subsequent recovery of Atka mackerel inside and outside CH in Areas 543, 542, and 541 to assess local abundance and movement (e.g. efficacy of trawl exclusion zones)

- Opportunistically assess the distribution and abundance of other groundfish (e.g., Pacific cod, POP, northern rockfish and pollock) during Atka mackerel recovery trawls

Chapter 3: Status of the WDPS

- Updated Steller sea lion trends with (new) confidence intervals
  - The western Aleutian Islands only sub-region with a significant negative population growth trend
  - WDPS appears to be increasing significantly:
    - Non-pups 1.67% (1.01 - 2.38%) per year
    - pups (1.45% (0.69 – 2.22% per year)
- Updated population estimate for the WDPS in AK: 52,200

Chapter 3: Movement between populations

- New information on movement between the eastern stock and WDPS from brand re-sights (Fritz et al. 2013, Jemison et al. 2013)
  - Estimate net increase of ~400 females in Southeast Alaska (eastern stock) and net increase of ~600 males in the western stock.
  - Fritz et al. (2013) conclude net movement has a negligible impact on non-pup trend estimates in both stocks

Chapter 3: Movement of western AI Juveniles

- NMFS branded 52 pups at Agattu Island (western AI) in June 2011 (new)
- Of the 25 re-sighted, 82% seen on western AI islands
- 1 sighted in central AI in Nov. 2011 and again on St. Paul Island (1200 km northeast of Agattu) in Aug. 2012
- 4 were sighted on Commander Islands in Russia in Nov. 2011 and June-Aug 2012. 3 of these animals re-sighted at Agattu Island and Attu Island via remote camera between Oct 2012 and May 2013

Chapter 3: Population Viability

New evaluation of the WDPS extinction risk (Johnson 2013)

- Western AI projected to have high probability of quasi-extinction in 50 years under both models
- The only other sub-region with slightest probability of quasi-extinction in next 50 or 100 years is the eastern GOA (1% in the next 50 years) based on the results in Johnson (2013)

Chapter 3: WDPS Survival

- New data on juvenile survival for the eastern GOA, central GOA and eastern AI (Horning and Mellish 2012, Fritz et al. In Review)
- First estimate of survival to year 1 in the western AI, 48% -- highest survival of all rookery cohorts surveyed in the eastern AI through the eastern GOA (Fritz et al. In Review)
- No data to inform how juvenile or adult survival has changed over past 30 years in the western and central AI
- NMFS expects to collect survival data through resightings of animals branded at Agattu and through additional brand/resight work in the western and central AI

Review of the pup to non-pup ratio to infer natality

- New simulation experiment to test validity of pup to non-pup ratios as an index for natality in response to external reviews of 2010 BiOp (Johnson and Fritz 2013)
- Power of trend in pup to non-pup ratio (R_t) as a proxy for natality depends on magnitude and direction of population natality and survival rates
- R_t is an imperfect and sometimes erroneous proxy for changes in natality, Johnson and Fritz caution against direct comparisons of absolute pup to non-pup ratios as was done in the 2010 BiOp
- Thus, NMFS no longer relies on pup to non-pup ratios as a proxy to infer natality in the absence of data on the confounding variables.

Chapter 3: Reproduction

- Chapter 3 (pages 53-60) summarize what is known about natality in the WDPS
- Table 3-9 (pg 56) reveals dearth of empirical data on WDPS birth rates
- No new birth rate data since 2010 BiOp
- No natality data exist for the western and central AI

Chapter 3: Contaminants

- The SSL Recovery Plan ranked toxic substances as a medium threat to SSL Recovery
- Subsequent studies indicate that contaminants may pose a greater threat to WDPS recovery
- New information on contaminants (Castellini et al. 2012, Rea et al. 2013)

Chapter 3: Killer Whale Predation

- Summary of killer whale predation with new information for the eastern GOA (Horning and Mellish 2012)
- The available evidence about the abundance and diet habits of transient killer whales in the WDPS (summarized on pgs. 63 -67) is not consistent with the regional variation seen in SSL sub-population trends
- Transient killer whale diet appears to vary by region and killer whale predation may affect SSL population dynamics differently among WDPS sub-regions
- Threat of killer whale predation to the recovery of sea lions in the central and western AI cannot be assessed with confidence with the available data

Chapter 3: Nutritional Stress

- New Hoopes et al. (2014), Rea et al. (2011), Calkins et al. (2013)
- Prevalence of nutritional stress in WDPS today is unknown
- Most available evidence is either counter to or non-supportive of a nutritional stress mechanism to explain the apparent population dynamics of the WDPS
- Role of nutritional stress in limiting recovery of the WDPS remains uncertain and the subject of intense scientific debate
- Conclusion: If nutritional stress is affecting the WDPS, evidence suggests the mechanism would be through chronic nutritional stress through a switch from high reproduction to a high juvenile investment life history strategy.

Chapter 4: Western and Central AI Trend

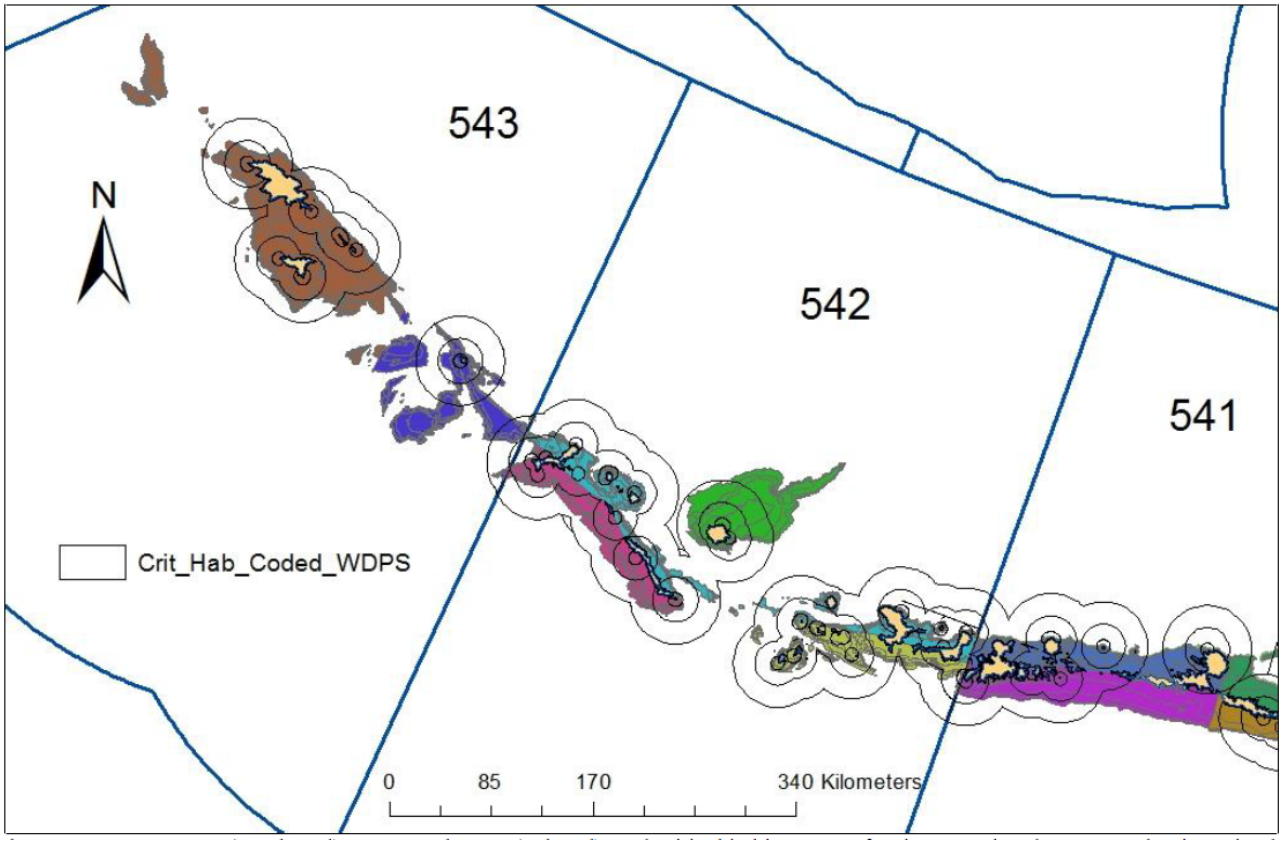
Region		Non-pups			Pups		
	Latitude Range	Trend	-95%	+95%	Trend	-95%	+95%
Central Aleutian Islands	170°W-177°E	-0.56	-1.45	0.43	-0.46	-1.50	0.72
Western Aleutian Islands	172° -177°E	-7.23	-9.04	-5.56	-9.36	-10.93	-7.78

Source: Johnson and Fritz (In Review)

Chapter 4: Western and Central AI Diet

- New decadal comparison of SSL diet from 1990-1998 and 1999-2009 (Sinclair et al. 2013)
- Used 10% FO of prey hard parts in SSL scat to infer important prey species for groundfish consultation consistent with prior biops
- Summer important prey: Atka mackerel, cephlapods, salmon
- Winter important prey: Atka mackerel, Pacific cod, pollock, rockfish, sandlance, cephlapods, Irish lord

Chapter 4: Fine Scale Biomass Estimates



New Survey biomass est. for each survey stratum (Conners et al. 2013)

Chapter 5: Telemetry Data

- CIE recommended improvements in analysis of telemetry data (Bowen 2012)
- Review of the use of telemetry information in prior biops
- New telemetry analysis of 45 SSLs in the western and central AI (Lander et al. 2013)
- New telemetry data from 6 adult females tagged in 2011 and 2012 (3 in western, 3 in central) and 17 juveniles tagged 2002-2004

Chapter 5: Telemetry Data

- Over 90% of the winter and summer juvenile locations and the summer adult female locations were within 20 nm from listed rookery or haulout
- 80.6% of the winter adult female locations were within 20 nm from listed rookery or haulout
- Higher proportion of adult female locations 10-20 nm compared to analysis in 2001 BiOp for all ages and seasons

Chapter 5: Telemetry Data

Infer

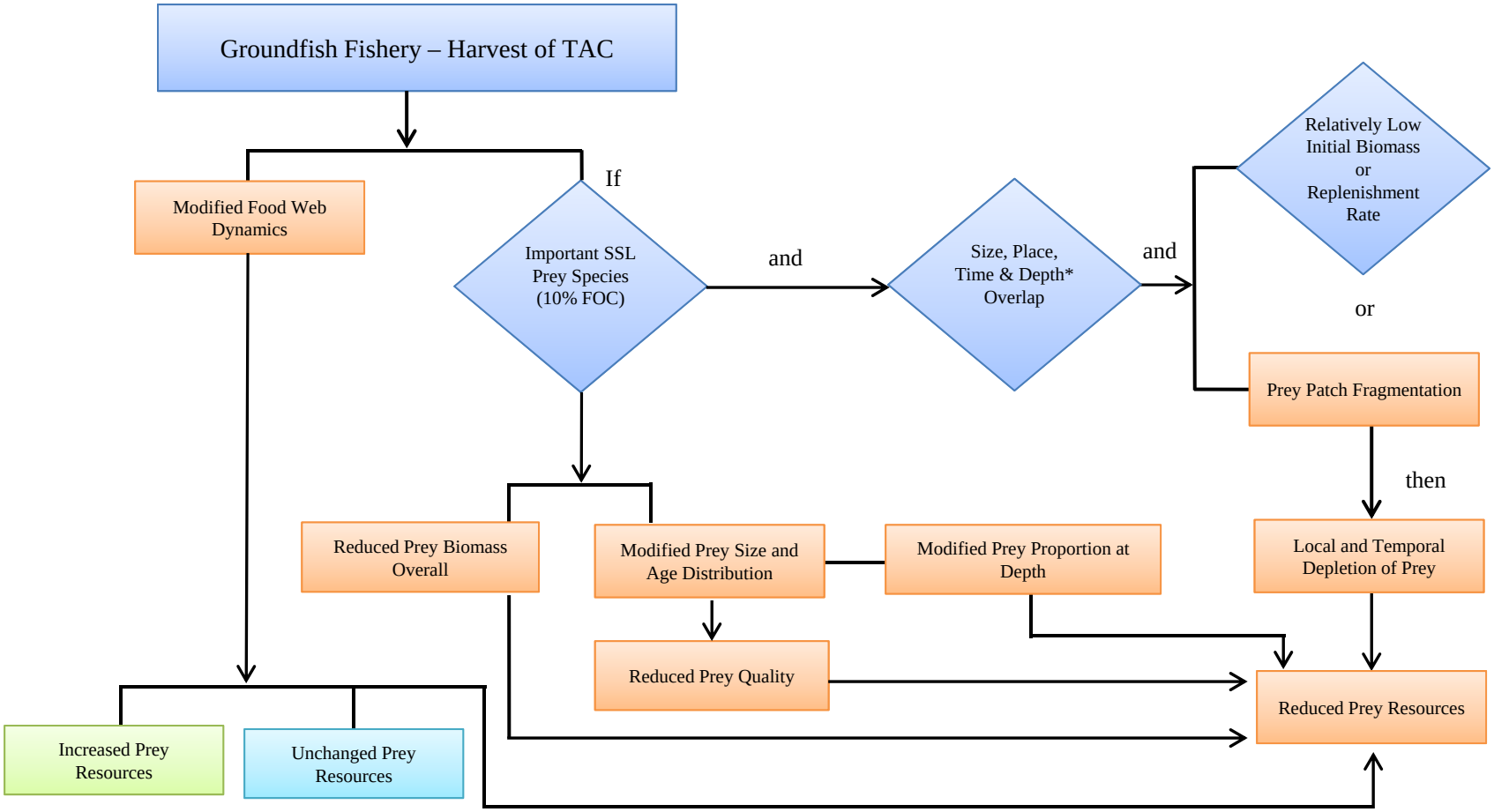
- 0-10 nm is more important than 10-20 nm for all ages and seasons consistent with NMFS 2001
- In western and central AI, 10-20 nm appears to be used by adult females in winter to greater extent than in areas to the east (e.g. compare Tables 5-6 with 5-1)

Chapter 5: Telemetry Data

Conclusions

- For this BiOp, NMFS is less concerned about potential interactions between fisheries and SSLs outside of 20 nm consistent with NMFS 2000, 2001 and 2003
- Telemetry coverage remains limited and there are significant gaps in the western & central AI:
  - No juvenile data from Sept – Jan
  - Lacking data for adult females during pup-rearing period

Revised Exposure Conceptual Model



Exposure Analysis Results

Atka mackerel

- Qualitatively high: time (summer and winter) and size overlap
- No place overlap between fishery and 0-10 nm from rookeries, 0-3 nm from haulouts
- Potential direct place overlap in 24%, 8%, and 3% of CH in 543, 542 and 541 & where co-occur outside CH
- Appears to be some depth partitioning though unknown if fishery and SSLs targeting same sub-populations

Exposure Analysis Results

Pacific cod

- Qualitatively high: time (winter) and depth overlap
- Least amount of size overlap of the 3 fisheries—fishery doesn't take small cod eaten by SSLs but SSLs may eat larger cod taken by fishery. Observed size overlap from ~ 30-70 cm.
- Greatest amount of spatial and depth overlap of the 3 species (esp. non-trawl)

Exposure Analysis Results

Pollock

- Qualitatively high degree of time (winter) and size overlap
- Apparent low degree of depth overlap in 543, more depth overlap in 542 and 541 ~ least amount of depth overlap of the 3 species
- Expected to have lowest spatial overlap in 543 because 95% of CH is closed; direct overlap may occur in 13% and 72% of CH in 542 and 541

Exposure Analysis Results

Biomass Levels and Replenishment Rates

- Best data for Atka mackerel in areas with FIT studies and all areas/species in summer
- Have least information about pollock and P cod biomass in AI in winter
- Unknown initial winter biomass for pollock, P cod, and Atka mackerel in Area 543
- Atka mackerel may be more susceptible to localized depletion – though local pollock and P cod exploitation rates may be high. Thus, unknown if fisheries cause local depletion.

Exposure Analysis Results

Global Depletion

- NMFS (2010) and the National Research Council (2003) hypothesize that on global scale (i.e. scale of assessed stock) there appears to be sufficient prey for a recovered sea lion population (e.g. larger than today's population)

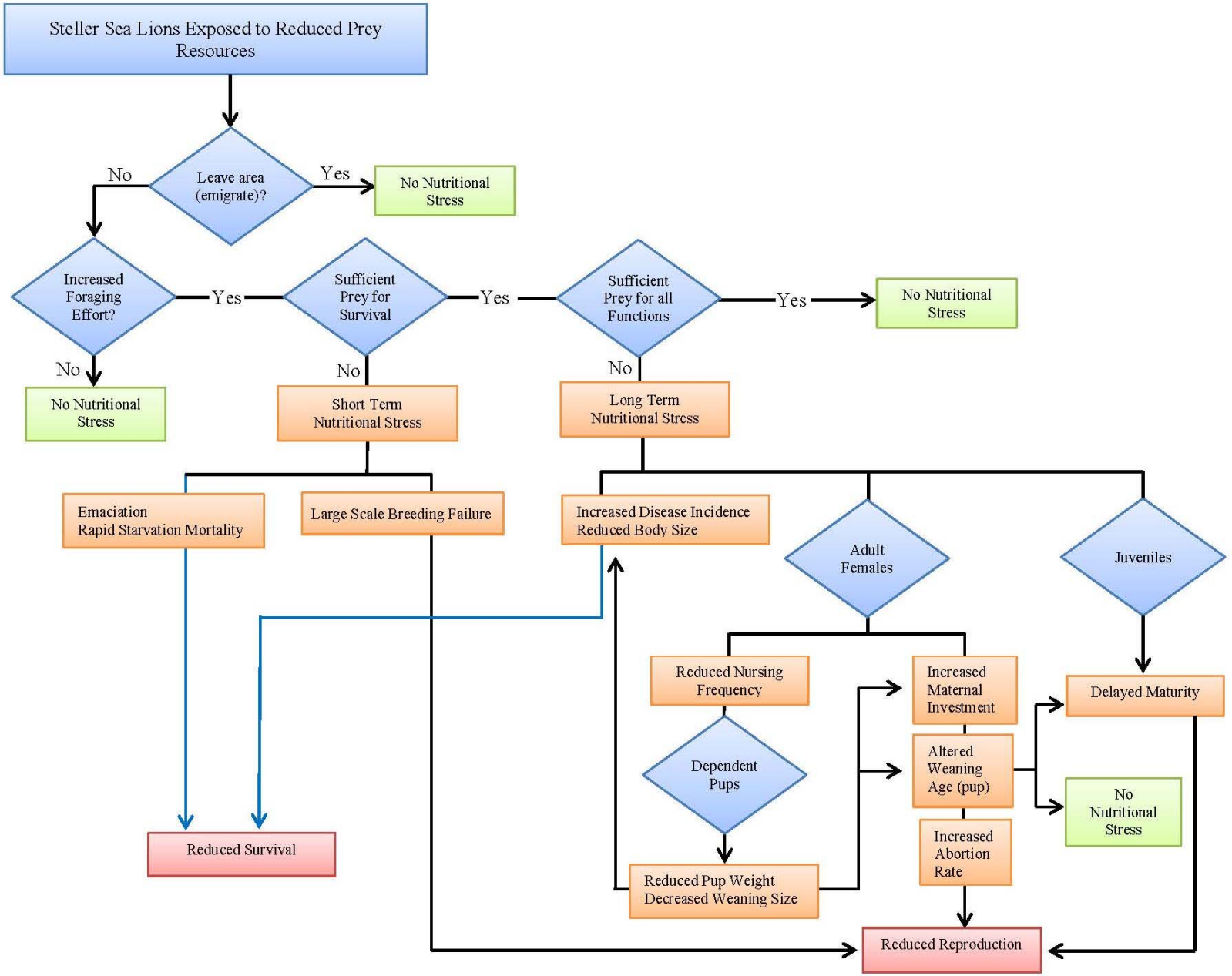
Exposure Analysis Results

- Natural fluctuations dominate over fishing effects for Atka mackerel size and age distribution (Lowe et al. 2013)
- Environmental effects also dominate the amount of interannual variability in pollock and P cod recruitment (Jim Ianelli and Grant Thompson, pers comm)

Exposure Analysis Results

- Insufficient data to determine if fisheries fragment prey patches, modify the proportion at depth and ultimately reduce SSL prey resources
- NMFS demonstrates partial overlap with unknown initial biomass for all four fisheries, resulting in some potential for reduced prey resources
- Limited exceptions: Atka mackerel fishery near Seguam Pass, Kanaga Island and Kiska Island. Effective TEZs combined with high initial biomass reduce potential for fishery local depletion.

Revised Response Conceptual Model



Risk Analysis Focus

- Whether the proposed fisheries are likely to result in local depletions of prey in areas and times important to sea lions with emphasis on animals with highest food requirements– lactating, pregnant females in winter and spring.

Fishery Correlation Simulation Analysis (New)

- External reviews of FMP BiOp highlighted statistical tests to assess the effects of fishing on SSLs.
- Bernard et al. (2011) maintain that the FMP BiOp should have rejected the hypothesis that a negative relationship exists between fishing and SSL populations because several correlative studies failed to find statistical associations
- In response, NMFS conducted a simulation experiment to investigate the power of statistical tests using the types of data available (Conn et al. 2013)

Fishery Correlation Simulation Analysis

- Conn et al. simulated idealized predator-prey time series where sea lion declines were attributable to a prey availability effect on (a) fecundity and (b) non-pup survival
- Next, used different combinations of dependent (e.g., non-pup counts, pup counts, etc.) and independent (e.g., fishery catch, fishery effort, etc.) variables to try to detect effects of fishing with analyses similar to those referenced in Bernard et al.

Fishery Correlation Simulation Analysis

Results

- Many of the combinations of dependent and independent variables resulted in little to no power to detect prey removal effects on SSL populations.
- Several combinations in existing data have potential to diagnose prey removal effects on sea lion vital rates.

  Examples:

  - Analyses relating successive ratios of non-pup (or pup) counts to an unbiased relative fish abundance index (CPUE) had potential to diagnose relationship between non-pup survival (or fecundity) and prey availability.

Fishery Correlation Simulation Analysis

Conclusions

- Suggest disregarding previous hypothesis tests that use non-pup counts as a dependent variable or measures of fishery catch or effort as a dependent variable.
- Leaves considerably fewer studies than suggested by Bernard et al. (e.g., only 2).
- No studies to date have examined successive ratio of pup counts and fish CPUE to assess relationship between SSL fecundity and prey availability.
- Overwhelming lack of statistically significant positive regression coefficients appears to suggest that local availability of groundfish stocks has minimal effect on non-pup survival (Dillingham et al. 2006, Hui 2011)

Atka Mackerel Tagging Research (new)

NMFS commenced research in 2000 to:

- estimate local abundance and movement of Atka mackerel
- evaluate the potential for fisheries to cause local depletions of Atka mackerel

McDermott and Haist (In Review) estimated local abundance and movement of Atka mackerel and local fishery exploitation rates at the 4 major fishing sites in the eastern and central AI.

Atka Mackerel Tagging Research

Conclusions:

- Atka mackerel have high fidelity to local areas
- Highest population size and biomass found at Seguam Pass, lowest at south end of Amchitka Island
- Exploitation rate at Seguam Pass & Amchitka Island estimated to be 2% and 60%
- Amchitka Is. susceptible to local depletion but exploitation rates low at Seguam, Tanaga Pass, and Kiska Is.
- Each local area needs to be evaluated to understand area-specific variation in abundance and movement
- Research planned in Area 543 in 2014

Remaining Uncertainty

- Most of the available data do not support conclusion that groundfish fisheries and groundfish abundance are limiting SSL population growth
- However, the western AI sub-population continues to decline at a steep rate and important data gaps hinder NMFS's ability to rule out bottom-up drivers, including effects of fishing as contributing to trends in the western and central AI

Important Data Gaps

- Winter groundfish biomass data
- SSL energetic requirements and foraging behavior
- Cause for continued decline in western AI

Given these data gaps, NMFS PRD maintains that:

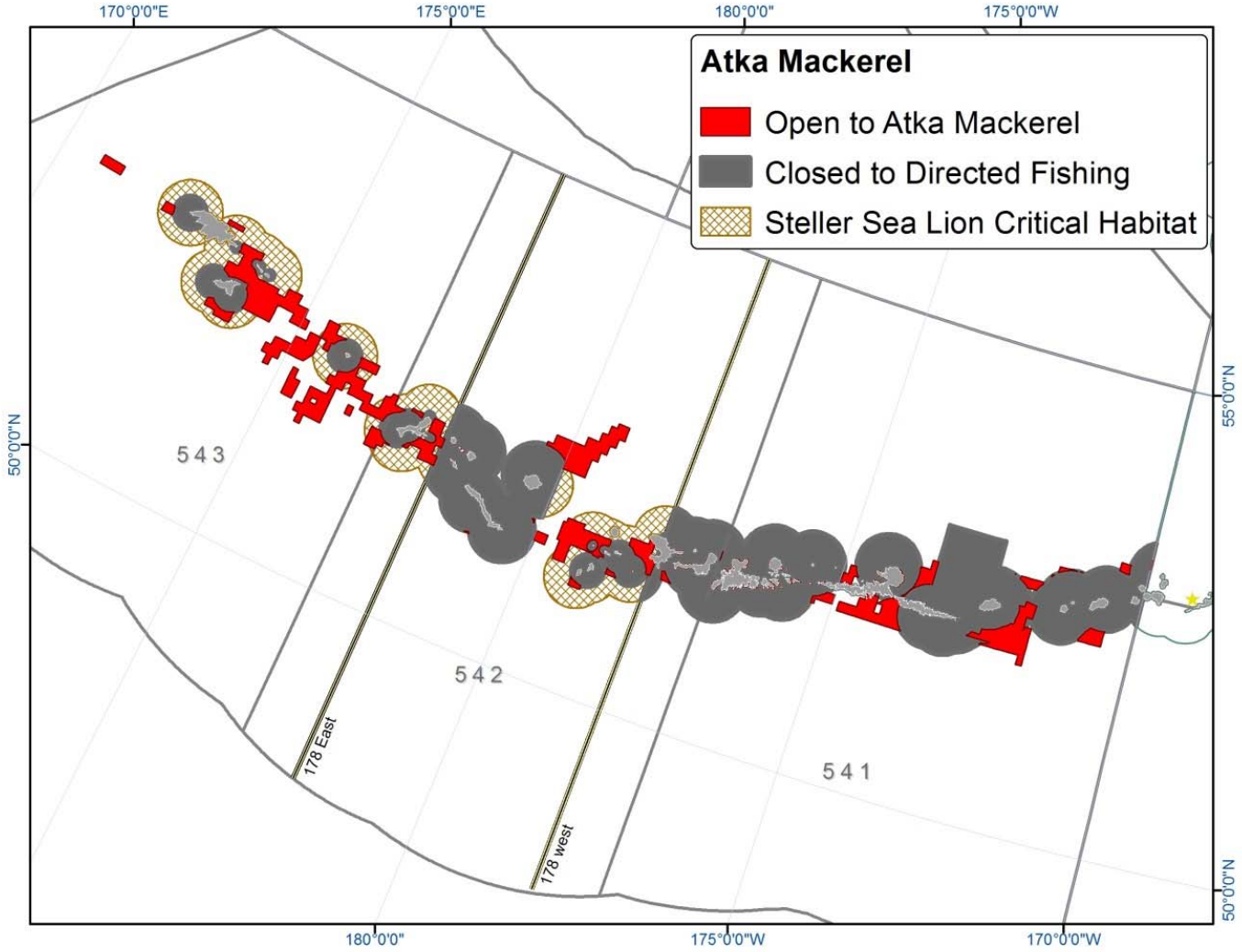
a cautionary approach to fishing for SSL prey species in CH is warranted, especially in winter, catch should be dispersed in time and space to prevent localized depletion pending better information.

Atka Mackerel Fishery Effects

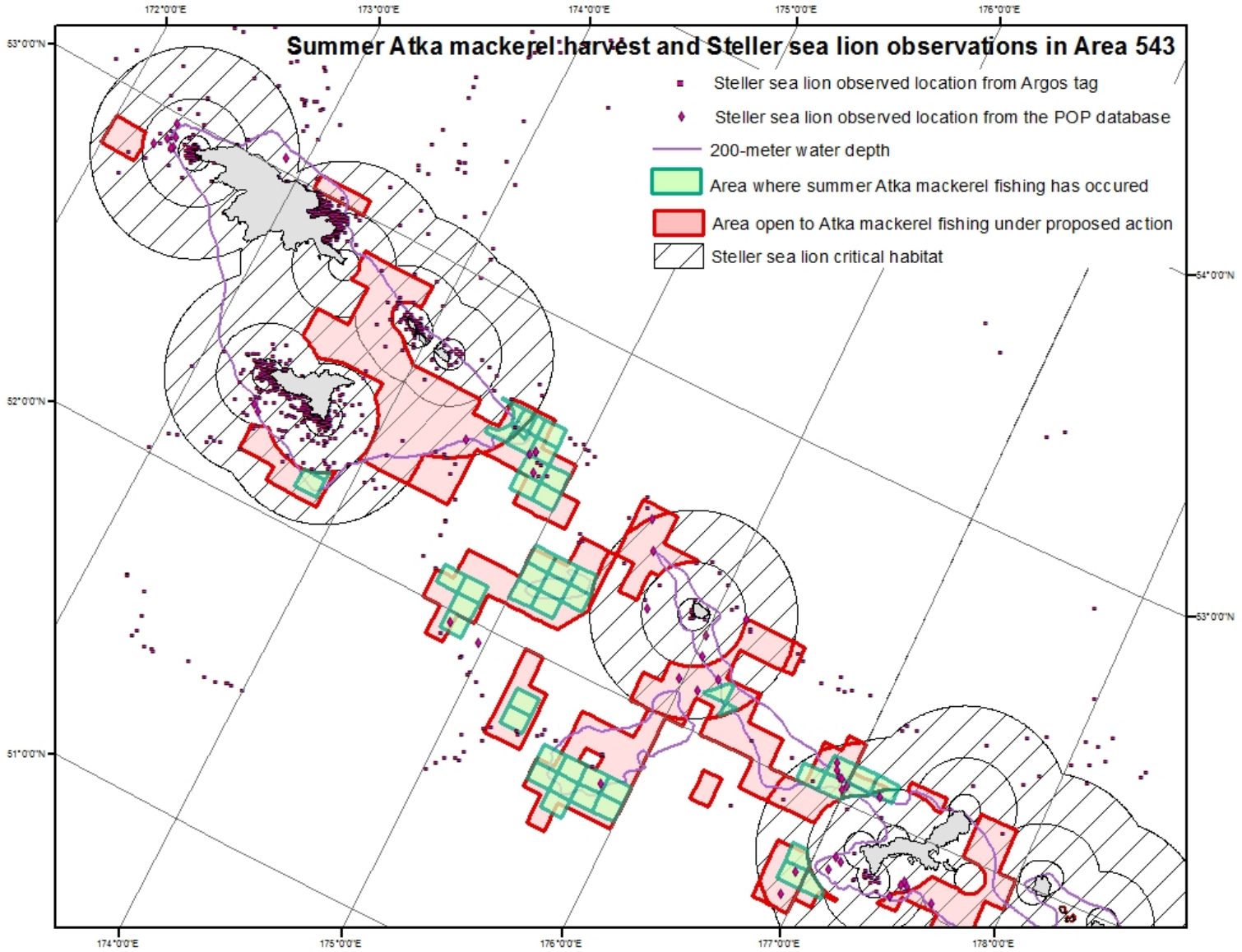
- Section 5.2, NMFS concludes that closures to groundfish fishing are not needed outside of CH

Atka Mackerel Fishery Effects

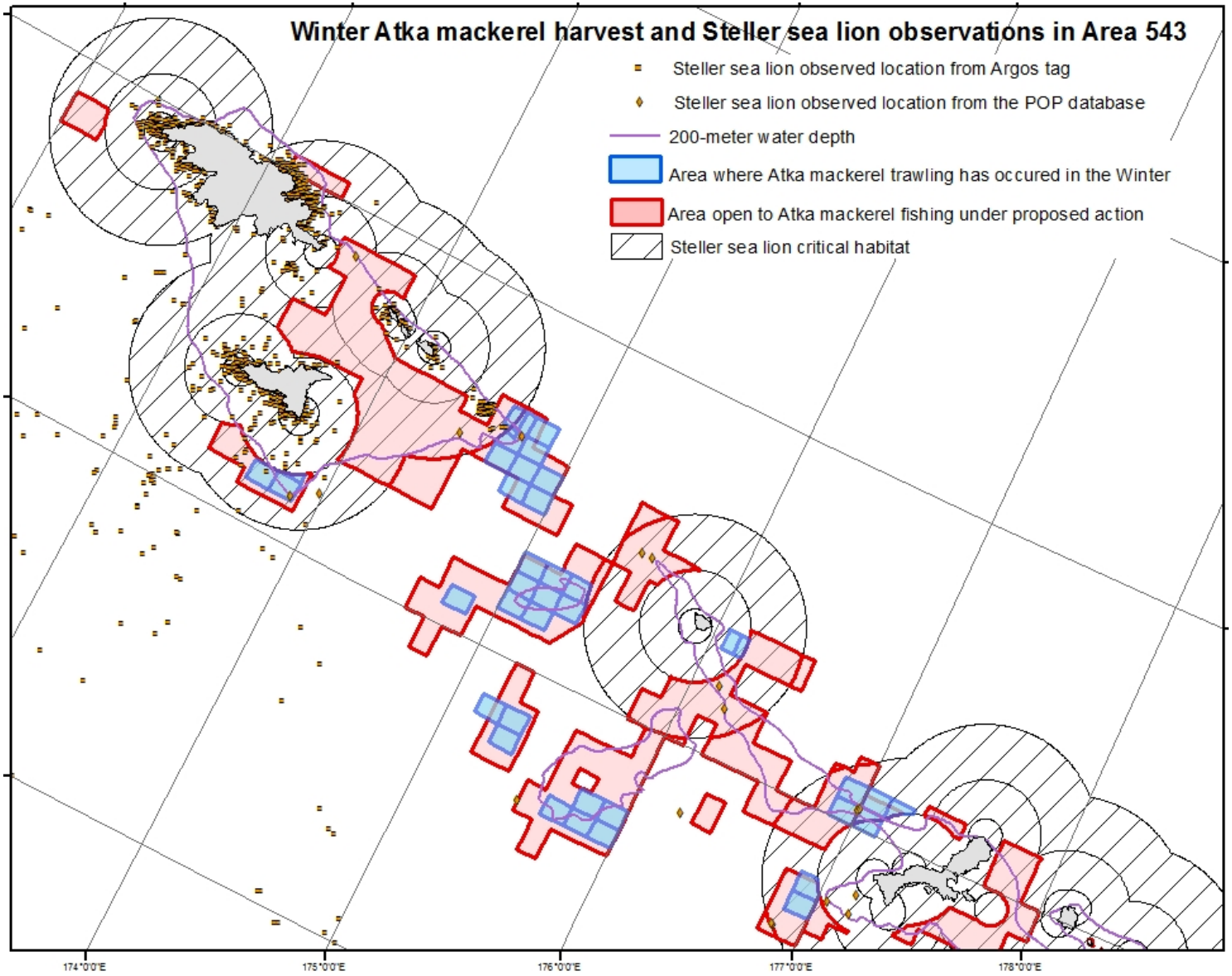
Amount of CH Closed	
543	76%
542	92%
541	97%



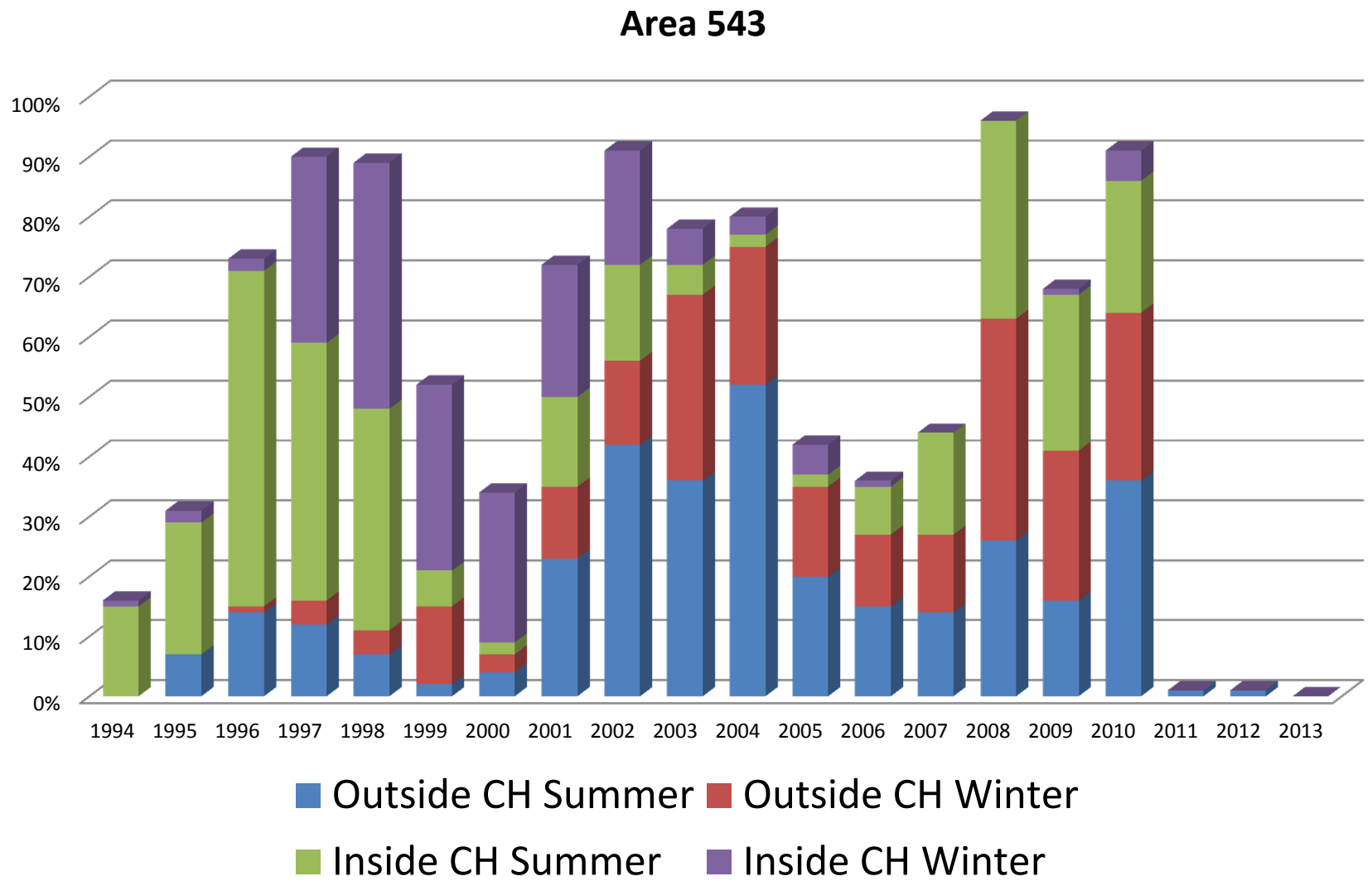
Atka Mackerel Fishery Effects



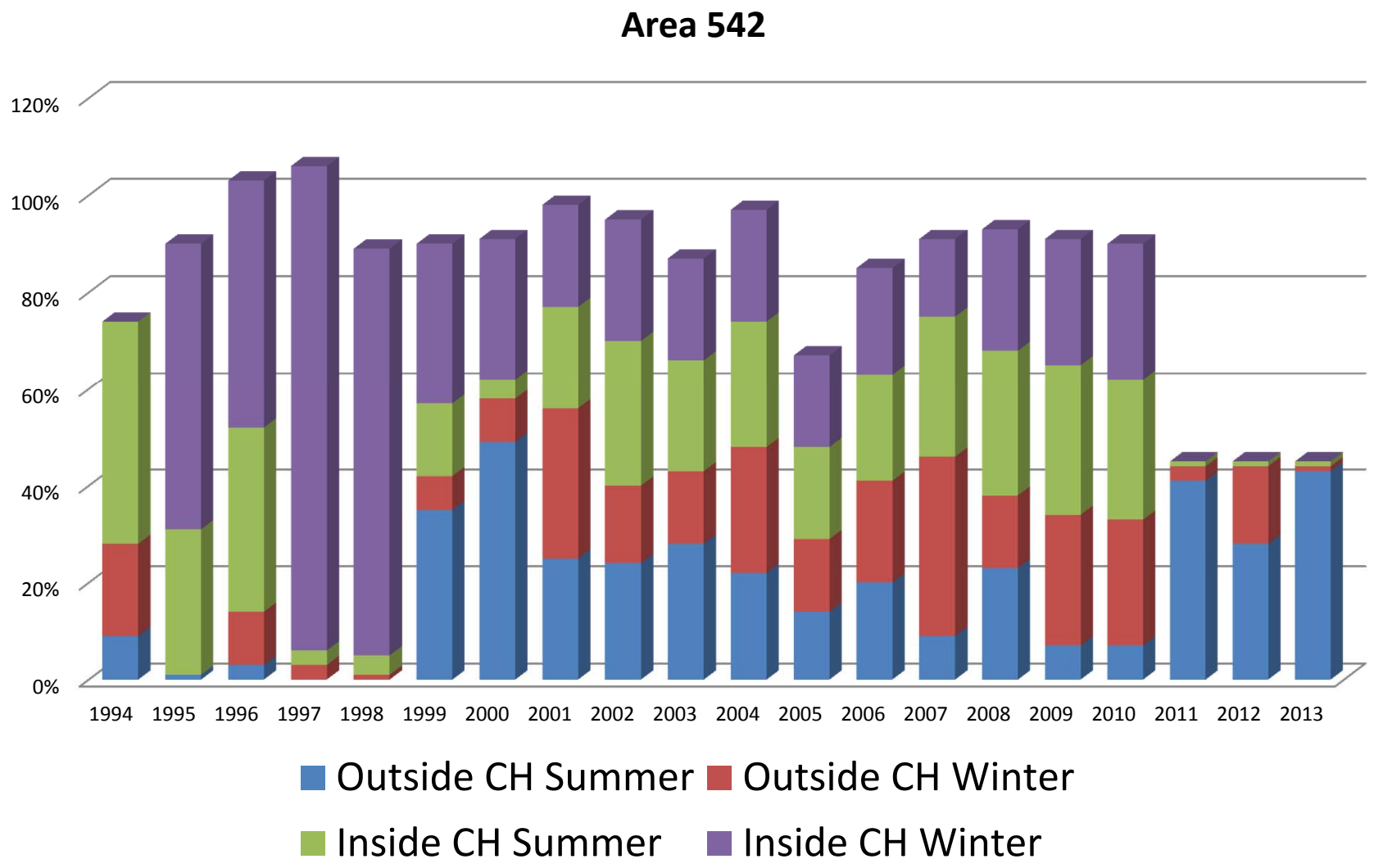
Atka Mackerel Fishery Effects



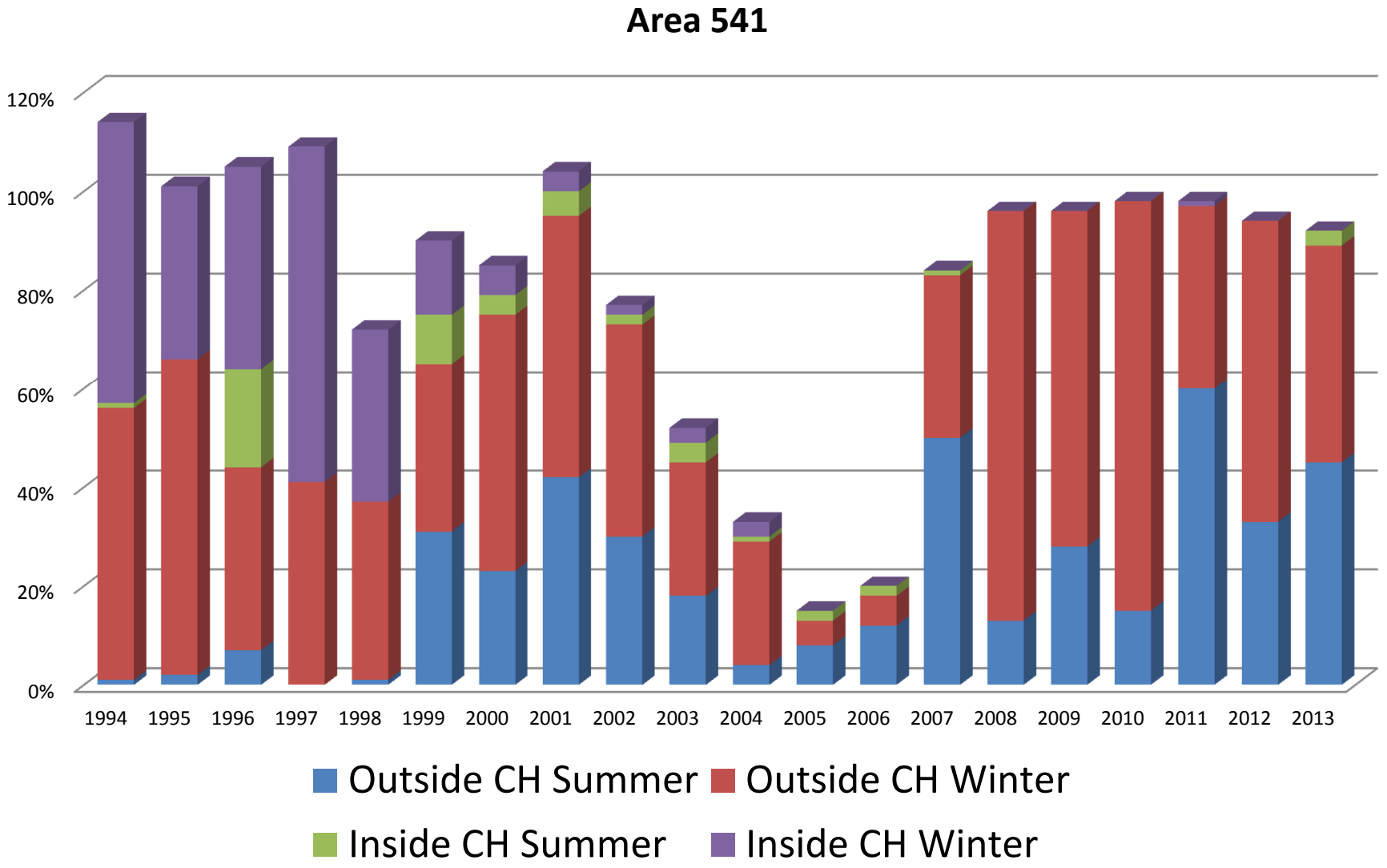
Atka mackerel Fishery Effects



Atka Mackerel Fishery Effects

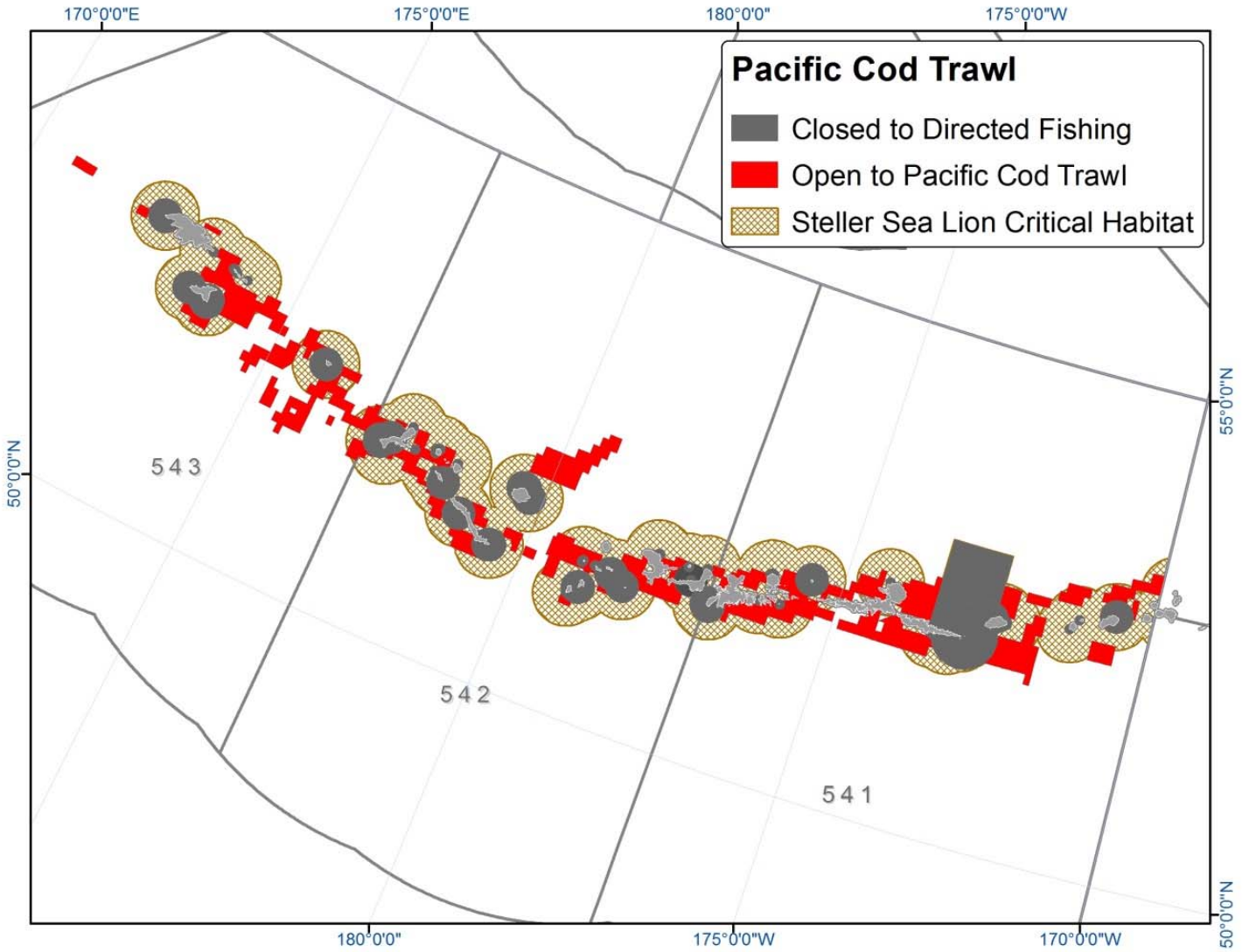


Atka Mackerel Fishery Effects

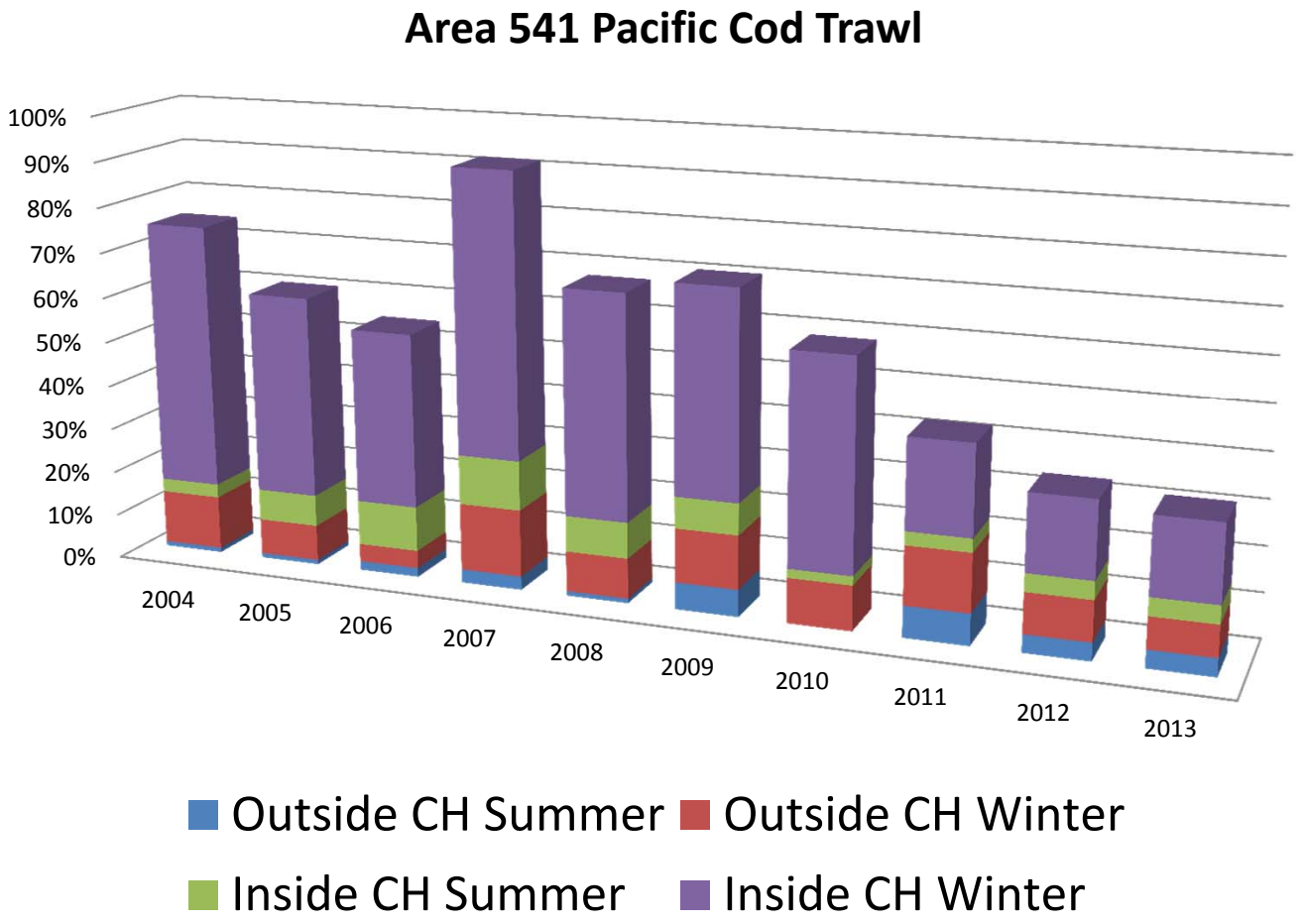


Pacific cod Trawl

Amount of CH Closed	
543	76%
542	82%
541	75%

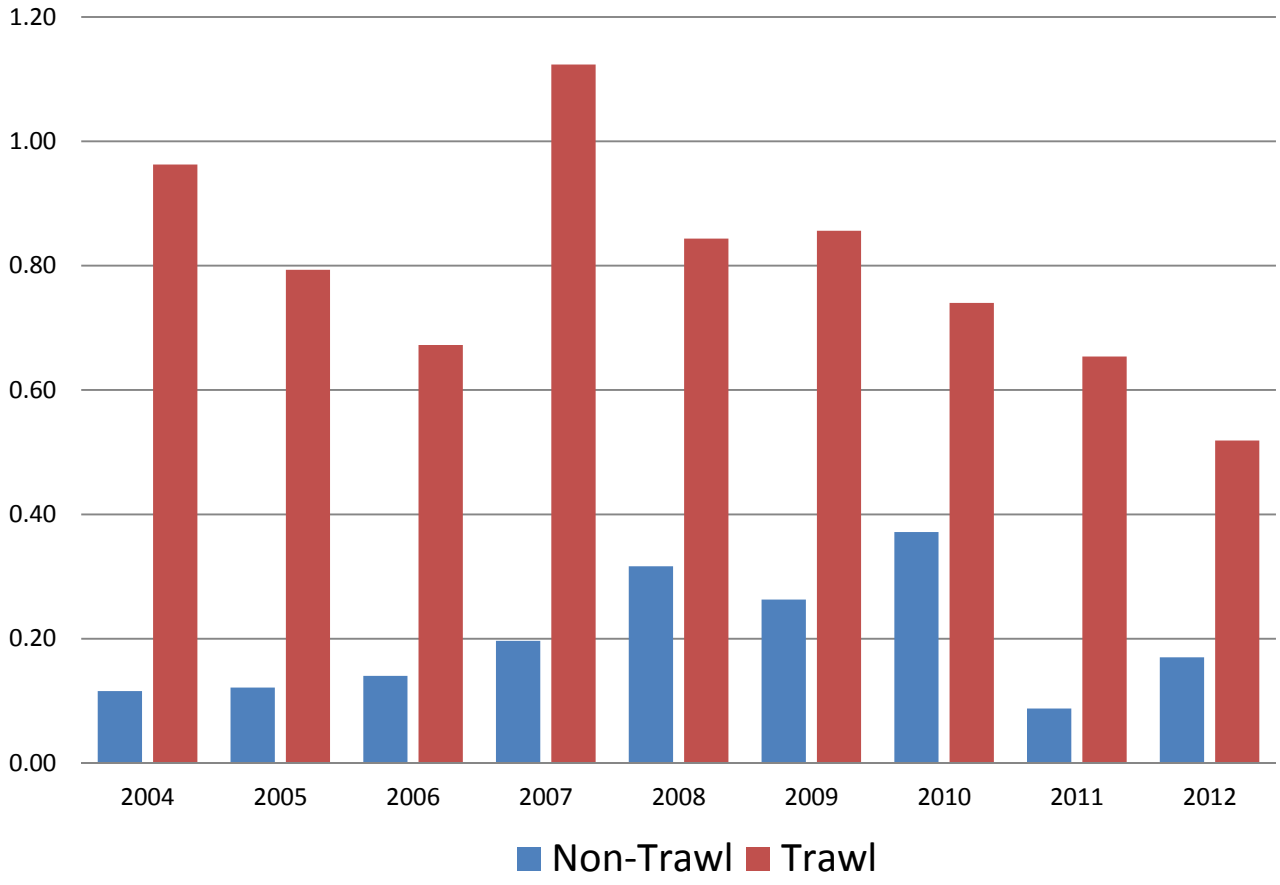


Pacific cod Trawl



Pacific cod

2004 – 2012 Average % of Est AI P Cod ABC	
Trawl	Non-Trawl
80% ± 18%	20% ± 10%



Pacific Cod Area 543

- Major changes to the Pacific cod fishery relative to 2010 are the AI-specific ABC and TAC and the Area 543 harvest limit.
- Based on the analysis, NMFS expects most of the P cod to be caught by trawl gear in Area 541. Area 543 harvests are expected to resemble harvest amounts under the interim final rule. Thus, Area 543 P cod fishery not likely to result in localized depletions of P cod

Pacific Cod Area 542

- Given the large reduction in AI P cod harvest due to the TAC split and the small amount of P cod taken historically in Area 542, the P cod trawl and non-trawl fisheries are not likely to locally deplete Pacific cod stocks in Area 542 under the proposed action.

Pacific Cod Area 541

- NMFS expects the majority of the P cod TAC to be taken by trawl gear in Area 541 similar to 2004 – 2010
- Expected to be taken in spatially and temporally compressed fashion in February and March
- Area 541 harvests expected to be < 50% of harvests from 2007 – 2010 due to TAC split
- SSLs appear to be increasing (non-significant) in the eastern portion of the central AI (541) and were increasing when the 2011 protection measures implemented. Thus not likely to limit SSL recovery or adversely modify CH.

Pollock Fishery

- Proposed action would open portions of CH to pollock fishing for first time since 1999
- Proposed action structured to be most conservative for SSLs in the western AI with decreasing protection in for critical habitat to the east.

Pollock Fishery Area 543

- Expect minimal depth overlap in Area 543, especially in late January and February
- Allowed in 5% of CH in Area 543
- Expect temporally compressed harvest of 5% of the AI ABC in the A season
- Estimated that 1,970 mt would be harvested in Area 543 CH in 2015
- Outside of 3 nm from all 3 haulouts in Area 543– Alaid only haulout used in winter

Pollock Fishery Area 543

- Unknown whether the initial pollock biomass is low around Alaid Is. haulout-- NMFS cannot rule out potential for the Area 543 pollock fishery to create a localized depletion, despite low level of proposed harvest.

- Given the numerous catch limits, inferred depth partitioning and rapid expected replenishment of pollock, NMFS does not expect the proposed Area 543 pollock fishery to reduce the prey resources to adult female and juvenile SSLs to extent that reproduction or survival is reduced

Pollock Fishery Area 542

- May adversely affect SSLs at 4 haulouts used in winter from 3-20 nm and at one winter haulout from 10-20 nm in Area 542.
- There would be no pollock fishing around remaining 10 important winter sea lion sites in Area 542.
- NMFS estimates that a max of 5,911 mt of pollock could be harvested in winter in 2015 under the proposed action.

Pollock Fishery Area 542

- Similar to 1992 through 1998, most of this harvest expected to occur 3-10 nm from 4 haulouts.
- Unknown if the pollock fishery would cause local depletions in CH in Area 542
- Some depth partitioning expected (not as much as 543)
- Extent of impact depends on how fishery executed
- However, not likely to have population-level effects on central AI sub-population or adversely modify CH

Pollock Fishery Area 541

- Impact of proposed pollock and P cod fisheries combined in Area 541 expected to be similar to impact of the P cod fishery in Area 541 prior to 2014
- SSL pup and non-pups increased at a non-significant rate from 2004 – 2010 in 541 despite temporally compressed P cod fishing
- Thus, NMFS does not expect the proposed 541 pollock fishery to reduce the survival or recovery of the central AI sub-population

Conclusions

- It is NMFS's biological opinion that the proposed action is not likely to jeopardize the continued existence of the WDPS of Steller sea lions

- It is NMFS's biological opinion that the proposed action is not likely to destroy or adversely modify designated critical habitat.