



Alaska Region



Draft Analytical Approach for a Biological Opinion to Coincide with the 2014 Steller Sea Lion Protection Measures EIS

Presented to the SSC of the North Pacific Fishery Management Council
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Objective

Outline NMFS' planned steps to analyze the effects of the (preliminary) preferred alternative in the Steller sea lion protection measures EIS on the WDPS of Steller sea lions and designated critical habitat under Section 7 of the Endangered Species Act (ESA).



Caveats

- Snapshot of current plan:
 - Some analyses depend on feasibility
 - Does not preclude other analyses



ESA Section 7 Consultation

- Federal agencies must insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.
- Required to use the best scientific and commercial data available.



“jeopardize the continued existence of”

- means 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.

Background

- Biological Opinion on the BSAI and GOA groundfish fishery FMPs (FMP BiOp)(November 2010)
- Concluded JAM and contained a Reasonable Prudent Alternative (RPA) to insure action not likely to result in JAM
- NMFS implemented RPA through interim final rule (2011) which modified the spatial/temporal distribution of Atka mackerel and Pacific cod TAC in the Aleutian Islands
- Litigation in District Court of Alaska
 - Upheld BiOp and Interim-Final Rule
 - Ordered NMFS to Prepare an EIS by March, 2014
- *Decision under appeal with Ninth Circuit Court*



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Background (cont'd)

- Council will select a preliminary preferred alternative in the EIS at its April 2013 meeting
- If Council selects any alternative but status quo (Alt 1), NMFS will reinitiate ESA section 7 consultation and complete a biological opinion on the preferred alternative concurrent with the EIS schedule.



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Scope of Anticipated Biological Opinion

- The 2010 FMP BiOp will remain as FMP-level coverage for aspects of the FMP not addressed in the RPA and for all other species except the WDPS of SSL.
- The 2014 BiOp will be "project-level" and will evaluate effects of the proposed AI Atka mackerel, P cod, and pollock fisheries on the WDPS of SSL and its designated critical habitat.
- Action Area = BSAI



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External Reviews of 2010 FMP BiOp

- States of AK and WA-sponsored review (Bernard et al. 2011)
- NMFS-Commissioned Center for Independent Experts Review (CIE Review)(2012)
- Reviews were critical of many aspects of the FMP BiOp and highlighted concerns about the evidence relied upon by NMFS to support the conclusions in the BiOp
- NMFS has evaluated the reviews and will incorporate results of the external reviews in subsequent biops (including 2014)



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New Information to Inform Analysis

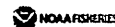
- Draft SSL Protection Measures EIS
 - Updated SSL at-sea habitat use, food habits data, and trends
- SAFE Reports (2010 – 2012)
- Groundfish Trawl Survey Data (2010, 2012)
- Marine Mammal Stock Assessment Reports (2011, 2012)
- SSL survey data (2010-2012)
- Extensive published literature



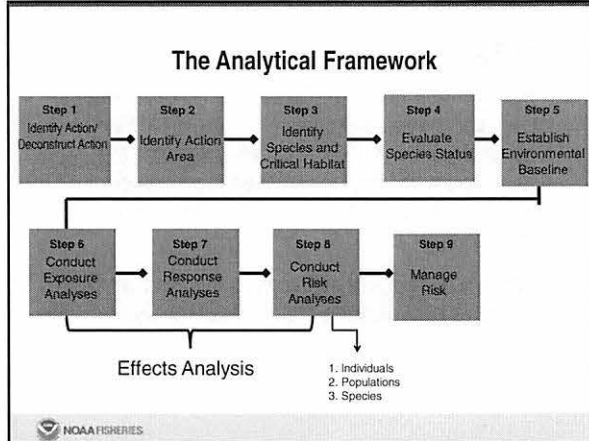
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Draft Analytical Approach

Objective: produce a biological opinion that is transparent, objective, evidence-based and compliant with applicable law.



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Species Status

- Objective: Identify risk of species' extinction and the base status of critical habitat at time of consultation.
 - Focus: WDPS of SSLs and designated critical habitat
 - 2008 Recovery Plan Criteria as frame of reference for recovery, including sub-region criteria

Population Viability Analysis (PVA)

- The last formal PVA included SSL survey data through 2006 (Boyd 2010).
- To estimate the base extinction risk to the WDPS, NMFS will conduct a count-based PVA using SSL survey data through 2012 (Quantitative)
- Population trends will be estimated from simulated population data based on WDPS non-pup and pup counts from 1990 - 2012 (Johnson and Fritz in prep)

Population Viability Analysis (PVA)

- The quasi-extinction threshold specified in the 2008 Recovery Plan ($N = 4,743$) will be partitioned across 35 rookeries in the WDPS to set a quasi-extinction threshold for each sub-region.
- The expanded trend information will be projected forward in time to estimate the probability of quasi-extinction over various time frames for each sub-region and the WDPS as a whole.

Vital Rates

- The FMP Biop used pup/non-pup ratios as an indicator for birth rate.
- The CIE reviewers were critical of this index.
- In response, NMML is conducting analyses to determine conditions under which pup/non-pup ratios are useful for inferring SSL birth rate (Quantitative)

Vital Rates

- NMML will sample simulated populations with known demographics to determine conditions under which pup/non-pup ratios are useful in making birth rate inferences.
- Pup/non-pup ratios will be calculated by sub-region for each year from 1990 through 2012 using the expanded trend dataset from Johnson and Fritz (in prep).

Vital Rates

- Next, NMML will construct population times series with known underlying changes in survival, birth rate, and trend.
- Then, populations in each sub-region will be sampled (simulated aerial surveys) to construct corresponding time series of pup and non-pup counts.

Vital Rates

- Pup/non-pup ratios will be calculated to determine how well they track known changes in birth rate given changes in other population parameters (e.g., rates and age/sex classes of movement, juvenile survival, adult survival, trends, proportions hauled-out).
- This will be a purely simulated population with an objective of evaluating the ratio as a proxy for natality.

At-Sea Habitat Use and Movement

- To inform a conceptual model for the effects analysis, NMFS will:
- summarize the telemetry information and make a general conclusion about the current understanding of at-sea habitat use of SSLs by area, season, and life stage (Quantitative) and;
- review interpretation of the Platforms of Opportunities (POP) sightings data in prior biops over time. NMFS will discuss the agency's current interpretation of the POP data in inferring at-sea habitat use (Qualitative).

Critical Habitat (CH) Assessment

- Prevailing condition of CH is an important frame of reference for the effects analysis.
- The essential features of marine designated critical habitat are important SSL prey species.
- NMFS is attempting to describe the status of essential prey resources in CH.
- However, has been virtually impossible to assess prey resources in CH since its designation.

Critical Habitat (CH) Assessment

- NMFS is hampered by lack of data on proportion of biomass inside of CH (esp. winter), density of prey patches, and composition of prey patches
- NMFS is reviewing the best available data to determine how best to characterize current condition of CH
- NMFS is estimating catch in CH for years prior to 2003 using updated methods for expanding observer data

Effects of the Action

A. Assess the Species Exposure to the Proposed Action (Exposure Analysis)

NMFS assesses the exposure of listed species and CH by identifying the spatial and temporal overlap between direct and indirect stressors caused by the action.

Exposure Analysis

- NMFS used “seven questions” in the 2000 FMP Biop to establish potential overlap between prey species targeted by the fisheries and SSLs.
- NMFS determined that the groundfish fisheries were likely to compete with SSLs for Atka mackerel, Pacific cod, and pollock.
- Given the best available information today, NMFS maintains this conclusion and the focus of the 2014 Biop will be on the fisheries for these three species.

Exposure Analysis – SSL Diet

- One critique of the 2010 FMP Biop was the use of frequency of occurrence (FO) of prey hard parts (bones and otoliths) in opportunistically collected scat samples to infer SSL diet habits.
- Upon review, NMFS maintains that FO remains the prevailing scientific standard upon which new experimental methods are judged.
- An objective review of the studies mentioned in the CIE review (Tollit 2003; 2007) confirm that FO remains among the best tools available when appropriately applied to wild diets. Other methods remain developmental.

Exposure Analysis – SSL Diet

- Other emerging methods are promising and NMFS is committed to supporting their development
- However, these methods are not currently stand-alone options for detailing SSL prey consumption patterns at the scale described in the FMP Biop.
- NMFS will elaborate on this topic in the 2014 Biop.

Exposure Analysis - Overlap

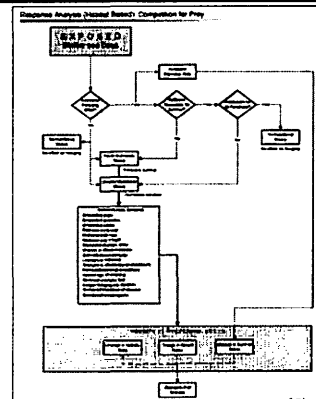
- NMFS is evaluating feasibility of a refined spatial/temporal overlap analysis between the fisheries and SSLs. Analysis would also include best available data on size of prey consumed by SSLs.

Effects Analysis - Response

B. Assess the species response to exposure to fishery effects

- NMFS will review and update the response schematic from the 2010 FMP Biop (Figure 4.25)

Response Schematic from 2010 FMP Biop (Figure 4.25)



Effects Analysis - Risk

C. Assess the Species Risk

- NMFS must consider the risk of the fisheries to SSLs and CH.
- Risk assessment considers both the probability of harm and the severity of the consequence.

Effects Analysis - Risk

The best available science and latest conceptual models suggest that the current risk posed to SSLs by fisheries is the localized depletion of prey at a scale important to adult female and juvenile SSLs.

Potential harm to SSLs from insufficient availability of prey hypothesized to include:

- a) Reduced juvenile survival due to starvation or disease
- b) Reduced reproduction due to insufficient energy intake by adult females

Effects Analysis - Risk

- The current understanding is that indirect effects that manifest as local depletion of SSL prey resources may reduce SSL reproduction and numbers.
- In the risk assessment NMFS must evaluate the likelihood that the proposed action will result in or contribute to local depletion of prey in critical habitat, and
- The severity of the expected response of individuals and populations on the likelihood of survival and recovery in the WDPS.

Risk Analysis

- Data are not available to directly measure the amount of prey biomass in CH
- Moreover, we may never know density of prey that should be maintained for SSLs
- Prevents understanding effects of fishing on suitability of prey field
- NMFS will attempt to estimate CH biomass availability and fishery CH harvest rates
- Pessimistic given gaps, though scenarios and limited data for some areas may be insightful

Fishery Correlation Analyses

- In lieu of direct measurements, several studies have correlated fishery harvest rates with SSL trends to understand if fisheries negatively affect SSL foraging.
- In 2010, NMFS concluded that the spatial scale of the fishery correlation analyses were too coarse and statistical power too low to detect effect of fishery harvests on SSL trends.
- External reviews of the 2010 FMP Biop were critical of NMFS' treatment and interpretation of the fishery correlation analyses.
- Most reviewers asserted NMFS should be able to determine effect of fisheries on SSL populations by regressing harvest against SSL trends.

Fishery Correlation Analyses

- In response to external reviews, NMFS will undertake an examination and critical review of the studies in Bernard et al. (2011). (Qualitative)
- NMFS will also perform a small simulation to test whether external drivers of survival can be detected with the regression analysis used in the Bernard et al. (2011) literature. (Quantitative)

Fishery Correlation Analyses

- NMFS will use a matrix model to simulate an age-structured population in which survival and natality can be functions of a simulated external covariate (e.g. fishing harvest or prey availability).
- After simulation, the regression analysis will be performed to determine the power of this analysis with respect to detecting the covariate.



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Adaptive Management Experiment

- Given the complexity of the marine ecosystems off Alaska and the multiple factors likely affecting the dynamics of apex predators, including SSLs, many experts have concluded that the only way to understand the impact of fisheries on SSLs is to conduct large-scale, adaptive management experiments with replicated open and closed areas.
- Such an approach has not been implemented.



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Adaptive Management Experiment

- A simulation study by Punt and Faye (2006) demonstrated that uncontrollable factors (movement of sea lions among treatment areas, different trends at rookeries irrespective of fishing, and demographic stochasticity) of the marine environment have a major impact on the power of the experiments. Their simulated experiments performed poorly in resolving the question of whether the cause for the decline of SSLs was due to fishing-related factors.



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Monitoring

- Need for expanded groundfish surveys to understand proportion of biomass inside and outside of CH in summer and winter has been emphasized for > 20 years in groundfish biological opinions and the SSL Recovery Plan. Such a monitoring protocol has never been implemented.



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Risk Analysis - ESA Requirements

- Despite information gaps, NMFS must endeavor to understand the true effects of the fisheries to SSLs and CH.
- ESA is clear that when data are equivocal, NMFS must give benefit of doubt to the listed species (minimize Type II statistical error).
- The 2014 Biop will endeavor to distill the available scientific and commercial data to the extent possible to evaluate the effects of the preferred alternative on SSLs and CH.



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Risk Analysis

- While much remains unknown, NMFS has narrowed down the potential effects and areas of particular concern over the past two decades.
- Extensive research has filled some key information gaps.
- NMFS will present a chronology of the understanding of the effects of the groundfish fisheries on the viability of the WDPS



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Risk Analysis (cont'd)

- NMFS will also present a chronology of the 15-year history of fishery management actions implemented to protect SSLs and SSL population responses (Qualitative)
- NMFS will explore an analysis to evaluate the of efficacy of closed areas by calculating probability of SSL decline given varying closures (Quantitative)

Risk Analysis (cont'd)

- NMFS will use a weight-of-evidence analysis to determine whether the preferred alternative insures that the fisheries are not likely to jeopardize SSLs or adversely modify designated CH (Qualitative)
 - NMFS will present evidence consistent with hypothesis that the fisheries, as proposed, (do/ do not) reduce survival and recovery of SSLs and adversely modify CH.
 - NMFS will conclude which hypothesis is more probable given the evidence.

Performance Measures

- If NMFS determines that the available evidence provides stronger support for a JAM conclusion than a no JAM conclusion, then NMFS will present performance measures to further address the stressors of concern. These recommendations would flow from the preceding evidence and conclusions from the analyses.

Table 2-19 Comparison of Alternatives for Atka Mackerel

Alternative	Seasons	Area 543		Area 542		Area 541/Bering Sea	
		closures	Catch and participation limits	closures	Catch and participation limits	closures	Catch and participation limits
1	Trawl: A season: 1/20-6/10 B season: 6/10-11/1. 50:50 seasonal apportionment including CDQ. Rollover from A to B season.	No retention.	Not applicable.	Critical habitat closed except between 178°W and 179° W, closed critical habitat 0-10 nm.	Must be in a cooperative or CDQ fishing to fish inside critical habitat. No more than 10% of the group's allocation harvested from critical habitat, distribute evenly between seasons. TAC ≤ 47% of ABC.	Critical habitat closed to directed fishing. BS subarea closed to directed fishing.	TAC for combined Area 541/BS subarea.
2	Trawl: A season: 1/20-6/10 B season: 6/10-12/31. 50:50 seasonal apportionment including CDQ. Rollover from A to B season fished outside of critical habitat.	Critical habitat closed. W of 174.5 E long. closed.	TAC set 65% of ABC. Option 1: TAC 50% of ABC. Option 2: TAC 40 % of ABC.	Critical habitat closed between 178°E long. to 180°E and between 178°W to 177°W. long. Option: prohibit BS trawl limited access vessels inside critical habitat. In remaining critical habitat, close 0-3 from haulouts and 0-10 from rookeries.	TAC 65% of ABC. Critical habitat harvest limit 50% of TAC, distribute evenly between seasons.	Critical habitat closed except 12-20 nm portion southeast of Seguam Island. BS subarea closed to directed fishing.	Prohibit BS trawl limited access inside critical habitat. Critical habitat catch limit 50% of TAC, distribute evenly between seasons. TAC specified for combined Area 541 and BS. Amend. 80 coop and CDQ in BS: Revise MRA calculation for Atka mackerel as an incidental species.
3	Trawl: A season: 1/20-6/10 B season: 6/10-12/31 Option: B season June 10-Nov. 1. 50:50 seasonal apportionment including CDQ. Rollover from A to B season fished outside of critical habitat.	Critical habitat closed 0-3 haulouts and 0-10 from rookeries. Option: Close all critical habitat. Close Buldir Island 0-15 nm except portions in 10-15 nm zone. Option: Close west of 174.5° E long.	Critical habitat harvest limit 60% of TAC, distribute evenly between seasons.	Critical habitat closed 0-3 haulouts and 0-10 from rookeries except close critical habitat between 178°E long. to 180° E and east of 178°W long.	Critical habitat harvest limit 60% of TAC west of 178° W long, distribute evenly between seasons.	Same as Alternative 2	Amend. 80 coop and CDQ in BS: Revise MRA calculation for Atka mackerel as an incidental species.
4	Trawl: A season: 1/20-6/10 B season: 6/10-12/31. Rollover from A to B season. 50:50 seasonal apportionment including CDQ.	Critical habitat closed 0-3 haulouts and 0-10 from rookeries. Close Buldir Island 0-15 nm.	Same as Alternative 3	West of 178°W, critical habitat closed 0-3 haulouts and 0-10 from rookeries. East of 178°W, critical habitat closed.	Same as Alternative 3	Same as Alternative 1	Same as Alternative 3
SSLMC PPA	Same as Alternative 2	Critical habitat closed 0-3 haulouts and 0-10 from rookeries.	Critical habitat harvest limit 60% of TAC, distribute evenly between seasons. TAC≤65% ABC	Same as Alternative 3	Same as Alternative 3	Same as Alternatives 2 and 3	Same as Alternatives 3 and 4

CDQ=Community Development Quota, TAC=total allowable catch, ABC=acceptable biological catch, MRA=maximum retainable amount, BS=Bering Sea, SSLMC PPA=Steller Sea Lion Mitigation Committee Preliminary Preferred Alternative

Table 2-20 Comparison of Alternatives for Pacific Cod Non-trawl Gear

Alternative	Seasons	Area 543		Area 542		Area 541	
		closures	Catch and participation limits	closures	Catch and participation limits	closures	Catch and participation limits
1	<p>Hook-and-Line: A season: 1/1-6/10 B season: 6/10-12/31 Pot: A season: 1/1-6/10 B season: 6/1-12/31 Jig: A season: 1/1-4/30 B season: 4/30-8/31 C season: 8/31-12/31 Seasonal apportionments based on BSAI-wide TACs under Amend 65.</p>	No retention	Not applicable	Critical habitat closed 0-6 nm year round. For vessels ≥ 60 ft, close critical habitat 0-20 nm Jan 1-March 1. Prohibit directed fishing after Nov. 1.	ESA reinitiation trigger with harvest more than 1.5 % of BSAI Pacific cod ABC.	Critical habitat closed 0-10 nm year round and 0-20 nm Jan 1-March 1. Seguum Foraging Area closed. Prohibit directed fishing after Nov. 1.	ESA reinitiation trigger with harvest more than 1.5% of BSAI Pacific cod ABC.
2	<p>Hook-and-Line: A season: 1/1-6/10 B season: 6/10-11/1 Pot: A season: 1/1-6/10 B season: 6/1-11/1 Jig: A season: 1/1-4/30 B season: 4/30-8/31 C season: 8/31-11/1 Seasonal apportionments based on BSAI-wide TACs under Amend 65.</p>	Critical habitat closed 0-6 nm from rookeries and haulouts. <u>Protective option:</u> A season: Close 0-10 nm from rookeries and haulouts. B and C seasons: Close 0-6 nm from rookeries and haulouts.	Catch limit in proportion to Area 543 abundance based on annual stock assessment. Option 1: Only CPs and shoreside CVs. Prohibit motherhips. Option 2: Only CPs, CVs, and motherhips with associated CVs. Establish catch limit for CP or CP/motherhip sector in proportion to historical average annual catch 2006-2010. Shoreside CVs limited to overall Area 543 catch limit.	Critical habitat closed 0-3 nm from rookeries.	Catch limit in proportion to Area 542/541 abundance based on annual stock assessment. Establish 542/541 catch limit for CP/motherhip sector based on portion of historical average annual catch 2006-2010. Shoreside CVs limited to overall 542/541 area catch limit.	Critical habitat closed 0-3 nm from rookeries. Seguum Foraging Area closed.	Catch limit in proportion to Area 542/541 abundance based on annual stock assessment. Establish 542/541 catch limit for CP/motherhip sector based on portion of historical average annual catch 2006-2010. Shoreside CVs limited to overall 542/541 area catch limit.
3	Same As Alternative 1	Critical habitat closed 0-3 nm from rookeries and 0-10 nm from Buldir.	Catch limit in proportion to Area 543 abundance based on annual stock assessment. Establish catch limit for CP/motherhip sector in proportion to historical average annual catch 2006-2010.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
4	Same as Alternatives 1 and 3	Hook-and-line and pot: Critical habitat closed 0-3 nm from rookeries and 0-10 from Buldir.	None	Hook-and-line and pot: Critical habitat closed 0-3 nm from rookeries.	None	Seguum Foraging Area closed. Hook-and-line and pot: critical habitat closed 0-3 from rookeries W of 172.58° W long., critical habitat closed E of 172.58° W long.	None
SSLMC PPA	<p>Hook-and-line: A season: 1/1-6/10 B season: 6/10-12/31 Pot: A season: 1/1-6/10 B season: 6/1-12/31 Jig: A season: 1/1-4/30 B season: 4/30-8/31 C season: 8/31-12/31 Seasonal apportionments based on BSAI wide TACs under Amend 65.</p>	Hook-and-line and pot: Critical habitat closed 0-3 nm from rookeries and 0-10 from Buldir Island.	Catch limit in proportion to Area 543 abundance based on annual stock assessment.	Hook-and-line and pot: Critical habitat closed 0-3 nm from rookeries.	None	Seguum Foraging Area closed. Hook-and-line and pot: critical habitat closed 0-3 from rookeries west of 172.59° W long., critical habitat closed east of 172.59° W long.	None

ESA=Endangered Species Act, TAC=total allowable catch, ABC=acceptable biological catch, BSAI=Bering Sea and Aleutian Islands Management Area, GHL=guideline harvest level, SSLMC PPA=Steller Sea Lion Mitigation Committee recommended preliminary preferred alternative, CV=catcher vessel, CP=catcher/processor

Table 2-21 Comparison of Alternatives for Pacific Cod Trawl Gear

Alternative	Seasons	Area 543		Area 542		Area 541	
		closures	Catch and participation limits	closures	Catch and participation limits	Closures	Catch and participation limits
1	A season: 1/20-4/1 B season: 4/1-8/10 C season: 8/10-11/1 Seasonal apportionment based on BSAI wide TAC level under Amend 85.	No retention	Not applicable	Critical habitat closed except between 178°W and 177° W long. Critical habitat closed 0-10 nm year round and 0-20 nm June 10-Nov. 1.	ESA reinitiation trigger with harvest more than 2% of BSAI P. cod ABC.	Critical habitat closed 0-10 nm year round and 0-20 nm June 10-Nov. 1. Sequim Foraging Area closed.	ESA reinitiation trigger with harvest more than 11.5% of BSAI Pacific cod ABC.
2	A season: 1/20-4/1 B season: 4/1-8/10 C season: CVs and AFA CPs: 8/10-11/1. CDQ and Amend. 80 coop: 8/10-12/31. Seasonal apportionment based on BSAI wide TAC level under Amend 85.	Critical habitat closed except close 0-10 nm from rookeries and haulouts between 174.5° E long. and 173° E long. <u>Protective option:</u> A and B season: Close 0-10 nm from rookeries, close 0-20 nm from haulouts between 173° E long. and 174.5° E long.	Catch limit based on annual stock assessment. Vessels limited to CPs and CVs. Option 1: Prohibit motherhips. Option 2: Allow motherhips. Establish catch limit for CP or CP/motherhip sector based on historical average annual catch 2006-2010. Shoreside CVs limited to overall area catch limit. Prohibit directed fishing after April 30.	Critical habitat closed except east of 178°W and west of 174°W, critical habitat closed 0-3 at haulouts and 0-10 at rookeries.	Catch limit in proportion to Area 542/541 abundance based on annual stock assessment. Establish CP/motherhip catch limit based on historical average annual catch 2006-2010. Shoreside CVs limited to overall area catch limit.	Critical habitat closed except west of 174°W long., critical habitat closed 0-3 at haulouts and 0-10 at rookeries. Sequim Foraging Area closed.	Combined with Area 542.
3	For Area 543: A season: 1/20-4/1 B season: 4/1-8/10 C season: 8/10-11/1 For Areas 542/541: A season: 1/20-4/1 B season: 4/1-8/10 C season: CVs and AFA CPs: 8/10-11/1. CDQ and Amend. 80 coop: 8/10-12/31. Seasonal apportionment based on BSAI wide TAC level under Amend 85.	Critical habitat closed 0-3 haulouts and 0-10 from rookeries.	Catch limit in proportion to Area 543 abundance based on annual stock assessment. Establish catch limit for CP/motherhip sector based on historical average annual catch 2006-2010. Shoreside CVs limited to overall area catch limit.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
4	A season: 1/20-4/1 B season: 4/1-8/10 CVs and AFA CPs: C season: 8/10-11/1. Amend. 80 coop and CDQ: C season: 8/10-12/31. Seasonal apportionment based on BSAI wide TAC level under Amend 85.	Same as Alternative 3	None	Critical habitat closed 0-3 haulouts and 0-10 from rookeries.	None	Sequim Foraging Area closed. Critical habitat closed 0-3 haulouts and 0-10 from rookeries, except a 20 nm closure at Agilgadak.	None
SSLMC PPA	Amend. 80 and CDQ: A season: 1/20-8/10 B season: 4/1-8/10 C season: 8/10-12/31. CVs and AFA CPs: A season: 1/20-4/1 B season: 4/1-8/10 C season: 8/10-11/1. Seasonal apportionment based on BSAI wide TAC level under Amend 85.	Critical habitat closed 0-3 haulouts and 0-10 from rookeries.	Catch limit in proportion to Area 543 abundance based on annual stock assessment.	Critical habitat closed 0-3 haulouts and 0-10 from rookeries.	None	Sequim Foraging Area closed. Critical habitat closed 0-3 haulouts and 0-10 from rookeries except a 20 nm closure at Agilgadak.	None

CDQ= Community Development Quota, TAC=total allowable catch, ABC=acceptable biological catch, BSAI=Bering Sea and Aleutian Islands Management Area, ESA=Endangered Species Act, CP= catcher/processor. SSLMC PPA= Steller Sea Lion Mitigation Committee recommended preliminary preferred alternative, CV=catcher vessel, CP=catcher/processor

Table 2-22 Comparison of Alternatives for Pollock

Alternative	Seasons	Area-wide Catch and Participation limits	Area 543	Area 542	Additional participation limits	Area 541
			Closures and catch limit	Closures and catch limit		Closures and catch limit
1	A season: 1/20-6/10. B season: 6/10-11/1.	Only vessels registered with the Aleut Corporation in directed fishery. 50% of AI directed fishery allocation to vessels ≤ 60 ft. When AI ABC ≥ 19,000 mt, AI TAC is 19,000 mt. When AI ABC < 19,000 mt, AI TAC ≤ ABC. Total A season apportionment no more than 40% of ABC.	Critical habitat closed to directed fishing.	Critical habitat closed to directed fishing.	None	Critical habitat closed to directed fishing.
2	A season: 1/20-6/10. B season: 6/10-11/1.	Same as Alternative 1	No directed fishing in the area.	Critical habitat closed to directed fishing except for: - Rat Island Area outside of 3 nm from Tanadak, Segula, and Krysi Point and 10 nm from Little Sitkin and Ayugudak, and -an area outside of 3 nm from Kanaga and Bobrof Island. Option: Kanaga area outside 10 nm closure at Kanaga/Ship rock. Option: Kanaga area outside 6 nm closure at Kanaga/Ship rock. <u>Protective Option:</u> A season: close 0-10 nm from rookeries, close 0-20 nm from haulouts. B season: close 0-10 nm from rookeries and haulouts.	Option: prohibit directed fishing for pollock in Kanaga area by vessels ≥ 60 ft.	Critical habitat closed to directed fishing, except -an area at Atka North Cape outside of 3 nm from haulouts -an area at Amukta Pass outside of 3 nm from haulouts. <u>Protective Option:</u> A season: close 0-10 nm from rookeries, close 0-20 nm from haulouts B season: close 0-10 nm from haulouts, close 0-20 nm from rookeries.
3 and 4	A season: 1/20-6/10. B season: 6/10-11/1.	Same as Alternative 1	Critical habitat closed except an area outside of 0-3 nm from Shemya, Alaid, and Chirikof.	Critical habitat closed 0-10 nm at rookeries and haulouts west of 178° W long. Critical habitat closed 0-3 nm haulouts and 0-10 nm from rookeries east of 178° W long., except open critical habitat in Rat Island and Kanaga areas as under Alternative 2. <u>Protective Option:</u> Same as Alternative 2.	None	Critical habitat closed to directed fishing 0-3 nm from haulouts and 0-10 nm from rookeries. <u>Protective Option:</u> Same as Alternative 2.
SSLMC PPA	A season: 1/20-6/10. B season: 6/10-11/1.	Same as Alternative 1	Critical habitat closed except an area outside of 0-3 nm from Shemya, Alaid, and Chirikof. Catch limit 5% of ABC.	Critical habitat closed 0-10 at rookeries and haulouts west of 178°W long. Critical habitat closed 0-3 nm haulouts and 0-10 nm from rookeries east of 178° W long., except open portions of critical habitat at: Rat Island Area outside of 3 nm from Tanadak, Segula, and Krysi Point, and 10 nm from Little Sitkin and Ayugudak, and outside of 3 nm from Kanaga and Bobrof Island. Catch limit 15% of ABC.	None	Critical habitat closed to directed fishing 0-3 nm from haulouts and 0-10 nm from rookeries. Sequam Foraging Area closed to directed fishing. Catch limit 30% of ABC.

TAC=total allowable catch, ABC=acceptable biological catch, SSLMC PPA= Steller Sea Lion Mitigation Committee recommended preliminary preferred alternative, AI=Aleutian Islands

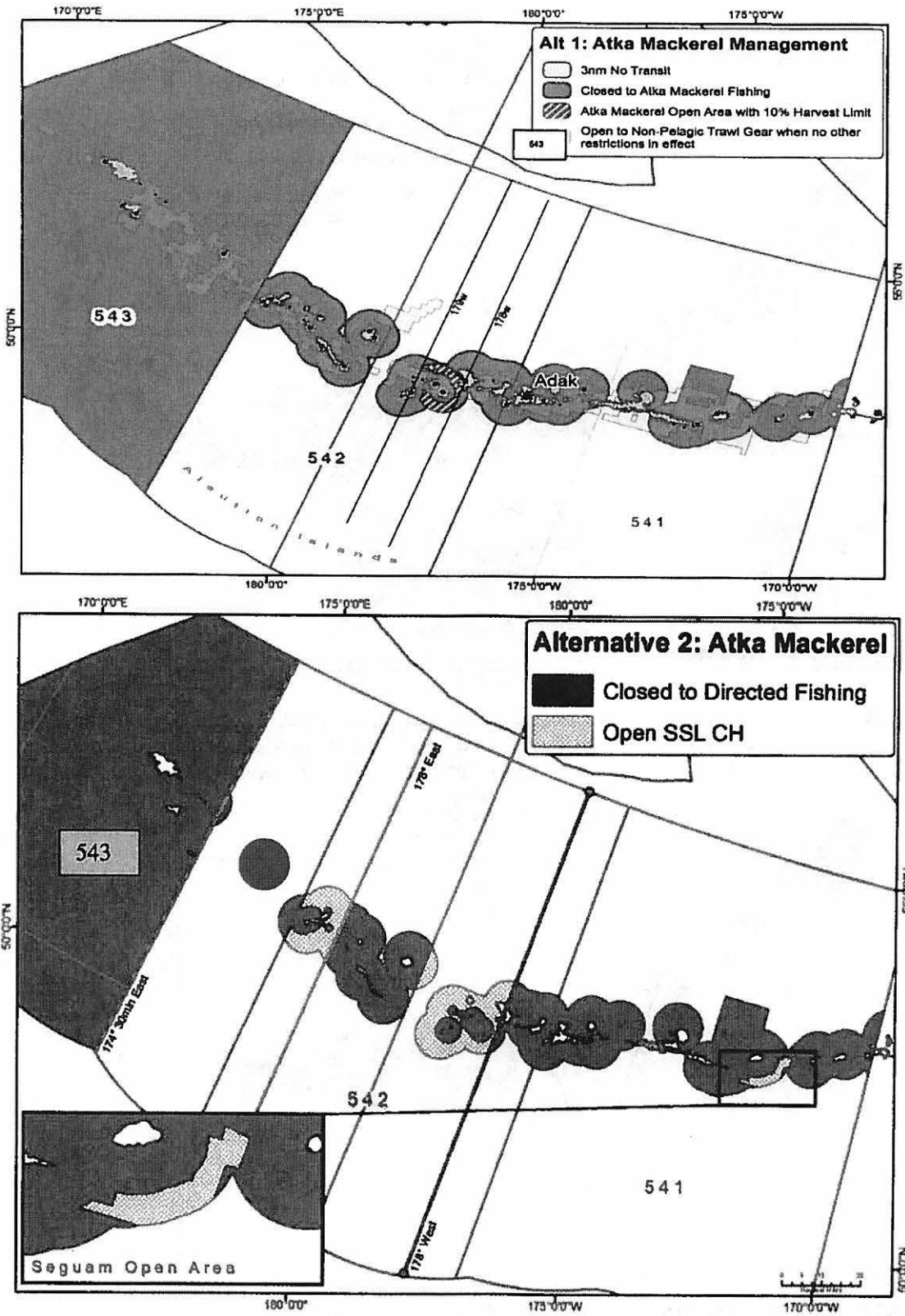


Figure 2-31 Alternative Closures for Atka Mackerel

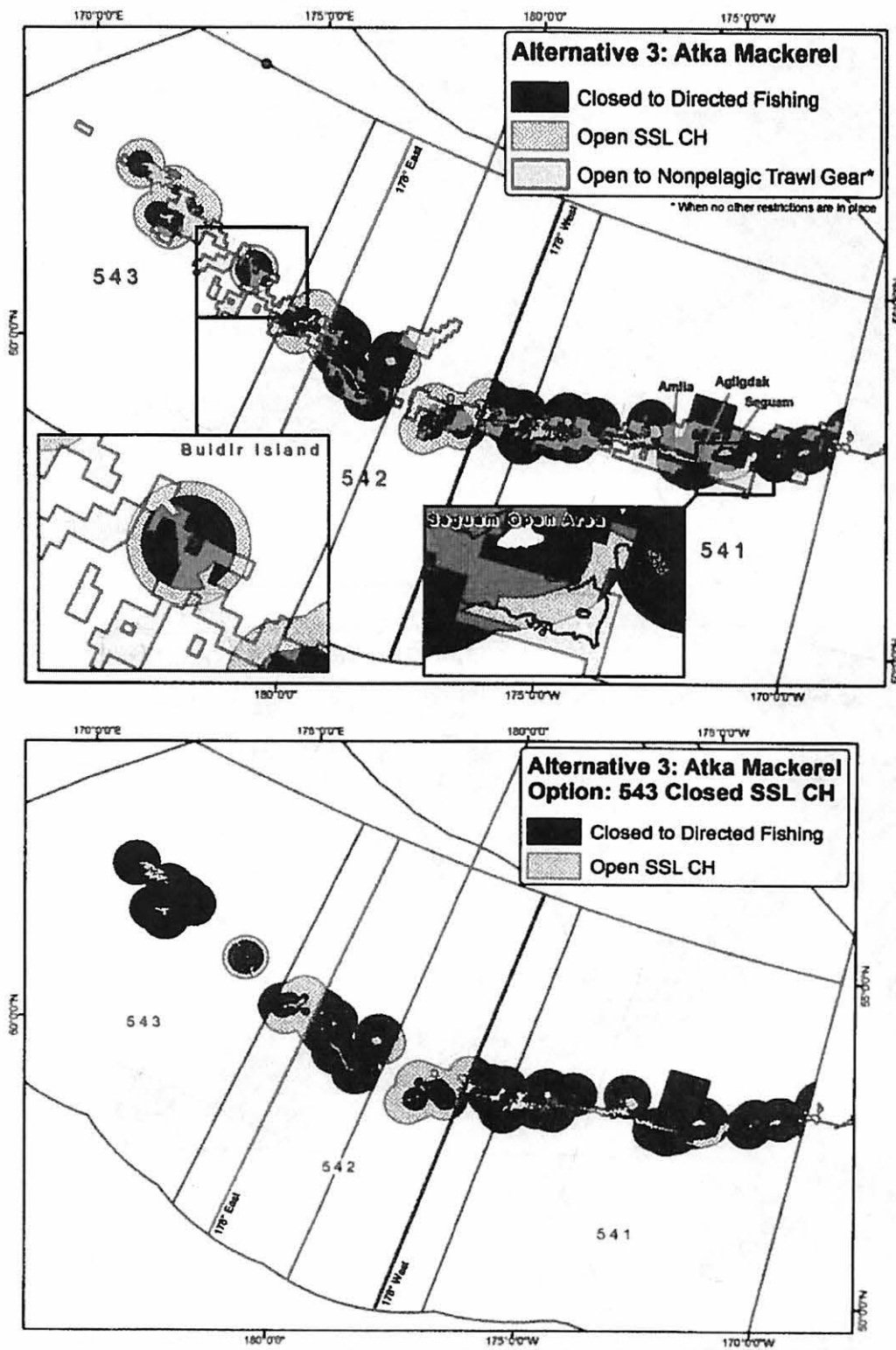


Figure 2-31 Alternative Closures for Atka Mackerel, cont.

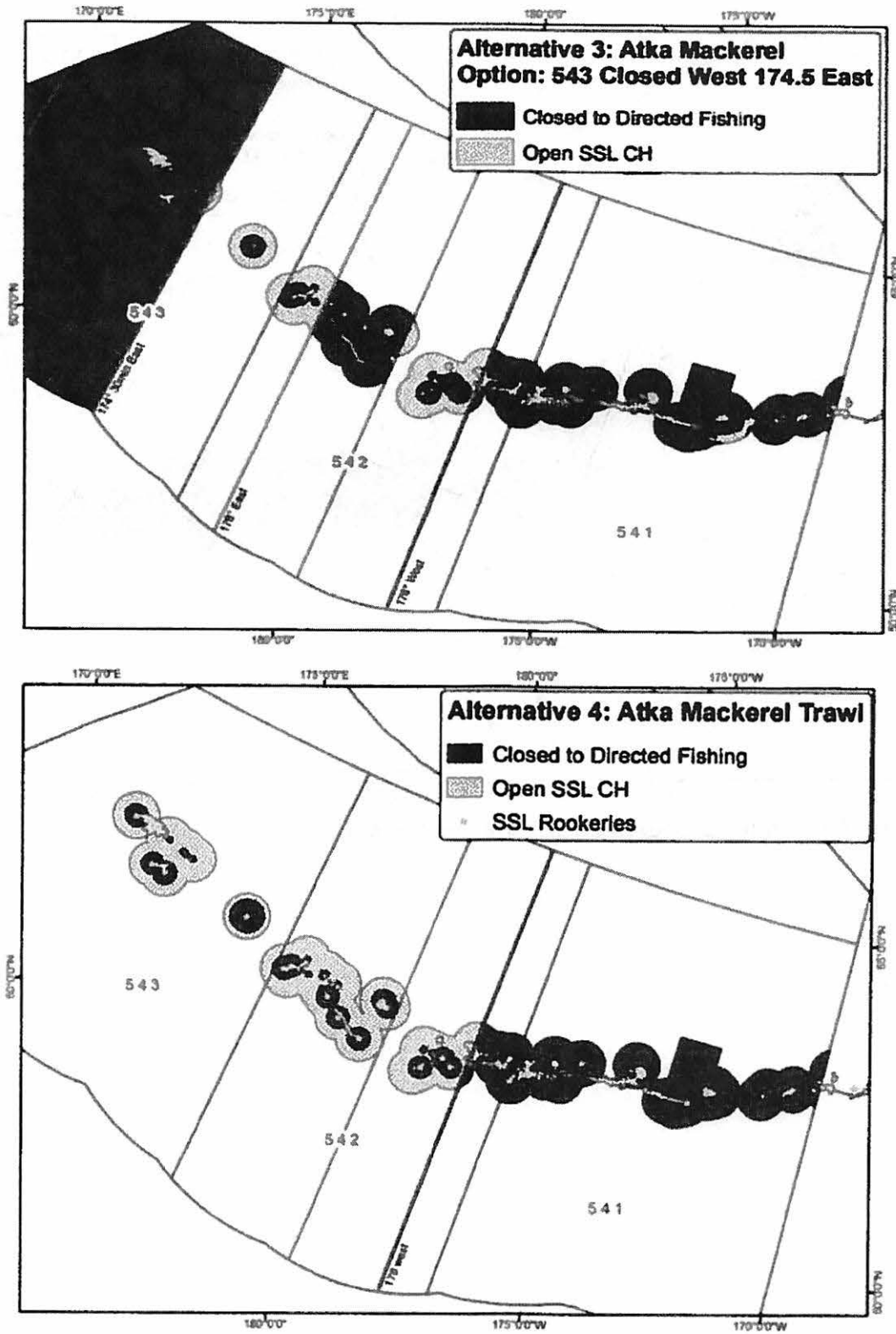


Figure 2-31 Alternative Closures for Atka Mackerel, cont.

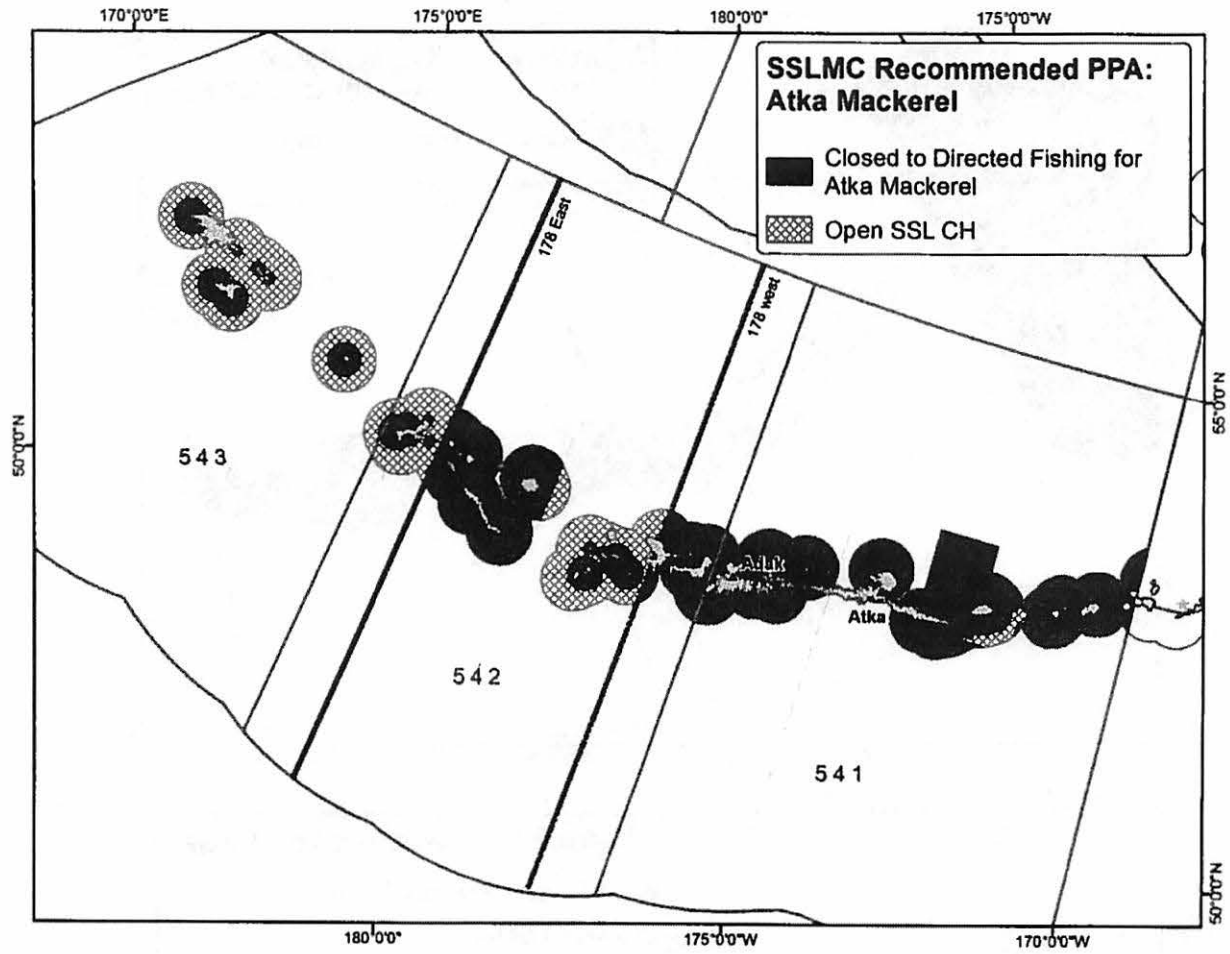


Figure 2-31 Alternative Closures for Atka Mackerel, cont.

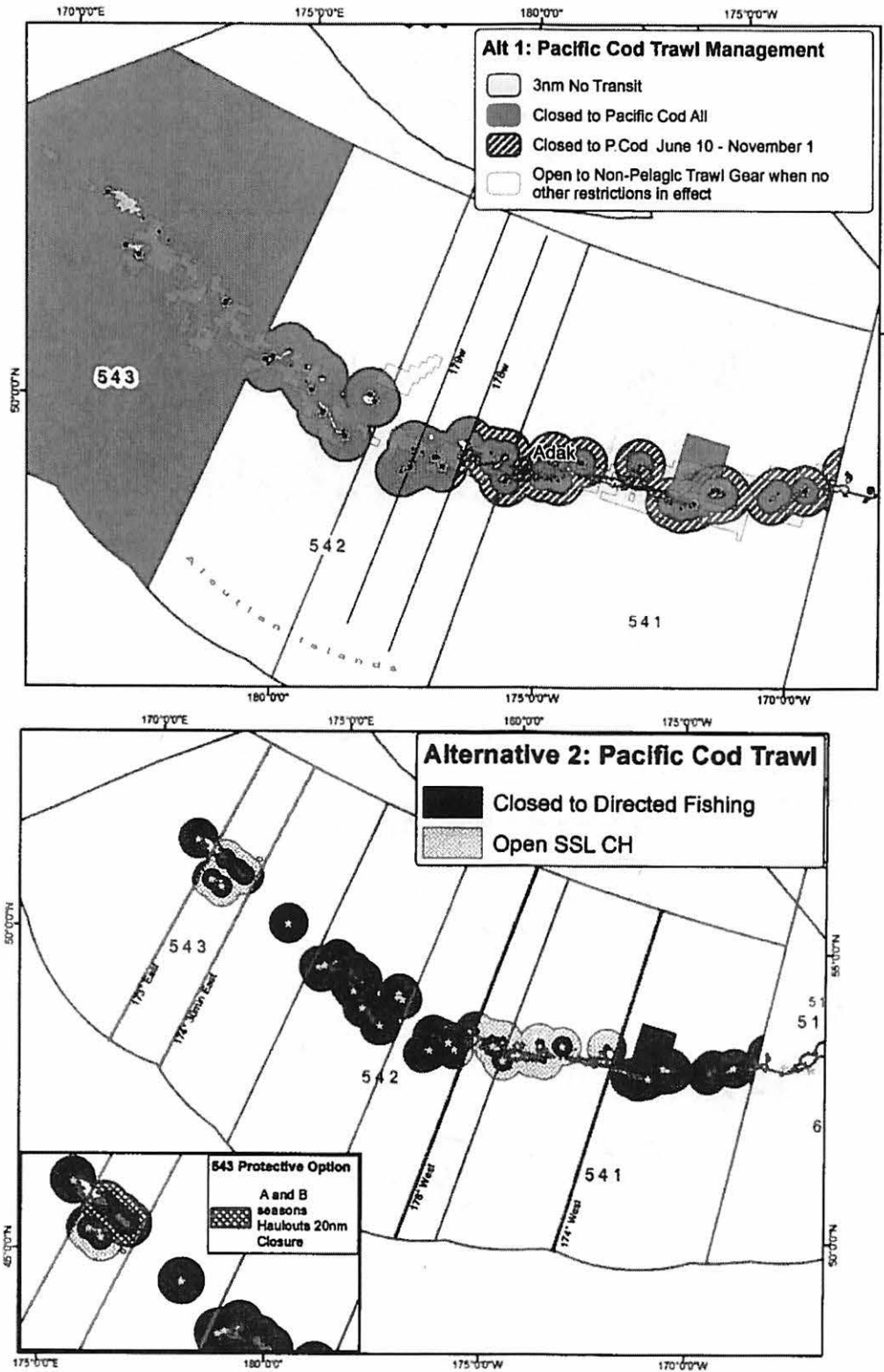


Figure 2-32 Alternative Closures for Pacific Cod Trawl

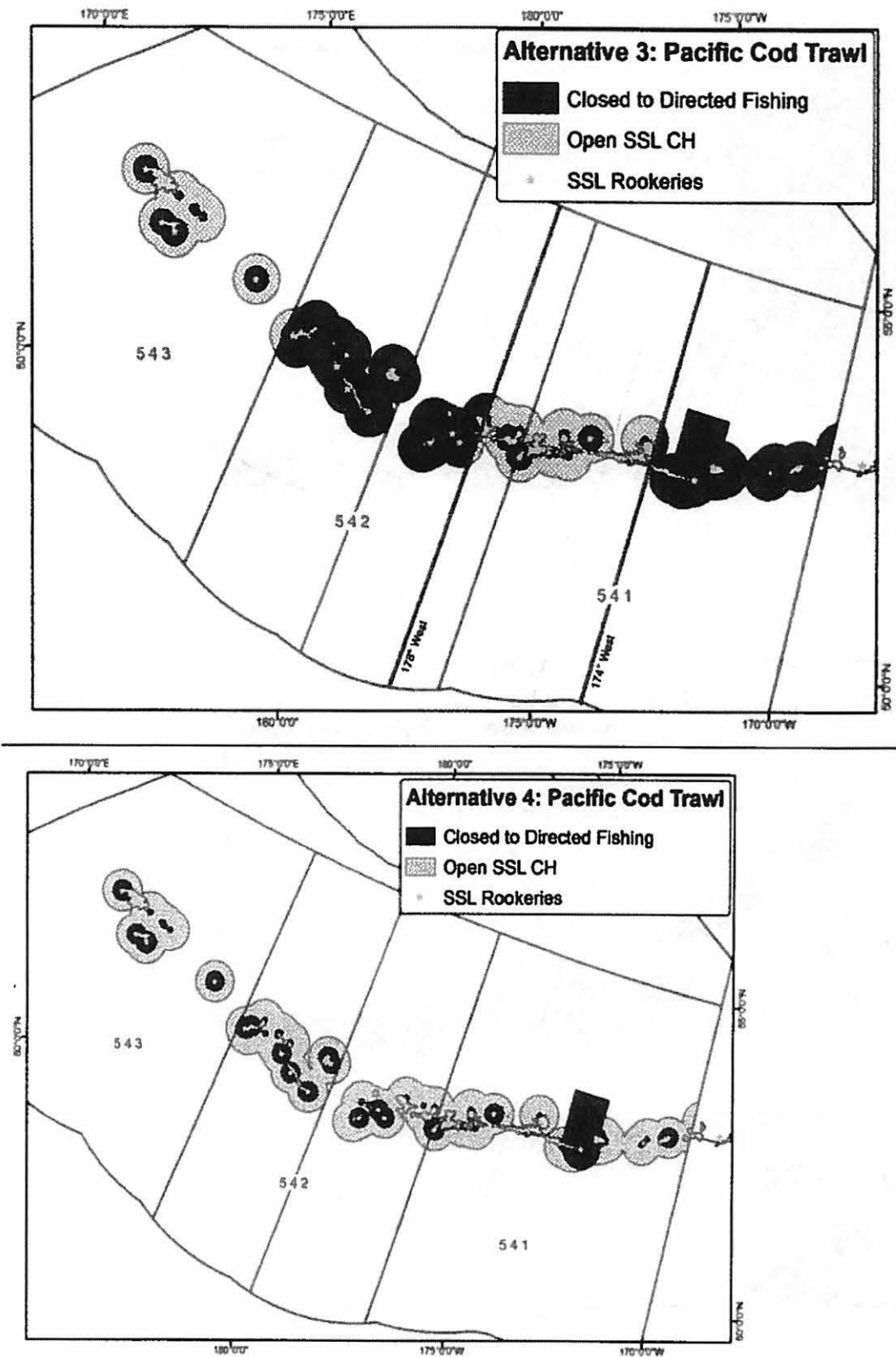


Figure 2-32 Alternative Closures for Pacific Cod Trawl, cont.

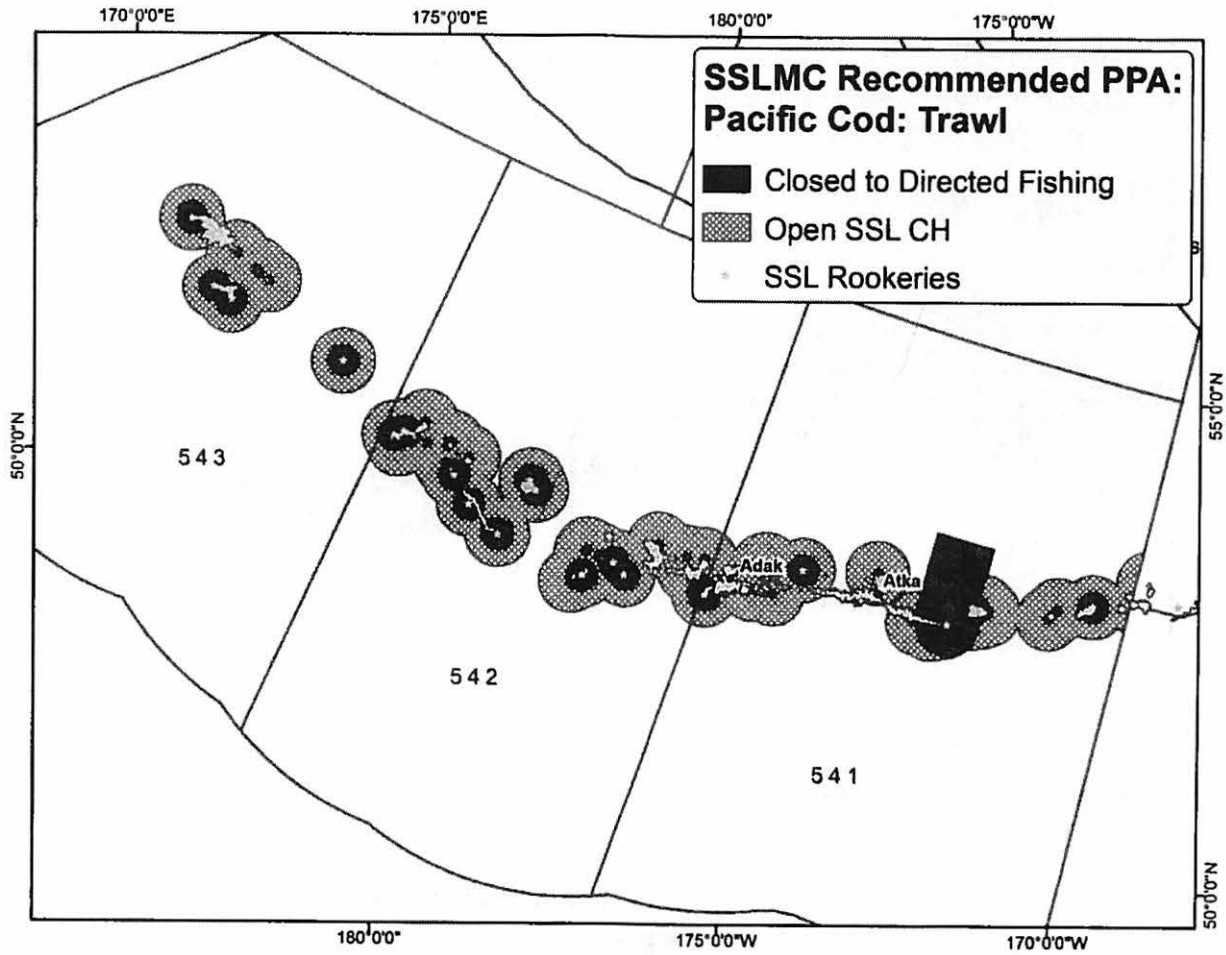
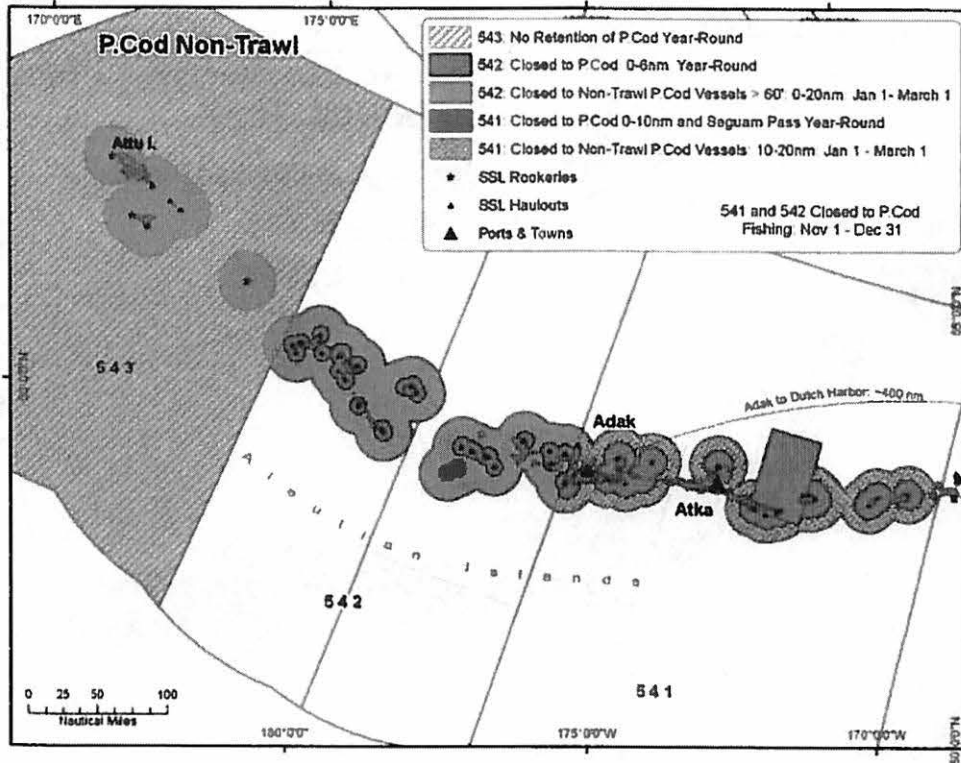


Figure 2-32 Alternative Closures for Pacific Cod Trawl, cont.



Alternative 1 Pacific Cod Non-trawl

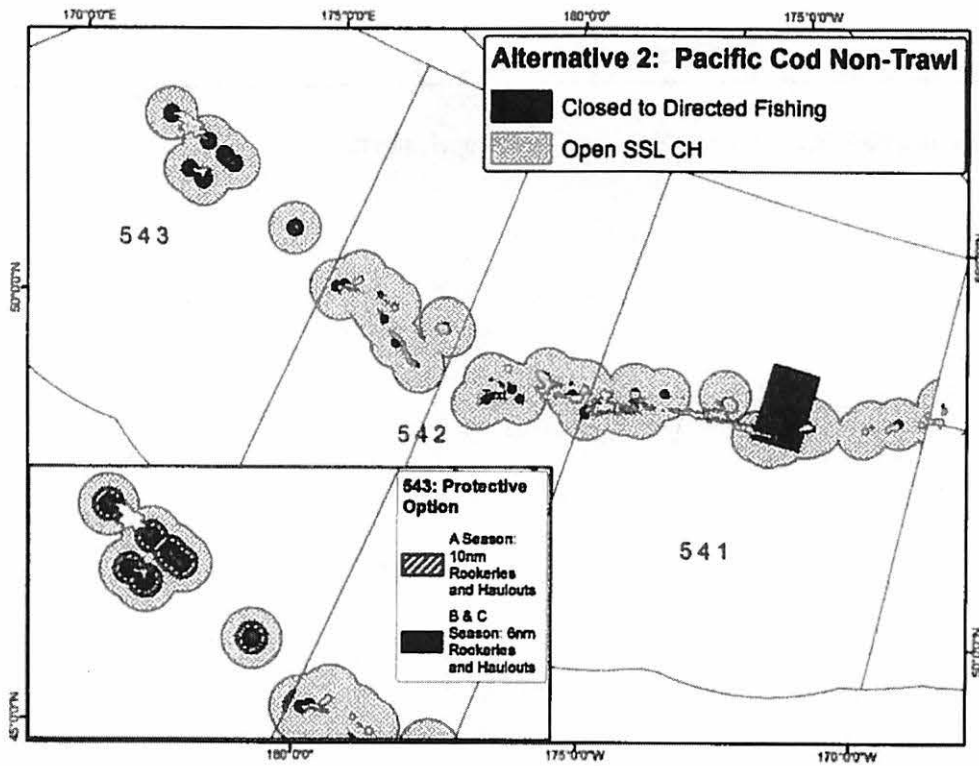


Figure 2-33 Alternative Closures for Pacific cod non-trawl

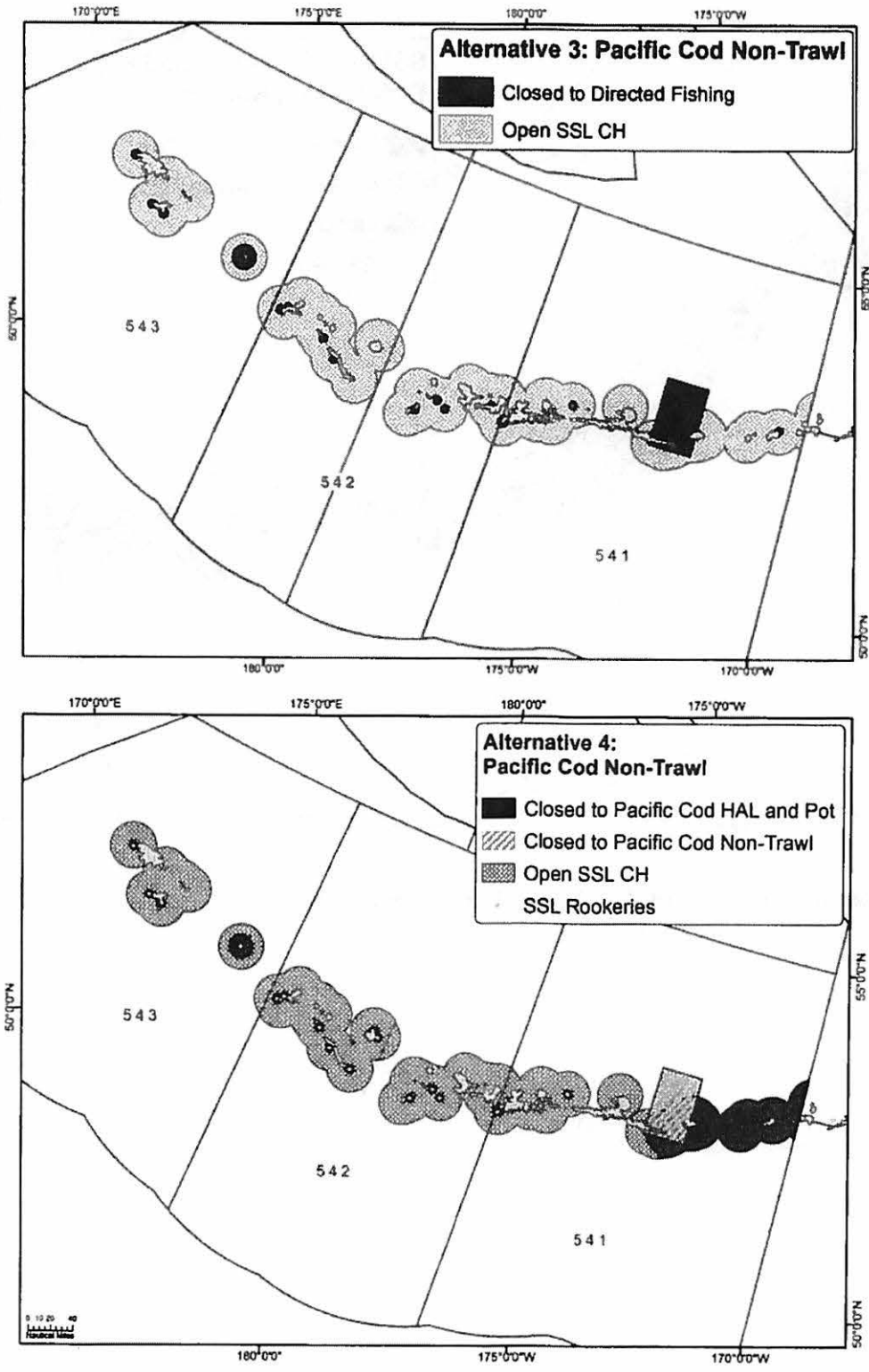


Figure 2-33 Alternative Closures for Pacific Cod Non-Trawl, cont.

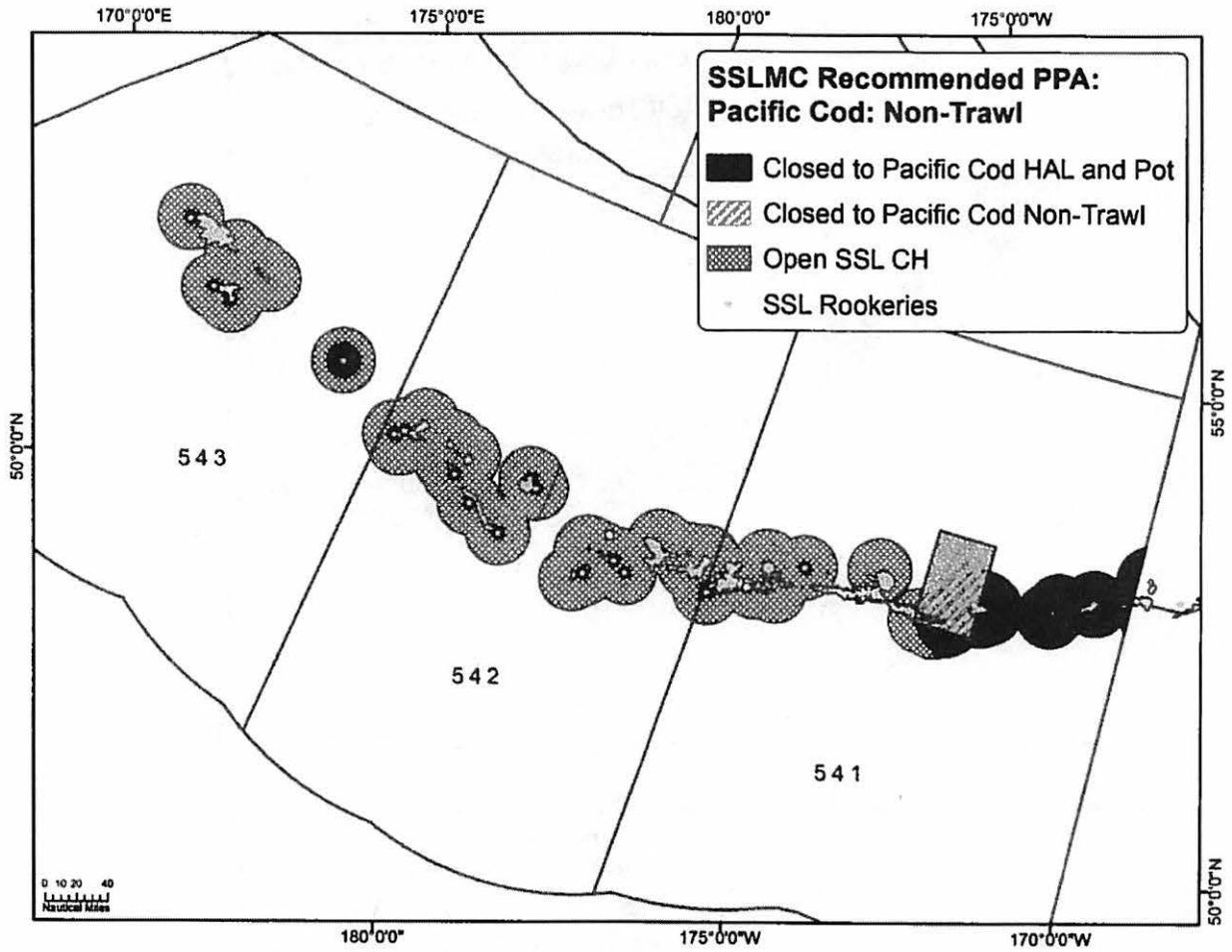
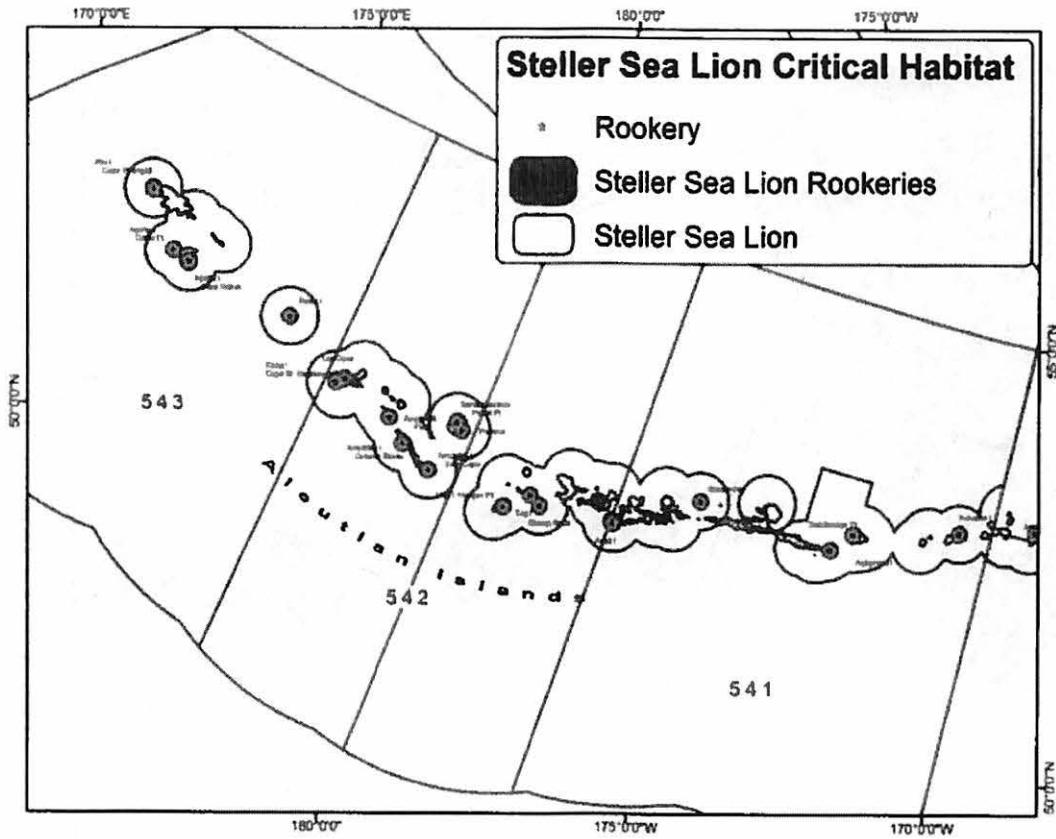


Figure 2-33 Alternative Closures for Pacific Cod Non-Trawl, cont.



Alternative 1 Critical Habitat closed to Directed Fishing for Pollock

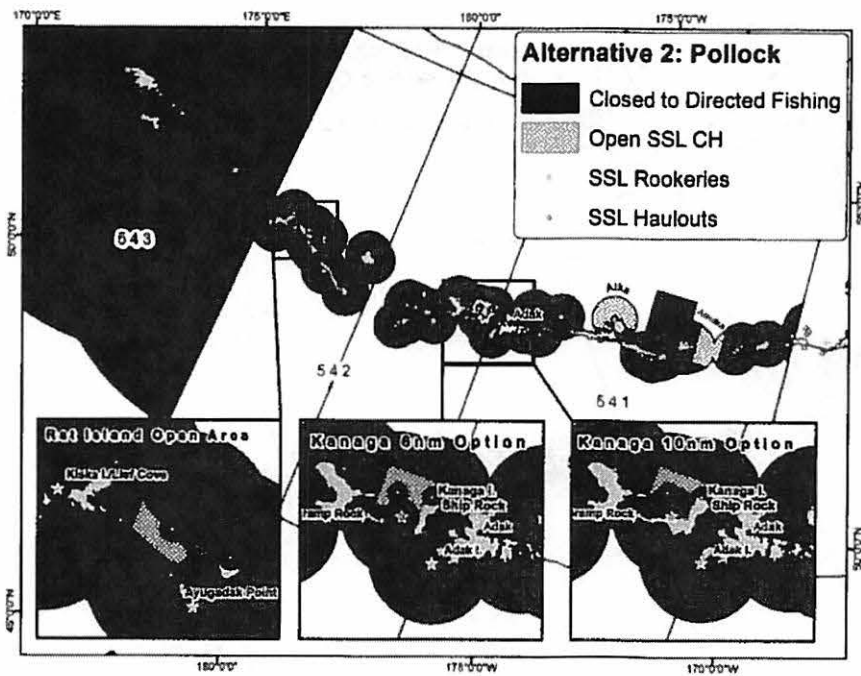


Figure 2-34 Alternative Closures for Pollock

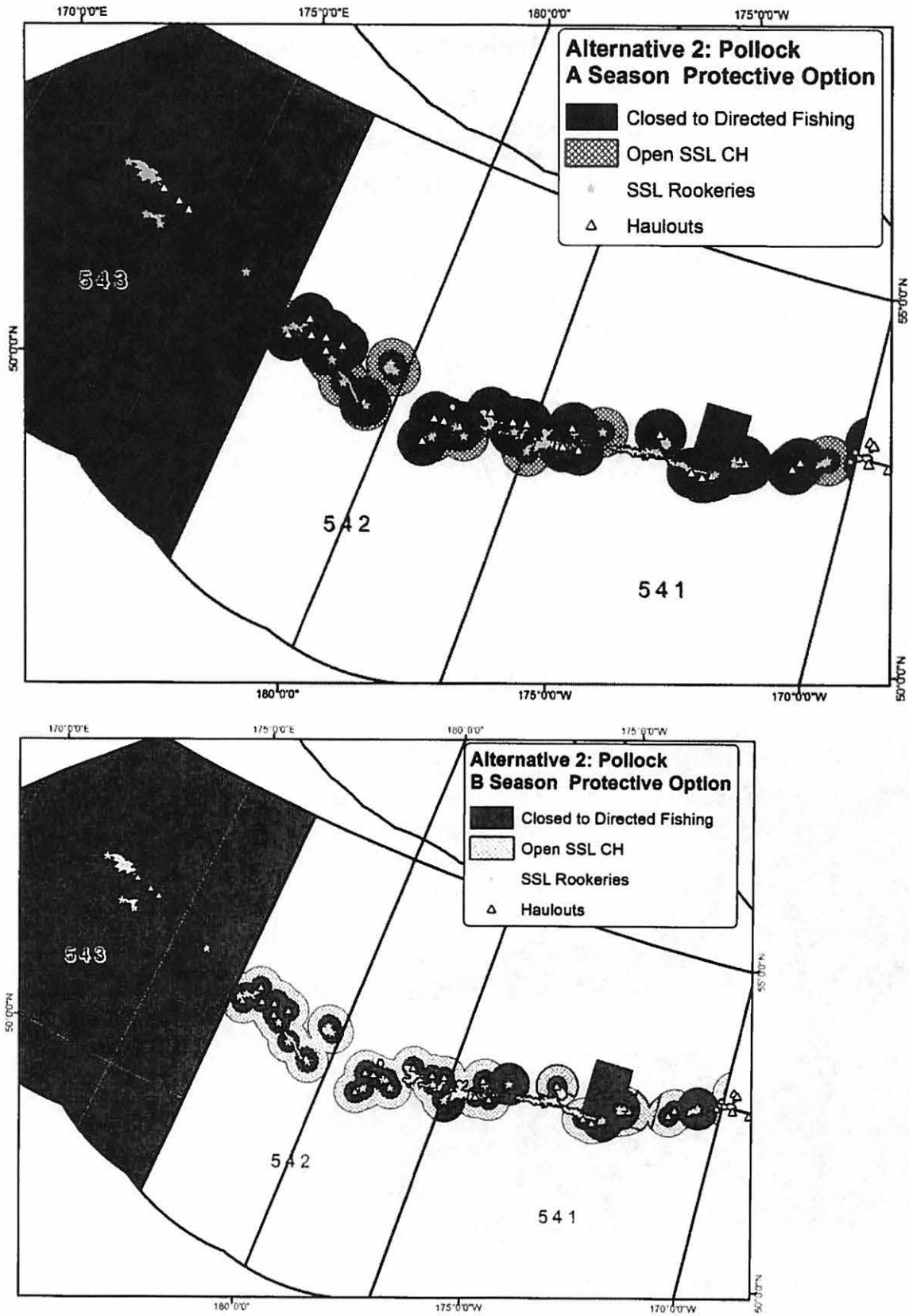
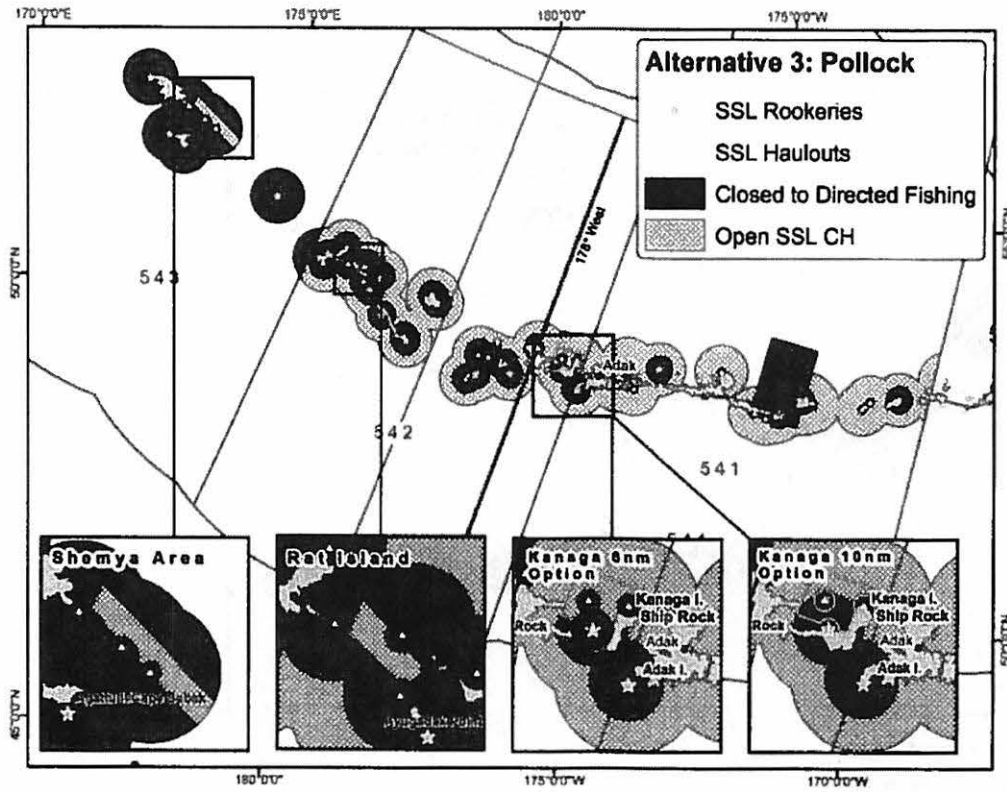


Figure 2-34 Alternative Closures for Pollock, cont.



Alternatives 3 and 4

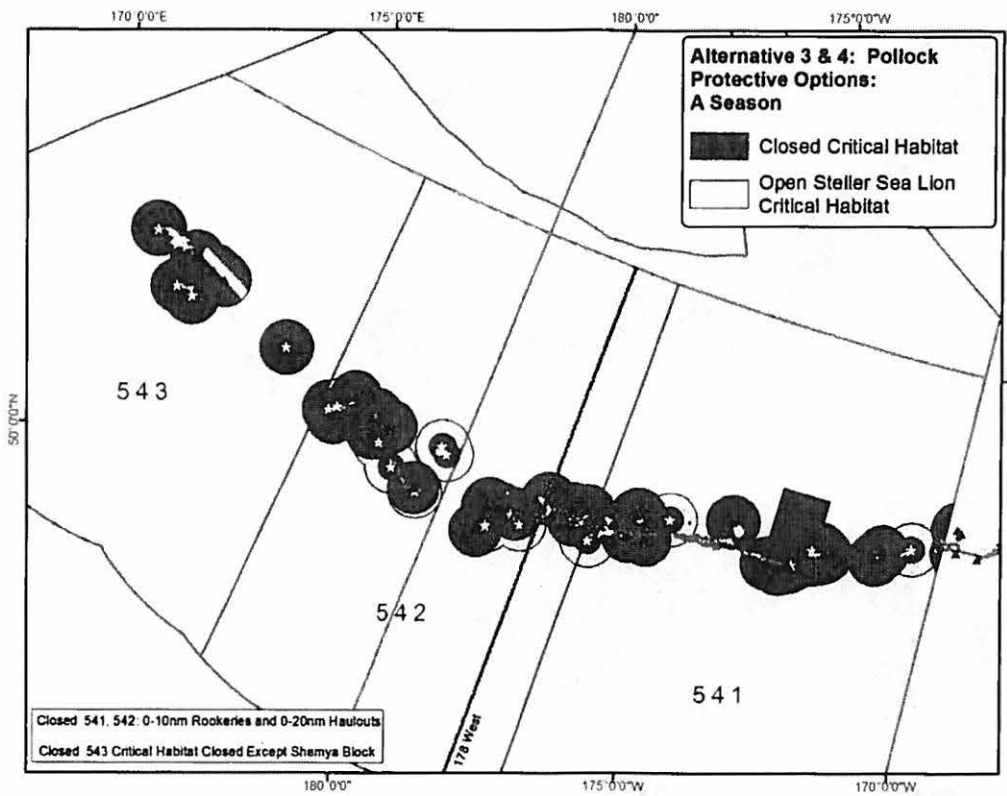


Figure 2-34 Alternative Closures for Pollock, cont.

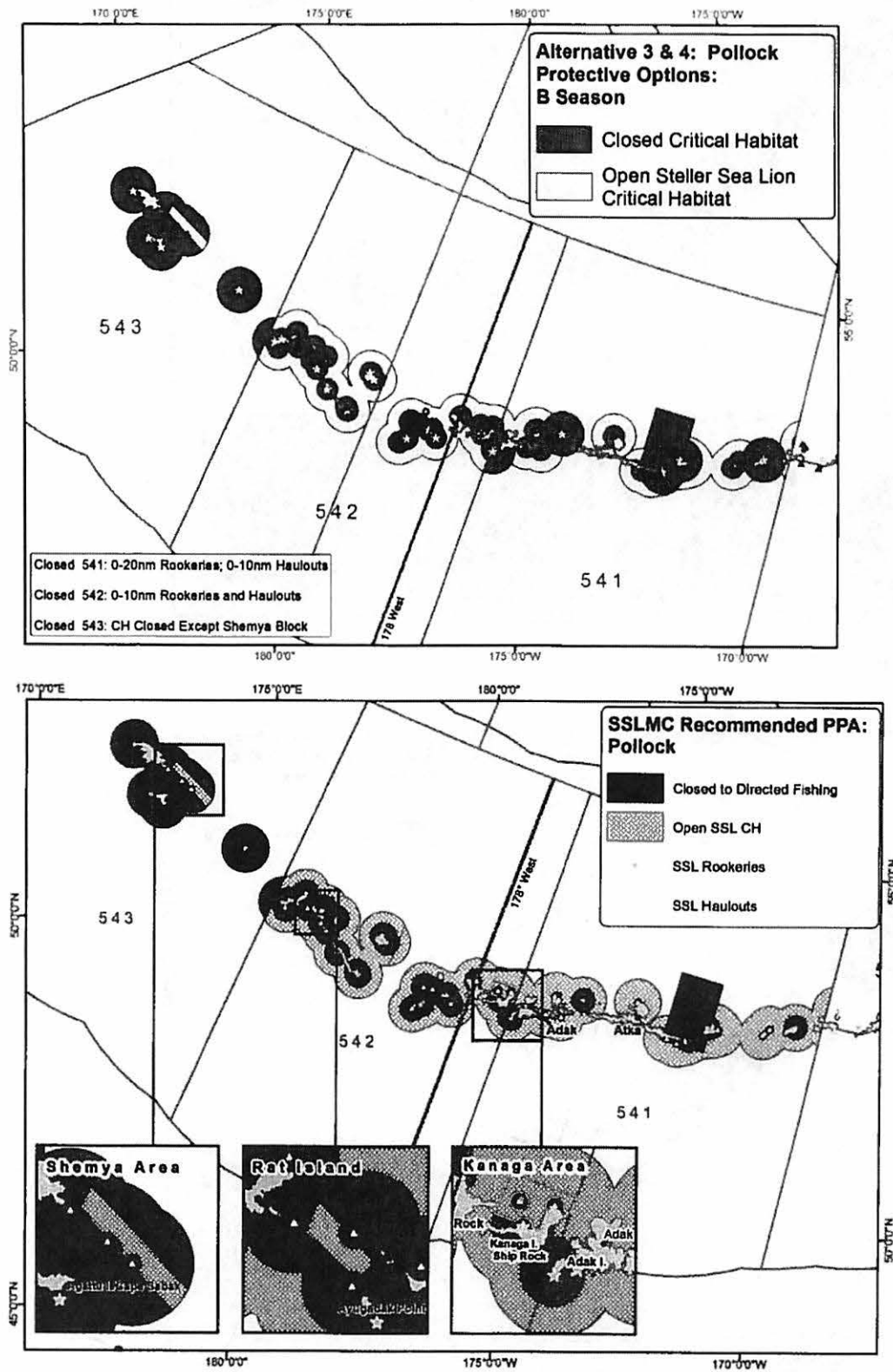


Figure 2-34 Alternative Closures for Pollock, cont.