Steller Sea Lions in Alaska: Direct Mortality by Humans

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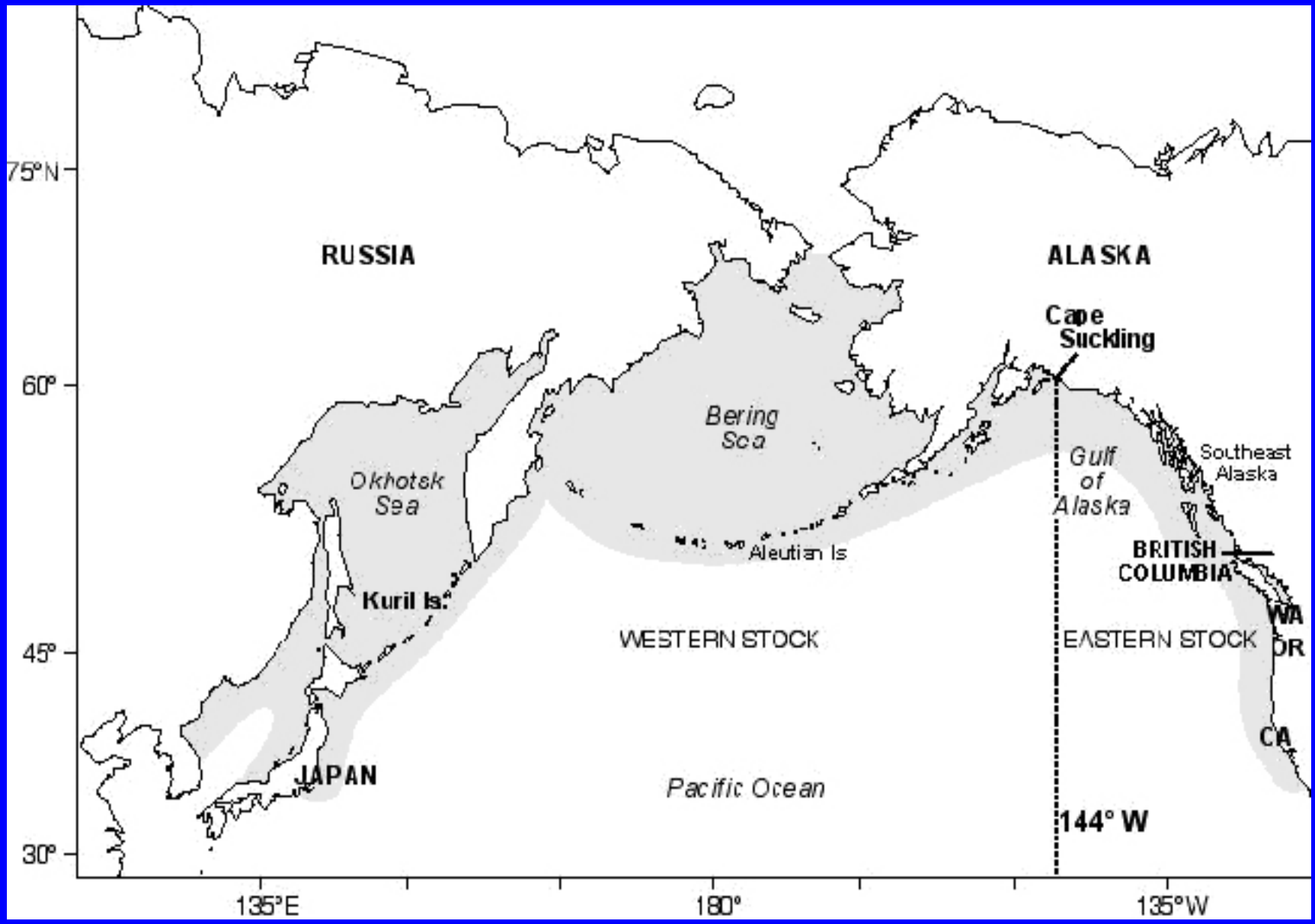

75°N
60°
45°
30°
135°E
180°
135°W
RUSSIA
ALASKA
Cape Suckling
Bering Sea
Okhotsk Sea
Gulf of Alaska
Southeast Alaska
Aleutian Is
BRITISH COLUMBIA
Kuril Is.
WESTERN STOCK
EASTERN STOCK
WA
OR
CA
JAPAN
Pacific Ocean
144° W

An Endangered Species: Recent Protections

- 1990—illegal to shoot Steller sea lions destroying fishing gear or causing a threat to human safety.
- 1991— on-board observers on domestic fishing vessels >125 ft. in length.
- 1997—the western SSL stock listed as “endangered” under the Endangered Species Act.

PUPS ABOUT FOUR WEEKS OLD.

Study Hypothesis and Research Focus

- **Hypothesis:** Indiscriminate shooting is not a primary source of increased mortality on the western distinct population segment of Steller sea lions.

- **Study focus:** To examine contemporary direct mortality by humans from shooting and fishing gear bycatch in key areas, during 1975-1990.

Key Research Questions

- What have been the patterns of shooting by fishermen?
- What have been the patterns of sea lion bycatch in fishing gear?
- What is the contribution of direct mortality to sea lion decline?

Research Methods

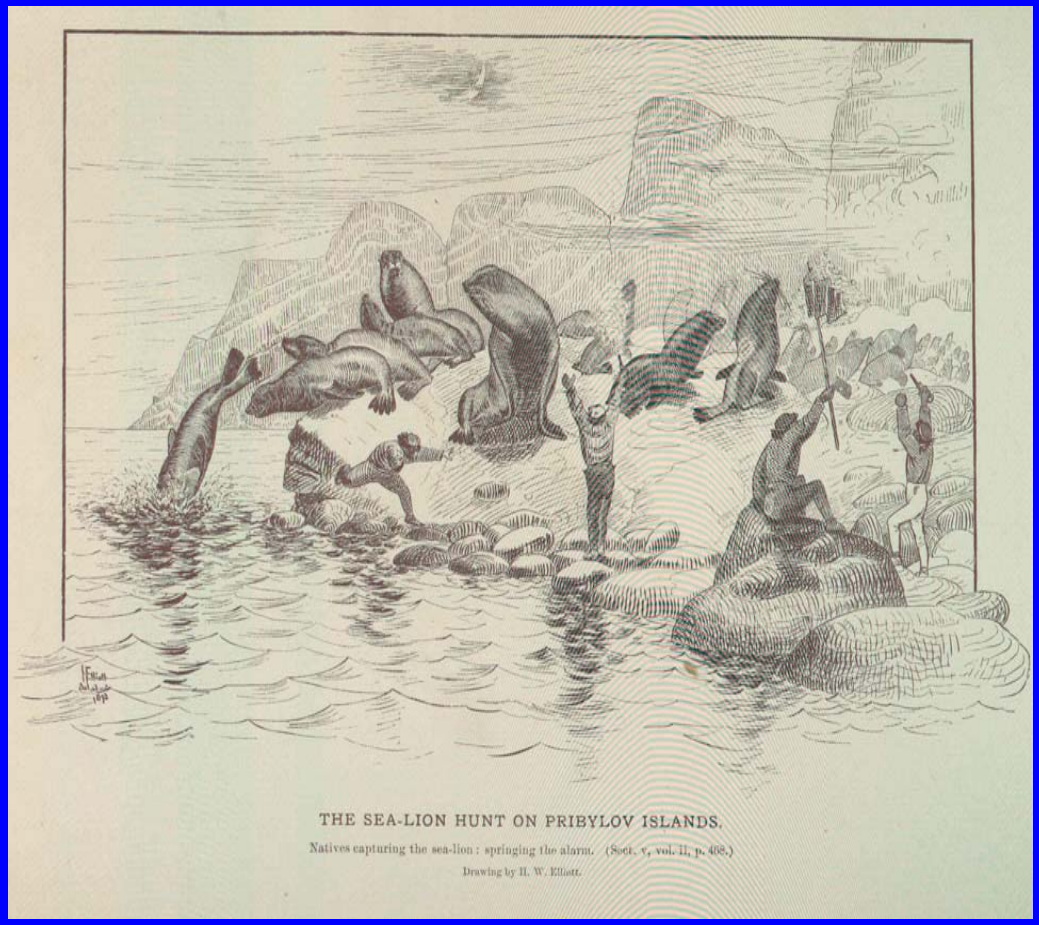
- Review literature with information about direct mortality.
- Compile and review subsistence harvest and patterns of take by communities in the study area.
- Identify and interview knowledgeable, commercial fishers and others with experience in the Gulf of Alaska, Kodiak and Aleutian Islands since the 1970s.
- Questions focus on patterns of shooting and bycatch, in certain geographic areas, rookeries, and haulouts.

Types of Mortality by Human Activity

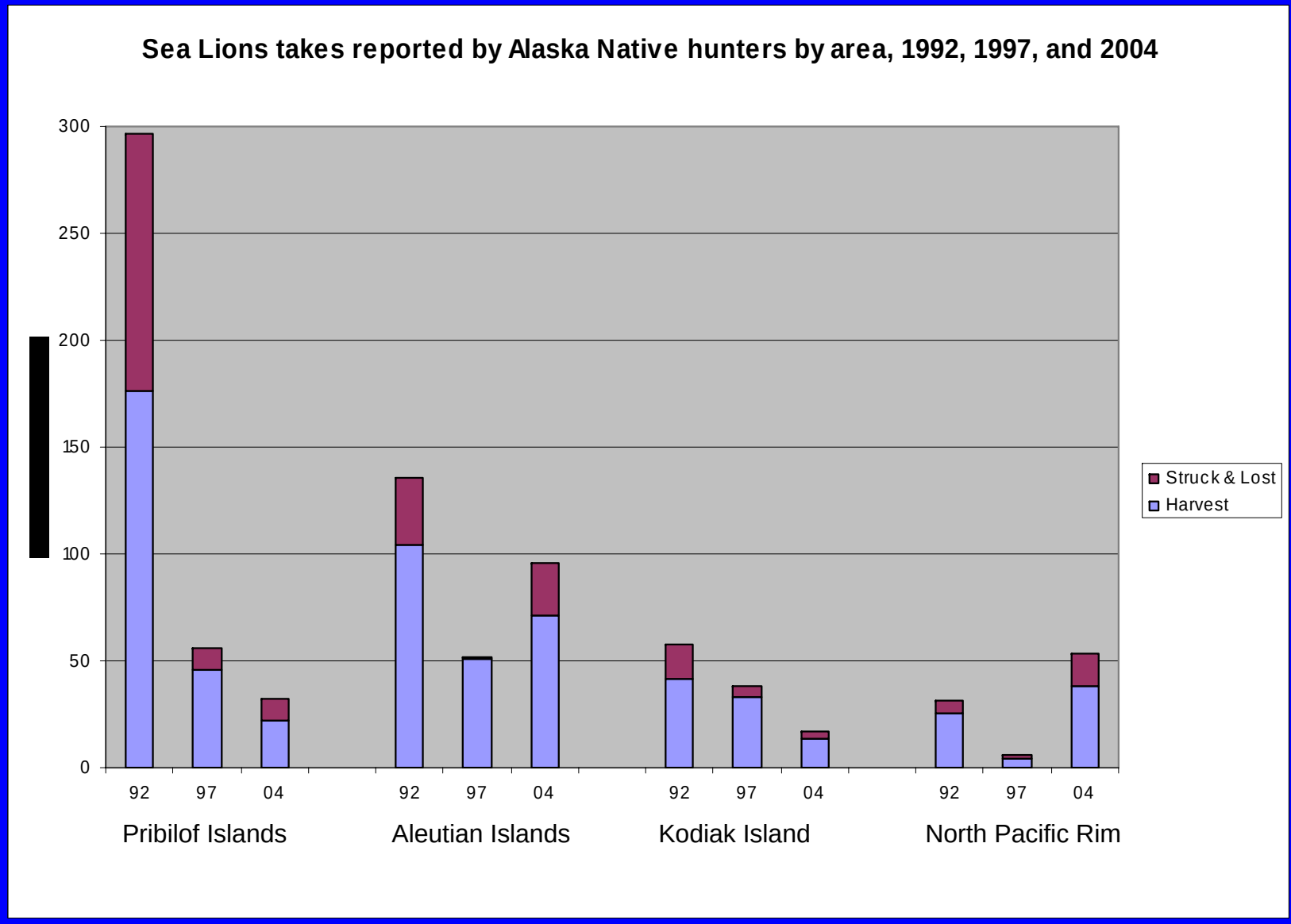
- Directed subsistence harvest
- Directed commercial harvest
- Incidental in commercial fisheries (domestic—gillnet, troll, seine, longline, crab, groundfish)
- Incidental in foreign trawl fisheries
- Incidental in Joint Venture trawl fisheries
- Direct shooting by fishermen

Direct Mortality from Subsistence Uses

- Hunting sea lions is a relatively specialized subsistence activity in Alaska communities.
- About 30 % of the hunters reported taking about 69 % of all sea lions, distributing marine mammal products to other households through non-commercial networks of sharing and trade.
- Hunting techniques vary by community.



Subsistence takes at the regional level



Direct Mortality from Commercial Sea Lion Harvests

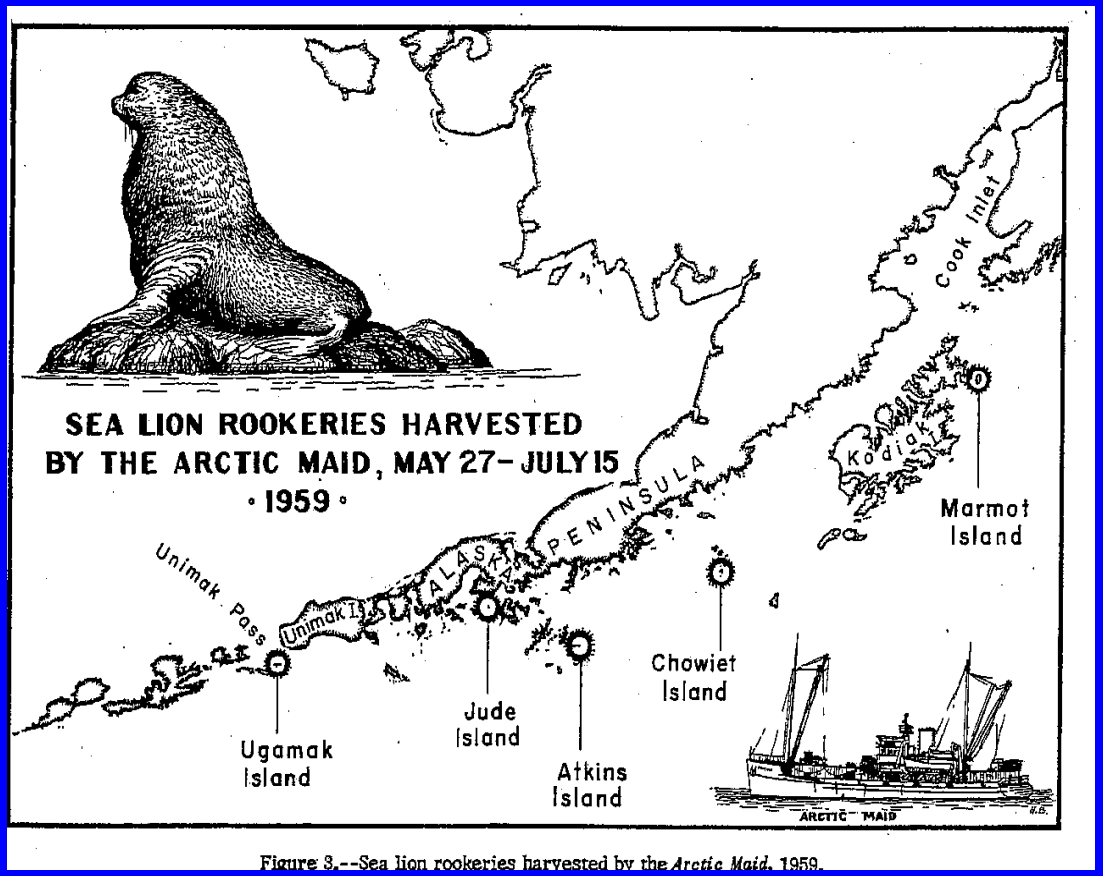


Figure 3.--Sea lion rookeries harvested by the *Arctic Maid*, 1959.

- Commercial harvests were allowed under state permits from 1959 to 1972 in the eastern Aleutian Islands and Gulf of Alaska.
- Experimental harvest allowed in 1959, 616 adult (mostly male) sea lions were taken from 5 rookeries.
- Over 45,000 Steller sea lion pups of both sexes were taken from 1963 – 1972, primarily on three islands (rookeries), Marmot, Sugarloaf and Akutan.
- Scientists believe these harvests cannot account for the dramatic decline of the 1980s though possibly a contributor (Trites & Larkin 1992).

Incidental Mortality in Commercial Domestic Fisheries

- Drift gillnets and set gillnets
  - high incidence of interactions with Steller sea lions
- Trollers
  - moderate to high interactions
- Shellfish (Crab)
  - SSLs shot for bait, destruction of floats.
- Seine boat fleet
  - low incidence of interactions
- Longline fisheries
  - very low levels of incidental mortality
- Domestic groundfish fishery (other than pollock)
  - low incidence of interactions

Incidental Mortality by Foreign Trawl Vessels from the outset

- 1929 — Japanese foreign trawl fishery begins in the Northeast Pacific as exploratory fisheries. Commercial operations began in 1954.
- Early 1930s — Soviet exploratory fisheries in the Bering Sea begin. Commercial operations began in 1959.
- 1954-1959 — Steller sea lions were caught in these foreign trawl fisheries in the Bering Sea and Gulf of Alaska since the beginning of these fisheries.

Foreign Trawl Fisheries
Steller Sea Lion Mortalities

- By the mid 1960s, trawl fisheries efforts were increasing in Alaska and Steller sea lion populations were also growing (1966 was a peak year of SSL abundance).

- In the Bering Sea, from 1966-77, est. total of 11,650 Steller sea lions died in trawls.
- In the Gulf of Alaska, from 1966-77, est. total of 3,180 sea lions died in trawls.

Total mortality est.--14,830
(12 yr. avg.=1,236)

- From 1978-81, est. annual take of 724, principally females, and likely sexually mature.

Incidental Mortality Reported by Foreign and Joint Venture Trawl Vessels

- 1973-1988, 3,661 marine mammals of 17 species were reported as incidental catch.
- Steller sea lions accounted for 90% of the reported incidental mortality in the Gulf of Alaska and eastern Bering Sea.
- 43% were caught in the Bering Sea and 57% in the Gulf of Alaska.
- In the Bering Sea most sea lions incidentally caught were males, while in the Gulf of Alaska females were more frequently caught.

Observed Rates
Steller Sea Lion takes, 1978-1988

- An estimated total of 6,543 Steller sea lions were killed in trawls by both foreign and JV fisheries throughout Alaska during 1978-88.
- 1978-88 — Steller sea lions were most numerous in the Gulf of Alaska, in the Chirikof, Kodiak, and Yakutat statistical areas.
- Avg. observed rates of SSL takes 1978-88 were higher for the Gulf of Alaska than the Bering Sea.
- Greater numbers of SSLs were caught by JV fisheries (66% of all SSL taken) than foreign fisheries 1978-88, based on observed hauls.
- 1982-84 — nearly half were taken in trawl nets in the JV fishery in Shelikof Strait.

Incidental Take by Month and Time of Day

- Steller sea lions were caught in nets in all months of the year.
- Nearly 60% of Steller sea lions were caught at night.

- In the Bering Sea, foreign trawlers caught 29% of their annual incidental take from February to May and 55% from September to December.
- JV vessels caught 62% of their annual incidental take during April and May.

- In the Gulf of Alaska, foreign trawlers caught 65% of their annual incidental take from September to November.
- JV vessels caught 92% of their take from February to April, primarily in Shelikof Strait.

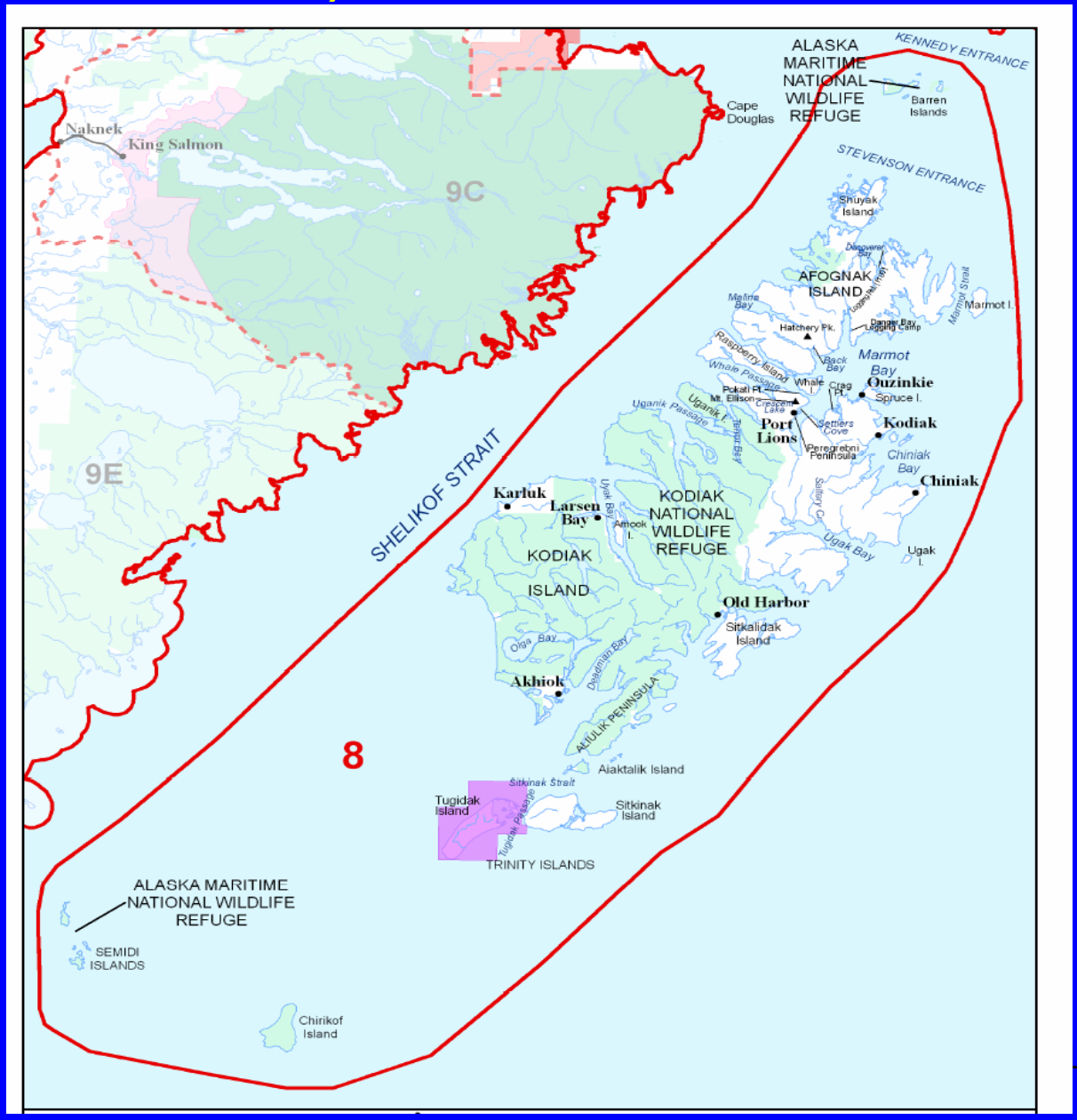
Incidental Mortality Levels in Shelikof Strait

- The greatest incidental mortality levels observed during 1973-88 occurred in the 1982 Shelikof Strait JV fishery, where 1,440 sea lions were estimated killed in the Chirikof area alone.
- Steller sea lions were usually caught at night--73% were caught between 8 PM and 5 AM. These animals were most likely caught during net ascent or while the net was near the surface during the haul back.
- Mortality of Steller sea lions caught in the JV fisheries was nearly 100%.
- These sea lions were predominantly (79%) sexually mature females. Sexually mature males were rarely caught.

Shelikof Strait, Gulf of Alaska

In the Gulf of Alaska during 1978-88,

39% of the total est. mortality of Steller sea lions occurred in the Chirikof area of Shelikof Strait.



Direct Mortality from Shooting

- There has been little documentation of the number of Steller sea lions killed by fishermen.
- Indiscriminate shooting was a common and widespread practice among fishermen until the early 1990s.
- Patterns of shooting by fishermen during 1975-90 (one exception) show no consistent patterns – shooting was opportunistic, generally not targeted on rookeries or haulouts; did not target pups; did not favor taking of males or females, juveniles or adults.
- The exception – Shelikof Strait

Fishermen's comments on shooting in Shelikof Strait

- "In the early days of the JV fishery, in Shelikof Strait, the ocean was full of sea lions—so many of them it was hard to comprehend . . ."
- "Significant amount of sea lions shot in that time, Shelikof was at times like a shooting gallery . . ."
- "Apart from Shelikof, wasn't common to see sea lions, nor to shoot them. . ."

Preliminary Conclusions

- From 1992 – 2004, subsistence takes appear to have declined overall and account for less than 600 animals in any one year.
- Commercial harvests, taking pups on rookeries ceased in 1972, prior to the critical period 1975-1990. Commercial harvests are not considered a primary factor in the sea lion decline.
- The greatest incidental mortality levels observed occurred in the 1982 Shelikof Strait JV fishery, where 1,440 sea lions were estimated killed in the Chirikof area alone.
- From 1975-1990 indiscriminate takes (shootings) by commercial fishermen show no consistent patterns except in the Shelikof Strait JV fishery during the early 1980s.
- Our preliminary conclusions corroborate other studies, direct mortality was not a ***primary*** factor in Steller sea lion decline in the late 20th century.

Acknowledgements

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