



Assessing Cumulative Effects of Scientific Research: A Case Study on Alaska's Steller Sea Lions (SSL)

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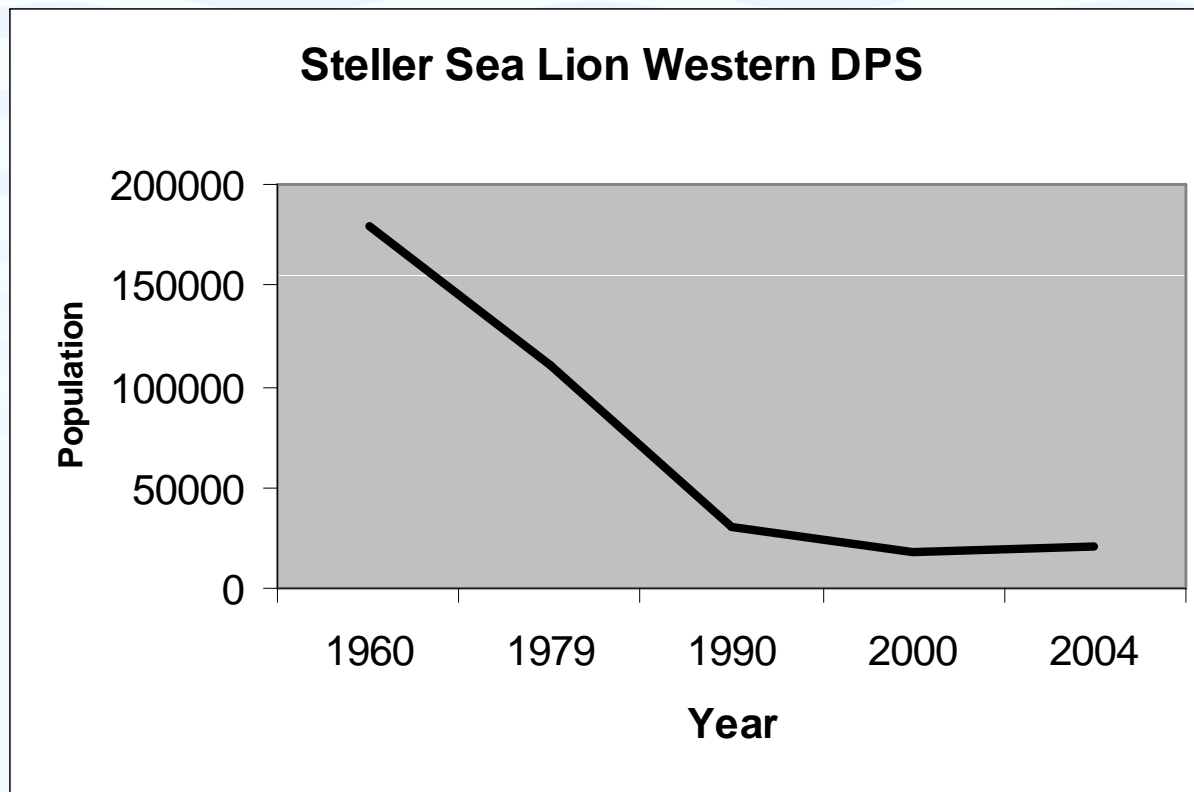
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SSL Status

Western "Endangered" Distinct Population Segment (DPS)



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\$80,000,000 for Research

- 2000-2001 Congress
 - appropriated \$80 million with direction to perform research into causes of decline of SSLs and,
 - to develop conservation and protective measures to ensure SSL recovery
- Funding = dramatic increase in research
- NMFS challenged with coordinating so much research all at once

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Why Are Permits Required for Research?

- Permits allows researchers specific exemptions to the prohibitions on “takes” under the ESA and MMPA
- ESA and MMPA prohibit “takes” of threatened and endangered species and of marine mammals, respectively
 - ESA defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”
 - MMPA defines “take” as “to ‘harass, hunt, capture, collect or kill, or attempt to harass, hunt, capture, collect or kill any marine mammal.”

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2005 Humane Society Files Suit

- Alleges NMFS authorized research that could have a significant, irreversible impact on SSLs
- HSUS requested that NMFS:
 - Complete an Environmental Impact Statement on research
 - Enlist independent experts to:
 - identify recovery goals requiring research
 - establish sampling design
 - develop strategic plan to ensure cohesive research approach
 - develop quantitative models of energetics, life history, and population dynamics of SSLs

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2005 NMFS Agrees to Complete EIS on SSL Research

- EIS Challenges:
 - How to analyze effects of research?
 - How to analyze cumulative effects?

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Analyzing Effects of Research: Risk Assessment Tool

The screenshot displays the Risk Assessment Tool interface with several overlapping spreadsheets. The primary spreadsheet visible is titled "Temporary captivity for experimentation" and lists activities such as "Capture", "Transport/holding/release", and "chemical sedation (inje-)", along with age classes and mortality rates. Other overlapping windows show "Handling and sampling procedures", "Capture and restraint activities", and another "Handling and sampling procedures" window. The interface includes various data entry fields, headers for "Activity", "Age class", "Number of procedure-animals", and "When mortality occurs".





Capture and Restraint





Capture and Restraint

Age class	Number of animals captured	Type of effect	Estimated mortality rate per affected animal	Predicted mortalities (number of animals)
Inhalable agents - e.g. isoflurane				
pups	860	Observed mortality during activity	0	0
		Unobserved/post-capture mortality	0.001	0.86
non-pups	1,090	Observed mortality during activity	0.004	4.36
		Unobserved/post-capture mortality	0.0001	0.11





Estimated Mortality Due to Research

Source of mortality	Alternative 2 (No handling)	Alternative 3 (Status Quo)	Alternative 4 (Expanded)
Researcher presence in view of animals	0.9	0.9	4.1
Researcher presence among animals	2.5	5.8	9.8
Capture and restraint		5.6	12.4
Handling and sampling procedures		2.4	3.3
Temporary captivity		0.1	0.2
Total estimated mortality (animals)	3.4	14.8	29.8
Estimated mortality as a percent of PBR (234 animals)	1.45%	6.32%	12.74%





Analyzing Cumulative Effects

- Environmental Baseline
 - Population listed as endangered
- Direct/Indirect Effects of Research
 - (i.e., risk assessment of capture and restraint)
- Past Effects
 - (i.e., subsistence & entanglement in fishing gear)
- Reasonably Foreseeable Future Actions
 - (i.e., subsistence & effects of climate change on prey availability)





Cumulative Effects on Western DPS SSL

	Analysis of Preferred Alternative: Research Program with Full Implementation of Conservation Goals
Direct Effects of Research	<ul style="list-style-type: none">• Mortality 29.8 SSLs/yr (12.7% of PBR¹); minor on population level.• Individuals could be disturbed >5-6x/yr; moderate effect.
Cumulative Effects (Past+Present+Future)	<ul style="list-style-type: none">• Research contributes 29.8 SSL mortalities/yr.• Total mortality² 245/yr (104.9% of PBR¹); major cumulative effect.





June 2007 NMFS Issues EIS Record of Decision

- Research permits issued but limited to 2 years' duration
- Record of Decision
 - NMFS stated intent to convene an independent panel to assess SSL research program

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Independent Panel Recommendations

- Prior to issuing permits for SSL research, NMFS must address:
 - Is proposed research sound and has it been vetted through scientific peer review?
 - Will findings from proposed research be useful for promoting recovery as determined through scientific peer review with reference to the recovery plan?
 - Are procedures humane; do they represent best animal care and husbandry practice as evaluated by an Institutional Animal Care and Use Committee (IACUC)?

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Next Steps

- NMFS Actions

- Re-Issuing a Record of Decision in July 2009 to present a new Permit Implementation Plan to address:

- Improved coordination among researchers
 - Recommend observations of post research effects to gain better understanding of effects of research activities

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