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May 7, 2024

MEMORANDUM

TO: Fish and Wildlife Committee

FROM: Patty O'Toole, and staff

SUBJECT: Overview and discussion of the Ocean Survival of Salmonids Project and Funding

BACKGROUND:

Presenter: Patty O'Toole, Mark Fritsch

Summary: Staff will describe the impetus for ocean and plume research, monitoring, and evaluation (RM&E) and how implementation scope and funding have changed over time. Implementation will be described in reference to Program strategies and measures associated with the estuary, plume, and ocean. Staff will then review the most recent Council project recommendation. This provides context for contemporary implementation of the NOAA ocean project and the key funding issues affecting implementation. This agenda item will not be focused on ocean harvest. An overview of ocean and Columbia River harvest was provided at the December Council meeting.

Relevance: Recently, the Council heard two updates on the ocean. Brian Burke, NOAA, presented on ocean conditions in March along with contemporary monitoring data. In April, the Council hosted the Ocean and Plume Science and Management Forum. Patty O'Toole summarized forum presentations at the April Council Meeting. After the March and April presentations, Council Members requested additional information on how the scope and funding for ocean monitoring and research have changed

over time. Members also requested information on the cost-share between NOAA and BPA for this work. Staff will verbally describe possible options to address funding shortfalls.

Background:

Why does the Columbia River Basin Fish and Wildlife Program (Program) include ocean survival research and monitoring?

The Gorton Amendment to the Northwest Power Act was enacted in 1996 and instructed the Council to “*consider the impact of ocean on fish and wildlife populations when making recommendations to Bonneville regarding projects to be funded.*” The Council developed an issue paper in response to this amendment (Council Document 97-6). The paper introduced three basic principles that are still evident in the Fish and Wildlife Program today. These principles are:

- *The Council views the estuary, plume, and nearshore ocean environments as part of an ecosystem that includes the Columbia River.*
- *Salmon and steelhead accommodate ocean mortality and environmental variability through a sufficient level of productivity and a wide range of biological diversity.*
- *The Columbia River estuary and plume are important features that have been and continue to be impacted by upriver management actions and local habitat change.*

In the 2000 Program, the first to follow the amendment, the Council reiterated these principles in a new strategy on Ocean Conditions, which called for identifying the effects of ocean conditions on anadromous fish and using this information to evaluate and adjust inland actions. The two measures in this strategy were focused on managing for variability and distinguishing ocean effects from freshwater effects.

- *Ocean conditions and regional climates play a large role in the survival of anadromous fish and other species in the Columbia River Basin. Management actions should strive to help those species accommodate a variety of ocean conditions by providing a wide range of life history strategies.*
- *Monitoring and evaluation actions should recognize and take into account the effect of varying ocean conditions and, to the extent feasible, separate the effects of ocean-related mortality from that caused in the freshwater part of the life cycle.*

The concepts in this ocean conditions strategy carried forward in subsequent Fish and Wildlife Programs

Implementation of ocean research and monitoring, 1998 – 2011

Two research and monitoring projects were initiated in the Columbia River Plume and ocean in the late 1990s, with a focus on studying juvenile salmon and steelhead and the biological and physical conditions affecting their survival during the first few months of ocean residence. These projects coordinated development of survey and sampling methods, shared data and analyses, and developed a joint report on results, with the objective of providing broad coverage of the environments inhabited by juvenile salmon and steelhead.

Ocean Survival of Salmonids - project #1998-014-00 (NOAA)

The NOAA project conducts surveys for Columbia River salmon off the coast of Oregon and Washington. There were initially three surveys conducted in May, June, and September. For each of these, surveys are comprised of multiple transects extending out from shore along the Oregon and Washington coasts. Each survey is timed to intersect the seaward migration of different species of salmon and steelhead and provide information on their abundance, condition, and other biological data. Concurrent with capturing fish, other biological data- such as presence of various prey species (like copepods) and predator observations- and physical data- such as temperature- are collected. All of these data feed into a broader indicator of ocean conditions occurring during the critical early ocean phase for salmon and steelhead and are useful for predicting subsequent ocean survival and adult returns.

Multiple organizations are involved in securing boat time, conducting ocean surveys, collecting and processing samples (such as genetics), managing data, and analyzing results from surveys. Funding flows to NOAA and then NOAA subcontracts for portions of this work to OSU, PSMFC, UW, and others.

Canada-USA Salmon Shelf Survival Study - project #: 2003-009-00 (DFO)

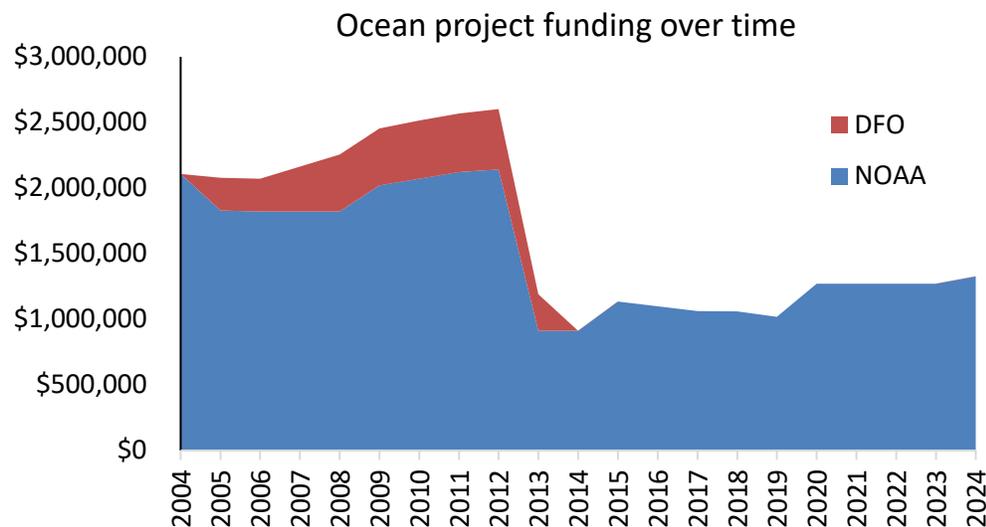
The Canada-USA Salmon Shelf Survival Study initiated as a subset of NOAA's project and then became a stand-alone project in 2003. The Canadian project focused their work on Columbia River Salmon off the coast of British Columbia. The primary objective of the research by the Canadian Department of Fisheries and Oceans was to assess the effects of ocean conditions on the production of Columbia River Basin salmon – in particular along the coast of BC. The information generated in this study intended to map the ocean conditions that determine the growth and survival of Pacific salmon along the west coast of North America from southern British Columbia to southeast Alaska, and to identify which stocks of Columbia River salmon forage in these areas. Sockeye from Columbia and Snake rivers were one of the key species tracked in this project.

Implementation of ocean research and monitoring, post 2012

In 2011, the Council recommended two projects for funding to Bonneville: the NOAA Ocean Survival of Salmonids project (\$2,312,151), and the Canada-US Shelf Survival Study (\$444,850). Bonneville's funding decision on the Council recommendation was to (1) eliminate the Canadian Shelf study due to policy concerns about continuing funding

for Canadian government entity, and (2) reduce funding by 53% for the NOAA Ocean Survival of Salmonids project. With reduced funding, the project was rescoped to focus on priorities in the BiOp. The May coastal survey was shortened to 5 days, the full June survey occurred, and the September survey was eliminated. In addition, there was less funding available to cover NOAA staff time to analyze data.

Funding, 1998 – Present



2014 Program and 2020 Addendum identify Ocean RM&E as a priority

Following the decrease in funding in 2012, the 2014 Program details the critical importance of continuing support for research and monitoring in the ocean, recognizing this work as a core part of the program that needs to be preserved.

The 2014 Program includes a Plume and Nearshore Ocean Strategy which calls for monitoring ocean conditions and related salmon survival and endorses mitigation and management actions that improve the survival, growth and viability of Columbia River fish and varying ocean conditions. Strategy principles and measures call for monitoring ocean conditions and in river restoration actions to determine those actions of greatest benefit, to separate the effects of ocean-related mortality from that caused in the freshwater part of the life cycle, and to assess salmonid survival and evaluate restoration potential given variable ocean conditions. The Program also recognizes the importance of managing for variability. Variations in ocean conditions play a large role in the survival of anadromous fish and other species. The Council supports management actions that help anadromous species accommodate a variety of ocean conditions by providing a wide range of life history strategies.

In the 2020 Addendum the Council supports as a near-term priority, restoring funding for this element of the program to the level needed to address existing and new

monitoring components supported by the Independent Scientific Review Panel and discussed by the Ocean Forum.

Most recent project review and Council recommendation

The Council's most recent review of this project was in the 2019 Project review: this project was part of the review of Mainstem and Program Support Projects. The Council recommendation from this review remains the current recommendation.

The ISRP noted in recent reviews that the Ocean Survival of Salmonids project is an example of an excellent long-term monitoring project investigating factors that influence the early ocean distribution, timing and survival of salmonids. The key finding is that ocean conditions are highly influential and highly predictive of salmon returns, and ocean conditions can conceal the effects of local restoration actions. These findings are important in the development of models used to investigate the impact of different proposed management actions (for example, additional spill or habitat restoration actions) over the entire salmonid life cycle. In their final Report: Mainstem and Support Category Review, the ISRP further noted that the significance of this ongoing project to the region and to mitigation and management of Columbia River salmon and steelhead is widely recognized and cannot be overstated. The Council agrees. Extending the 21-year dataset and addressing the proposed objectives are critical to understanding how management actions in the Basin may increase salmonid survival at sea.

In their project review proposal, NOAA Fisheries provided three alternative scopes of work (A thru C) and budgets for project implementation, recognizing the budgetary constraints. Option A would represent a reduction in surveys (no May survey), option B represented the status quo and additional predator prey effort, and option C would restore full funding to the project and allow for full implementation of food web studies (including predation).

The 2019 Council recommendations was for:

Bonneville to implement Option B for Ocean Survival of Salmonids, as proposed by the sponsor, at the funding level identified by the sponsor (approx. \$1.5M) and maintain the current project scope [May survey, June survey, sample processing and analysis] that includes additional effort on avian predators and salmon prey. The project should continue to consider freshwater management implications on ocean survival, continue working to understand the biological and physical mechanisms underlying correlations and continue to develop an ecosystem model that will allow for testing various freshwater management actions.

Funding was provided at a level between Option A and Option B, resulting in incomplete implementation of the Council recommendation.

Current NOAA project in 2024

The 2019 funding level, with some adjustment for inflation, has remained in place through 2024.

		Options	
BPA Funds	A	B	C
2019 (proposed)	\$ 1,006,000	\$ 1,497,000	\$ 1,970,000
2019 (actual)		\$ 1,270,000	
2024 (actual)		\$ 1,327,000	

Today, the Ocean Survival of Salmonids project implements a short May survey and the full June survey through three contracts wrapped into one project with the following contract funding breakdown:

NOAA contract: \$350,241

This contract covers primarily salary for staff working on the project and survey supplies. Through time NOAA's proportion of the Bonneville funding goes down each year as vessel costs and OSU staff costs increase under a mostly flat overall project budget.

Pacific States Marine Fisheries Commission: \$335,298

This contract only covers the cost of contracting the survey vessel.

Oregon State University: \$ 641,313

This contract covers the salaries of researchers from Oregon State University who analyses the data collected on the surveys.

Project costs are shared by NOAA and Bonneville:

Cost Share	BPA	NOAA	Cost Share by NOAA
2022	\$1,270,000	\$1,576,000	55%
2023	\$1,270,000	\$1,623,000	56%
2024	\$1,327,000	\$1,954,000	60%

There is additional cost share with data collected and analyzed through a NOAA-funded project known as "the Newport line." Since 1996, NOAA has monitored bottom-up ecosystem processes by sampling hydrography and plankton twice a month along a survey transect that extends off the coast at Newport, Oregon. This information contributes significantly to the data included in the [stoplight chart](#). The Newport Line project is not included in the above cost-share chart.

NOAA Fisheries has indicated that the current funding level will cause a rescoping of the project in the near term, further reducing survey effort. The key issue is inflation. It affects the cost of goods like fuel, supplies, and more, and the cost of services and salaries. Although NOAA has received periodic budget adjustments from BPA, they have not kept pace with inflation. Now NOAA is in a position where they must reduce their share of the BPA contract each year in order to maintain the contract for ship time with Pacific States Marine Fisheries Commission, and staff time for analysis with Oregon State University. As a result, there is very little staff time left at NOAA to complete other analysis and reporting associated with this project and other identified analytical needs (such as predation or alternative indicators).

By 2025, NOAA anticipates that it will not draw on any BPA funds to cover staff salaries associated with this project so that PSMFC and OSU can maintain the existing level of work. By 2026, the overall scope of the project will have to be reduced if inflation is not fully addressed. NOAA is considering their options which include collecting fewer samples, (otoliths), eliminating the monitoring of growth (IGF), and reducing the number survey days further.

Costs required to continue current level of work	
2025	\$ 2,143,000
2026	\$ 2,250,150
2027	\$ 2,362,658
2028	\$ 2,480,790
2029	\$ 2,604,830

Other existing or potential funding for NOAA efforts

Separate from the efforts described above, NOAA has received funds from the Inflation Reduction Act. This is new, temporary funding (3 years) that includes several expanded efforts. Life cycle modeling (which is broader than the marine life stage), predator surveys in the Columbia River plume, and coastal ecology. Brian Burke and Lisa Crozier discussed these efforts at the recent Ocean and Plume Science and Management Forum. Research on predators incorporates thermal imaging for identification and quantification of marine mammal and bird predators. Models on coastal ecology include prey and predator impacts, climate change, potential management actions in freshwater that could improve ocean survival.

The recent U.S. Government Commitments in support of the Columbia Basin Restoration Initiative included a section on ocean and estuary. There is no guarantee of funds being available for this new work. Language in the description of the commitments includes:

NOAA will continue to prioritize ongoing work to develop decision support tools to track ocean productivity in a stock specific manner and to develop indicators that provide valuation for nearshore, estuary, and tributary habitat that can be used for restoration planning and prioritization.

NOAA also commits to collaborate with existing sovereign fish managers and regional entities conducting fisheries research in marine environments and by September 30, 2024:

- *Identify specific actions that can be taken in freshwater, estuarine, and marine habitats to improve fish condition and marine survival or otherwise mitigate marine habitat impacts; e.g., controlling predation and enhancing prey availability.*
- *Identify mechanisms and tools for life-cycle modeling, monitoring, and adaptive management efforts to better integrate new information on ocean conditions and marine fish survival as it becomes available through ongoing or expanded ocean research efforts to help inform adaptive management of ongoing implementation of these USG Commitments in response to the CBRI.*

Staff has not detailed possible actions for the Council to take in this memo. At the May Committee meeting staff can provide verbal options based on the interest of Committee members.

More Info:

Ocean Survival of Salmonids [1998-014-00](#)

Canada-USA Salmon Shelf Survival Study [2003-009-00](#)

[Stoplight Chart](#)

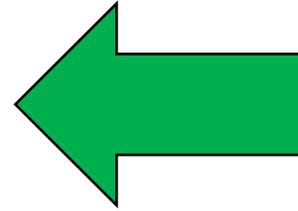
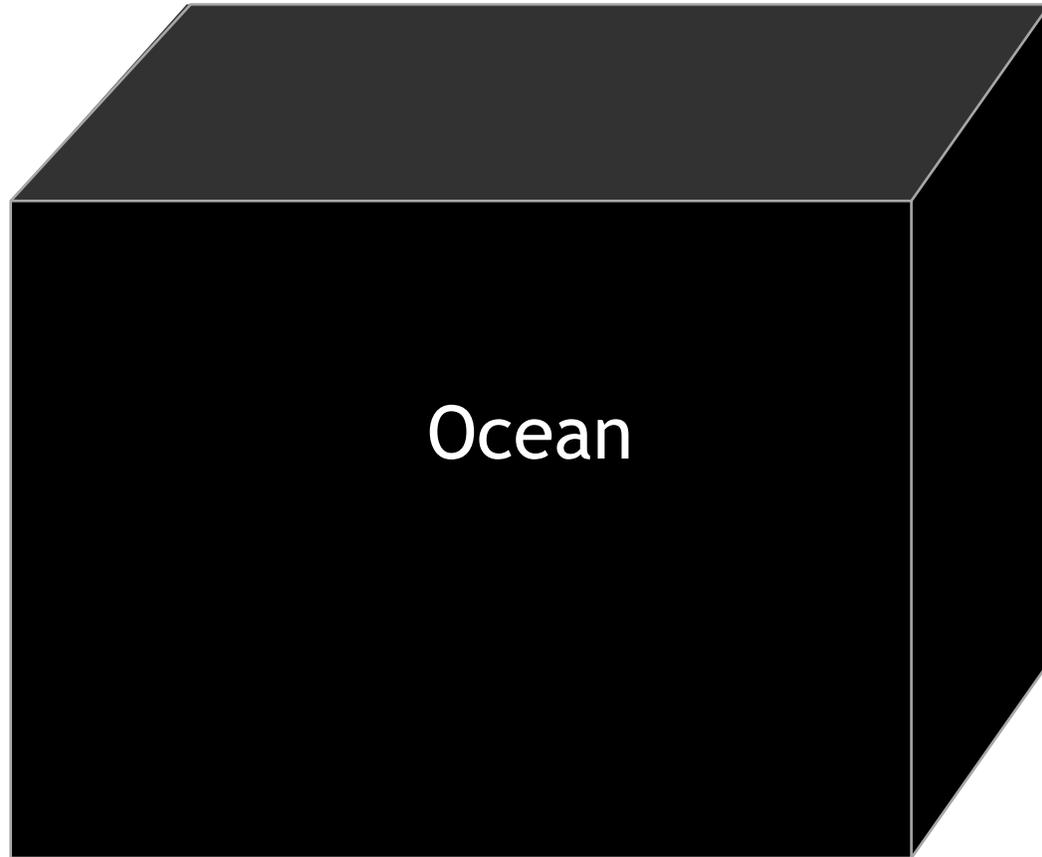
Overview and discussion of the Ocean Survival of Salmonids Project and Funding

Patty O'Toole, Kris Homel, Mark Fritsch



Northwest **Power** and
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In the beginning...



Smolts



Adults

1996 Amendment to the Northwest Power Act

839b(h)(10)(D)(vi). The Council shall fully consider the recommendations of the Panel when making its final recommendations of projects to be funded through BPA's annual fish and wildlife budget, **In making its recommendations to BPA, the Council shall consider the impact of ocean conditions on fish and wildlife populations** ... [Northwest Power Act, 94 Stat. 2710, as amended by Pub.L. 104-206, § 512(4)(h)(10)(D)(vi), September 30, 1996, 110 Stat. 3005.]

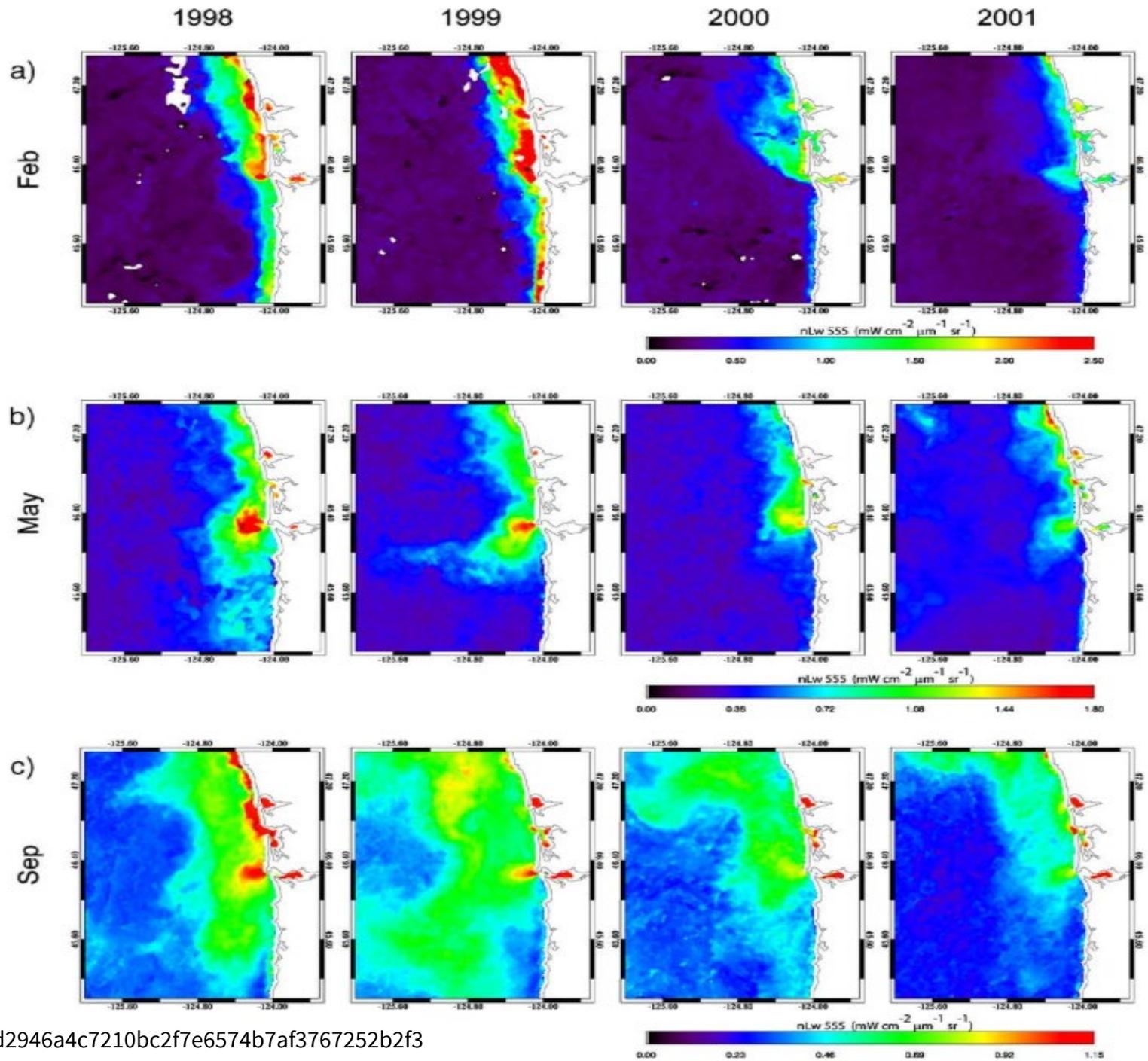
Council developed issue paper in response to 1996 amendment (Council Document 97-6)

The paper introduced three basic principles that are still in the Fish and Wildlife Program today:

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Hydrosystem affects Columbia River Plume

- Freshwater discharge affects seasonal extent of plume
- Other effects include suspended sediment and nutrients

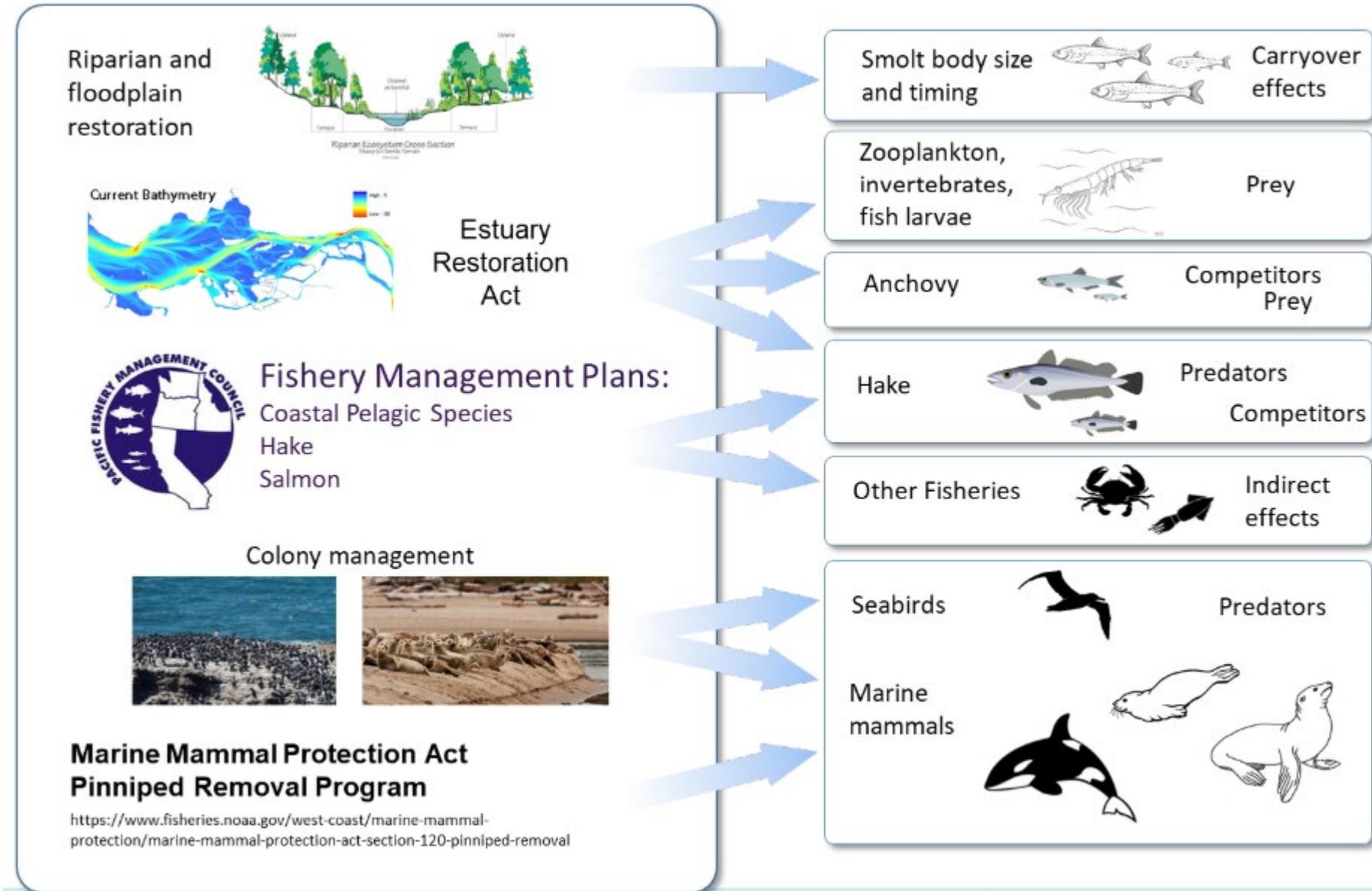


Graphic from Thomas and Weatherbee 2006

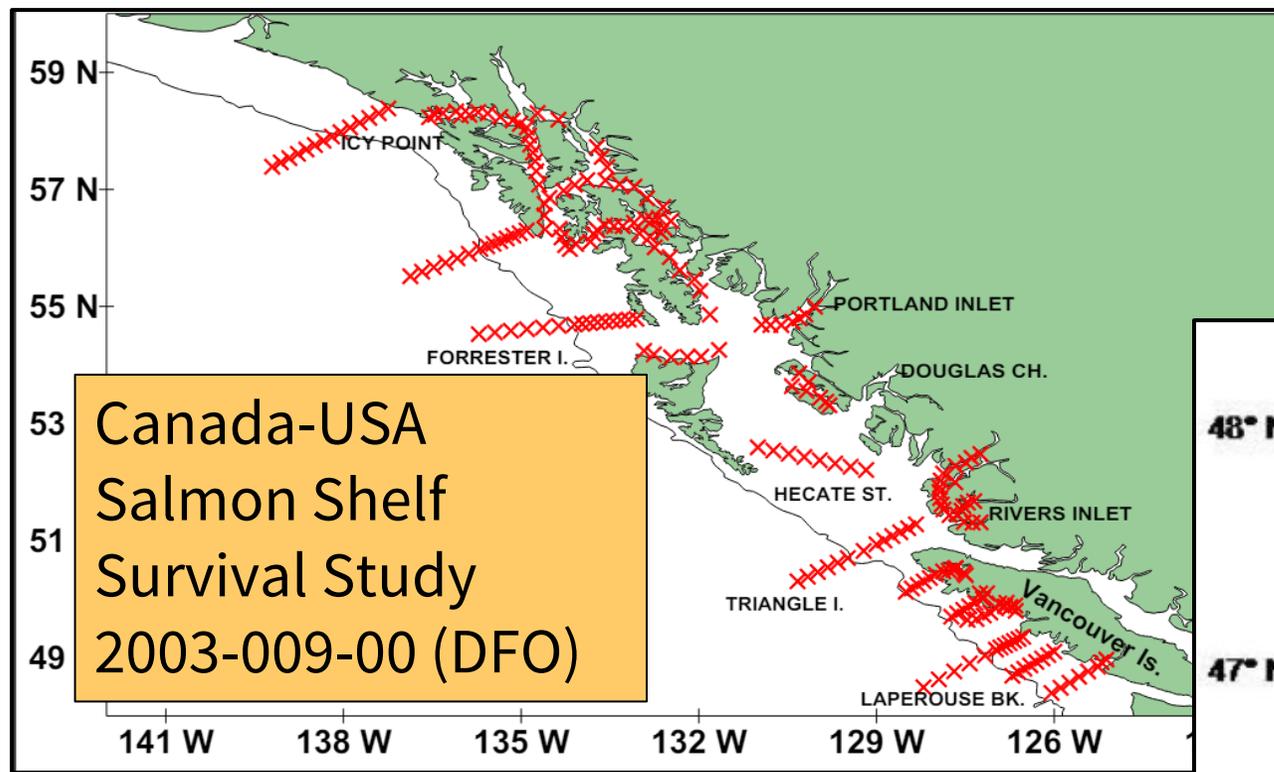
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Why focus on the plume and ocean?

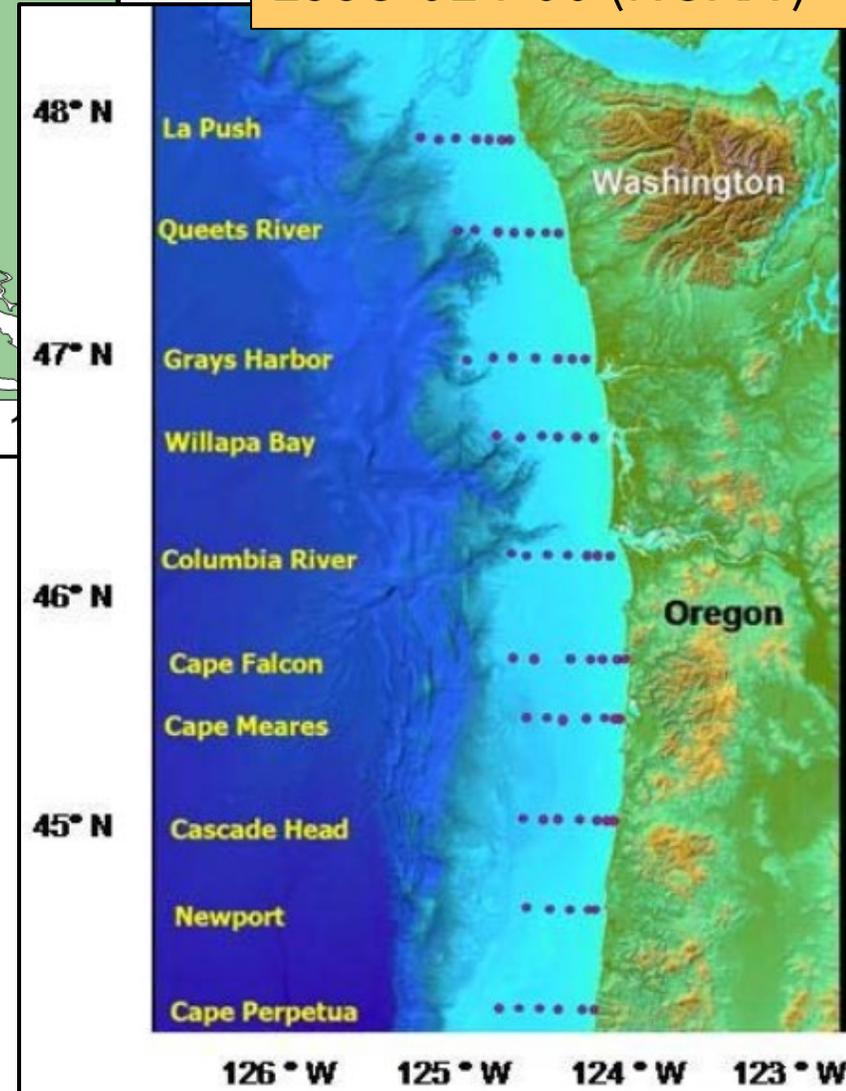
- Separate out effects of ocean from fresh water
- Identify differences in survival among species
- Improve understanding of management options in fresh water and ocean to improve ocean survival



Ocean and plume research begins in 1998



Ocean Survival of Salmonids 1998-014-00 (NOAA)



NOAA catch composition varies by survey

- **May**- Steelhead, Chinook yearlings, Coho
- **Jun**- Coho, Chinook of multiple ages
- **Sep**- Chinook subyearlings

What we have learned from this research

- Variation in ocean conditions geographically and over time - 20 years of data show this complex pattern
- Relationships between certain ocean indicators- like PDO- and growth/survival change over time
 - Requires continued monitoring to understand what predicts ocean survival
- Years of observation data on predators in plume, limited understanding of diet-level predation impacts on Columbia River salmon and steelhead
 - 3-year study to build food web model (Inflation Reduction Act), no funding for long-term monitoring

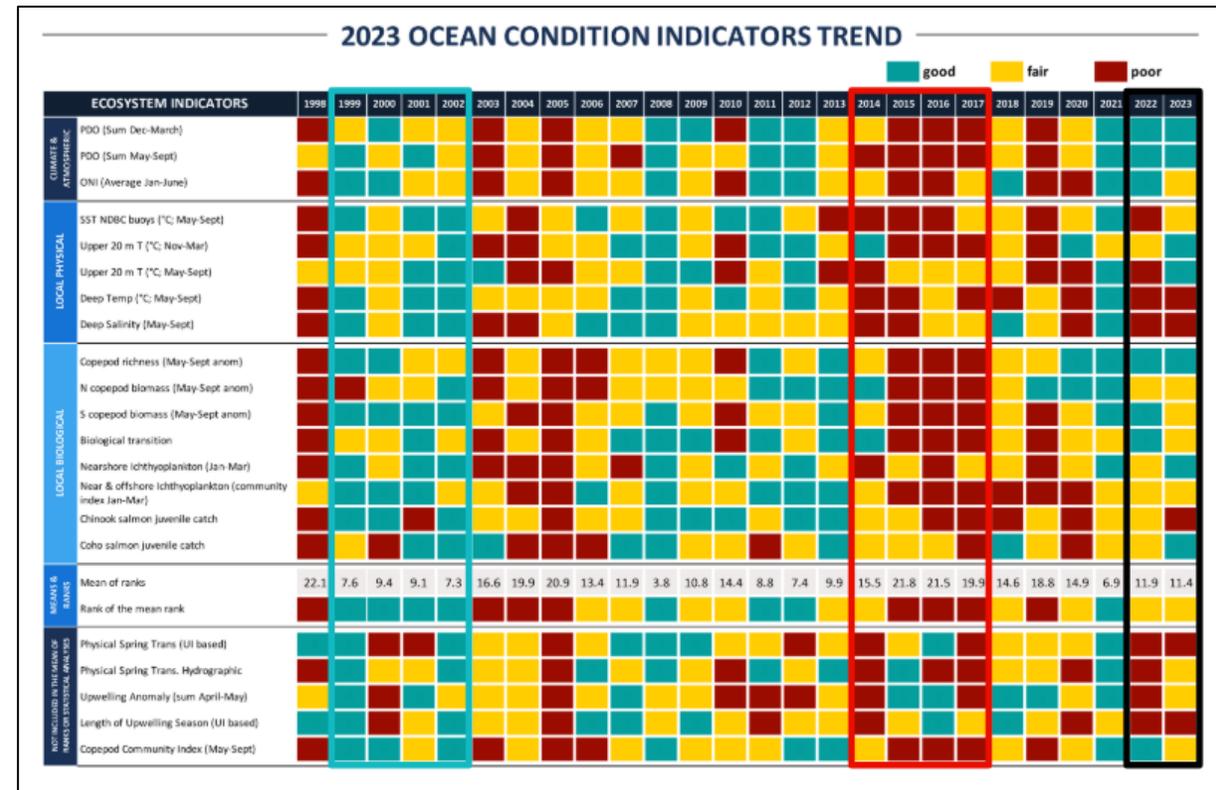
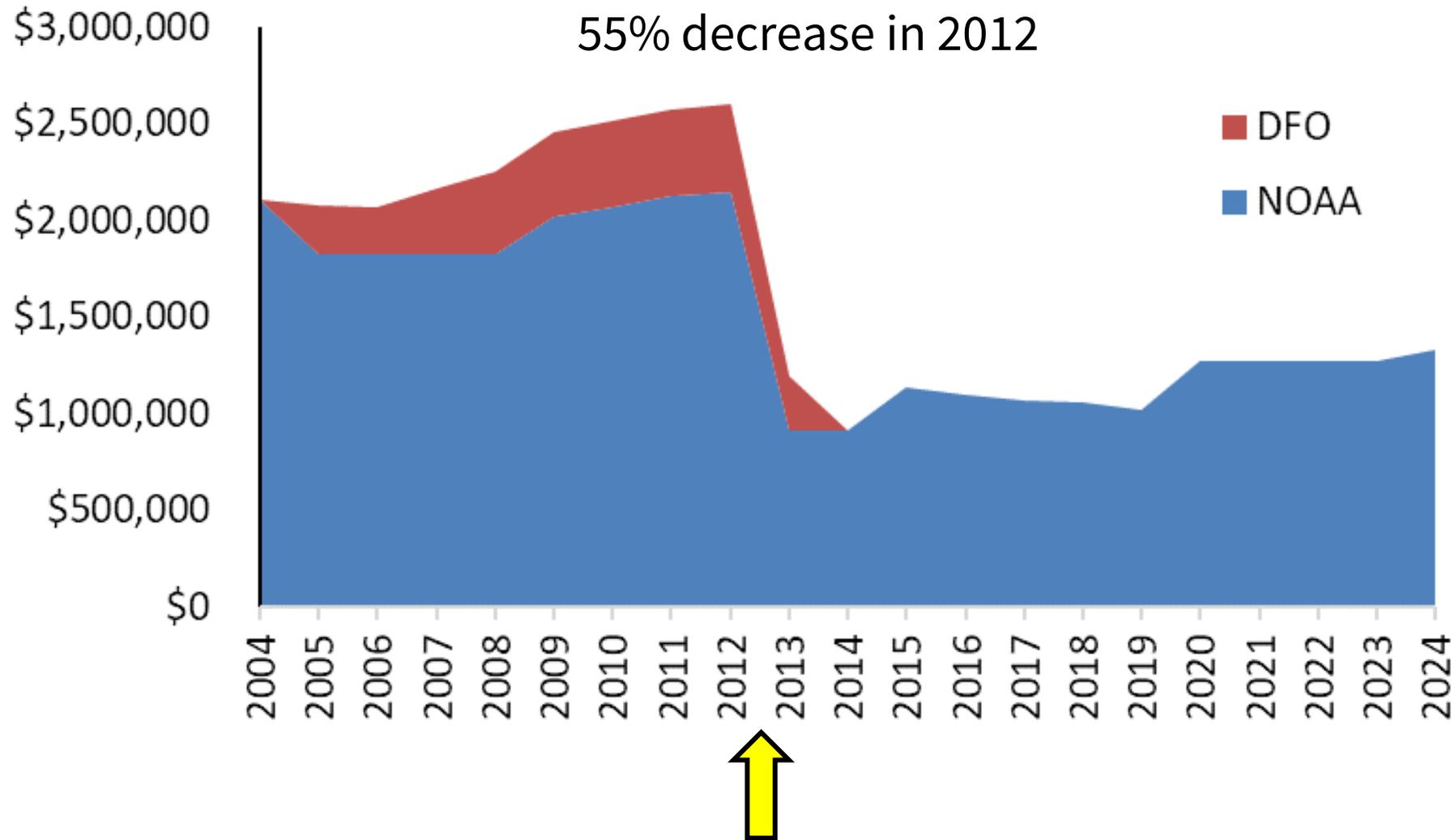


Photo from LCEP presentation

Budget changes over time

- Contracts for boat time, surveys, sample processing
- NOAA time for data analysis and modeling
- Multiple partners involved in research, monitoring, and evaluation
 - OSU, UW, PSMFC



- Shelf study ends (DFO)
- September survey dropped (NOAA)
- May survey reduced to 5 days (NOAA)

Budget increases have not kept pace with inflation

- Increased cost for boat time, fuel, sample collection, processing, analysis
- Cost of living increases for contractors at OSU
- Maintained full June survey and half of May survey
- Reduced time available for NOAA staff to analyze data
 - Currently 2-3 weeks staff time covered by project funding



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Take home:

- As budgets decrease, NOAA prioritizes data collection (preserving time-series)
- NOAA cost-share increases and less time available to work on ocean project
 - NOAA funds additional surveys not described here



Questions?