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March 7, 2023

MEMORANDUM

TO: Fish & Wildlife Committee Members

FROM: Maureen Hess

SUBJECT: Dworshak Fishery Mitigation: Rebuilding Fisheries from the Bottom Up

BACKGROUND:

Presenter: Ryan Hardy, Principal Fishery Research Biologist, Idaho Department of Fish and Game (IDFG)

Summary: Idaho Department of Fish and Game presentation update on Dworshak Fishery Mitigation, a component of project #2019-005-00

Relevance: Project #2019-005-00 Lake Pend Oreille/Dworshak implements status and trend monitoring and evaluation of resident fish species, improves reservoir conditions for resident fish species, and predator management efforts that address multiple areas of the 2014 Columbia River Basin Fish and Wildlife Program and the 2020 Addendum, in particular: Resident Fish Mitigation and Anadromous Fish Mitigation in Blocked Areas.

Background: As part of the Lake Pend Oreille/Dworshak Resident Fish Mitigation Project (#2019-005-00), the objective of the Dworshak Resident Fish Mitigation Project is to improve resident fisheries in Dworshak Reservoir as partial mitigation for losses from the construction of Dworshak Dam and continuing impacts from ongoing dam and reservoir operations. This project seeks to improve resident fisheries in the Reservoir through the careful addition of a nitrogen-based fertilizer to the reservoir.

Reservoir operations negatively impact resident fish resources in the North Fork Clearwater River. In particular, oligotrophication (i.e. nitrogen limitation) related to reservoir senescence and operations has created conditions that regularly lead to lower productivity and formation of harmful algal blooms (HABs) in the absence of mitigation. These factors reduce the productivity of the reservoir food web, ultimately reducing kokanee growth and production. Kokanee are a critical food resource for piscivores of both conservation and recreational importance, including Bull Trout and Smallmouth Bass. Continued implementation of nutrient restoration programs will be required to mitigate for lost or declining fishery resources in Dworshak Reservoir and the North Fork Clearwater River.

To mitigate for oligotrophication and harmful algal blooms (HABs), the Idaho Department of Fish and Game (IDFG) and U.S. Army Corps of Engineers (USACE) initiated a pilot study to test manipulation of nitrogen to phosphorous ratios. Data collection began in 2004 and two nitrogen restoration periods (2007 – 2010, 2012 – 2015) were evaluated for their effectiveness. The project was in compliance with water quality standards set by the Idaho Department of Environmental Quality (IDEQ) and U.S. Environmental Protection Agency (USEPA). This program resulted in reductions in HABs, increases in edible algae, increases in large Daphnia, and increases in growth, abundance, and biomass of kokanee in Dworshak Reservoir and upstream into the North Fork Clearwater River. Based on the results of this pilot study, the project became part of the regular operation and maintenance of Dworshak Reservoir in 2017. In a MOU between the USACE and IDFG, the USACE agreed to continue the applications of N-based fertilizer. The USACE also contracted a consultant to provide the nutrient prescription, analyze water and plankton samples, and interpret limnological data. In turn, IDFG agreed to provide personnel and equipment (boat, scientific equipment, etc.) to conduct the sampling, technical consultation regarding the project, and assist with public outreach. The project will continue research, monitoring, and evaluation to assess the status and trend of the limnology, kokanee, and other fishery components of Dworshak Reservoir. The specific objectives of the program are to 1) Maintain improved reservoir productivity while maintaining good water quality; 2) Sustain a kokanee population capable of supporting a consistent harvest fishery, a stable Bull Trout population, and a trophy Smallmouth Bass Fishery; 3) Maintain or enhance Westslope Cutthroat Trout populations for conservation purposes and to improve angling opportunity; 4) Improve reservoir conditions related to survival, growth and contribution of stocked Rainbow Trout to the fishery.

More Info:

[Project #2019-005-00 – Lake Pend Oreille/Dworshak Early trophic responses to nutrient addition in Dworshak Reservoir, Idaho](#)

Dworshak Reservoir Fishery Mitigation: Rebuilding Fisheries From the Bottom Up

NPCC Update 3/14/23

Ryan Hardy

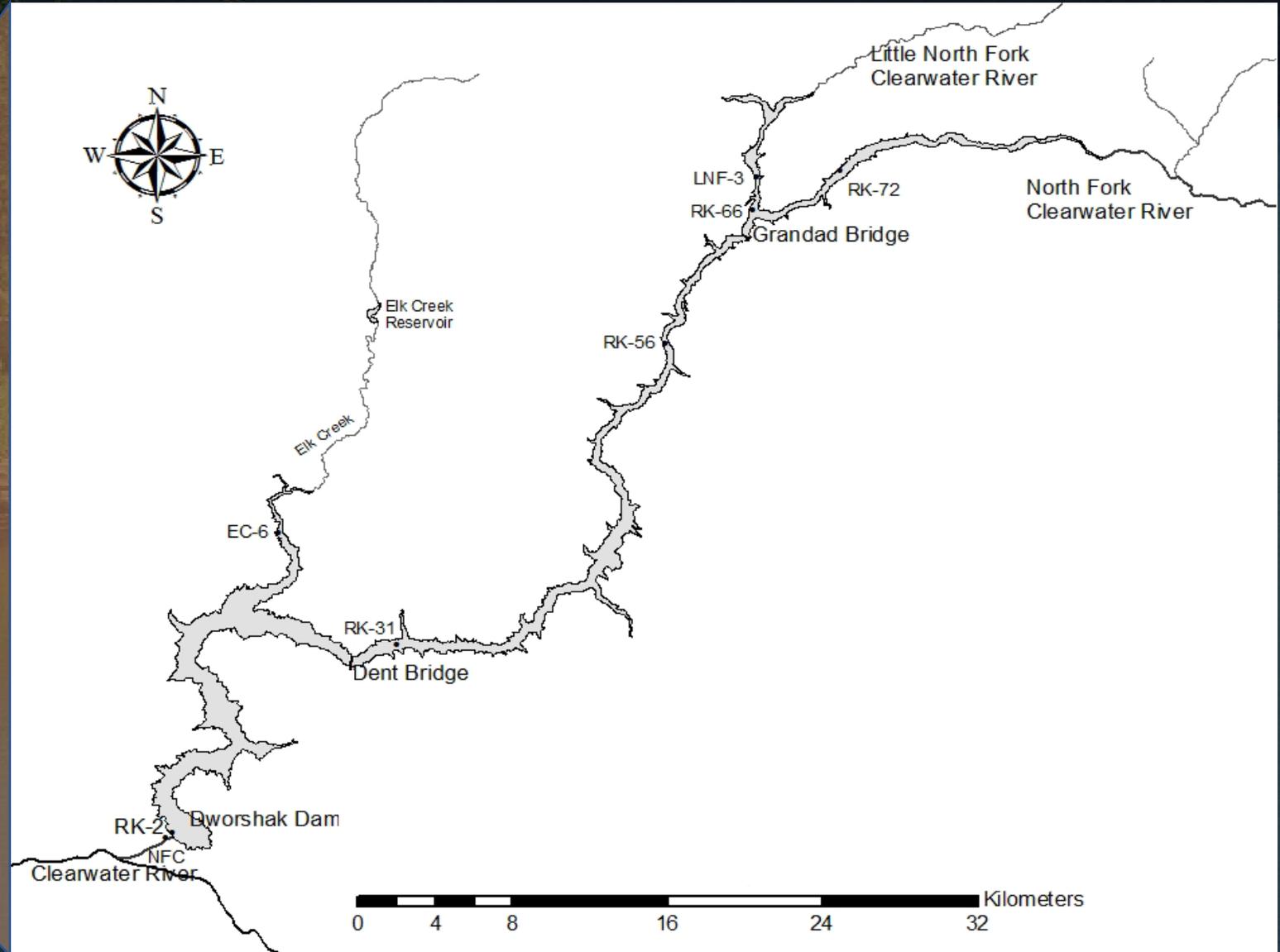
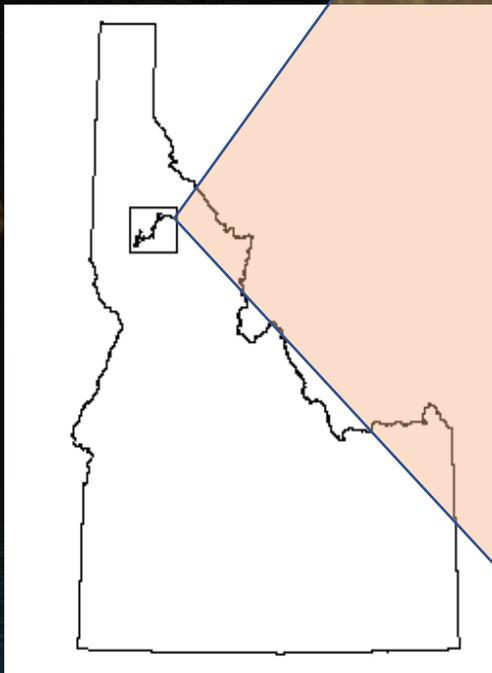
Principal Fishery Research Biologist

Project: 2019-005-00

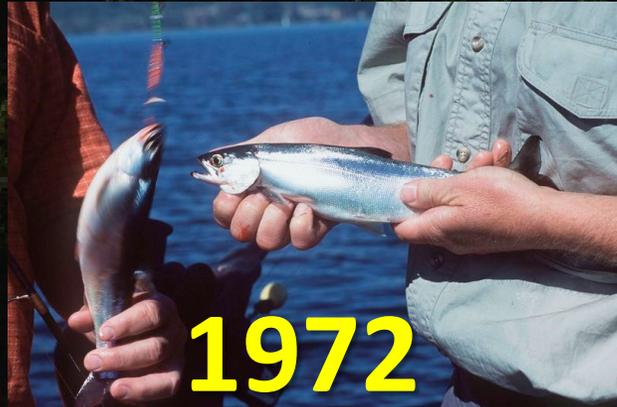




Dworshak Reservoir



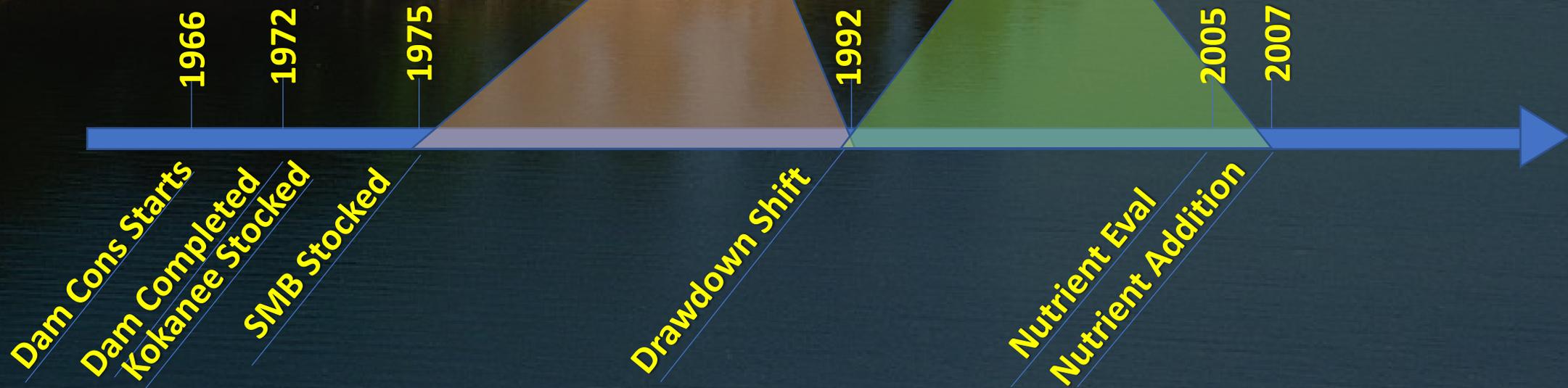
Dworshak Reservoir Fisheries



Dworshak Dam (1972)



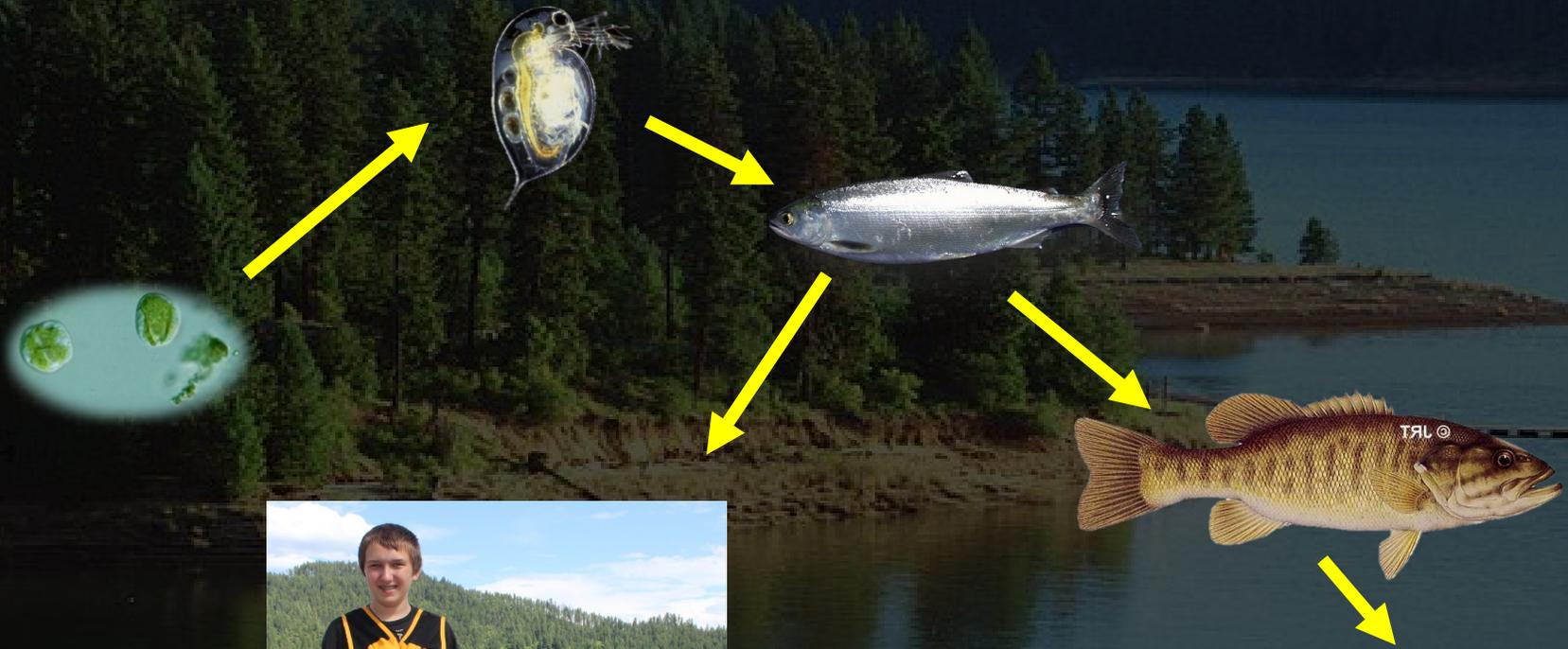
Struggling Fisheries



Reduced Productivity



Aquatic Food Web



Nutrient Restoration



Project Objectives

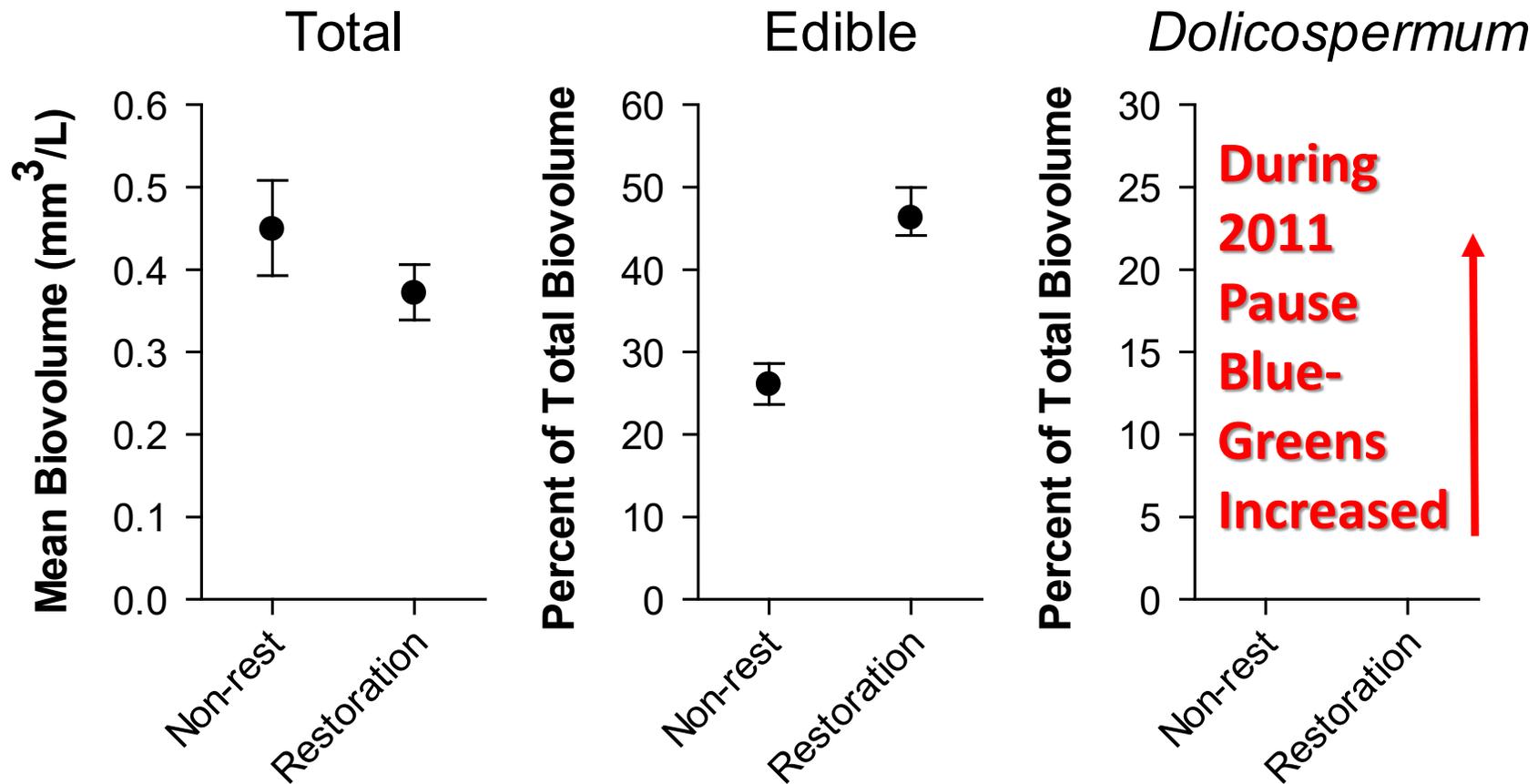
- Maintain productivity and water quality
- Sustain a kokanee population for fishery and benefits to other species
- Maintain Westslope Cutthroat Trout populations
- Improve conditions for stocked Rainbow Trout



Evaluation



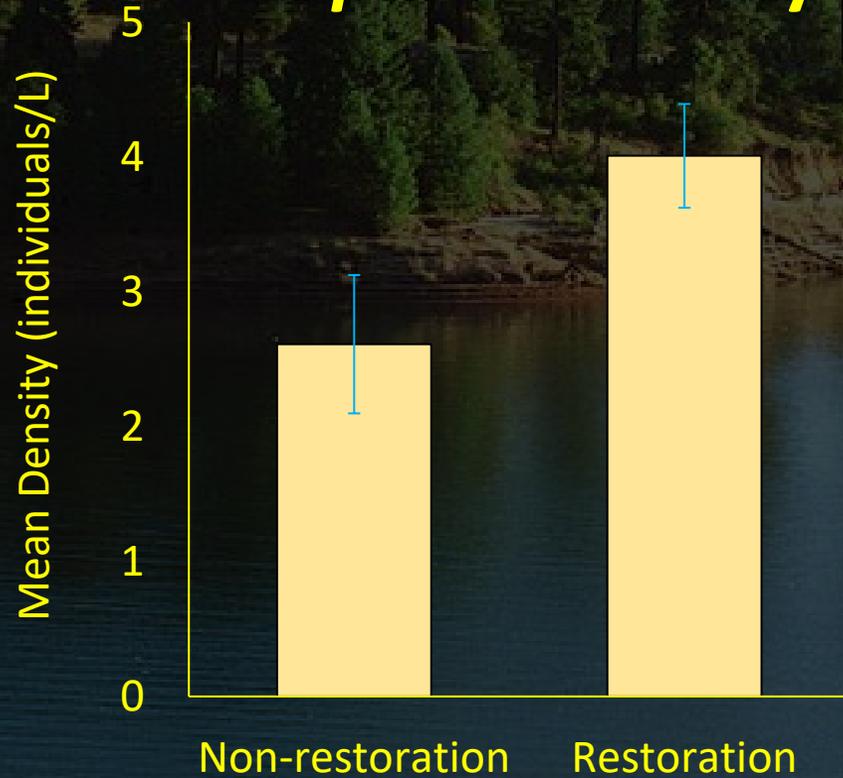
Phytoplankton



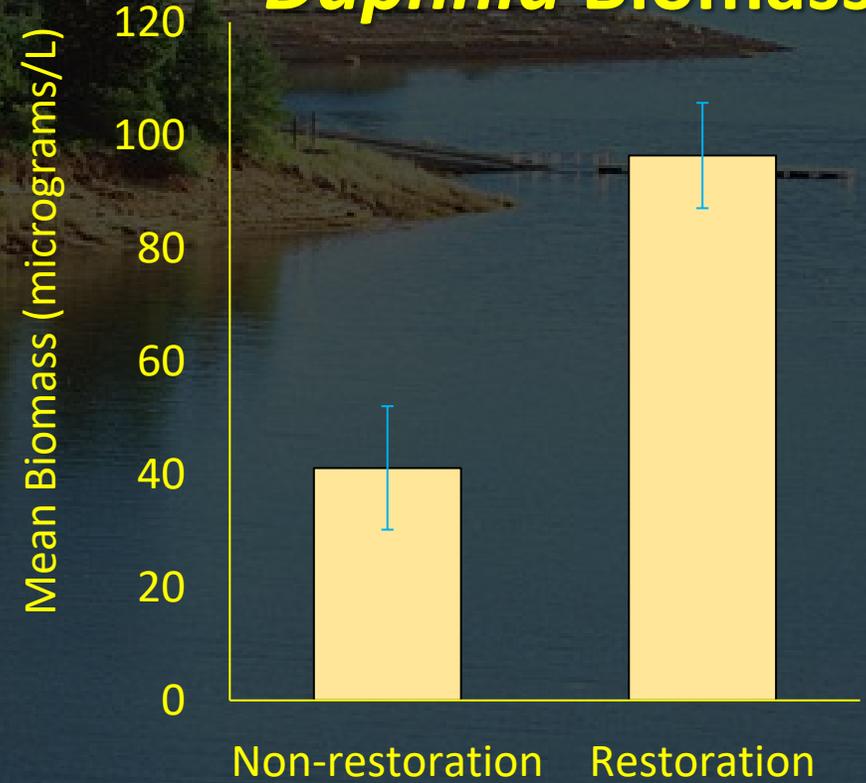
Zooplankton



Daphnia Density



Daphnia Biomass



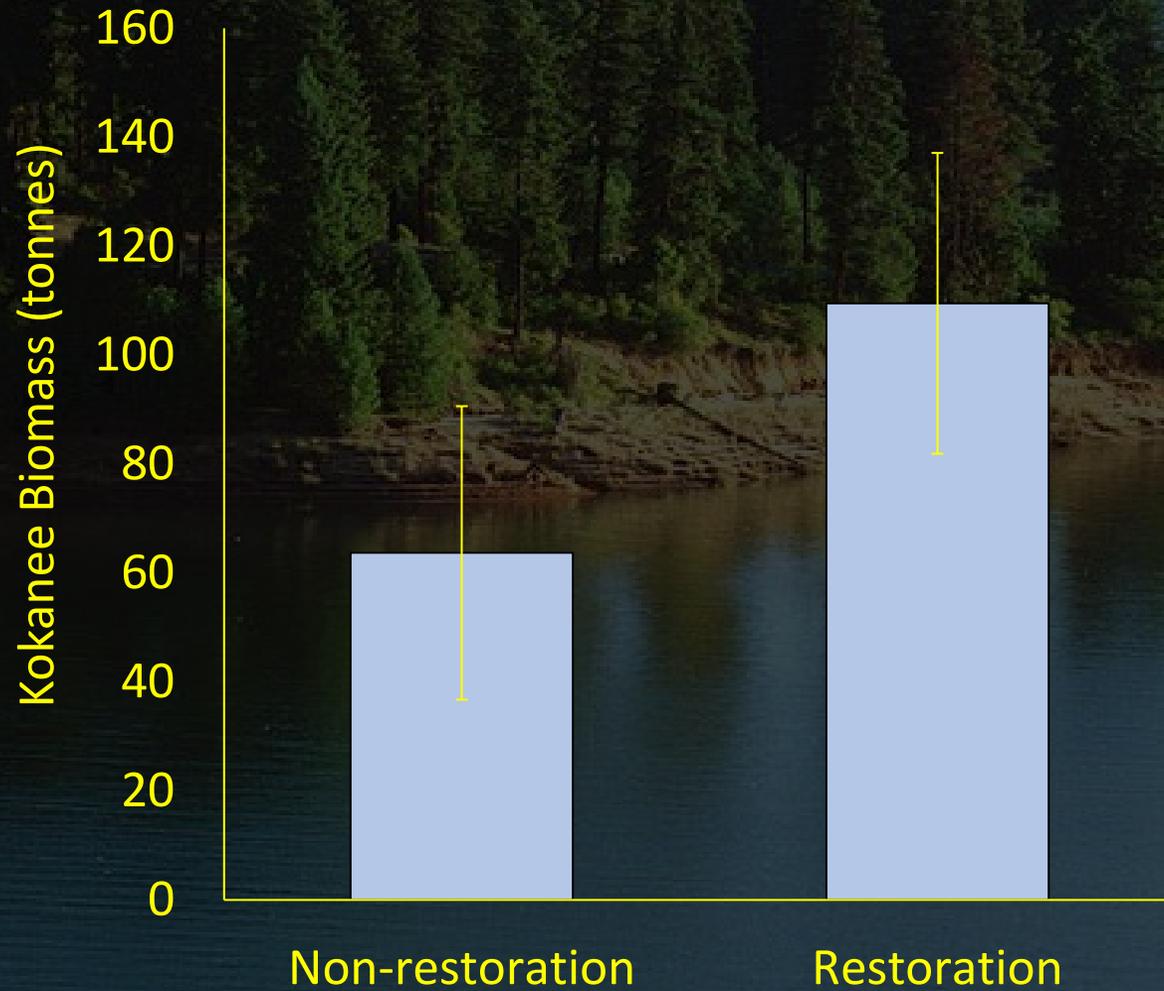
Kokanee Growth



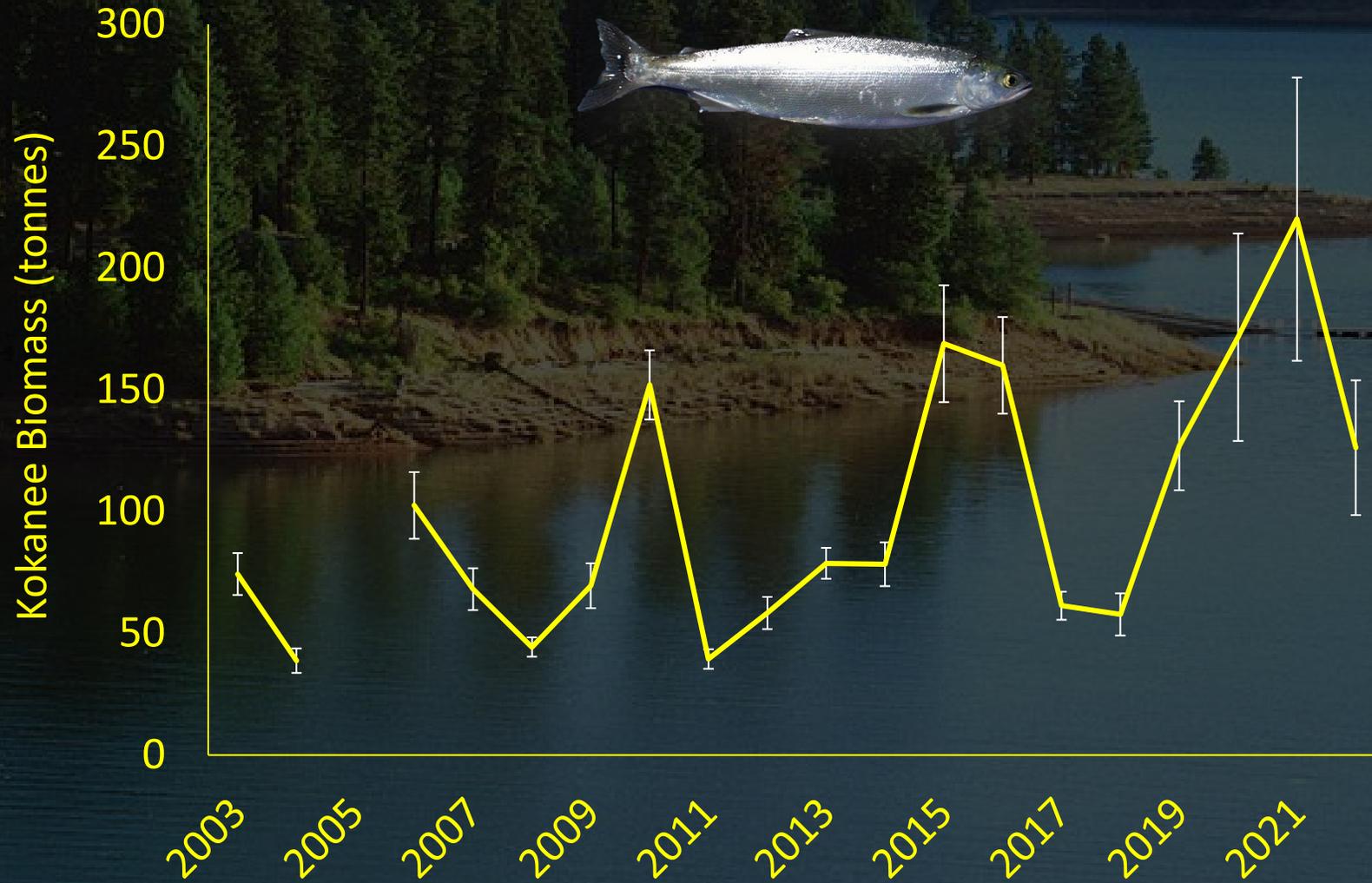
- Growth driven by *Daphnia*
- Kokanee abundance \uparrow *Daphnia* \downarrow
- Nutrient addition drives Kokanee growth



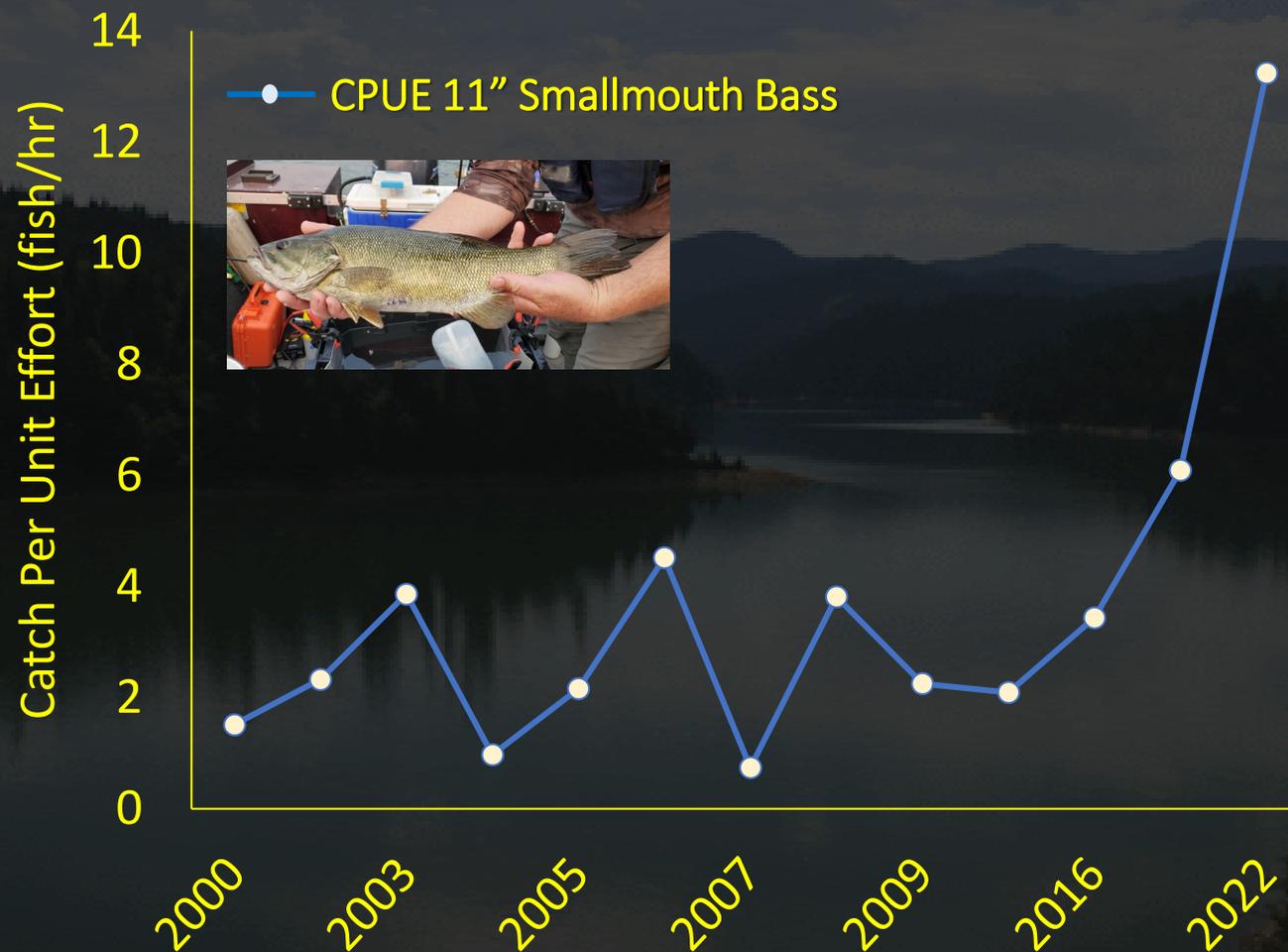
Kokanee Biomass



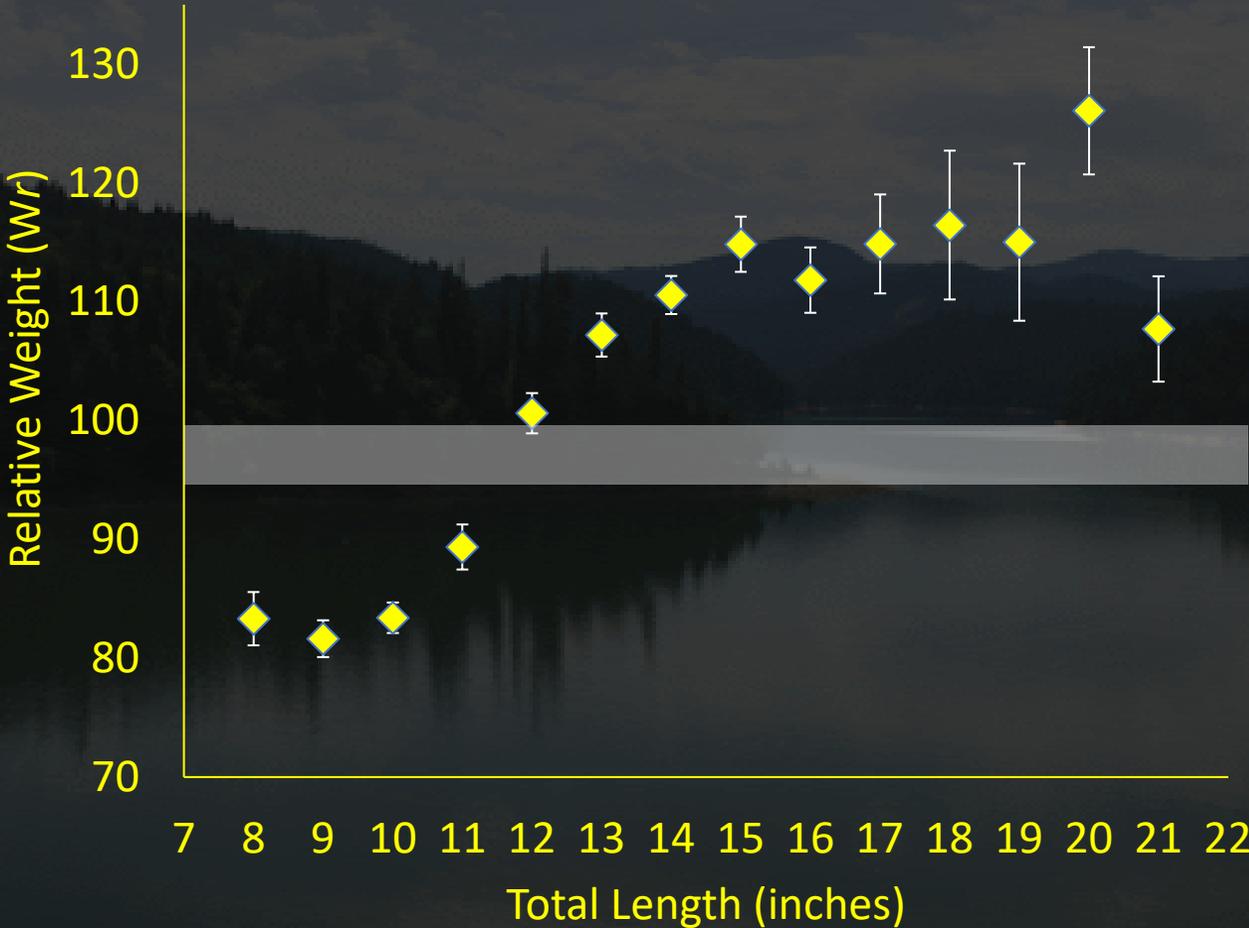
Kokanee Biomass



Smallmouth Bass Fishery Monitoring



Smallmouth Bass Growth



Smallmouth Bass Growth



Idaho State Records





Summary of Results

- Maintain productivity and water quality
- Increased consumable *Daphnia*
- Increased Kokanee and SMB size and abundance
- Increased fishery efforts and improved catch rates



Partnerships



Fertilizer Outlook



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