

WF4313/6613-Fisheries Management

Class 24– Invasives continued

In the news



Announcements

Exam II not graded yet...
Paddlefish Tomorrow!



Management Brief

- Brief- Due 8 am December 5th, the management brief should be no longer than 1000 words and targeted towards the same stakeholders as the presentation.
- Brief presentations-November 28th. The presentation should be short, 5 minutes at most and aimed at an audience of stakeholders. Stakeholders in fisheries may include anglers, angler groups (e.g., BASS), and lake associations. The following rubric provides guidance on how this element will be assessed. Presentations will be held Tuesday November 28th during lab.

Presentation rubric

Scoring Rubric for WFA 4313 Oral Presentations

	0	2.5	5	7.5	10	12.5	15
PRESENCE							
-body language & eye contact							
-contact with the public							
-poise							
-physical organization							
LANGUAGE SKILLS							
-correct usage							
-appropriate vocabulary and grammar							
-understandable (rhythm, intonation, accent)							
-spoken loud enough to hear easily							
ORGANIZATION							
-clear identification of objectives							
-logical structure							
-clear management implications							
MASTERY OF THE PAPER							
-pertinence							
-depth of commentary							
-spoken, not read							
-able to answer questions							
-application to Mississippi fisheries							
OVERALL IMPRESSION							
-very interesting / very boring							
-pleasant / unpleasant to listen to							
-very good / poor communication							

TOTAL SCORE _____ / 75

Journals to look in

- [North American Journal of Fisheries Management](#)
- [Canadian Journal of Fisheries and Aquatic Sciences](#)
- [Transactions of the American Fisheries Society](#)
- [Fisheries Management and Ecology](#)

Homework Assignment 1

- Due November 15th 8am.
- Find an article and email it to me to check.



Management case study

North American Journal of Fisheries Management 26:849-860, 2006
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DOI: 10.1577/M05-118.1

[Article]

Evaluation of an Unsuccessful Brook Trout Electrofishing Removal Project in a Small Rocky Mountain Stream

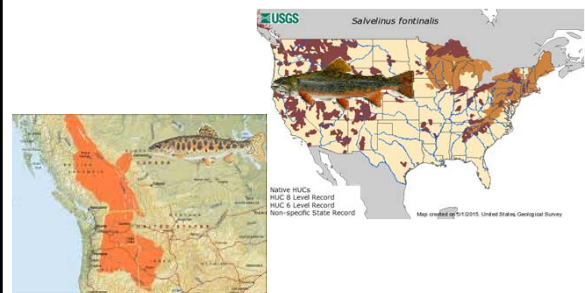
KEVIN A. MEYER,* JAMES A. LAMANSKY, JR., AND DANIEL J. SCHILL
Idaho Department of Fish and Game, 1414 East Locust Lane, Nampa, Idaho 83850, USA

Abstract—In the western United States, exotic brook trout *Salvelinus fontinalis* frequently have a deleterious effect on native salmonids, and biologists often attempt to remove brook trout from streams by means of electrofishing. Although the success of such projects typically is low, few studies have assessed the underlying mechanisms of failure, especially in terms of compensatory responses. A multiagency watershed advisory group (WAG) conducted a 3-year removal project to reduce brook trout and enhance native salmonids in 7.8 km of a southwestern Idaho stream. We evaluated the costs and success of their project in suppressing brook trout and looked for brook trout compensatory responses, such as decreased natural mortality, increased growth, increased fecundity at length, and earlier maturation. The total number of brook trout removed was 1,401 in 1998, 1,241 in 1999, and 899 in 2000; removal constituted an estimated 88% of the total number of brook trout in the stream in 1999 and 79% in 2000. Although abundance of age-1 and older brook trout declined slightly during and after the removals, abundance of small brook trout increased

Brook Trout Eradication



Distribution



Approach

- 2-pass depletion
- Physically remove brook trout captured
- 1998-2002
- Very intensive



Expected effects

What would we expect for a massive removal of the population?

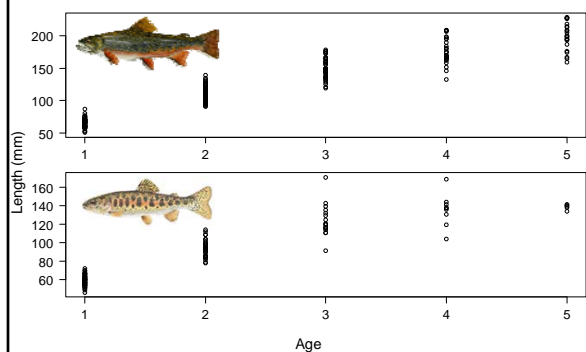
Abundance?

Size structure?

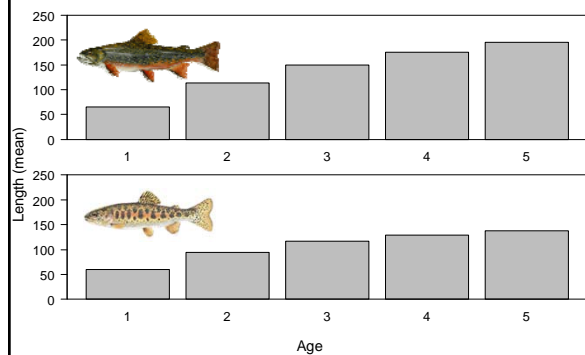
Age structure?

Others?

Expected Growth



Expected Age Structure



Effect of removal?

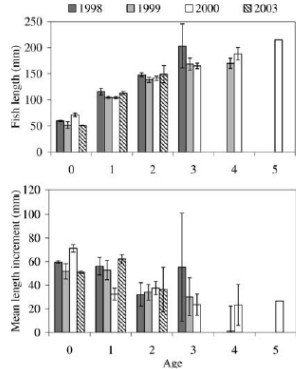
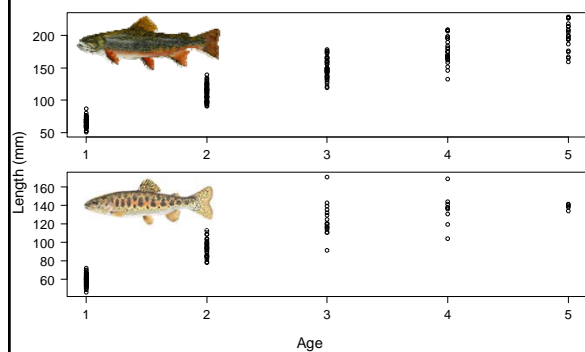
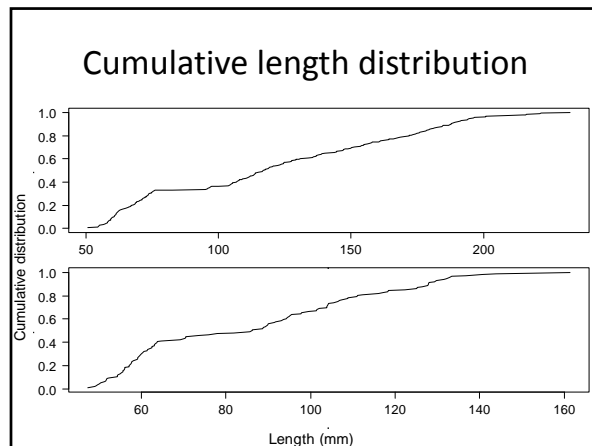


FIGURE 3.—Mean ($\pm 95\%$ CI) length at age and length increment for nonnative brook trout removed by electrofishing in Pike's Fork, Idaho, during 1998–2000 and 2003.

Age Structure





Effect of removal

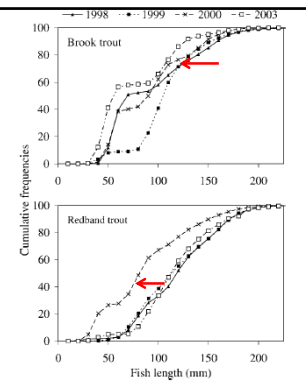


FIGURE 4.—Cumulative length frequencies of nonnative brook trout and native redband trout in Pike's Fork, Idaho, during 1998–2003. Electrofishing removal of brook trout was conducted in all years except 2001 and 2002.

Effect

- Length-weight?
- Fecundity?

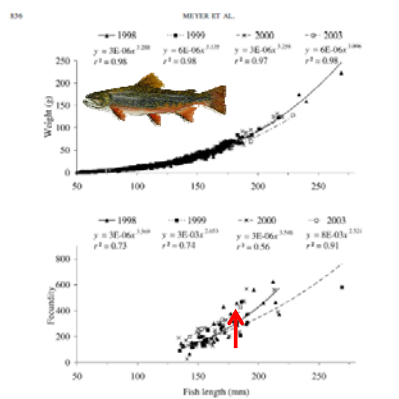


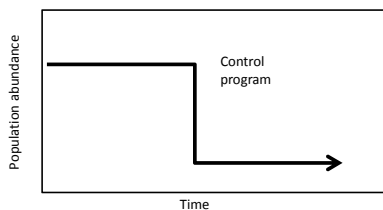
FIGURE 5.—Length-weight and length-fecundity relationships for nonnative brook trout removed by electrofishing in Pike's Fork, Idaho, during 1998–2000 and 2003. Length is total length (mm).

Take home message

- Eradication is rarely achieved, even with extraordinary efforts!
- Mental model versus real model
 - No conceptual or physical model
 - No management alternatives
 - Unintended consequences = compensation
- Control more likely than eradication

Control

- Reduce population to level that minimizes impact



Methods of Eradication & Control

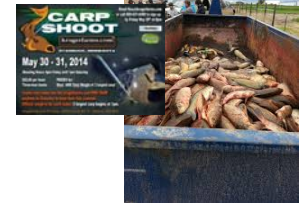
- Chemicals
 - Rotenone, Lampricide
- Physical
 - Traps, nets, explosives, water level, electrofishing, commercial fishing
- Biological
 - Predator & prey, pathogens, daughterless technologies, pheromones

Chemicals



Physical

- Fishing
 - Commercial
 - Recreational



Strategies to Control a Common Carp Population by Pulsed Commercial Harvest

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Simulated Population Responses of Common Carp to Commercial Exploitation

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 South Dakota 57007, USA

Biological

- Predator prey
Tiger musky & brook trout
- Pathogens
Koi Herpes virus-carp
- Pheromones
Lamprey, brook trout



But I really want to introduce a fish...

American Fisheries Society Position (taken from Policy Statement 15)

1. Rationale
2. Search
3. Preliminary assessment of the impact
4. Publicity and review
5. Experimental research
6. Evaluation or recommendation
7. Introduction

Rationale

Reasons for seeking an import should be clearly stated and demonstrated. It should be clearly noted what qualities are sought that would make the import more desirable than native forms.

Search

Within the qualifications set forth under rationale, a search of possible contenders should be made, with a list prepared of those that appear most likely to succeed, and the favorable and unfavorable aspects of each species noted.

Preliminary assessment of the impact

This should go beyond the area of rationale to consider impact on target aquatic ecosystems and general effect on game and food fishes or waterfowl, aquatic plants, and public health. The published information on the species should be reviewed, and the species should be studied in preliminary fashion in its biotope.

Publicity and review

The subject should be entirely open, and expert advice should be sought. It is at this point that thoroughness is in order. No importation is so urgent that it should not be subject to careful evaluation.

Experimental research

If a prospective import passes the first four steps, a research program should be initiated by an appropriate agency or organization to test the import in confined waters (e.g., experimental ponds).

Evaluation or recommendation

Publicity is in order and complete reports should be circulated amongst interested scientists and presented for publication in the Transactions of the American Fisheries Society.

Introduction

With favorable evaluation, the release should be effected and monitored, with results published or circulated.

Final Review of the Species Management Plan (2017)
Species Management Plan (2017)
Species Management Plan (2017)
Species Management Plan (2017)

MANAGEMENT BRIEF

Risk Screening of Arapaima, a New Species Proposed for Aquaculture in Florida

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Restoration & Introduced Species?

A critical first step in dealing with a potential introduction is positive identification of the species to confirm the species is nonnative (Fuller et al. 1999).

Best of intentions for species recovery?

Colorado Greenback Trout

U.S. Fish & Wildlife Service
ECOS Environmental Conservation Online System
 Conserving the Nature of America

Species Profile for Greenback Cutthroat trout (*Oncorhynchus clarki stomias*)

Greenback Cutthroat trout (*Oncorhynchus clarki stomias*)

[Endemic Species](#) / [Recovery](#) / [Global Habitat](#) / [Conservation Plans](#) / [Pathways](#) / [Life History](#)

Taxonomy: [View taxonomy in ITIS](#)

Listing Status: **Threatened**

Where Listed: **WHEREVER FOUND**

General Information

Greenback cutthroat trout are coldwater fish belonging to the trout, salmon and whitefish family. They have dark, round spots on the sides and tail and two colorful blood-red stripes on each side of the throat under the jaw, hence the name "cutthroat". During the spring spawning season the entire body may become crimson red.

• **States/US Territories** in which the Greenback Cutthroat trout, Endemic is known to or is believed to occur: [Colorado](#), [Utah](#)

• **US Counties** in which the Greenback Cutthroat trout, Endemic is known to or is believed to occur: [View All](#)

Current Listing Status Summary

Status	Date Listed	Lead Region	Where Listed
Threatened	03/11/1967	Mountain-Prairie Region (Region 3)	Endemic

Science News from research organizations

Efforts To Save Greenback Cutthroat Trout Snagged: Wrong Fish Restocked For Decades

Date: September 11, 2007
 Source: University of Colorado at Boulder

Summary: A new study indicates biologists trying to save Colorado's native greenback cutthroat trout from extinction over the past several decades through hatchery propagation and restocking efforts have, in most cases, inadvertently restocked the wrong fish.

Share: [Facebook](#) [Twitter](#) [LinkedIn](#) [Email](#) [Print](#) Total shares: 7

RELATED TOPICS


Plants & Animals

- Fish
- Wild Animals
- Ecology Research
- Nature
- New Species
- Extinction

RELATED TERMS

- Trout
- Fish farming
- Salmon
- Extinction event
- Angelfish
- Fish migration

Full Story



A new University of Colorado at Boulder study has shown biologists trying to save the recovery of the threatened greenback cutthroat trout in Colorado, have in many cases been restocking the wrong subspecies of trout into small streams and lakes in the state.

Credit: Colorado Division of Wildlife

