Could Turbidity Curtains be Used to Create Predator-free Environments for Rearing Razorback Sucker

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Problem – Low survival of hatchery-reared Razorback suckers within Lake Mohave

Solution – Get rid of predators or grow bigger suckers

Large scale commercial fishing to crash striped bass populations

Pelagic fish
Vulnerable to commercial gear

Indecision as a Rational Choice

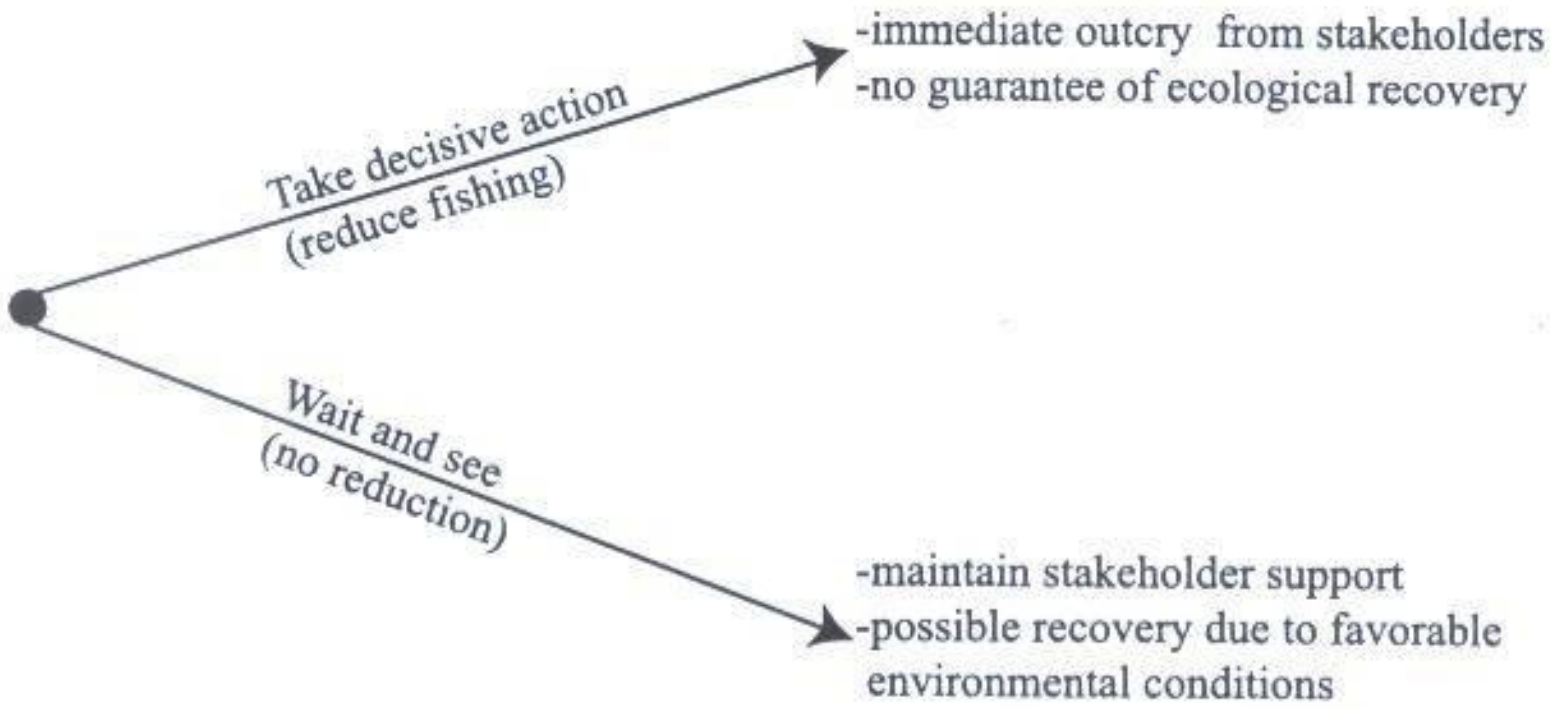


FIGURE 1.1: Indecision as a rational choice during a fishery decline. Viewed from a fishery manager's perspective in terms of a simple decision tree, it can be fully rational for the manager faced with either certain outcry from fishing stakeholders if decisive action is taken, or the possibility that nature will correct the situation without intervention even if no action is taken, to gamble on the situation's correcting itself (i.e., to be deliberately indecisive).

Walters and Martel 2004, Fisheries Management and Ecology

Problem – Survival of hatchery reared fish

Solution – ~~Get rid of predators~~ or grow bigger suckers

No political will

How do you grow a bigger sucker?

- Time
- Space – low densities
- Good water quality
- Lots of Food

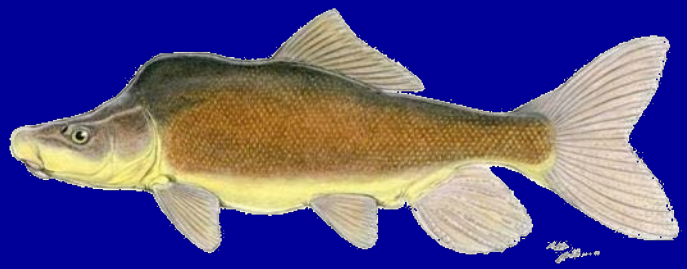
Predator free

Isolated Backwaters

Golf Course Ponds

Problems – Have to get the fish out
Seasonally poor water quality

Turbidity Curtain ?
Block of a cove within a lake



VS

- Chemical treatment within the curtain to remove predators – Rotenone or ammonia
- Manipulate the water quality within
  - Add turbidity

- More durable for long term deployment – less likely predators will get in

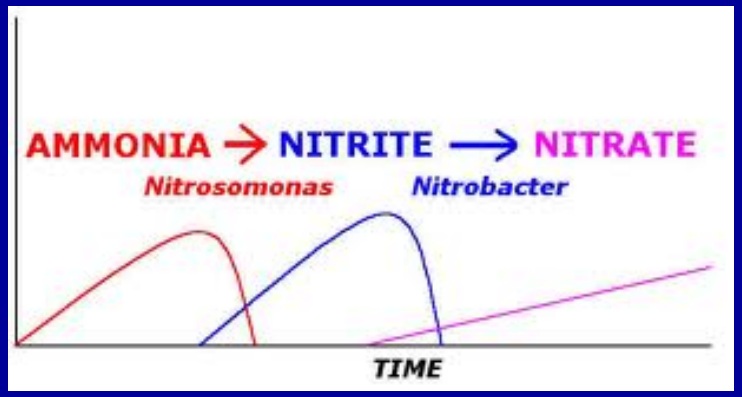
Advantages over isolated backwaters Or golf course ponds

- Thermally connected to the lake
  - Better mid-summer water quality
- Easy to release fish - remove the curtain

Use of Ammonia to remove invasive aquatic species

Natural product of fish metabolism
Naturally present in environment
Natural bacteria detoxifies

Creates a fertile environment
For native fish



registration-manual-chapter-12-applying-experimental-use-permit

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You are here: EPA Home » Pesticide Registration » Pesticide Registration Manual: Chapter 12 - Applying for an Experimental Use Permit

Pesticide Registration Manual: Chapter 12 – Applying for an Experimental Use Permit

In This Chapter

- Introduction to Experimental Use Permits

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Registration Manual Table of Contents

Pesticides Registration Manual Home Page

Exemptions from EUP Requirements

EPA generally will not require an EUP for a substance or mixture of substances if the EUP is limited to:

- **Laboratory or Greenhouse Tests**
- **Limited Replicated Field Trials** involving fewer than 10 acres per pest for terrestrial tests or less than one acre per pest for aquatic tests, in which the sole purpose is to determine pesticidal value, toxicity, or other properties under the following small-scale field testing scenarios:
  - **Land** - Pesticide testing on plots of land 10 acres or less in size. Specifically, test plots may be as large as 10 acres per pest if the effect of each pesticide on several pests is being investigated at a different time for each pest. However, if pesticide effects on more than one pest are being investigated all at the same time, the test plot may not exceed 10 acres in size. Furthermore, any food or feed crops involved in or affected by the tests must be destroyed or consumed only by experimental animals unless a tolerance or exemption from a tolerance has been established. Please refer to 40 CFR 172.3(c)(1).
  - **Aquatic Uses** - Pesticide testing on water bodies one surface acre or less in size. Specifically, water bodies may be as large as one acre per pest if the effect of each pesticide on several pests is being investigated at a different time for each pest. However, if pesticide effects on more than one pest are being investigated all at the same time, the water body may not exceed one acre in size.

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Triton

Triton

Mark III Turbidity Barrier
ASTM Universal
Quick Connector
12" Octagon Styrofoam Float
Dual 5/16" Coated
Galvanized Cable
22 oz. PVC Coated Fabric
(Heavier Fabrics Available)
3/8" Galvanized Chain Ballast
3/8" Polypropylene Rope
Sealed in Fabric Ends

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Invoice #	Date	Due Date
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AMERICAN MANUFACTURER

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Bill To	Ship To
National Park Service Melissa Trammel 324 South State St. Suite 200 Salt Lake City, UT 84111	Glen Canyon NRA Wahweap Warehouse 130 NPS Maintenance Road Page, AZ 86040 ATTN: Mark Anderson

Sales Person	P.O. No.	S.O. No.	Ship Date	Ship Via	Terms
IR	Melissa100915	3349	10/12/2015	Common Carrier	Credit Card

Item	Description	Qty	U/M	Unit Price	Total
N-ETC2-I-10-05...	Type 2- Impermeable Curtain 10'x 50' - 6" Flotation - 18oz Yell, 5/16" Chain - Velcro end flaps	3	ea	591.50	1,774.50
N-EATB-18 LD	TOW BRIDLE, Floating - 13" to 18", LD Connector, Float	1	ea	69.78	69.78
Shipping/delivery	Ship via common carrier.	1		540.00	540.00

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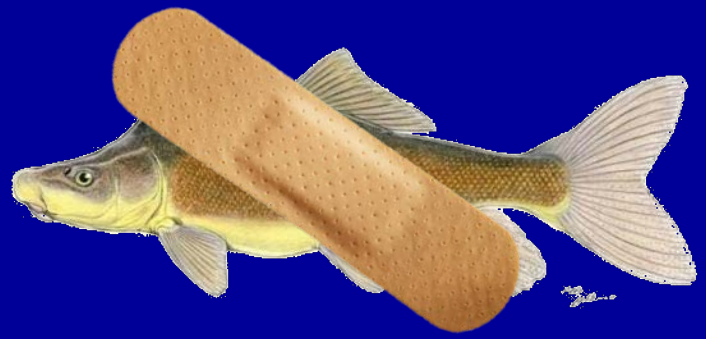
Solutions

- If we are not willing to address the original/root cause of native fish declines – Predation



- Then we better get creative and come up with some new ideas to grow bigger fish

The success of traditional hatchery programs is typically measured by the number of fish stocked, but hatchery programs for endangered species must measure success in terms of long-term survival and species recovery

(Anders 1998, Brannon 1993)