Fish Ecology and Management Workshop

Fisheries management options

Management Options to Enhance Fishing (Lake Assn.)

- Stocking
- Artificial Structures
- Vegetation Control
- Natural shoreline
- Other considerations

* Additional mgt. tools for DNR

Fish stocking

- Can be a tool to improve fishing & fish community
- Not a panacea
- Not every lake can be (or should be) a walleye lake

Fish stocking permit

- Application available online
- Permit **required** to stock fish into Michigan Public Waters
- Ensures fish stocked are:
  - Healthy and won't pose disease risk
  - Species is currently in the watershed, no long term management problems
  - Species is compatible with management goals

Talk to the biologist!!!!

- Tell the biologist WHY you want to stock
  (i.e., what's the problem?)
- Tell the biologist WHAT you want to stock
- Know WHAT FACILITY you plan to get the fish from
- Know THE HEALTH STATUS of that facility
  - Note the expiration date of certificate

The biologist can tell you:

- Management goals for waterbody
- Is it likely to work (we'll be honest!)

Fish Structures in Lakes: The Good and the Bad

Artificial Structure Types

- Half-log
- Benches
- Whole tree log drops
- Brush bundles
- Rock reefs
- Log Cribs
- Porcupine structures

The Givens

- DEQ permit is needed – Part 301
- USACE review may also be needed
- Structure needs to be placed so it doesn't impede navigation
- There's no "magic solution"!

- Natural features act as "structures" too

The Good

- Artificial Structures
  - Can concentrate fish
  - Provide cover for a variety of fish species
  - Can work in waterbodies with a relatively homogeneous bottom, lack of natural habitat, and lack of aquatic vegetation (where habitat is limiting fish production)

The Bad

- Structures concentrate fish
- May increase the amount of angler harvest
- May create unrealistic expectations
- Can be a hazard if improperly built or placed

Considerations

- What's the goal?
- Should be designed to improve existing habitat if habitat is limiting fish production
- Where habitat is lacking, structures may be used for restoration or enhancement purposes to increase fish growth rates and spawning success
- Natural material should be used

Considerations –cont.

- Structures should be placed above the thermocline at depths of 9-18 feet and at least 3 feet below the water surface or near the shoreline
- Construction/design should reflect target species preference

Aquatic Vegetation Control – Options and Ecological Effects

Aquatic Vegetation Control

- Government roles
- Effects of aquatic plants on ecosystems and human users
- Control options
  - Pros
  - Cons

Government Roles

State Legislature

- PA 451 of 1994 – Part 33 (Aquatic Nuisance Control)

Michigan Department of Environmental Quality

- Administrative rules
- Reviews permit applications and establishes permit conditions

United States Environmental Protection Agency

- Registers herbicides

Michigan DNR – Fisheries Division

- Provides recommendations to DEQ and stakeholders regarding effects of proposed activities on fish and other aquatic organisms
- Natural resource damage assessment

Aquatic Plants - Functions

- Produce oxygen by day and use oxygen at night
- Base of food chain
  - sunlight → plants → insects → fish (shoreline)
  - sunlight → algae → zooplankton → fish (offshore)
- Cover for fish, frogs, and turtles
  - diversity of plant types important
  - milfoil better than no vegetation
  - especially important for juvenile fish

Aquatic Plants - Functions

- Spawning habitat for northern pike and perch
- Erosion control
  - reduce wave energy at the shoreline
  - emergent plants can stabilize soil

Aquatic Plants - Drawbacks

- Summer fish kills in shallow lakes or bays with extremely dense weed growth
- Aesthetics?
- Interfere with boating and swimming

Vegetation Control Options

- Chemical
- Biological
- Mechanical
- Integrated

Vegetation Control

Selective

- Goal = eliminate or control **invasive** species
- Methods:
  - selective herbicides
    - (e.g, 2,4-D)
  - milfoil weevils
  - hand pulling

Vegetation Control

Non-selective

- Goal = eliminate or control all types of vegetation
- Methods:
  - broad spectrum herbicides
  - bottom barriers
  - mechanical harvesting or raking
  - aeration

Selective treatment options

2,4-D (Navigate®)

- Target = milfoil (native and Eurasian)
- Also kills coontail, water lilies, and some emergent plants at higher concentrations
- Used for small and large-scale treatments
- Most applicable for spot treatments (milfoil is limited to one or a few isolated patches)

Wisconsin DNR

Non-Selective treatment options

Fluridone (Sonar®)

- Target = Eurasian milfoil
- Typically is successful in reducing abundance of milfoil for 1-2 years
- Effects on fish and native plant communities vary
  - fluridone concentrations
  - species composition of plant community
  - sampling methods
- Clifford Lake example
  - Eurasian milfoil 5.6% of biomass pre-treatment
  - Plant bio-volume was severely reduced
  - Macroalgae 50% of biomass (pre) → 90% (post)
  - Significant reduction in coontail, eel grass, and thin-leaved pondweeds

Herbicides

Herbicide effects on other aquatic organisms

Short-term effects:

- fish kills (oxygen deprivation) – timing restrictions
- large-scale habitat loss
- algal blooms
- reduced abundance of milfoil weevils
- potential toxicity to other organisms
  - fluridone → water mites
  - copper → snails

Long-term effects:

- less clearly understood
- accumulation of copper in sediments
- resistance to herbicides

Herbicides

“Overall, whole-lake aquatic plant treatment is risky. Significant biological risks associated with large-scale manipulations include excessive removal of fish habitat and thus decline of fish populations, loss of sensitive plant species, declinesin water clarity and potential long-term cumulative effects of multiple treatments, since eradication of non-native plant species is highly unlikely.” [Valley et al. 2004]

Mechanical

- Hand-pulling
- DASH (Diver-Assisted Suction Harvesting)
- Harvester
- Raking

Biological

- Milfoil weevil
- Others being researched/developed

Natural shorelines & Riparian Wetlands

- Includes shoreline and nearshore areas
- Provides shore protection from erosion
- Protects waterbody from excess sediment/nutrient inputs
- Provides spawning and nursery habitat for a number of fish species
- Provides habitat for reptiles/amphibians

Other considerations

- Say No to sea walls
  - Consider soft-engineering instead, or rip-rap (not angular)
  - Natural shoreline preferable
- Docks
  - Say NO to sheet pile
  - Open pile preferred
  - Cribs okay if necessary, but should have spacing between

Other consideratons –cont.

- Minimize dredging
- Minimize beach sanding

- Caveat Emptor
  - Not every lake is (or should be) a Higgins Lake or <insert lake name here>
  - Appreciate your lake for what it is, try to protect and enhance it

Questions?