Fish and Wildlife Habitat Recommendations for the Shoreline

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# Shoreline Habitat Issues

- What is habitat
- Fish and wildlife relationships with habitat
- Habitat-people relationships
- Management recommendations
- Resources for understanding and mitigating

### What is habitat?

- The places where fish and wildlife live
- Chemical, physical, and biological
- Required to survive, grow, and reproduce



## Habitat: Global scale drivers



# Habitat: Watershed scale drivers



#### Habitat: Lake scale drivers



#### Habitat: Microhabitat scale drivers



# Fish-Habitat relationships: Aquatic Vegetation



- Most research on Largemouth Bass has found an intermediate coverage and heterogeneous mix of patches increases production
- Vascular plant cover positively related to Largemouth Bass, Bluegill, Northern Pike, and Yellow Perch (Cross and McInerny 2001)

#### Aquatic Vegetation- Ecosystem effects



- Green frog density declines with:
  - Development
  - Lack of breeding habitat
- Habitat for amphibians and reptiles
- Invertebrate densities greater in macrophytes
- Habitat for waterfowl and other birds

# Large Woody Debris



### Large Woody Debris



- Split a lake into two basins and removed large woody debris from one
- Largemouth Bass at less fish, more terrestrial prey, and grew more slowly
- Yellow perch recruitment extremely low and high predation mortality

#### Large Woody Debris



- Then, Sass et al. ADDED wood to a basin and...
- NO fish population-level effects in the short term

Sass et al. 2012

#### Large woody debris ecosystem effects



- Midge larvae densities decline
- Loss of habitat for amphibians, turtles, and birds

## Fish-Habitat-people relationships

- Decreased woody debris, emergent vegetation, and floating vegetation (Christensen et al. 1996; Radomski and Goeman 2001; Jennings et al. 2003)
- Removal of shoreline vegetation on 60% of properties in Michigan (Nohner, unpublished)
- Negative association between developed shorelines and:
  - Muskellunge spawning habitat (Nohner and Diana 2015)
  - Largemouth Bass and Yellow Perch (Sass et al. 2006)
  - Lake Trout, Lake Whitefish, Cisco (Clingerman et al. 2012)
  - Pike, Bluegill, Pumpkinseed (Radomski and Goeman 2001)
  - Fish diversity (Jennings et al. 1999)





#### Status and Trends of Michigan Inland Lake Resources

- Collect chemical, physical, and biological indicator data
- Partnership between DNR / DEQ
- ~430 lakes complete from 2002 Present
- ~30 lakes per year

## Local effects – Shoreline development



#### Local effects – Boat docks



#### Local effects – Woody debris



### Local effects – Shoreline armoring



#### Status and Trends Lake Habitat Viewer





#### **Riparian vegetation**

- Buffer: >100 ft. + 5 feet per 1% increase in slope
- No cutting of trees >4" dbh within 25 ft.
- Selective cutting from 25 ft. to landward edge of buffer



#### Wood and artificial structures

- Healthy fish population in the water body with homogenous bottom lacking natural structural habitat such as large wood or aquatic vegetation
- Made of natural materials, placed above the thermocline or near the shoreline, and reflect target species
  - Whole-log tree drops: Largemouth Bass, Bluegill, Rock Bass, Black Crappie
  - Half-logs: Smallmouth Bass
  - Brush bundles and evergreen trees: Bluegill, White Crappie



#### Aquatic Vegetation

- Control should only occur in conjunction with watershed management to reduce unnatural nutrient loading
- Removals of nuisance plants should preserve 60% 80% of native aquatic plants
- Whole lake treatments to control non-indigenous plants only when:
  - Nuisance exotic plants distributed throughout and
  - Nuisance exotic plants at levels that threaten natural plant community and
  - Integrity of the native plant community won't be affected and
  - Treatment will control greater areas of nuisance exotic than native species

#### DNR Wildlife Action Plan 2015-2025

#### Pugnose Shiner



#### Blanchard's Cricket Frog





#### Starhead Topminnow





#### Littoral Zone Conservation Priority

High Moderate

This map is based on focal species occurrences by watershed.







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- Due Oct. 15
- Plans to allocate \$180,000
- Funds conservation, outreach, and assessment
- Learn more at: Midwestglaciallakes.org

### DNR Aquatic Habitat Grant

- To improve fish and other aquatic organism populations by protecting intact and rehabilitating degraded aquatic habitat.
- Provides \$1.25 M annually in funding
- A small fraction of proposed projects with lake (3%) or wetland (3%) focus – We want more!

## Summary

- Aquatic vegetation and large woody debris benefit fish populations
- Structural habitat effects depend on ecosystem context
- Need to treat the symptoms and not causes
- Financial resources are available!



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# Helpful links

Michigan Lake Water Clarity Interactive Map Viewer Status and Trends Inland Lake Habitat Viewer **Conservation Guidelines for Michigan Lakes and Associated Natural Resources** Michigan Natural Shoreline Partnership Michigan Inland Lakes Partnership Michigan Shoreland Stewards Program Midwest Glacial Lakes Partnership Michigan State University Extension

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