

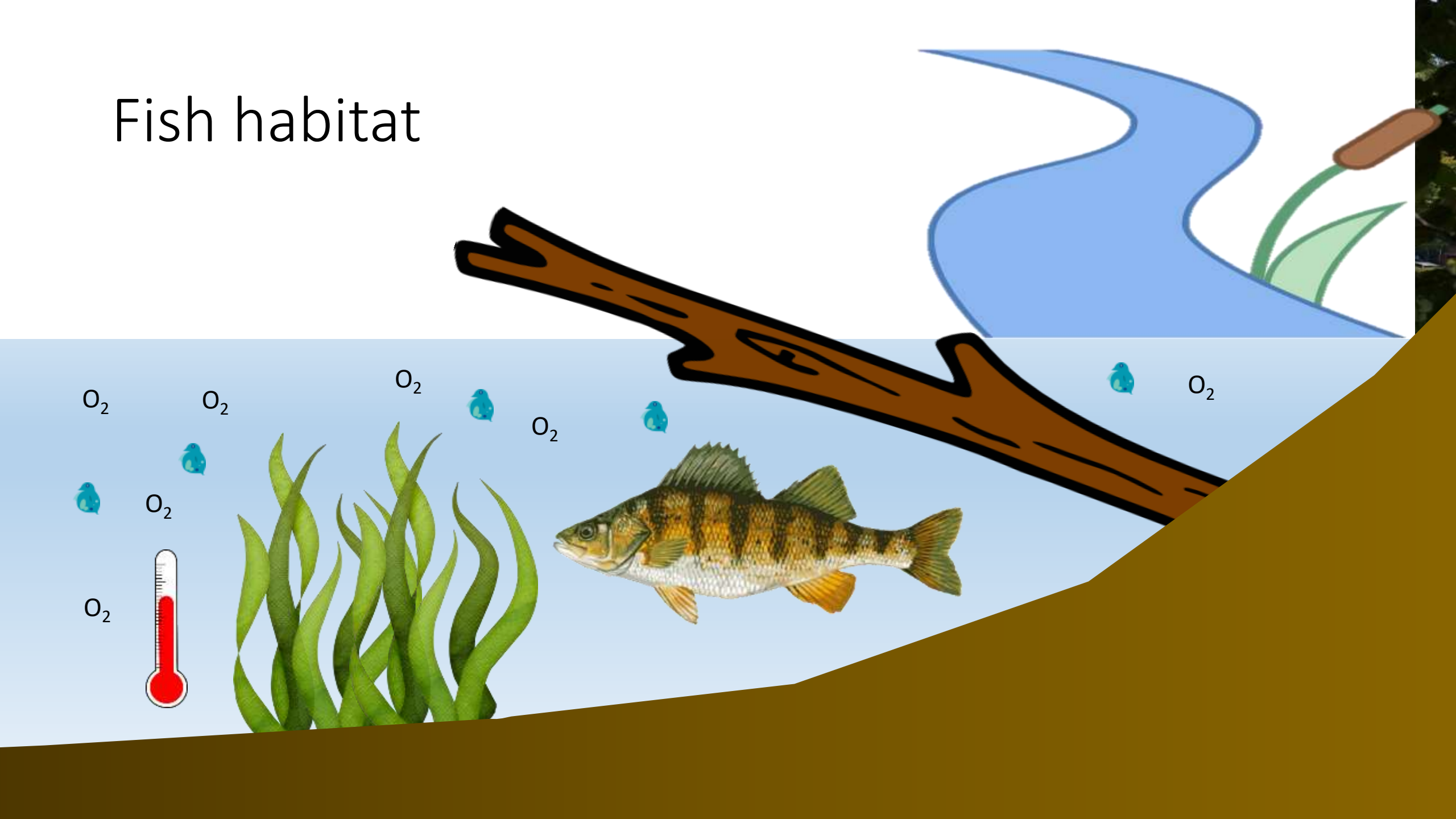
# Woody habitat in lakes for fish and more

Joe Nohner

Michigan Department of Natural Resources



# Fish habitat



# Large woody habitat: *Fallen sticks, logs, and trees found in the water.*

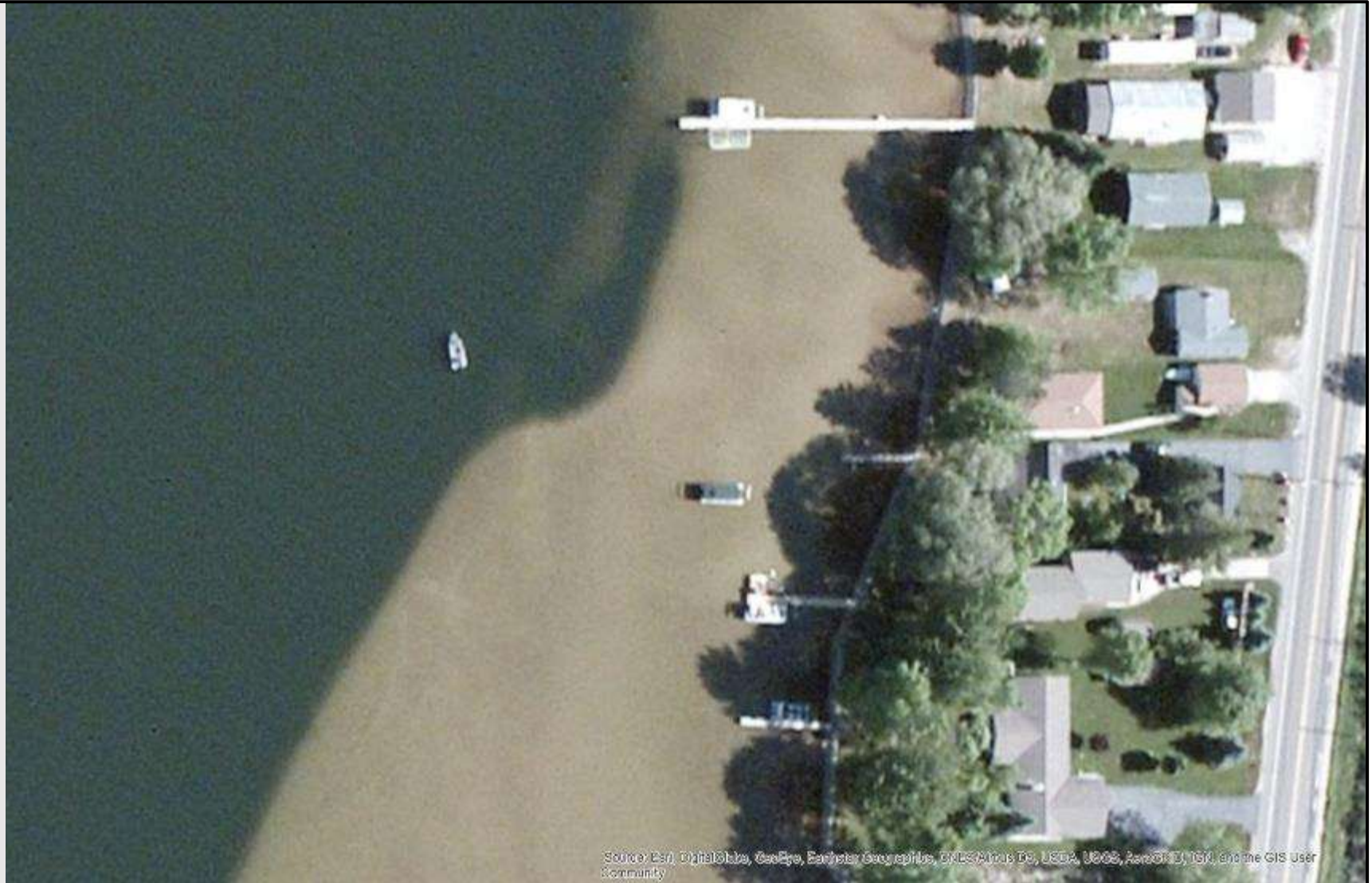
Can provide refuge from predation, increase food resources, and benefit natural reproduction for fishes

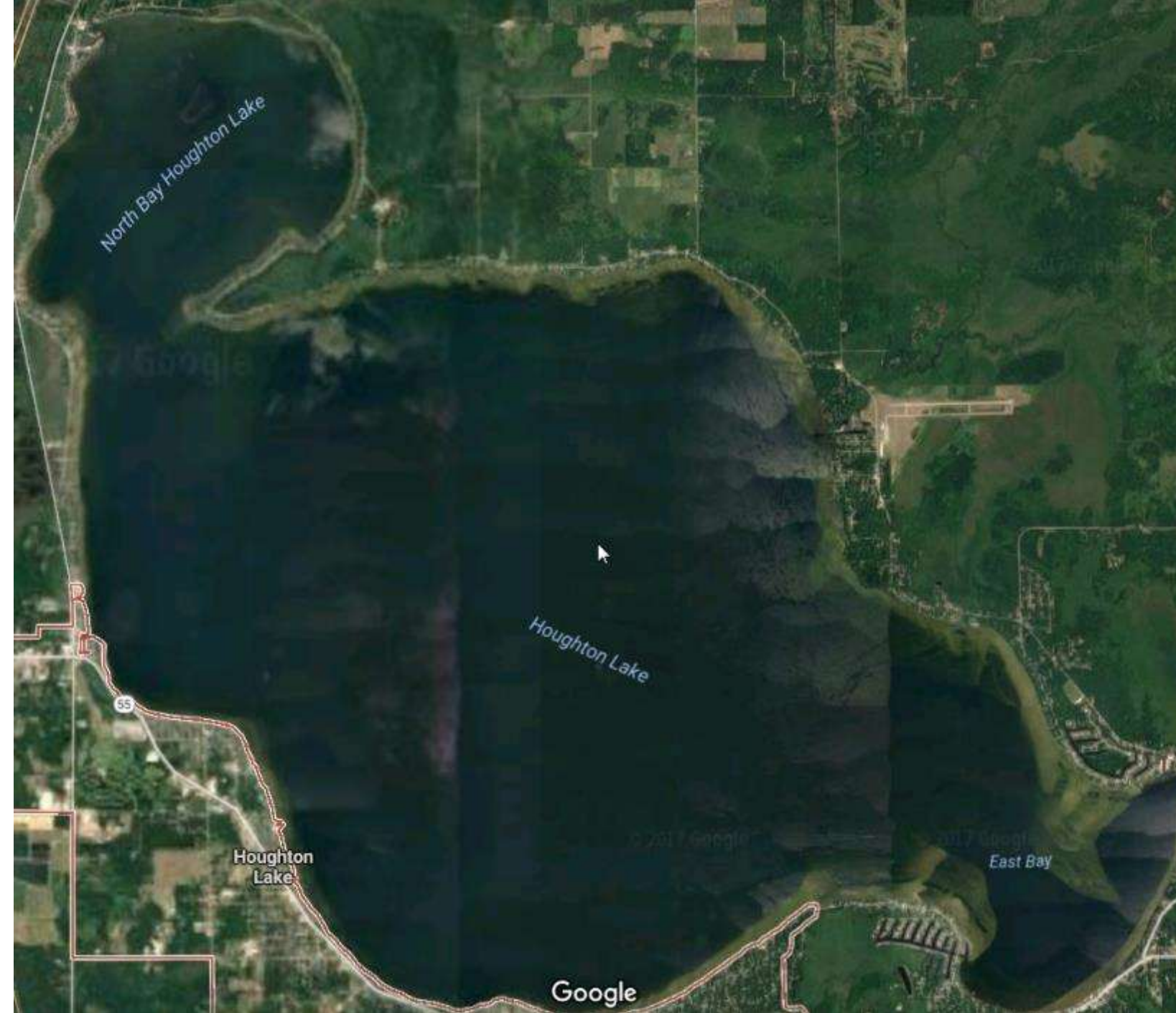


# Habitat: Microhabitat scale drivers

Often when we think about habitat it's at the local scale, as characteristics of stationary objects in one place, because it is a direct connection we can see, and often fish are aggregated near structure.

Examples: woody habitat, vegetation, "weed edge", drop-offs, docks, complex shorelines, substrate





Zoom out: Think about how the watershed affects habitat

Fish migrate, need connectivity to spawning areas (e.g. pike spawning marshes or walleye spawning in rivers), migrate among lakes (metapopulations), may take advantage of local resources (feeding in rivers during some part of the year)

Nutrient outputs from streams into lakes can drive the nutrients in a lake and therefore water clarity, P, N, productivity. Agricultural or urban watershed can result in eutrophication.

Zoom out even further: Think about how the watershed affects habitat

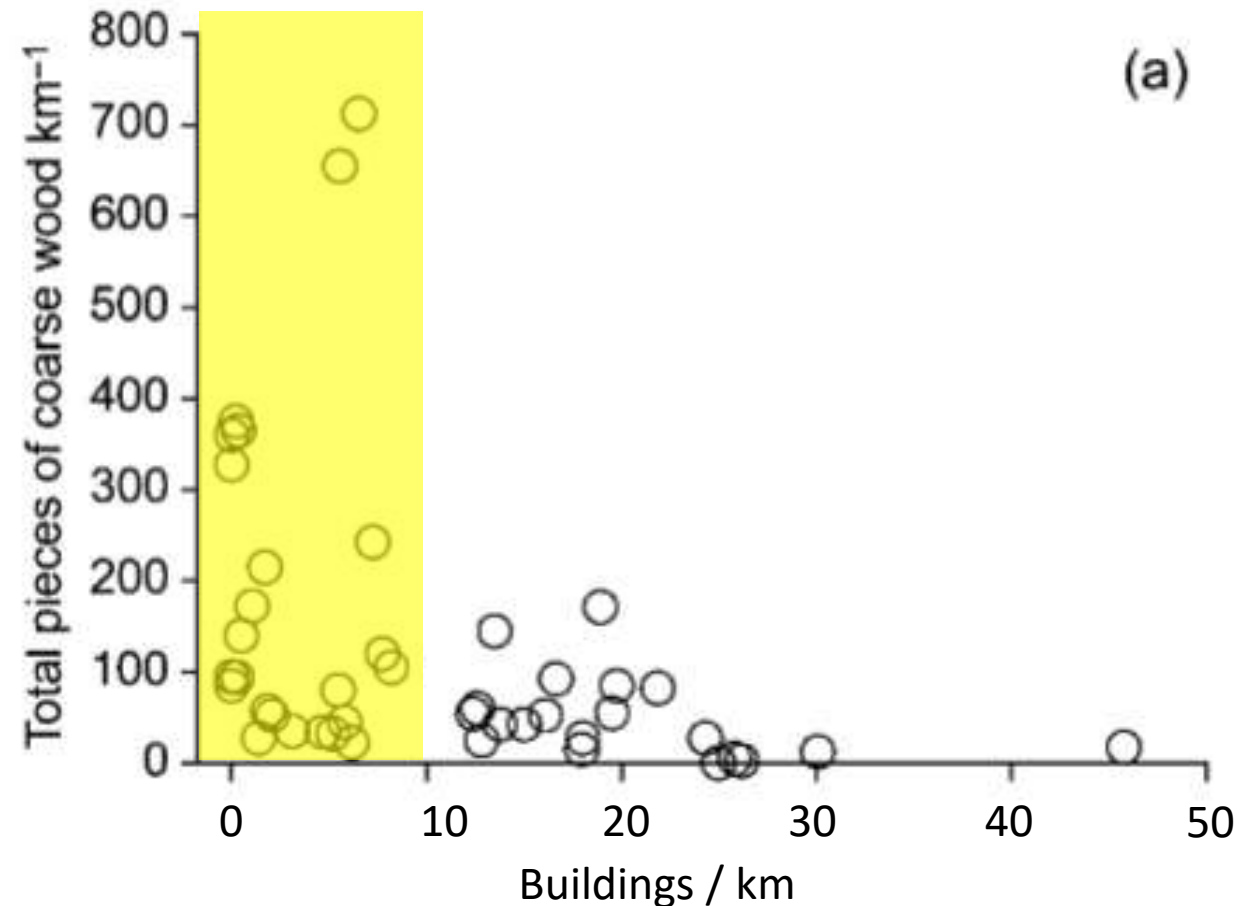


Zoom out even further and think about global effects on habitat.



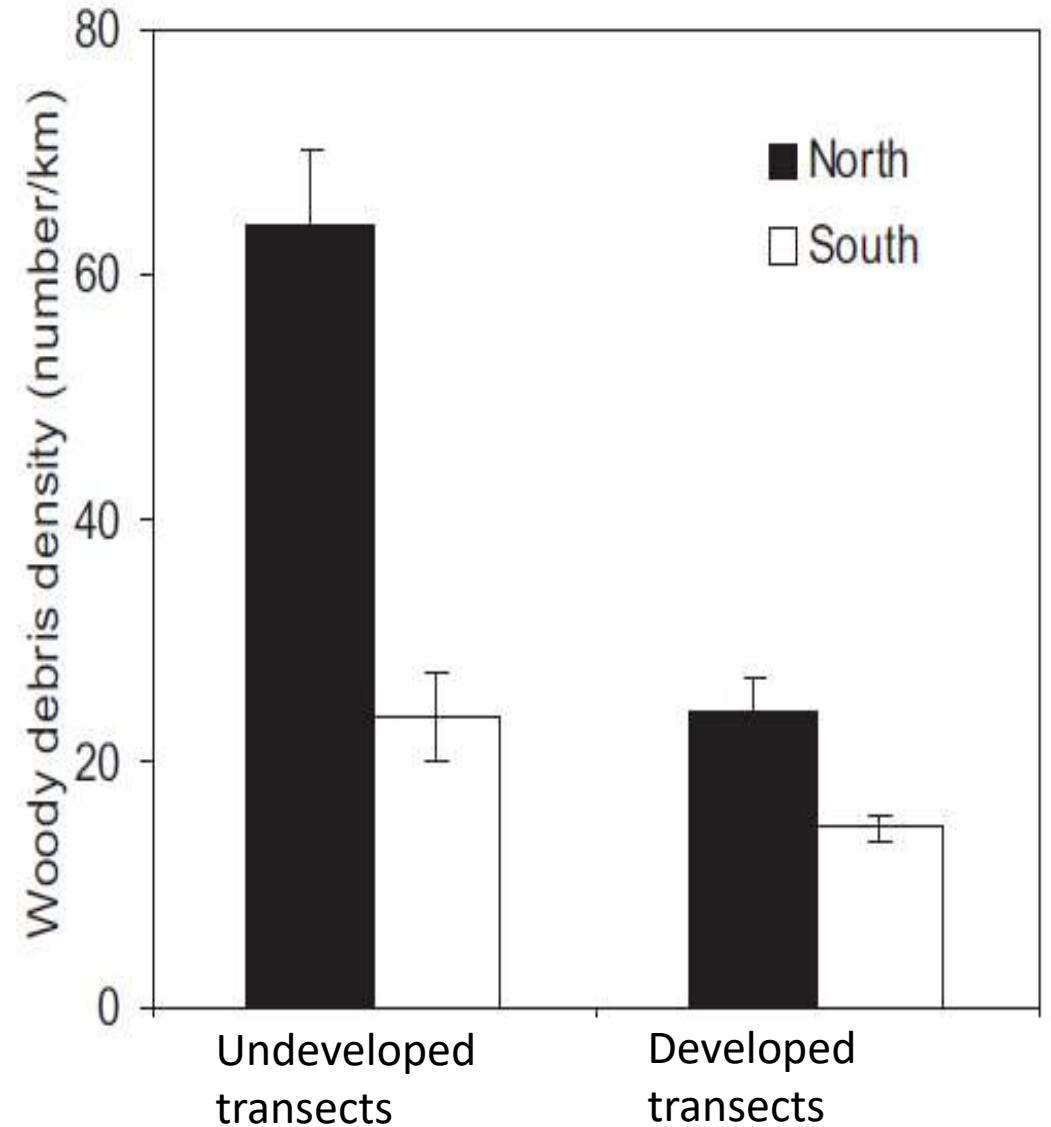
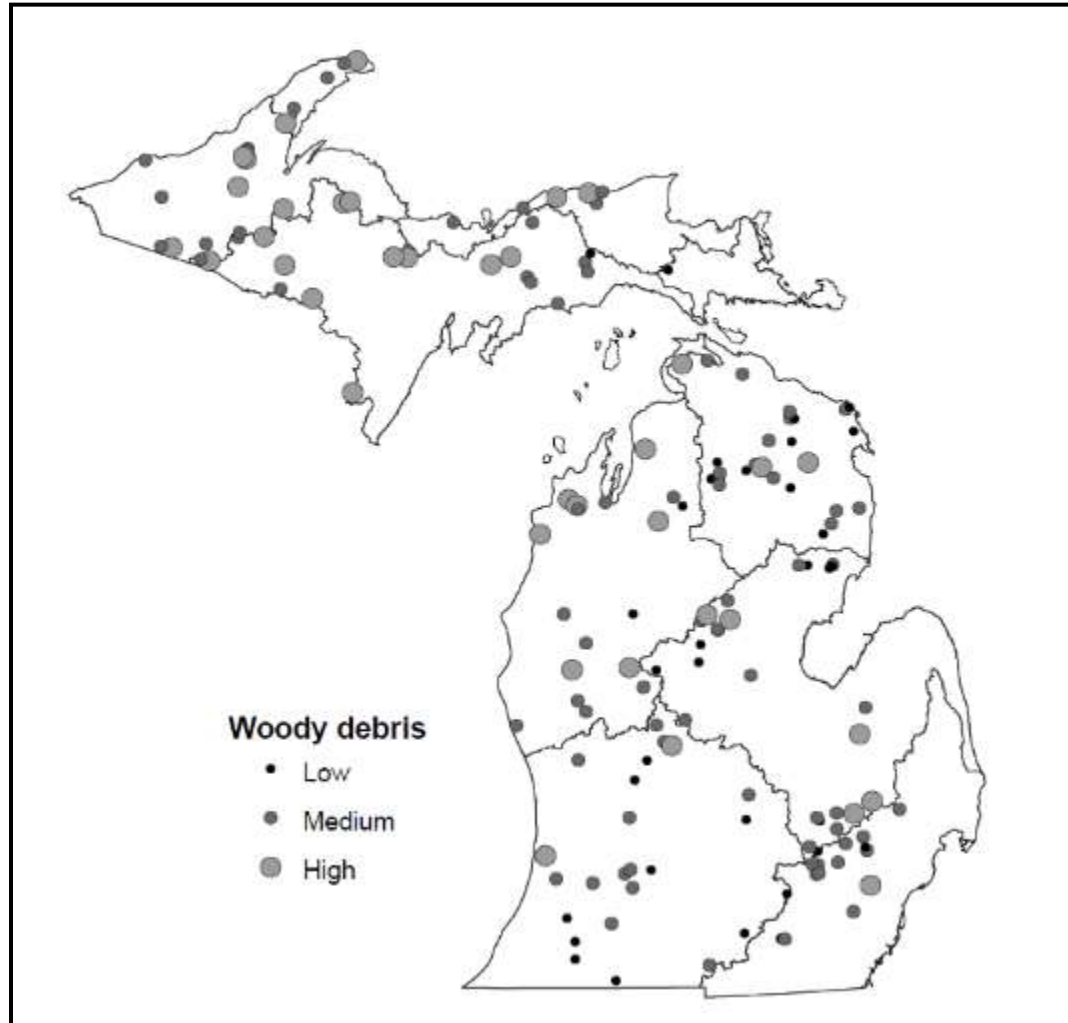
# Woody habitat and shoreline development

- Woody habitat drops precipitously with development.
- More than 10 buildings/km (1 every 330 feet) and wood is less than 1/8<sup>th</sup> of its natural level





# Large woody habitat in Michigan



# High and dry

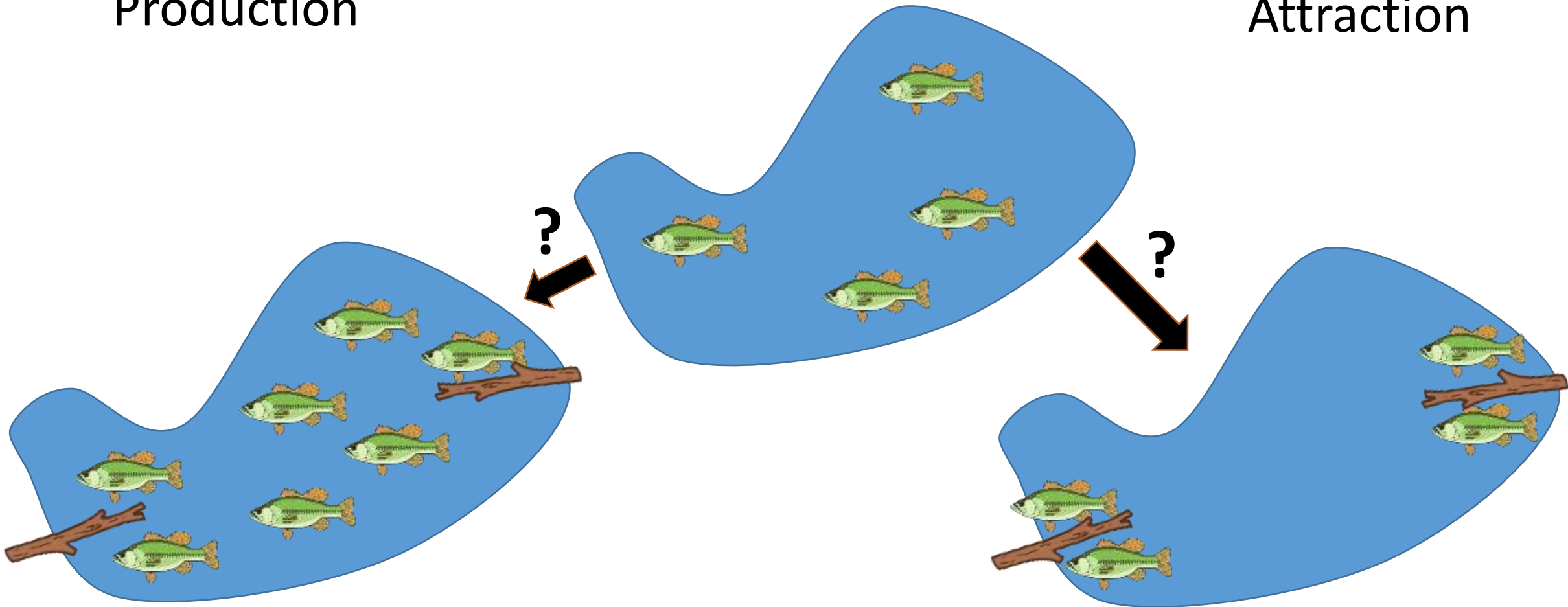
- Drought in Wisconsin lowered lake levels 2.8 ft.
- Lost 55% of large woody habitat from the nearshore areas



# Fish responses to structural habitat changes

Production

Attraction



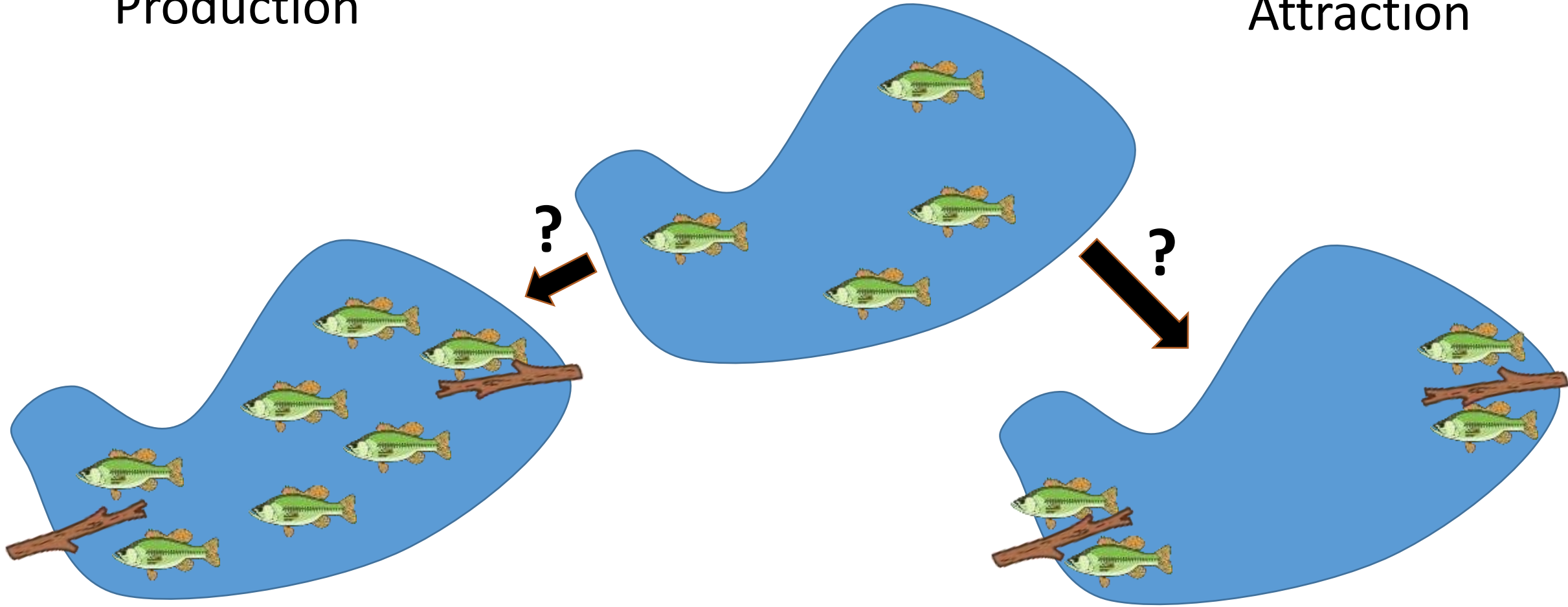
# Attraction



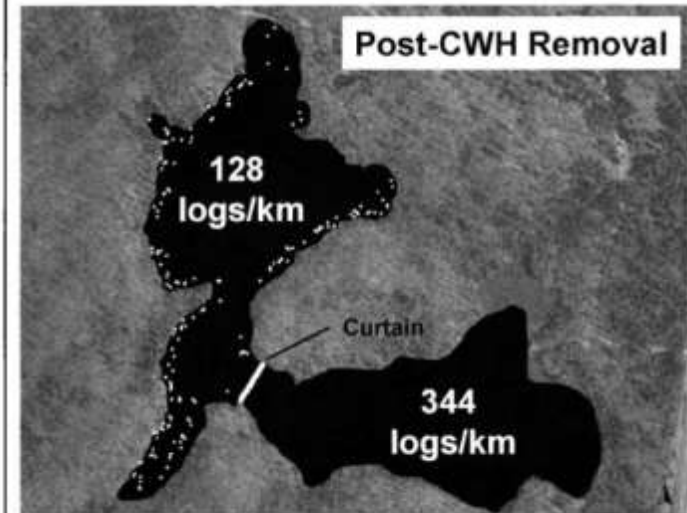
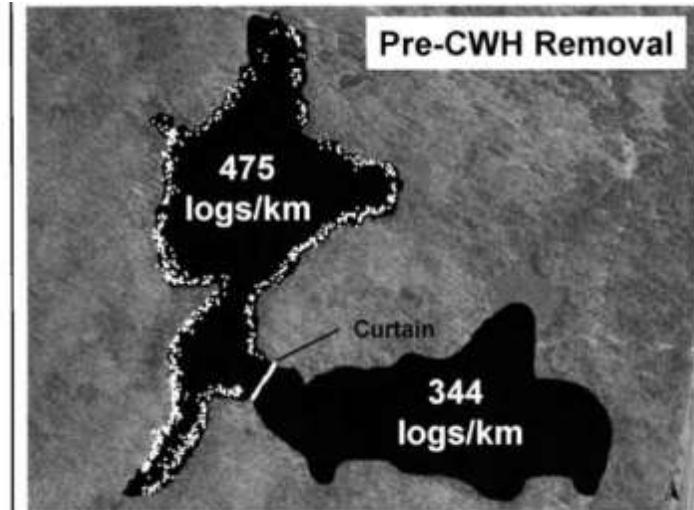
# Fish responses to structural habitat changes

Production

Attraction

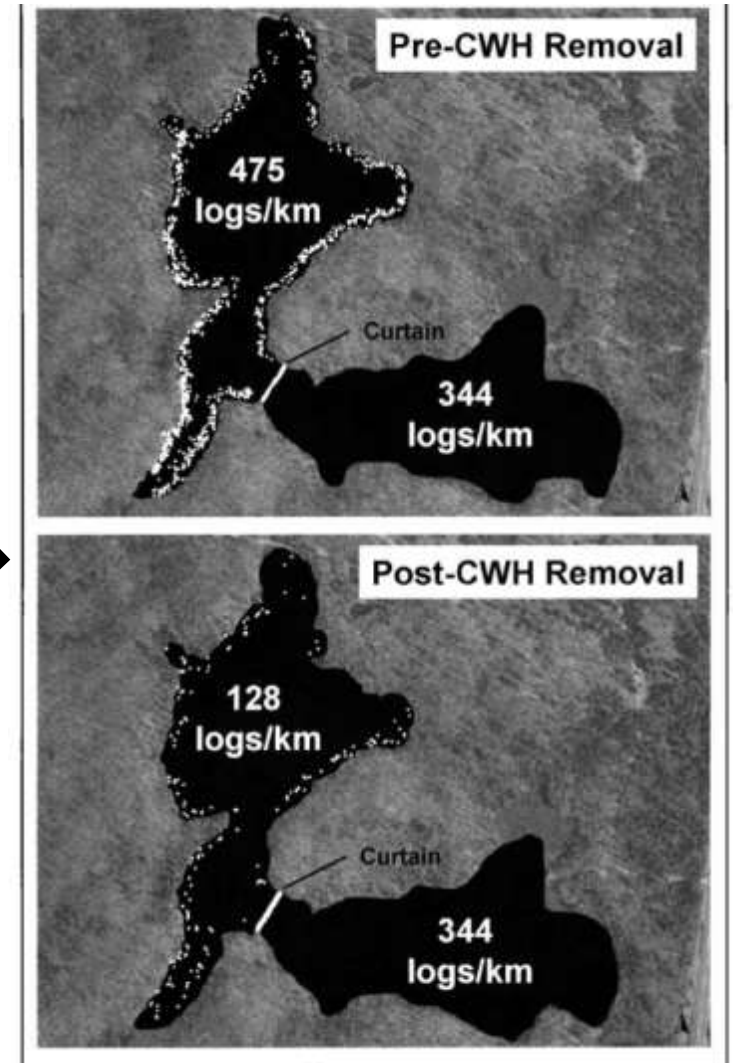
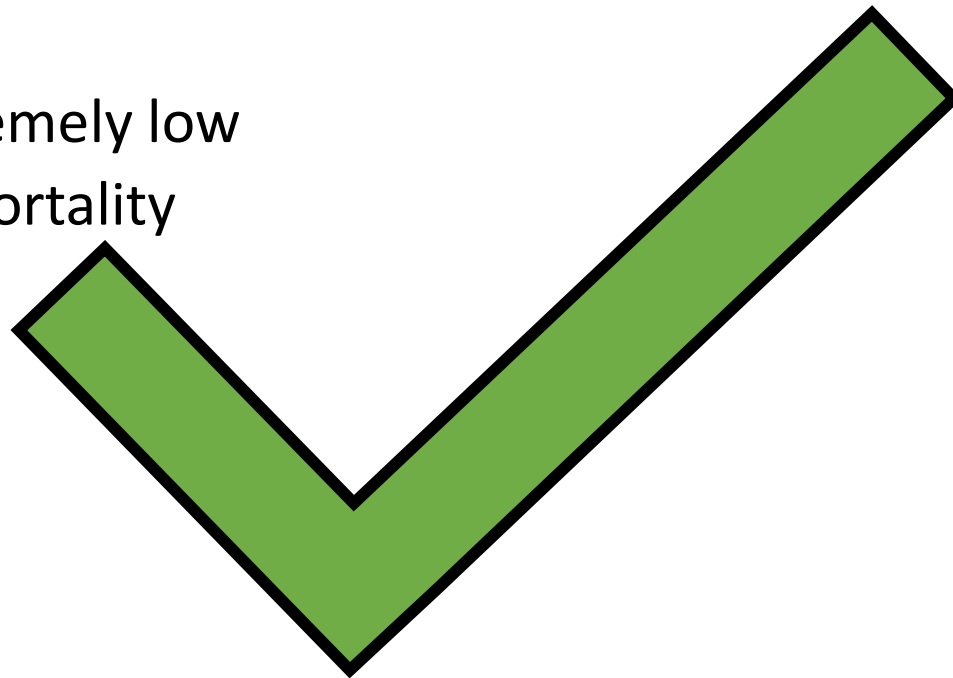


# Production: Woody habitat removal effects



# Production: Woody habitat removal effects

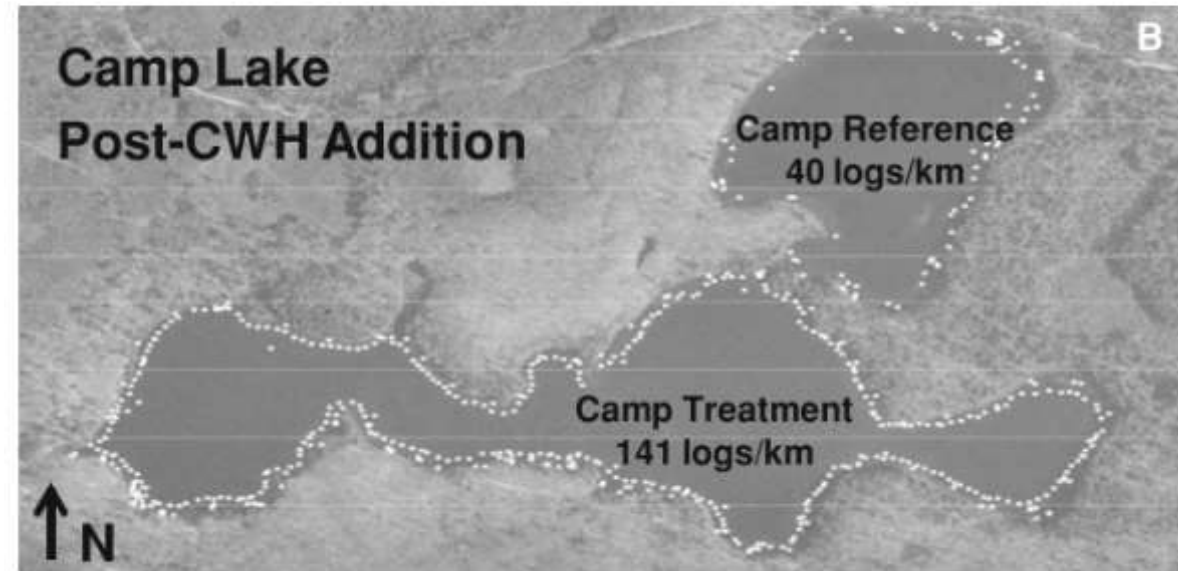
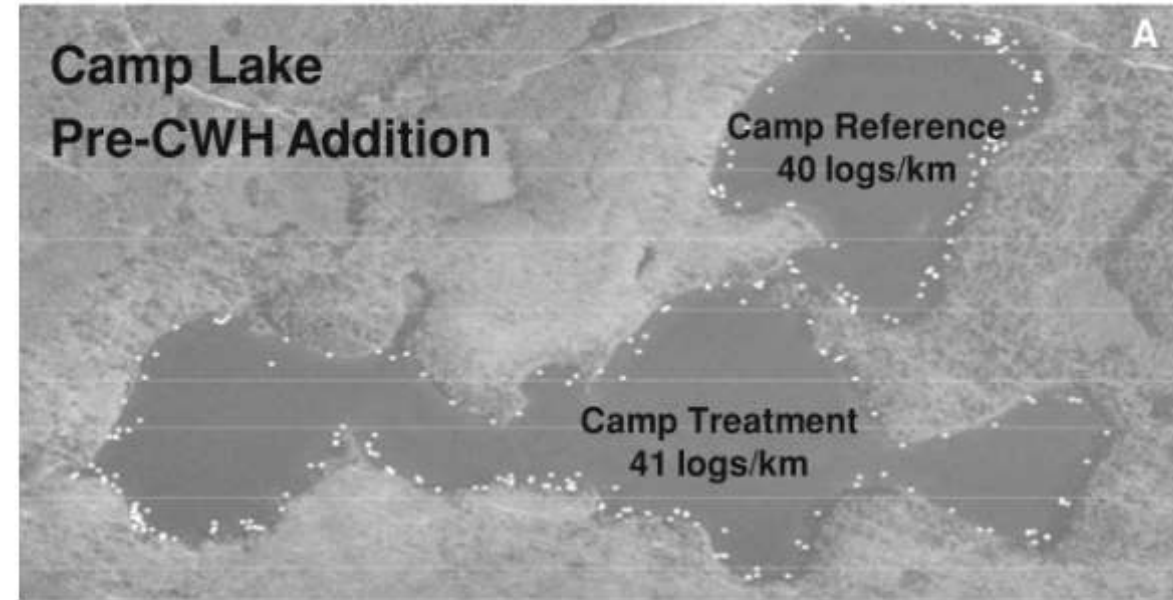
- Largemouth Bass:
  - Ate less fish
  - Consumed more terrestrial prey
  - Grew more slowly
- Yellow perch:
  - Recruitment extremely low
  - High predation mortality



# Production: Woody habitat restoration effects



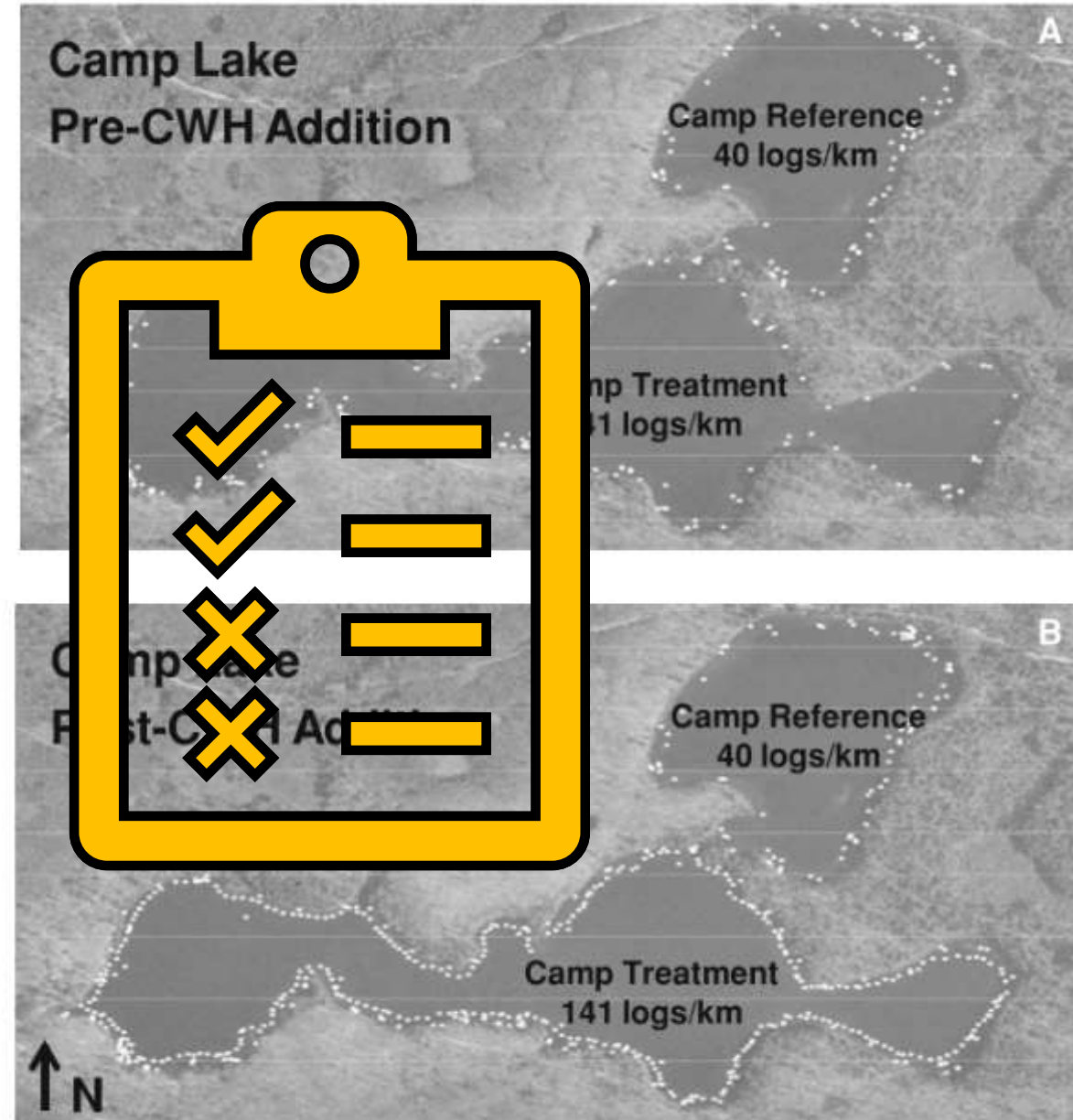
Photographs: Michelle Woodford





# Production: Woody habitat restoration effects

- Diet and behavioral responses
  - Prey diversity and amount increased
  - Consumption of fish prey increased
  - Habitat use correlated with branch complexity and abundance
- “No discernible effect on fish population dynamics”
- Emphasized need for long term solutions



# Wildlife Action Plan priorities

**Blanchard's Cricket Frog**



**Muskrat**



**Bluegill**



**Starhead Topminnow**



- Littoral zones are a focus of the Wildlife Action Plan

- Woody habitat is a critical habitat component for many of these species

**Painted Turtle**



**Mallard**



**Pugnose Shiner**



**Largemouth Bass**



# How much is enough? Natural levels vary...

Source	Density (logs/km)	Average spacing (1 log every XX feet)	Notes
Christensen et al. 1996	555	5.9	Undeveloped MI and WI lakes
Marburg et al. 2006	27 – 156	122 – 21	45 Northern WI lakes
Sass et al. 2012	141	23	Detected effects on fish with additions to this level
Sass et al. 2006	475	7	Detected effects on fish populations with removals from this level
Wehrly et al. 2012	140	23	Undeveloped Northern MI transects
Wehrly et al. 2012	50	66	Undeveloped Southern MI transects
Gaeta et al. 2014	663	5	Undeveloped WI lake

# Funding opportunities for woody habitat projects

- Midwest Glacial Lakes Partnership Lakes Conservation Grant
  - ~\$325,000 available
  - Request for proposals typically November
- DNR Fisheries Habitat Grant
  - ~\$1.825 M available
  - Request for proposals early October
- FishAmerica Foundation grant
  - Email Joe for inquires
- Lake Association funds
- DIY!



# Take homes on woody habitat

- Natural component of our lakes
- Attracts fish
- Removing wood harms fish populations
- Benefits of rehab depend on context
- DNR Fisheries supports woody habitat rehab
- Long term solutions
- Funding and technical expertise available

Joe Nohner,

[Nohnerj@michigan.gov](mailto:Nohnerj@michigan.gov)

