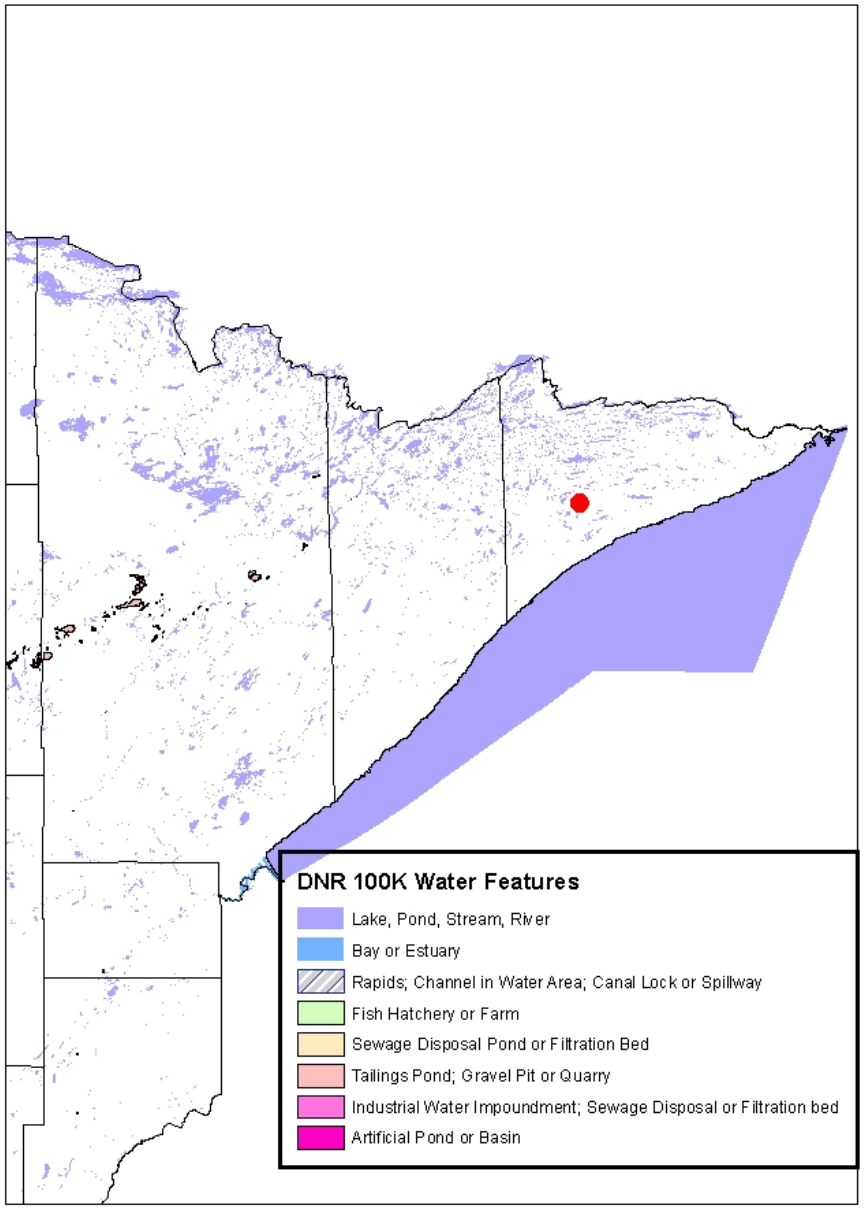
Fisheries Resources and Issues

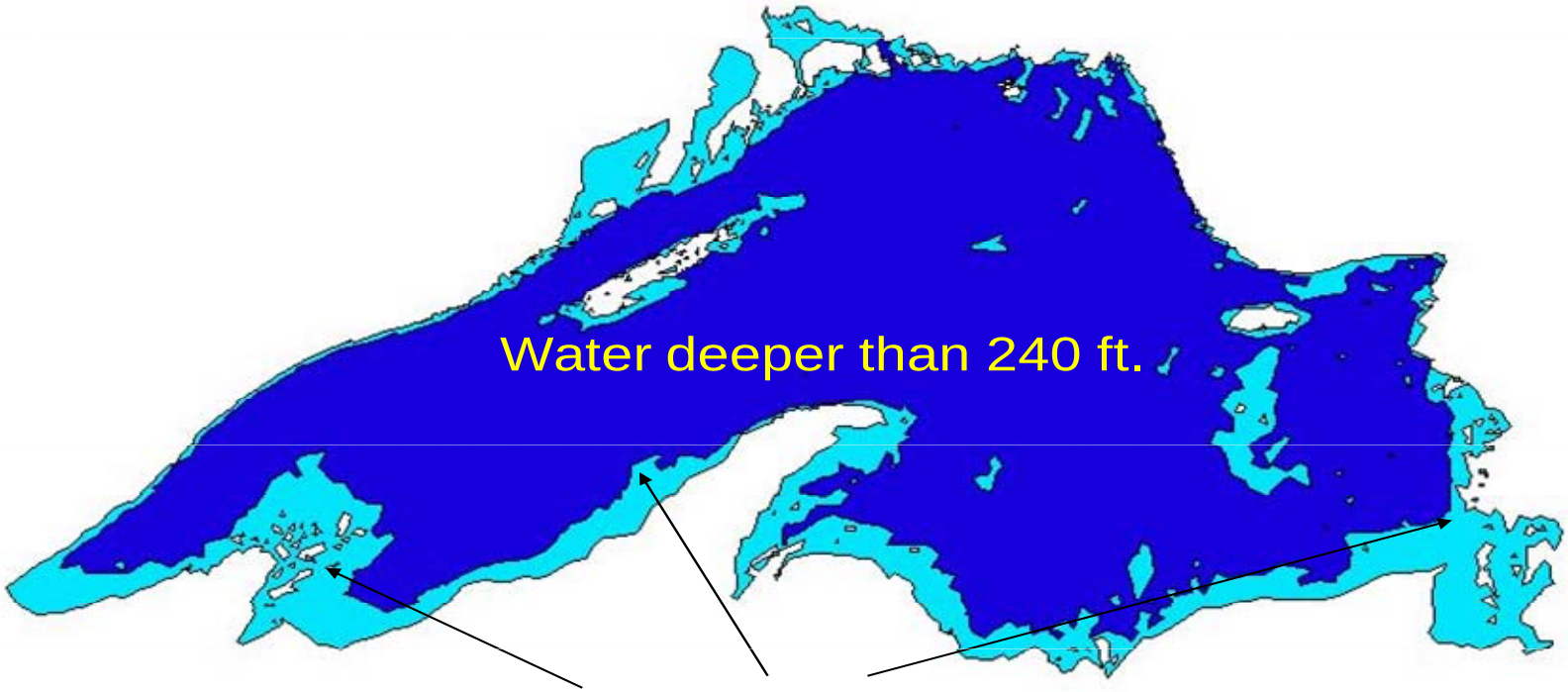
Steve Persons, MN DNR Area Fisheries Supervisor
Grand Marais


DNR 100K Water Features
Lake, Pond, Stream, River
Bay or Estuary
Rapids; Channel in Water Area; Canal Lock or Spillway
Fish Hatchery or Farm
Sewage Disposal Pond or Filtration Bed
Tailings Pond; Gravel Pit or Quarry
Industrial Water Impoundment; Sewage Disposal or Filtration bed
Artificial Pond or Basin

Fisheries Resources

- Lake Superior – 1,634,073 acres
- Inland lakes – 3,197 lakes, 631,504 acres
- Streams and rivers – thousands of miles
- 394 Aquatic Management Areas
- 480 Public Water Accesses
- Fisheries staff – MNDNR, USFS, 1854 Treaty Authority, Grand Portage Reservation

Lake Superior



Lake Superior

- Most fishery activity in areas near shore
- Major lake fisheries for lake trout and salmon
- Commercial fisheries for cisco, with limited commercial lake trout and smelt harvests
- Tributary streams support important spring rainbow trout (steelhead and kamloops) and fall salmon fisheries
- Coaster brook trout fishery limited, recovery effort underway

Walleye Lakes

- Walleye found in 420 lakes (394,384 acres)

- Carlton County – 20 lakes, 4,693 acres
- St. Louis County – 197 lakes, 270,711 acres
- Lake County – 88 lakes, 60,126 acres
- Cook County – 115 lakes, 58,854 acres

Walleye Stocking

- Most walleye lakes are self-sustained
- Stocking done for two reasons:
  - Inadequate natural reproduction
  - Social pressure
- Number of lakes stocked, by county:
  - Carlton – fry in 5 lakes, fingerlings in 4 lakes
  - St. Louis – fry in 34 lakes, fingerlings in 38 lakes
  - Lake – fry in 2 lakes, fingerlings in 12 lakes
  - Cook - fry in 6 lakes, fingerlings in 8 lakes

Northern Pike Lakes

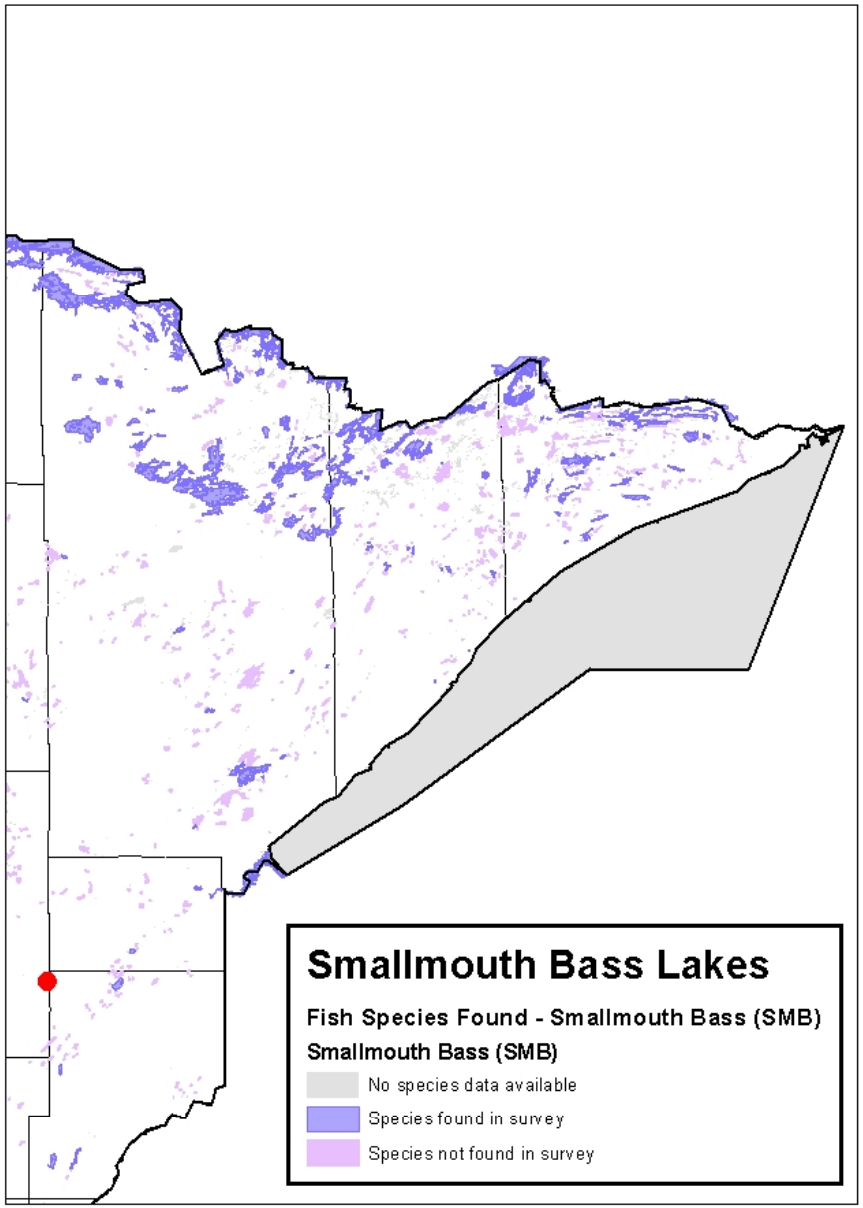
- Northern pike found in 518 lakes (410,357 acres)

- Carlton County – 27 lakes, 5,211 acres
- St. Louis County – 237 lakes, 277,336 acres
- Lake County – 120 lakes, 61,656 acres
- Cook County – 134 lakes, 66,153 acres

Smallmouth Bass Lakes

- Smallmouth bass found in 203 lakes (332,451 acres)
- Range is expanding

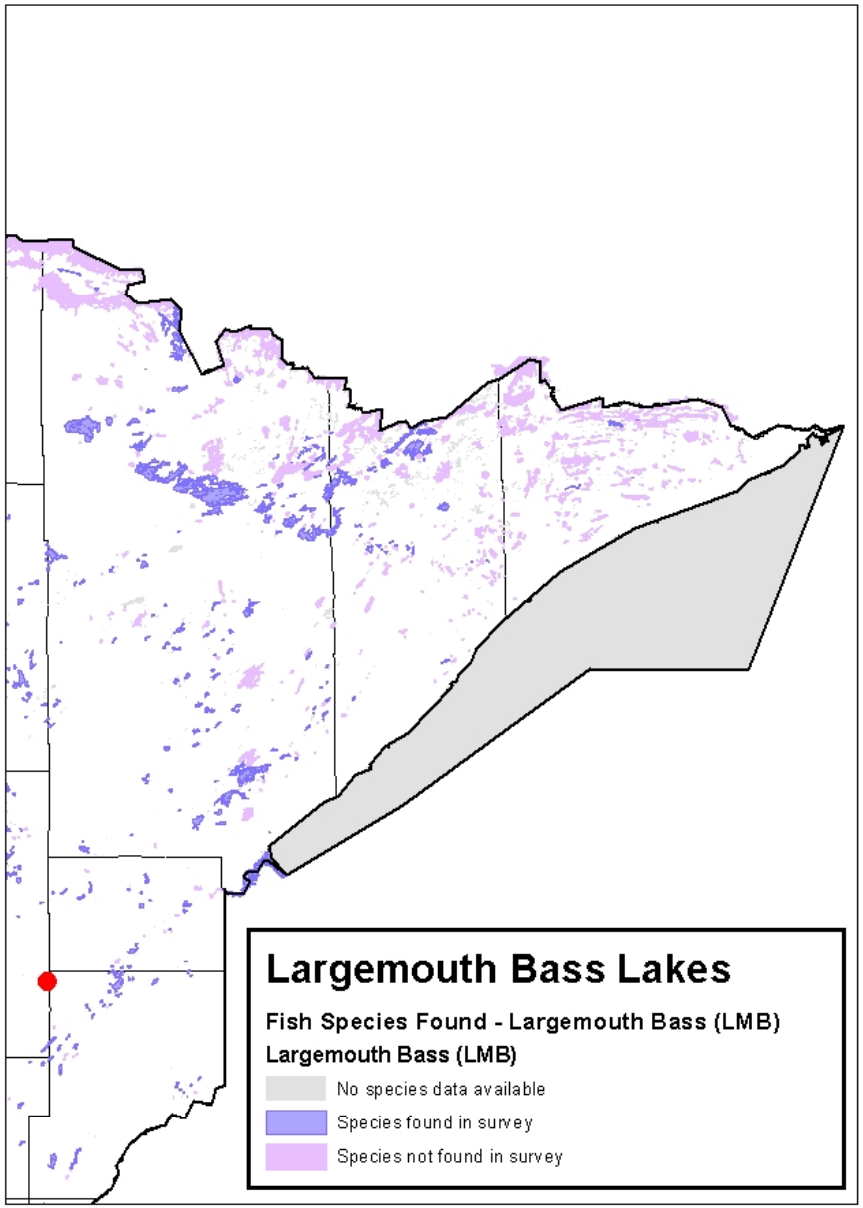
- Carlton County – 3 lakes, 1,076 acres
- St. Louis County – 79 lakes, 229,370 acres
- Lake County – 39 lakes, 42,057 acres
- Cook County – 82 lakes, 59,947 acres


Smallmouth Bass Lakes
Fish Species Found - Smallmouth Bass (SMB)
Smallmouth Bass (SMB)
No species data available
Species found in survey
Species not found in survey

Largemouth Bass Lakes

- Largemouth bass found in 217 lakes (150,480 acres)

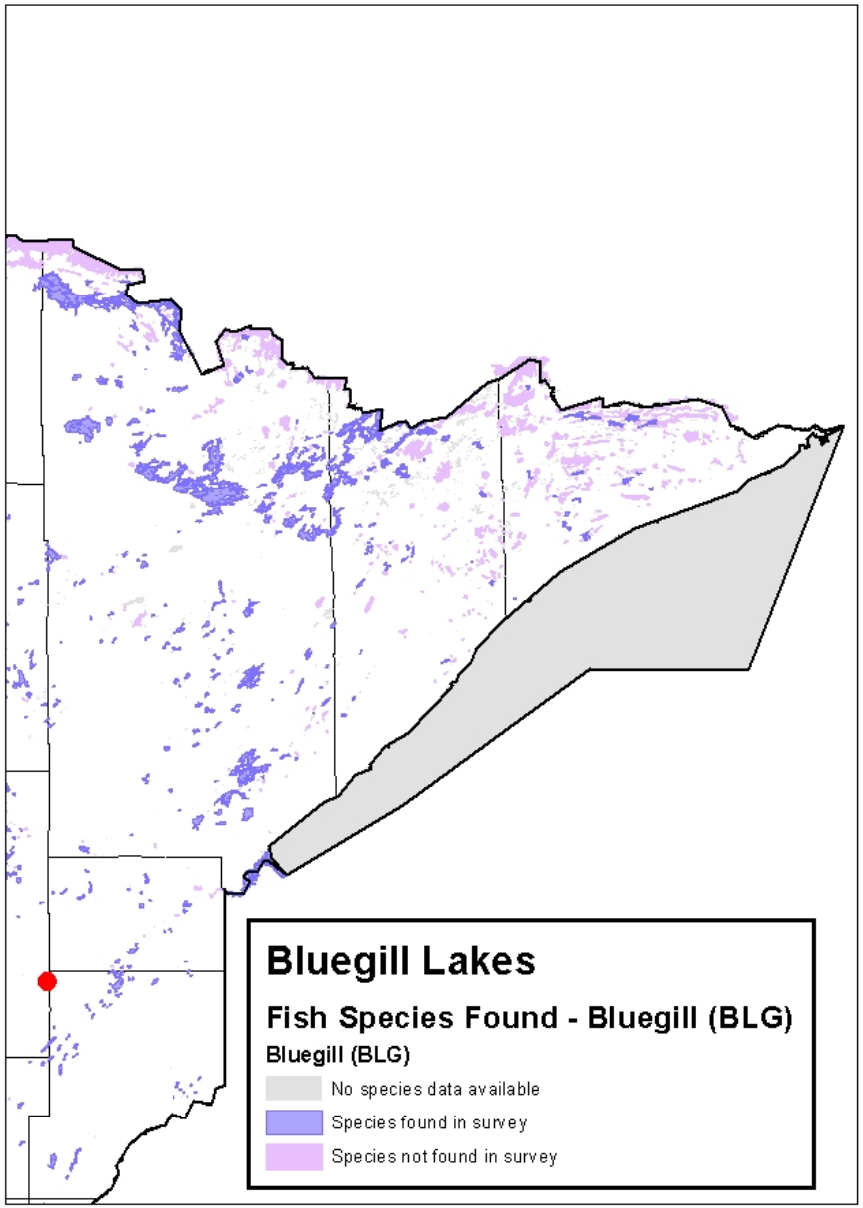
- Carlton County – 22 lakes, 4.077 acres
- St. Louis County – 149 lakes, 128,125 acres
- Lake County – 41 lakes, 17,206 acres
- Cook County – 5 lakes, 1,073 acres


Largemouth Bass Lakes
Fish Species Found - Largemouth Bass (LMB)
Largemouth Bass (LMB)
No species data available
Species found in survey
Species not found in survey

Bluegill Lakes

- Bluegill found in 284 lakes (246,156 acres)

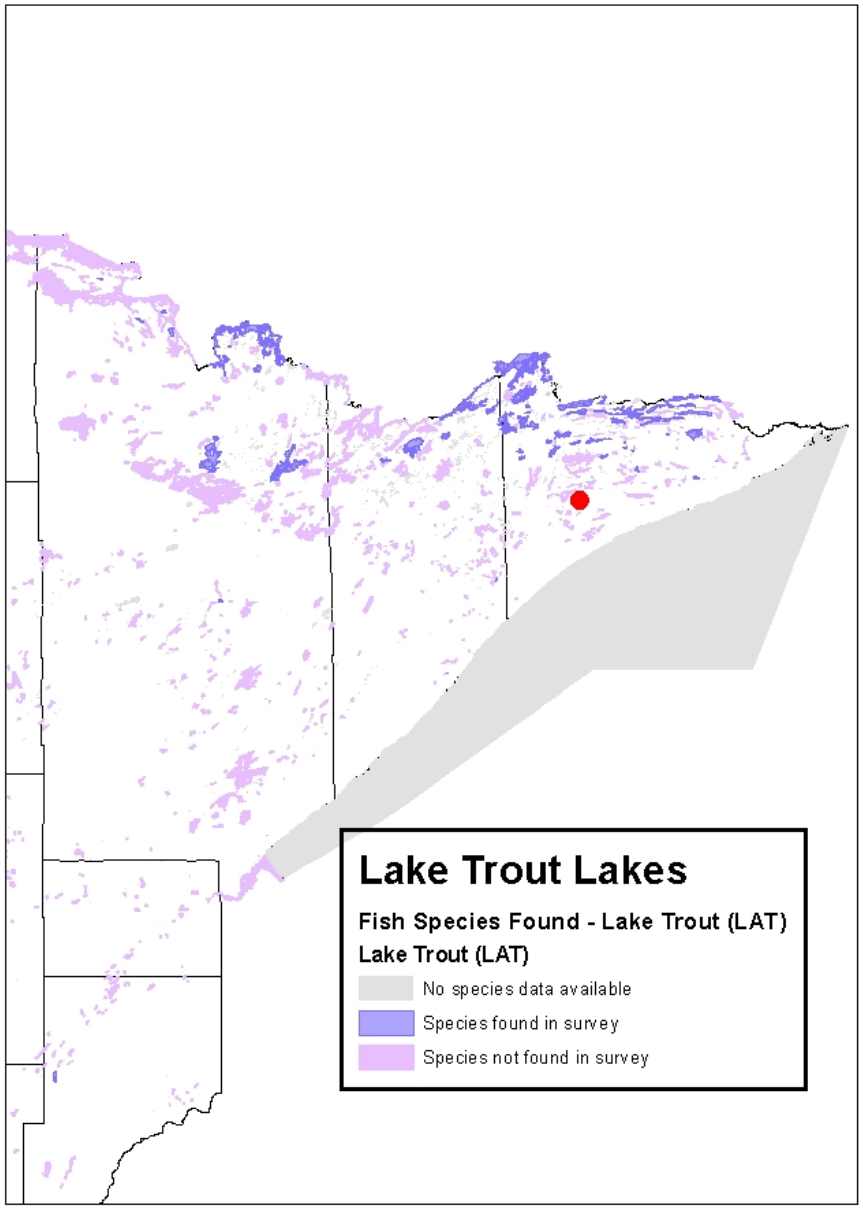
- Carlton County – 25 lakes, 4,553 acres
- St. Louis County – 183 lakes, 201,588 acres
- Lake County – 51 lakes, 32,310 acres
- Cook County – 25 lakes, 7,706 acres


Bluegill Lakes
Fish Species Found - Bluegill (BLG)
Bluegill (BLG)
No species data available
Species found in survey
Species not found in survey

Lake Trout Lakes

- Lake trout found in 82 lakes (93,829 acres)
- At southern edge of range

- Carlton County – none
- St. Louis County – 13 lakes, 33,366 acres
- Lake County – 9 lakes, 11,072 acres
- Cook County – 60 lakes, 49,391 acres

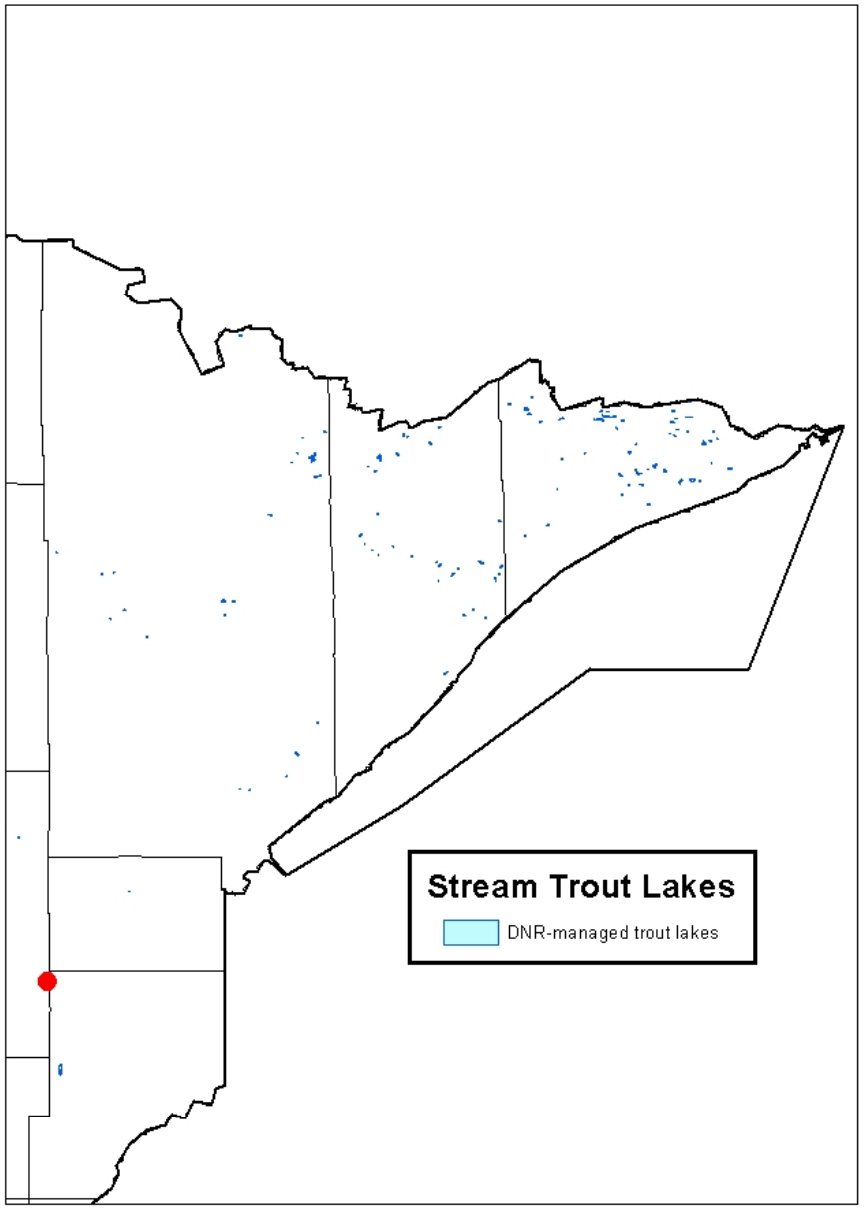

Lake Trout Lakes
Fish Species Found - Lake Trout (LAT)
Lake Trout (LAT)
No species data available
Species found in survey
Species not found in survey

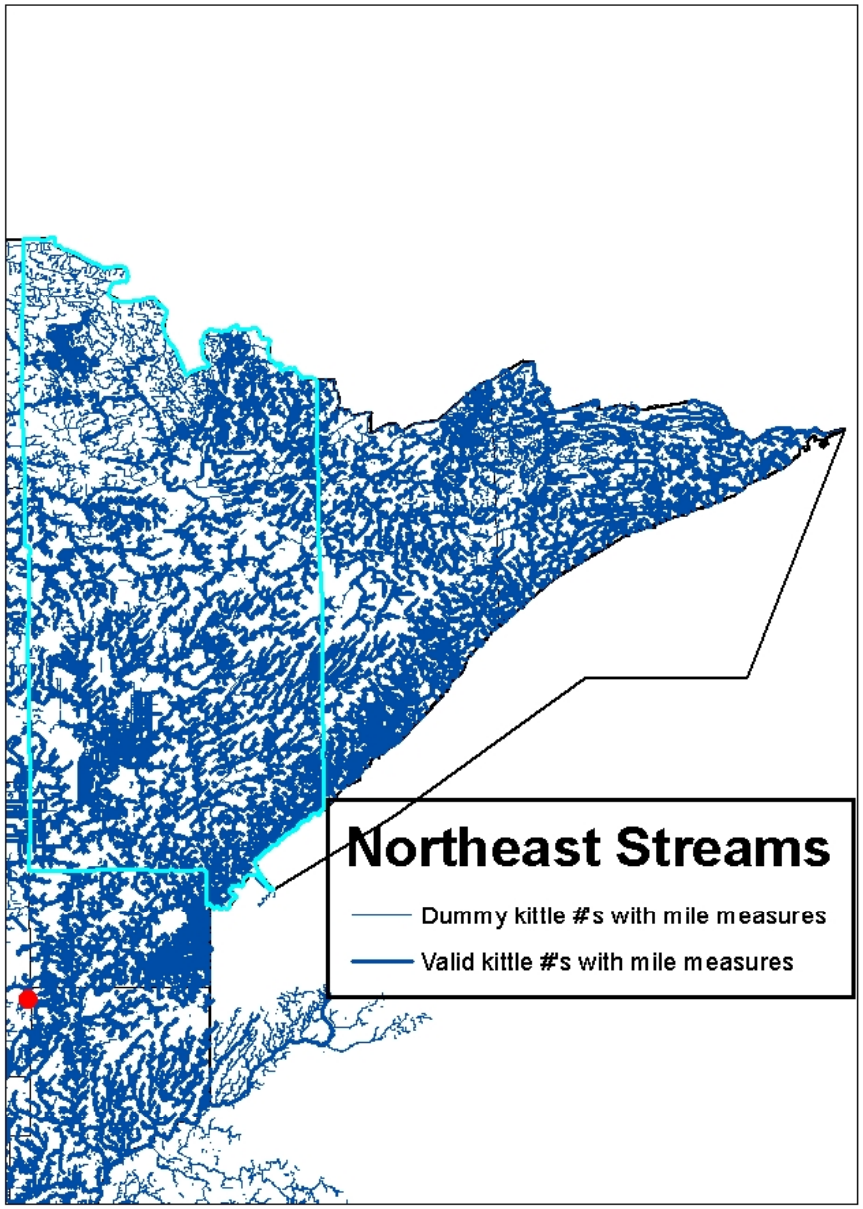
Lake Trout Stocking

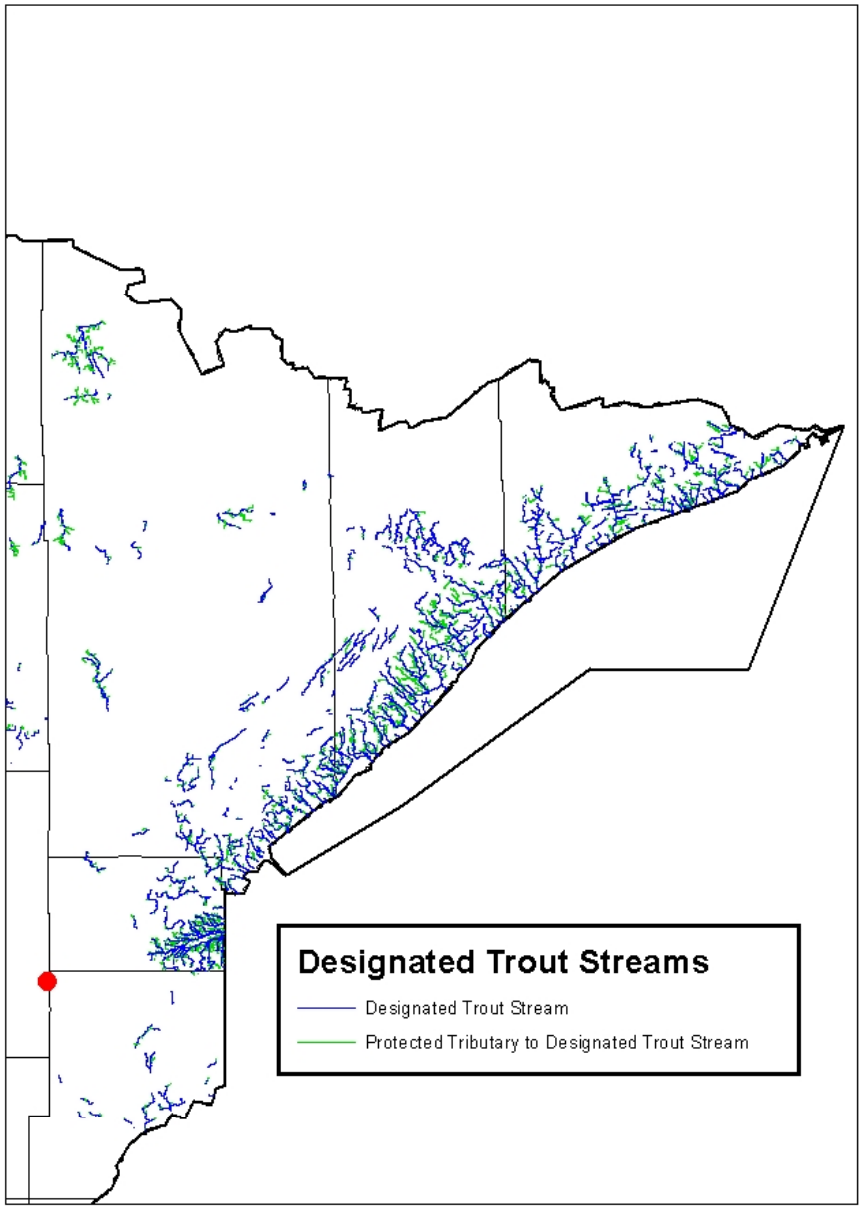
- Most lake trout lakes are self-sustained
- Stocking done for two reasons:
  - Introduce or reintroduce lake trout
  - Supplement natural reproduction
- Number of lakes stocked, by county:
  - Carlton – 2
  - St. Louis – 6
  - Lake – 1
  - Cook - 5

Stream Trout Lakes

- All but a handful are maintained by stocking
- Managed for brook trout, splake, rainbow trout, or brown trout, or a combination of trout species.
- Include small natural lakes, and deep mine pits
- Number of lakes stocked, by county:
  - Carlton – 2
  - St. Louis – 27
  - Lake – 38
  - Cook - 60


Stream Trout Lakes
DNR-managed trout lakes


Northeast Streams
Dummy kittle #'s with mile measures
Valid kittle #'s with mile measures


Designated Trout Streams
Designated Trout Stream
Protected Tributary to Designated Trout Stream

Designated Trout Streams

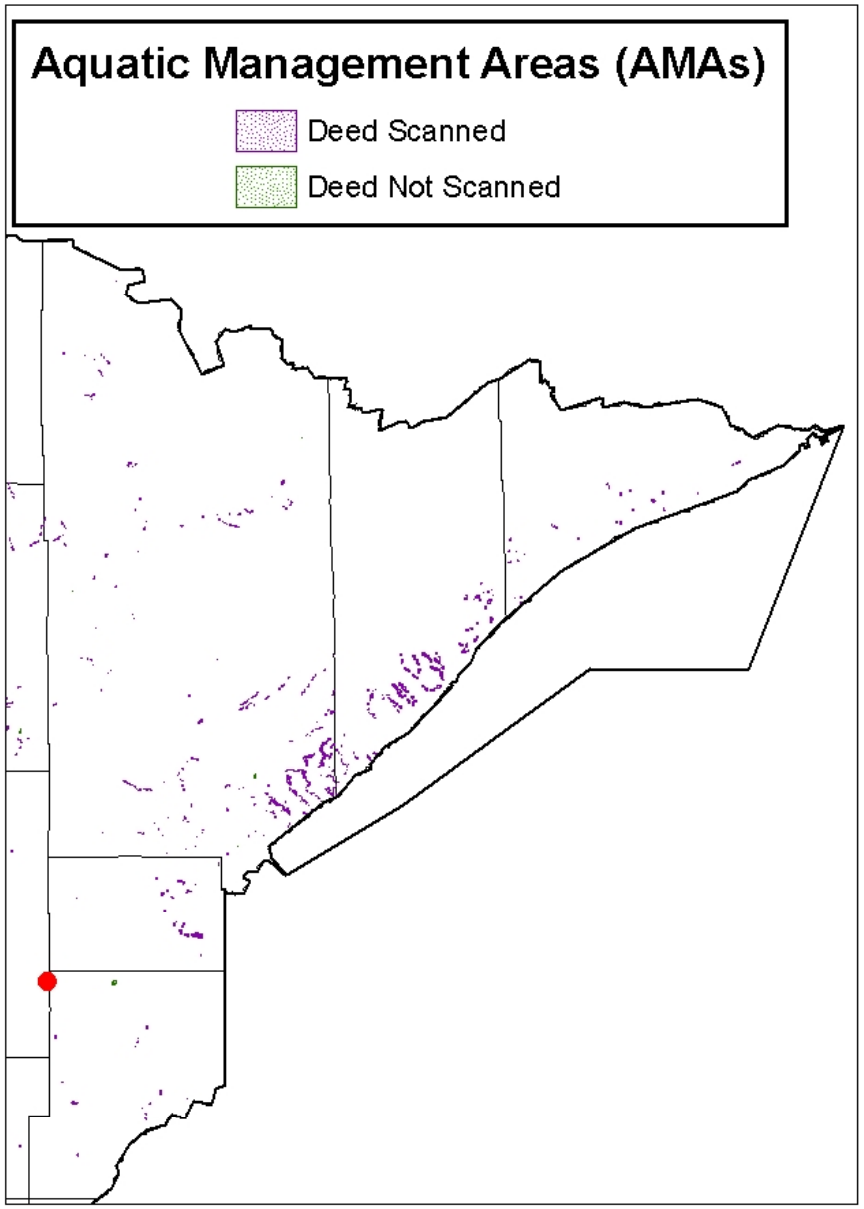
- Lake Superior watershed:
  - 332 streams, 1,807 miles
  - 1,576 protected tributaries, 1,100 miles
- Other watersheds:
  - 68 streams, 362 miles
  - 234 protected tributaries, 177 miles

Trout Stream Stocking

- Most trout streams are self-sustained
- Stocking done for three reasons:
  - Provide put-and-take fishing
  - Supplement natural reproduction
  - Support steelhead (rainbow trout) populations
- Number of trout streams stocked, by county:
  - Carlton – none
  - St. Louis – 12 (5 rainbow, 3 brook, 9 brown)
  - Lake – 4 (all rainbow)
  - Cook – 2 (all rainbow)

Aquatic Management Areas

- Carlton County
  - 13 easements (71.5 acres, 4.3 stream miles)
  - 15 owned (2,257 acres, 17.0 stream miles)
- St. Louis County
  - 223 easements (2,598 acres, 157.6 stream miles)
  - 18 owned (3,634 acres, 22.6 stream miles)
- Lake County
  - 64 easements (496 acres, 27.3 stream miles)
  - 35 owned (8,750 acres, 45.2 stream miles)
- Cook County
  - 15 easements (164 acres, 7.7 stream miles)
  - 11 owned (1,062 acres, 5.6 stream miles)


Aquatic Management Areas (AMAs)
Deed Scanned
Deed Not Scanned

Public Water Accesses

- Federal (USFS) – 176
- State (DNR) – 206
- County – 34
- City – 34
- Other - 30

- Many more waters are accessible across public lands, but have no designated access.

Fish Habitat and Habits

Warmwater Species:

Bluegill, Largemouth Bass

Coolwater Species:

Northern Pike, Walleye, Smallmouth Bass

Coldwater Species:

Trout, Cisco

Bluegill

- Nest-building, in shallow waters, areas with firm bottom, often in groups or colonies
- Spawn in early summer, in 67-80 F waters
- Diet mainly invertebrates
- Young fish rely on heavy vegetation to avoid predators
- Larger fish use deeper, more open waters

Largemouth Bass

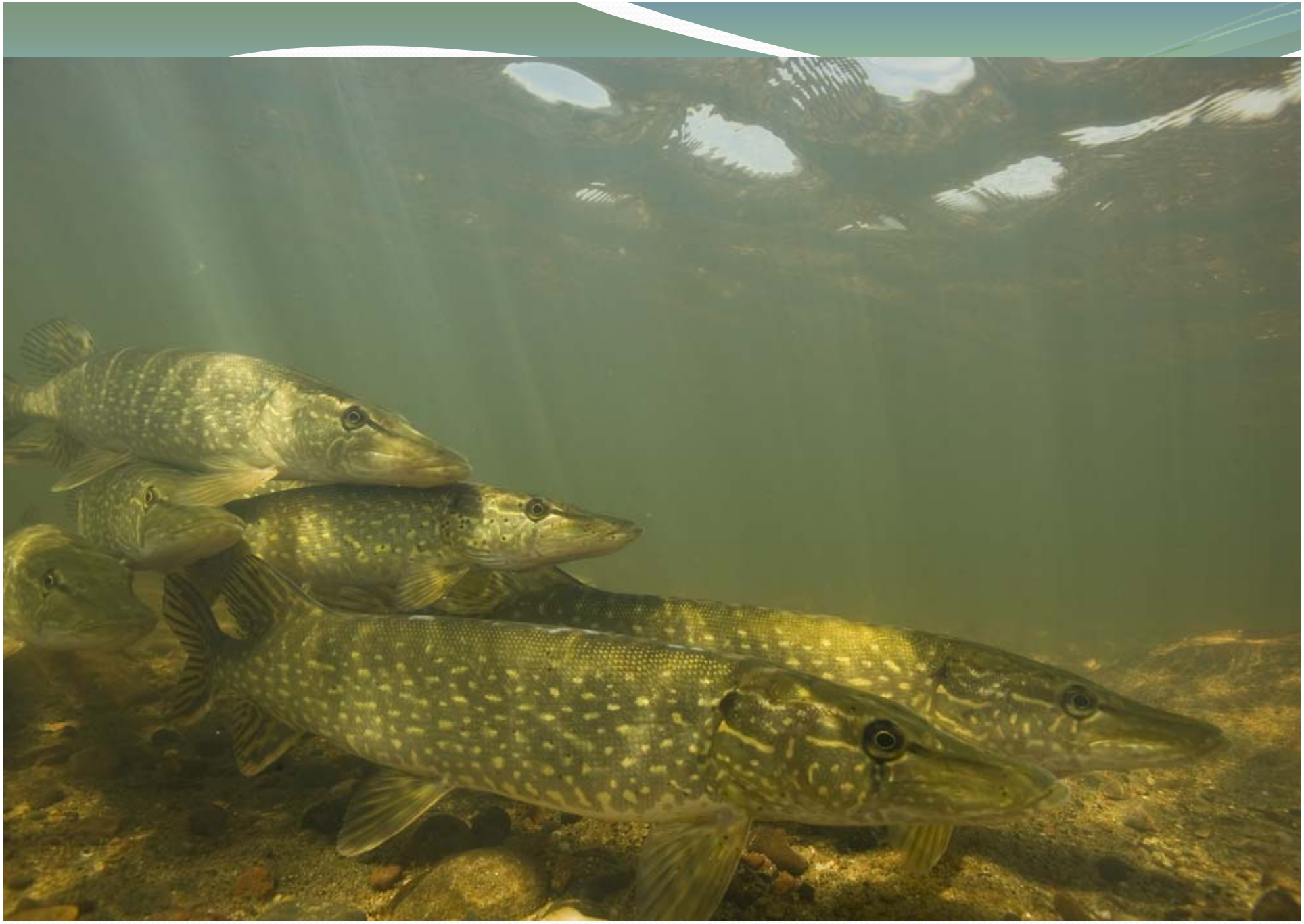
- Nest-building, in 2-6 ft water, areas with sand, firm mud, or gravel bottom
- Spawn in late spring, in waters over 60 F
- Males defend nests aggressively
- Diet invertebrates and fish
- Thrive in 80 F water, can survive mid-90s
- Tolerates turbid water

Smallmouth Bass

- Nest-building, in 2-6 ft water, areas with sand, firm mud, or gravel bottom, often near woody cover or large boulders
- Spawn in late spring, in waters over 60 F
- Males defend nests aggressively
- Diet crayfish, other invertebrates, and fish
- Prefer cooler water; avoids water over 85 F, over 90 F lethal
- Well adapted to rivers, does best in clear water
- In large streams or rivers, may migrate 50 miles or more to congregate in winter resting areas

Walleye

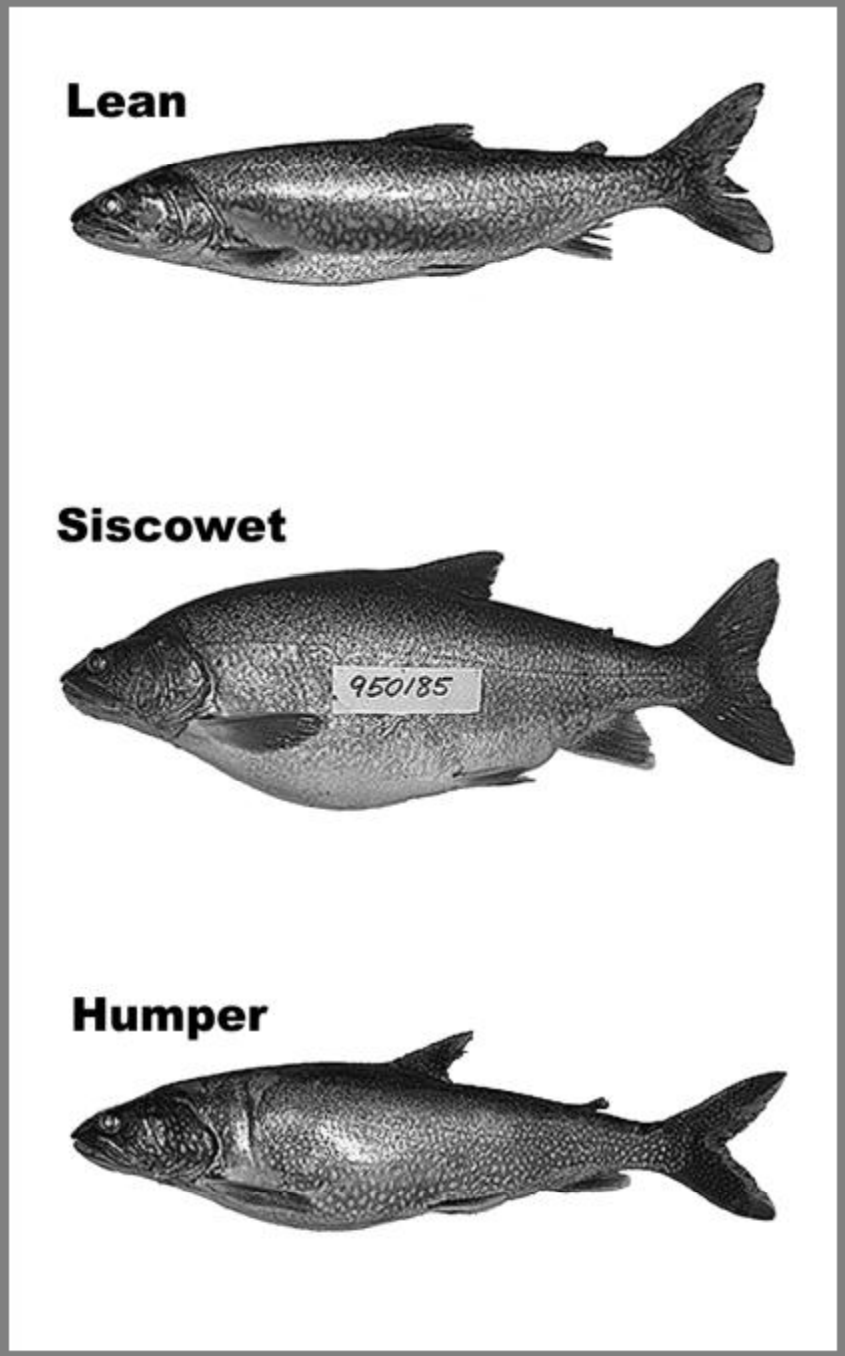
- Lay adhesive eggs on clean rock, rubble, or gravel
- Spawn in streams and rivers, and along wave-washed shorelines of lakes
- Spawn in early spring, in water 42-50 F
- Eggs hatch in two-three weeks
- Perch most important prey, also do well on invertebrates, cisco, or smelt.
- Sensitive to light
- Widely distributed across Northeast. Many populations are introduced.



Northern Pike

- Lay adhesive eggs on vegetation
- Spawn in seasonally-flooded marshes, and in heavy vegetation along lake shores
- Spawn in early spring, just after ice-out, in water 39-52 F
- Eggs hatch in two weeks, fry respond to downstream flow to return to lakes
- Prey on fish – prefer cylindrical species, but will eat what they can catch. Will take large prey.
- Large fish prefer cool water (under 65 F), will stop feeding in warmer waters
- Widely distributed across Northeast. Most populations are native.

Lake Trout forms in Lake Superior



Lake Trout

- Spawn over clean rock or boulders at depths of 3 to 260 ft
- Spawning done in October, in 40-50 F water
- Eggs hatch in 16 to 20 weeks
- Prey on invertebrates and fish – will reach largest sizes when coldwater forage species are available
- Require cold, well-oxygenated waters (55 F or cooler preferred)
- At the southern edge of their range in Minnesota

Cisco (Tullibee)

- Spawn over any hard bottom, at depths of 3-9 ft
- Spawning done in November, water in the low 40s
- Diet of invertebrates, plankton, and small fish
- Require cold, well-oxygenated waters, but can tolerate warmer water than lake trout

Brook Trout

- Deposit eggs in clean gravels, where there is upwelling oxygenated water
- Spawning done in mid September through October
- Diet of invertebrates and fish
- Require cold, well-oxygenated waters – prefer waters cooler than 68 F, but can tolerate warmer water for brief periods

Some Fisheries Trends

Fishing Pressure on Large Lakes

Commercial Harvests on Lake Superior

Lamprey Wounding on Lake Superior

Fishing Pressure

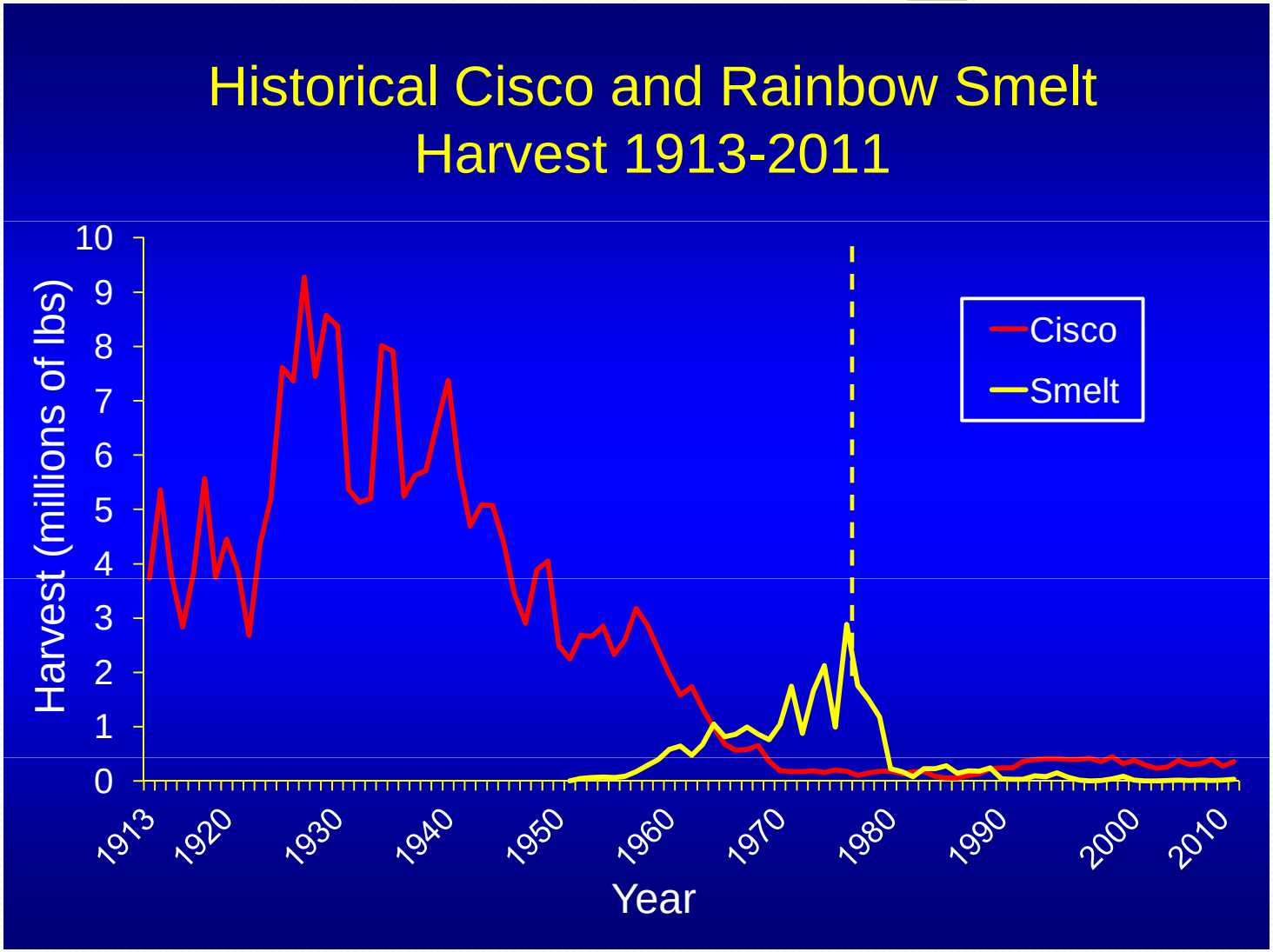
- Pressure on Crane, Kabetogama, Little Vermillion, Namakan, and Sand Point Lakes has been stable or declining
- Pressure on Rainy Lake increased from 1977 to 2000, but has declined slightly since 2000
- Summer pressure on Lake Superior is lower than in the 1980s, but has been fairly stable since 1994
- Spring pressure on Lake Superior tributaries has fluctuated since 1992, no clear trend, but higher pressure seen in 2009 and 2010
- Trends on small inland waters can't be determined due to a lack of creel survey data

Fish Catches

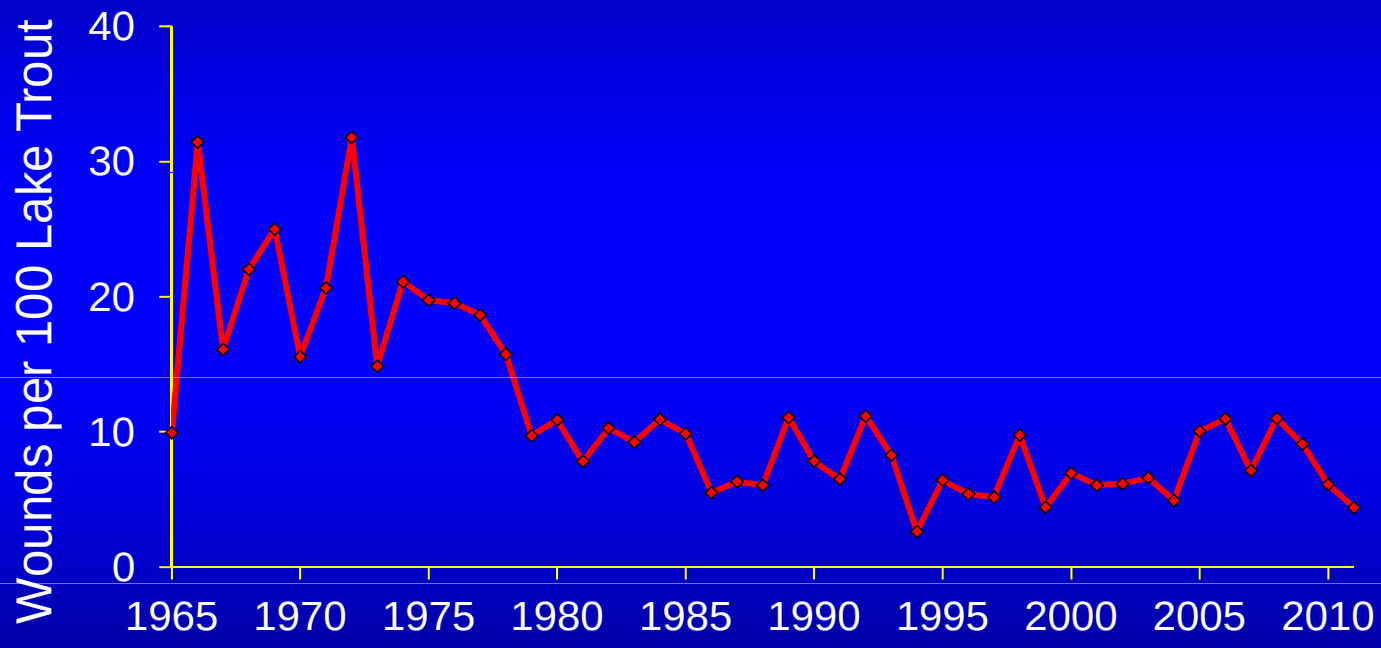
- Walleye catches stable or up on Crane, Kabetogama, Little Vermillion, Namakan, Sand Point and Rainy Lakes
- Lake trout harvest rate up considerably on Lake Superior, percentage of wild fish up dramatically
- Lake Superior chinook and coho harvests variable, no clear trend for chinook, possible decline for coho
- Large increase in catch of unclipped steelhead, decrease in catches of clipped rainbow trout on North Shore

Cook County Fisheries

- Fishing pressure on lakes stable or declining
- Pressure on inland trout streams has declined
- Smallmouth bass being illegally stocked, range increasing, abundance and size increasing
- Walleye populations stable
- Yellow perch populations declining
- Lake trout populations stable


Historical Cisco and Rainbow Smelt Harvest 1913-2011
Harvest (millions of lbs)
0
1
2
3
4
5
6
7
8
9
10
1913
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
Year
Cisco
Smelt

Lamprey Wounds per 100 Lake Trout, MN Shore
May Assessment 1965-2011



Fisheries Resource Issues

- Declining participation
- Climate change
- Development
- Forest management
- Invasive species and diseases

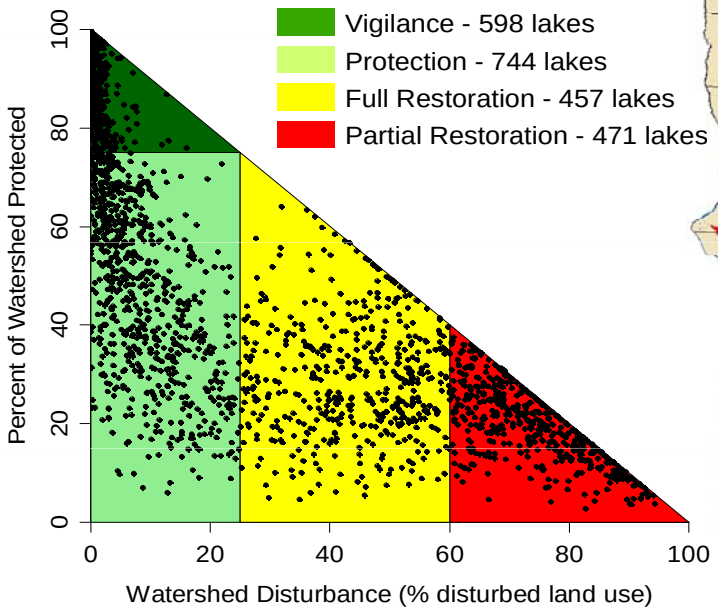
Declining Participation

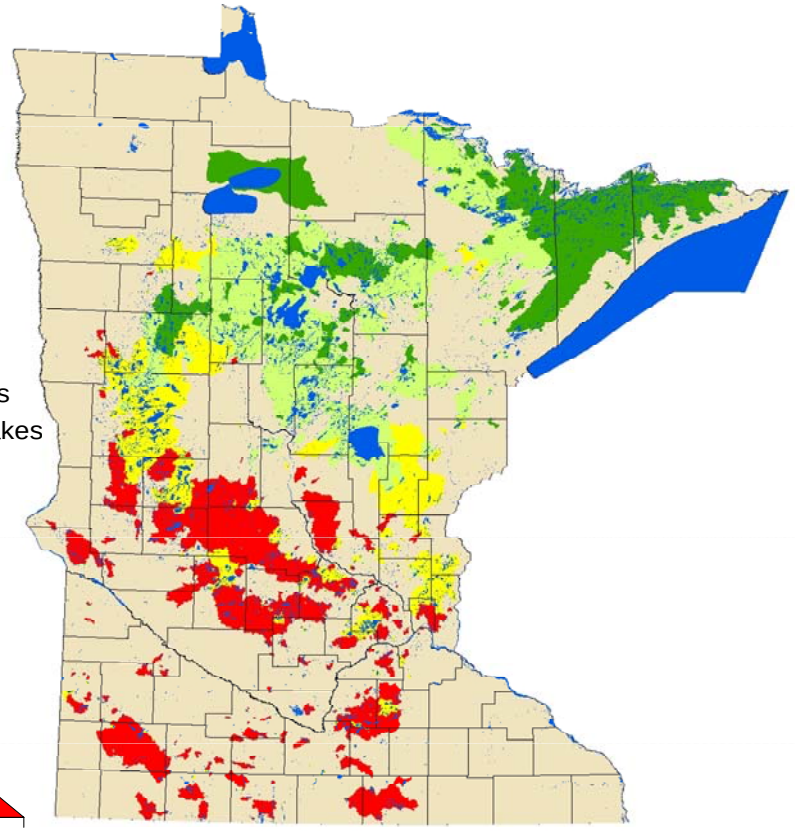
- License sales flat or down
- Loss of anglers means loss of people with direct stake in environmental issues
- Reduced revenue for management and protection

Development

- Urban sprawl – more impervious surface, increased nutrient loading, fewer people connected to environment
- Fragmented ownership – increased rural infrastructure, reduced access
- Lakeshore development – shift to “McMansions”, multiple-tier development, increase in nutrients, sediment, loss of vegetation and large woody habitat
- Much of Northeast remains relatively undisturbed and well protected

Suggested approaches for watershed protection and restoration of DNR managed fish lakes in Minnesota





Forest Management

- Much improved, but…
- Lack of accepted standards for watershed-scale disturbance
- Proliferation of roads and crossings
- Continued need for riparian protection

Invasive Species and Diseases

- VHS – found in Lake Superior, potential to spread inland
- Zebra Mussels – Lake Superior, lower St. Louis River, White Pine River, Pike and Mud Lakes (St. Louis Co.)
- Quagga Mussels – not here yet, potentially a bigger problem than Zebra Mussels in cold, deep lakes
- Eurasion Water Milfoil – found in one Carlton County lake, two lakes in St. Louis County
- Asian Carp – not here yet, potential for spread in NE Minnesota unknown, but major river systems could be vulnerable

Thanks!

- Creel survey data from the Namakan Reservoir and Rainy Lake provided by Kevin Peterson, MN DNR, International Falls
- Creel survey data from Lake Superior, and slides on Lake Superior trends provided by Don Schreiner, MN DNR, Duluth
- Figure on watershed protection developed by Pete Jacobson, MN DNR, for the Fisheries habitat plan
- Fish photos courtesy of Bill Lindner Photography