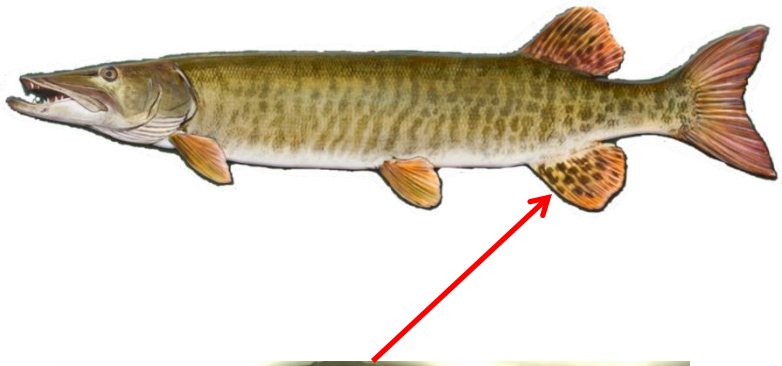
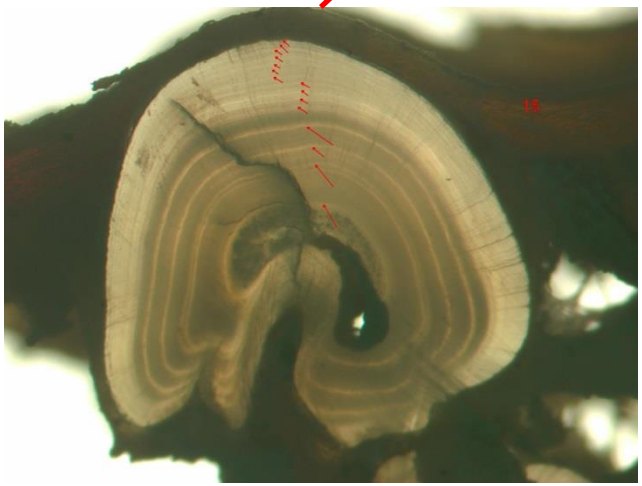
# Status of Muskellunge in Lake of the Pines

Timothy Parks

Fisheries Research Scientist, WDNR

# Why are we doing this Research Project?



# Background and Objectives

- Basis for this project is about Muskellunge Age and Growth:
  - Understand and validate age and growth
  - Better understand Growth using PIT-tags
  - Develop better methods to understand growth
- Also in includes other study components:
  - Precision of population estimates and other musky population dynamic measures
  - Contribution of stocked fish to populations
  - Create network of volunteer anglers to monitor muskellunge and in numerous lakes

# Status of Muskellunge in LOP-Connors

- Habitat and fish community
- Stocking history
- Sampling efforts and catches
- Size Structure
- Growth of fish
- Population Abundance
- Contribution of stocked fish

# Fish Community and Habitat

- Lake of the Pines
  - Shallow, upstream drainage lake
  - Class A2 musky lake:
    - High action fisheries
  - Lake Class:
    - Complex-Cool-Turbid
- Connors
  - Deep, downstream drainage lakes
  - Lake Class:
    - Complex-Cool-Clear

# LOP Muskellunge Stocking History

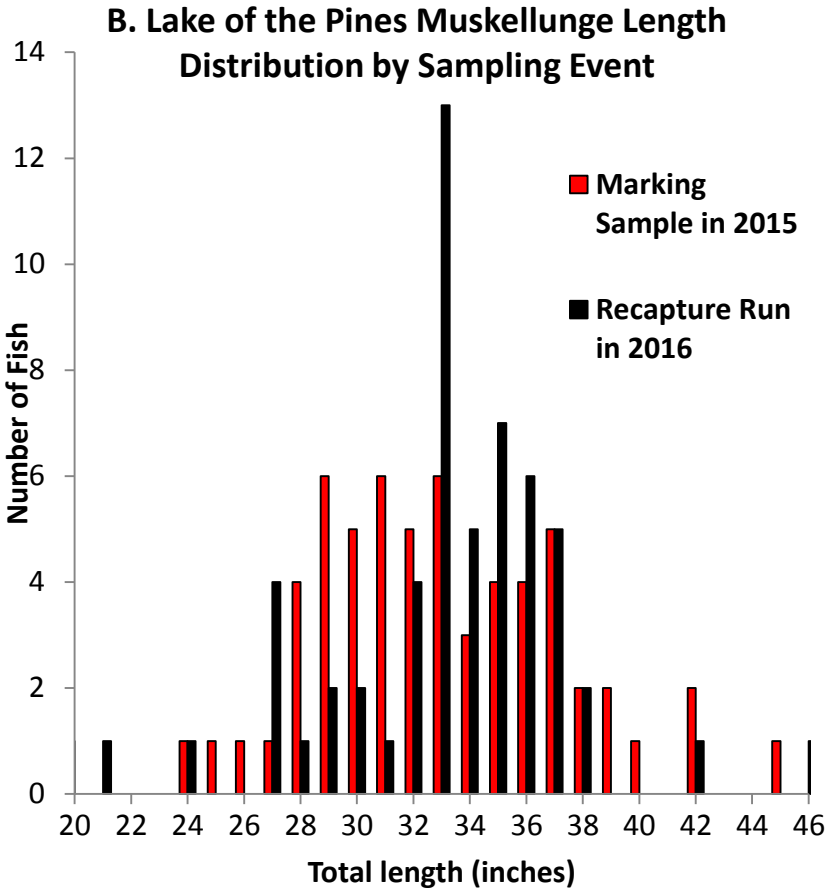
- Small fingerlings stocked from 1972-1996
  - 350-2450 fish/stocking event
- Large fingerlings stocked from 2000-Recent
  - 2000-2008 (215-429 fish/stocking)
  - Our Project stock with PIT-tags:
    - 2009 (273 fish/stocking)
    - 2011-on (136 fish/event)
    - 2017 will be last stocking event

# Sampling Efforts on LOP

- Two-year Spring Mark-recapture musky assessments (fyke-netting)
- 2009-2010
  - Before PIT-tagged stocked fish recruit
- 2015-2016
  - PIT-tagged stocked fish begin to recruit to gear
- Assessments mainly on LOP and Connors included to sample additional known age stocked fish

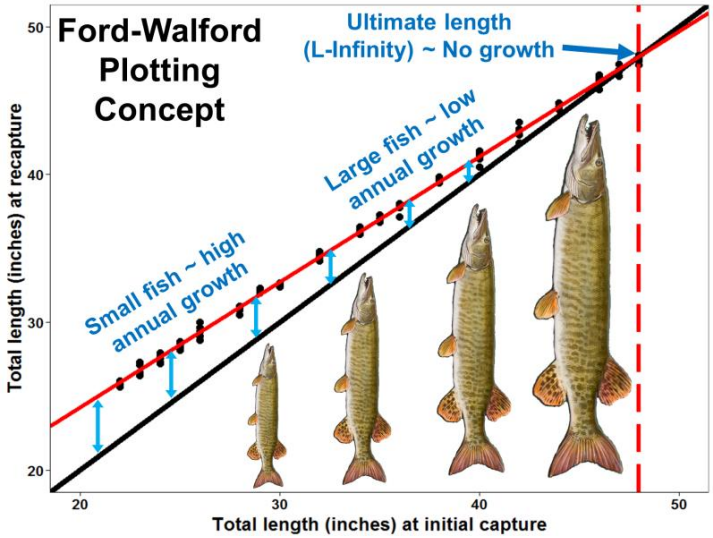
# LOP Size Structure

- 2015:
  - 23.7-44.6”
  - Mean = 32.5 ± 4.2” (±SE)
  - Proportion of Quality and memorable sized fish typical for A2 lakes
    - PSD-34 = 51 and PSD-42 = 2
  - Proportion of preferred size fish below 25 percental
    - PSD-38 = 15
    - Although lower than normal, 45% greater than in 2009



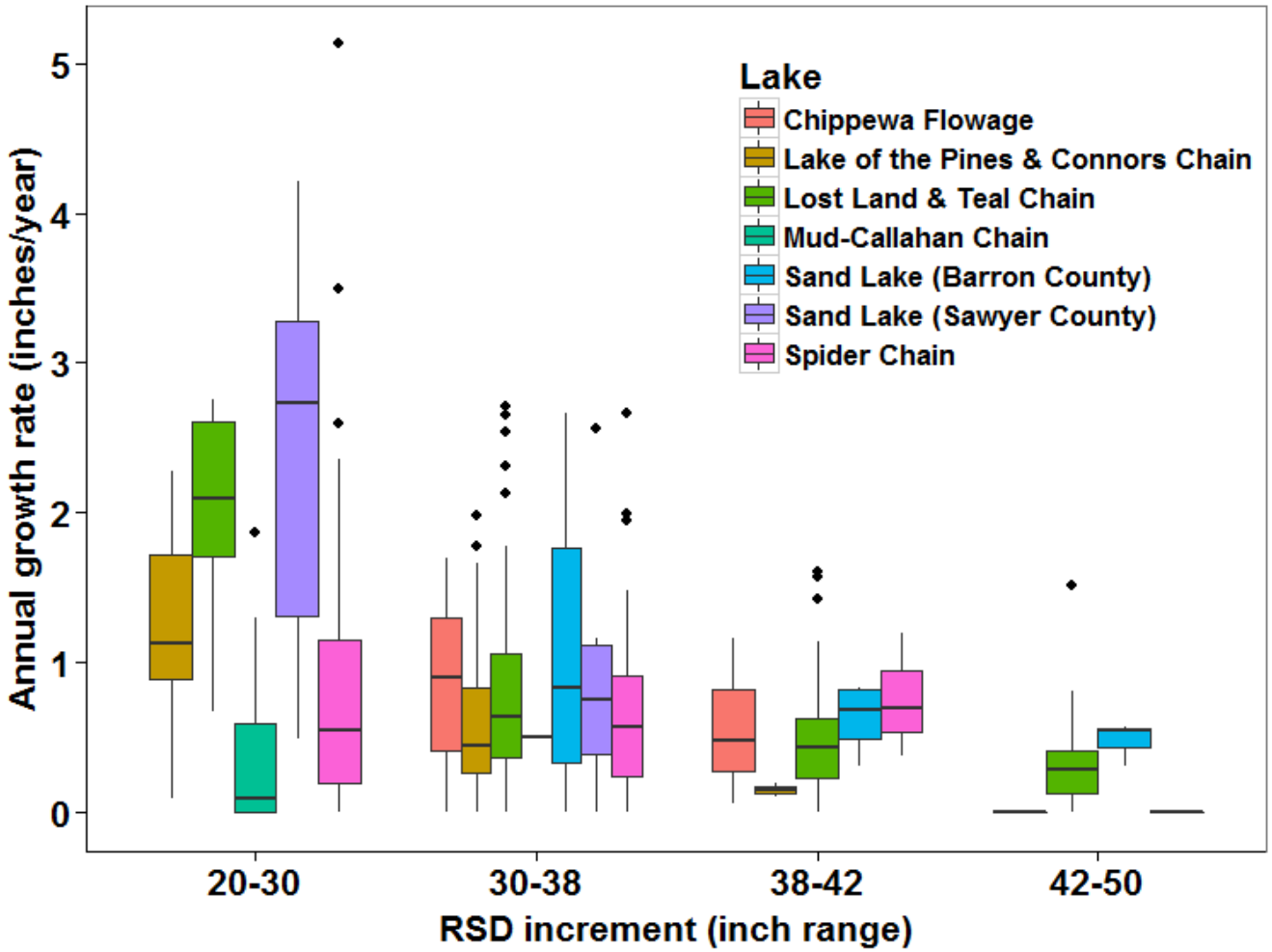
# LOP Growth Potential

- We quantified growth potential and we believe this to be between 37.2-39.3” on average for all fish




| | | Ford-Walford estimator | | | | Fabens' estimator | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 95% confidence limits | | | | 95% confidence limits | |
| **Population** | **Sex** | **n** | **Ultimate length** | **Upper** | **Lower** | **n** | **Ultimate length** | **Upper** | **Lower** |
| Lake of the Pines | All | 30 | 37.2 | 40.2 | 34.1 | 100 | 39.3 | 44.7 | 35.3 |
| | Female | 5 | 35.4 | 39.1 | 31.7 | 24 | 39.8 | 42.3 | 37.1 |
| | Male | 25 | 37.4 | 41.0 | 33.7 | 68 | 36.1 | 38.6 | 33.7 |
| Northwestern Wisconsin lakes | All | 245 | 42.7 | 44.7 | 40.6 | 517 | 40.0 | 42.5 | 38.5 |
| | Female | 81 | 44.5 | 48.3 | 40.8 | 170 | 43.5 | 45.1 | 42.0 |
| | Male | 172 | 38.6 | 40.1 | 37.1 | 302 | 37.5 | 39.5 | 35.6 |

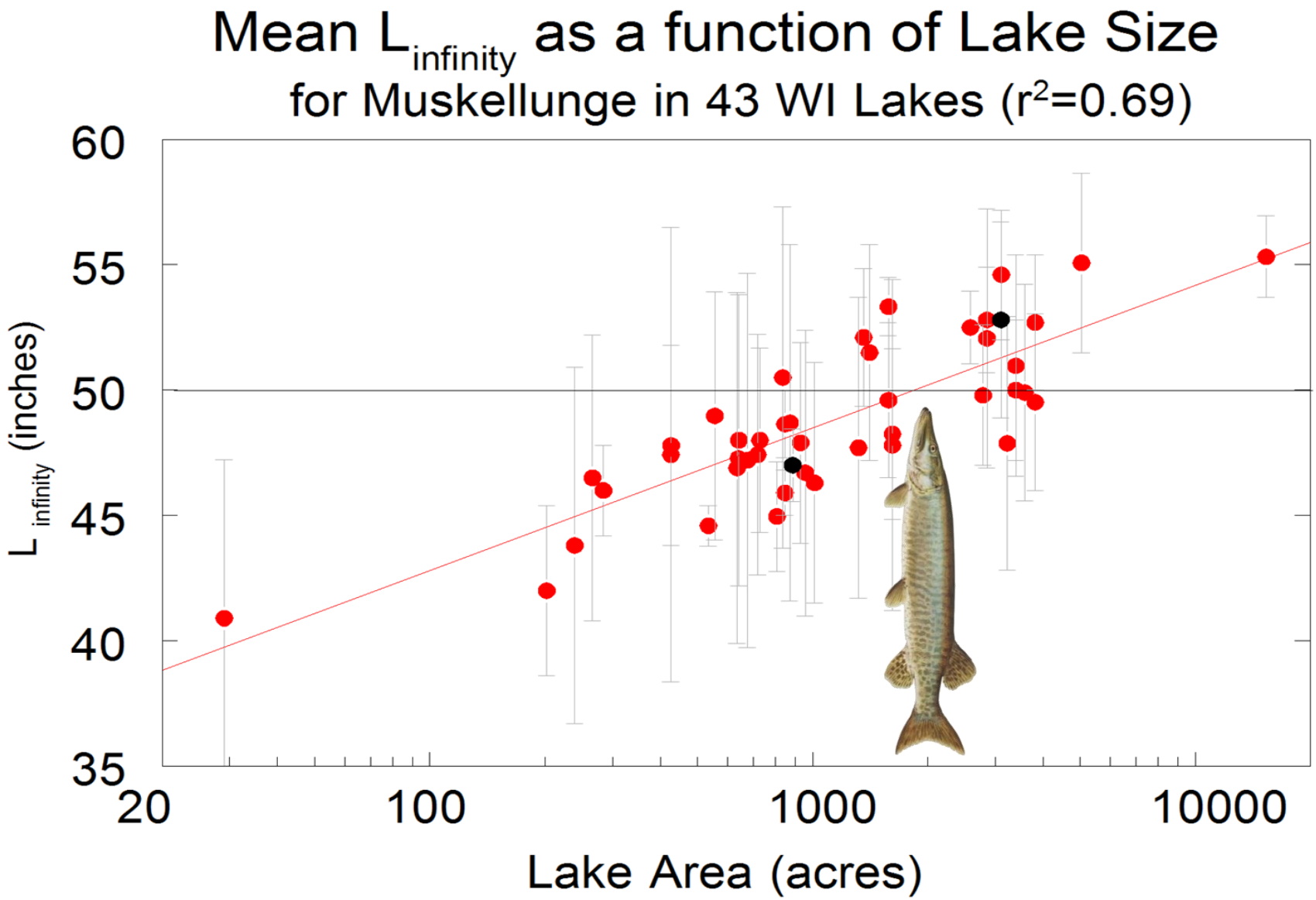
# LOP Growth Rates Compared to Other Lakes



# Growth and What Controls It

- Growth potential could be related to
  - 1. Lake size
  - 2. Productivity and forage composition (related to lake size)
  - 3. Musky population density
  - 4. Growing degree days potentially
  - 5. Other potential factors are less important or are largely unknown

# Lake-Specific Growth Potential



# LOP Population Abundance

- 2015
  - 340 or 1.24 fish/acre
  - 95% confidence limits (0.73-2.44 fish/acre)
- 2009
  - 389 fish or 1.42 fish/acre
  - Higher than 2015, but statistically the same
- Statewide A2 density
  - range: 0.28-0.70 fish/acre

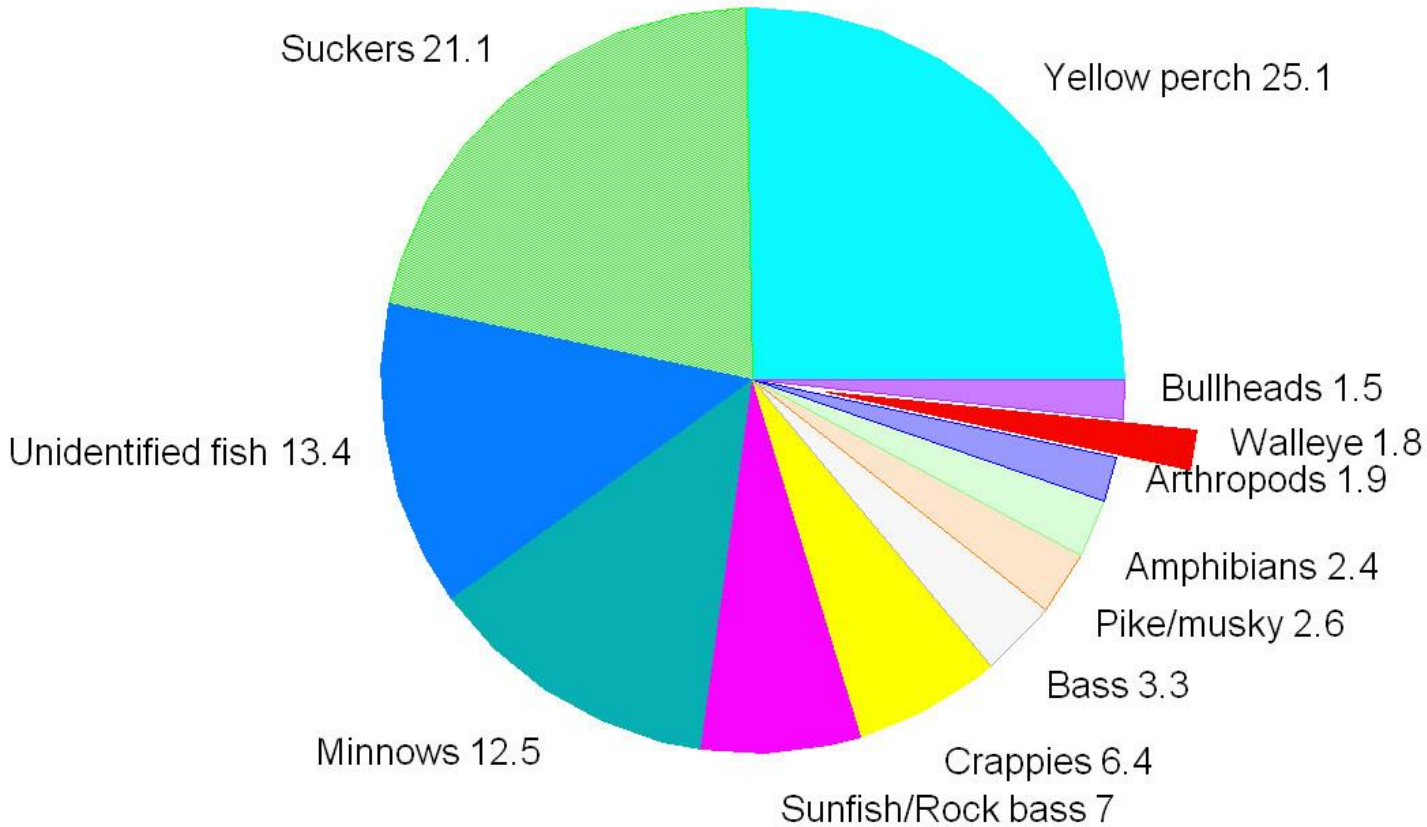
# LOP Stock Contribution

- By 2015, we observed stocked fish in the nets
  - Based on the number of marked fish, stocked fish comprised 22% of fish in Lake of the Pines (~75 fish)
  - These came from a stocking event in 2009 (273 fish).
  - This suggest that only 27% of those fish survived from stocking.
  - Additionally, since PEs did not significantly change from 2009 to 2015, it is unknown whether these fish maintained the population size or replaced natural fish.

# Thank You! Any Questions?

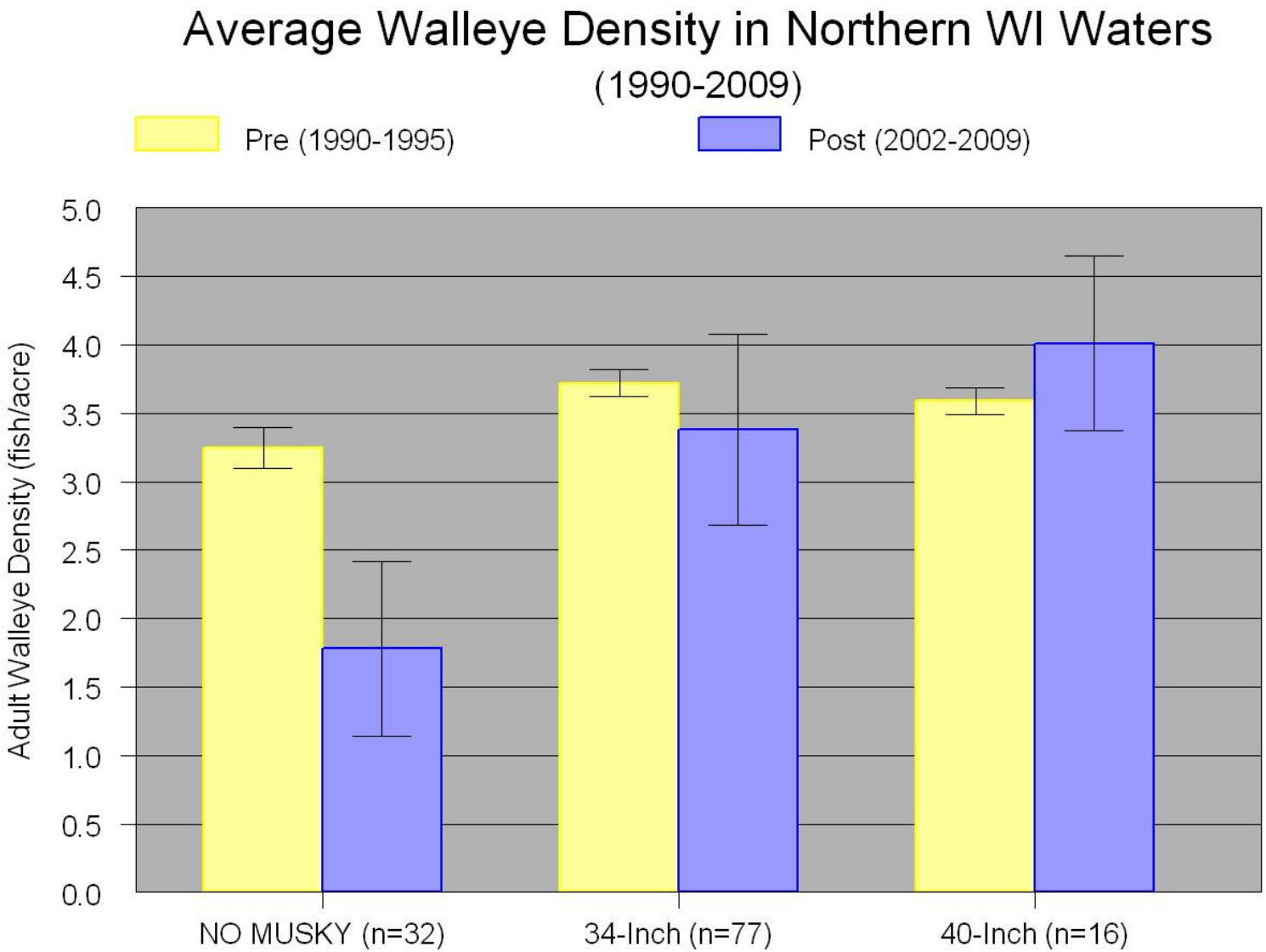
# Relative Importance of Various Prey Items

## 1,092 muskellunge stomachs, 1991-1994 (717 empty)




Bozek et al. 1999. Diets of muskellunge in northern Wisconsin lakes.
North American Journal of Fisheries Management 19:258-270.

Abundance of walleye in WI lakes before and after implementation of a 40” minimum length limit for muskellunge



# Extra: Feasibility of Moving Muskellunge from Lake of the Pines

*North American Journal of Fisheries Management* 29:791–804, 2009

DOI: 10.1577/M08-007.1

[Article]

**Walleye and Muskellunge Movement in the Manitowish Chain of Lakes, Vilas County, Wisconsin**

JORDAN G. WEEKS*[1] AND MICHAEL J. HANSEN
*College of Natural Resources, University of Wisconsin–Stevens Point, 800 Reserve Street, Stevens Point, Wisconsin 54481, USA*

*Abstract.*—We quantified within-year and between-year movement of walleyes *Sander vitreus* and muskellunge *Esox masquinongy* in the Manitowish Chain of 10 interconnected lakes in Vilas County, Wisconsin. Beginning in May 2004, we marked 7,427 walleyes (55–2,720 fish/lake) and 491 muskellunge (24–99 fish/lake) with T-bar anchor tags and marked 33 walleyes and 36 muskellunge with radio tags. Tags were recaptured and recovered through October 2005 via fyke-netting, electrofishing, angling, and spearing. Anchor tag loss averaged 2.9% for walleyes and 2.1% for muskellunge. Of 1,752 anchor-tagged walleyes (19–555 fish/lake), 81% (54–90% per lake) were recovered in the same lake in which they were tagged. Of the 95 muskellunge tagged (1–18 fish/lake), 53% (0–100% per lake) were recovered in the same lake in which they were tagged. For radio-tagged fish, 82% (27 of 33 fish) of walleyes and 50% (18 of 36 fish) of muskellunge were recovered in the same lake in which they were tagged. Of 1,153 anchor tag returns for walleyes (8–326 fish/tag group and 6–340 fish/lake) and 57 anchor-tag returns for muskellunge (1–17 fish/tag group and 1–12 fish/lake), 76% of walleyes (37–98% per lake) and 45% of muskellunge (0–100% per lake) were found in the same lake in spring 2004 and spring 2005. Our results indicate that most walleyes remained in the same lake during the year of tagging and between years, whereas half of all muskellunge did not remain in the same lake during the tagging year or between years. We recommend that walleye angling and spearing fisheries be managed for individual lakes and that muskellunge fisheries be managed for the entire chain of lakes.

*North American Journal of Fisheries Management* 31:461–467, 2011

ISSN: 0275-5947 print / 1548-8675 online
DOI: 10.1080/02755947.2011.590118

MANAGEMENT BRIEF

**Spring Capture Site Fidelity of Adult Muskellunge in Inland Lakes**

**Martin J. Jennings,* Gene R. Hatzenbeler, and Jeffrey M. Kampa**
*Wisconsin Department of Natural Resources, Bureau of Science Services, 810 West Maple Street, Spooner, Wisconsin 54801, USA*

- Lake of the Pines seems to have some population exchange with Connors Lake
- Likely that muskellunge have greater affinity to be in a lake with better habitat and will come back to the same habitat to complete life history events.
- Lake of the Pines has extensive littoral habitat whereas Connors has more limited littoral habitat and more deep-water habitat
- Transferring fish out of Lake of the Pines may not be cost-effective
  - Likely that fish could just swim back to Lake of the Pines