



## Landmark MN-FISH Muskie Study Completes First Year on Leech Lake

The MN-FISH Muskie Movement and Survival Study has completed its first full open-water field season on Leech Lake, marking a major milestone in this three-year collaborative effort between MN-FISH, the Leech Lake Band of Ojibwe, the Minnesota Department of Natural Resources (MNDNR) and Bemidji State University. Together, these partners are working to better understand the movement, habitat use, and seasonal survival of Minnesota’s muskie population.

Often called the “fish of 10,000 casts,” the muskie is more than a trophy species in Minnesota. Muskie is a cornerstone of the state’s fishing identity and a driver of local tourism and outdoor recreation. Protecting this fish means protecting a resource that supports businesses, communities, and generations of anglers.

For the study, tagging began in May during the annual muskie egg-take in Miller Bay on Leech Lake.

In total, **43 muskies** in Leech Lake now carry study tags, with **21 equipped with acoustic transmitters**. Anglers have already reported **10 recaptures**, representing **8 individual fish**, with two muskies caught more than once, an encouraging sign of angler engagement and fish survival.

Researchers began both passive and active tracking immediately after the fish completed spawning.

- **29 muskies** were tagged during egg take, including **15 fish surgically implanted with acoustic transmitters** and **14 fish fitted with PIT and floy tags**.
- As the season progressed, **six additional muskies** were caught in open water and implanted with acoustic tags, and **eight more** received floy tags when equipment limitations prevented full tagging.
- **32 acoustic receivers** were deployed across the lake, including deep-water areas such as the Paris Trench, key inflows and outflows, and major bay entrances.
- The research team also established **196 active tracking points** across the lake, to aid in manual tracking of tagged fish.

Throughout the season, **16 of the 21 acoustically tagged muskies** were detected through active tracking, generating **106 confirmed detections**. Muskies from these detections were observed using a wide range of habitats:

- **37.7%** on rock
- **30.2%** in weeds
- **28.3%** on sand
- **3.8%** in open water

A clear seasonal shift emerged, with many fish starting the season in open water before moving toward rock and sand habitats as summer progressed.

Movement patterns varied widely among individuals. Some muskies established small home ranges, while others traveled extensively. On average, fish moved **6.5 miles in straight-line**

**distance**, with one wide-ranging muskie covering more than **16 miles**. Two fish tagged during spring egg-take were later identified as mortalities or the tags were expelled from the fish.

Of the 32 passive receivers deployed, five were compromised by water intrusion, resulting in lost data. These receivers were replaced by the manufacturer. Receivers placed in the Boy River and Leech Lake River were removed ahead of fall to prevent ice-related loss and will be redeployed in spring. Even with these challenges, the receivers collected **over 70,000 detections**. Early analysis shows:

- **18 of the 21 acoustically tagged muskies** used the Paris Trench receiver array.
- Distinct daily movement patterns are emerging as detections are plotted and decoded.
- Upcoming analysis will explore how depth, temperature, and season influence muskie behavior.

“This first season has already shown us how dynamic and resilient these fish are,” said Baylor Short, Bemidji State graduate assistant and Leech Lake Band of Ojibwe Fisheries Specialist for the study. “Every detection, every movement pattern, every habitat shift helps us understand what muskies need to thrive. It’s a privilege to follow these fish across the lake and begin uncovering the story of their year-round lives.”

With the onset of ice, active boat-based tracking has now paused for winter. Once ice conditions are safe, the team will begin on-ice tracking, starting at each fish’s last known location. This first winter of ice-on tracking will help refine methods for future years and provide rare insight into muskie behavior during periods of low activity and environmental stress.

“I’ve watched this lake change a lot over the years”, said Jeff Arnold, MN-FISH board member and active Leech Lake muskie angler. “There’s a lot working against muskies right now including invasive plants, changing water conditions, more fishing pressure, and technology that makes every fish easier to find. If we want this muskie population to survive and stay healthy, we need solid science. This study is starting to give us the data we need.”

This marks the end of Year One of a three-year study designed to build one of the most comprehensive movement and survival datasets ever collected for Minnesota muskie. What is learned here will inform long-term management decisions and benefit muskie populations on Leech Lake and in waters across the entire state.



### **About MN-FISH**

The MN-FISH Sportfishing Foundation and Coalition was formed in 2018 to develop a voice for the anglers of Minnesota to influence the State around the issues anglers care about. By connecting anglers, scientists, local stakeholders, policymakers, and conservation leaders, MN-FISH works to ensure that Minnesota’s lakes and rivers remain a thriving environment for today and future generations. Help MN-FISH become an even **GREATER VOICE FOR ANGLERS!** Visit [MN-FISH.com](https://www.mn-fish.com) to join our cause or donate.