

Rat Root River Walleye Sampling
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The Minnesota Department of Natural Resources (DNR) has been conducting periodic monitoring of the walleye spawning run in the Rat Root River near Ericsburg since the early 1990s. The Rat Root River is the second largest tributary on the Minnesota side of Rainy Lake and was historically known to be a natural spawning area.

Over time, the number of walleyes spawning in the river appears to have declined, and an increase in the average size of male and female walleyes suggest the population may not be replenishing itself with as many new recruits as in the past.

The Rainy Lake Sportfishing Club (RLSC), a local angler group, working cooperatively with the Koochiching County Soil and Water Conservation District, were awarded funding from the Lessard-Sams Outdoor Heritage Council (LSOHC) in the form of Conservation Partner Legacy Grants to improve walleye spawning habitat in the Rat Root River. DNR increased sampling efforts to learn more about the Rat Root walleye spawning population and collect additional information needed to assist with project development and evaluate the future outcome of habitat improvement projects.

The DNR's International Falls Area Fisheries office, initiated a walleye tagging project in 2010. The multi-year project involves tagging 1,000 spawning walleye with unique identifying numbers so each individual fish can be tracked and identified upon re-capture by staff or anglers. Information collected from those recaptures helps fisheries staff determine if walleye return to the Rat Root River to spawn and how often. In addition, tag returns allow biologists to get a more accurate estimate of the size of the population spawning in the river and where these fish disperse in Rainy Lake after they spawn.

Shortly after ice-out, DNR crews used an electrofishing boat to capture, tag, and release walleye for the study. Two types of tags are being utilized to assess tag loss and minimize the chance that a fish will lose both tags and no longer identified as a member of this study. The first and easiest tag to spot is a small yellow, cylinder-shaped tag with a six digit number followed by the words "MN DNR". This tag is applied just below the dorsal fin with a "T-bar" similar to the "T" end used to attach tags to clothing. A small percentage of all tagged fish received two of these numbered tags.

The second tagging method is referred to as Visual Implant Elastomer (VIE). VIE is a color-coded liquid material that is mixed with a hardening agent just prior to insertion with a syringe. This material is injected under the skin on underside of the mouth and stiffens to a hard, rubbery material. A different color was used each year of tagging and appears as a thin line approximately one half inch long. Pink, blue, and orange VIE were used in 2010, 2011, and 2012, respectively. Green VIE will be used in 2013. Most fish received one individually numbered tag and VIE on the underside of their mouth.

A total of 672 individual walleyes were tagged in the last three seasons, and many of these fish have been recaptured by DNR staff and anglers. In 2011, 58 individual fish tagged in 2010 (16%

of all 2010 tagged fish) returned to the Rat Root and were caught by DNR crews. The return rate increased slightly in 2012 with 19 percent of fish tagged in 2010 returning and being recaptured by DNR staff in 2012. Similar return rates of walleyes tagged in 2011 and recaptured in 2012 electrofishing efforts were identified (20%).

These relatively low return rates suggest a sizeable portion of the population is not being sampled in the Rat Root each year. It is known that not every fish is captured using the electrofishing gear and it is likely to miss a few very early or very late spawners. However, it is also possible that some walleyes do not spawn in the Rat Root every year. They may spawn in other rivers or the lake during certain years, or not at all as has been documented in other fish species.

Approximately 40 percent of the fish sampled in the 2013 Rat Root River assessment had previously been tagged and the population estimate for this run, averaged over the three years of tagging, was approximately 1,000 walleyes. These numbers suggest the Rat Root River walleye spawning run is not very large and represents a relatively small portion of the total walleye population in Rainy Lake. However, as the Rat Root spawning run has declined it appears other runs or lake spawning fish have filled in the gaps as the overall walleye numbers in Rainy Lake appear higher than past years. In addition, we have observed very good natural reproduction and recruitment in Rainy Lake in recent years meaning mature walleyes are finding good spawning habitat and successfully reproducing.

Angler tag returns demonstrate that walleyes in Rainy Lake move incredible distances throughout the year. Sixty-six tagged walleyes were caught and reported since 2010. The first tagged fish reported by an angler occurred on the fishing opener in 2010 from Black Bay. Other tag returns have come from as far east as Lost Bay on the Minnesota side of Rainy Lake to Devil's Cascade in the North Arm in Ontario. Devil's Cascade is a distance of at least 60 miles of straight line travel from our tagging location on the Rat Root River. Seventeen tagged walleyes have been reported from the North Arm of Rainy Lake. This amounts to 26 percent of all tagged fish reports and suggests many of the fish spawning in the Rat Root River spend part of the year in Ontario waters, highlighting the continued need for natural resource management agencies on both sides of the border to work cooperatively.

In 2012, DNR field staff added an additional component to tagging efforts currently underway that included implanting miniature radio transmitters in female walleye to pinpoint individual spawning sites. Ten radio transmitters were inserted via the oviduct into the egg mass of female walleye just prior to spawning. These transmitters were small enough that they would be expelled along with the egg mass during spawning. Transmitters could then be located by DNR staff and exact locations pinpointed to determine where spawning occurs within the river.

Tracking began immediately after implantation until transmitters appeared stationary for a few days - indicating they had been deposited. Crews then used a special underwater antenna to pinpoint and attempt to recover the transmitters, while documenting the substrate and other lake characteristics at spawning locations. Twelve walleyes were outfitted with miniature transmitters. Four of those transmitters were recovered and two were re-used.

Eight of 12 radio transmitters were expelled and located within the study area. All transmitters were deposited upstream of the County Road 145 bridge where the river narrows and flow appears to increase. Walleye eggs were found at or near four transmitter locations, confirming walleyes spawned at these sites. This kind of information could provide valuable insight into the design of future walleye spawning habitat improvement projects.

The International Falls area fisheries office plans to continue numbered and VIE tagging in 2013 as well as a repeat of the miniature radio transmitter project. It will likely be the final year of tagging new fish but tag returns will continue to be monitored for the next few years.

Angler reported tag returns were at their lowest level in 2012 despite a higher total number of tagged walleye in Rainy Lake than previous years. It appears that this decrease is due to less reporting of tagged walleye captures by anglers rather than fewer captures of tagged walleyes.

Anglers are asked to call the DNR fisheries office in International Falls at 218-286-5220 or use the tag reporting feature on the DNR website (www.mndnr.gov) if you catch a tagged walleye in Rainy Lake or connected waters. Be prepared to provide information regarding the fish you caught including the tag number, where it was caught, and its approximately length. Thank you in advance for helping us learn more about this unique and valuable resource.



