Assessment of Small, Nearshore, Non-game Fish Populations in Lake Ripley, Jefferson County, Wisconsin

Figure 1: Bluntnose minnow (Pimephales notatus) found during the 2025 survey on Lake Ripley.

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Summary

Lake Ripley has been a popular recreational destination since the completion of a railroad line that travelled from Milwaukee to Madison in 1881, and the line that came up from Chicago through Rockdale to Cambridge. This lake has long been considered one of Wisconsin's finest largemouth bass lakes and holds the state's largemouth bass record since 1940. But without our nearshore, nongame fish species – we wouldn't have record-producing bass or other large game fish. Historically, Lake Ripley had a diverse fish community of at least 37 species, including many small, nearshore, nongame fish. These fish are known to be intolerant of environmental degradation and were common across the state. However, over the last 35 years these fish have been slowly declining as nearshore habitat has ben lost to human interference including structures, such as piers, and loss of aquatic plants.

The District conducted a nearshore, nongame fish survey (NSNG) on June 11th, 2025, to determine the current status of the NSNG fish population in Lake Ripley. This survey was the fifth NSNG fish survey to be completed on the lake; the last survey was conducted in 2020. During the 2020 survey, we found evidence of a least darter population in Lake Ripley, encouraging the District to continue pursuing the feasibility and reintroduction of an extirpated nearshore, nongame fish.

Introduction

Lake Ripley is a glacially formed lake in Jefferson County, Wisconsin. It is a 423-acre, mesotrophic lake with a deep hole reaching 44 feet deep. It is a highly used aquatic resource that is famous for its sport fishing, producing the state's angling record for largemouth bass measuring a whopping 11 pounds, three ounces! The lake is popular with swimmers and boaters and gets heavily used during the summer.

Recognition has been growing that freshwater nongame fishes, native fishes not traditionally targeted for recreation or harvest, are vastly understudied and under-conserved (Cooke et al., 2005, 2020; Rypel et al., 2021). While the lake is studied and managed by the DNR for popular game fish species like walleye and bluegill, not as much attention has been given to its diverse assemblage of nongame, nearshore fish species. Without a plan in place to protect these species, declines of their populations can go unnoticed, leading to extirpation or extinction. Recognizing the ecological importance of these often-overlooked species, the District has been conducting nearshore, nongame fish surveys to assess the diversity, abundance, and ecological roles of nearshore, nongame

fish in Lake Ripley since 1975. The lake once supported at least 37 different fish species, with 18 of those species being nongame species! These 'little fish' are imperative in a healthy, functional lake ecosystem.

Fish Species 1975-2025					
Species	**1975**	**2004**	**2012**	**2020**	**2025**
Golden shiner	17	3	255	0	0
Pugnose shiner	17	0	0	0	0
Blackchin shiner	15	0	0	0	0
Blacknose shiner	3	0	0	0	0
Bluntnose minnow	152	1833	10	11	4
Fathead minnow	1	1	11	0	0
Lake chubsucker	18	0	0	0	0
Common carp	0	0	1	0	0
Central mudminnow	0	0	33	4	18
Grass pickerel	1	0	0	0	0
Yellow bullhead	0	0	33	38	33
Tadpole madtom	0	0	1	0	0
Western Banded killifish	45	0	0	0	0
Blackstripe topminnow	0	0	1	0	0
Brook silverside	19	69	0	2	6
Green sunfish	3	0	6	9	0
Hybrid sunfish	0	0	1	0	0
Bluegill	171	324	226	109	89
Pumpkinseed	64	0	4	3	6
Rock bass	1	0	14	3	4
Smallmouth bass	0	44	7	0	0
Largemouth bass	153	783	76	98	2
Black crappie	58	6	0	0	1
Iowa darter	1	25	2	6	0
Least darter	3	0	0	2	0
Johnny darter	2	17	15	2	0
Fantail darter	4	0	15	13	7
Yellow perch	316	89	22	12	1
Total Native Species	**21**	**11**	**16**	**14**	**11**
Total Individuals	**1041**	**3252**	**462**	**312**	**171**

Table 1: Nongame fish species reported from Lake Ripley throughout the years since 1975. Tolerance refers to the species' relative sensitivity to environmental degradation (Lyons, 1992).

Nongame fish fill important functional roles in lake ecosystems, including: food-web stability, nutrient cycling, ecosystem engineering, and mussel hosting (Naill, et al., 2025). Small cyprinids (minnows and shiners) serve as forage for juvenile game fish, herons, and kingfishers. Darters, suckers and mudminnows contribute to nutrient cycling and the control of aquatic invertebrate populations (Childress et al., 2014; Huson et al., 2023).

During the 35-year period from 1975 to 2010, nearshore habitat declined as shoreline development expanded. Consistent with other lakes, the declines in Lake Ripley coincided with habitat degradation, introduction of aquatic invasive species, habitat fragmentation and environmental pollution, including aquatic herbicide use. In the 1980's, Eurasian watermilfoil (*Myriophyllum spicatum*)(EWM) and Curly-leaf pondweed (*Potamogeton crispus*)(CLP) found their way into Lake Ripley, which the community attempted to control through herbicides. Herbicide use on Lake Ripley was first documented in 1977 and was discontinued by 1990; 2-4-D was one of the herbicides used to target the invasive Eurasian watermilfoil. Dehnert et. al. and Anton et. al., both suggest how aquatic herbicides, specifically 2-4-D, could "act as an endocrine disrupting chemical that alters expression of primary genes regulating hormone receptors, and could present risks to the reproductive health of non-target aquatic species". By targeting EWM with herbicides, the nearshore, nongame fish population could have been severely negatively affected as these fish often seek out vegetation for protection. The District has not used aquatic herbicides since 1990, instead using mechanical harvesting to control EWM.

However, over the last two decades, watershed and shoreline work has been completed by the District improving habitat and water quality and leading to invasive species declines. We have worked hard on restoring habitat and protecting sensitive/critical areas of our lake which has led to habitat improvements, such as the floristic quality index of aquatic plants increasing and native aquatic plant diversity increasing. This has allowed native aquatic plants to flourish, which in turn creates suitable, sustainable habitat for our NSNG fish species.

Over the last five years the District has been trying to gain support to reestablish Western Banded Killifish in the lake. The improvements made to the lake indicate that Lake Ripley could support the Western Banded Killifish. A re-introduction effort could bring this species back, improving the biodiversity and resilience of the lake food-web. They are an important NSNG fish species in the food-web of many lakes. With that in mind, the District partnered with Underwater Habitat Investigations, LLC to complete an NSNG fish survey of Lake Ripley. The primary goals were to 1) determine the occurrence and relative abundance of fish species in nearshore aeras of the lake, 2) to compare catch results from 1975, 2004, 2012 and 2020 surveys to detect possible trends, 3) to assess the condition of the

nearshore habitat, and 4) to evaluate its suitability for possible reintroduction of one of the extirpated nearshore, nongame fish species.

Methods

The survey was completed on June 11th, 2025. Starting at 9:00am, the survey lasted roughly 4.5 hours with the crew finishing around 1:35pm, which is faster than usual due to an extra DNR crew assisting us. The weather was sunny and 75°F, with a 12mph southwest wind. Fourteen different nearshore sites were selected around the lake for this survey. These sites were repeated sites from previous surveys and included newly designated Critical Habitat Designation sites (Wisconsin Lakes)(Figure 3). The sites were selected as they encompassed different habitat types and shoreline conditions (protected, substrate type, vegetated, etc.).

Throughout the survey the crew recorded site coordinates (latitude and longitude) and site conditions including: water temperature, dissolved oxygen, percent saturation of oxygen, substrate type and vegetation.

A combination of sampling methods was utilized to maximize the detection of the small nongame, nearshore species:

- Seining: Small-mesh seine nets (1/8th inch) were pulled in nearshore areas to capture small-bodied fish and juveniles.
- Electroshocking: A DC towed electroshocker barge (3.5 amps, 150 volts) was used to sample a range of nearshore habitats, including woody debris, aquatic plants and rocky substrates.

Electroshocking is more effective along rocky shores and dense vegetation. During the electroshocking portion of the survey, two biologists sampled fish while the other biologist took notes from the boat. One of the biologists operated the shocker in 1-2 feet water depth to collect all species of fish within the area. All fish collected were identified to species, counted, and most were released unharmed when possible.

Seining is generally more effective along sandy shores. Similar to the electroshocking part of the survey, two biologists sampled fish nearshore – with one of them sampling as close to shore as possible. They pulled the seine parallel to shore for a distance of around 100 feet, if piers were not an obstacle. At the end of each sampling site, the seine was pulled towards shore with the lead line remaining on the bottom of the lake to reduce fish escape. Consistent with the electroshocking part of the survey, all fish collected were identified to species, counted, and most were released unharmed when possible.

At each site three different water quality parameters measured: dissolved oxygen, % saturation, and water temperature (°C). Below is the map identifying sampling sites. There were two sites that were unable to be surveyed due to environmental factors. See below (Figure 1) for the identification of the sampling locations.

Figure 2: The sites sampled during the 2025 survey.

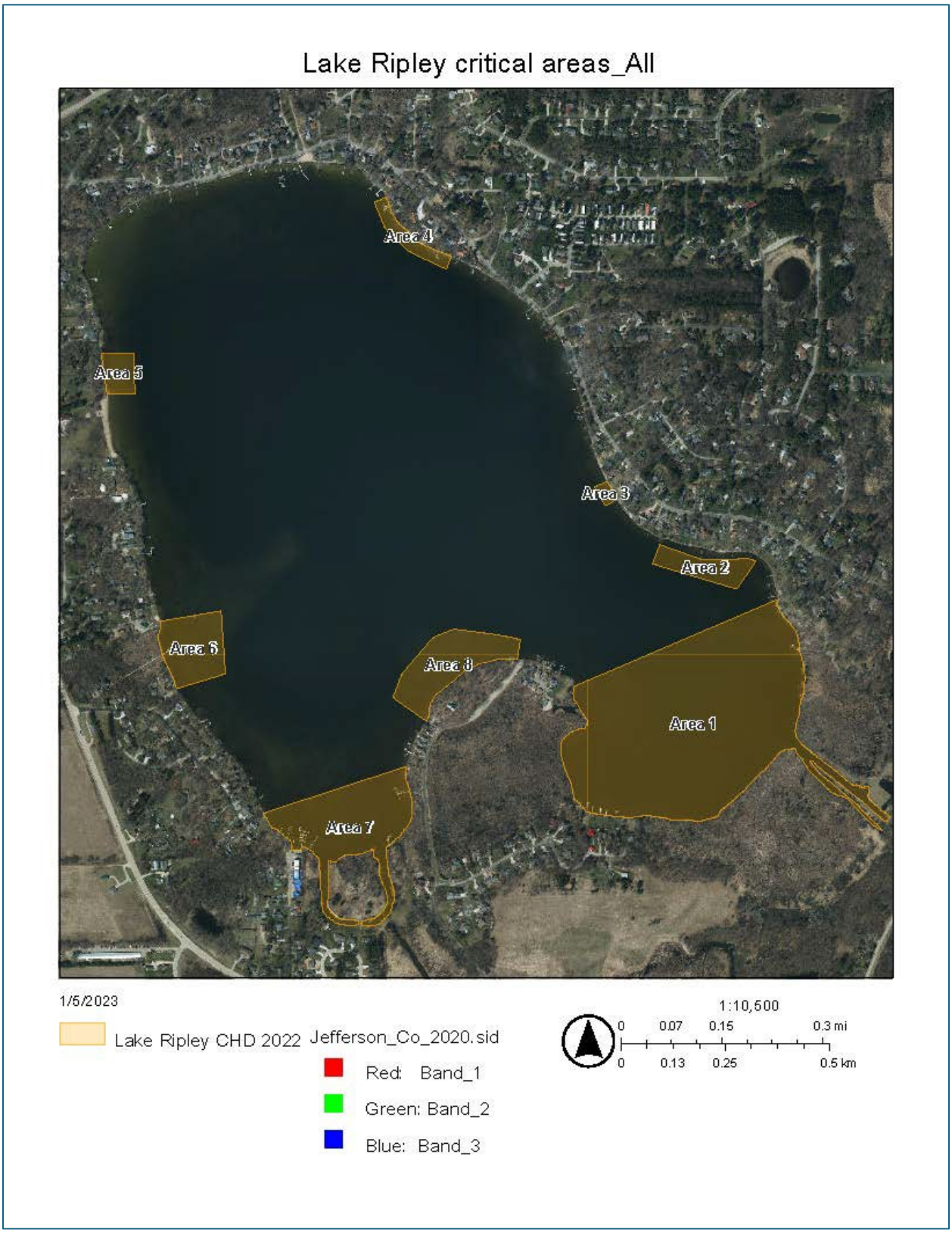

Figure 3: Critical Habitat Designations on Lake Ripley.

Results

Species Composition

Compared to the last NSNG fish survey completed in 2020, we found fewer NSNG species and numbers of individuals. The survey results are not encouraging but it is too soon to determine if the differences are the result of weather conditions or a decline in the nearshore fish assemblage. In either case, results from all surveys completed since 1975 demonstrate a significant loss of this important fish assemblage in terms of both biodiversity loss and food-web instability.

Four near-shore nongame fish species were positively identified during the 2025 survey. No 'environmentally intolerant' species were found, including the 'Special Concern' least darter and the 'Species of Greatest Conservation Need' Iowa darter identified during the 2020 survey.

The most common species found during the 2025 survey were:

- Bluntnose minnow (*Pimephales notatus*)
- Brook silverside (*Labidesthes sicculus*)
- Fantail darter (*Ethesostoma flabellare*)
- Mud minnow (*Umbra limi*)

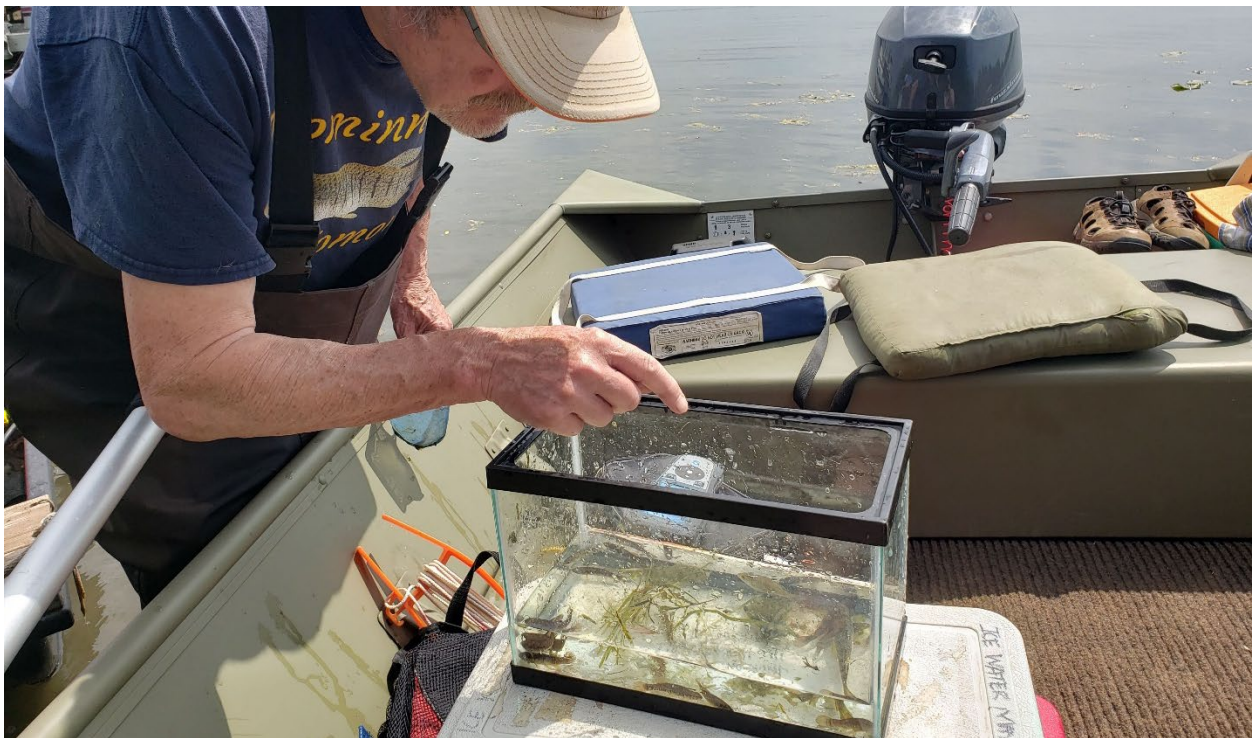

Figure 4: A crew member identifying nearshore, nongame fish.

Site 1

This site is along the southern shoreline of Lake Ripley, along the peninsula to the west of the boat launch (Figure 2). This is a part of Critical Habitat Designation #8 on Lake Ripley (Figure 3). The shoreline is artificial, lined with rock riprap. Rock riprap typically isn't the best habitat for nearshore, non-game fish species, as the rocks may attract more predators compared to vegetation. There was woody cover present all along the shoreline, from the installation of multiple fish sticks back in 2014 to support fish habitat. Site 1 was sampled for a total of 29 minutes.

Figure 5 : Dave Marshall and Jake Schmidt at Site 1 shocking fish.

The dissolved oxygen was 9.73mg/L, with a saturation of 112.9%. The temperature at this site was 21.5°C. There were no zebra mussels present, and little algae. There were no emergent or floating plants. Submersed aquatic plants present were: water celery (*Vallisneria americana*) and a small pondweed species. The substrate was 95% boulder and 5% cobble, likely from the riprap.

This site was sampled using electroshocking. In total, 52 fish were found at Site 1 (Table 1). There were 24 bluegills, 2 pumpkinseed, 7 fantail darters, 2 bluntnose minnows, 14 yellow bullhead and 3 rock bass.

Fish Species Found at Site 1	
Species	**Site 1**
Bluegill (*Lepomis macrochirus)*	24
Yellow bullhead (*Ameiurus natalis)*	14
Fantail darter (*Etheostoma flabellare*)	7
Rock Bass (*Ambloplites rupestris)*	3
Bluntnose minnow (*Pimephales notatus*)	2
Pumpkinseed(*Lepomis gibbosus)*	2
Total:	**52**

Table 1: Total fish species and individuals counted at Site 1.

Figure 6: A fantail darter!

Figure 8: Bluntnose minnow captured at Site 1.

Figure 7: Riprap at Site 1.

Site 2

This site is located in Marina Bay along the southern shoreline of Lake Ripley, to the east of the Lake Ripley Marina and to the west of Vasby's Channel (Figure 2). This is a part of Critical Habitat Designation #7 on Lake Ripley (Figure 3). This site has a natural shoreline, with swamp loosestrife lining the shore. There was woody coverage along the shoreline.

The dissolved oxygen was 7.03mg/L, with a saturation of 82.5%. The temperature at this site was 22.0°C.

Unfortunately, this site was not able to be shocked or seined due to the bottom being too soft and mucky. The substrate was 100% muck. The one submersed aquatic plant present was sago pondweed. The one floating aquatic plant present was white water lily. There were no emergent plants and lots of algae at this site.

Site 3

This site is located in Marina Bay along the southwestern shoreline of the lake. It is just north of the Lake Ripley Marina, nestled in between two piers (Figure 2). This is a part of Critical Habitat Designation #7 on Lake Ripley (Figure 3). The shoreline is artificial, lined with rock riprap. There was no woody coverage along the shoreline. Site 3 was sampled for twenty minutes.

Figure 9: Site conditions at Site 3.

The dissolved oxygen was 15.62mg/L, with a saturation of 184.1%. The temperature at this site was 22.1°C. There was lots of filamentous algae. There were no emergent plants.

Submersed aquatic plants present were: curly-leaf pondweed and sago pondweed. Floating aquatic plants present were white water lily and spatterdock. The substrate was 50% sand and 50% muck.

Figure 10: Site conditions of Site 3.

This site was sampled using electroshocking. In total, 9 fish were found at Site 2. There were 7 bluegills and 2 yellow bullheads. This site was hard to sample as there was low visibility due to the amount of algae. Six adult bullfrogs were also found at the site!

Site 4

This site is located directly south of the Lake Ripley Park beach (Figure 2). The shoreline is artificial, lined with rock riprap. Oak and cottonwood trees were overhanging the lake providing woody cover.

The dissolved oxygen was 10.39mg/L, with a saturation of 123.0%. The temperature at this site was 22.5°C. Algae was present. There were no emergent or floating aquatic plants. Submersed aquatic plants present were: water celery, a Chara species, flat-stem pondweed and white-stem pondweed. The substrate was 100% marl.

This site was sampled using seining nets. In total, three fish were found. One bluegill, one bluntnose minnow, and one dead, largemouth bass. There were also a few dead bluegill seen at this site, that exhibited signs of columnaris.

Figure 11: This photo was taken of Site 4 in 2024.

Site 5

This site is located north of Lake Ripley beach (Figure 2). It has a completely natural shoreline, with lots of woody cover overhead and in the lake. Willows, silver maples and cottonwoods were all identified. This site has a shallow slope into the lake. This is a part of Critical Habitat Designation #5 on Lake Ripley (Figure 3).

The dissolved oxygen was 10.00mg/L, with a saturation of 119.3%. The temperature at this site was 22.7°C. Submersed aquatic plants present were: water celery, a Chara species, flat-stem pondweed and sago pondweed. The one floating aquatic plant present was white water lily. Algae was present at this site. The substrate was 100% sand.

This site was sampled using seining nets. In total, twenty fish were found at Site 5. There were 2 brook silverside, 16 bluegill, 1 black crappie and 1 perch.

Figure 12: This photo of Site 5 was taken in 2024.

Site 6

This site is located on the northwest side of Lake Ripley (Figure 2). The shoreline is artificial, lined with rock riprap. The unnatural shore has a 2:1 slope. There is coverage by a few willow and cedar trees that are along the shoreline.

The dissolved oxygen was 9.57mg/L, with a saturation of 112.1%. The temperature at this site was 21.8°C. Submersed aquatic plants present were: Chara species, water celery, flat-stem pondweed, Illinois pondweed and sago pondweed. The substrate was 100% marl.

This site was sampled using seining nets. In total, one bluegill was found. There were other dead bluegill in the area that again exhibited signs of columnaris.

Site 7

This site is located on the north side of Lake Ripley. The shoreline is artificial, lined with rock riprap (Figure 2). There was no woody cover.

The dissolved oxygen was 9.98mg/L, with a saturation of 115.8%. The temperature at this site was 21.4°C. Submersed aquatic plants present were: Chara species, water celery, Illinois pondweed and sago pondweed. The substrate was 100% marl.

This site was sampled using seining nets. In total, one bluegill was found.

Figure 13: Bluegill caught during our 2023 fall fyke net sampling.

Site 8

This site is located on the north side of Lake Ripley, southeast of Shoreplace Beach (Figure 2). The shoreline is artificial, lined with large rock riprap that looked recently installed. There was no woody cover present.

The dissolved oxygen was 10.56mg/L, with a saturation of 123.1%. The temperature at this site was 21.4°C. Submersed aquatic plants present were: a Chara species, water celery, coontail, flat-stem pondweed, Illinois pondweed and sago pondweed. The substrate was 50% marl and 50% sand.

This site was sampled using seining nets. In total, one largemouth bass was found.

Figure 14: A crew member looking at the site conditions at Site 8.

Site 9

The dissolved oxygen was 10.22mg/L, with a saturation of 118.2%. The temperature at this site was 22.2°C. This site was unfortunately overlooked by both crews and did not get sampled. This site in general has a rocky bottom substrate with submersed and floating aquatic plants.

Site 10

This site is located on the east side of Lake Ripley, near the inlet stream (Figure 2). The shoreline is natural, with no woody cover. The shoreline consists mostly of cattails and has some undercut banks. This is a part of Critical Habitat Designation #1 on Lake Ripley (Figure 3).

The dissolved oxygen was 17.23mg/L, with a saturation of 203.1%. The temperature at this site was 22.2°C. Submersed aquatic plants present were: water celery, flat-stem pondweed, and coontail. The one floating aquatic plant present was white water lily. Cattails were the emergent aquatic plants present. Jewelweed and reed canary grass were also present along the shoreline. The substrate was 50% marl and 50% sand.

This site was sampled using seining nets. In total, seven fish were found at Site 10. There were 2 bluegill, 1 pumpkinseed and 4 brook silverside. There were dead pumpkinseed in the area.

Site 11

The site is located in East Bay, on the south side of the lake (Figure 2). On the east side of the lake's peninsula. The shoreline is artificial, lined with rock riprap. There is swamp loosestrife and cattails growing along the shoreline with one tree providing little woody cover. This site in located within Critical Habitat Designation #1 (Figure 3).

Figure 15: Site conditions at Site 11.

The dissolved oxygen was 13.80mg/L, with a saturation of 163.8%. The temperature at this site was 22.5°C. Submersed aquatic plants present was a small pondweed. Floating aquatic plants present were spatterdock and white water lily. Cattails and swamp loosestrife were the emergent aquatic plants present. There was a lot of filamentous algae at this site. The substrate was 100% silt/marl. Bullfrogs were also present at this site.

This site was sampled using electro-shocking. In total, 26 fish were found at Site 11. There were 14 bluegills, 11 bullheads, and 1 rock bass.

Figure 16: Crew members sampling Site 11 with the electroshocker.

Site 12

This site is located on the east side of Lake Ripley, in Milwaukee Bay (Figure 2). It is within Critical Habitat Designation #1 (Figure 3). Unfortunately, this site was unable to be sampled due to the mucky bottom.

Site 13

The site is located on the north-east side of the lake, roughly 200-feet north of the public pier (Figure 2). The shoreline is artificial, lined with large rock riprap at the ordinary high-water mark. There was an herbaceous layer covering the steep shoreline. This site is located within Critical Habitat Designation #4 (Figure 3). Site 13 was sampled for a total of 9 minutes.

Figure 17: Crew members shocking the shoreline at Site 13.

The dissolved oxygen was 11.11mg/L, with a saturation of 127.9%. The temperature at this site was 21.0°C. Submersed aquatic plants present was common chara. There were no floating or emergent aquatic plants present. There was a lot of filamentous algae at this site. The substrate was 65% cobble, 5% gravel and 30% sand.

This site was sampled using electro-shocking. In total, 16 individual fish were found at Site 13. There were 14 bluegills, 1 bluntnose minnow, and 1 pumpkinseed.

Figure 18: One of the crew members is using the shocking device, while the other has a net ready to catch any fish.

Site 14

This site is located along the west shoreline of the lake (Figure 2). This is a part of Critical Habitat Designation #6 on Lake Ripley (Figure 3). It is just north of District-owned shoreline property, referred to as the FEMA property.

There is a pier at the starting point of this site. The shoreline was natural and vegetated with the exception of the one pier. Site 14 was sampled for a total of 18 minutes.

The dissolved oxygen was 12.62mg/l, with a saturation of 151.7%. The temperature at this site was 23.2°C. Submersed, floating and emergent plants were present including: cattail species, white water lily, curly-leaf pondweed, Chara species, water stargrass, and a small pondweed species. Filamentous algae was also present. There were lots of dragonfly nymphs at this site. The substrate was 50% sand and 50% silt/marl.

Figure 19: Site conditions at Site 14.

This site was sampled using electro-shocking. In total, 32 fish were found at Site 14 (Table 2). There were 9 bluegills, 3 pumpkinseed, 18 mudminnows and 3 yellow bullheads. There were lots of tadpoles spotted in the water column.

Figure 20: Central mudminnow found at Site 14.

Fish Species Found at Site 14	
Species	**Site 14**
Bluegill (*Lepomis macrochirus)*	9
Yellow bullhead (*Ameiurus natalis)*	3
Pumpkinseed (*Lepomis gibbosus)*	2
Central mudminnow (*Umbra limi)*	18
Total:	**32**

Table 2: Total fish species and individuals counted at Site 14.

Lake Pointe Pier

The crew decided to sample two other areas, as we were in the area and curious. The first site we stopped at was the Lake Pointe pier, on the south side of the lake. This site is located in Critical Habitat Designation #7 (Figure 3). The shoreline was natural, dominated by cattails and swamp loosestrife.

The dissolved oxygen was 8.51mg/l, with a saturation of 103.9%. The temperature at this site was 24.1°C. Submersed, floating and emergent plants were present including: cattail species, white water lily, and a Chara species.

This site was sampled using electro-shocking. In total, 6 bluegills were found. Unable to catch them with the shocking equipment, hundreds of juvenile bass and bluegills were observed in the water column.

Vasby's Channel

The second site not included in the survey was Vasby's Channel, on the south side of the lake. This site is located in Critical Habitat Designation #7 (Figure 3). The shoreline was a mix of natural and artificial, including areas dominated by cattails and other areas lined with riprap.

The dissolved oxygen was 7.89mg/l, with a saturation of 95.6%. The temperature at this site was 23.6°C. Submersed, floating and emergent plants were present including: cattail species, white water lily, spatterdock, coontail and duckweed.

This site was sampled using electro-shocking. Two fish were shocked, including a bluegill and a largemouth bass. There were not a lot of fish observed in the channel, with more fish seen outside of the channel. There were lots of turtles in the channel.

Discussion

The nearshore area of Lake Ripley comprises a small portion of the total lake area (>8%) but is essential for biodiversity, invertebrates, fish spawning and early life-history stage survival. The nearshore fish assemblage establishes critical links in the lake's food web. This area is also the most altered zone of the lake due to a number of factors including piers, motorboats, shoreline armoring and historic herbicides treatments.

The loss of small nongame fish species can affect the growth rates of popular sport fishes. The WDNR conducted a nearshore fish survey and pier count on 13 southeast Wisconsin lakes, including Lake Ripley (Marshall and Lyons, 2008). During that survey, they found a significant negative correlation between numbers of intolerant nongame fish species and

pier densities. By 2004, Lake Ripley had a high pier density at over 50 piers/mile. Piers were found to negatively affect habitat (Garrison et al., 2005), but also indicated other activities and development that can impact habitat and nearshore fish populations as well (Radomski et al., 2010).

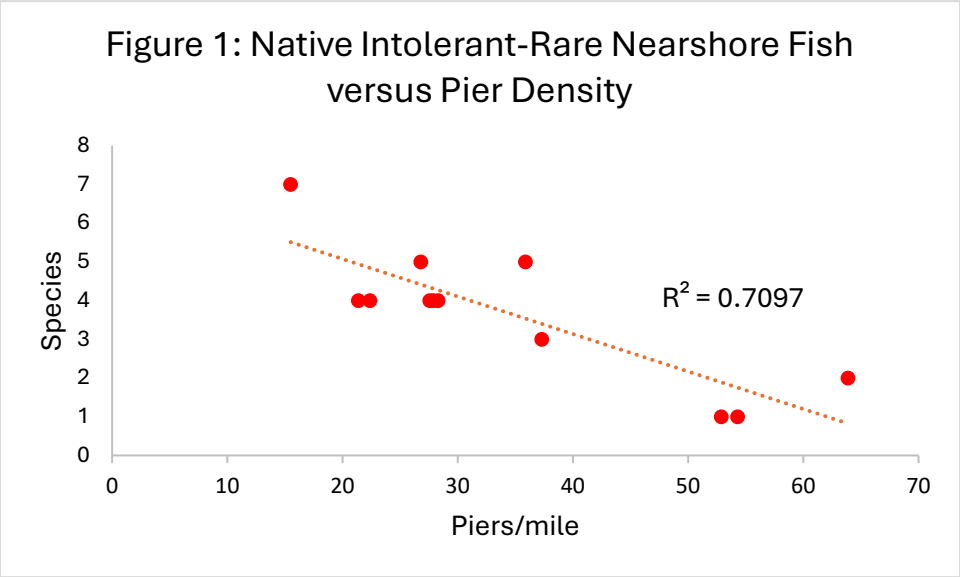

Figure 21: Native intolerant/rare nearshore fish vs pier density.

Nearshore habitat zones serve as important biodiversity hotspots, historically supporting diverse nearshore, nongame fish species. These fish contribute to the ecological integrity of the lake by linking energy flow between trophic levels, facilitating nutrient cycling, and supporting higher order consumers (Vander Zanden et al., 2011). The historical presence of several sensitive and indicator species suggests that portions of the nearshore habitat remain in good ecological condition. However, anthropogenic pressures have threatened this balance and warrant proactive management.

Abundance and Distribution

Nongame fish abundance varied among habitat types. Vegetated shorelines supported the most nongame fish species. Gravel and cobble substrates harbored darters while riparian vegetation supported mudminnows. The sites with a healthy, established aquatic plant community saw a more active nongame fishery. Developed shorelines with hardened structures generally exhibited lower species richness and abundance.

The littoral area is a critical component of lake ecosystems with the undisturbed habitats being a haven for aquatic life, teeming with aquatic plants and food. However, residential development over the years has led to nearshore habitat modification, which can alter NSNG fish communities. Studies have linked lakeshore development to reductions in abundance of aquatic vegetation, coarse woody habitat, and many have quantified the influence of the density of docks on aquatic habitat structure and individual fish species (Dustin and Vondracek, 2017). Undisturbed nearshore habitats are crucial for fish reproduction because they provide spawning grounds, protective nurseries for juveniles, and a rich food web that supports all life stages.

All of our sampled sites had submersed, floating or emergent aquatic plants. The complete list of aquatic macrophytes are listed below.

Plant Species Found at Sampling Sites	
Common Name	**Scientific Name**
Cattail	*Typha spp.*
Chara	*Chara contraria*
Chara spp.	*Chara spp.*
Coontail	*Ceratophyllum demersum*
Curly-leaf pondweed	*Potamogeton crispus*
Duckweed	*Lemna minor*
Flat-stem pondweed	*Potamogeton zosteriformis*
Illinois pondweed	*Potamogeton illinoensis*
Sago pondweed	*Stuckenia pectinata*
Small pondweed	*Potamogeton pusillus*
Spatterdock	*Nuphar advena*
Water celery	*Valisneria americana*
Water stargrass	*Heteranthera dubia*
White-stem pondweed	*Potamogeton praelongus*
White water lily	*Nymphaea odorata*

Table 3: List of native plants found at each sampled site.

In 2023, with help from the DNR, the District designated eight different areas of the lake as Critical Habitat Designations. Critical Habitat Designations are intended to identify areas, which if disturbed, would adversely affect public use and enjoyment of the lake. Such areas include locations important for maintaining fish and wildlife habitat, water quality, or reaches of shore that are predominately natural in appearance or that screen man-made or artificial features.

Our previous nearshore, nongame fish surveys aided the District is designating these areas. In previous surveys, we have found least darters and other sensitive nongame species in these areas.

Figure 22: Critical Habitat Designations in Lake Ripley.

In 2025, all but one survey site that was designated CHD had nearshore, nongame fish species present. The one CHD survey site that did not have any nongame species had recently had large boulder-like rock riprap installed, which may have contributed to the lack of fish species present.

Several factors were identified as potential threats and challenges to the health and diversity of nearshore, nongame fish populations in Lake Ripley:

- Habitat Degradation: Shoreline development, loss of vegetation, and the hardening of banks can reduce available spawning and refuge habitat.
- Water Quality: Lake Ripley is still mesotrophic, but maintaining favorable water quality is important.
- Invasive Species: The introduction and spread of non-native aquatic plants, zebra mussels and non-native fish may disrupt native fish assemblages and compete for resources.
- Climate Change: Warming temperatures and altered precipitation patterns can shift habitat availability and the timing of reproductive events.

Fish Species and Tolerance Levels Found in Lake Ripley (1975-2025)						
Species	**Notes**	**1975**	**2004**	**2012**	**2020**	**2025**
Golden shiner	Tolerant	17	3	55	0	0
Pugnose shiner	Intolerant	17	0	0	0	0
Blackchin shiner	Intolerant	15	0	0	0	0
Blacknose shiner	Intolerant	3	0	0	0	0
Bluntnose minnow	declining	152	1,833	10	11	4
Fathead minnow	Tolerant	1	1	0	0	0
Yellow bullhead*	Tolerant	0	0	33	38	19
Tadpole madtom*	Rare in L. Ripley	0	0	1	0	0
Central mudminnow	Tolerant	1	0	11	4	18
W. banded killifish	Intolerant	45	0	0	0	0
Blackstripe topminnow	Rare in L. Ripley	0	0	1	0	0
Brook silverside	-	19	69	0	2	6
Rock bass	-	1	0	13	3	3
Green sunfish	Tolerant	3	0	6	9	0
Pumpkinseed	-	64	0	0	3	10
Bluegill	-	171	324	217	109	61
Smallmouth bass	-	0	44	2	0	0

Largemouth bass	-	153	783	76	98	1
Black crappie	-	58	66	0	0	1
Iowa darter	Intolerant	0	25	2	6	0
Fantail darter*	-	0	0	15	13	7
Least darter	Intolerant	3	0	0	2	0
Johnny darter	-	2	17	15	2	0
Yellow perch	-	316	89	4	12	1
Total species	-	18	11	16	14	11
Total catch		1,041	3,252	461	312	131
Intolerant nongame fish	-	5	1	1	2	0

*Indicates the first time species were found in the lake when sampling was expanded to include a towed DC electroshocking barge beginning in 2012.

Table 4: Comparison of Nearshore Fish Catches From 1975 to 2025

The results indicate long term declines in nongame fish abundance and particularly numbers of environmentally intolerant minnows, topminnows and darters. Table 4 displays the intolerant nongame fish species decline since the 1975 Fish Distribution Study survey. It demonstrates a long-term decline in numbers of fish within the nearshore areas of Lake Ripley. In lakes where nearshore habitats have been altered, sunfishes and bullheads become the most common species while nongame fish species, particularly environmentally sensitive species, decline.

In all categories, the 2025 survey had the lowest number of native species, lowest total catch and for the first time not a single intolerant nongame fish was found.

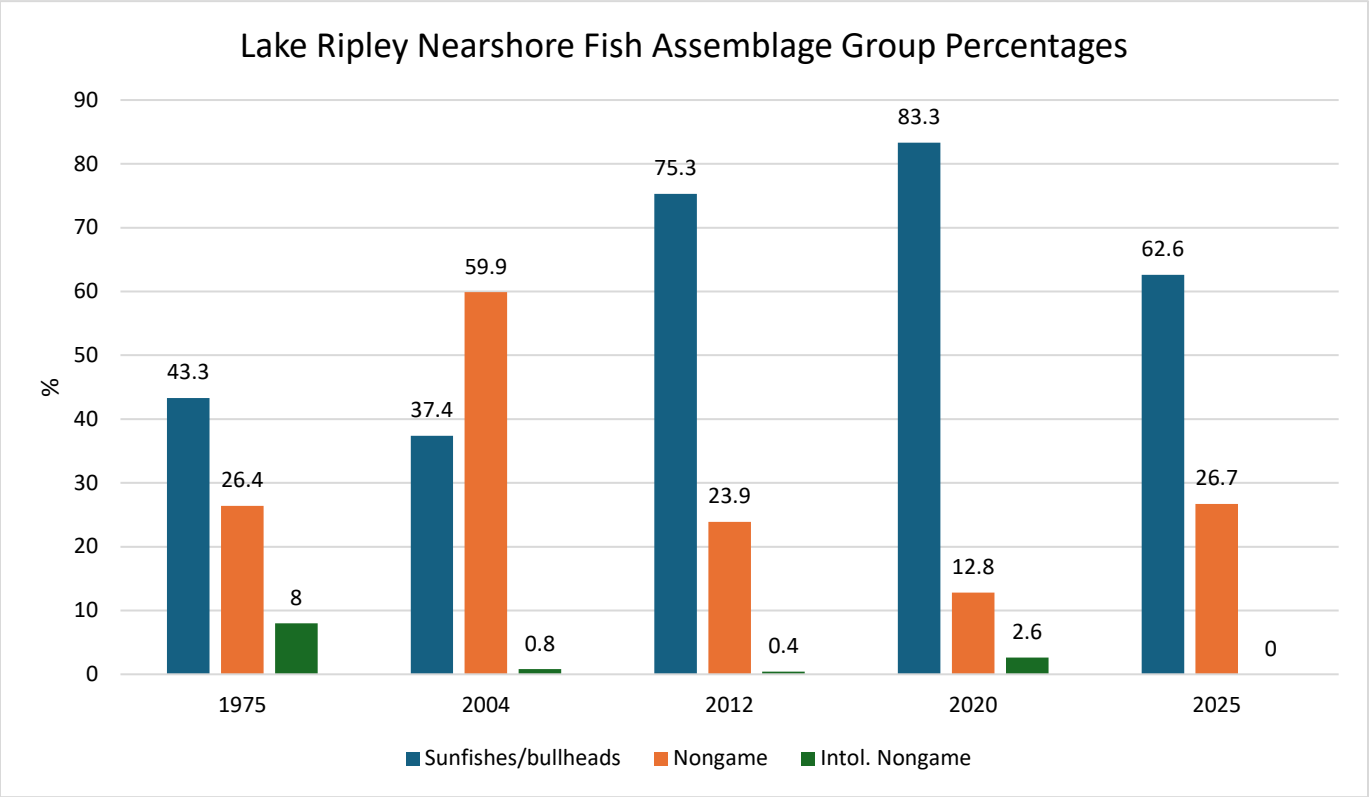

Figure 23: Nearshore fish assemblage group percentages on Lake Ripley.

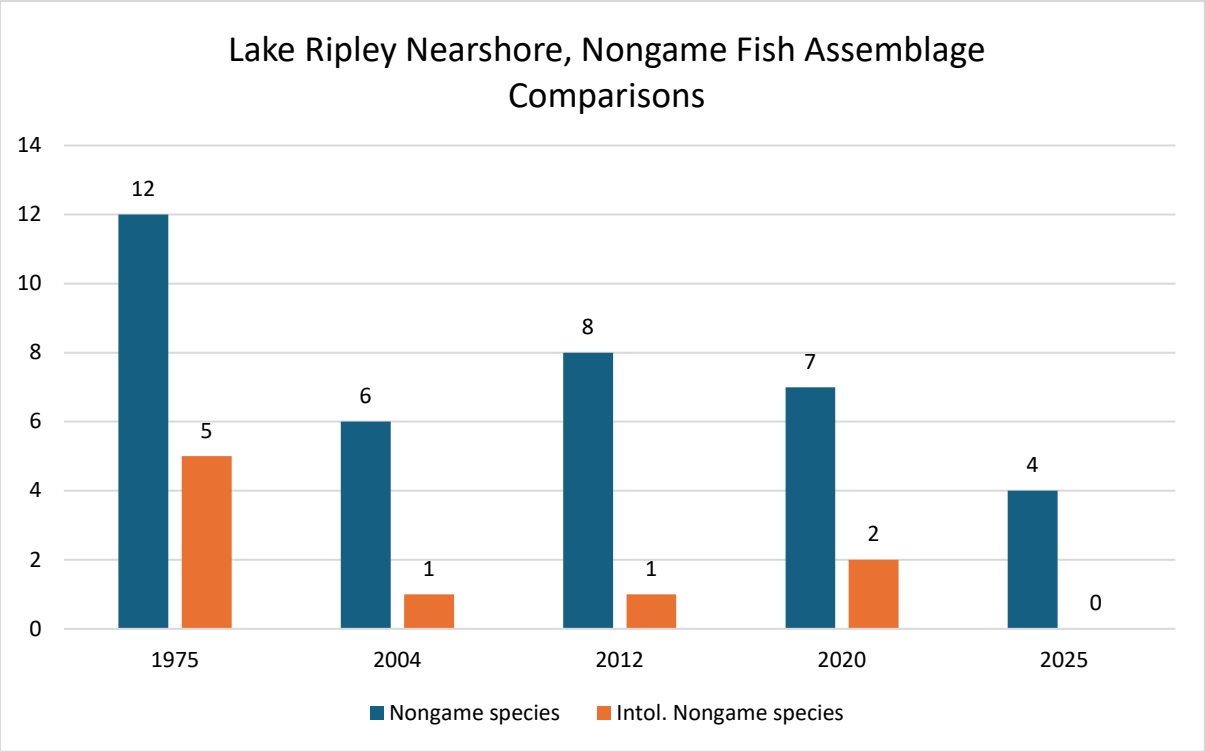

Figure 24: Nearshore fish assemblage comparisons.

Recommendations

To safeguard nearshore nongame fish populations in Lake Ripley, the following measures are recommended:

- Reintroduction of small nearshore, nongame fish species (ex. western banded killifish).
- Preservation and Restoration: Protect and restore natural shoreline vegetation and minimize development in critical habitats.
- Water Quality Improvement: Implement best management practices to reduce nutrient runoff and sedimentation from surrounding lands.
- Monitoring: Establish long-term monitoring programs focused on both game and nongame fish assemblages to detect changes over time.
- Public Education: Raise awareness among property owners and lake users about the value of nongame species and the importance of shoreline stewardship.

- Invasive Species Management: Increase efforts to detect and control invasive aquatic species before they become established.

Restoration Project – Western Banded Killifish

The western banded killifish is an important nongame fish species in the food web of many lakes. It became extirpated from Lake Ripley after 1975, likely due to one or more of the factors mentioned above. In 2013, the Lake Ripley Management District completed the first feasibility study to investigate options for restoring extirpated nongame fish species in the lake (Marshall and Dearlove 2013 Lake Planning Grant report). Given the importance of nearshore populations of small nongame fish for lake ecosystems, restoring nongame fishes in the lake is warranted. We have an opportunity to raise the western banded killifish in a nearby fish farm as a conservation aquaculture project.

In western Wisconsin, conservation aquaculture was used successfully to reestablish the state endangered starhead topminnow in Lake Wisconsin (Lyons et al. 2022, Marshall et al. 2021). The starhead topminnow and western banded killifish are members of the Fundulus genus in the Topminnow family (Fundilidae). The successful breeding and reintroduction of the much rarer starhead topminnow is a favorable indicator for western banded killifish in Lake Ripley.

Conclusion

Fisheries management has historically focused conservation efforts on game or sport fish species despite most fishes being nongame species. Although the intrinsic value of these nongame species should be impetus enough for conservation, this isn't the case in Wisconsin. The nearshore, nongame fish study on Lake Ripley provides a detailed snapshot of the lake's often-overlooked fish community.

The 2025 survey results showed declines in the native nearshore, nongame fish population. The most common species found (from most to least) were central mudminnow (18), fantail darter (7), brook silverside (6) and bluntnose minnow (4). Since 1975 there has been a significant loss of important fish assemblages in terms of both biodiversity loss and food-web instability.

The findings reinforce the ecological and conservation value of nongame species and underscore the importance of maintaining diverse and healthy nearshore habitats. Continued research, monitoring, and community involvement will be essential in ensuring the long-term vitality of Lake Ripley for both wildlife and people.

The District recognizes the importance of these species and has committed to a conservation aquaculture project. Loss of fish biodiversity in Wisconsin lakes has been a well-documented problem. This conservation aquaculture effort represents the second attempt in the state to restore locally extirpated non-game fish species using conservation aquaculture. This project not only has important implications for managing Lake Ripley but also for lakes across Wisconsin.

Recognizing the importance of these ‘little fish’ is crucial. They are vital in maintaining ecosystem balance and supporting biodiversity. The District strives to protect and enhance Lake Ripley’s overall ecological health, and will continue to fight for these ‘little fish’ and their ecosystem.

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