Focus on Aitkin Area Fisheries

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Slab Panfish!

By Rick Bruesewitz

Recently there has been some interest in making changes to the regulations for sunfish, which is currently a 20 fish possession limit, with no closed season. Some ideas that have been circulated include changes affecting the number of big fish that can be harvested. The reason for this is due to the unique behavior of Bluegills during spawning. Males of these gregarious centrarchids (family name for the sunfishes) fan out shallow depressions creating dish like nests, which they intently guard. Here's the interesting thing…the bigger the spawning males the better the population. When those few bigger males are removed, there will be more smaller males nesting and spawning in their place. This causes a decrease in growth rate because those smaller males are now putting more energy into spawning than growth. The end result is that there would then be more juvenile Bluegills too. When there are more, it often means they will grow more slowly too, simply because they are sharing the same food resources with more juvenile gills. Sometimes the poor early life growth rates continue too, to older ages. When this happens overall quality of the Bluegill fishery suffers. In other words you catch a lot of little ones, but not so many decent sized fish.

So….some ideas to help protect existing fisheries or to improve others included changes to limit the number of large fish that are harvested. Such as a 10 or 20 fish limit with no more than 5 over 8 inches. Others included 10 fish and 5 fish creel limits. The 5 fish limit is the current "Toolbox" regulation for sunfish and in the Aitkin Area it has been in place on the Big Sandy system since 2011. This includes the Sandy River from Hwy 210 to the mouth of the Mississippi River, as well as each lake in-between (Big Sandy, Flowage, Sandy River Lake, Steamboat, Davis, plus Aitkin Lake).

There are a handful of lakes in the county I believe would benefit from a reduced bag limit, but I'd also like to hear from you regarding Bluegill management. Consider giving me a call or sending me a note on your observations and what type of regulation you would be willing to live with. Ultimately, it's decisions you make now that determine what fish populations look like in the future.

This and all future issues will be posted on the Aitkin Fisheries website at: DNR FISHERIES LINK. I look forward to your feedback and suggested topics for future issues. You can contact our office by email at aitkin.fisheries@state.mn.us.

Did you know…that sometimes, when young, Northern Pike can resemble Muskellunge?

These are both Northern Pike that are about 18-20 inches long. While the bottom fish appears to have vertical bars (like a Muskie), those bars are light colored and within a short time they will separate into the light colored markings of a typical Northern Pike (top fish). Young Pike often have this coloration, which results in many people thinking they have caught a Muskie. Below are two photos of young Muskies. Note that the markings are each a bit different (different strains of Muskie) but each have dark markings on lighter backgrounds, whereas the Pike have light markings on a dark background.

"GRUMPY TECH TIPS

By Kris Nissen

HI, my name is Kris Nissen. I have been a fisheries technician at Aitkin for 12 years. One of my job responsibilities is keeping boats, equipment, and survey gear maintained. A simple yet often overlooked part of equipment maintenance is properly greasing equipment. Sometimes I get a little grumpy when the grease gun doesn't work!

A very common problem with grease guns is after installing a new tube of grease, the grease doesn't come out. A pocket of air gets trapped between the new grease and the pumping mechanism. It is necessary to bleed this air from the grease gun before it will work smoothly. Simply unscrew the head of the grease gun approximately one half to one turn and start pumping the handle. Loosening the head of the grease gun allow the trapped air to escape while the handle is pumped. Fully tighten the handle after the air is purged. This is a very simple tip that really works. Some grease guns have a built in bleeder air valve.

Here are a few more grease gun tips

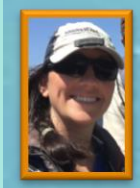
- Work clean. I like to wear disposable gloves and have a rag around when working with grease.
- Clean the surface of the zerk fitting with a rag to prevent pushing dirt into the zerk.

Typical grease gun.

- Make sure the zerk fitting accepts grease. Clean or replace the zerk if it doesn't accept grease.
- Keep the grease gun in a warm area in the winter if possible. Warm grease flows easier than cold grease.
- Follow the owners manual for how frequently to grease your equipment. Use common sense when greasing equipment, parts that don't move fast need less grease than parts that spin or move fast.
- Be careful to not over grease trailer bearings. It is possible to damage the inside seal on a trailer bearing if you force too much grease inside a bearing.

I hope these tips help with your grease gun. Maybe they will prevent a "grumpy" moment.

Limnology Basics: Lake Morphometry (Shape and Depth) and what it means to fish.



By Alisha Hallam

The land of 10,000 lakes is the land of 10,000 different lakes and we actually have more than that (11,842 that are 10 acres or larger). Minnesota lakes are different sizes, depths, and shapes and support a wide variety of diverse communities of organisms. The sizes of the lakes that are completely within the state can be anywhere from a single acre up to 288,800 acres (Upper and Lower Red Lakes) and our two largest border lakes are even bigger. Lake of the Woods is a total of 950,400 acres with 307,010 of those in Minnesota and Lake Superior is 20,364,800 acres with 962,700 of those in Minnesota. The deepest inland lake in Minnesota is Portsmouth Mine Pit in Crosby at 450 feet deep; our deepest natural lake is Lake Saganaga, in Cook County, at 240 feet; while our deepest border lake is Lake Superior at 1,290 feet deep.

The shape and depth of a lake can often tell you what type of lake it is. Some lakes will be oligotrophic, which means they are less productive, while other lakes will be more eutrophic, meaning they are more productive. Mesotrophic lakes are in the middle, less productive than eutrophic and more productive than oligotrophic lakes, and are what is most common in Aitkin County. For instance, a cone shaped lake with steep shorelines will often be a deeper lake with a limited littoral zone; whereas, a bowl shaped lake will be more shallow and have a proportionately larger littoral zone.

The littoral zone is the area of a lake that is near shore and shallow enough that light can penetrate through the water to the sediment. This is important since photosynthesis (primary production) can only occur with sunlight, also so rooted aquatic vegetation can grow. The littoral zone is one of three zones often referred to when discussing a lake and the organisms within it. The other two zones are the pelagic zone, and the benthic zone.

Back to the case of the cone shaped lake. Because it has such steep shorelines, the depth reaches beyond the littoral zone much sooner than it does in lakes with a gradual shoreline. Less of a littoral zone typically means less productivity and so the lake will be more oligotrophic. In contrast, bowl shaped lakes tend to be more eutrophic because the littoral zone is larger due to the depths dropping off more gradually, creating a larger area where productivity is higher.

While the littoral zone is near shore, the pelagic zone is the open water offshore where light does not penetrate all the way to the bottom. The third zone is the benthic zone and is the zone of water near the bottom of the lake, which consists of layers of mud, sand, rock, other minerals, or decomposed organic matter. The benthic zone is within both the littoral and the pelagic zones.

Each of these zones offers different habitats and is home to its own unique community of organisms. Some organisms remain primarily in one zone, whereas others can use

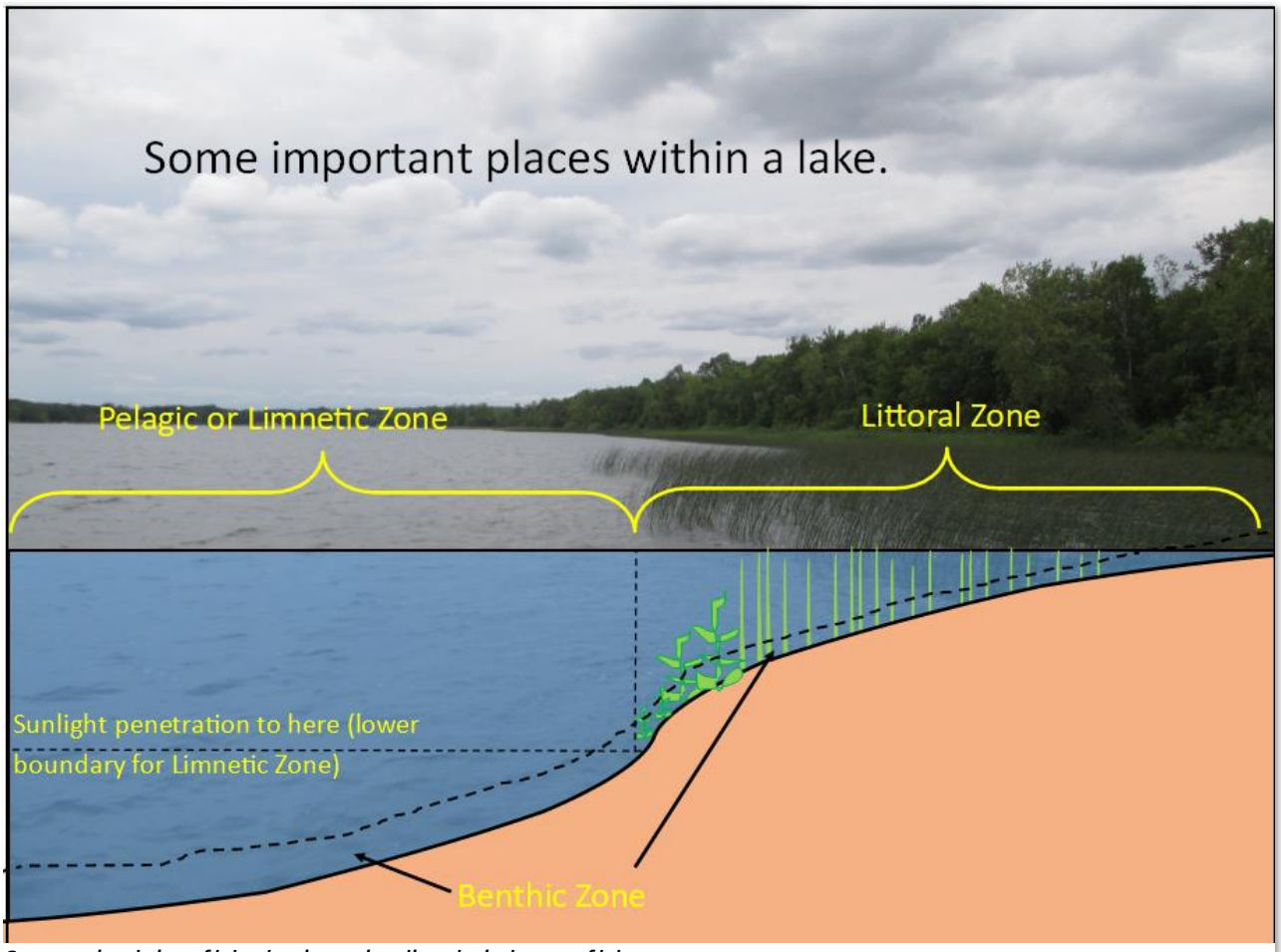
Lake Moprhometery cont'd

different zones for different purposes or life stages. Organisms from one zone can have an impact on another zone. For example, faecal matter from zooplankton in the pelagic zone is an important source of food for the benthic zone organisms; and in smaller lakes, phytoplankton carried into the littoral zone can be a food source for mussels and cladocera (a small zooplankton).

Throughout their development, fish tend to use different zones for feeding. As juveniles, most minnows tend to feed on plankton and are therefore found in the pelagic zone; but as adults, they are typically found feeding in the benthic zone during the day and using the littoral zone at night.

Game fish often use more than one zone in a lake depending on their life stages and timing. Fish also prefer lakes with different levels of productivity. In an oligotrophic lake (with steep shorelines, deeper water, a larger pelagic zone and a limited littoral zone), you are more likely to find fish species such as trout or cisco because they prefer the pelagic zone where the water is deeper and colder. Mesotrophic lakes (with productivity higher than an oligotrophic lake and lower than that of a eutrophic lake) are ideal for walleye, which will utilize all zones dependent on sources of food. Northern Pike, Largemouth Bass, and panfish are great examples of fish you would find utilizing the littoral zone of both mesotrophic and eutrophic lakes (generally bowl shaped with shallow waters and a larger proportion of littoral zone than oligotrophic waters).

So now, when you look at the shape and depth of a lake it can often tell you what type of creatures you might find there and where each might be located.



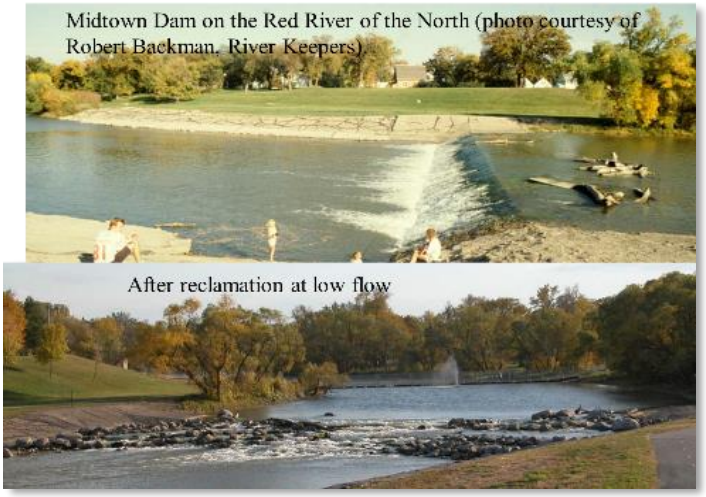
Cross-sectional view of lake showing various limnological zones of lake.

River and Stream Connectivity

By Greg Berg

Minnesota has large and diverse stream and river resources. In fact there are nearly 70,000 miles of stream and rivers in Minnesota of which roughly 16,000 of those miles support recreational fishing, with species ranging from trout to catfish. Aitkin County is home to hundreds of miles of rivers and streams, including over 100 miles in just the Mississippi River. At one point in history rivers were primarily managed by DNR Fisheries, however now there are multiple state and federal government agencies as well as many special interest groups involved the process.

MN DNR Fisheries considers there to be 5 major components when managing streams: Hydrology, Geomorphology/Fish Habitat, Water Quality, Biological Communities, and Connectivity. Hydrology refers to precipitation, stream flow, watershed and drainage data. Geomorphology and fish habitat refers to channel shape, depth, velocity and substrate of streams. Water quality are variables such as temperature, pH, oxygen, conductivity and many others. Biological communities include the aquatic plants, animals, invertebrates and fish that live in the stream. And last, but not least, is "Connectivity", which addresses nutrient cycling, energy pathways and habitat fragmentation.



An example of a dam replaced with a rock arch rapids to promote fish movement above the dam.

Many river experts make reference to how river health is similar to human health. For instance, just as our human health is determined by the factors that influence our bodies, including environment, lifestyle, and healthcare, so too is stream health determined by the combined factors of the stream's configuration, environment, resilience, and our stewardship. A stream, like the human body, has several interdependent features that indicate health of the stream. Hydrology, geomorphology, water quality, biology, and connectivity are components of rivers that work collectively to define rivers and their health (Annear et al. 2004). Each of these components is, in itself, a complex group of variables. Changes in one of these components can have a cascading effect on the other components.

Mississippi River and its tributary the Rice River. Also note the numerous oxbow lakes (locally known as Logans) that were formed when bank erosion on the main river broke through and the meanders were lost . The ones that still connect to the Mississippi can have awesome fisheries. Also note that the Rice River connects such waters as French, Gun, Fleming, Wilkins, Portage, Dam, Long, Camp, and Rice Lakes to the Mississippi River.

For the purpose of this article I would like to address the "Connectivity" component of stream management and some examples of how projects have helped to restore connectivity in streams including how a project in Aitkin County aims to do the same.

Connectivity of a river system refers to the flow, exchange, and pathways that move organisms, energy and matter through these systems. These pathways are not always linear. The interrelated components of watershed, hydrology, biology, geomorphology, and water quality, together with climate, determine the flow and distribution of energy and material in river ecosystems. Complexity and interdependence is the hallmark of connectivity. The interaction of primary factors (i.e., water, energy, and matter) creates an extensive physical environment that varies over time. Rivers are connected in four dimensions: longitudinally from headwaters to their mouth, laterally from channel to floodplain and valley, vertically from their bed to the groundwater, and through time. Rivers are shaped and characterized by the movements of water through the longitudinal, lateral, and vertical dimensions, which transfer materials, energy, and organisms. The time dimension is also a critically important consideration in establishing instream flow prescriptions because of the dynamic nature of the riverine components (MN DNR Stream Survey Manual).

Over time, one of the largest factors that has caused rivers to lose their connectivity from a fisheries perspective has been the construction of dams. It's well documented that dams are known to fragment habitat in river systems and prevent many species of fish from being able to reach historical spawning and nursery areas. While most dams were built with good intentions such as creating hydroelectric power and maintaining or controlling water levels, many of them did not provide the anticipated benefits, deteriorated over time and either needed to be updated, rebuilt or removed. Many of them also became hazards to boaters and swimmers due to the dangerous currents and undertows that can exist near dams.

Schematic of a typical rock arch rapids that would allow fish to swim upstream past the dam.

In recent times there has been a trend toward dam removal and replacing old dams with rock arch rapids structures that maintain existing water levels and also allow for fish passage. The largest example of this type of work and its success has been done on the Red River of the North. Early on, the Red River and its tributaries were home to a wide variety of dams, many of which prevented species from gaining access to critical spawning areas. Perhaps the most notable fish species affected by the fragmentation of habitat caused by the construction of dams was the Lake Sturgeon. Lake Sturgeon are known to migrate long distances to areas with clean rock and gravel to lay their eggs. There is not a lot of ideal spawning habitat in the Red River itself so when dams began to block migrations they could not reach the best spawning locations, which were found in the tributaries. Coupled with heavy exploitation the species was not able to sustain itself and crashed. There has been a huge movement to reconnect the Red River in the past 25 years by removing many of dams that had once been barriers to fish movement and together with stocking efforts the Lake Sturgeon population is recovering. Though on smaller scales similar efforts have become commonplace on many other rivers and streams as well.

Another example of a low head dam that prevents fish movement on the Ripple River. This is at the outlet of the Ripple River at Spirit Lake. Here, the main issue is with juvenile fish. There is a spawning area just below the dam and while adult can usually make it back up into the lake, later in summer the juvenile walleye cannot navigate the barrier. Members of the Aitkin County Water Planning Task force toured the site a few years ago.

Not unlike the Red River basin, here in Aitkin County there are several dams/water control structures that are hindering fish passage as well. One such structure is the water control structure at the outlet of Lake Minnewawa. Currently there is a proposal to modify the existing structure to allow for fish passage under all flow conditions. The area below the dam will be reconstructed to accommodate a series of riffles termed "rock arch rapids" and will be designed in a stepped fashion to simulate a natural gradient and also provide spawning habitat. When completed Walleye and other species will again be able to move naturally throughout the watershed and its associated lakes and streams, while the flow regime and water levels on Lake Minnewawa remain unchanged. The height of the dam will be the same so water levels will remain close to recent flow regimes.

Minnewawa Creek Dam at Lake Minnewawa. While not very high, it still prevents fish from moving back up into the lake. This is especially true of smaller juvenile fish when water levels are low.

These types of projects have been successfully completed on numerous rivers and streams throughout Minnesota and we expect them to continue in the future to improve connectivity and subsequently the overall health of these aquatic systems.

Another example of a modified dam, similar to plans for Minnewawa Creek. This one was near the McKeown Lake outlet, near Longville, MN.