

Rice Lake – Lake Protection and Rehabilitation District Radio Spot #3

Annual Changes in Aquatic Plant (lake weeds) Growth

Introduction

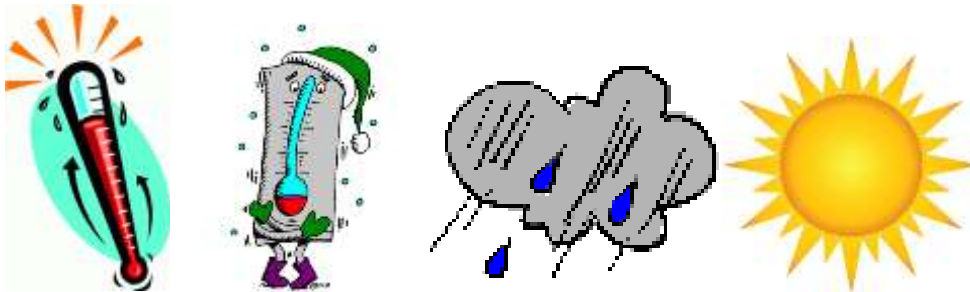
Like all plants, aquatic plants, or plants that grow in the water, need three things to grow: sunlight, water, and nutrients (food). Agricultural plants like corn and soybeans need the same thing: sunlight, rain (water), and nutrients. Trees, grass, flowers, and the vegetable plants in your garden do to. Annual or seasonal variation in these three things will determine the amount of plant growth that occurs. Mother Nature (weather conditions) has the most to do with these variations, but other factors can affect plant growth as well.

Weather

Depending on the growing conditions that present themselves in any given year, the amount of plant growth, whether in a lake or in a field, changes.

Hot, Cold, Wet, Dry

When there is a cold, late spring plants get started growing later. An early warm spring typically means plants get started growing earlier. But even this is not always the case. An early spring with little sunshine and lots of rainfall will slow plant growth down. An early spring with lots of sunshine, but little rainfall will slow plant growth down. A late spring with lots of rain and little sun will really slow things down. A late spring with plenty of sunlight, but little rain fall will slow plant growth down.



The perfect spring that promotes the kind of plant growth humans beings would like is seldom ever had. So we do our bests to manipulate Mother Nature, but in reality, we have little control over her. The agricultural industry supporting our local farmers thrives on trying to manipulate and accommodate for what Mother Nature brings each year. There are more ideas on when to plant, what to plant, how to plant, and where to plant agricultural products than anyone could imagine. Almost every farmer has his or her own philosophy on how to get the best yield out of their crops. In many lakes, we try to manipulate the aquatic plant growth as well. In Rice Lake, curly-leaf pondweed, an invasive species, is managed with harvesting and herbicides just as soon in the spring as possible. Other native plants are managed by the Lake District and by lakeshore property owners.

Winter Conditions

It is not just the kind of spring that is had, it is also the kind of winter. This is particularly true of aquatic plant growth in lakes. A long winter with lots of heavy snow cover prevents sunlight from penetrating through the ice to the water and aquatic plants below. When this happens plants in a lake get a late start, as they don't start getting enough sunlight until all the snow melts. A winter where there is not a lot of snow cover typically lets more sunlight pass through the ice giving plants a little earlier start in growing. The amount of ice plays a role. Thick ice reduces sunlight, thin ice lets more through. This is similar to the amount of frost in the ground. Frost (or frozen ground) that extends deeper than is "normal" can damage or reduce the growth rates of many plants.



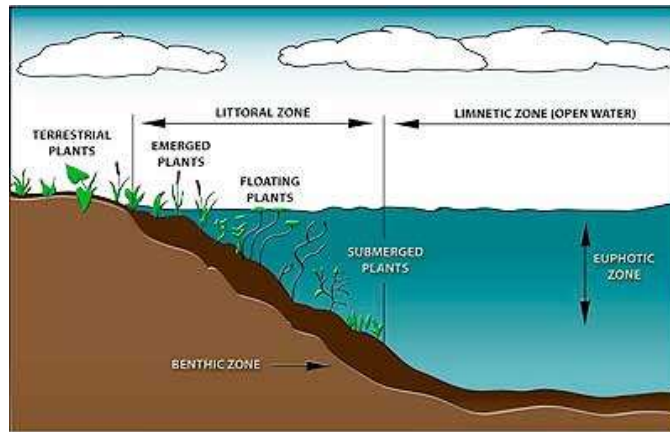
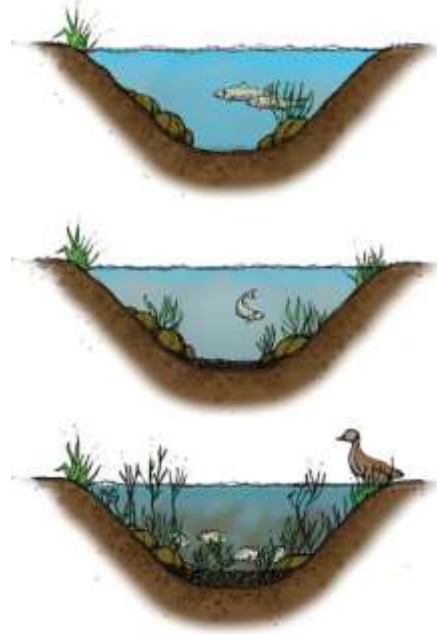
Summer Conditions

The kind of summer we have also impacts the growth of aquatic plants, and perhaps more important, the growth of algae, the tiny aquatic plant that turns many of our lakes green and gross as the summer progresses. A very warm summer supports greater algae growth. A warm summer with lots of rainfall really supports algae growth because all that rain carries lots nutrients (plant food) into the lakes. A cool summer may support a lesser amount of plant growth. A very dry summer that is also cool, will support even less aquatic plant and algae growth as the available nutrient (plant food) supply in a lake is generally reduced.



Location

There are different kinds of lakes. Some are deep and some are shallow. Some are small and some are large. Some have simple shapes and some have complicated or irregular shapes. Aquatic plants in a lake grow where enough sunlight penetrates into the water and down to the bottom of the lake to provide the necessary energy for that growth. The area of a lake where the penetration of sunlight is adequate to grow aquatic plants is called the "littoral zone". Every lake has one, but depending on the kind of lake, it will have more or less. Deep lakes with steep shores will have a very narrow littoral zone. In a shallow lake, the entire lake might be considered a littoral zone. In any lake, once the water gets too deep to allow adequate sunlight to reach the bottom, plant growth ends. That is why in most lakes there is a "band" of vegetation around the lakeshore, and the deep water stays open or unvegetated.



The depth to which sunlight can penetrate into the waters of a lake is influenced by several factors. Dark water lakes allow less light to penetrate, clear water lakes allow more. As the summer season progresses, algae growth that causes the water to turn green can limit sunlight penetration. Sediment in the water either washed into the lake from the shore, or stirred up from the bottom can make the water brown and limit sunlight penetration.



Type of Bottom

Different bottom types grow different species and abundance of aquatic plants. Soft bottom or mucky areas with lots of nutrient-rich, organic sediment will grow many more plants than areas that have a hard bottom made up of sand, gravel, or rock. If your lake property is on a back bay or some other location where there is a lot of muck, there will be a lot of aquatic plant growth. Property on points or along exposed shorelines will have less aquatic plant growth.

Nutrients (Food)

Aquatic plants need food. The food of choice are nutrients like phosphorous and nitrogen, the same phosphorus and nitrogen that is put on farm fields and lawns to make the crops grow or the lawn thick and green. Unfortunately in the water an over-abundance of plant food leads to excessive aquatic plant growth and algae growth. Many things contribute nutrients to the water.

Human Activities

Intense cultivation or land development near a lake generally increases the amount of aquatic plants by increasing the amount of nutrients flowing from the land into the water. Nutrient-laden discharges from sewage treatment plants, livestock feedlots, and leaky septic systems promote heavy growth of aquatic plants. Development on the land also speeds up the aging process of a lake. The construction of roads and houses removes vegetation that would normally protect soils, leading to more soil erosion. Mowed lawns down to the edge of the water increase the amount of nutrient laden runoff that enters a lake. Eroded soils from shorelines and along paths and stairways leading to the lake cover sand and gravel providing additional areas where plants might grow. The addition of houses, paved driveways, and other hard surfaces adds to the amount of nutrient-rich runoff that flows into lakes and streams. For all of these reasons, lakes and ponds that did not support a dense growth of aquatic plants in their natural state may show increased growth because of human activities.

High levels of boat traffic can increase the amount of sediment disturbed from the bottom of the lake. Nutrients are also in this sediment, and when it is re-suspended into the water column instead of left at the bottom, more food is released for plant and algae growth. So if you are driving a boat on Rice Lake, go slow in the shallow water areas, and pull your motors up a bit when entering and leaving your favorite fishing spot.

Types of Aquatic Plants

Aquatic plants are grouped into four main categories. The type of plant and where it grows is influenced by annual variations in growing conditions. The four main categories of aquatic plants are:

1. **Algae** – Algae have no true roots, stems, or leaves and range in size from tiny, one-celled organisms to large, multi-celled plant-like organisms, such as chara or muskgrass. Plankton algae, which consist of free-floating microscopic plants, grow throughout both the littoral zone and the well-lit surface waters of an entire lake and what is most associated with a green color in the water. Other forms of algae, including stringy filamentous types, are common only in the

littoral area. In lakes that have excessive amounts of nutrients, more toxic blue-green algae can develop further deteriorating conditions in a lake.



Planktonic algae



Filamentous algae



Toxic blue-green algae

2. **Submerged plants** have stems and leaves that grow entirely underwater, although some may also have floating leaves. Flowers and seeds on short stems that extend above the water may also be present. Submerged plants grow from near shore to the deepest part of the littoral zone and display a wide range of plant shapes. Depending on the species, they may form a low-growing "meadow" near the lake bottom, grow with lots of open space between plant stems, or form dense stands or surface mats. Two well-known aquatic invasive plant species in Wisconsin lakes curly-leaf pondweed and Eurasian watermilfoil are submerged plant species.



Good submerged plants



Curly-leaf pondweed



Eurasian water milfoil

3. **Floating-leaf plants** are rooted in the lake bottom, but their leaves and flowers float on the water surface. Water lilies are a well-known example. Duckweed is a very tiny floating-leaf plant that is not rooted to the bottom. Floating leaf plants typically grow in protected areas where there is little wave action.



Lily pads



Duckweed



Water-shield

4. **Emergent plants** are rooted in the lake bottom, but their leaves and stems extend out of the water. Cattails, bulrushes, and other emergent plants typically grow in wetlands and along the shore, where the water is typically less than 4 or 5 feet deep.

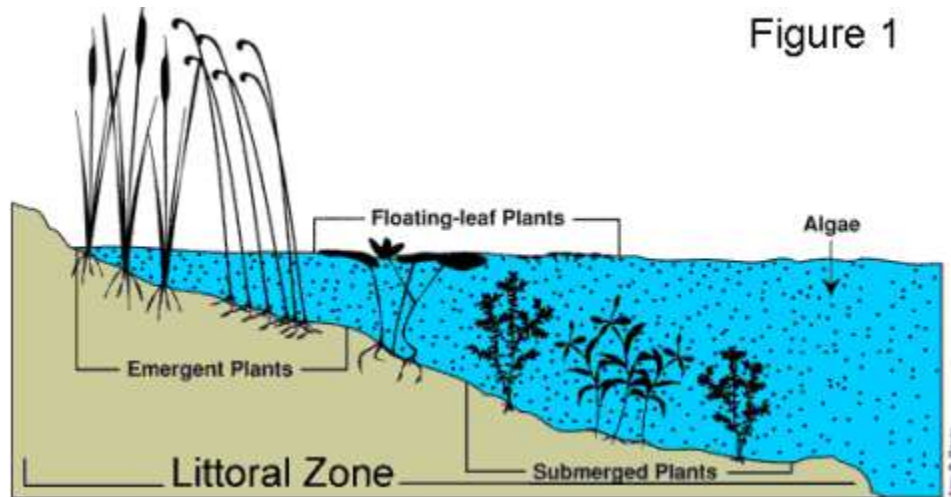


Ruses and more

Pickerel weed

Arrowhead

Once again, all of these plants grow in the area of the lake that is called the littoral zone, and are mostly driven by the amount of sunlight that is available to them.



Aquatic Plant Growth in Rice Lake

Aquatic plant growth in Rice Lake is generally considered pretty abundant. In the spring, growth of the non-native, cold water, invasive species curly-leaf pondweed (CLP) dominates the aquatic plant community. CLP is one of the earliest growing plants species in Wisconsin lakes, actively growing even under the ice. It thrives in colder water that other plants cannot tolerate. When the ice goes out, and water temperature is still too cold to grow other plants and algae, CLP thrives. It is during this time that the big blue aquatic plant harvesters are the most active on Rice Lake. It is also during this time frame that aquatic herbicides are being used to aide in management of CLP. From 2009 to 2013, aquatic herbicides were used to control CLP along Lakeshore Drive. The end result was a shoreland area that

was much nicer looking for Aquafest and other spring and early summer activities. Beginning in 2015, aquatic herbicides are being used in an attempt to severely reduce the amount of CLP in the South Basin (south of the Narrows bridge).



CLP harvesting on Rice Lake

When the water starts getting warmer in the early summer, CLP completes its life cycle and dies back. Native aquatic plants then take over replacing the CLP. More than 40 different species of aquatic plant were identified in Rice Lake during the 2013 aquatic plant survey. This is substantially higher than the number of plant species in most flowages (lakes created by damming a river). The greater the diversity of aquatic plants, the healthier the lake is considered to be.

There are places in Rice Lake where aquatic plant growth is abundant and places where it is limited. Whether this is good or bad is based on perspective. In terms of a healthy lake, abundant aquatic plants, but not excessive amounts, are considered good. If you are a property owner trying to launch a boat or swim in an area of the lake that has a lot of vegetation, you probably think it is bad. Once the CLP is gone, the Lake District tries to maintain open navigation corridors and access lanes through areas of the lake with the most abundant plant growth. Areas of the lake that see the most disturbance, like by boat landings and along shorelines where wave action from the wind and from boat traffic, generally have less vegetation. Those areas in back bays protected from wind and waves generally have more vegetation.

2015 Aquatic Plant Growth in Rice Lake

The spring of 2015 was cool and dry, leading to clear water lasting longer than usual in Rice Lake. It was too cold early in the season to grow the algae that makes the water turn green. Clear water in Rice Lake extended to more than 10 feet this spring as there was also little runoff from shorelines, farm fields, and roadway ditches. Since the water clarity lasted longer, more of the bottom of the lake was exposed to adequate sunlight to grow aquatic plants.

Curly-leaf pondweed had a terrific year due to the clear and cool lake water, producing several times more vegetation than in the last couple of years. The big blue harvesters were very busy this spring. Longer lasting clear water has also stimulated a greater amount of native plant growth in the lake. More recent large-scale rain events have added a lot more surface water runoff from the land into the rivers and streams that bring water into Rice Lake. This additional runoff carries with it nutrients that add to the food available for plants and algae. This additional food will lead to more algae, with the possibility of some of the toxic blue-green algae growing.

Over the last several years, water quality conditions in Rice Lake have improved. With a little hard work and appropriate management actions, the lake's water quality will continue to improve. Lake management is not as an exact science as one would like it to be. Sometimes the best we get is "two steps forward, and one step back". As long as the lake continues to improve over time, one less desirable year can be tolerated.

Dave Blumer, Lake Educator
Lake Education and Planning Services, LLC
Rice Lake – Lake Protection and Rehabilitation District Consultant

dblumerleaps@gmail.com

715-642-0635

Aquatic Plant Resource Pages

<http://www.dnr.state.mn.us/shorelandmgmt/apg/abundance.html>

<http://www.ecy.wa.gov/programs/wq/plants/native/lakes.html>

<http://dnr.wi.gov/lakes/plants/>

<http://extension.psu.edu/natural-resources/water/ponds/pond-management/aquatic-plants>