UTAH Master Naturalist

Watersheds Plant Field Book

Mark Larese-Casanova

UtahStateUniversity
COOPERATIVE EXTENSION

UTAH Master Naturalist

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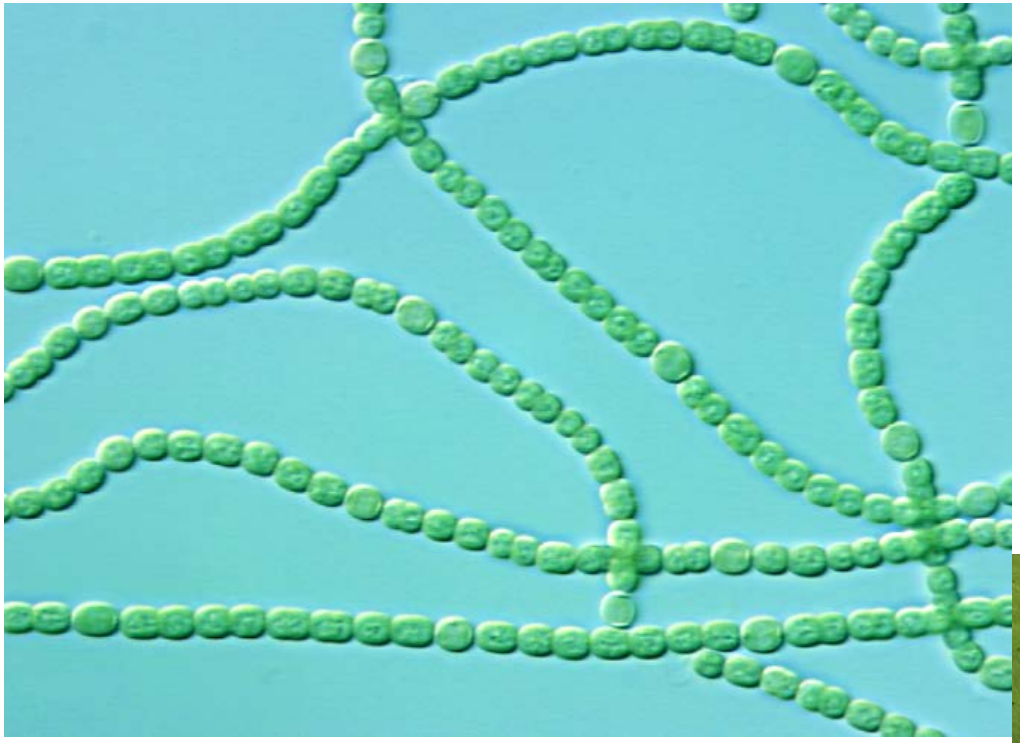
How to Use this Field Book:

The Utah Master Naturalist Watershed Plant Field Book is meant to provide you with an annotated look at some of the common, rare, and invasive plants and other producers of Utah's watershed ecosystems. This book provides photographic examples of each species along with useful information on the species' life history and ecology. When used along side a detailed field guide, this book will help you learn about plants during your watershed explorations. Have fun!

Contents:

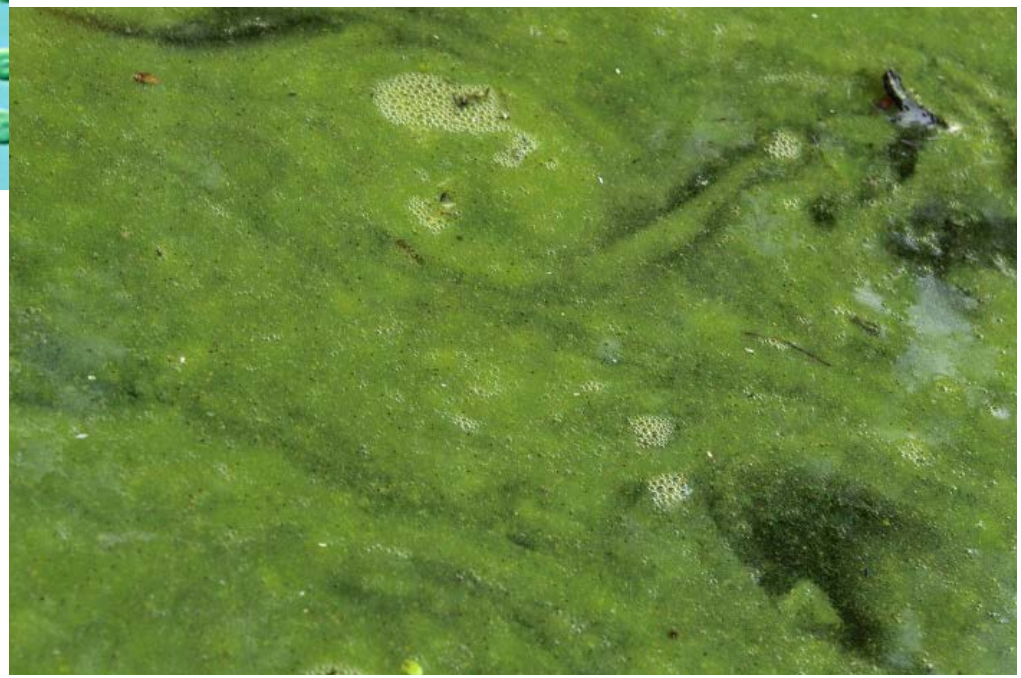
All photos are courtesy of Mark Larese-Casanova (Utah State University) and various public open sources, unless otherwise noted. All plant maps are courtesy of the Digital Atlas of the Vascular Plants of Utah authored by Beverly J. Albee, Leila M. Shultz, and Sherel Goodrich, published by the Utah Museum of Natural History, 1988.

Cyanobacteria
Phylum cyanobacteria



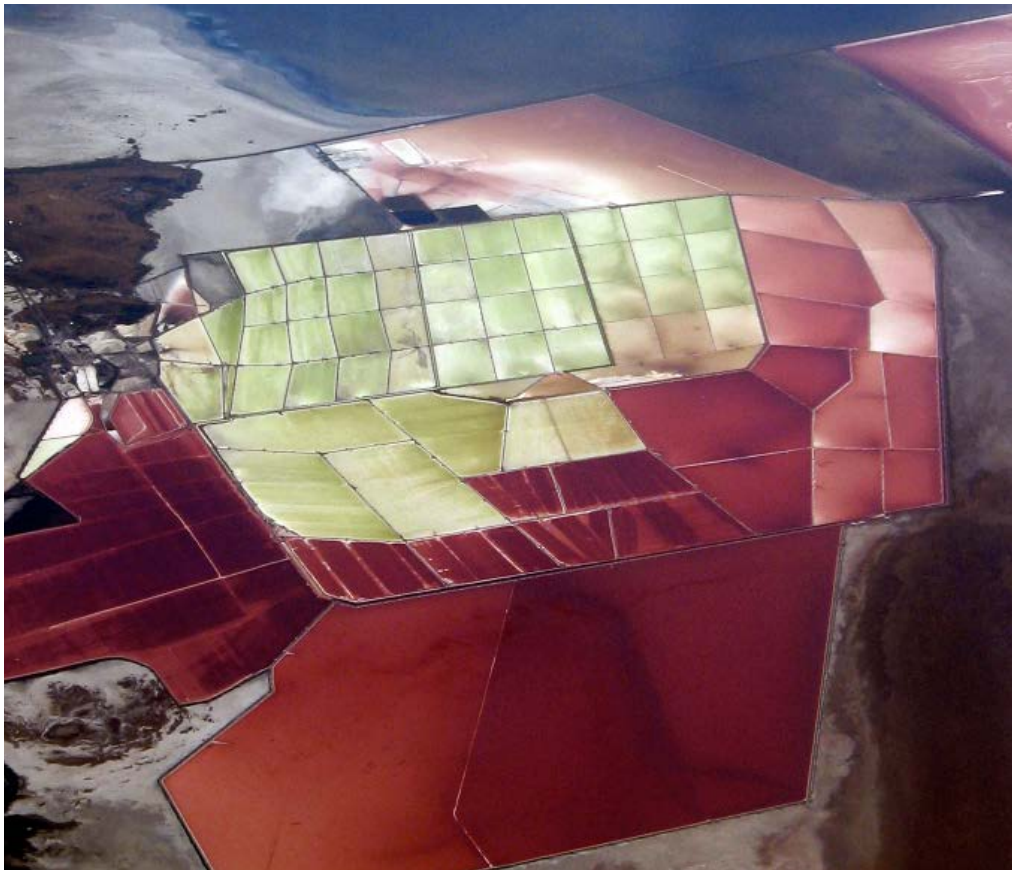
- Most primitive and diverse group
  - oldest fossil
  - origin of cloroplasts
  - generated much of Earth's oxygen
- Photosynthetic
- Food for other organisms

Microscopic producers are commonly referred to as phytoplankton. Cyanobacteria, or blue-green algae, are a common type of photosynthetic organism in aquatic and wetland habitats. They are prokaryotes (cells without nuclei), and were one of the first photosynthetic organisms to emerge on earth. While they are predominantly unicellular, they can grow in colonies that are large enough to see. Cyanobacteria have the distinction of being the oldest known fossil (i.e., approximately 3.5 billion years old) and are greatly responsible for generating the oxygen in Earth's atmosphere millions of years ago. Cyanobacteria are also responsible for the origin of photosynthesis in plants. The chloroplast that generates food via photosynthesis originated from a cyanobacterium living within the cells of plants. This endosymbiotic relationship between plants and cyanobacteria began approximately 500 million years ago.



Algae

Kingdom Protista



- Green algae
- Great Salt Lake algae
  - Foundation of the GSL food web
  - High salinity tolerance
- Diatoms

Aside from cyanobacteria, there are many single and multi-celled microscopic phytoplankton that live in Utah's aquatic systems. They share many characteristics with plants, but are considered to be a different kingdom, Protista, which is comprised primarily of single-celled organisms that are either plant- or animal-like. The autotrophs, or organisms that produce their own food via photosynthesis, are called phytoplankton. Plankton play a very important role in the ecosystem. Much of the photosynthesis that happens in aquatic environments is carried out by phytoplankton.

Green algae are are the largest and most diverse group of algae, with over 7000 individual species. They can be single or multi-celled, and are one of the oldest types of photosynthetic eukaryotes (cells with nuclei housing the genetic information). Two main species of algae are common in Great Salt Lake: the red pigmented *Dunaliella salina* and the green pigmented *Dunaliella viridis*. Each of these three common algae have their own range of tolerance to salinity. The red *D. salina* is tolerant of higher salinity than the green *D. viridis*. When the salinity of Great Salt Lake fluctuates, so do the proportions of each of these species within the algal communities.

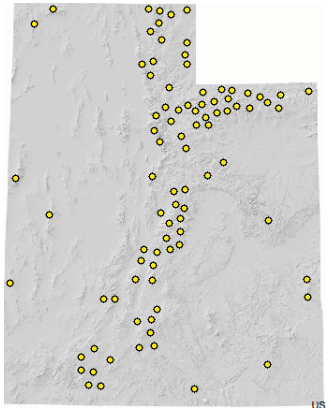
Diatoms are another common type of algae, or Protist, found in Utah's aquatic and wetland systems. A defining characteristic of diatoms is that they possess a cell wall of silica (i,e, glass) with two halves that fit together like a shoebox. While diatoms are not green like many other autotrophs, their yellowish-brown chloroplasts (i.e., organelles that conduct photosynthesis) render them efficient primary producers.

Tufted hairgrass

Deschampsia cespitosa

Tufted hairgrass is native to North America, but can now be found in temperate and moist arctic regions around the world. It is generally found in moist soils, and grows at more than 14,000 feet above sea level. In the western United States, it is a useful native grass to stabilize recently disturbed areas. It is a perennial grass. The culms are hollow and stand up to or over 40 inches high. The leaves are concentrated around the base of the plant and can be over 12 inches long. It has a very dense root system, which is helpful in stabilizing riverbanks and other areas with high erosion risk. In Utah, it is an important grazing food for both livestock and wildlife, predominantly elk and cattle.

- Common in saturated soils
- Dense stands up to 40″ high
- Dense, deep root system
- Important food for wildlife

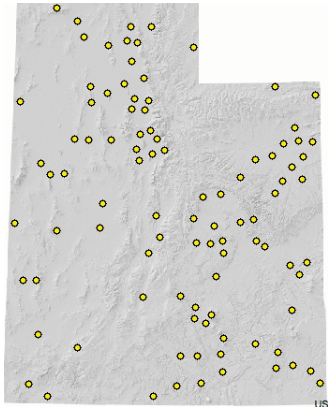


Saltgrass

Distichlis spicata

Saltgrass is a low perennial grass, standing 4-16 inches high. It reproduces by sending out long underground horizontal rootstocks (I.e., rhizomes) approximately 6 inches deep. This vigorous, asexual reproduction results in large round bunches of genetically identical individuals where saltgrass recolonizes once flooded playas. Saltgrass also reproduces via seeds , which, along with the stems, are valuable food for wildlife such as meadow voles and savannah sparrows. The dense bunches of saltgrass also provide cover for small mammals, birds, and insects. While saltgrass can tolerate up to 3% salinity, it is most often found in moist soil between 0.1 and 1.5% salinity. Saltgrass is able to secrete excess salt through glands on the surface of its leaves, forming salt crystals that can be observed with a hand lens.

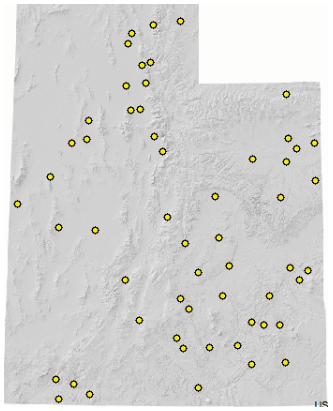
- Common in salt marshes
- Reproduces via seeds and rhizomes
- Tolerant of saline soils (0.1-1.5%)
- Secretes salt
- Habitat for wildlife



Phragmites

Phragmites australis

- Reproduces via seeds and rhizomes
- Two lineages in Utah
- Introduced is native to Eurasia and outcompetes native wetland plants
- Native subspecies does not grow as tall or dense, and coexists with other native plants



The common reed, *Phragmites australis*, is a wetland plant that is widespread in the contiguous United States. It flowers from July-October, producing clusters of small flowers called inflorescenses that are often purplish while flowering and turn whitish brown after producing seeds. These wind borne seeds are used to colonize new areas. Once established, *Phragmites* often spreads via shoots from the plant's rhizome. *Phragmites* grows in saturated soils and shallow water.

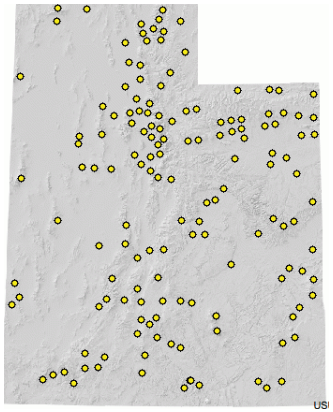
There are two lineages of the species in Utah. The introduced *Phragmites*, orginially from Eurasia, is particularly invasive and is now found in all 50 states and on every continent except for Antarctica. It can grow to more than 15 feet in height, with long blade-like leaves that sheath the stalk at the bottom. It can survive in either fresh or brackish water habitats, and can take over an area very quickly after a disturbance, forming a monoculture (only one species). These dense stands of reeds compete for resources and space with native plants and reduce sunlight within aquatic habitats. In Europe, where the introduced *Phragmites* is native, its distribution is declining. However, in the United States and other places where *Phragmites* has been introduced, it poses a threat to biodiversity, and management efforts are underway.

The native subspecies, *P. australis americanus* often does not grow in particularly tall or dense stands, and is interspersed with other native plants. Its leaves are generally lighter in color and its inflorescences are more sparse than those of the introduced *Phragmites*.

Creeping Spikerush

Eleocharis palustris

- Common in saturated soils
- Solitary, terminal spikes
- Rhizomatous
- Symbiotic with N-fixing bacteria
- Food and cover for wildlife



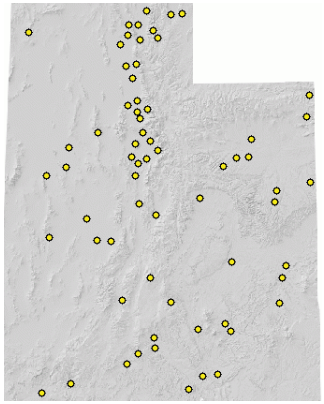
Creeping spikerush grows throughout the United States in saturated soils. It can survive complete submersion for up to a third of the year, and will grow in standing water and completely saturated soils. It can also survive in areas where the water table drops to a foot below ground level during dry times in the year, but it is an obligate wetland species. The above ground segment of the plant consists of stalks that grow singularly or in small clusters. These stalks can reach up to 5 feet tall depending on the depth of standing water. The stalks are topped with scaled spikes, which contain the flowers and fruit of the plant. Leaves are reduced to sheaths around the base of the stalk.

Creeping spikerush has an extensive rhizome system, which accounts for the majority of the stand expansion. These rhizome systems are also symbiotic with nitrogen fixing bacteria. This plays an important role in wetland ecology, taking atmospheric nitrogen and converting it to nitrites and nitrates, which can be taken up by vascular plants and reintroduced to the food web. Rhizome systems are also important factors in stabilizing wetland soils. Big game animals and geese feed on the spikes and stalks, ducks eat the seeds, and the stalks provide cover for nesting waterfowl and fish.

Hardstem bulrush

Schoenoplectus acutus

- Emergent wetland plant
- Reproduce via rhizomes and seeds (nutlets)
- Seeds and stems are important foods for wildlife
- Dense stands provide cover for wildlife



Hardstem bulrush is a perennial, emergent plant found in marshes across the continent. It grows stems from thick rhizomes. The stiff, round stems can reach height of 9 feet tall; the plant can grow in water as deep as or deeper than 5 feet. Hardstem bulrush grows best in sandy to marly (clay and limestone) soils, with good circulation around the root zone. It can also be found in alkali, calcareous fens.

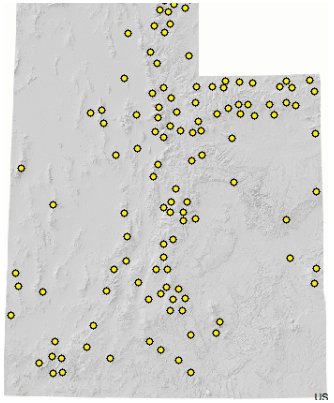
Hardstem bulrush either reproduces via rhizome expansion or by nutlets found in spikelets at the end of the stalk. The seed structures are small and covered by whitish-brown scales. The seeds are commonly spread through the digestive systems of animals, since they are an important source of food for shorebirds and waterfowl. Geese and muskrats will also eat the stems and rhizomes. Bulrush grows in both monoculture stands and in codominance with other emergent plant species. These stands provide important cover and nesting sites for birds, mammals, and aquatic animals such as fish and amphibians.

Nebraska sedge

Carex nebrascensis

Nebraska sedge is one of the most common sedges found along lake and wetland shores. It grows throughout Utah in moist soils close to water. Nebraska sedge reproduces predominantly by rhizome expansion, but also by seeds. The rhizomes send out shoots throughout the growing season, and produce dense root systems. This root system provides excellent resistance against erosion, helping to create overhanging banks, which in turn provides habitat for fish. It is a source of food for many grazing animals, particularly cattle and elk, and is susceptible to overgrazing and trampling. When streams have been overgrazed, Nebraska sedge is usually replaced by more grazing resistant species like Kentucky bluegrass. Because of this, Nebraska sedge is a good indicator species to determine if a lake shore or wetland has been overgrazed. Nebraska sedge was also used extensively by indigenous tribes, which used the fibers for bedding and mats and ate the rhizomes.

- Common along lake shores
- Produces seeds and rhizomes
- Dense root systems
- Heavily grazed, but intolerant



Duckweed

Lemna spp.

- Smallest flowering plant
- Dense floating mats
- Bisexual flowers
- Tiny fruit & seeds
- Plants divide
- Useful in bioremediation

Duckweed is the smallest of all flowering plants. Its lacks stems and leaves, and sometimes has roots. The chlorophyll is found in structures called thalluses, which are small floating spheres. The flowers and resulting fruits and seeds are tiny, invisible to the naked eye, and are located in small cavities in the thallus. Despite their size, the flowers have both male and female parts, though they usually require cross-pollination. The primary means of reproduction is through budding. Because of this, duckweed is the fastest growing of all higher plants- it can double its surface area in less than 2 days. It survives winters in temperate climates by making buds, called turion, which sink to the bottom of the pond. These buds are heavily laden with starch reserves, which are consumed in the spring. As air spaces develop in the tissues, the buds rise back to the surface of the water. It can grow in sunlight or shade and in fresh or slightly brackish water, but grows best in shallow, nutrient-rich pools with calm water. Duckweed is so small that plants can disperse during weather events such as tornados and storms. It is also dispersed by water movement and by hitchhiking on aquatic birds.

Duckweed is an important part of the ecosystem, since it grows in dense mats, which stabilize the dissolved oxygen concentration of the pond. As it takes up nutrients and blocks out sunlight, duckweed prevents algal blooms and eutrophication associated with decomposing algae. It also shades the pond, reducing the temperature and increasing its ability to hold dissolved gases. Since duckweed absorbs nutrients so efficiently, it can be used in bioremediation, converting wastewater and sewage into clean water.

Eurasian watermilfoil

Myriophyllum spicatum

- Submerged aquatic plant
- Native to Eurasia
- Highly invasive
- Alters lake ecology

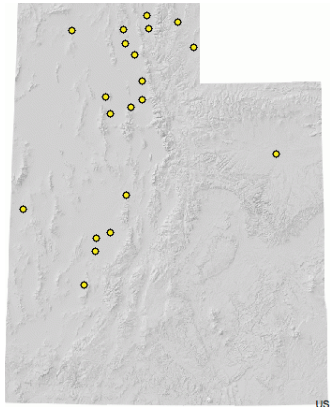
Eurasian watermilfoil is an attractive plant with feathery underwater foliage. Eurasian watermilfoil originates from Europe and Asia, but was introduced to North America many years ago and is now found over much of the United States. It was once commonly sold as an aquarium plant, and was likely introduced by people releasing pet fish into lakes. Because it is widely distributed and difficult to control, Eurasian watermilfoil is considered to be a problematic plant in Utah.

The introduction of milfoil can drastically alter a lake's ecology. Eurasian watermilfoil forms very dense mats of vegetation under the surface of the water. These mats interfere with recreational activities such as swimming, fishing, water skiing, and boating. The sheer mass of plants can cause flooding and the stagnant mats can create good habitat for mosquitoes. Eurasian watermilfoil mats can rob oxygen from the water by preventing the wind from mixing the oxygenated surface waters to deeper water. The dense mats of vegetation can also increase the sedimentation rate by trapping sediments that otherwise might flow out of a lake or pond. Milfoil also starts spring growth sooner than native aquatic plants and can shade out these beneficial plants. When milfoil invades new territory, the species diversity of aquatic plants usually declines. While some species of waterfowl will eat milfoil, it is not considered to be a good food source. Milfoil reproduces through seeds, but appears to reproduce more readily by fragmentation. Once a milfoil plant is broken into smaller pieces, each piece grows to form a new plant.

Pickleweed

Salicornia spp.

- Succulent plant
- Native to hypersaline soils (2.5-5%)
- Germinates during spring storms
- Resistant to desiccation
- Wind dispersed seeds
  - Food for wildlife



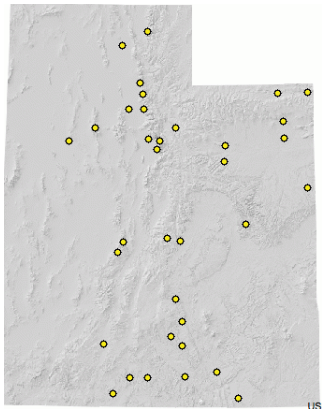
Pickleweed is a common plant found in the salty marshes and playas surrounding the Great Salt Lake. It is also native to ocean shores and other high saline, alkali wetlands. It can survive in water with up to 5% salinity- the concentration of ocean salt water. It survives in these conditions by holding high concentrations of dissolved salts in central vacuoles, or chambers, of each cell. This reduces the osmotic potential and allows the plant to keep stomata (pores in the leaf necessary for photosynthesis) open without desiccating. It is a small plant with opposing stems, succulent leaves that are very reduced, and small red flowers.

The amount of pickleweed present in an area varies greatly from year to year. The seeds lie dormant on the surface, and germinate with the presence of sun and fresh water during spring storms. When precipitation conditions are ideal, a large crop of pickleweed will germinate and survive through the summer, other years hardly any plants reach flowering and release seeds. Each of the small, rudimentary flowers produces many small seeds, which are wind dispersed. The next generation generally grows very close to where the parent plants germinated. In the fall and winter, Canada geese may gorge themselves on the seeds.

Horsetail

Equisetum spp.

- Common in N. Hemisphere
- Segmented stems
- Fertile or non-fertile
- Rhizomatous
- Medicinal uses



Horsetail grows in wet soils throughout the northern hemisphere. The anatomy of horsetail can be separated into three different segments. The fertile shoots are unbranched and grow up to about one foot tall. They do not contain chlorophyll, and have spore-producing bodies. Spores grow into a prothallus, which constitutes the gametophytic generation of the horsetail's life cycle. These gametophytes differentiate into sexes, produce sperm and eggs, and produce new seeds, which are distributed in the water to colonize new areas. The sterile shoots are branched and grow about twice as tall as the fertile parts of the plant. They have leaves dispersed around the stalk.

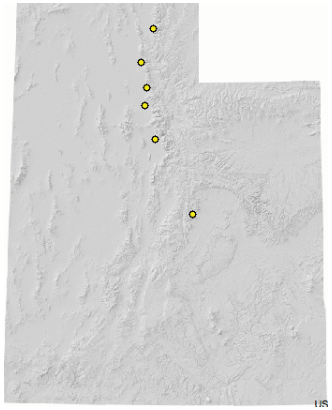
Horsetail has creeping rhizomes, which can grow more than 6 feet into the ground and send out colonizing shoots at approximately foot-long intervals. This rhizome system comprises the main reproductive means for the plant. As a result, horsetail grows in dense stands, and the root/rhizome system helps stabilize marshy soils. The rhizomes also have tubers, which store food for the plant. These tubers are a food source for bears and other animals. The stalks of the plant are not particularly nutritious and grazers do not feed heavily on horsetail.

Horsetail has been used for centuries as a natural diuretic. It is also used to treat osteoporosis, kidney stones, urinary tract inflammation, and topical application for wound healing. Although, it is high in alkaloids, and can have detrimental health affects if consumed in too high of amounts. These include dermatitis, thiamine deficiency, hypokalemia, and nicotine toxicity. If the amount of horsetail in hay is higher than 20% it can cause scours, paralysis, and death in horses.

Purple loosestrife

Lythrum salicaria

- Native to Eurasia
- Tall perennial herb
- Outcompetes native wetland plants
- Large amounts of seed
- Rhizomatous
- Degrades wildlife habitat



Purple loosestrife is a detrimental plant in aquatic and wetland systems in North America. It is native to Europe in Asia, with native populations found across Europe and on Japan's main islands. Its tall, flowering stalks can grow up to nine feet.

Purple loosestrife arrived on ships from Europe during the mid 19th century. It has since spread west into virtually every state and all of southern Canada. Highway construction has been shown to aid in the dispersal of the plant, by disturbing habitat and aiding in seed dispersal. It can grow submerged or in saturated soils, in pH from about 4-9, and in varying light levels. Mature plants can produce 2.7 million seeds, which are very small and do not provide a significant food source for wildlife. The stalks form crowns up to 5 feet across, and the vegetative root system causes stalks to emerge from standing water about 3 feet apart. This creates monotypic stands very dense at the top and spread out at the base, which is insufficient cover for nesting birds.

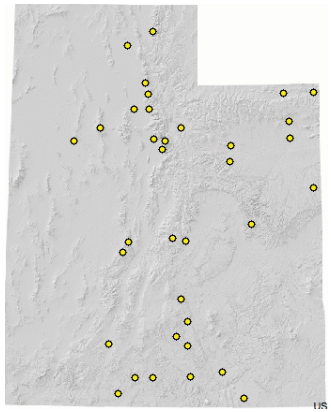
Since purple loosestrife isn't useful to wildlife (save redwing blackbirds, taking advantage of the absence of long-billed marsh wrens), this causes the native animals to leave as well. Loosestrife will also invade agricultural lands, including irrigation channels, which causes additional management challenges.

Purple loosestrife has been used medicinally for thousands of years, dating to the Greeks. *Lythrum* comes from the Greek word for blood- either for the flower's colors or for the plant's medicinal uses. It is used to treat internal and external bleeding, ulcers, and dysentery.

Cattails

Typha spp.

- Common wetland plant
- Reproduces via rhizomes within stands
- Reproduces via seeds for new stands
- Food & cover for wildlife
- Historically used by humans as food



Cattails are typically found in fresh water marshes, but is also tolerant of brackish waters. The cattail reproduces sexually via seeds and vegetatively through its rhizomes. The seeds will only germinate in a warm environment with direct sunlight, so they usually do not begin to grow in already established stands. The seeds have hairs which allow the wind to carry them to areas where they can establish a new stand. Once a seed begins to grow, it quickly sends out shoots to establish a stand. As such, cattails are an important early successional species for wetlands.

Cattails provide important cover and food for many animals. Canada geese and muskrats eat the rhizomes. Marsh wrens, yellow headed and red winged blackbirds nest in large cattail stands. Ducks and other waterfowl prefer wetlands with about equal amounts of cattail cover and open water. Deer sometimes use the thick cattail growth for cover. Historically, cattails have been used by humans for food and as material for making mats and padding.

Typha latifolia, or the broadleaf cattail, is a common plant in wetlands across the North American continent and throughout the world. It thrives in shallow water with soils rich in organic matter, and can be invasive.

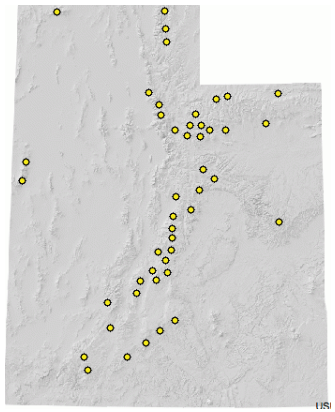
The narrow-leaved cattail (*T. angustifolia*) and southern cattail (*T. domingensis*), both of which are also found in Utah, regularly hybridize with broadleaf cattail.

Booth willow

Salix boothii

- Most common willow in the western US
- Grows in dense stands 6-10 ft tall
- Yellow stems
- Wildlife habitat

Booth willow is found throughout the western US and in southwest Canada. It grows up to 15 feet tall along streams and in other wet soils, providing stability to stream banks. It produces wind and water dispersed seeds, which are important in colonizing and stabilizing new alluvial deposits and fire-cleared areas. Booth willow also displays vegetative regeneration, and as a result can survive fires and browsing or cutting, if only the top of the tree is affected. Heavy grazing can, however, result in reduced seed production as a result of plant resources being diverted to growth instead of reproduction. Booth willow is eaten by livestock and wildlife, and is an important habitat for birds and small animals. It grows in dense stands, which reduces grazers' and predators' access into the interior. Booth willow will grow in many different soil types if it has sufficient water. It is shade intolerant and will not grow if shaded by larger trees. It can survive floods, but growth is impacted if the root crown is submerged. Booth willow has yellow stems and green, narrow leaves characteristic of willows. Its flowers are erect catkins at the end of the stem.

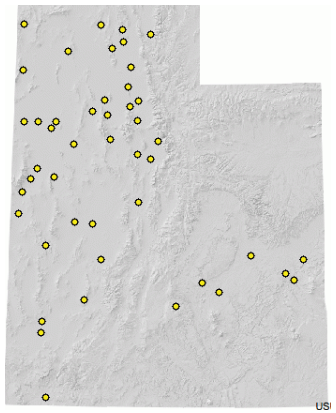


Iodinebush

Allenrolfea occidentalis

Iodinebush is a common plant in the playas surrounding the Great Salt Lake. It is a woody shrub with dark stalks and small deciduous leaves. Iodinebush is a perennial plant that generally grows up on raised, sandy hummocks in the playas. It flowers in mid-summer to fall, and releases small seeds in the fall. These seeds are an important source of food for migratory birds. Animals will also graze on the woody plant matter. Iodinebush has similar adaptations to hypersaline soils as pickleweed- it exports salt from the tissues into a central vacuole in each cell.

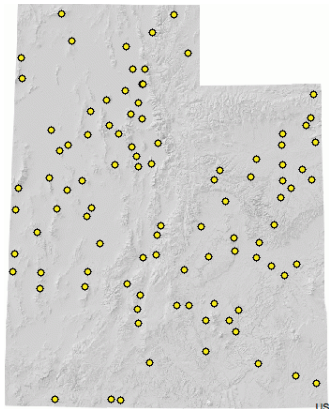
- Woody shrub
- Common in the playas surrounding GSL
- Reduced, scale-like leaves
- Tolerant of hypersaline soils (1-1.5%, up to 3-4%)
- Seeds & stems are food for wildlife



Greasewood

Sarcobatus vermiculatus

- Tolerant of saline soils (0.5%)
- Cover for wildlife
- Can be toxic to livestock



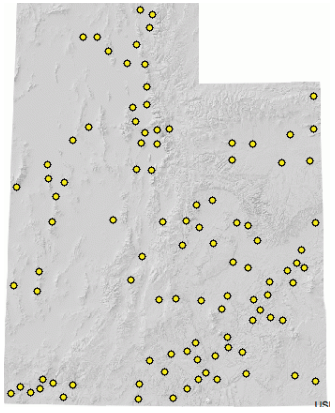
Greasewood is a tall weedy shrub common to western North America and Great Salt Lake playas, where it can tolerate soils of approximately 0.5% salinity. Greasewood has succulent leaves, spiny branches, and a deep root system. Male and female flowers occur on each plant, with the male flowers being taller, catkin-like stalks. Its seeds are wind-dispersed, which helps in re-establishment after fire.

The dense stands of greasewood often serve as cover for wildlife, such as small mammals and birds. Greasewood stems are an important food source for animals, such as jackrabbits. While livestock, such as cattle and sheep, can graze greasewood stems, excessive grazing can cause oxalate poisoning, resulting in kidney failure.

Saltcedar/Tamarisk

Tamarix ramosissima

- Native to Eurasia
- Drought and flood tolerant
- Highly invasive
- High seed production
  - Wind dispersed
  - 250 million seeds per plant
  - Germinate in <24 hours

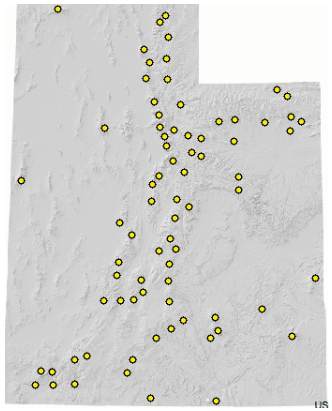


Saltcedar, or tamarisk, is one of the most tenacious and persistent invasive species in Utah. It is native to southern Eurasia, brought to North America in the mid-19th century as an ornamental plant and for erosion control, and has since spread throughout the southwest. It primarily lives in riparian areas, growing alongside cottonwoods and willows. Salt cedars are more tolerant to extreme conditions, including drought, floods, and high saline soils, than are the native species, and can gain ground during hard years. Saltcedar colonizes shores and sand banks much faster than native species thanks to its high seed production and short germination time. One tree can produce 250 million wind-dispersed seeds per year, and seeds will germinate in fine sand or silt in less than a day. Satlcedar also has a deep root structure that is capable of lowering the water table beyond the reach of other trees' roots. Finally, saltcedar grows in salty soils by concentrating salt in its leaves. When these leaves are shed, they further increase the salinity of the soil, making it harder for native plants to survive. Although saltcedar is detrimental to riparian and wetland ecology, the release of the tamarisk beetle (*Diorhabda carinulata*) has been a particularly effective method of control.

Red osier dogwood

Cornus sericea

- Common along streams
- Dense shrub 3-10 ft tall
- Red stems, opposite leaves
- Edible berries
- Cover for wildlife



Red osier dogwood is an important riparian plant in Utah. It grows in moist, rich soils, along streams and on sandbars, in wetlands, and in forest openings. It grows in dense stands along the sides of rivers, primarily due to vegetative regeneration. Branches that touch moist fertile soil will take root and propagate the dense cover, as well as stabilize stream banks. It is not tolerant of full shade, but seems to do best at about 75% of full light intensity, particularly when it may face water stress.

The fruit of red osier dogwood is white or gray, the leaves dark green, and the stems grow dark red, fade to gray-green, and turn red again in the fall. Red osier dogwood is found across the northern part of the continent, but high temperatures limit its range in the south. It can acclimate very well to extremely cold temperatures.

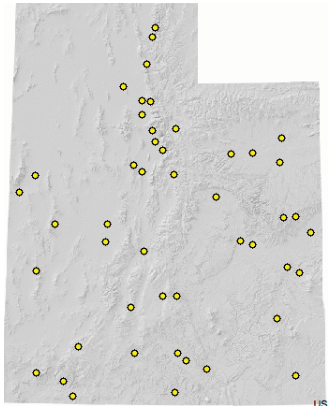
Red osier dogwood is important for wildlife both as a food and cover source. Its stems, leaves, and branches provide food for grazers, and it produces fruits that are eaten by bears, birds, fish, and other wildlife. The berries are lower in sugar content than most other available fruits. This leads to them being passed over while other fruits are available, as well as increases the time they can stay on the tree without rotting. This results in dogwood fruit being an important food in the winter months, when other food sources are scarce. Passing through the digestive system helps disperse the seeds as well as increasing the odds of them germinating.

Russian olive

Elaeagnus angustifolia

Russian olive is an invasive tree, native to Eurasia, and can be found in riparian habitats throughout the western, central, and northeastern United States. It can grow up to 30 feet tall, and is typically thorny with silvery green leaves and fruits. These fruits provide the primary method of dispersal. They are eaten by many species of birds and distributed with the bird's movements. Despite being a ready source of food, it has been found that lower avian biodiversity exists in areas dominated by Russian olive. Russian olive can live in bare mineral soil without many nutrients because its roots harbor nitrogen-fixing bacteria. While these bacteria are a vital part of any ecosystem, they enable the invasive tree to dominate areas where nitrogen deficiency limits the growth of native trees. It is a high water user, and will also outcompete native plants when water is limited.

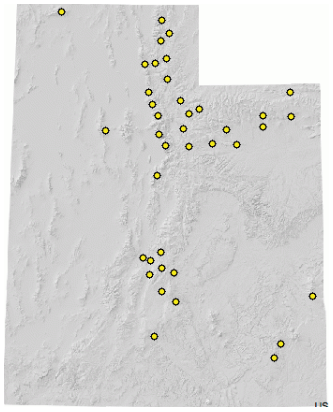
- Tall shrub or tree
- Highly invasive
- Fixes nitrogen
- High water consumption
- Fruit is eaten by birds
- Spreads via seed



Alder

Alnus spp.

- Prefers abundant water
- Common in riparian areas
- Symbiotic N-fixing bacteria
- Attract pollinators



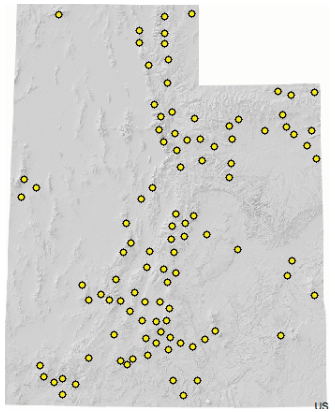
'Alder' refers to a diverse genus with about 30 species of deciduous trees and shrubs. They are characterized by smooth bark, rounded alternating leaves, and catkin fruiting bodies (flowers without petals that grow in clusters). They are closely related to birches, though the female catkins are woody and open to release seeds. Alder species are found all over the world. Speckled and thin-leaf alder are common in Utah and throughout the western US. In Utah, they generally grow in riparian areas with plenty of access to water.

Alders serve many important ecological roles. They have a symbiotic relationship with nitrogen fixing bacteria that live within root nodules and transform atmospheric nitrogen to nitrate, which is an important nutrient for plants. This relationship provides alders with ample amounts of nitrogen as well as making the soil around the tree more productive for other plants. Dead organic matter from alders makes excellent compost. Alder is and important food source for bees, butterflies, and other pollinating insects.

Water birch

Betula occidentalis

- Common riparian plant
  - Stabilizes streambanks
- Shrub or small tree
  - Grows to 25 ft
- Spreads via seed
- Wildlife habitat

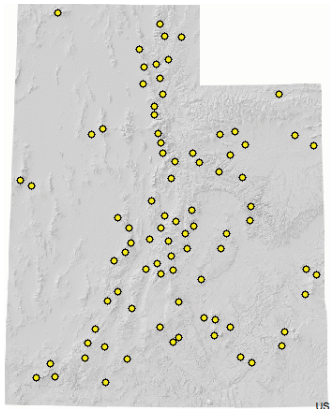


Water birch is an important riparian species. It grows almost exclusively along stream and riverbanks, in alluvial deposits, floodplains, and other areas that are flooded annually. It is flood resistant, but its shallow roots in wet soil makes it susceptible to being toppled by strong winds. These roots are also important in stabilizing the banks where the tree grows. Water birch is an important source of cover for many types of wildlife. During the life cycle of a water birch, it can grow over 100 trunks from the base, providing numerous cavities for animals to take cover in from predators and the elements. Grouse are known to winter in these spaces. The tree also provides food for wildlife, predominantly birds that feed on the catkins, buds, and seeds. Although, grazers will also feed on the woody parts- particularly new growth. The tree does regenerate vegetatively, but its primary method of dispersal is small wind-carried seeds released in the fall.

Narrow-leaf cottonwood

Populus angustifolia

- Most common UT native cottonwood
- Moist soils on streambanks
- Seeds disperse by wind
- Reproduce vegetatively
- Stabilize stream banks
- Life cycle impacted



Cottonwoods are found in great numbers along stream and riverbanks, and on the shores of wetlands and lakes across Utah. The narrow-leaf cottonwood is the most common native Utah cottonwood. It grows in moist soils along stream and river banks, but it will not grow as well in the shade. The cottonwood is a deciduous tree, meaning it loses its leaves in the fall. Male and female flowers are found on separate trees, and flowers are pollinated by wind. The seeds are small, with a white tuft of hair ('cotton') that allows for wind dispersal. Seeds will germinate only on open, sunlit, moist soil. It can also reproduce vegetatively by sprouting from a root or stump.

Cottonwoods are an important part of aquatic systems. They provide habitat for many different species, including squirrels, deer, bears, birds, and aquatic mammals. New growth on the tree is browsed by deer, moose, and rabbits. Quail and grouse will eat the buds and flowers of the tree. Leaves and branches from cottonwoods fall into the water and provide food for aquatic detritivores. Cottonwood roots also help to stabilize stream banks during high flows.

The life cycle of cottonwoods follows the annual flooding cycle of unobstructed rivers and streams. As the spring floods scour the banks of a river or stream, layers of fine silty soil are deposited downstream on sand or gravel bars. This fine moist soil is ideal for the germination of cottonwood seeds, which are released shortly after the spring floods. Because many rivers in the western US are dammed, these spring floods often do not approach natural levels. This, along with other impacts such as grazing, logging, development, and the introduction of exotic species (e.g., Russian olive, salt cedar), has resulted in a decline of cottonwoods over the past few decades.

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COOPERATIVE EXTENSION