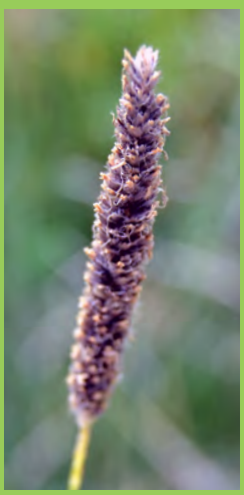
Wetland Plants of Great Salt Lake

A guide to identification, communities, & bird habitat

Rebekah Downard · Maureen Frank · Jennifer Perkins
Karin Kettenring · Mark Larese-Casanova



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{notes}

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Preface

The wetlands of Great Salt Lake (GSL) are internationally important bird use areas, ecological wonders, and local treasures. I feel lucky to have spent each summer during 2012–2015 immersed in these wetlands, identifying plants as part of my dissertation work at Utah State University. Originally, the plant data I gathered was intended to be used in developing an index of the condition of GSL wetlands; however, it quickly became apparent that the data would also provide useful information for a wide range of organizations, agencies, and people.

Around this same time, Maureen Frank was working on a guide to GSL wetland vegetation and how to manage native plants as high-quality habitat for birds. This book is a combination of Maureen's and my research and showcases a current, comprehensive list of GSL wetland plants. Native wetland plants are the first link in complex food webs, and they highlight the unique ecology of each wetland community and the diversity of wetland-dependent bird species.

From deep, submergent wetlands at the heart of conservation areas, to the flat, salty playas where killdeer dart back and forth, my hope is that this guide provides you a window into the fascinating inner workings of GSL wetlands. Together, I believe our efforts in dedicating time, knowledge, and resources to understanding GSL wetland plants will benefit every species that depends on these wetlands, including ourselves.

Rebekah Downard

Acknowledgments

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Rebekah would like to thank Diane Menuz with the Utah Geological Survey and Dr. Toby Hooker with the Utah Department of Water Quality for their help in assembling a comprehensive plant species list.

Maureen wishes to thank Howard Browers from the Bear River Migratory Bird Refuge for his help classifying birds and for providing an understanding of wetland systems.

About this guide

Wetland Plants of Great Salt Lake: A Guide to Identification, Communities, and Bird Habitat is designed to assist researchers, land managers, birders, and wetland enthusiasts. Its color-coded chapters represent plant communities surrounding Great Salt Lake (GSL):

Each wetland community is classified by its topography, dominant plants, hydroperiod, and water chemistry (See Table 1.1, p. 3).[11] The Upland Plants chapter lists species that occasionally disperse to and survive in wetlands but do not represent a wetland community. All chapters include a community description, a plants list, plant identification pages, and bird information and images. To view where wetland communities are located around GSL, use the *Wetland plant communities of Great Salt Lake* map (p. *xii*).

Plant species are listed in the wetland community where they are most commonly found. However, some species may be found in multiple communities (pp. *x*–*xi*). Each plant species is described in detail with four accompanying images, including the whole plant (big), its habitat (top left), its flowers, inflorescences, or seeds (top middle), and its leaves, stems, or both (top right). See the glossary for illustrations and definitions of plant anatomy (pp. 184–195). Each plant's historical, medicinal, or distinguishing facts are included in the facts section when applicable.

Many state, regional, and national plant identification resources, or floras, were used to complete each plant identification page: *Vascular Plants of Northern Utah*[45], *A Utah Flora*[65], *Intermountain Flora*[13], *Manual of Grasses for North America*[4], and *Flora of North America*[20]. Look to these sources for additional information.

Plant taxonomy—the classification of species into related groups—changes frequently as scientists use DNA research to find how species are related. The species names included in this guide represent

the current accepted names according to the U.S. Department of Agriculture PLANTS Database[57], as of December 2015. Older plant species' names are included as synonyms when appropriate.

Bird species are pictured in their preferred wetland community based on nesting, foraging, and resting connections to plants within that community. They may be referred to by groups, such as waterfowl, shorebirds, waterbirds, and passerines.

Many bird species listed in this guide are highly dependent on GSL wetlands. This dependency qualifies them as species of special management concern or priority bird species (See Table 1.2, p. 7). Priority bird species represent the general habitat requirement of other bird species that may not be mentioned here.

The scientific and common names of bird species included in this guide correspond with the most recent scientific consensus as published in the American Ornithologists' Union checklist, 57th Supplement, July 2016. Bird taxonomy is subject to change.

{notes}

Using the general plant information key

A general plant information key is located on the bottom left of each identification page. It indicates a plant species' typical wetland community (color), wetland indicator status, duration and growth form, nativity, and commonness. If a species is found in more than one wetland community, a colored line below the key will represent the other community. The example below shows that this species is typically found in submergent wetlands (blue) but may also be found in emergent wetlands (green).

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	C

One can also infer, using the categories below, that this species is an obligate wetland plant, a perennial forb, and a native plant in the United States that is common in Great Salt Lake submergent wetlands.

Wetland Indicator Status[58]

Obligate Wetland Species (OBL): nearly always occur in wetlands
Facultative Wetland Species (FACW): usually occur in wetlands
Facultative Species (FAC): occur in both wetlands and uplands
Facultative Upland Species (FACU): usually occur in uplands
Upland Species (UPL): rarely occur in wetlands
No Indicator Status (NA): no wetland indicator status

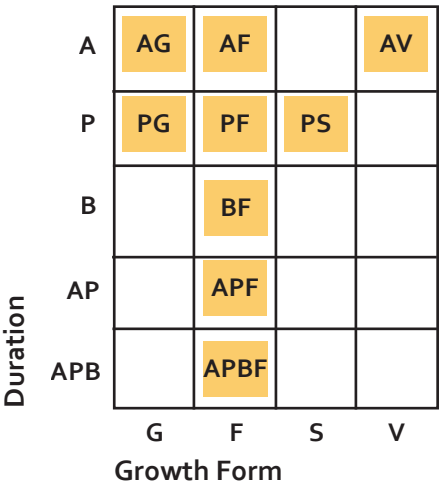
Duration and Growth Form[59]

Duration

Annual (A): completes life cycle and dies in one growing season
Perennial (P): part of the plant persists year to year
Biennial (B): requires 2 years to complete life cycle
Annual or perennial (AP): depends on local conditions
Annual, perennial, or biennial (APB): depends on local conditions

Growth Form

Graminoid (G): grasses and grass-like plants, including species in the families Poaceae, Cyperaceae, and Juncaceae
Forb (F): a plant that is not a graminoid and not woody, also called an herb
Shrub (S): perennial, woody plant, usually < 5 meters (16 ft) tall, often multi-stemmed
Vine (V): a climbing or twining plant with long stems



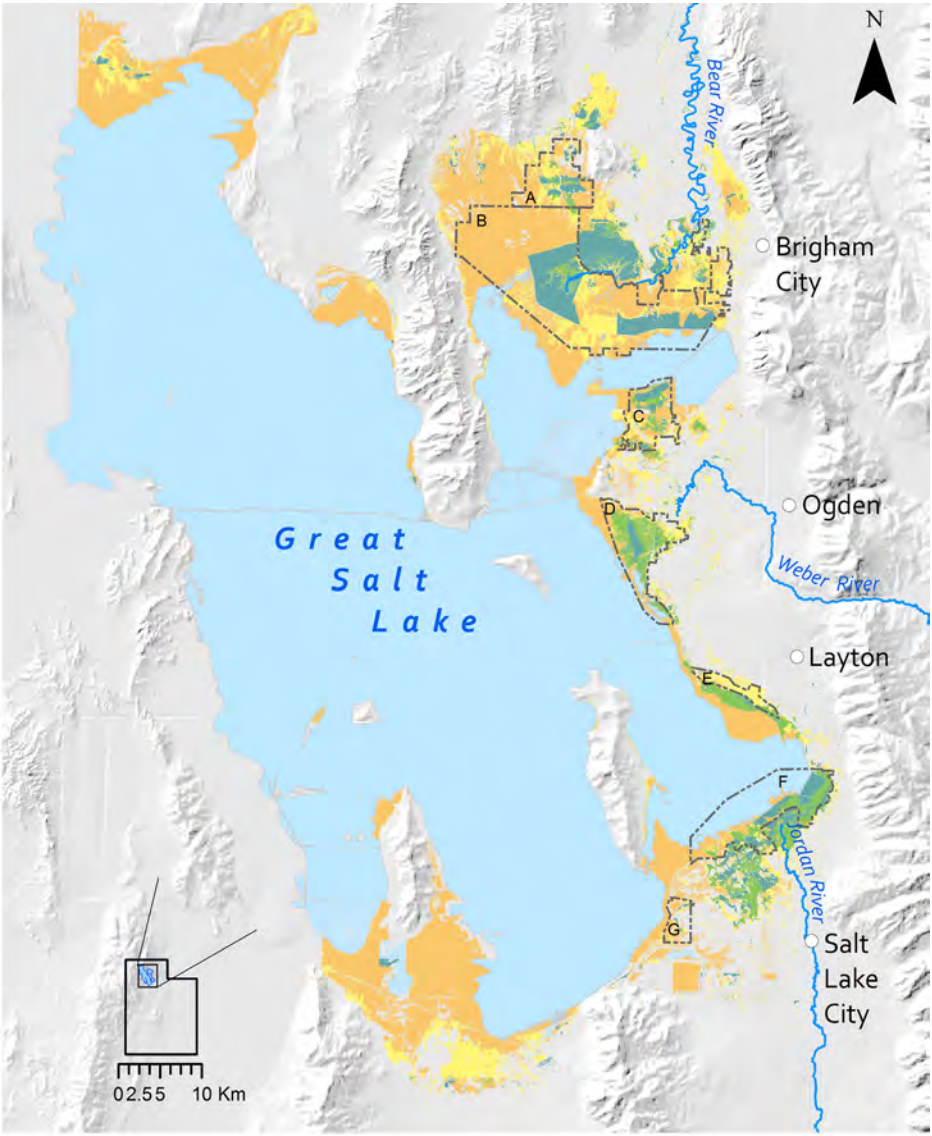
Nativity in the Lower 48 States[60]

Native (N): naturally occurring in the contiguous United States
Introduced (I): accidentally or deliberately introduced from outside the United States
Native and Introduced (NI): introduced in part of the range

Commonness in Wetland Community

Common (C): found abundantly in the appropriate GSL wetland community
Uncommon (U): found less abundantly in the appropriate GSL wetland community
Occasional (O): found infrequently in GSL wetlands

Wetland plant communities of Great Salt Lake[37; 38; 55]



- Submergent Wetland
- Emergent Wetland
- Meadow Wetland
- Playa Wetland
- Wetland Management Areas

A. Public Shooting Grounds Waterfowl Management Area
B. Bear River Migratory Bird Refuge
C. Harold Crane Waterfowl Management Area
D. Ogden Bay Waterfowl Management Area
E. The Nature Conservancy Shorelands Preserve
F. Farmington Bay Waterfowl Management Area
G. Inland Sea Shorebird Reserve

Introduction

Great Salt Lake wetlands: water, plants, birds, and management

Great Salt Lake (GSL) is renowned throughout North America for its size, salinity, and importance to migratory bird flyways. Located in the Great Basin, the lake encompasses approximately 4,400 km^2 (1,087,000 ac) of northern Utah and is the largest terminal lake in North America.[61] Nearly 1,400 km^2 (351,000 ac) of wetlands surround GSL's shorelines; these wetlands teem with life and are a flooded oasis in an otherwise arid region.[55]

From submergent wetlands to playas, plant communities play a vital part in GSL wetland ecosystems. Wetland plants provide habitat for insects, amphibians, fish, reptiles, mammals, and birds that thrive in wetlands. In fact, Great Salt Lake was designated a Western Hemisphere Shorebird Reserve Network because over 250 bird species migrate to and rely on its wetlands for food, cover, and rest. Together, water, plants, and birds contribute to healthy, vibrant GSL wetland communities. Managing GSL's wetland plant communities is a tremendous, yet necessary challenge that stands to benefit many stakeholders.

Water

Water is the defining feature of wetlands. From tiny microbes to hardy plants and towering great blue herons, all GSL wetland life is tied together by the presence of water. Water factors such as depth, flooding pattern, and chemistry differentiate the types of wetland communities.

Water levels at GSL and surrounding wetlands fluctuate with changes in snowpack, upstream irrigation demand, and evaporation. Fluctuations are cyclical, but irregular, and have a direct impact on how GSL wetlands function. For the past 15,000 years, water has only been able to leave GSL via evaporation. Meanwhile, salts and other minerals have been left behind and continue to accumulate as GSL's three main tributaries—the Bear, Weber, and Jordan rivers—contribute more than 2 million tons of salt to the lake each year. Over time, the accumulation of salt has increased GSL's salinity to 3–7 times the concentration of seawater.[22]

Wetlands are classified, in part, by the length of time and depth they are flooded. The pattern of flooding and drawdown is called the hydroperiod.[36] Depending on the type of GSL wetland, flooding can vary from permanent, deep flooding to temporary saturation. Temporarily flooded wetlands, like playas, are only flooded for brief periods during the growing season, which runs from approximately April to October. Submergent and emergent wetlands are often semi-permanently flooded with standing water throughout most of the growing season. The hydroperiod and water source influence the salinity and alkalinity (pH) of a wetland, shaping the plant community. See Table 1.1 (p. 3) for specific hydroperiod depth and duration attributes of each wetland community.

The salinity and alkalinity of the water in GSL and associated wetlands fluctuates throughout the year. These fluctuations occur when freshwater inflows peak during spring snowmelt conditions, and when evaporation increases with rising summer temperatures. When GSL's water level is low, an additional 1,678 km^2 (414,688 ac) of saline mudflats and playas are exposed.[55] The receding lake leaves behind high concentrations of salts and other elements, leading to high salinity and alkalinity in exposed wetland soils. Brackish wetlands, those with salinities in between fresh and saline conditions, are common where periodic freshwater inflows have flushed hypersaline soils. Freshwater wetlands are found close to freshwater sources like streams and springs. Generally, the longer and deeper wetlands are flooded, the lower the salinity will be. Many GSL wetlands are alkaline, which means the soil or water has a pH higher than 7.4. See Table 1.1 (p. 3) for water chemistry types specific to each wetland community.

Great Salt Lake wetland communities[39]

	Submergent Wetlands	Emergent Wetlands	Meadow Wetlands	Playa Wetlands
Elevation, distance to freshwater	Closest to freshwater where deep flooding is possible; farthest from GSL shoreline	Intermediate elevations in large, flat areas where flooding is shallow	Higher elevation between uplands and deeply flooded wetlands	At lowest elevations; expanding when shoreline recedes
Dominant plants	Submerged aquatic vegetation growing in the water column	Tall vegetation growing up through the water surface	Mid-height, dense grasses and forbs	Sparse growth of short, salt-loving plants
Hydroperiod	Permanently to semi-permanently flooded; deep: 40–90 cm (16–35 in) to shallow: 10–45 cm (4–18in)	Seasonally to semi-permanently flooded with drawdown; deep: 20–30 cm (8–12 in) to shallow: 5–20 cm (2–8 in)	Seasonally flooded to saturated; very shallow: less than 5 cm (2 in), to saturated soils	Temporarily flooded; shallow: 0–5 cm (0–2 in), dry most of the season
Water chemistry	Fresh to brackish	Fresh to brackish	Fresh to brackish	Salty and alkaline
Management tactics	Maintain consistent flooding; low to moderate salinity; dredge nutrient-rich sediments; minimize physical disturbance	Ensure spring, fall flooding; drawdown to stimulate seed production; prevent undesirable species invasion	Manage for a diverse mosaic of plants	Protect ground-nesting birds from predators and flooding

Table 1.1

Plants

Plants, another defining feature of wetlands, determine what ecosystem functions a wetland might provide. Some plant species are effective at filtering pollutants out of the water, and others are beneficial because they prevent erosion, buffer nearby communities against flooding, or provide food and resting space for wildlife. See Table 1.1 (p. 3) that lists the dominant plant types in each community.

Wetland plants have a variety of adaptations that allow them to live and reproduce in flooded, low oxygen conditions and during periodic droughts or drawdown. General adaptations differ for each wetland plant community depending on the conditions plants must face in that habitat.

Submerged aquatic vegetation (SAV) have flexible, floating stems and leaves that are capable of photosynthesizing in low light.

Emergent plants have rigid stems that can grow exceptionally fast in order to keep leaves and flowers above the surface of the water.

Meadow plant species have a variety of underground adaptations that enable survival in variable conditions. These adaptations include dense root growth for soil stabilization and creeping or floating stems for rapid expansion.

Playa plants thrive in an especially harsh environment with a variety of adaptations such as very small leaves that reduce water loss during periods of drought and internal chambers that hold salts.[12]

Wetland plants also vary in their reproductive adaptations in order to take advantage of dynamic water conditions. Many SAV and emergent plants have large, nutritious, floating seeds that must be eaten by ducks in order to germinate; this requirement ensures that such seeds will travel far before sprouting.[32] Some meadow plant species have light, wind-dispersed seeds capable of floating to bare soil patches that are ideal for germination. When conditions are favorable—often the short period of the year when water is present—several playa species have short life cycles that allow them to reproduce quickly.[12]

In addition to seed adaptations, many wetland plants are capable of reproducing without seeds, a strategy known as vegetative or asexual reproduction. When deep water or dry soil conditions exist and make seed germination and establishment difficult, some plants sprout new shoots from modified stem parts. These shoots are called rhizomes and stolons. Rhizomes are underground stems, and stolons are aboveground stems. Both rhizomes and stolons enable wetland plants to clone themselves and maintain or expand the area they cover.[16]

Birds

Great Salt Lake wetlands provide habitat for many different kinds of wildlife, most notably, migratory birds.[18] At times, over 6 million birds may be present on and around GSL, including priority species (See Table 1.2, p. 7).[41] GSL wetlands are particularly important because they constitute more than 75% of Utah's wetlands.

The amount of available food and the quality of cover that wetland plants provide determine the type and number of birds and wildlife that wetland communities support. The main groups of birds found in GSL wetlands are waterfowl, shorebirds, and waterbirds.[63]

Waterfowl are relatively large birds that spend a considerable amount of time swimming or diving. Birds classified as waterfowl include ducks, geese, and swans.[1]

Shorebirds are small-bodied, long-legged wading birds like plovers, stilts, and sandpipers. They are typically found next to water or in shallow water rather than swimming. Nine species of shorebirds regularly breed and nest at GSL wetlands. Another 14 species regularly occur in the ecosystem during some part of the year.[1]

Waterbirds can be large or small and include pelicans, grebes, and herons. Sixteen species of waterbirds live on or near the water in GSL wetlands, often in colonies.[1]

Two additional bird groups include songbirds and birds of prey. These two groups rely on wetlands less than waterfowl, shorebirds, and waterbirds, but they are often found in or near GSL wetland habitats.

Birds are attracted to GSL wetland habitats because of the abundance of foraging and cover resources that are otherwise unavailable or uncommon in the surrounding arid region. Numerous species of birds consume plant seeds, while stems and leaves provide structure and cover for aquatic macroinvertebrates, amphibians, fish, reptiles, and small mammals that birds will also consume.[3] Nesting birds and their young rely on the cover that wetland plants provide in order to hide from predators. See Table 1.2 (p. 7) for a list of priority bird species and how those species use various preferred GSL wetlands.

Wetland managers have goals and plans that prioritize maintaining and improving bird populations via wise habitat management. Priority species receive special management because GSL and its surrounding wetlands are particularly important to those species. In fact, GSL wetlands host a large proportion of several bird species' continental population.[18]

Many species use different wetland communities depending on when they visit GSL wetlands. During the fall migration, birds rely on more deeply flooded wetlands when foraging is critical. In spring, birds value wetlands with dense vegetation that is suitable for nesting habitat. Birds will also use different wetland communities based on their diet and adaptations to varying water depths. Management often focuses on maintaining a mosaic of wetland communities that support a diversity of migratory birds year round.

Great Salt Lake Priority Bird Species[18; 39]

Species	Group	*Foraging Habitat	*Breeding Habitat
American avocet	Shorebird		
American white pelican	Waterbird		
Black-necked stilt	Shorebird		
Black tern	Waterbird		
Cinnamon teal	Waterfowl		
Forster's tern	Waterbird		
Franklin's gull	Waterbird		
Green-winged teal	Waterfowl		
Long-billed curlew	Shorebird		
Long-billed dowitcher	Shorebird		
Marbled godwit	Shorebird		
Redhead	Waterfowl		
Snowy plover	Shorebird		
Tundra swan	Waterfowl		
Western grebe	Waterbird		
Western sandpiper	Shorebird		
Wilson's phalarope	Shorebird		
White-faced ibis	Shorebird		

Submergent
Emergent
Meadow
Playa

*Organized by most to least preferred

Table 1.3

Management

Great Salt Lake wetland health is critical for resource managers, hunters, birders, conservationists, educators, photographers, and all who value wetland plants and birds. However, maintaining and managing wetland health is difficult. Drought, invasive species, and pollutants thwart many management efforts.

To produce as many wetland benefits and functions as possible, managers often seek to maintain a mosaic of wetland communities with heterogeneous vegetation structure.[56] This is achieved by using the main principles of wetland management summarized below:

- Ensure an adequate supply of water, both in quantity and quality
- Provide favorable interspersion of open water and emergent vegetation for adequate foraging and nesting habitat
- Encourage vertical interspersion of vegetation in addition to horizontal

For wetlands that have water control structures, another principle can be applied:

- Ensure proper timing and duration of flooding[12]

In unhealthy wetland communities, habitat management can be a foundation for rebuilding healthy ecosystem functioning. While the management recommendations above are generalizations, this book cites resources that managers can seek for specific guidance.

The first step in caring for GSL wetland communities—for researchers, land managers, birders, or wetland enthusiasts—is to learn about the plants and birds that inhabit these ecosystems. The following guide to wetland plants of GSL provides a good footing to that first step for anyone visiting these unique, beautiful wetlands.

Submergent Wetlands

Submergent wetlands are often referred to as ponds or open water wetlands. They are large, relatively deep, and flooded for most or all of the year.[39] Approximately 260 km^2 (64,375 ac) of Great Salt Lake (GSL) wetland habitat is classified as submergent. Most of these submergent wetlands occur in large impoundments or wetland units where deep flooding can be accomplished through diking, diversion, and water level management.[14] Submergent wetlands are characterized by an abundance of submerged aquatic vegetation (SAV) that grows while submerged within the water column or floating on the water's surface.[39] Most SAV are well adapted in constantly flooded environments because of tuberous roots and large, floating seeds.[10]

Plants

Spiral ditchgrass (*Ruppia cirrhosa*, p. 24) and sago pondweed (*Stuckenia pectinata*, p. 23) are two of the most common and valuable GSL submergent species. Both tolerate elevated salinity and are high-quality food sources for migratory birds; however, sago pondweed is considered the cornerstone SAV species.[7] Its presence in a submergent wetland indicates the wetland's productivity for birds. The entire plant is edible and highly nutritious, including the leaves, tubers, and large seeds.[8; 39] Spiral ditchgrass is also highly nutritious but less productive; its importance to bird diets increases significantly during the winter months when other food sources are rare.[62]

Wetland water level management is a key tool for maintaining the appropriate levels of salinity and depth necessary for SAV growth and reproduction. In GSL wetlands, a flush of freshwater in the spring is important for maintaining optimal water and salinity levels.[10] Freshwater inflow varies throughout GSL wetlands, so managing SAV is easier in areas with a consistent supply of freshwater than in areas that experience frequent summertime drought.[50] To stimulate the most plant production and therefore create the highest food availability for birds, 38–45 cm (15–18 in) of water with brackish salinity (9–15 ppt) is optimal for sago pondweed.[44] Spiral ditchgrass thrives best in shallow wetlands where water depth is often less than 30 cm (12 in) and salinity is between 10–21 ppt.[35]

Submergent vegetation provides habitat for macroinvertebrates and fish, but the physical disturbances from these species tend to alter SAV.[15] Sago pondweed is especially intolerant of disturbances created by carp (Cyprinidae family).[16] Carp are invasive bottom-feeding fish that uproot plants and increase water turbidity while searching for food in the mud.[10] Managers can use pesticides or hydrologic drawdowns to control carp populations and decrease physical disturbances in submergent wetlands.

Native SAV need nutrients like nitrogen and phosphorus to grow, but when water nutrient levels are too high, SAV can be negatively impacted. High levels of nitrogen or phosphorous cause algal blooms that block sunlight and inhibit the growth of SAV. At their thickest, algal blooms prevent birds from accessing food in the water column. To deal with excess nutrients, managers can draw down their wetlands, allowing nutrients to bind to soil particles, then managers can dredge and remove the soil.[27]

Submerged aquatic plants by family

Azollaceae

Azolla microphylla

Mexican mosquitofern

Habitat

Permanently flooded wetlands, ponds, and slow-moving streams

Stems and Roots

Free-floating mats to 2 cm (0.8 in) across; small roots

Leaves

Pinnately compound branching, two-lobed leaves, green to red

Flowers and Seeds

No flowers; sporocarps located on underside of leaves

Facts

Synonym: *A. mexicana*

Mosquitofern is a fern, not a flowering plant.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	APF	N	U

Ceratophyllaceae

Ceratophyllum demersum

Coon's tail

Habitat

Streams, ditches, ponds

Stems and Roots

Submerged, 1 m (3.2 ft) long stems, freely branched and tangled; rootless

Leaves

Whorls of 5–12 flat, linear leaves, toothed margins

Flowers and Seeds

Inconspicuous flowers in leaf axils; elliptical achene

Facts

Synonym: *C. apiculatum*

Coon's tail can be distinguished from *Myriophyllum* species (p. 15) by its tiny, hidden flowers.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	U



Characeae

Chara spp.

Chara

Habitat

Permanently flooded, alkaline wetlands

Stems and Roots

Multi-cellular algae attached to substrate via rhizoids

Leaves

No leaves; whorls of 6–16, light green, linear branches, gritty due to calcium carbonate deposits

Flowers and Seeds

No flowers; smells of hydrogen sulfide

Facts

Synonyms: stonewort, skunkweed, sandgrass

Chara is an algae often mistaken for a vascular plant.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	AF	N	O



Haloragaceae

Myriophyllum sibiricum

Shortspike watermilfoil

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Commonness:
OBL	PF	N	O

Habitat

Permanently flooded wetlands and ponds

Stems and Roots

Submerged, 30–80 cm (1–2 ft) long stems, slender with few branches

Leaves

Whorls of 4–5, thread-like, finely dissected leaves, 10 or fewer leaflets

Flowers and Seeds

Whorls of red flowers on short spikes held above water

Facts

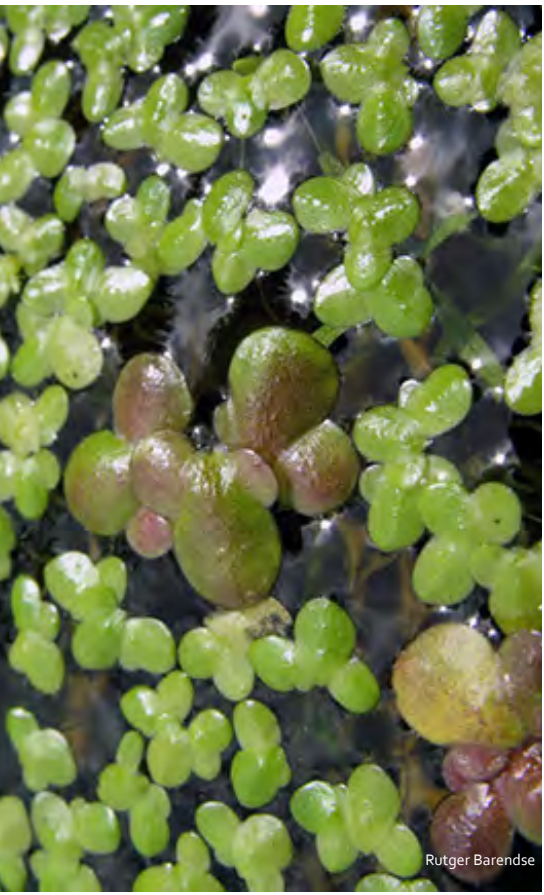
Synonyms: *M. exalbescens, M. magdalenense, M. spicatum*

M. spicatum, an invasive milfoil, has longer leaves with more pairs of leaflets (16-21) than shortspike watermilfoil.

Lemnaceae

Lemna gibba

Swollen duckweed



Habitat

Permanently flooded wetlands, ponds, and slow-moving streams

Stems and Roots

Small floating plants, form colonies; single, small root per thallus

Leaves

Leafless; oval to round thallus, 5x4 mm (0.2x0.1 in); inflated air chambers below surface

Flowers and Seeds

Reproduction primarily by budding; flowers inconspicuous

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	O



Lemnaceae

Lemna minor

Common duckweed

Habitat

Permanently flooded wetlands, ponds, and slow-moving streams

Stems and Roots

Small floating plants, form colonies; single, small root per thallus

Leaves

Leafless, flat, oval, green or purple thallus, 3 faint veins; 4.5x3 mm (0.2x0.1 in)

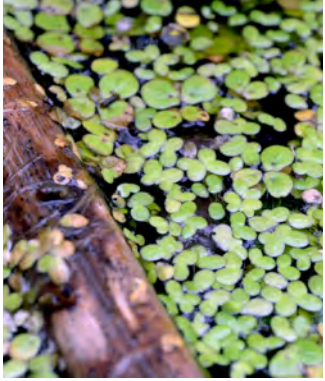
Flowers and Seeds

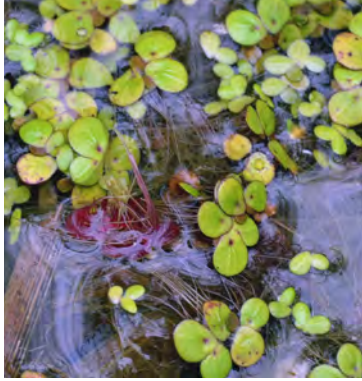
Reproduction primarily by budding; flowers inconspicuous

Facts

Synonyms: *L. cyclostasa, L. minima*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	C

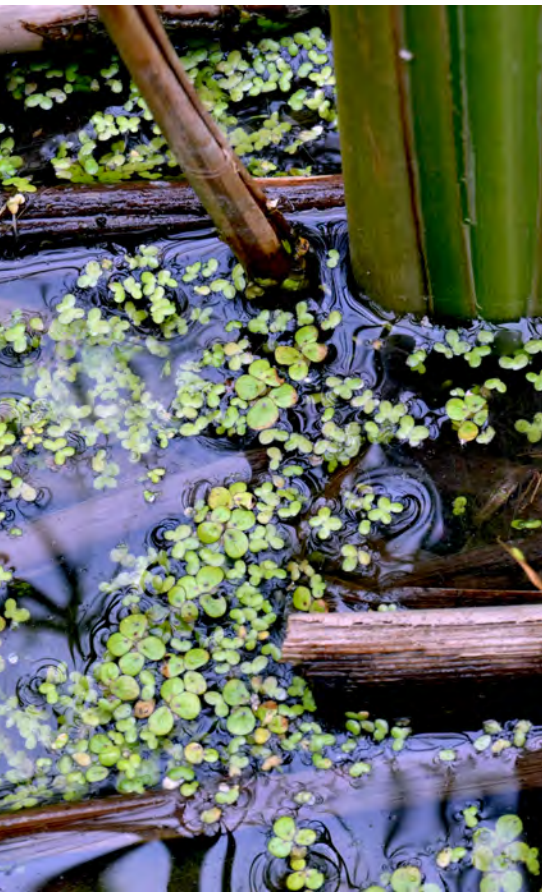




Lemnaceae

Spirodela polyrrhiza

Great duckweed



Habitat

Permanently flooded wetlands, ponds, and slow-moving streams

Stems and Roots

Small floating plants; many roots per thallus

Leaves

Leafless, 2–5 oval thalli connected by stalks, dark-green above, purple below, 5.5x3.5 mm (0.2x0.1 in)

Flowers and Seeds

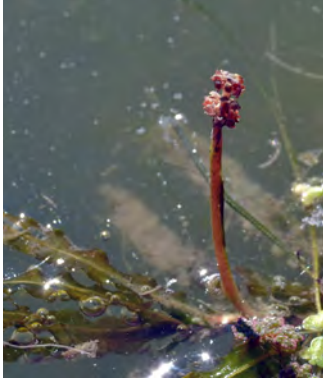
Reproduction primarily by budding, flowers inconspicuous

Facts

Synonym: *Lemna polyrrhiza*

Great duckweed is distinguished from *Lemna* species (pp. 16–17) because it is larger and has many rootlets.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	O



Potamogetonaceae

Potamogeton crispus

Curly-leaf pondweed

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	I	U

Habitat

Deeply flooded wetlands and slow-moving streams

Stems and Roots

Submerged, 40–80 cm (1.5–2 ft) long, freely branching stems, forming mats; slender, creeping rhizomes

Leaves

Alternate, flat, ribbon-like blades, 3–5 mm (0.1–0.2 in) wide, crisped margins

Flowers and Seeds

Stout, 3–5 cm (1–2 in) tall, pedunculate spikes of yellow flowers; ovate, beaked achenes

Facts

Synonyms: crisped pondweed, curly pondweed

Curly-leaf pondweed was first introduced to the Western United States by gun clubs.



Potamogetonaceae

Potamogeton foliosus

Leafy pondweed

Habitat

Shallowly flooded wetlands and slow-moving streams

Stems and Roots

Submerged, 20–100 cm (0.5–3 ft) long, slender, compressed stems, freely branching; matted, slender rhizomes

Leaves

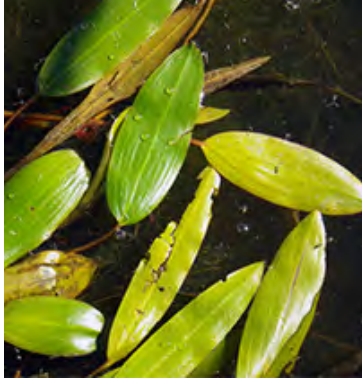
Alternate, flat, ribbon-like blades, 1 mm (0.03 in) wide, entire margin

Flowers and Seeds

0.5–1.5 cm (0.2–0.6 in) tall, pedunculate spikes of crowded, globular, greenish flowers; achene with wavy keel

Narrow, flat leaves distinguish leafy pondweed from *Stuckenia filiformis* (p. 22) and *S. pectinata* (p.23), which have round leaves

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	U



Potamogetonaceae

Potamogeton nodosus

Longleaf pondweed

Habitat

Deeply flooded wetlands, ponds, and streams

Stems and Roots

Partially submerged, 40–150 cm (1–5 ft) long, round stems; stout rhizomes

Leaves

Submerged leaves lanceolate, 10–20 cm (4–8 in) long; floating leaves elliptical, 5–12 cm (2–5 in) long; all petiolate, alternate

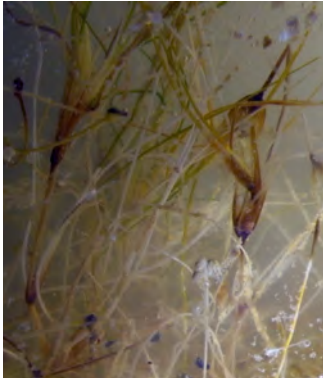
Flowers and Seeds

Stout, pedunculate spikes of crowded, green-brown flowers; achene with 3 keels

Facts

Synonyms: *P. americanus, P. fluitans, P. oblongifolius*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	U



Potamogetonaceae

Stuckenia filiformis

Fineleaf pondweed

Habitat

Shallowly flooded wetlands, slow-moving ditches

Stems and Roots

Submerged, 20–60 cm (0.5–2ft) long, slender stems; slender, creeping rhizomes, tubers

Leaves

Alternate, round, thread-like blades, 1–3 mm (.04–0.1 in) wide, blunt tip; sheaths fused into a tube

Flowers and Seeds

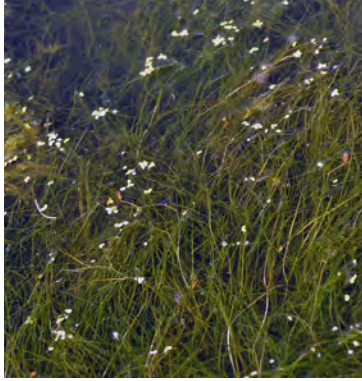
Slender, pedunculate, 3–10 cm (1–4 in) long spikes, 2–8 whorls of brown flowers; achene with rounded keel

Facts

Synonym: *Potamogeton filiformis*

Fineleaf pondweed is distinguished from *S. pectinata* (p. 23) by its wider leaves and fused leaf sheath.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	O



Potamogetonaceae

Stuckenia pectinata

Sago pondweed

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	C

Habitat

Moderate to deeply flooded, fresh to brackish wetlands, and slow-moving ditches

Stems and roots

Submerged, 30–80 cm (1–2.5 ft) long, round stems, freely branched; slender, creeping rhizomes, tubers

Leaves

Alternate, round, thread-like blades, 1 mm (.04 in) thick, pointed tip; sheath open

Flowers and Seeds

Slender, 1–15 cm (0.4–6 in) long, pedunculate spikes with unequally spaced whorls of green-brown flowers, 0.5–1.1 mm (0.02–0.03 in) beak; achene with rounded keel

Facts

Synonyms: *Coleogeton pectinatus, Potamogeton pectinatus*

*See pp. 9–10 for additional information.



Ruppiaceae

Ruppia cirrhosa

Spiral ditchgrass

Habitat

Shallow to moderately deep flooded brackish or alkaline wetlands

Stems and Roots

Submerged, 40–80 cm (1–2.5 ft) long, slender, freely-branched stems; creeping rhizomes

Leaves

Alternate, round, slender, scattered or tufted blades, 1–10 cm (0.4–4 in) long, sheathing leaf-bases

Flowers and Seeds

Flowers on spiraling peduncle; fruit a druplet

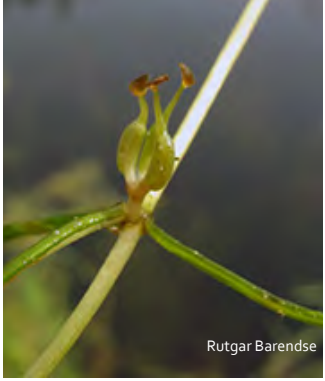
Facts

Synonyms: *R. maritima, R. occidentalis, R. spiralis,* widgeongrass

Spiralling flower stalks are a unique feature of spiral ditchgrass.

*See p. 9 for additional information.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	C



Zannichelliaceae

Zannichellia palustris

Horned pondweed

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	O

Habitat

Deeply flooded, fresh to brackish wetlands and slow-moving ditches

Stems and Roots

Submerged, 30–50 cm (1–1.6 ft) long, slender stems, freely branched; slender, creeping rhizomes

Leaves

Opposite, linear, slender, light green blades, 2–8 cm (0.8–3 in) long

Flowers and Seeds

Axillary buds enclosing minute flowers; clusters of oblong achenes, toothed margins

Facts

Synonym: *Z. major*

Horned pondweed has opposite leaves, which distinguish it from other pondweeds.

Birds

When submergent wetlands are managed for a variety of water depths and wetland complexes, they maintain a high diversity of birds (pp. 27–28). Deep submergent wetlands provide ideal conditions for waterfowl that feed on lush SAV growth, while shallow submergent wetlands attract shorebirds that hunt for the large, complex populations of aquatic macroinvertebrates living on the plants.[7:39]

A variety of waterfowl and other birds are attracted to high-quality submergent wetlands. Tundra swans (*Cygnus columbianus*) and many diving ducks, including canvasbacks (*Aythya valisineria*) and common mergansers (*Mergus merganser)*, rest in submergent wetlands during their annual migrations. While resting, these species feed extensively on the leaves and tubers of sago pondweed.[10] Dabbling ducks, including the northern pintail (*Anas acuta*) and American wigeon (*Anas americana*), consume the seeds of many SAV species, especially sago pondweed and spiral ditchgrass.[3] Many of the waterfowl and shorebird species mentioned in subsequent chapters forage on vegetation and macroinvertebrates in submergent wetlands during their fall migration.[7]

Submergent wetlands, particularly deep submergent wetlands, provide habitat for piscivorous (fish-eating) birds that prey on fish hiding among SAV.[39] Piscivorous bird species in GSL wetlands include the American white pelican (*Pelecanus erythrorhynchos*), double-crested cormorant (*Phalacrocorax auritus*), pied-billed grebe (*Podilymbus podiceps*), and the common merganser. Even birds of prey, including the bald eagle (*Haliaeetus leucocephalus*), fly over submergent wetlands in search of fish.

In addition to feeding in submergent wetlands, a few priority bird species will also use submergent plant species for breeding and nesting. Black terns (*Chlidonias niger*) breed in shallow submergent wetlands, and Clark's and western grebes (*Aechmophorus clarkii; A. occidentalis*) will use sago pondweed to build floating nests on the water of these deep wetlands.[33] Because they support so many different types of birds throughout the year, maintaining healthy, flooded submergent wetlands is a critical wetland management goal at GSL.

Tundra swan
Cygnus columbianus

Canvasback
Aythya valisineria

Common merganser
Mergus merganser

Northern pintail
Anas acuta

American wigeon
Anas americana

American white pelican
Pelecanus erythrorhynchos

Double-crested cormorant
Phalacrocorax auritus

Pied-billed grebe
Podilymbus podiceps

Bald eagle
Haliaeetus leucocephalus

Black tern
Chlidonias niger

Clark's grebe
Aechmophorus clarkii

Western grebe
Aechmophorus occidentalis

Emergent Wetlands

Emergent wetlands are what many people imagine when they think of marshes that fringe lakes and ponds. They are characterized by a mix of open water and vegetation that grows in, but emerges from, the surface of the water. Over the course of a year, emergent wetland water levels can fluctuate considerably between deeply flooded and dry.[39] The emergent wetlands surrounding Great Salt Lake (GSL) are often located near large submergent wetlands and encompass approximately 520 km² (129,693 ac). Emergent wetlands are dominated by stout, fast-growing bulrushes, cattails, and large grasses.

Plants

Alkali bulrush (*Bolboschoenus maritimus*, p. 39), hardstem bulrush (*Schoenoplectus acutus*, p. 40), and Olney's threesquare (*Schoenoplectus americanus*, p. 41) are three species of bulrushes that provide essential migratory bird habitat. Each thrives under slightly different flooding and water chemistry conditions, but all reproduce by rhizomes as well as by seeds.[40] Rhizomes allow stands of bulrushes to persist under stressful drought or flooding conditions that are characteristic of emergent wetlands.[12]

Alkali bulrush, the shortest and most valuable bulrush species, grows in expansive, loose stands.[34] While it grows best in 5–15 cm (2–6 in) of water, it also benefits from seasonally fluctuating water levels and is capable of withstanding both temporary, deep flooding and

short-term drought.[27] This hardy species can tolerate highly alkaline soils up to 9.0 pH, and while it grows most robustly when salinity is below 6 ppt, it can tolerate extended periods of time at salinities near 10 ppt with no increase in plant mortality.[51]

Hardstem, the tallest bulrush, grows in dense stands of deeply flooded wetlands (up to 30 cm or 12 in deep); however, it has lower drought and salinity tolerances than alkali bulrush.[13] Adult plants can tolerate salinities near 6 ppt with very little reduction in growth, but mortality increases at salinities above that level.[29] During periods of drawdown, the soil must remain saturated for long-term maintenance of hardstem bulrush.[52]

Olney's threesquare, another dense, stand-forming bulrush, gets its name from its concave, triangular stem. Thriving best in shallow water of at least 10 cm (4 in), Olney's threesquare can tolerate water depths up to 30 cm (12 in).[19] Olney's threesquare can also tolerate brackish conditions, around 6 ppt for up to 2 months, but will grow shorter as salinity approaches 12 ppt.[26]

In addition to bulrushes, cattails (*Typha* spp., pp. 64–65) are common in GSL emergent wetlands. Although native, cattails are often viewed as undesirable species because they can colonize wetlands after a disturbance or when water stagnates, forming dense monocultures that outcompete habitat-forming plants like bulrushes.[10] Without proper management of water flow, salinity, and nutrients, cattails will form dense, monotypic stands that waterfowl and other large birds cannot use.[47] Water management, herbicide application, mowing, disking, grazing, burning, or a combination of those techniques can be useful in preventing cattails from growing too densely.[31]

Emergent Plants by Family

Alismataceae

Sagittaria cuneata

Arrowhead

Habitat

Shallow to moderately deep ponds, slow-moving streams

Stems and Roots

10–50 cm (4–6 in) tall, emergent stem; rhizomes, tubers

Leaves

Basal, hastate blades, long petioles; ribbon-like submerged blades

Flowers and Seeds

2–8 whorls of large, white, 3-petal flowers, deciduous; globular fruiting bodies

Facts

Synonyms: wapato, duck potato, *S. arifolia*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	U

Apiaceae

Conium maculatum

Poison hemlock

Habitat

Saturated soils, ditchbanks

Stems and Roots

30–60 cm (1–2 ft) tall, hollow stems with purple spots, branching above; taproots

Leaves

Opposite, pinnately dissected blades, petiolate; lower leaves sessile

Flowers and Seeds

Compound umbels of numerous, small, white, 5-petal flowers; seeds oblong, ribbed

Facts

Ingesting poison hemlock can be fatal.

Conium is the poison that is believed to have killed Socrates.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	BF	I	O

Asclepiadaceae

Asclepias incarnata

Swamp milkweed

Habitat

Shallowly flooded wetlands, streams, and ditchbanks

Stems and Roots

40–150 cm (1–5 ft) tall, stout stems with milky latex; short rhizomes

Leaves

Opposite or whorled, linear-lanceolate blades, pointed tips

Flowers and Seeds

Pink, 5-petal flowers in umbelliform cymes, petals with corona; seed comas

Facts

Swamp milkweed provides habitat for butterflies, and its seed comas have been used as pillow and life jacket stuffing.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	U

Asteraceae

Euthamia occidentalis

Western goldentop

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PF	N	C

Habitat

Temporarily to permanently saturated soils

Stems and Roots

50–200 cm (0.6–6 ft) tall, stout stems, branched above; creeping rhizomes

Leaves

Many alternate, sessile, lanceolate blades; smooth surface, scabrous margins

Flowers and Seeds

Flat-topped corymbs of many small yellow flowers, involucres pale yellow, pappus of capillary bristles

Facts

Synonyms: false goldenrod, *Solidago occidentalis*

Western goldentop is taller than *Symphiotrichum ciliatum* (p. 79); its similar aster and flower heads are globular prior to blooming.

Brassicaceae

Nasturtium officinale

Watercress

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	I	U

Habitat

Shallow, slow-flowing streams and wetlands

Stems and Roots

10–60 cm (4 in–2 ft) tall, hollow stems, decumbent to ascending, forming dense colonies; fibrous roots

Leaves

Alternate, pinnately compound blades with pairs of elliptical leaflets, auriculate petiole

Flowers and Seeds

Terminal and axillary racemes of white, 4-petal flowers; silique

Facts

Synonym: *Sisymbrium nastrutium-aquaticum*

Watercress is used as a popular salad herb because of its spicy, peppery flavor.



Brassicaceae

Rorippa palustris

Marsh yellowcress

Habitat

Shallowly flooded wetlands and streambanks

Stems and Roots

20–100 cm (8 in–3.3 ft) tall, stout stems, branched above; taproots

Leaves

Alternate, cauline and basal, oblong and deeply lobed blades, margins irregularly toothed, clasping petiole

Flowers and Seeds

Terminal and axillary racemes of small, yellow, 4-petal flowers; silicle or silique

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	O

Cyperaceae

Bolboschoenus maritimus

Alkali bulrush

Habitat

Temporarily to permanently shallow-flooded, alkaline or saline wetlands

Stems and Roots

20–150 cm (8 in–5 ft) tall, stout, triangular culms; rhizomes, firm tubers

Leaves

Several long, flat, cauline blades

Flowers and Seeds

Compact cluster of 3–25 spikelets, scales tan or light brown, 2+ leaf-like involucre bracts; brown, lenticular achene

Facts

Synonyms: cosmopolitan bulrush, *Schoenoplectus maritimus, Scirpus maritimus*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PG	N	C

*See pp. 29–30 for additional information.



Cyperaceae

Schoenoplectus acutus

Hardstem bulrush

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PG	N	C

Habitat

Shallow to deeply flooded wetlands and shorelines

Stems and Roots

1–3 m (3–10 ft) tall, round, firm culms, >1 cm (0.4 in) across; rhizomatous

Leaves

Few, short blades near bottom of stem or bladeless sheaths

Flowers and Seeds

Open, branched inflorescence of 20+ spikelets, scales gray-brown with red spots; erect, stem-like involucre bract; small, dark brown, lenticular achene

Facts

Synonym: *Scirpus acutus*

S. tabernaemontani is similar in appearance to hardstem bulrush but is not found near GSL.

*See pp. 29–30 for additional information.

Cyperaceae

Schoenoplectus americanus

Olney's threesquare

Habitat

Semi-permanent, shallowly flooded wetlands

Stems and Roots

50–150 cm (1.5 ft–5 ft) tall, clustered, sharply 3-sided, concave culms; rhizomatous

Leaves

Few, short blades on lower part of stem

Flowers and Seeds

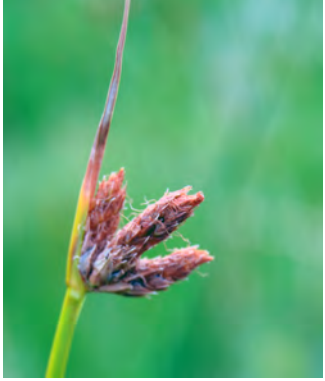
Small, compact cluster of 2–15 spikelets, scales yellow-brown to red-brown, 1 stem-like involucre bract; small, dark-brown, lenticular achene

Facts

Synonyms: *Scirpus americanus, S. olneyi, S. chilensis, S. conglomeratus*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PG	N	C

*See pp. 29–30 for additional information.



Cyperaceae

Schoenoplectus pungens

Common threesquare

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PG	N	U

Habitat

Saturated to shallowly flooded, alkaline wetlands

Stems and Roots

15–100 cm (0.5–3.3 ft) tall, triangular culms; rhizomatous

Leaves

Several flat or folded blades near base of stem

Flowers and Seeds

Compact cluster of 1–6 spikelets, scales yellow-brown with notched apex; lenticular achene

Facts

Synonym: *Scirpus pungens*

Common threesquare is distinguished from Olney's threesquare by its shorter height and slightly, not sharply, concave culms.



Grossulariaceae

Ribes aureum

Golden current

Habitat

Shallowly flooded wetlands, shorelines

Stems and Roots

1–3 m (3-9 ft) tall shrubs, gray or tan bark

Leaves

Alternate, 3-lobed blades, petiolate

Flowers and Seeds

Racemes of 5–18 yellow, 5-petal flowers with cylindrical hypanthium, fragrant, turns red with age; orange-red berries

Facts

Golden current flowers and berries are edible.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PS	N	O

Hippuridaceae

Hippuris vulgaris

Common mare's-tail

Habitat

Shallow ponds and slow-moving streams

Stems and Roots

10–40 cm (0.4–1 ft) tall, erect, partially submerged stems; rhizomes

Leaves

Whorls of 6+ thick, linear blades

Flowers and Seeds

Inconspicuous flowers in leaf axils, no petals

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	O

Iridaceae

Iris pseudacorus

Yellow flag

Habitat

Shallowly flooded wetlands, ditchbanks, and shorelines

Stems and Roots

40–150 cm (1–5 ft) tall stems, forming large clumps; rhizomatous

Leaves

Overlapping, broad (25 mm or 1 in), smooth, sword-shaped blades

Flowers and Seeds

Spathes with 2–3 large, yellow flowers with 3 spreading petals

Facts

Synonym: paleyellow iris

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	I	O

Lamiaceae

Lycopus asper

Rough bugleweed

Habitat

Shallow, semi-permanent to permanently flooded wetlands

Stems and Roots

20–80 cm (0.5–2.5 ft) tall, square stems with spreading hairs; rhizomes, tubers

Leaves

Opposite, sessile, oblong to lanceolate blades, serrated margins

Flowers and Seeds

Whorls of small, white, 4-lobed flowers in leaf axils, 2 exserted stamens

Facts

Synonym: *L. lucidus*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	U

Lamiaceae

Mentha arvensis

Wild mint

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PF	N	U

Habitat

Saturated to shallowly flooded wetlands

Stems and Roots

20–80 cm (0.5–2.5 ft) tall, erect, hairy, square stems; creeping rhizomes

Leaves

Opposite, ovate to elliptical blades, toothed margins, petiolate

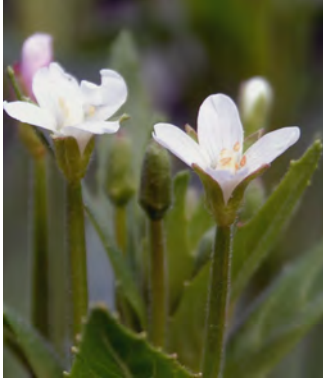
Flowers and Seeds

Whorls of small, white to light purple flowers with 4 fused petals in upper leaf axils and 4 exserted stamens

Facts

Synonyms: *M. canadensis, M. gentilis, M. glabrior, M. penardii*

Wild mint can be easily identified by its strong, minty fragrance.


Onagraceae

Epilobium ciliatum

Fringed willowherb

Habitat

Saturated to shallow, permanently flooded wetlands

Stems and Roots

1–2 m (3–6.5 ft) tall, erect stems; fibrous roots, turions

Leaves

Opposite, lanceolate to ovate blades, minutely toothed margins; upper leaves with short, fine hairs

Flowers and Seeds

Racemes of white or pink, 4-petal flowers on 2–15 mm (0.08–0.6 in) long pedicels; seeds with tuft of hairs

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PF	N	C



Poaceae

Phalaris arundinacea

Reed canarygrass

Habitat

Saturated to shallowly flooded streams and ditchbanks

Stems and Roots

40–230 cm (1–7.5 ft) tall culms; rhizomatous

Leaves

Scabrous blades, open sheaths, short auricles, membranous ligule

Flowers and Seeds

Contracted panicle with dense, spike-like branches, 3 florets (1 fertile and 2 scale-like) per spikelet; glumes with scabrous keel

Facts

Synonym: *Phalaroides arundinacea*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PG	NI	U



Poaceae

Phragmites australis subsp. *australis*

Common reed

Habitat

Shallow to moderately deep flooded, fresh to saline wetlands

Stems and Roots

1–4 m (3–13 ft) tall, stout, hollow, ribbed culms, forming dense stands; stout rhizomes

Leaves

Long, flat, green-blue blades, persistent open sheaths; <1 mm short (0.04 in), ciliate ligule

Flowers and Seeds

Large, 15–35 cm (6–13 in) long, open panicle, purple when young; 3–10 florets per spikelet; upper glume longer than lower glume; palea shorter than lemma

Facts

Synonyms: *P. communis, P. phragmites*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PG	I	C

*See pp. 112 and 181 for additional information.



Poaceae

Phragmites australis subsp. *americanus*

American common reed

Habitat

Saturated soils to shallow-flooded wetlands, streams, ditchbanks, and seeps

Stems and Roots

1–2 m (3–6 ft) tall, hollow, shiny culms in loose colonies; stout rhizomes

Leaves

Long, flat, green-yellow blades; loose, deciduous, sheath; >1 mm (0.04 in) long, ciliate ligule

Flowers and Seeds

Straw-colored panicle, smaller than introduced variety, 3–10 florets per spikelet; long, unequal glumes; palea shorter than lemma

Facts

Shiny or glossy culms and deciduous leaf sheaths are the most reliable distinguishing features of American common reed.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PG	N	U

*See p. 181 for additional information.



Poaceae

Polypogon monspeliensis

Rabbitsfoot grass

Habitat

Saturated to shallowly flooded saline or alkaline wetlands

Stems and Roots

5–65 cm (2 in–2 ft) tall, hollow culms; caespitose

Leaves

Flat blades, open sheaths; pointed, membranous ligule

Flowers and Seeds

Dense, contracted, spike-like panicle, 1 floret per spikelet, glumes with long, narrow awn

Fact

Synonym: *Alopecurus monspeliensis*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	AG	I	C



Poaceae

Puccinellia nuttalliana

Nuttall's alkaligrass

Habitat

Saturated to temporarily shallow-flooded, alkaline wetlands

Stems and Roots

35–70 cm (1–3.3 ft) long, erect culms; caespitose

Leaves

Blades often rolled inward, sheaths open, membranous ligule

Flowers and Seeds

Pyramidal, open panicle with spreading branches, slender spikelets with 3–7 florets

Facts

Synonyms: *P. airoides, P. cusickii*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PG	N	C

Polygonaceae

Polygonum lapathifolium

Pale smartweed

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	AF	I	U

Habitat

Shallowly flooded wetlands; often near a disturbance

Stems and Roots

10–200 cm (4 in–6.6 ft) tall, ascending or erect stems, swollen nodes; taproots, rhizomes when submerged

Leaves

Alternate, lanceolate blades, pitted surface, faint to dark spot near center; petiolate; membranous, cylindrical ocrea, tears with age

Flowers and Seeds

Long (3–8 cm or 1–3 in), arching racemes with bundles of 4–15 white flowers with 4–5 tepals; disc-shaped, brown achenes

Facts

Synonyms: *P. nodosum, P. tomentosum, Persicaria incarnata, P. lapathifolia*

The taxonomic treatment of *Polygonum* species is currently undergoing debate and change.

Polygonaceae

Polygonum persicaria

Spotted ladysthumb

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	AF	I	U

Habitat

Shallowly flooded wetlands and ditchbanks

Stems and Roots

10–70 cm (4 in–2.3 ft) tall, decumbent or erect stems, swollen nodes, branching near base; taproots

Leaves

Alternate, lanceolate blades, dark red spot in center; membranous ocrea with bristles on upper margin, tears with age

Flowers and Seeds

Nodding racemes with bundles of pink to purple flowers with 4–5 tepals; dark brown, disc-shaped achenes

Facts

Synonyms: *P. dubium, P. fusiforme, P. puritanorum, Persicaria maculata, P. maculosa, P. persicaria*

Polygonaceae

Rumex maritimus

Golden dock

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	AF	N	U

Habitat

Saturated to shallowly flooded wetlands

Stems and Roots

15–60 cm (6 in–2 ft) tall, erect stems; vertical rhizome

Leaves

Linear to lanceolate blades, smooth margins, petiolate

Flowers and Seeds

Panicles along half stem length, dense whorls of 15–30 green to yellow, pedicellate, valvate flowers; valves with irregularly toothed margins

Facts

Synonyms: *R. fueginus, R. persicarioides.* Plant taxonimists are investigating if *R. maritimus* and *R. fueginus* are distinct species from different continents.



Polygonaceae

Rumex stenophyllus

Narrowleaf dock

Habitat

Temporarily flooded wetlands, and ditchbanks

Stems and Roots

40–80 cm (1.3–2.6 ft) tall, erect stems, branched above; vertical rhizome

Leaves

Lanceolate blades, margins strongly crisped or wavy, petiolate

Flowers and Seeds

Panicles along half stem length, whorls of 20+ green to brown, pedicellate, valvate flowers, valves with 4–10 narrow projections or teeth on margins

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	**PF**	**I**	**U**

Ranunculaceae

Ranunculus cymbalaria

Marsh buttercup

Habitat

Saturated to shallowly flooded, saline wetlands, streambanks, and shorelines

Stems and Roots

3–18 cm (3–7 in) tall, solid stems, erect or ascending; stoloniferous

Leaves

Basal, orbicular or cymbal-shaped blades with small lobes, petiolate

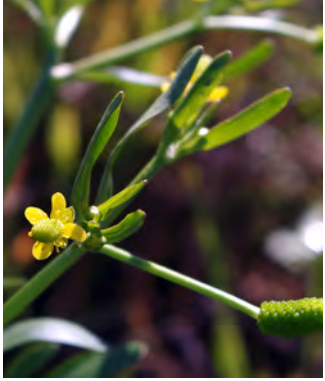
Flowers and Seeds

Cymes of 1–5 small, yellow, 5-petal flowers, deciduous; fruits a cluster of 25-200 achenes

Facts

Synonyms: alkali buttercup, *Cyrtorhyncha cymbalaria, Halerpestes cymbalaria*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	O



Ranunculaceae

Ranunculus sceleratus

Blister buttercup

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	APF	N	U

Habitat

Shallowly flooded wetlands, streambanks, and shorelines

Stems and Roots

10-40 cm (4in-1.3 ft) tall, hollow, smooth, erect, branched stems; fibrous roots

Leaves

Blades semi-circular in outline, deeply lobed into 3 parts, long petioles

Flowers and Seeds

Terminal, small, yellow 3-5 petal flowers, 3-5 green sepals, 10-25 stamen; fruit an ovoid cluster of 90+ achenes with beak

Facts

Synonym: cursed buttercup

Blister buttercup's juice is toxic and can cause blistering of the skin, tongue, and lips.

Scrophulariaceae

Mimulus guttatus

Seep monkeyflower

Habitat

Stream and ditchbanks, shorelines, and slow-moving streams

Stems and Roots

5–50 cm (2 in–1.6 ft) tall, erect to ascending stems; occasionally stoloniferous or rhizomatous; growth forms highly variable

Leaves

Opposite, obovate to orbicular blades, irregularly toothed margins, lower leaves petiolate, surface variable

Flowers and Seeds

Racemes of yellow, bilaterally symmetrical flowers with distinct upper and lower lips, red spots near throat

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	AFP	N	O

Scrophulariaceae

Veronica anagallis-aquatica

Water speedwell

Habitat

Shallow, permanently flooded wetlands, and slow-moving streams

Stems and Roots

10–60 cm (4 in–2 ft) tall, erect or ascending stems, often branched; rhizomatous

Leaves

Opposite, clasping, elliptical blades, smooth surface, toothed margins

Flowers and Seeds

Racemes of white to pale blue or purple flowers with 4 fused petals, flowers fall off easily

Facts

Synonyms: *V. anagallis, V. catenata, V. glandifera*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	U



Solanaceae

Solanum dulcamara

Climbing nightshade

Habitat

Saturated to shallowly flooded wetlands, often disturbed

Stems and Roots

1–3 m (3–9 ft) long, climbing, hairy stem; a vine, herb, or subshrub; rhizomatous

Leaves

Alternate, ovate blades, shallow to deeply cleft at base, petiolate

Flowers and Seeds

Cymes of purple, downward-facing flowers with united anthers; red berries

Facts

Climbing nightshade berries are poisonous, and the plant does not always grow upright.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PF	I	O



Sparganiaceae

Sparganium eurycarpum

Broadfruit bur-reed

Habitat

Moderately deep, flooded wetlands and shorelines

Stems and Roots

50–200 cm (1.6–6.5 ft) tall, stout stems; fibrous roots with creeping rhizomes

Leaves

Alternate, linear, flat or keeled blades

Flowers and Seeds

Branches with globular flowers, 5–12 staminate flowers above, 1–2 larger, pistillate flowers below; burr-like fruits, beaked achenes

Facts

Synonym: *S. californicum*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	O



Typhaceae

Typha domingensis

Southern cattail

Habitat

Moderate to deeply flooded wetlands

Stems and Roots

2–4 m (6–13 ft) tall, stout, cylindrical, pithy stems; rhizomes

Leaves

Alternate, wide, flat blades, bottom side concave, sheaths open

Flowers and Seeds

Cylindrical, spike-like flowers; yellow (staminate) and light-brown (pistillate) sections separated by length of green axil

Facts

Synonym: *T. angustata*

The rhizomes, young flower spikes, stem, leaf base, and pollen of southern cattail are edible.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	U

*See p. 30 for additional information.



Typhaceae

Typha latifolia

Broadleaf cattail

Habitat

Moderate to deeply flooded wetlands

Stems and Roots

1–3 m (3–9 ft) tall, stout, cylindrical, pithy stems; fleshy rhizomes

Leaves

Alternate, wide, flat leaves, sheaths open

Flowers and Seeds

Cylindrical, spike-like flowers; yellow (staminate) and dark-brown (pistillate) flower sections contiguous

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	C

*See p, 30 for additional information.

Birds

Emergent marshes provide critical nesting and resting cover for a wide array of migratory birds (pp. 67–68). Both diving and dabbling ducks primarily nest in bulrushes, as do Franklin's gulls (*Leucophaeus pipixcan*), black terns, Forster's terns (*Sterna forsteri*), and large waterbirds.[66] Large emergent plants provide materials for nests and a safe hiding place for hens and chicks.[27] Many passerines, including red-winged blackbirds (*Agelaius phoeniceus*) and marsh wrens (*Cistothorus palustris*), also build and hide their nests in emergent vegetation.[7] Marsh wrens are especially industrious, with males building several globe-shaped nests suspended from emergent wetland plants.

In addition to nesting habitat, the dense growth of GSL's emergent bulrushes provide a year-round protective resting space for birds. In the spring, marbled godwits (*Limosa fedoa*) will use emergent wetlands to stage. Redheads (*Aythya americana*) and other waterfowl loaf in emergent wetlands because of the proximity to open water, where they can remain safe from predation but close to food.[9]

Emergent plants are quite valuable to foraging birds. Wintering waterfowl seek Alkali bulrush seeds because they are a high-energy food source.[62] Dabbling ducks, including the mallards (*Anas platyrhynchos*) and northern shovelers (*A. clypeata*) commonly forage for seeds on the water's surface. American coots (*Fulica americana*) can be found grazing on the vegetative parts of bulrushes and grasses. In warmer months, emergent wetland plant species provide important habitat for insects and mollusks that are consumed by goldeneyes (*Bucephala* spp.) and other diving ducks.[39] Even shorebirds, which are typically found in playa wetlands, will visit shallow emergent wetlands for feeding. Lone great blue herons (*Ardea herodias*) are often seen stalking through emergent wetlands or perched in trees. Great blue herons usually eat fish and small mammals but will forage opportunistically on a variety of wetland wildlife, including snakes.[3]

Franklin's gull
Leucophaeus pipixcan

Forster's tern
Sterna forsteri

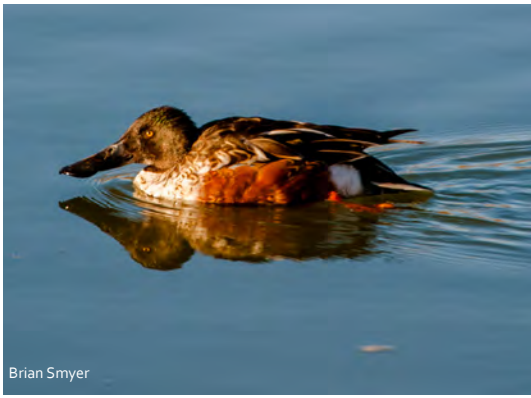
Red-winged blackbird
Agelaius phoeniceus

Marsh wren
Cistothorus palustris

Marbled godwit
Limosa fedoa

Redhead
Aythya americana

Mallard
Anas platyrhynchos



Northern shoveler
Anas clypeata

American coot
Fulica americana

Goldeneye
***Bucephala* spp.**

Great blue heron
Ardea herodias

Meadow Wetlands

Meadow wetlands, typically referred to as meadows, are defined by temporary or seasonal shallow flooding or saturated soils. Meadows comprise nearly 390 km^2 (97,225 ac) around Great Salt Lake (GSL) and are divided into wet and salt meadows based on differences in typical salinity ranges and dominant plant species.[55] Across these ranges, meadow plant communities are characterized by shorter grasses and sedges that are well-adapted to fluctuating water levels. Most meadows are either located on low-angled slopes at slightly higher elevation than submergent and emergent wetlands, or they are on the outside edges of depressions and streams. Due to frequent proximity to agricultural land, many GSL meadows are grazed by cattle.

Plants

A number of plant species are important to wet and salt meadow, although specific species are representative of either wet or salt meadows because of salinity. While a wet meadow is an especially species-rich habitat because of low soil salinity, a salt meadow is unique because of its salinity tolerant plants.

Common spikerush (*Eleocharis palustris*, p. 83) is one important wet meadow species. It is often the first plant to grow in disturbed areas and can quickly colonize bare areas following a drawdown. However, common spikerush is intolerant of elevated salinity and stunts at salinities above 6 ppt.[55]

Wet meadows often contain grasses and forbs. Slimstem reedgrass (*Calamagrostis stricta*, p. 96) and timothy (*Phleum pratense*, p. 102) are two characteristic wet meadow grasses, although they are found

infrequently. An abundance of common forbs, such as nodding beggartick (*Bidens cernua*, p. 74), are also present in wet meadows.

Saltgrass (*Distichlis spicata*, p. 97) is the most important habitat species in salt meadows because it provides nesting cover for a number of waterfowl species.[66] As a drought-tolerant, salt-tolerant species that grows in dense mats and expands via rhizomes, saltgrass can grow in wetland soils with salinity greater than 30 ppt without any impacts to growth or seed production.[6; 13] Periodic wetland burning can stimulate saltgrass growth because it creates bare ground that can be colonized by new growth from both seeds and rhizomes.[46]

Nebraska sedge (*Carex nebrascensis*, p. 81) and clustered field sedge (*Carex praegracilis*, p. 82) are common sedges in GSL salt meadows. Both species often grow in the same habitat—saturated to shallowly flooded meadows—and support the same bird species, but Nebraska sedge is taller, has larger seeds, and is more tolerant of alkaline conditions (pH of 7.5 of more).[54] Seasonally fluctuating water levels are beneficial to sedges, and dry periods are especially important after inundation.[54] As a stable wetland species, Nebraska sedge can be used to treat wastewater and is often a key species in determining the severity of cattle grazing pressure. If grazing is impairing a meadow, the rhizomatous structure of Nebraska sedge, which typically protects soil from erosion, will become weakened and more tolerant species will replace it.

Like sedges, arctic rush (*Juncus arcticus*, p. 89) is a salt meadow plant that benefits from fluctuating water levels. Arctic rush can tolerate brackish and alkaline soil, seasonal drought, shade, and frequent disturbance.[48] Arctic rushes' broad range of tolerance, combined with its dense, rhizomatous growth, makes it a particularly valuable native salt meadow species because it can prevent the spread of invasive vegetation.

Meadow Plants by Family

Apiaceae

Berula erecta

Cutleaf waterparsnip

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	U

Habitat

Saturated to shallow-flooded wetlands

Stems and Roots

20–110 cm (7 in–3.6 ft) tall, branching stems; fibrous roots, stoloniferous

Leaves

Opposite, pinnate blades with 5–15 pairs of leaflets, toothed margins, petiolate

Flowers and Seeds

Compound umbels of small, white, 5-petal flowers; flattened seeds

Facts

Synonyms: *B. incisa, B. pusilla, Siella erecta*

Cutleaf waterparsnip is highly toxic and easily misidentified as watercress (p. 37).

Asteraceae

Bidens cernua

Nodding beggartick

Habitat

Saturated to shallow-flooded wetlands

Stems and Roots

10–110 cm (4 in–3.6 ft) tall, smooth stems; fibrous roots

Leaves

Opposite, sessile, lanceolate blades, serrated margins

Flowers and Seeds

Many large heads with yellow disk and ray flowers present; nodding with age; trident-shaped seeds

Facts

Synonym: *B. glaucescens*

Nodding beggartick has been used as a honey plant.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	AF	N	U

*See p. 69 for additional information.



Asteraceae

Erigeron glabellus

Streamside fleabane

Habitat

Saturated to shallow-flooded wetlands

Stems and Roots

10–60 cm (4 in–2 ft) tall erect stems; caudex, fibrous roots

Leaves

Alternate, oblanceolate blades, sessile, with stiff hairs; lower leaves larger

Flowers and Seeds

Many heads, rays purple to white, numerous; hairy involucre bract, brown midvein

Facts

Synonym: Smooth daisy

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	**PF**	**N**	**U**

Asteraceae

Senecio hydrophilus

Water ragwort

Habitat

Saturated, alkaline wetlands

Stems and Roots

40–200 cm (1.5–6.5 ft) tall, hollow, clustered stems; fibrous roots

Leaves

Alternate, elliptical blades, smooth, slightly succulent; lower leaves larger, petiolate

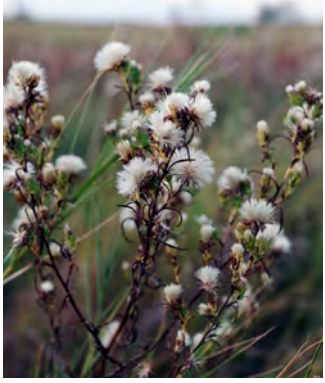
Flowers and Seeds

15+ clustered, erect heads of yellow disk and ray flowers

Facts

Synonyms: alkali-marsh butterweed, water grounsel, *S. sandvicensis*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	O


Asteraceae

Symphyotrichum ciliatum

Rayless alkali aster

Habitat

Saturated, saline wetlands and shorelines

Stems and Roots

10–70 cm (4 in–2.2 ft) tall, branching, red-tinged stems; taproots

Leaves

Alternate, linear blades, smooth with few hairs; lower leaves withering

Flowers and Seeds

Panicles of fluffy, white flowers; pappus bristles longer than ray flowers; blooming late summer

Facts

Synonyms: *Aster brachyactis, Brachyactis angusta, B. ciliata, Tripolium angustum*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	AF	N	C



Brassicaceae

Chorispora tenella

Musk mustard

Habitat

Temporarily saturated wetlands; disturbed areas

Stems and Roots

10–45 cm (4 in–1.5 ft) tall, stipitate-glandular stems; taproots

Leaves

Alternate blades; shape varies from oblong to pinnatifid, sessile, or petiolate

Flowers and Seeds

Racemes of pink to lavender, 4-petal flowers; long silique

Facts

Synonyms: blue mustard, crossflower

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	AF	I	O



Caryophyllaceae

Spergularia maritima

Salt sandspurry

Habitat

Saturated, alkaline wetlands

Stems and Roots

7–20 cm (2.7–8 in) long, prostrate to ascending, branched stems; taproots

Leaves

Opposite, linear blades, succulent, with stipules

Flowers and Seeds

Solitary, 5-petal, white to pink flowers, pedicellate; seed capsules

Facts

Synonyms: *S. marginata, S. media*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	**AF**	**I**	**U**



Chenopodiaceae

Atriplex prostrata

Triangle orache

Habitat

Saturated, alkaline wetlands; disturbed areas

Stems and Roots

10–100 cm (4 in–3.2 ft) tall, ribbed stems, branching, erect to prostrate; taproots

Leaves

Opposite (lower 2/3) to alternate (upper 1/3), petiolate, thin, triangular to hastate or ovate blades; farinose, becoming smooth

Flowers and Seeds

Branched spikes of glomerules; bracteoles triangular with toothed margins, smooth-face, pointed apex; black or brown seeds

Facts

Synonyms: thin-leafed orache, fat hen, *A. hastata, A. latifolia, A. triangularis.* Triangular, smoothed-faced bracteoles distinguish triangle orache from *Atriplex* spp. (pp. 119–120).

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	AF	N	C



Cyperaceae

Carex nebrascensis

Nebraska sedge

Habitat

Semi-permanently saturated to shallow-flooded wetlands

Stems and Roots

20–100 cm (8 in–3.2 ft) tall, stout, triangular culms; long, scaly rhizomes

Leaves

Firm, flat blades, bluish-waxy surface

Flowers and Seeds

3–6 sessile, erect, cylindrical spikes, brown-black scales with green midrib; inflated elliptical perigynia, light brown

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PG	N	U

*See p. 70 for additional information.

Cyperaceae

Carex praegracilis

Clustered field sedge

Habitat

Temporarily saturated to shallow-flooded wetlands

Stems and Roots

30–70 cm (1–2.3 ft) tall culms, solitary or clustered; stout, dark rhizomes

Leaves

Long, flat blades on bottom quarter of stem; lowest leaves reduced to sheaths

Flowers and Seeds

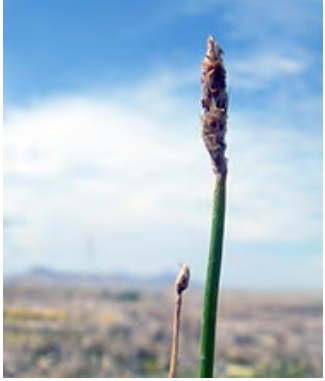
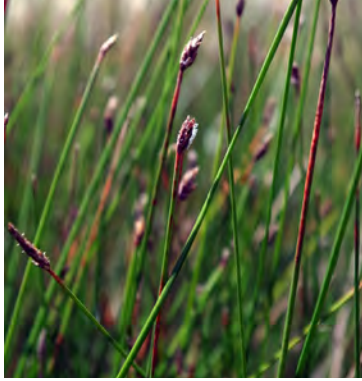
6–25 spikes aggregated in ovoid head, sessile; scales light brown; perigynia light brown, ovate, convex

Facts

Synonym: *C. camporum*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PG	N	U

*See p. 70 for additional information.

Cyperaceae

Eleocharis palustris

Common spikerush

Habitat

Saturated to shallow-flooded wetlands; exposed soils

Stems and Roots

10–100 cm (4 in–3.2 ft) tall, smooth, round culms; rhizomatous

Leaves

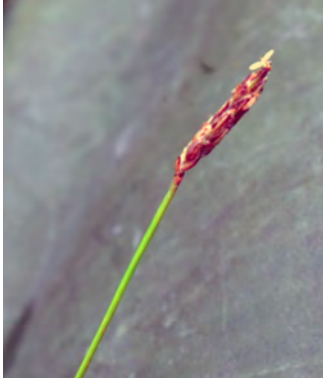
Bladeless leaf sheaths near stem base

Flowers and Seeds

Terminal, brown, lanceolate spikelet; lens-shaped, brown achenes with white tubercle constrained at the base

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PG	N	C

*See p. 69 for additional information.


Cyperaceae

Eleocharis parishii

Parish spikerush

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PG	N	U

Habitat

Saturated, fresh to brackish wetlands

Stems and Roots

10–30 cm (4 in–1 ft) tall, slender, round, ribbed culms; slender rhizomes

Leaves

Bladeless leaf sheaths near stem base

Flowers and Seeds

Terminal, brown, narrow, lanceolate spikelet; scales purple with translucent midrib; 3-sided achenes with sessile tubercle

Facts

Synonym: *E. disciformis*

Parish spikerush has thinner stems and smaller, darker spikelets than common spikerush.



Fabaceae

Glycyrrhiza lepidota

Wild licorice

Habitat

Saturated wetlands; disturbed areas

Stems and Roots

40–120 cm (1.2–3.9 ft) tall, punctate stems; sweet-flavored, deep roots

Leaves

Alternate, odd-pinnate blades, leaflets lanceolate to oblong with pointed tip

Flowers and Seeds

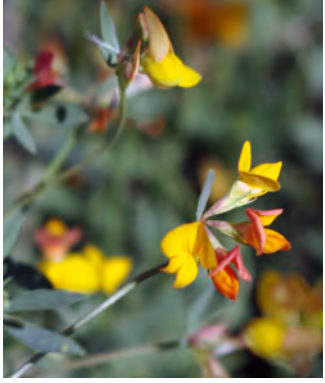
Racemes of white to cream, 5-petal flowers; burr-like, oblong or elliptical pods with hooks

Facts

Synonym: *G. glutinosa*

Roots of wild licorice have a licorice flavor.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	**PF**	**N**	**U**


Fabaceae

Lotus corniculatus

Birdfoot trefoil

Habitat

Streams and ditchbanks near agriculture

Stems and Roots

20–60 cm (8 in–2 ft) tall, slender stems; taproot, caudex

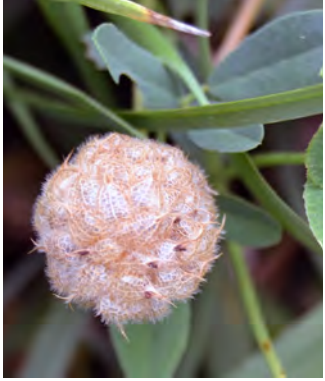
Leaves

Alternate, pinnate blades with 3 lanceolate or elliptical leaflets, petiolate

Flowers and Seeds

Pedunculate yellow, bilaterally symmetrical flowers, sometimes red-tinged; pods

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PF	I	O


Fabaceae

Trifolium fragiferum

Strawberry clover

Habitat

Saturated, alkaline or saline wetlands

Stems and Roots

5–30 cm (2 in–1 ft) long, creeping, mat-forming stems, rooting at nodes; initial taproot, rhizomes or stolons

Leaves

Alternate, palmate blades with 3 leaflets obovate with pointed tips, surface with soft hairs, petiolate

Flowers and Seeds

Compact, spherical heads of pink to purple flowers, become papery and veined with age

Facts

Stolons of strawberry clover can float, allowing survival during flooding.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	PF	I	O

Gentianaceae

Centaurium exaltatum

Desert centaury

Habitat

Saturated to flooded, alkaline wetlands

Stems and Roots

10–40 cm (4 in–1.3 ft) tall, erect, branched, 4-angled stems

Leaves

Opposite, sessile, linear to lanceolate blades

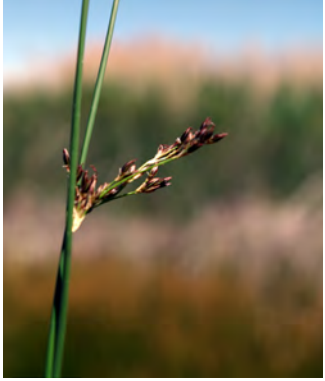
Flowers and Seeds

Cymose panicles of white or pink flowers, 4–5 petals and corolla tube, pedicellate

Facts

Synonyms: *C. nuttallii, Cicendia exaltata, Zeltnera exaltata*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	**AF**	**N**	**O**



Juncaceae

Juncus arcticus

Arctic rush

Habitat

Temporary to permanently saturated, alkaline wetlands

Stems and Roots

30–90 cm (1–3 ft) tall, firm, round culms; creeping, sod-forming rhizomes

Leaves

Blade-less, basal, brown leaf sheaths remaining

Flowers and Seeds

Lateral inflorescences of 10–50 flowers, approximately 6 cm (2.4 in) long, brown-black scales; erect, stem-like involucre

Facts

Synonym: *J. balticus*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PG	N	U

*See p. 70 for additional information.



Juncaceae

Juncus torreyi

Torrey's rush

Habitat

Saturated, alkaline wetlands and streambanks

Stems and Roots

40–100 cm (1.3–3.2 ft) tall, round culms; cord-like rhizomes

Leaves

Round, hollow blades, cauline, auriculate

Flowers and Seeds

2–10 dense, spherical inflorescences of 12+ flowers, brown scales

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PG	N	O

Juncaginaceae

Triglochin maritima

Seaside arrowgrass

Habitat

Temporary to permanently saturated, alkaline wetlands

Stems and Roots

30–120 cm (1–3.9 ft) tall, erect, round culms; stout rhizome

Leaves

Basal, short, linear blades

Flowers and Seeds

Scapes with dense racemes, elliptical tepals; follicular fruit

Facts

Synonym: *T. elatum*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	PF	N	U

Lythraceae

Lythrum salicaria

Purple loosestrife

Habitat

Stream and ditchbanks; shallow-flooded wetlands

Stems and Roots

50–150 cm (1.6–4.9 ft) tall, stout, square stems, clustered; rhizomes; wide variation in growth

Leaves

Opposite, sessile, lanceolate blades with hairy surface

Flowers and Seeds

Showy spikes with clusters of 4–6 petals, purple flowers, forming cylinder at base

Facts

Purple loosestrife is a noxious weed in Utah.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	**PF**	**I**	**U**

Plantaginaceae

Plantago lanceolata

Narrowleaf plantain

Habitat

Saturated, disturbed wetlands

Stems and Roots

15–60 cm (0.5–2 ft) tall scapes; fibrous roots

Leaves

Basal, long, narrowly elliptical to lanceolate blades

Flowers and Seeds

Scapes with dense, cylindrical spike, flowers with exserted stamens; capsules

Facts

Synonym: *P. altissima*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PF	I	U



Plantaginaceae

Plantago major

Common plantain

Habitat

Dry to saturated, disturbed wetlands

Stems and Roots

5–25 cm (2–10 in) tall scapes; fibrous roots

Leaves

Basal, cordate to ovate blades, petiolate

Flowers and Seeds

Scapes with dense, narrow spikes; flowers with reflexed corolla lobes, exserted stamens

Facts

Synonyms: *P. asiatica, P. halophila, P. intermedia*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PF	I	O



Poaceae

Alopecurus arundinaceus

Meadow foxtail

Habitat

Temporarily saturated to shallow-flooded wetlands

Stems and Roots

30–110 cm (1–3.6 ft) tall culms; rhizomatous

Leaves

Flat leaf blades on lower half of culm, open sheath, membranous ligule

Flowers and Seeds

Dense, spike-like inflorescence; 1 floret per spikelet, flattened; glume with hairs along keel; bent lemma awn

Facts

Meadow foxtail has been cultivated as meadow hay.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PG	I	O

Poaceae

Calamagrostis stricta

Slimstem reedgrass

Habitat

Saturated to shallow-flooded wetlands

Stems and Roots

35–90 cm (1.1–2.3 ft) tall, hollow culms; rhizomatous

Leaves

Flat blades ribbed on upper surface; open sheaths, membranous ligule

Flowers and Seeds

Inflorescences a contracted panicle, pale green to yellow; 1 floret per spikelet, laterally compressed, glumes keeled, lemma with awn and ring of hairs around base

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PG	N	U

*See p. 69 for additional information.

Poaceae

Distichlis spicata

Saltgrass

Habitat

Temporarily saturated to shallow-flooded wetlands and shorelines

Stems and Roots

10–45 cm (4 in–1.5 ft) tall culms, decumbent at bases; rhizomes or stolons

Leaves

Overlapping, rigid blades along entire culm, open sheaths, membranous ligule

Flowers and Seeds

Large, laterally compressed spikelets in green to yellow-green, contracted panicle over-topped by uppermost leaf blades; glumes keeled

Facts

Synonyms: *D. stricta, Uniola spicata*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PG	N	C

*See pp. 70 and 112 for additional information.



Poaceae

Echinochloa crus-galli

Barnyardgrass

Habitat

Stream and ditchbanks

Stems and Roots

30–100 cm (1–3.2 ft) tall culms, rooting at nodes; caespitose

Leaves

Broad, flat blades with scabrous margins, open sheaths, no ligule

Flowers and Seeds

Branching, nodding panicles; 2 florets per spikelet, dorsally compressed; glumes with long awn; fertile lemma 3-sided, shiny

Facts

Synonyms: Japanese millet, *Panicum crus-galli*

Barnyardgrass has been planted as a waterfowl habitat species in some state management areas.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	AG	I	U



Poaceae

Hordeum jubatum

Foxtail barley

Habitat

Temporarily saturated or flooded, alkaline wetlands

Stems and Roots

20–80 cm (8 in–2.5 ft) tall, hollow culms; caespitose, appearing annual

Leaves

Flat, lax, scabrous blade, open sheaths, membranous ligule

Flowers and Seeds

Inflorescence nodding spike, turning purple with age; 3 spikelets per node (1 fertile, 2 infertile), 1 floret per spikelet; glumes awn-like, lemma with long, 1–6 cm (0.35–2.5 in) awn

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PG	N	C



Poaceae

Leymus cinereus

Great Basin wildrye

Habitat

Temporarily saturated meadows, ditchbanks, and roadsides

Stems and Roots

1–2.5 m (3.2–8.2 ft) tall culms, caespitose with short rhizomes

Leaves

Flat blades with blueish waxy coating, 4-15 mm (0.15–0.59 in) wide, visible veins; open sheath, auricles present, membranous ligule

Flowers and Seeds

Inflorescence long, 10–29 cm (3.93–7.90 in) spike; spikelets on opposite sides with 3-7 florets each; keeled glumes, awned lemmas

Facts

Synonym: *Elymus cinereus*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PG	N	O



Poaceae

Muhlenbergia asperifolia

scratchgrass

Habitat

Permanently saturated to shallowly flooded, alkaline wetlands

Stems and Roots

10–60 cm (4 in–2 ft) tall, slender culms; long, scaly rhizomes

Leaves

Flat or folding cauline blades with open, overlapping sheaths; membranous ligule

Flowers and Seeds

Inflorescence an open panicle, almost as wide as long, breaking away at maturity; small, 1.5 mm (0.06 in), purple, laterally compressed spikelets; membranous glumes

Facts

Synonym: *Sporobolus asperifolius*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PG	N	U



Poaceae

Phleum pratense

Timothy

Habitat

Saturated soils in a variety of habitats

Stems and Roots

50–100 cm (1.6–3.2 ft) tall, hollow, tufted culms

Leaves

Flat leaf blades, scabrous margins, open sheath; membranous ligule

Flowers and Seeds

Contracted, dense, spike-like inflorescence, 1 floret per spikelet; distinct, flat-topped glumes with comb-like hairs on keel and awn

Facts

Timothy has awned glumes and spreading spikelets while *Alopecurus arundinaceus* (p. 97) has awned lemnas and ascending spikelets.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	PG	I	O

*See p. 69 for additional information.



Poaceae

Poa palustris

Fowl bluegrass

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PG	N	U

Habitat

Saturated to shallow-flooded wetlands

Stems and Roots

25–120 cm (10 in–3.9 ft) long, decumbent culms, rooting at nodes; tufted to stoloniferous

Leaves

Ascending, flat blades with rolled tip, sheaths open to base, membranous ligule pointed at top

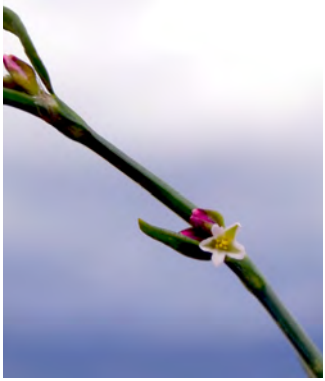
Flowers and Seeds

Pyramidal panicles, open or contracted, nodding with age; 25–100 spikelets per node; glumes keeled; lemmas with tuft of hair at base

Facts

Synonyms: *P. crocata, P. eyerdamii, P. triflora*

Fowl bluegrass is distinguished from *Poa pratensis* (p. 174) by its pointed (not flat) ligule.


Polygonaceae

Polygonum ramosissimum

Bushy knotweed

Habitat

Temporarily to permanently saturated wetlands; disturbed areas

Stems and Roots

10–100 cm (4 in–3.2 ft) tall, profusely branched, ribbed stems

Leaves

Small, alternate, lanceolate to elliptical, yellow to blue-green blades; ocrea disintegrating into brown fibers

Flowers and Seeds

Small, axillary and terminal, 5-parted flowers, white to yellow to yellow-green tepals, hypanthium present

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	AF	N	C

Scrophulariaceae

Castilleja minor

Lesser Indian paintbrush

Habitat

Saturated to shallow-flooded wetlands

Stems and Roots

20–80 cm (8 in–2.6 ft) long, simple stems, hairy; short taproots

Leaves

Many alternate, sessile, linear to lanceolate blades

Flowers and Seeds

Narrow racemes of tubular, bilaterally symmetrical, red flowers, bracts leafy, red-tipped

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	AF	N	O

Scrophulariaceae

Cordylanthus maritimus

Saltmarsh birds beak

Habitat

Saturated to shallow-flooded, alkaline wetlands

Stems and Roots

10–30 cm (4 in–2 ft) tall, branched stems, sticky-haired surface

Leaves

Alternate, lanceolate blades, often with powdery salt crystals

Flowers and Seeds

Spikes of light yellow or white, bilaterally symmetrical flowers, long leafy bracts; hairs on bracts and petals

Facts

Synonym: *C. maritimum*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	AF	N	O



Urticaceae

Urtica dioica

Stinging nettle

Habitat

Streambanks and shorelines

Stems and Roots

0.5–3 m (1.6–10 ft) tall, erect, 4-sided stems, covered in stinging hairs; rhizomatous

Leaves

Opposite, elliptical to lanceolate, dark green blades, toothed margins, petiolate, with stinging hairs

Flowers and Seeds

Long, pedunculate panicles of 4-lobed staminate and pistillate flowers

Facts

Avoid handling stinging nettle; contact with skin causes painful stinging.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PF	N	O

Birds

Meadow grasses are primary nesting habitat for ducks and shorebirds (pp. 109–10) seeking shorter nesting cover than other birds. Cinnamon, blue-winged, and green-winged teal (*Anas cyanoptera, A. discors,* and *A. crecca*) depend specifically on meadows for nesting cover.[39] Ducks require saltgrass for nesting habitat, and large dabbling and diving ducks may occasionally use sedges for nesting cover.[66] The largest concentration of staging Wilson's phalaropes (*Phalarous tricolor*) is found around GSL, though only a small population of this concentration nests here. When nesting, Wilson's phalaropes prefer the salt-tolerant grasslands of meadows.[39]

While meadow plant species tend to be shorter and have smaller seeds, they provide a valuable source of nutrition for some migratory birds. Teal, dabbling ducks, and geese will eat the vegetative parts and seeds of sedges and grasses.[66] Meadow plants also provide habitat for terrestrial invertebrates that loggerhead shrikes (*Lanius ludovicianus*) and other passerines seek as prey. In flooded meadows, tall shorebirds such as white-faced ibis (*Plegadis chihi*) and snowy egrets (*Egretta thula*) will forage for aquatic invertebrates among sedges.[54] Birds of prey such as rough-legged hawks (*Buteo lagopus*), American kestrels (*Falco sparverius*), and northern harriers (*Circus cyaneus*) fly over a variety of wetland habitats, but will use meadows more frequently to prey on plentiful insects, small birds, and mammals living within meadows or nearby emergent wetlands.[43]

Cinnamon teal
Anas cyanoptera

Blue-winged teal
Anas discors

Green-winged teal
Anas crecca

Wilson's phalarope
Phalarous tricolor

White-faced ibis
Plegadis chihi

Snowy egret
Egretta thula

Loggerhead shrike
Lanius ludovicianus

Northern harrier
Circus cyaneus

Rough-legged hawk
Buteo lagopus

American kestrel
Falco sparverius

Playa Wetlands

Playa means "beach" or "seashore" in Spanish and refers to an arid or semiarid wetland with distinct wet and dry seasons.[36] Playas comprise approximately 240 km² (60,317 ac) around Great Salt Lake (GSL); in fact, the lake itself is located in a playa depression, which is why it is relatively shallow. GSL playas typically collect water during the spring. When water evaporates, the mineral deposits left behind create highly saline and alkaline soil conditions.[39] Playas are sparsely vegetated and occur on poorly drained depressions that typically have no outlet. Because playas are a harsh environment, plants that do occur in playas have physiological adaptations to survive drought, salinity, and high pH.

Mudflats are areas that have become exposed when flooded submergent or emergent wetlands have been drawn down. GSL mudflats cover approximately 1,680 km² (414,689 ac) and are considered critical habitat for millions of migratory shorebirds. During periods of drought, large portions of the bed of GSL itself are also exposed and classified as mudflats.[55] Because plant species found in playas also occur on mudflats, this section combines facts about playas with facts about mudflats.

Plants

Despite their simple vegetation structure, playas and mudflats are difficult to manage and tend to be maintained passively. Playa vegetation requires both brief, seasonal flooding and extended drought. Plants that grow in playas, such as pickleweed (*Salicornia rubra,* p. 124) and Pursh seepweed

(*Suaeda calceoliformis*, p. 125), are typically short and sparse. Pickleweed is a halophyte (salt-loving plant) capable of growing in soils with a salinity of 35 ppt or greater. The leaves of pickleweed have been reduced to scales, while the stems are succulent and include vacuoles or chambers that sequester salts from the rest of the plant. The seeds of pickleweed are dehiscent, which means they are forcefully expelled from plants as they dry out during the late fall, attracting large flocks of waterfowl.[12] Pursh seepweed, another succulent halophyte, is taller than pickleweed and grows in both saline and brackish wetlands. Like pickleweed, Pursh seepweed produces more seeds when exposed to saline and alkaline conditions. In GSL playas, Pursh seepweed is important because it provides cover for nesting shorebirds.[42]

Other plants, such as phragmites (*Phragmites australis*, p. 50) and saltgrass (*Distichilis spicata*, p. 97) grow well in playas. Phragmites, an aggressive wetland invader, can quickly colonize playa ecosystems through seeds and by sending out stolons and rhizomes. Dense, invasive phragmites that grows on previously unvegetated ground completely alters the habitat, preventing birds that need open foraging areas from accessing their prey.[10] Although saltgrass is primarily a salt meadow species, it is prevalent in playas as well.

Playa Plants by Family

Aizoaceae

Sesuvium verrucosum

Verrucose seapurslane

Habitat

Temporarily saturated, saline, and alkaline wetlands

Stems and Roots

30–100 cm (1–3.2 ft) long, prostrate, short-branched stems, forming mats; taproots

Leaves

Opposite, oblanceolate to obovate, succulent blades, salt crystals on surface

Flowers and Seeds

Solitary, dark pink, 5-petal flowers in leaf axils

Facts

Synonym: *S. erectum*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PF	N	O



Asteraceae

Iva axillaris

Povertyweed

Habitat

Temporarily saturated, alkaline and saline wetlands; disturbed areas

Stems and Roots

10–60 cm (4 in–2 ft) tall stems; deep, creeping roots

Leaves

Opposite below and alternate above, oblong blades, sparsely hairy

Flowers and Seeds

Solitary, nodding flower heads, pedunculate; black achenes

Facts

Native Americans have used povertyweed to treat indigestion and colds.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PF	N	O



Asteraceae

Xanthium strumarium

Rough cocklebur

Habitat

Exposed mudflats

Stems and Roots

20–200 cm (8 in–6.5 ft) tall, hairy stems; taproots

Leaves

Alternate, broad, shallowly lobed blades with rough surface; petiolate

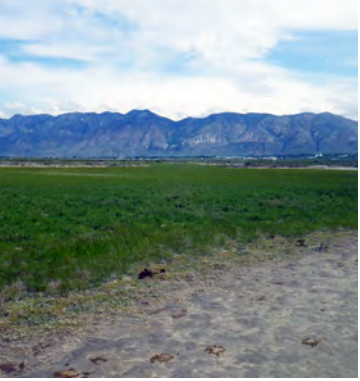
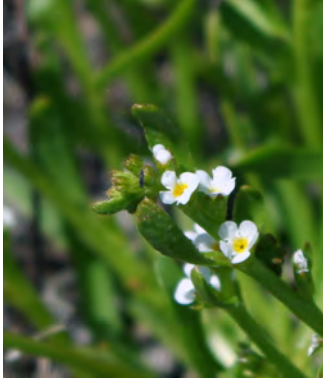
Flowers and Seeds

Brown, ovate burrs with rigid, hooked spines

Facts

Cocklebur seedlings are poisonous to livestock and humans.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	AF	N	C


Boraginaceae

Plagiobothrys leptocladus

Finebranched popcornflower

Habitat

Temporarily saturated wetlands

Stems and Roots

10–30 cm (4 in–1 ft) long, slender, prostrate stems, branching at base

Leaves

Opposite, narrowly linear blades, smooth above, stiff hairs below

Flowers and Seeds

Loose racemes of small, white flowers with 5 spreading petals; nutlet

Facts

Synonyms: *P. orthocarpus, Allocarya leptoclada*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	AF	N	O



Chenopodiaceae

Allenrolfea occidentalis

Iodine bush

Habitat

Saturated, alkaline wetlands

Stems and Roots

30–150 cm (1–4.9 ft) tall, alternate branching, fleshy, jointed stems, woody at base; large taproots

Leaves

Alternate, dark green, succulent, scale-like, triangular leaves

Flowers and Seeds

Cylindrical spikes of inconspicuous flowers, 3–5 per stem joint, 1–2 exserted stamens; seeds enclosed in bracts

Facts

Synonym: *Halostachys occidentalis*

Iodine bush tastes salty because of concentrated salt in its stems.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PS	N	U



Chenopodiaceae

Atriplex spp.

Saltbush

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	APF	NI	U

Habitat

Variety of saturated to dry, alkaline or saline wetlands

Stems and Roots

30–150 cm (1–4.8 ft) tall, prostrate to erect, stems often gray-green

Leaves

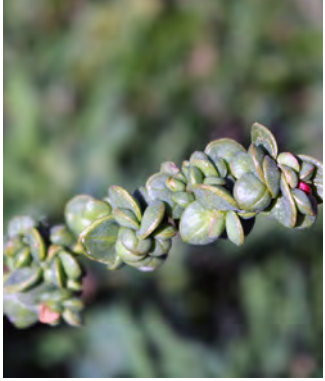
Alternate or opposite, deltoid, triangular or hastate leaves often farinose, especially when young

Flowers and Seeds

Clusters or panicles of glomerules, seeds enclosed by flattened bracteoles

Facts

The saltbush genus is complex, and species are difficult to identify during much of the growing season. Possible *Atriplex* species found in GSL wetlands include, *A. dioica, A. gardneri, A. micrantha, A. patula, and A. prostrata.*



Chenopodiaceae

Atriplex micrantha

Twoscale saltbush

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	AF	I	U

Habitat

Frequently saturated, disturbed wetlands

Stems and Roots

40–150 cm (1.3–4.9 ft) tall, erect, branched stems; taproots

Leaves

Mostly alternate (lowest opposite), triangular to hastate blades, sparsely farinose (green with age), margins entire or irregularly toothed, petiolate

Flowers and Seeds

Long, branching spikes of glomerules; bracteoles ovate to circular, smooth margins; seeds shiny black or brown

Facts

Synonym: *A. heterosperma*

Twoscale saltbush is distinguished from other *Atriplex* spp. (pp. 80, 119) by its smooth, round bracteoles.

Chenopodiaceae

Chenopodium glaucum

Oakleaf goosefoot

Habitat

Saturated, saline wetlands

Stems and Roots

7–25 cm (3–10 in) long, prostrate to ascending, sparsely farinose stems, branched from base

Leaves

Alternate, thick, rhombic to ovate blades, green and smooth above, white and farinose below; wavy or toothed margins

Flowers and Seeds

Short spikes of round, 3–5 parted glomerules; round, greenish fruit enclosing red-brown seeds

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	AF	I	U

Chenopodiaceae

Chenopodium rubrum

Red goosefoot

Habitat

Exposed, saline mudflats

Stems and Roots

10–90 cm (4 in–3 ft) tall (erect) or 3–20 cm (1–8 in) long (prostrate), reddish stems

Leaves

Alternate, rhomboid-ovate blades, wavy margins, petiolate; dark green turning red

Flowers and Seeds

Short spikes or panicles of glomerules; 3–4 parted, green flowers and fruits; dark brown or black seeds

Facts

Red goosefoot leaves are red underneath, while *Chenopodium glaucm* leaves are white underneath.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	**AF**	**N**	**C**

Chenopodiaceae

Salicornia rubra

Pickleweed

Habitat

Temporarily saturated to shallow-flooded, alkaline and saline wetlands

Stems and Roots

10–30 cm (4 in–1 ft) tall, simple or branched, succulent, segmented stems; slender taproots

Leaves

Opposite, succulent, scale-like leaves, green turning red

Flowers

Cylindrical spikes of inconspicuous flowers; scales form triad, central scale higher than lateral pair

Facts

Synonyms: red swampfire, red glasswort

Pickleweed is one of the most salt-tolerant species in the western United States.

*See pp. 111–112 for additional information.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	AF	N	C



Chenopodiaceae

Sarcobatus vermiculatus

Greasewood

Habitat

Infrequently flooded, alkaline and saline wetlands

Stems and Roots

1–2 m (3.2–6.5 ft) tall, woody, branched shrubs with thorns

Leaves

Opposite below, alternate above, linear, succulent blades

Flowers and Seeds

Spikes of two flower types; staminate flowers catkin-like, pistillate flowers fused to form circular disks

Facts

Greasewood has been used for making tools, weapons, and instruments.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	PS	N	U

Chenopodiaceae

Suaeda calceoliformis

Pursh seepweed

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	APF	N	C

Habitat

Saturated to shallow-flooded, alkaline wetlands

Stems and Roots

20–50 cm (8 in–1.6 ft) tall, erect stems, simple or with ascending branches

Leaves

Alternate, round, linear, succulent blades

Flowers and Seeds

Crowded spikes of glomerules with 3–7 keeled flowers, leafy bracts; shiny black seeds

Facts

Synonyms: *S. americana, S. depressa, S. maritima, S. minutiflora, S. occidentalis Dondia depressa, Schoberia occidentalis*

*See pp. 111–112 for additional information.



Convolvulaceae

Cressa truxillensis

Spreading alkaliweed

Habitat

Temporarily saturated, alkaline wetlands

Stems and Roots

10–15 cm (4–6 in) long, low and spreading stems, woody at base

Leaves

Alternate, ovate leaves with gray, woolly surface, sessile

Flowers and Seeds

Solitary white to purple flowers with 5 petals fused at base, stamens exserted; hairy seed capsule

Facts

Synonyms: *C. depressa, C. insularis*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACW	PF	N	C



Frankeniaceae

Frankenia pulverulenta

European seaheath

Habitat

Infrequently flooded, saline wetlands

Stems and Roots

15–30 cm (6–12 in) long, decumbent to ascending stems, sparse white hairs, branched at base; taproots

Leaves

Opposite, obovate blades with short hairs or powdery surface, short petioles

Flowers and Seeds

Solitary, white to pink flowers, 5 petals fused at the base, 6 stamen

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	AF	I	O

Poaceae

Crypsis schoenoides

Swamp pricklegrass

Habitat

Exposed, alkaline mudflats

Stems and Roots

2–75 cm (0.8 in–2.5 ft) long, prostrate, branching stems with red nodes, forming mats

Leaves

Flat or folded blades, open sheaths that become inflated, ligule of hairs

Flowers and Seeds

Short, compact panicle (spike-like) partially enclosed by a leaf sheath, spikelets laterally compressed with 1 floret

Facts

Synonyms: *Heleochloa schoenoides, Sporobolus schoenoides*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
OBL	**AG**	**I**	**U**



Poaceae

Hordeum marinum

Mediterranean barley

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	AG	I	C

Habitat

Infrequently to temporarily saturated, alkaline wetlands

Stems and Roots

10–50 cm (4 in–1.6 ft) tall, hollow culms, erect or jointed near base, hairy with smooth nodes; caespitose

Leaves

Flat, lax blades, hairy surface, open sheaths, membranous ligule

Flowers and Seeds

Short spike, 3 spikelets per node (1 fertile, 2 infertile), 1 floret per spikelet; central spikelet glumes scabrous and slender with stout awn; awned lemma

Facts

Synonym: seaside barley

Mediterranean barley is distinguished from *H. pusillum* and *H. murinum* by its central, scabrous, slender spikelet that has no broadened parts.



Poaceae

Sporobolus airoides

Alkali sacaton

Habitat

Temporarily to semi-permanently saturated, alkaline wetlands

Stems and Roots

40–90 cm (1.3–3 ft) tall, round stems; caespitose, forming large clumps

Leaves

Basal, flat or rolled blades, roughened lower surface, ligule of hairs

Flowers and Seeds

Long, open, pyramidal panicles; spikelets located at the end of branches; glumes deciduous, palea and lemma split at maturity

Facts

Synonym: *Agrostis airoides*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PG	N	U

Tamaricaceae

Tamarix spp.

Saltcedar

Habitat

Temporarily to permanently saturated, alkaline wetlands and streambanks; disturbed areas

Stems and Roots

2–5 m (6.5–16 ft) tall trees, brown to black bark; deep taproots

Leaves

Alternate, overlapping, scale-like leaves with pointed tips

Flowers and Seeds

Long racemes of small, lavender, 5-petal, 5-stamen flowers

Facts

Multiple *Tamarix* species have invaded Utah wetlands and are difficult to identify to species. *T. aphylla, T. chinensis, T. parviflora,* and *T. ramosissima* have all been found in Utah.

Saltcedar is classified as a noxious weed in Utah; it can reproduce via seeds and stem parts.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PS	I	U

Birds

GSL playas and mudflats host some of the world's largest breeding and staging shorebird populations; thus, conservation of these salty habitats has a significant impact on species that migrate across the entire Western Hemisphere.[1] Seasonal flooding of playas often leads to brief but critical hatches of protein-rich macroinvertebrates that support shorebird and wading bird foraging (pp. 133–134).[39] What playas offer in foraging they equally lack in cover, so it is essential to manage playas as part of a wetland complex with nearby or adjacent vegetated wetlands that provide cover and nesting habitat for birds that use unvegetated playas for foraging.

Many bird species prefer playas and mudflats for nesting. Snowy plovers (*Charadrius nivosus*) nest on playas by building scrapes or shallow depressions on the open ground.[39] American avocets (*Recurvirostra americana*) and black-necked stilts (*Himantopus mexicanus*) build crude nests, barely more than a scrape, on sparsely vegetated playas near water; rarely will they nest on unvegetated playas or mudflats. While sometimes near vegetation, killdeer (*Charadrius vociferus*) typically build scrapes in open, pebbly playa. Several shorebirds prefer to nest in open areas but frequently locate their scrapes near a clump of saltgrass.[39]

Mudflats host a rich source of food for many birds and are particularly crucial habitat for shorebirds. The salty, bare ground provides habitat for numerous types of burrowing invertebrates. American avocets, black-necked stilts, and long-billed dowitchers (*Limnodromus scolopaceus*) forage on these invertebrates by probing.[1] Snowy plovers prefer foraging on mudflats by gleaning insects off the surface.

Birds use various strategies for accessing prey on playas or mudflats.[39] American avocets are best known for their scything method of foraging, in which they sweep their open bills through flooded mudflats to catch invertebrates. Black-necked stilts forage in areas that are bare or very shallowly flooded, typically pecking at insects on the surface of the water or mud. Long-billed dowitchers use their bills to probe into the mud to find hidden invertebrates.[39] Smaller shorebirds, such as western

sandpiper (*Calidris mauri*) and lesser yellowlegs (*Tringa flavipes*), also probe to find invertebrates, but the bills of these species are much shorter than that of the long-billed dowitcher. Each bird species has varying bill lengths, an adaptation specifically allowing them access to different mud depths and invertebrate prey.

Snowy plover
Charadrius nivosus

American avocet
Recurvirostra americana

Black-necked stilt
Himantopus mexicanus

Killdeer
Charadrius vociferus

Long-billed dowitcher
Limnodromus scolopaceus

Western sandpiper
Calidris mauri

Lesser yellowlegs
Tringa flavipes

Upland Plants

Rather than a wetland community, this collection of upland plants represents species that are often found in or disperse to Great Salt Lake (GSL) wetlands—particularly under conditions of drought and disturbance. This listing is not comprehensive of upland plants, but the selected species often indicate previous or regular wetland disturbance, so they are important to note. Often disturbance to wetlands comes in the form of drought, which increases the likelihood of upland and invasive species establishing in a wetland.

Also, upland habitat and its plants benefit wetlands. A mosaic of upland habitat interspersed with wetland habitat provides structural diversity to wetland plant complexes and supports a wide variety of bird species. Although some wetlands surrounding GSL include small portions of upland habitat in their management plans, most upland habitat is not explicitly managed.

Plants

Upland plants grow where soil conditions are dry, on small topographic rises within large marshes, or on elevated areas near roads and dikes. Due to the proximity of GSL to agricultural lands, many upland plants found in its wetlands are agricultural or pasture weeds. A group of upland plants, including bassia (*Bassia hyssopifolia*, p. 157) and intermediate wheatgrass (*Thinopyrum intermedium*, p. 175), were deliberately planted after the construction of dikes and roads to prevent erosion.

Upland Plants by Family



Asclepiadaceae

Asclepias speciosa

Showy milkweed

Habitat

Roadsides, streams, and ditchbanks

Stems and Roots

60–120 cm (2–3.9 ft) tall, stout, erect stems with milky latex; woody rhizomes

Leaves

Opposite, ovate blades, finely hairy on top surface, densely hairy undersides

Flowers and Seeds

Umbelliform cymes of pink to purple, 5-part flowers, petals with cream corona; large, soft follicle of seeds with tufts of hair

Facts

Synonym: *A. giffordii*

Showy milkweed is habitat for butterflies, and its latex has been used as an antiseptic.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	**PF**	**N**	**C**

Asteraceae

Ambrosia artemisiifolia

Common ragweed

Habitat

Dry to saturated soils

Stems and Roots

10–100 cm (4–3.2 ft) tall, branching stems; taproots

Leaves

Opposite below, alternate above, blades 1–2 times pinnatifid, variously hairy

Flowers and Seeds

Hanging cymes of nodding, cup-shaped flowers

Facts

Ragweed is a primary cause of hay fever.

A. psilostachya, a perennial species with opposite leaves, is more common in rangelands than *A. artemisiifolia*.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	AF	I	U



Asteraceae

Arctium minus

Common burdock

Habitat

Dry to saturated soils

Stems and Roots

50–150 cm (1.6–4.9 ft) tall, stout, branching stems; taproots

Leaves

Alternate, ovate to cordate blades, thinly hairy surface, petiolate

Flowers and Seeds

Spreading, branched inflorescences, green heads of disk flowers; corollas pink or purple, involucre bracts with hooked bristles

Facts

Synonym: *Lappa minor*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	BF	I	O



Asteraceae

Cichorium intybus

Chicory

Habitat

Dry to saturated soils

Stems and Roots

30–170 cm (1–5.6 ft) tall stems with milky juice; deep taproots

Leaves

Oblanceolate blades, toothed to pinnatifid and petiolate below, entire and sessile above

Flowers and Seeds

Spikes of blue flowers, all ray flowers

Facts

Chicory roots are used to strengthen the bitter flavor of coffee.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	PF	I	O

Asteraceae

Cirsium arvense

Canada thistle

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	P	I	O

Habitat

Dry, disturbed soils

Stems and Roots

30–150 cm (1–4.9 ft) tall, smooth stems; deep, creeping roots

Leaves

Alternate blades, longer than wide, deeply lobed to pinnatifid, often spine-tipped, smooth above, wooly below

Flowers and Seeds

Many solitary, pink to purple flowers at the end of branches, pappus longer than corollas, involucre bracts with spiny tips

Facts

Synonyms: *Breea arvensis, B. incana, Carduus arvensis, C. incanum, Serratula arvensis, S. setosum*

Asteraceae

Cirsium vulgare

Bull thistle

Habitat

Dry soils or near roads

Stems and Roots

50–150 cm (1.6–4.9 ft) tall, spiny-winged stems; taproots

Leaves

Alternate, pinnatifid blades with spiny wings, decurrent leaf bases, surface scabrous above, wooly below

Flowers and Seeds

Several large, flat-topped flower heads, purple, involucre bracts spine-tipped

Facts

Synonyms: *C. lanceolatum, Carduus lanceolatus, C. vulgaris*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	**BF**	**I**	**U**



Asteraceae

Conyza canadensis

Horseweed

Habitat

Dry to saturated, disturbed soils

Stems and Roots

10–150 cm (4 in–4.9 ft) tall, simple stems; taproots

Leaves

Many alternate, cauline, linear to oblanceolate blades, some deciduous

Flowers and Seeds

Long panicles of small flowers, white ray flowers and yellow disk flowers

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	AF	N	U



Asteraceae

Erigeron divergens

Spreading fleabane

Habitat

Dry to temporarily flooded soils near a disturbance

Stems and Roots

10–70 cm (4 in–2.3 ft) tall stems, branching near base and above; taproots

Leaves

Alternate, hairy blades, basal blades oblanceolate, cauline blades narrower

Flowers and Seeds

Diffuse inflorescence of white, pink, or blue ray flowers, yellow disk flowers; double pappus of bristles and scales

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	BF	N	O



Asteraceae

Grindelia squarrosa

Curlycup gumweed

Habitat

Dry soils near roads

Stems and Roots

10–100 cm (4 in–3.2 ft) tall, smooth stems; taproots

Leaves

Alternate, simple, thick blades with minutely toothed margins

Flowers and Seeds

Solitary heads with yellow disk and ray flowers; receptacle with reflexed, sticky resinous bracts

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	**BF**	**N**	**U**



Asteraceae

Gutierrezia sarothrae

Broom snakeweed

Habitat

Dry to saturated soils; pristine to disturbed areas

Stems and Roots

20–60 cm (8 in–2 ft) tall, slender, brittle, branching stems, woody at base

Leaves

Alternate, linear blades, resinous and scabrous

Flowers and Seeds

Flat-topped corymbs of small, yellow flowers

Facts

Synonyms: *G. diversifolia, G. lepidota, G. linearis, Solidago sarothrae, Xanthocephalum sarothrae*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	**PS**	**N**	**O**

Asteraceae

Helianthus annuus

Common sunflower

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	AF	N	O

Habitat

Various disturbed soils

Stems and Roots

2+ m (6.5+ ft) tall, rough, branching stems

Leaves

Opposite below and alternate above, ovate to cordate blades, surface rough with stiff hairs, petiolate

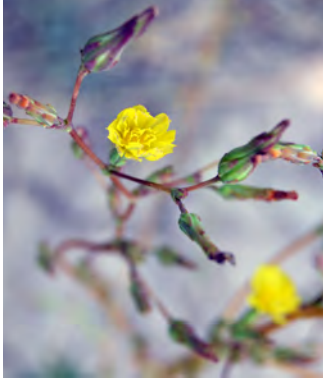
Flowers and Seeds

Solitary or corymbs of large flowers with flat, green receptacle; yellow ray flowers, red-brown disk flowers

Facts

Synonyms: *H. aridus, H. lenticularis*

Common sunflower has been cultivated for sunflower seeds.


Asteraceae

Lactuca serriola

Prickly lettuce

Habitat

Dry, disturbed soils

Stems and Roots

30–150 cm (1–4.9 ft) tall stems with milky juice

Leaves

Alternate, smooth, pinnately-lobed blades with prickly margins, spines along back midrib; clasping and twisted at base

Flowers and Seeds

Solitary, small, yellow, all-ray flowers, blue when dried

Facts

Synonym: *L. scariola*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	AF	I	U

Asteraceae

Matricaria recutita

German chamomile

Habitat

Roadsides and exposed soils

Stems and Roots

20–80 cm (0.6–2.6 ft) tall, branching stems, aromatic

Leaves

Alternate, pinnate blades, ultimate segments linear

Flowers and Seeds

Corymbs of flower heads with cone-shaped receptacles, white ray flowers, yellow disk flowers

Facts

Synonyms: stinking chamomile, *M. suaveolens, Chamomilla chamomilla, C. recutita*

M. discoidea is more frequent in rangelands and distinguished by a lack of ray flowers.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	AF	I	U



Asteraceae

Sonchus asper

Spiny sowthistle

Habitat

Saturated, disturbed soils or streambanks

Stems and Roots

10–200 cm (4 in–6.5 ft) tall, smooth stems with milky juice

Leaves

Alternate, obovate to pinnatifid blades, prickly margins, auriculate bases

Flowers and Seeds

Corymbs of yellow flowers, all ray flowers; pappus of capillary bristles

Facts

Synonym: *S. nymanii*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	AF	I	O

Brassicaceae

Cardaria draba

Whitetop

Habitat

Dry to moist, alkaline soils near agriculture

Stems and Roots

20–45 cm (0.6–1.5 ft) tall, erect stems, forming dense colonies; strongly rhizomatous

Leaves

Alternate, oblanceolate leaves, irregularly toothed margins; short, soft hairs; lower leaves petiolate

Flowers and Seeds

Branched corymb of many small, white flowers; inflated, cordate silicles

Facts

Synonym: *Lepidium draba*

Whitetop is classified as a noxious weed in Utah.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	PF	I	U



Brassicaceae

Lepidium latifolium

Perennial pepperweed

Habitat

Moist soils; disturbed areas

Stems and Roots

40–150 cm (1.3–4.9 ft) tall, erect stems, profusely branched above; taproots

Leaves

Alternate, lanceolate blades, lower petiolate and deciduous

Flowers and Seeds

Short, diffusely branched panicles of small, white, 4-petal flowers; ovate silicles

Facts

Synonyms: *Cardaria latifolia*

Perennial pepperweed is classified as a noxious weed in Utah.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PF	I	U



Brassicaceae

Lepidium perfoliatum

Clasping pepperweed

Habitat

Dry, alkaline soils

Stems and Roots

15–40 cm (0.5–1.3 ft) tall, erect, simple stems drying light brown; taproots

Leaves

Alternate blades of two types; upper leaves cordate with perfoliate leaf attachment, lower leaves 2–3 times pinnatifid in linear segments

Flowers and Seeds

Long racemes of small, yellow, 4-petal flowers, inflorescences widely branched; obovate silicles

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	AF	I	C

Capparaceae

Cleome serrulata

Rocky Mountain beeplant

Habitat

Various areas, often disturbed

Stems and Roots

30–200 cm (1–6.3 ft) tall, erect stems; unpleasant smelling; taproots

Leaves

Alternate, palmate blades with 3 elliptical leaflets, petiolate

Flowers and Seeds

Showy racemes of pink to purple flowers, 4 distinct petals, 6 exserted stamen; long pods

Facts

Synonym: *Peritoma serrulata*

Beeplant attracts bees through copious nectar production.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	AF	N	O



Chenopodiaceae

Atriplex gardneri

Gardner's saltbush

Habitat
Infrequently flooded, saline soils

Stems and Roots
10–40 cm (4 in–1.3 ft) tall, erect or ascending stems, woody at base

Leaves
Alternate (lowest opposite), deciduous, linear to ovate blades: grayish to green, farinose surface

Flowers and Seeds
Spikes of glomerules; yellow to brown, staminate glomerules; pistillate glomerules axillary, enclosed by long or round bracteoles; brown seeds

Facts
Synonyms: *A. buxifolia, A. gordonii*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	PS	N	U



Chenopodiaceae

Bassia hyssopifolia

Fivehorn bassia

Habitat

Roadsides

Stems and Roots

20–100 cm (0.6–3.2 ft) tall, branched, red-tinged, ribbed stems; taproots

Leaves

Alternate, linear blades with wooly surface and prominent midvein, sessile

Flowers and Seeds

Dense panicles of hairy glomerules, 5-lobed flowers with 5 hooked spines

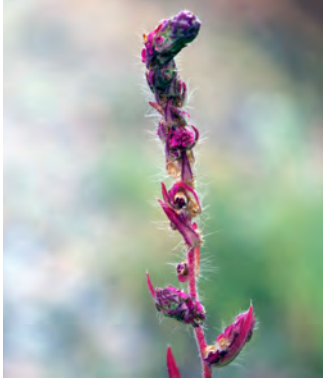
Facts

Synonyms: *Echinopsilon hyssopifolius, Kochia hyssopifolia*

Fivehorn bassia is planted for erosion control, and its persistent hooks on the fruits stick to clothing and fur.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	AF	I	C

*See p. 135 for additional information.



Chenopodiaceae

Bassia scoparia

Annual kochia

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	AF	I	O

Habitat

Dry to temporarily flooded alkaline or saline soils

Stems and Roots

30–100 cm (1–3.2 ft) tall, branched stems; taproots

Leaves

Alternate, oblanceolate blades, 3 parallel veins, petiolate

Flowers and Seeds

Axillary glomerules, leafy or ciliate bracts, flowers develop 5 membranous wings

Facts

Synonyms: burningbush, *B. sieversiana, Kochia alata, K. scoparia*

B. scoparia is distinguished from *B. hyssopifolia* by its 3 leaf veins.



Chenopodiaceae

Chenopodium album

Lambsquarter

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	AF	I	U

Habitat

Various disturbed places

Stems and Roots

20–70 cm (0.6–2.3 ft) tall, erect, red-tinged stems

Leaves

Alternate rhombic to ovate blades, irregular waved or toothed margins, pale green, farinose, petiolate

Flowers and Seeds

Dense panicles of glomerules, 5 flower parts, overlapping and keeled; black seeds

Facts

Lambsquarters can be cultivated as a valued source of calcium, phosphorus, and potassium. It is distinguished from *Atriplex* species by its round (not flat) fruits.



Chenopodiaceae

Salsola tragus

Russian thistle

Habitat

Dry, alkaline to saline soils

Stems and Roots

10–100 cm (4in–3.2 ft) tall, spiny, branched stems

Leaves

Alternate, narrowly linear blades with spine-like tip

Flowers and Seeds

Flowers separated by lengths of stem; bracteoles of 5 fused, wing-like parts with spines

Facts

Synonyms: *S. australis, S. pestifer, S. ruthenica*

Russian thistle is the most common species of tumbleweed.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	AF	I	O



Cuscutaceae

Cuscuta pentagona

Five-angled dodder

Habitat

Dry to temporarily flooded soils

Stems and Roots

Parasitic plants, slender, orange, twining stems; rootless

Leaves

Alternate, highly reduced, scale-like blades

Flowers and Seeds

Glomerules of small, white, 5-petal flowers

Facts

Dodder is a parasitic plant that obtains nutrients from other plants.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	AV	N	O



Dipsacaceae

Dipsacus fullonum

Fuller's teasel

Habitat

Roadsides and ditchbanks

Stems and Roots

0.5–2 m (1.6–6.5 ft) tall, stout, prickly, ribbed stems; taproots

Leaves

Opposite, oblanceolate blades, united at base, prickly

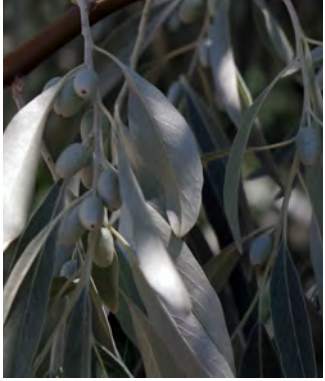
Flowers and Seeds

Terminal, dense, cylindrical heads of blue, 4-lobed flowers, spiny involucre bracts, pedunculate

Facts

Synonym: *D. sylvestris*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	BF	I	C


Elaeagnaceae

Elaeagnus angustifolia

Russian olive

Habitat

Stream and ditch banks

Stems and Roots

5–10 m (16-33 ft) tall, thorny trees, young branches with silvery scales

Leaves

Alternate, lanceolate to elliptical blades, silvery with hairs or scales below, green above

Flowers and Seeds

Clusters of yellow, 4-lobed flowers, with hypanthium; ellipsoid drupes with dense white scales

Facts

Russian olive is classified as a noxious weed in Utah.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PS	I	U



Fabaceae

Medicago lupulina

Black medic

Habitat

Escaping from lawns

Stems and Roots

10–40 cm (4 in–1.3 ft) long, prostrate or decumbent stems; taproots

Leaves

Alternate, pinnate blades, 3 obovate to rhombic leaflets, toothed margins, petiolate

Flowers and Seeds

Dense, head-like racemes of 6–25 small, yellow flowers, pedunculate

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	APF	I	O



Fabaceae

Medicago sativa

Alfalfa

Habitat

Escaping from irrigated fields

Stems and Roots

40–120 cm (1.3–3.9 ft) tall, erect or spreading stems; deep taproots

Leaves

Alternate, pinnate blades with 3 oblong to lanceolate leaflets, toothed margins

Flowers and Seeds

Pedunculate racemes of 10–40 small, bilaterally symmetrical, purple flowers

Facts

Alfalfa has been cultivated as livestock forage for more than 3,000 years.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
UPL	APF	I	U



Fabaceae

Melilotus officinalis

Sweetclover

Habitat

Various dry to infrequently flooded places

Stems and Roots

40–150 cm (1.3–4.9 ft) tall, branching stems; taproots

Leaves

Alternate, pinnate blades with 3 obovate to elliptical leaflets, toothed margins, petiolate

Flowers and Seeds

Pedunculate racemes of numerous, small, nodding, white or yellow, bilaterally symmetrical flowers

Facts

Synonyms: *M. alba, M. arvensis, M. leucanthus, M. lutea*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	APBF	I	U

Fabaceae

Trifolium repens

White clover

Habitat

Irrigated pastures

Stems and Roots

8–35 cm (3-12 in) long, wiry stems, rooting at nodes, forming dense mats; stoloniferous

Leaves

Alternate, palmate blades with 3 obovate leaflets united at base, minutely toothed margins, petiolate

Flowers and Seeds

Pedunculate, spherical heads of white or pink, bilaterally symmetrical flowers, turning brown and hemispherical with age

Facts

The 4-leafed variation of white clover is a symbol of good luck.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	PF	I	O



Lamiaceae

Nepeta cataria

Catnip

Habitat

Roadsides and ditchbanks

Stems and Roots

30–100 cm (1-3.2 ft) tall, square stems with ascending branches

Leaves

Opposite, ovate to oblong blades, serrated margins; covered in short, matted hairs

Flowers and Seeds

Cymes of 5-parted, tubular, bilaterally symmetrical flowers, white with purple spots

Facts

Cats are strongly attracted to and affected by catnip.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	PF	I	O



Malvaceae

Malva neglecta

Common mallow

Habitat

Dry, disturbed soils

Stems and Roots

15–60 cm (0.5–2 ft) long, prostrate stems, branched near base; caudex

Leaves

Alternate, kidney-shaped blades, surface with short, stiff hairs; petiolate

Flowers and Seeds

Axillary groups of 3–4 white, 5-petal flowers, pedicellate; schizocarp

Facts

Synonym: *M. rotundifolia*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	APF	I	U



Onagraceae

Oenothera curtiflora

Velvetweed

Habitat

Dry to temporarily saturated soils; disturbed areas

Stems and Roots

50–150 cm (1.6–4.9 ft) tall stems with hairy or glandular surface

Leaves

Alternate, elliptical to lanceolate blades with spreading hairs

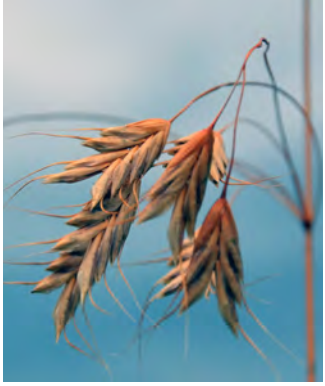
Flowers and Seeds

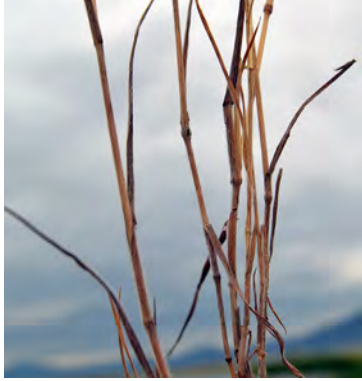
Long racemes or panicles of numerous flowers with long (1.5–5 mm or 0.02–0.2 in) hypanthium, 4 small, white or pink petals; hard, 4-sided fruits

Facts

Synonyms: *Gaura mollis, G. parviflora*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	AF	N	U





Poaceae

Bromus secalinus

Rye brome

Habitat

Dry to temporarily saturated soils; disturbed areas

Stems and Roots

20–80 cm (8 in–6.2 ft) tall, smooth culms with hairs at nodes

Leaves

Flat blades covered in soft, straight hairs; closed sheaths, membranous ligule

Flowers and Seeds

Open, nodding panicle with strongly laterally compressed spikelets and spreading florets, short glumes, broad lemmas with 4–5 mm (0.1–0.2 in) curving awn

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	AG	I	U



Poaceae

Bromus tectorum

Cheatgrass

Habitat

Dry roadsides and disturbed soil

Stems and Roots

10–50 cm (4 in–1.6 ft) tall culms covered in soft hairs

Leaves

Flat, softly hairy blades, closed sheaths, membranous ligule

Flowers and Seeds

Drooping, 1-sided panicle; lemmas narrow with two-pronged apex and straight or slightly bent, 7–17 mm (0.3–0.6 in) long awns

Facts

Synonym: *Anisantha tectorum*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	AG	I	U



Poaceae

Poa bulbosa

Bulbous bluegrass

Habitat

Irrigated pastures

Stems and Roots

15–50 cm (0.5–1.6 ft) tall, wiry culms arising from a small bulb; caespitose

Leaves

Flat blades, thin and withering, sheaths open to base, membranous ligule

Flowers and Seeds

Ovoid panicles with ascending to spreading branches, florets modified into small bulbs; spikelets laterally compressed, glume with scabrous keel

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	PG	I	U



Poaceae

Poa pratensis

Kentucky bluegrass

Habitat

Temporarily saturated lawns and pastures

Stems and Roots

15–70 cm (0.5–2.3 ft) tall culms; creeping, sod-forming rhizomes

Leaves

Folded blades with pointed tips, sheaths open to base, ligule membranous and flat-topped

Flowers and Seeds

Pyramidal panicle with spreading branches; spikelets green or purplish, laterally compressed; glumes unequal and short; hairs on lemma keel

Facts

Kentucky bluegrass is cultivated as a grass for lawns.

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	PG	I	O



Poaceae

Thinopyrum intermedium

Intermediate wheatgrass

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
NA	PG	I	C

Habitat

Roadsides

Stems and Roots

70–100 cm (2.3–3.2 ft) tall culms with waxy surface; rhizomatous

Leaves

Blades smooth on top, stiff-haired underside, ribbed; sheaths open, auricles present, membranous ligule with short hairs

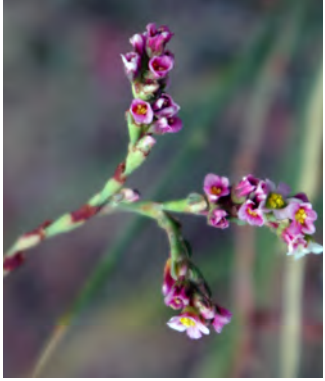
Flowers and Seeds

Erect spike with 1 spikelet per node, 3–10 florets per spikelet; glumes thick, oblong with blunt tips

Facts

Synonyms: *Agropyron aucheri, A. ciliatiflorum, A. gentryi, A. glaucum, A. intermedium, A. podperae, A. pulcherrimum, A. trichophorum, Elymus hispidus, E. intermedius, Elytrigia intermedia*

*See p. 135 for additional information.


Polygonaceae

Polygonum argyrocoleon

Silversheath knotweed

Habitat

Dry, saline, disturbed soils

Stems and Roots

15–100 cm (0.5–3.2 ft) long, decumbent to erect, ribbed stems

Leaves

Alternate, small, linear to lanceolate, blue-green leaves, sessile or petiolate; green ocrea disintegrating into fibers

Flowers and Seeds

Bundles of 4–6 small, axillary and terminal, 5-parted flowers, usually pink but sometimes white to green

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	AF	I	U

Polygonaceae

Rumex crispus

Curly dock

Habitat

Dry to temporarily saturated, disturbed soils

Stems and Roots

40–100 cm (1.3–3.2 ft) tall, erect stems, branched above; vertical rhizome

Leaves

Alternate, lanceolate blades, margins strongly crisped and wavy, petiolate

Flowers and Seeds

Large, terminal panicles along half stem length, green to reddish valvate flower in whorls of 10–25, valves with smooth margins, pedicellate

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FAC	**PF**	**I**	**O**



Rubiaceae

Galium aparine

Stickywilly

Habitat

Dry to temporarily flooded soils

Stems and Roots

10–100 cm (4 in–3.2 ft) tall, hooked, square stems; growing on other plants

Leaves

Whorled, narrow blades with pointed tip, scabrous

Flowers and Seeds

Axillary groups of 3–5 small, white-green, hooked flowers, pedunculate

Facts

Synonyms: *G. spurium, G. vaillanti*

Wetland indicator:	Duration & growth:	Nativity in lower 48:	Common-ness:
FACU	AF	N	O

Birds

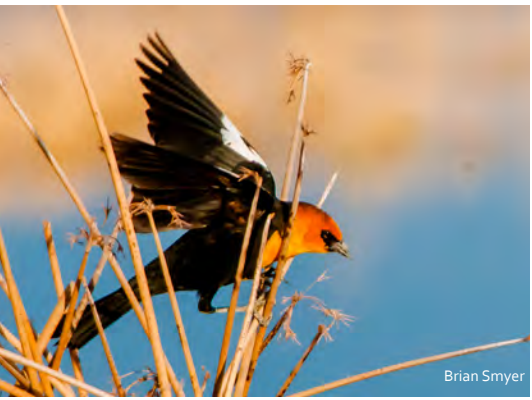
Upland areas typically provide habitat for upland bird species (p. 180) such as western kingbirds (*Tyrannus verticalis*), sparrows (family Emberizidae), and yellow-headed blackbirds (*Xanthocephalus xanthocephalus*). Large upland game birds, such as ring-necked pheasants (*Phasianus colchincus*), use and can be flushed from small upland habitats.

Upland plants are important for wetland birds during different stages of their life cycle. Dabbling ducks will often nest in a variety of upland plants, and a number of shorebirds that usually nest on mudflats will sometimes nest in sparsely vegetated upland habitat.[39] While long-billed curlews (*Numenius americanus*) select nesting sites on mudflats near meadows, they will also nest in and forage throughout sparse and dense upland grasses.[39]

One challenge to managing upland plants and upland habitat for birds is that mammalian predators also thrive in upland habitat.[39] Species such as coyotes *(Canis latrans)*, red foxes (*Vulpes vulpes*), striped skunks (*Mephitis mephitis*), and raccoons (*Procyon lotor*) take refuge in upland habitat and prey upon ground nesting birds and eggs in nearby wetlands. Predator control or other techniques can be used to reduce predation on upland-nesting birds.[21]

Western kingbird
Tyrannus verticalis

White-crowned sparrow (Sparrows)
Zonotrichia leucophrys (Family Emberizidae)



Yellow-headed blackbird
Xanthocephalus xanthocephalus

Ring-necked pheasant
Phasianus colchincus

Long-billed curlew
Numenius americanus

Epilog

Threats to Great Salt Lake wetlands

Wetlands around the world, including Great Salt Lake (GSL) wetlands, currently face many threats. The most challenging threats to GSL wetlands are invasive plant species, urbanization, and drought.

Invasive plant species are a major conservation issue at GSL wetlands because they outcompete native plants. Purple loosestrife (*Lythrum salicaria*, p. 92), whitetop (*Cardaria draba*, p. 152), poison hemlock (*Conium maculatum*, p. 34), thistles (*Cirsium* spp., pp. 142–143) and pepperweeds (*Lepidium* spp., pp. 155–156) are invasive species that thrive under dry or more nutrient-rich conditions and are capable of rapidly invading disturbed areas.[68] In addition to those invasive species, over 89 km^2 (22,000 ac) of wetland habitat around GSL's shorelines are densely populated with an invasive lineage of phragmites (*Phragmites australis*, p. 50).

Phragmites, colloquially called phrag, is a tall grass that grows in dense monocultures, outcompeting native vegetation, changing the course of rivers, and degrading wildlife habitat.[30] Soras (*Porzana carolina*), rails (Family Rallidae), and blackbirds (Icteridae family), can use stands of phragmites, but very few other bird species are adapted to living in such dense vegetation.[7] In addition, phragmites also causes many problems for humans and their domestic animals. Hunters frequently lose equipment and their navigation when walking through phragmites stands. Often, hunting dogs suffer cuts to their feet, faces, and tongues by phragmites leaves and broken, sharp stems.[27]

As with most invasive species, controlling phragmites is a daunting task that needs our attention. Dry phragmites is a fire hazard,

while phragmites growing in water control structures can clog them and prevent the flow of water to wetlands. Many emergent wetland species benefit from seasonal/summer drawdown, but during the drawdown period, exposed, unvegetated areas are at increased risk of phragmites invasion via seed, thus creating a complex management challenge.

While invasive phragmites is incredibly damaging to GSL wetlands, there is also a lineage of North American native phragmites that is found throughout Utah. Shiny stems (rather than ribbed) and deciduous leaf sheaths reliably distinguish native phragmites (*Phragmites australis* subsp. *americanus*, p. 51) from the invasive strain.[25] Native phragmites does not grow as densely as invasive phragmites, so other native plants can still grow alongside it and create interspersed layers of plants that can be utilized by many wildlife groups. Native phragmites is widespread in riparian and wetland areas in the southern half of the state, but occurs only rarely in GSL wetlands.

Most of Utah's population lives on the Wasatch Front in cities and suburbs adjacent to GSL, and urbanization is expected to continue. This urban expansion result in wetland habitat loss and poses threats such as water diversion and increased nutrient inputs.[5] Additional homes built along the Wasatch Front increasingly push into the buffer zones around GSL wetlands. These buffer zones are necessary to protect wetlands from surrounding land and water use changes.[2] The combined impacts of development and roads results in significant wetland habitat loss, and the loss of native plants can be devastating to birds.[64]

Water is already a scarce resource for GSL wetlands.[14] Climate change models suggest water availability problems will worsen as winter snowpack is likely to decrease and summertime evapotranspiration increases.[23] Urbanization further threatens water availability because water diverted to urban and suburban areas does not return to wetlands like excess runoff from irrigation.[49] The water that will make it to GSL wetlands in the future will likely have higher concentrations of nutrients, leading to hypereutrophic conditions.[67]

Healthy GSL wetlands are important for human needs such as flood contol, erosion control, and water filtration, and they are vital for countless native species of wildlife, particularly birds. Understanding the invasive plant, urbanization, and drought threats to GSL wetlands and knowing wetland communities and their plant species, will help ensure sustainable wetland ecosystems for all stakeholders.

{notes}

Flowers

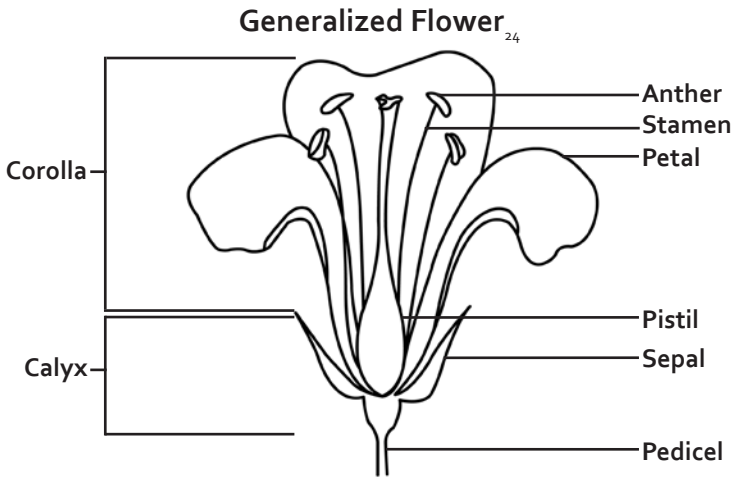


Figure 1.1

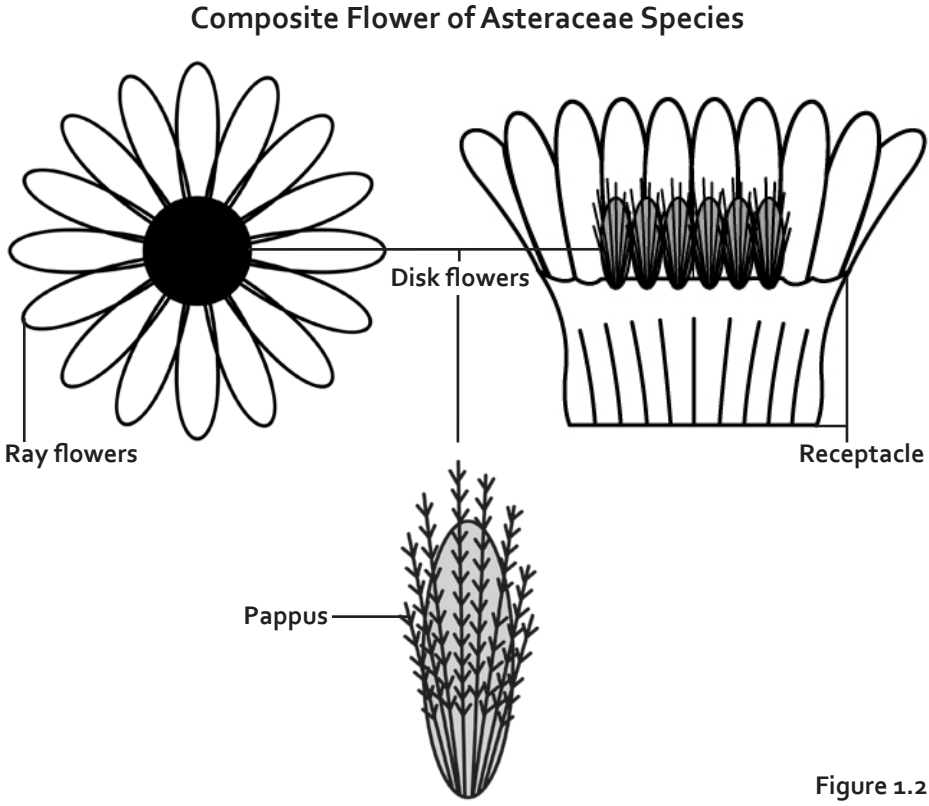


Figure 1.2

Flower parts

Anther: pollen-bearing portion of the stamen
Beak: the pointed, end projection of a fruit
Bract: a leaf- or stem-like structure at the base of a flower or inflorescence
Capillary bristle: slender, hair-like bristles; often attached to the achenes of Asteraceae flowers
Corolla: collection of flower petals
Corona: crown-like structures on the petals of *Asclepias* species
Disk flowers: small tubular flowers of Asteraceae
Hypanthium: a cup-shaped extension of the flowers formed by the fused, lower parts of the corolla and calyx
Involucre: bracts located below inflorescences of Asteraceae
Pappus: awns, scales, or bristles at the base of Asteraceae flowers and the apex of achenes
Peduncle/Pedicil (pedunculate/pedicellate): the stalk or stem of a single flower or an inflorescence
Pistil: female reproductive parts
Pistillate: flowers bearing pistils, lacking stamens
Ray flowers: narrow, petal-like composite flowers, often surrounding disk flowers
Receptacle: the part of the Asteraceae peduncle where the flowers of the head are borne
Scale: thin, dry, membranous structure
Sepal: a segment of the calyx (outer whorl of a flower)
Stamen: male reproductive parts
Staminate: flowers bearing stamens but not pistils
Tepal: an undifferentiated flower segment
Valve: segments of a fruit that separate from each other
Valvate: opening by valves, like the fruit of *Rumex* species

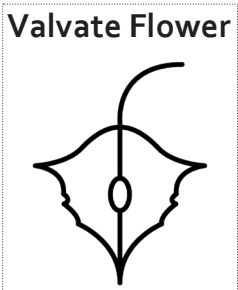


Figure 1.3

Grasses

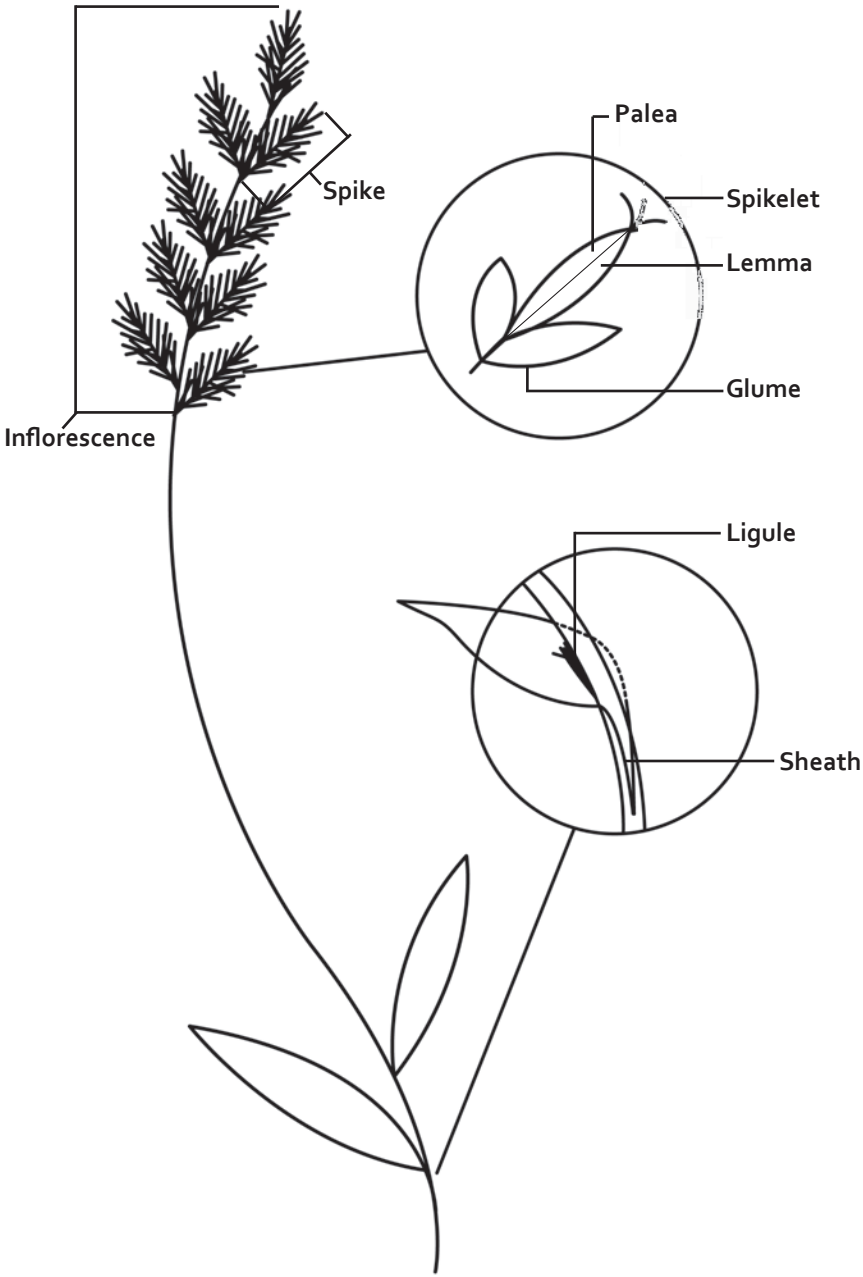
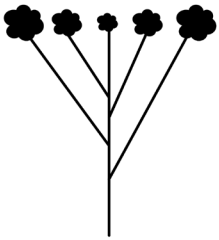


Figure 1.4

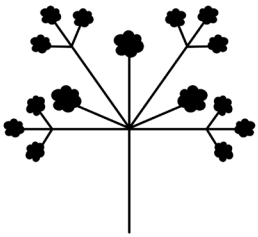
Grass parts

Auricle: ear-shaped appendage of a grass leaf where it meets the stem
Awn: bristle-like extension at the tip or back of lemma or glume
Dorsally compressed: spikelets that are flattened from front to back
Floret: an individual flower within a grass spikelet
Glume: paired bracts at the base of grass florets'
Laterally compressed: spikelets that are flattened from the sides
Lemma: lower of two bracts of a grass floret, often partially surrounding the palea
Ligule: in Poaceae species, an appendage at the junction of the inner leaf with the leaf sheath; can be membranous or ciliate (with hairs)
Palea: the upper of two bracts of a grass floret, often partially enclosed by lemma
Sheath: the base of the grass leaf that surrounds the stem; can be open or closed; sides of closed sheaths touch, and open sheaths have a gap between sides (Poaceae and Potamogetonaceae species)
Spike: a long, unbranched inflorescence with sessile flowers, maturing from the bottom upward
Spikelet: basic unit of a grass flower usually consisting of two glumes and one or more florets

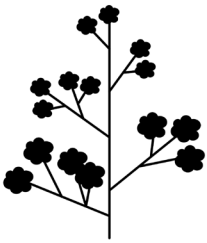
Inflorescence types[24]



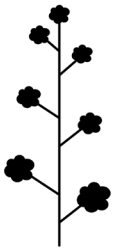
Corymb



Cyme

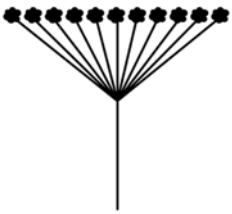


Panicle

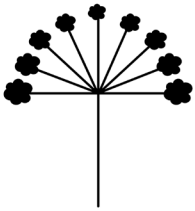


Raceme

Spike



Umbel–flat



Umbel–round

Figure 1.5

Inflorescence types

Axillary: arising from leaf or stem axil
Bilaterally symmetrical: with two mirrored sides, often with distinct top and bottom petals
Compound: with two or more similar parts
Corymb: flat or round-topped inflorescence, lower pedicels are longer than upper
Cyme: flat or round-topped inflorescence, the terminal flower blooms first (Cymose)
Exserted: protruding beyond surrounding parts
Globular: globe-shaped or spherical
Glomerule: a dense, head-like cluster of flowers
Inconspicuous: small, often 1 mm or less
Inflorescence: a cluster or arrangement of flowers
Ovoid: egg-shaped
Panicle: branched inflorescence in which flowers mature from the bottom up
Pyramidal: pyramid-shaped
Raceme: an unbranched, elongate inflorescence with pedicellate flowers
Spike: a long, unbranched inflorescence with sessile flowers, maturing from the bottom upward
Spathe: a large bract that often encloses an inflorescence
Terminal: borne at the tip or apex
Umbel: a flat-topped or round inflorescence with pedicels arising from the same point like an umbrella
Umbelliform: with the appearance, but not structure, of an umbel

Leaf attachments[24]

Alternate: arising singly from each node
Auriculate: leaf attachment with ear-shaped lobes
Basal: arising from the base of the stem
Cauline: arising from along the stem above ground
Clasping: surrounding the stem
Deciduous: falling off, not persistent
Decurrent: extending downward
Opposite: two leaves arising from the same node on opposite sides of the stem
Perfoliate: a leaf with margins surrounding the stem so the stem appears to pass through the leaf
Petiolate: attached via a leaf stalk called a petiole
Sessile: leaf attached directly to stalk, without petiole
Whorls: arranged in rings around nodes

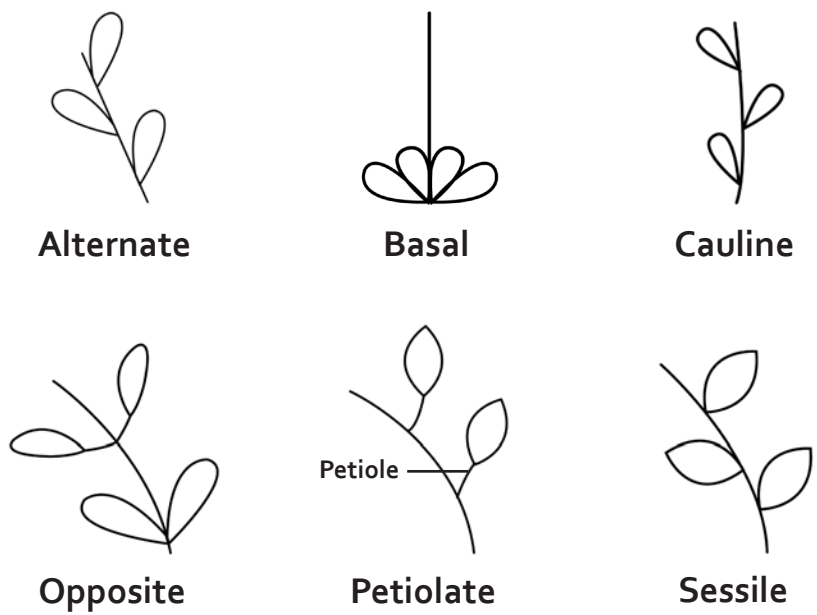


Figure 1.6

Leaves

Margins (edge of the leaf)

Crisped: wavy or crinkly
Entire: smooth, not toothed
Serrated: saw-like margin with forward-facing teeth

Parts

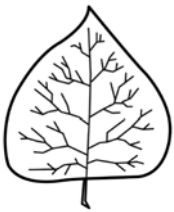
Axil: space formed between the axis of the stem and leaf
Blade: the broad part of a leaf
Leaflet: divisions of compound leaves
Margin: the edge of a leaf blade
Ocrea: a membranous sheath around stems in Polygonaceae species
Petiole: leaf stalk
Stipule: leaf-like structures at the base of the petiole
Thallus: undifferentiated plant body
Wing: thin, flat margin extending from a structure

Surface

Farinose: surface with powdery or mealy substance
Glabrous: surface lacking hairs or glands
Glandular: bearing glands
Hirsute: surface with (usually soft) hairs resent
Scabrous: roughened surface due to thick cells or stiff hairs

Leaf shapes[24]

Cordate



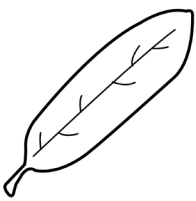
Deltoid

Elliptic

Hastate

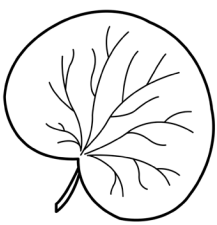
Lanceolate

Linear



Oblong

Ovate



Reniform

Rhomboid

Figure 1.7

Leaves

Shapes

Cordate: heart-shaped with a notched base
Deltoid: shaped like an equilateral triangle
Dissected: divided into narrow segments
Elliptical: shaped like an oval, broadest in center
Hastate: shaped like an arrowhead with outward-turned bottom lobes
Keeled: with a ridge, like the keel of a boat
Lanceolate: shape that is longer than wide, and widest below the center
Linear: long and narrow shaped, with near-parallel sides
Lobe: a rounded segment or division
Oblanceolate: inversely lanceolate shape, longer than wide, attached at the narrowest end
Oblong: shape that is longer than wide, sides near parallel
Obovate: egg-shaped, attached at the narrow end
Orbicular: approximately circular
Ovate: egg-shaped, attached at the broadest end
Palmate: lobed or divided at a single point like the fingers of a hand
Pinnatifid: divided or lobed with parts arranged on opposite sides of the axis
Pinnate: dissected with leaflets arranged on opposite sides of leaf axis
Rhombic: diamond-shaped
Succulent: juicy and fleshy

Measurements and abbreviations

ac: acres
cm: centimeters
ft: feet
in: inches
km²: square kilometers
m: meters
mm: millimeters
p.: page
pp.: pages
pH: a number between 0–14 indicating a chemical's alkalinity or acidity
ppt: parts per thousand
ssp: multiple species

Seeds

Achene: a small dry fruit with a single seed
Apex: the tip
Bracteole: a small bract enclosing the seeds of *Atriplex* species
Capsule: a dry fruit, opening at maturity
Coma: a seed with a tuft of hair
Druplet: a small, fleshy fruit
Follicle: a dry pod, opening along the side at maturity
Keel: a prominent ridge along longest axis
Lenticular: biconvex, lentil-shaped
Nutlet: small, lobed, nut-like fruits
Perigynia: scale-like bract enclosing the pistil in *Carex* species
Schizocarp: a dry fruit that splits into segments at maturity
Silicle: a dry fruit of Brassicaceae species, less than twice as long as wide, with two valves splitting at maturity
Silique: a dry fruit, more than twice as long as wide, with two valves splitting at maturity; Brassicaceae fruit
Tubercle: a small swelling or projection

Stems and roots

Ascending: growing upward, usually curved
Caespitose (cespitose): growing in dense tufts
Caudex: a persistent woody base
Colonies: growing in groups connected by underground parts
Creeping: growing along the surface or just below
Culm: hollow or pithy stems of Cyperaceae, Juncaceae, and Poaceae species
Decumbent: reclining on the ground but with the tip ascending
Erect: vertical, straight
Fibrous: roots system with branches of approximate equal thickness
Node: section of stem from where leaves originate
Pithy: spongy tissue
Prostrate: growing flat along the ground
Punctate: dotted with pits and/or sunken glands
Rhizoid: a root-like structure
Rhizome: thick, horizontal, underground stems
Ribbed: surface with prominent veins, ribs, or ridges
Scape: a long, leafless peduncle
Spreading: growing or reaching horizontally
Stipitate-glandular: surface with glands born on stalks
Stolon: long, horizontal, creeping stem, rooting at nodes
Taproot: main root axis from which small root branches arise
Tuber: thickened portion of a rhizome bearing nodes and buds
Tufted: growing in dense clusters
Turion: small, over-wintering shoot

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Contributors

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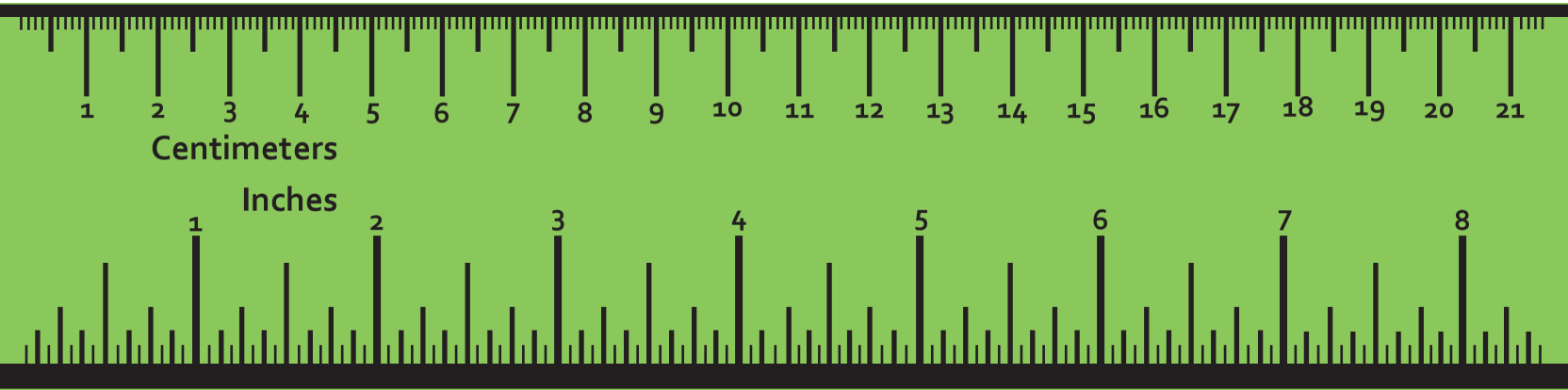
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