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Riparian Planting Zones in the Intermountain West

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INTRODUCTION

Establishment of riparian plant species depends on proper selection of species, plant material procurement and handling, planting location, and establishment techniques (Hoag 1993). The success of a project is dependent on the complete integration of these steps. When planning a project, it is important to observe the existing vegetation and their respective locations in relationship to the stream and watertable. These elevational and lateral relationships are described as Riparian Planting Zones. In addition to matching the spatial Riparian Planting Zone relationships, an effort should be made to match the potential native woody species at the project site. Note that not all riparian sites will have woody species (i.e. low gradient, meadow streams with fine textured soils). If the project area does not

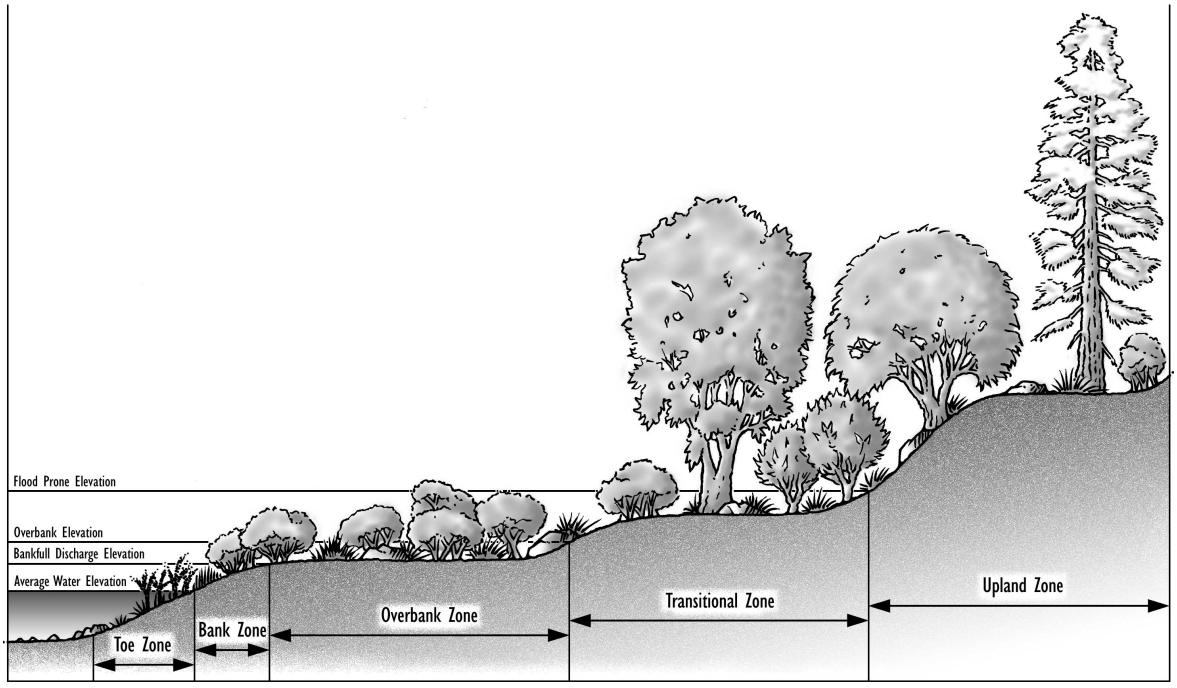


Figure1: Riparian Planting Zones can be used to determine where riparian species should be planted in relation to the waterline. This is a general depiction of a riparian zone. Not all streams look like this one. In the real world, some of these zones may be absent. (From Hoag 1999, Hoag and Landis 1999)

have woody plant species and it should, a vegetation reference site similar to the project site should be located.

Plants with flexible stems and rhizomatous root systems are usually located from the water line to the top of the bank zone. Larger shrubs are found from the bank zone to the overbank zone and beyond. Tree species are usually found above the overbank zone in the transitional zone and the upland zone. Wetland herbaceous species can be found throughout the streambank cross section up to the upland zone, although most emergent aquatics will be found in the toe zone (Bentrup and Hoag, 1998).

Figure 1 is a general depiction of a stream. Not all streams will have all the zones shown in Figure 1. Many streams will have much narrower zones that in some cases will be difficult to identify. The descriptions of the zones will apply, but the limits will need to be established in the field.

RIPARIAN PLANTING ZONE DESCRIPTIONS

Toe Zone

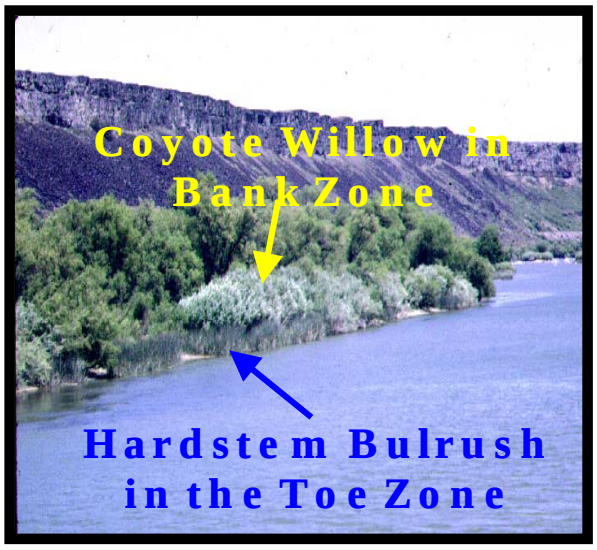
The toe zone is the zone that is located below the average water elevation or the baseflow. The baseflow is that level where there is flow all summer long. Generally, this is the zone of highest stresses and the most erosion. It is also described as the scour zone because streamflow velocities are constantly scouring the banks and bed movement is at its highest. This zone is critical to successful treatment of streambank erosion. Many failures occur when the banks are undercut and the upper section falls into the water. This zone can also be one of the hardest to stabilize (Allen and Leech 1997).

The toe zone will rarely have much vegetation in it. It is inundated for most of the year. Woody species are very difficult to establish here because of this inundation. Basically, it is too wet for them. In some cases, wetland plants like cattails (*Typha*) and bulrush (*Scirpus*) can be established in the toe zone. These species can survive in this zone because of aerenchymous cells or tissue. Aerenchyma are specialized material within the stem that allows oxygen to move from the atmosphere down to the root system and create an aerobic layer around the roots called the Rhizosphere. However, wetland plants do not establish or survive well in areas where velocities are high. They are generally found in low energy streams or areas such as backwaters and protected corners.

Bank Zone

The bank zone is the area between the average water elevation and the bankfull discharge elevation. It is less erosive than the toe zone. It will be exposed to erosive river currents, wind generated waves, wet and dry cycles, and freezing or thawing cycles. This zone is also exposed to ice scour and debris deposition during the cold

weather and/or high flows (Allen and Leech 1997).



The bank zone will generally be vegetated with early seral or colonizing herbaceous species, flexible stemmed willows, and low shrub species. This zone will be inundated far less frequently than the toe zone. Soil moisture levels in this zone will be much lower after spring runoff and fall rains.

Overbank Zone

The overbank zone is located between the bankfull discharge elevation and the overbank elevation. This zone is usually formed from water transported deposits. It is generally flat and often has layered soils. It is sporadically flooded, usually about every 2-5 years. This zone is occasionally exposed to erosive water currents, ice and debris deposition and damage, freeze – thaw cycles and some wind generated wave erosion.

Vegetation in the overbank zone should be flood tolerant. Normally, the vegetative composition is about 50% hydrophytic plants. Shrubby willows with flexible stems, dogwoods, alder, birch, and others will predominate here. Larger shrub type willows will generally occur on the higher end of the zone. Cottonwoods and tree type willows may survive well at the higher end of this zone. Species that have large inflexible stems should not be part of the planting plan in this zone. They can cause significant disruption to the stream dynamics.

Transitional Zone

The transitional zone is located between the overbank elevation and the flood prone elevation. The floodplain elevation is flooded about every 50 years. This zone is usually not subjected to erosive water currents except during high water events.

The transitional zone will be where hydrophytic species will transition to upland species. For the most part, species in this zone are not extremely flood or inundation tolerant. This is the zone where the larger tree species are typically found.

When a stream is actively downcutting, the watertable in this zone will start moving down in elevation and upland plants, like sagebrush or rabbitbrush, will make up a higher percentage of the composition. When

the stream system is depositional and the watertable is coming up, hydrophytic plants and young willows will increase in the plant community. Often the older established upland shrubs will still be seen, but they will start to stress, become decadent, and die out over time as the water table drops out of the root zone.

Upland Zone

The upland zone is found above the flood prone elevation. Erosion in this zone is due to overland water flow, wind erosion, and elimination of vegetative buffers from improper farming practices, over grazing, logging, and development.

Vegetation in this zone is predominantly upland species. Drought tolerance is one of the most important factors when determining what species to plant here. In low precipitation areas, supplemental irrigation may be necessary for plant establishment.

HYDROLOGIC ZONES WITHIN THE TOE AND BANK ZONE

Plant establishment in the toe zone is very difficult. Success can be increased by breaking the toe zone into hydrologic zones based on the depth of the water. Figure 2 displays the hydrologic zones found in the toe zone. It specifically identifies planting zones for herbaceous species. Bankfull discharge elevation is at the top of hydrologic zone 3 (zones 1,2, and 3 are part of the toe and bank zone). Zone 4 is found in the overbank zone. Wetland plants that are found in these zones are usually associated with a certain water depth. Appendix A lists a number of the more common species found in the Intermountain West and the hydrologic zones they normally occupy.

Zone 1: Deep Water Pool (3 – 6+ feet water depth)

Emergent vegetation generally will not grow in permanent water depths over 3 feet. Many species can withstand these water depths for short periods of time. Most plants that are found in deeper water are called submergent plants. They root in the stream bottom and extend their stems upward to the water surface. Rarely will they emerge out of the water. These plant species provide excellent fish and aquatic invertebrate habitat. They also provide water cleaning functions for deeper water, such as reduction of nitrates and phosphorous.

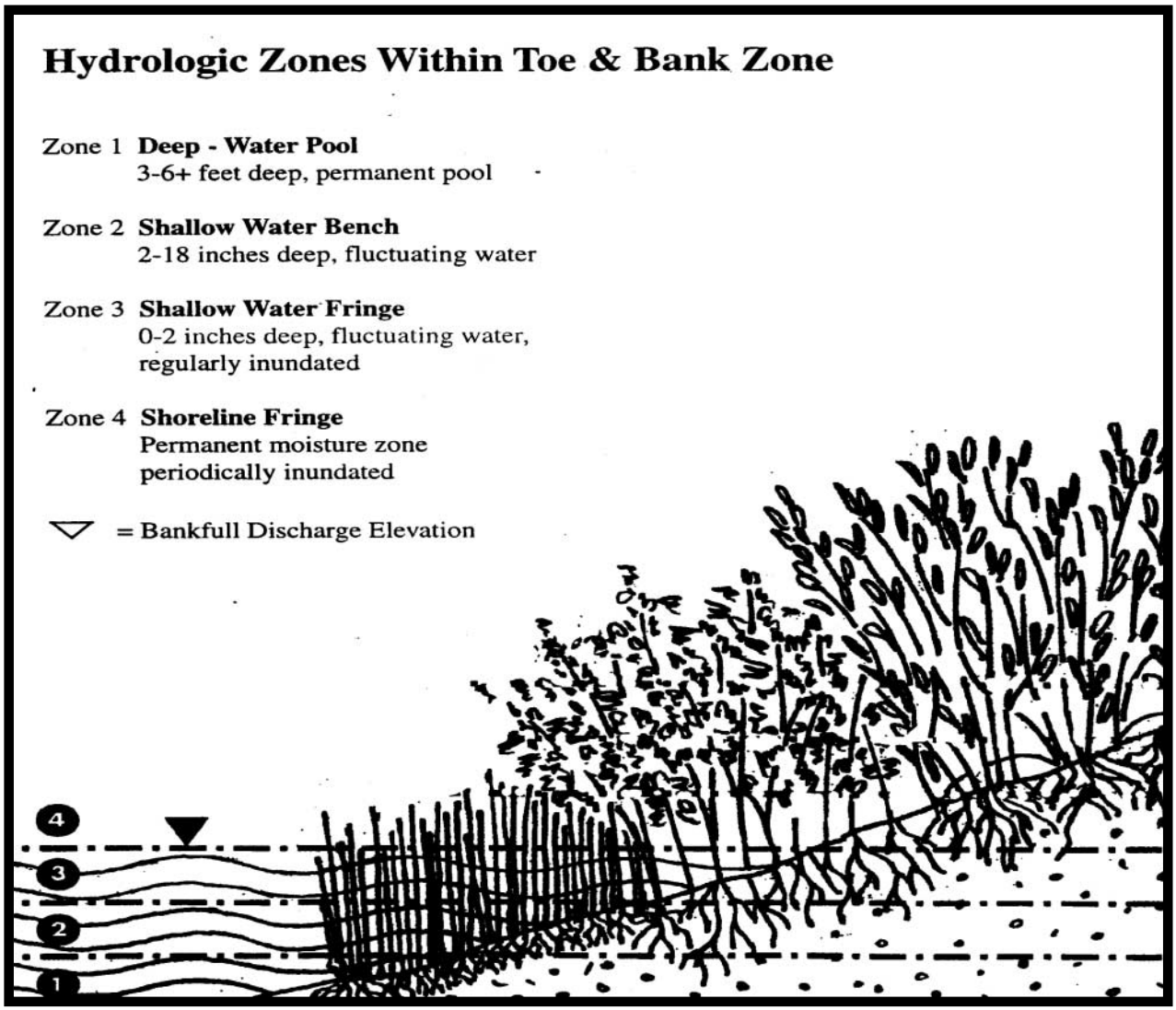


Figure 2: Hydrologic zones for planting herbaceous species in the Intermountain West. This is a general depiction of a riparian zone. Not all streams look like this one. In the real world, some of these zones may be absent).

Zone 2: Shallow Water Bench (2 - 18 inches water depth), fluctuating water

Emergent wetland plants grow in this zone and are generally limited to long-term permanent water depths of less than 3 feet and more often less than 18 inches. Species such as Hardstem bulrush can withstand water depths of 8 feet for short periods of time. However, they typically prefer water depths of 10 – 18 inches.

There are additional benefits that can be realized from establishing wetland plants in this zone. The plants enhance wildlife and fish habitat to the wetland areas. The plants

provide resident sites for phytoplankton, which provide nutrient reduction to water that surrounds the plant stems. The plants also provide bank protection by dissipating the wave energy before it hits the bank. By reducing the wave energy, the plants will cause the water to deposit suspended sediment thereby cleaning the water and supplying bank building material.

Zone 3: Shallow Water Fringe (0 - 2 inches water depth), fluctuating water, regularly inundated

Zone 3 is the fringe at the edge of the water along the streambank. This area is regularly inundated, but drys out on a frequent basis as the water level fluctuates. It is important that good plant cover be established in this area to reduce erosion and to assist with wave attenuation.

Establishment of plants in this zone is difficult because of the fluctuating water. This area is not accessible for maintenance when water levels are high. Plants should be established in this zone to reduce public access.

This zone will support wetland plants such as common threesquare, beaked sedge, etc. and water tolerant shrubs such as willows, birch, dogwood, and other shrubs. The shrubs provide wildlife habitat and water quality improvement through shade, nutrient uptake and breakdown, and sediment deposition.

Zone 4: Shoreline Fringe, permanent moisture zone, periodically inundated

This zone extends about 1 –2 feet above the normal water level. It is subject to periodic inundation after storms or high water events. Water will typically move off of this zone fairly rapidly. Plants in this zone typically like saturated soil conditions and do well under fluctuating water levels. This zone is saturated for a majority of the growing season except when droughty conditions cause the water level in the wetland or pond to drop below normal levels for an extended period of time.

SUMMARY

Establishment of riparian plant species can be complicated. There may be a high risk of failure without the proper selection of species, planting location, planting elevation, plant material procurement, plant handling, and establishment techniques. Post installation monitoring and management will help improve the likelihood of success for the current project and future projects.

REFERENCE LITERATURE

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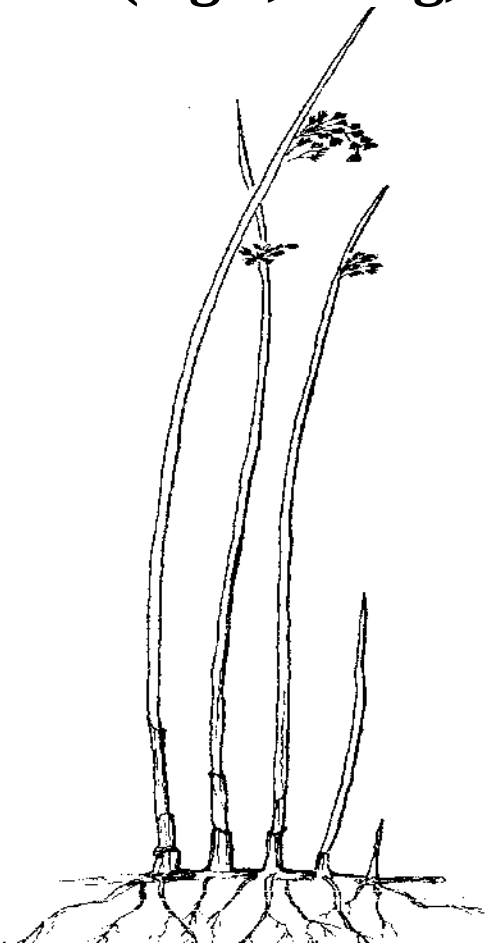
Appendix A

Characteristics of Riparian Plant Species

(Hoag et al 2001)
(Ogle and Hoag 2000)
(Ogle, Hoag, and Scianna 2000)



Description of Herbaceous Grass and Grass-Like Plants

Species	Elevation Range[1]	Root Type	Hydrologic Regime[2]	Availability In Field[3]	Commerical Availability[4]
Herbaceous Grasses and Grass-Like Species					
Agropyron cristatum Crested wheatgrass	Low-Med.	Bunch Perennial	Well Drained	Introduced	Yes-Seed
Agropyron desertorum Crested wheatgrass	Low-Med.	Bunch Perennial	Well Drained	Introduced	Yes-Seed
Agropyron sibericum Siberian wheatgrass	Low- Med.	Bunch Perennial	Well Drained	Introduced	Yes-Seed
Agrostis species Redtop bentgrass	Low-Med.	Rhizomatous Perennial	Seasonally-Flooded	Introduced Common	Yes-Seed
Alopecurus arundinacea Creeping foxtail	Low-Med.	Rhizomatous Perennial	Seasonally-Flooded	Introduced	Yes-Seed
Beckmannia syzigachne Sloughgrass	Low-Mid.	Stoloniferous Annual	Seasonally-Flooded	Fairly Common	Yes-Seed & Plugs
Bromus erectus Meadow brome	Low-High	Rhizomatous Perennial	Seasonally-Saturated Well Drained	Introduced	Yes-Seed
Bromus inermis Smooth brome	Low-High	Rhizomatous Perennial	Seasonally-Saturated Well Drained	Introduced	Yes-Seed
Calamagrostis canadensis Blue-joint reed grass	Mid.-High	Rhizomatous Perennial	Seasonally-Saturated	Common	Yes-Seed & Plugs
Carex aquatilis Water sedge	Mid.-High	Rhizomatous Perennial	Up to 3" Water Depth	Fairly Common	Yes-Seed & Plugs
Carex nebrascensis Nebraska sedge	Low-High	Rhizomatous Perennial	Seasonally-Saturated	Common	Yes-Seed & Plugs
Carex utriculata Beaked sedge	Low-High	Rhizomatous Perennial	Seasonally-Saturated	Common	Yes-Plugs
Dactylis glomerata Orchardgrass	Low-Med.	Bunch Perennial	Well Drained	Introduced	Yes-Seed
Deschampsia cespitosa Tufted hairgrass	Mid.-High	Fibrous Perennial	Seasonally-Saturated	Common	Yes-Seed
Distichlis stricta Inland Saltgrass	Low-Mid.	Rhizomatous Perennial	Seasonally-Saturated	Very Common	Yes-Seed & Plugs
Eleocharis palustris Spikerush	Low-High	Rhizomatous Perennial	Seasonally-Flooded Up to 6" Water Depth	Very Common	Yes-Seed & Plugs
Elymus lanceolatus Streambank wheatgrass	Low-Med.	Rhizomatous Perennial	Seasonally-Saturated	Common	Yes-Seed
Elymus lanceolatus Thickspike wheatgrass	Low-Med.	Rhizomatous Perennial	Seasonally-Saturated	Common	Yes-Seed
Elytrigia elongata Tall Wheatgrass	Low-Med.	Bunch Perennial	Seasonally-Flooded	Introduced	Yes-Seed
Elytrigia intermedia Intermediate wheatgrass	Low-Med	Rhizomatous Perennial	Seasonally-Saturated Well Drained	Introduced	Yes-Seed
Elytrigia intermedia Pubescent wheatgrass	Low-Med.	Rhizomatous Perennial	Seasonally-Saturated Well Drained	Introduced	Yes-Seed
Festuca arundinacea Tall fescue	Low-Med.	Bunch	Seasonally-Flooded	Introduced	Yes-Seed
Festuca ovina Sheep fescue	Low-Med.	Bunch Perennial	Seasonally-Saturated Well Drained	Introduced	Yes-Seed

Description of Herbaceous Grass and Grass-Like Plants

Species	Height	Rate of Spread[5]	Acidity Tolerance[6]	Salinity Tolerance[7]
Herbaceous Grasses and Grass-Like Species				
Agropyron cristatum Crested wheatgrass	12-24"	V. Slow	Low	Medium
Agropyron desertorum Crested wheatgrass	12-24"	V. Slow	Low	Medium
Agropyron sibericum Siberian wheatgrass	12-24"	V. Slow	Low	Medium
Agrostis species Redtop bentgrass	18-36"	Rapid	High	Low
Alopecurus arundinacea Creeping foxtail	24-48"	Rapid	Med.	Med.
Beckmannia syzigachne Sloughgrass	36"	Rapid	U	U
Bromus erectus Meadow brome	24-48"	Medium	Low	Low
Bromus inermis Smooth brome	18-36"	Rapid	Low	Low
Calamagrostis canadensis Blue-joint reed grass	24-36"	Medium	Med.	Low
Carex aquatilis Water sedge	10-24"	Medium	Med.	Low
Carex nebrascensis Nebraska sedge	10-24"	Medium	Low	Medium
Carex utriculata Beaked sedge	10-40"	Rapid	Med.	Low
Dactylis glomerata Orchardgrass	24-48"	Slow	Low	Low
Deschampsia cespitosa Tufted hairgrass	18-30"	Medium	Med.	Med.
Distichlis stricta Inland Saltgrass	12-18"	Medium	Low	High
Eleocharis palustris Spikerush	6-30"	Rapid	Low	Med.
Elymus lanceolatus Streambank wheatgrass	6-12"	Medium	Low	Med.
Elymus lanceolatus Thickspike wheatgrass	8-24"	Medium	Low	Med.
Elytrigia elongata Tall Wheatgrass	30-60"	Rapid	Low	High
Elytrigia intermedia Intermediate wheatgrass	24-48"	Rapid	Med.	Med.
Elytrigia intermedia Pubescent wheatgrass	24-48"	Rapid	Med.	Med.
Festuca arundinacea Tall fescue	24-48"	Rapid	High	High
Festuca ovina Sheep fescue	6-18"	Slow	Med.	Low

Description of Herbaceous Grass and Grass-Like Plants

Species	Wildlife Value	Notes	Use in Hydrologic Zone[8]	Flood Tolerance[9]	Plant Ind. Status[10]
Herbaceous Grasses and Grass-Like Species					
Agropyron cristatum Crested wheatgrass		Drought tolerant	6	L	Upland
Agropyron desertorum Crested wheatgrass		Drought tolerant	6	L	Upland
Agropyron sibericum Siberian wheatgrass		Very drought tolerant	6	L	Upland
Agrostis species Redtop bentgrass	Waterfowl food	Good soil stabilizer	3,4,5	H	FACW
Alopecurus arundinacea Creeping foxtail	Waterfowl, small mammal, and big game food	Excellent soil stabilizer Slow initial establishment	3,4,5,6	H	FACW
Beckmannia syzigachne Sloughgrass	Waterfowl and small mammal food	Palatable forage grass	3,4,5	H	OBL
Bromus erectus Meadow brome	Waterfowl, small mammal, and big game food	Excellent soil stabilizer	4,5,6	H	FACU
Bromus inermis Smooth brome	Waterfowl, small mammal, and big game food	Excellent soil stabilizer	4,5,6	H	FACU
Calamagrostis canadensis Blue-joint reed grass	Small mammal food and upland bird cover	Excellent soil stabilizer	3,4,5	H	FACW+
Carex aquatilis Water sedge	Waterfowl food and cover		2,3,4	H	OBL
Carex nebrascensis Nebraska sedge	Waterfowl food and cover, small mammal cover	Tolerates heat if provided with adequate moisture	2,3,4	H	OBL
Carex utriculata Beaked sedge	Waterfowl and small mammal food	Also known as *C. rostrata*	2,3,4	H	OBL
Dactylis glomerata Orchardgrass	Waterfowl, small mammal, and big game food		5,6	L	FACU
Deschampsia cespitosa Tufted hairgrass	Small mammal cover		3,4	H	FACW
Distichlis stricta Inland Saltgrass	Waterfowl food		3,4,5	H	FACW
Eleocharis palustris Spikerush	Waterfowl food	Excellent soil stabilizer	2,3,4,5	H	OBL
Elymus lanceolatus Streambank wheatgrass		Good soil stabilizer, low growth form, drought tol.	5,6	M	FACU
Elymus lanceolatus Thickspike wheatgrass		Good soil stabilizer and very drought tolerant	5,6	M	FACU
Elytrigia elongata Tall Wheatgrass		Good soil stabilizer and very saline tolerant	3,4,5,6	H	FAC
Elytrigia intermedia Intermediate wheatgrass	Small mammal and big game food	Excellent soil stabilizer	5,6	M	FACU
Elytrigia intermedia Pubescent wheatgrass	Small mammal and big game food	Excellent soil stabilizer	5,6	M	FACU
Festuca arundinacea Tall fescue		Excellent soil stabilizer	2,3,4,5,6	H	FAC
Festuca ovina Sheep fescue		Excellent soil stabilizer	5,6	M	FACU

Description of Herbaceous Grass and Grass-Like Plants

Species	Elevation Range[1]	Root Type	Hydrologic Regime[2]	Availability In Field[3]	Commerical Availability[4]
Festuca ovina duriuscula Hard fescue	Low-Med.	Bunch Perennial	Seasonally-Saturated Well Drained	Introduced	Yes-Seed
Festuca rubra Red fescue	Low-Med.	Rhizomatous Perennial	Seasonally-Saturated Well Drained	Introduced	Yes-Seed
Glyceria striata Mannagrass	Mid.-High	Rhizomatous Perennial	Seasonally-Flooded	Fairly Common	Yes-Seed & Plugs
Juncus balticus Baltic rush	Low-High	Rhizomatous Perennial	Seasonally-Saturated	Very Common	Yes-Seed & Potted
Juncus mertensianus Merten's rush	Mid.-High	Rhizomatous Perennial	Saturated Seasonally-Saturated	Fairly Common	Yes-Seed & Plugs
Juncus tenuis Poverty rush	Mid.-High	Rhizomatous Perennial	Saturated Seasonally-Saturated	Fairly Common	Yes-Plugs
Pascopyrum smithii Western wheatgrass	Low- Med.	Rhizomatous Perennial	Seasonally-Flooded	Common	Yes-Seed
Poa pratensis Kentucky bluegrass	Low-High	Rhizomatous Perennial	Seasonnaly-Flooded Well Drained	Introduced	Yes-Seed
Phalaris arundinacea Reed canarygrass	Low-Mid.	Rhizomatous Perennial	Seasonally-Flooded	Common	Yes-Seed & Plugs
Phleum pratensis Timothy	Low-High	Rhizomatous Perennial	Seasonally-Flooded	Introduced	Yes-Seed
P. spicata X E. repens Newhy hybid wheatgrass	Low-Med.	Weak Rhiz. Perennial	Seasonally-Saturated	Introduced	Yes-Seed
Puccinellia nuttalliana Alkali grass	Low-Mid.	Fibrous Perennial	Seasonally-Saturated	Common	Yes-Seed & Plugs
Scirpus acutus Hard-stem bulrush	Low-High	Rhizomatous Perennial	Up to 36" Water Depth	Very Common	Yes-Seed & Plugs
Scirpus maritimus Alkali bulrush	Low-Mid.	Rhizomatous Perennial	Up to 6" Water Depth	Common	Yes-Seed & Plugs
Scirpus pungens Three-square bulrush	Low-Mid.	Rhizomatous Perennial	Up to 6" Water Depth	Very Common	Yes-Seed & Plugs
Spartina pectinata Prairie cordgrass	Low-Mid.	Rhizomatous Perennial	Seasonally-Flooded	Fairly Common	Yes-Seed & Plugs
Typha latifolia Cattail	Low-Mid.	Rhizomatous Perennial	Up to 12" Water Depth	Very Common	Yes-Seed & Plugs
Verbena hastata Blue vervain	Low-Mid.	Fibrous Perennial	Seasonally-Saturated	Common	Yes-Seed & Plugs

Footnotes:

1. **Elevation Range:** for this region.
   - **Low** 2000-4500 feet
   - **Middle** 4500-7000 feet
   - **High** 7000-10000 feet
2. **Hydrologic Regime:** This indicates optimal moisture conditions, although local conditions are the best benchmarks for design. Well-drained species may tolerate short periods of saturation. Seasonally saturated species prefer soil that is saturated early in the season but later dry out. Seasonally flooded species prefer flooding in the early portion of the season. Saturated indicates species that prefer very wet conditions all season. Others prefer standing water to the depths described.
3. **Availability in the Field:** This refers to natural occurrences in the region. Introduced are not native species and are probably not available in field. The order of the ranking is from least to greatest:
   Fairly Common **Common** **Very Common**
4. **Commercial Availability:** This refers to whether the species is available in the seed or nursery trade.
5. **Rate of Spread:** Refers to the horizontal rate of growth. These rates are only guidelines since rates will vary with growing season, elevation, soil, soil limitations, etc.
   - **Rapid** More than 1.0 feet per year
   - **Medium** About 0.5 feet per year
   - **Slow** About 0.2 feet per year
   - **V. Slow** Less than 0.2 feet per year

Description of Herbaceous Grass and Grass-Like Plants

Species	Height	Rate of Spread[5]	Acidity Tolerance[6]	Salinity Tolerance[7]
Festuca ovina duriuscula Hard fescue	6-18"	Slow	Med.	Low
Festuca rubra Red fescue	6-12"	Medium	Med.	Low
Glyceria striata Mannagrass	24-36"	Rapid	U	Low
Juncus balticus Baltic rush	18-24"	Medium	Med.	Med.
Juncus mertensianus Merten's rush	4-16"	Medium	U	U
Juncus tenuis Poverty rush	6-12"	Medium	U	U
Pascopyrum smithii Western wheatgrass	6-12"	Rapid	Med.	Med.
Poa pratensis Kentucky bluegrass	6-18"	Rapid	Low	Low
Phalaris arundinacea Reed canarygrass	24-48"	Rapid	Low	Low
Phleum pratensis Timothy	24-48"	Medium	Med.	Low
P. spicata X E. repens Newhy hybid wheatgrass	8-18"	Slow	Low	V. High
Puccinellia nuttalliana Alkali grass	6-12"	Medium	Low	High
Scirpus acutus Hard-stem bulrush	Up to 6'	Rapid	Low	Med.
Scirpus maritimus Alkali bulrush	24-36"	Medium	Low	High
Scirpus pungens Three-square bulrush	24-48"	Rapid	Low	Med.
Spartina pectinata Prairie cordgrass	24-48"	Rapid	Low	Med.
Typha latifolia Cattail	Up to 6'	Rapid	Med.	High
Verbena hastata Blue vervain	18-30"	Slow	U	Low

6. **Tolerance to Acidity:** Resistance to acidity relative to native vegetation on similar sites.
7. **Tolerance to Salinity:** Resistance to salinity relative to native vegetation on similar sites.
8. **Hyrologic Zone: 1**-Deep Water; **2**-Shallow Bench; **3**-Shallow Fringe; 4-Shoreline Fringe; 5-Terrace; 6-upland
9. **Flooding Tolerance: (H)**igh; **(M)**edium; **(L)**ow
10. **Plant Indicator Status for Occurrence in Wetlands:**
    - **OBL** = Obligate
    - **FACW** = Facultative Wet
    - **FAC** = Facultative
    - **FACU** = Facultative Upland
    - **Upland** = Upland

U Unknown

Description of Herbaceous Grass and Grass-Like Plants

Species	Wildlife Value	Notes	Use in Hydrologic Zone[8]	Flood Tolerance[9]	Plant Ind. Status[10]
Festuca ovina duriuscula Hard fescue		Excellent soil stabilizer	5,6	M	FACU
Festuca rubra Red fescue		Excellent soil stabilizer	4,5,6	M	FAC
Glyceria striata Mannagrass	Waterfowl and big game food	Excellent soil stabilizer	3,4,5	H	OBL
Juncus balticus Baltic rush	Waterfowl food	Tolerates wide range of hydrologic conditions	2,3,4,5,6	H	OBL
Juncus mertensianus Merten's rush	U		3,4,5	H	OBL
Juncus tenuis Poverty rush	U		3,4,5	M	FAC
Pascopyrum smithii Western wheatgrass		Excellent soil stabilzer	4,5,6	H	FACU
Poa pratensis Kentucky bluegrass	Waterfowl, small mammal, and big game food	Excellent soil stabilizer	3,4,5,6	H	FACU
Phalaris arundinacea Reed canarygrass	Waterfowl food	Excellent soil stabilizer	2,3,4,5,6	H	FACW
Phleum pratensis Timothy	Waterfowl, small mammal, and big game food	Excellent soil stabilizer Slow establishment	3,4,5,6	H	FACU
P. spicata X E. repens Newhy hybid wheatgrass		Tolerates high salinity	3,4,5,6	H	FAC
Puccinellia nuttalliana Alkali grass	Small mammal cover	Tolerates high salinity	3,4,5,6	H	OBL
Scirpus acutus Hard-stem bulrush	Waterfowl food and cover, small mammal cover	Excellent soil stabilizer	2,3,4	H	OBL
Scirpus maritimus Alkali bulrush	Waterfowl cover and food	Tolerates high salinity	2,3,4,5	H	OBL
Scirpus pungens Three-square bulrush	Waterfowl food and cover, small mammal cover	Tolerates some hydrologic drawdown	2,3,4	H	OBL
Spartina pectinata Prairie cordgrass	Small game cover	Not palatable for livestock	2,3,4,5	H	FACW
Typha latifolia Cattail	Waterfowl food and cover, small mammal cover and food	Can be invasive	2,3,4	H	OBL
Verbena hastata Blue vervain	Upland bird food	Very fibrous root system	2,3,4	M	FACW

Descriptions of Native Willows

Species	Size/Form	Elevation Range[1]	Root Type	Rooting Ability From Cuttings	Riparian Zone[2]	Availability In Field[3]
Riparian Willows						
Salix alba White/Golden willow	Med. - Lg. Tree	Low - Mid.	Shallow to Deep	Good	4	Common
Salix amygdaloides Peachleaf willow	Sm. Tree	Low	Fibrous	Very Good	4	Common
Salix bebbiana Bebb's willow	Lg. Shrub	Low to Mid.	Shallow to Deep	Good	4	Common
Salix boothii Booth willow	Med. Shrub	Mid.	Shallow to Deep	Moderate	2,3	Very Common
Salix drummondiana Drummond willow	Sm. - Med. Shrub	Mid. - High	Shallow to Deep	Good	2,3	Common
Salix exigua Coyote willow	Med. Shrub	Low - Mid.	Rhizomatous	Very Good	2,3,4	Very Common
Salix geyeriana Geyer willow	Med.. Shrub	Mid.	Shallow to Deep	Good	2,3	Very Common
Salix lasiandra Pacific willow	Sm. Tree	Low - Mid.	Shallow to Deep	Good	4	Common
Salix lemmonii Lemmon willow	Sm. - Med. Shrub	Mid. - High	Shallow to Deep	Good	2,3	Fairly Common
Salix lutea Yellow willow	Med. - Lg. Shrub	Low	Shallow to Deep	Good	2,3	Very Common
Salix nigra Black willow	Lg. Tree	Low - Med.	Shallow to Deep	Good	4	Fairly Common
Salix planifolia Planeleaf willow	Sm. Shrub	Mid. - High	Shallow to Deep	Moderate	2,3	Fairly Common
Salix prolixa Mackenzie willow	Sm. Tree	Low - Med.	Shallow to Deep	Good	3	Fairly Common
Salix scouleriana Scouler willow	Lg. Shrub	Low - Mid.	Shallow to Deep	Need to treat with hormone	5 (upland willow)	Fairly Common
Salix sitchensis Sitka willow	Sm. - Med. Tree	Low - Med.	Shallow to Deep	Moderate	3	Common

Footnotes:

U Unknown

1. Elevation Range: for this region.

Low 2000-4500 feet
Middle 4500-7000 feet
High 7000-10000 feet

2. Riparian Zone: 1-Toe Zone; 2-Bank Zone; 3-Overbank Zone; 4-Transitional Zone; 5-Upland Zone; 6-Unknown

3. Availability in the Field: This refers to natural occurrences in the region. The order of the ranking is from least to greatest:

Fairly Common-Common-Very Common

4. Commercial Availability: This refers to whether the species is currently available in the nursery trade.

Descriptions of Native Willows

Species	Commerical Availability[4]	Deposition Tolerance[5]	Flooding Tolerance[6]	Drought Tolerance[7]	Salinity Tolerance[8]	Wildlife Value	Plant Ind. Status[9]
Riparian Willows							
Salix alba White/Golden willow	Yes	High	High	Med.	Low	Good	FACW
Salix amygdaloides Peachleaf willow	Yes-limited	High	High	Low	Med.	Good	FACW
Salix bebbiana Bebb's willow	Yes-limited	High	High	Low - Med.	Low	Good	FACW
Salix boothii Booth willow	Yes-limited	High	Med. - High	Low - Med	Low	Good	FACW
Salix drummondiana Drummond willow	Yes-limited	High	Med. - High	Low - Med	Low	Good	FACW
Salix exigua Coyote willow	Yes	High	Med. - High	Low - Med.	Low	Good	OBL
Salix geyeriana Geyer willow	Yes-limited	High	Med. - High	Low - Med	Low	Good	OBL
Salix lasiandra Pacific willow	Yes	High	Med. - High	Low - Med	Low	Good	FACW
Salix lemmonii Lemmon willow	No	High	Med. - High	Low - Med	Low	Good	FACW
Salix lutea Yellow willow	Yes-limited	Med.	Med. - High	Low - Med.	Med.	Good	FACW OBL
Salix nigra Black willow	Yes	Med.	Med. - High	Low - Med.	Low	Good	FACW OBL
Salix planifolia Planeleaf willow	No	High	Med. - High	Low - Med.	Low	Good	OBL
Salix prolixa Mackenzie willow	Yes-Limited	High	Med. - High	Low - Med.	Low	Good	OBL
Salix scouleriana Scouler willow	Yes	High	Med. - High	Low - Med.	High	Good	FACU FAC
Salix sitchensis Sitka willow	Yes-Limited	High	Med. - High	Low - Med.	Low	Good	FACW

5. Deposition Tolerance: Regrowth following shallow coverage by soil.

6. Tolerance to Flooding:

High – tolerates 10-30+ days of flooding
Medium – tolerates 6-10 days of flooding
Low – tolerates 1-5 days or less of flooding

7. Tolerance to Drought: Resistance to drought relative to native vegetation on similar sites.

8. Tolerance to Salinity: Resistance to salinity relative to native vegetation on similar sites.

9. Plant Ind. Status-Occurrence in Wetlands:

OBL = Obligate
FACW = Facultative Wet
FAC = Facultative
FACU/Upland = Facultative Upland/Upland

Description of Native Riparian Trees and Shrubs

Species	Size/Form	Elev. Range[1]	Root Type	Rooting From Cuttings	Riparian Zone[2]	Availability In Field[3]	Commerical Availability[4]
Riparian Shrubs and Trees							
Acer negundo Boxelder	Med.-Lg. Tree	Low - Mid.	Moderately Spreading	Poor	4	Common	Yes
Alnus rubra Red alder	Med. Tree	Mid. - High	Shallow Spreading	Poor	3,4	Fairly Common	Yes
Alnus sinuata Sitka alder	Sm.- Med. Tree	Mid. - High	Shallow Spreading	Poor	2,3	Fairly Common	Yes
Alnus incana spp. tenuifolia Thinleaf alder	Sm.- Med. Tree	Mid. - High	Shallow Spreading	Poor	2,3	Common	Yes
Betula occidentalis Water birch	Lg. Shrub to Sm. Tree	Mid. - High	Shallow to Deep Spreading	Poor	2,3	Fairly Common	Yes
Cornus sericea Redosier dogwood	Med. Shrub	Mid.	Shallow	*Moderate	2,3,4	Fairly Common	Yes
Crataegus douglasii Black/Douglas hawthorn	Sm. Tree	Low - Mid.	Shallow to Deep Spreading	Poor	3,4	Fairly Common	Yes
Pentaphylloides floribunda Shrubby cinquefoil	Sm. Shrub	Low - Mid.	Shallow to Deep Spreading	Poor	3,4	Very Common	Yes
Philadelphus lewisii Mockorange	Sm. - Med. Shrub	Low - Mid.	Spreading Fibrous	Good	3,4	Common	Yes
Populus angustifolia Narrowleaf cottonwood	Lg. Tree	Mid.	Shallow	Very Good	4	Very Common	Yes
Populus fremontii Fremont cottonwood	Lg. Tree	Low - Mid.	Shallow Fibrous	Very Good	4	Fairly Common	Yes
Populus tremuloides Quaking aspen	Med. Tree	Mid. - High	Shallow	Poor	4	Very Common	Yes
Populus trichocarpa Black cottonwood	Lg. Tree	Low - Mid.	Shallow Fibrous	Very Good	4	Very Common	Yes
Prunus virginiana Chokecherry	Med. - Lg. Shrub	Low - Mid.	Rhizomatous	Good from root cuttings	4,5	Common	Yes
Rhus trilobata Skunkbush sumac	Med. - Lg. Shrub	Low - Mid.	Deep Spreading Rhizomatous	Poor	4,5	Fairly Common	Yes
Ribes aureum Golden current	Sm. - Med. Shrub	Low - Mid.	Spreading	Good (in greenhouse)	3,4,5	Common	Yes
Ribes cereum Wax/Squaw current	Sm. - Med. Shrub	Mid. - High	Spreading	Fair	3,4,5	Common	Yes
Rosa woodsii Wood's rose	Sm. - Med. Shrub	Low - Mid.	Shallow to Deep	Good (in greenhouse)	2,3,4,5	Very Common	Yes
Sambucus coerulea Blue elderberry	Sm. Tree	Mid.	Rhizomatous	Poor	4,5	Fairly Common	Yes
Sambucus racemosa Red elderberry	Med. Shrub	Mid. - High	Spreading	Poor	4,5	Fairly Common	Yes
Shepherdia argentea Silver buffaloberry	Lg. Shrub	Low - Mid.	Rhizomatous	Poor	3,4,5	Fairly Common	Yes

Footnotes:

U Unknown

1. Elevation Range: for this region.

Low 2000-4500 feet

Middle 4500-7000 feet

High 7000-10000 feet

2. Riparian Zone: 1-Toe Zone; 2-Bank Zone; 3-Overbank Zone; 4-Transitional Zone; 5-Upland Zone; 6-Unknown

3. Availability in the Field: This refers to natural occurrences in the region. The order of the ranking is from least to greatest:

Fairly Common-Common-Very Common

4. Commercial Availability: This refers to whether the species is currently available in the nursery trade.

Description of Native Riparian Trees and Shrubs

Species	Deposition Tolerance[5]	Flooding Tolerance[6]	Drought Tolerance[7]	Salinity Tolerance[8]	Wildlife Value/Misc. Notes	Plant Ind. Status[9]
Riparian Shrubs and Trees						
Acer negundo Boxelder	High	High	High	Med.	Birds and small mammals eat fruits	FAC
Alnus rubra Red alder	Med.	Med.	Low	Low	Big game browse upland bird food	FAC
Alnus sinuata Sitka alder	Med.	Med.	Low	Low	Big game browse upland bird food	FACW
Alnus incana spp. tenuifolia Thinleaf alder	Med.	Med.	Low	Low	Big game browse upland bird food	FACW
Betula occidentalis Water birch	Med.	Med	Low	Low	Big game browse	FACW
Cornus sericea Redosier dogwood	Low	High	Med.	Low	Big game browse, sm. mammal food, upland bird food.	FACW
Crataegus douglasii Black/Douglas hawthorn	Med.	Low	High	Low	Browse for many species and cover	FAC,U
Pentaphylloides floribunda Shrubby cinquefoil	U	U	High	U	Big game browse	FACW FAC
Philadelphus lewisii Mockorange	U	High	U	U	Big game browse	FACU,U
Populus angustifolia Narrowleaf cottonwood	Med.	Med.	High	Med.	Big game browse	FACW
Populus fremontii Fremont cottonwood	Med.	Med.	Med.	Med.	Big game browse	FACW
Populus tremuloides Quaking aspen	Low	Low	Med.	Med.	Big game browse	FAC FACU
Populus trichocarpa Black cottonwood	Med.	Med.	Med.	U	Big game browse	FACW
Prunus virginiana Chokecherry	Low	Low	Low-Med.	Low-Med	Birds and small mammals eat fruits	FACU
Rhus trilobata Skunkbush sumac	High	Med.-High	Med.-High	Med.	Birds and sm. mammals eat fruits Doesn't tolerate long-term flood	FACU,U
Ribes aureum Golden current	U	U	U	High	Birds and small mammals eat fruits	FAC FACW
Ribes cereum Wax/Squaw current	U	U	U	U	Birds and small mammals eat fruits	FACU,U
Rosa woodsii Wood's rose	U	Low	Low-High	Low	Rosehips eaten by many species	FACU
Sambucus coerulea Blue elderberry	Med.	Med.	Med.	Low	Fruits are important for birds	FAC
Sambucus racemosa Red elderberry	Med.	Med.	Med.	Low	Big game browse, Fruits eaten by birds and small mammals	FACU
Shepherdia argentea Silver buffaloberry	U	U	U	Low	Fruits eaten by birds and small mammals	FACU

5. Deposition Tolerance: Regrowth following shallow coverage by soil.

6. Tolerance to Flooding:

High – tolerates 10-30+ days of flooding

Medium – tolerates 6-10 days of flooding

Low – tolerates 1-5 days or less of flooding

7. Tolerance to Drought: Resistance to drought relative to native vegetation on similar sites.

8. Tolerance to Salinity: Resistance to salinity relative to native vegetation on similar sites.

9. Plant Ind. Status-Occurrence in Wetlands:

OBL = Obligate

FACW = Facultative Wet

FAC = Facultative

FACU/Upland = Facultative Upland/Upland

Descriptions of Upland Trees and Shrubs

Species	Mature Size 20 Yr. Height	Crown Spread	Growth Rate[1]	Flower[2]	Fruit Usable[3]	Fall Leaf Color	Suckers[4]	Plant Ind. Status[5]
Upland Shrubs								
Shepherdia argenta Buffaloberry, silver	6-14'	8-14'	Medium	Yes	Yes	None	Yes	FACU
Caragana arborescens Caragana-Siberian peashrub	10-25'	10-20'	Medium	Yes	No	Yellow	No	Upland
Prunus fruticosa Cherry, Mongolian	3-6'	3-6'	Slow	Yes	No	Yellow	Yes	Upland
Prunus virginiana Chokecherry	10-25'	10-25'	Medium	Yes	Yes	Yellow to Purple	Yes	FACU
Cotoneaster integerrimus Cotoneaster, European	8-12'	8-12'	Medium	No	No	Yellow to Brown	No	Upland
Ribes aureum Golden Current	5-10'	5-10'	Medium	Yes	Yes	Yellow	Moderate	FAC +
Cornus sericea Dogwood, redosier	5-10'	10-15'	Fast	Yes	No	Purple	Moderate	FACW
Forsythia X 'Meadowlark' Forsythia, Meadowlark	6-11'	6-11'	Medium	Yes	No	Purple to Yellow	No	Upland
Lonicera maackii Honeysuckle, Amur	10-14'	10-14'	Medium	Yes	No	Brown to Purple	No	FAC
Lonicera korolkowi Honeysuckle, Blueleaf	10-14'	10-14'	Medium	Yes	No	Brown to Purple	No	FAC
Amelanchier alnifolia Serviceberry	6-15'	6-15'	Slow	Yes	Yes	Yellow	Yes	FACU
Syringa vulgaris Lilac, Common	8-12'	8-12'	Slow	Yes	No	Brown	Yes	Upland
Prunus americana Plum, American	8-10'	8-10'	Medium	Yes	Yes	Yellow to Orange	Yes	Upland
Potentilla fruticosa Shrubby Cinquefoil	3-4'	3-4'	Slow	Yes	No	Brown	No	FAC
Spiraea X vanhouttei Spiraea, Vanhoutte	4-8'	4-8'	Medium	Yes	No	Purple	No	FAC
Rhus aromatica Sumac, Fragrant	3-9'	6-10'	Slow	Yes	No	Red to Yellow	Rarely	Upland
Rhus trilobata Sumac, Skunkbush	3-9'	5-12'	Medium	Yes	No	Red to Yellow	No	FAC
Rhus glabra Sumac, Smooth	5-15'	7-17'	Slow	Yes	No	Red	Yes	Upland
Rhus typhina Sumac, Staghorn	10-15'	12-20'	Medium	Yes	No	Red to Orange	Yes	Upland

Descriptions of Upland Trees and Shrubs

Species	Commer. Available	Cold/Wind Tolerance	Drought Tolerance	Salinity Tolerance	Wildlife Value/Misc. Notes
Upland Shrubs					
Shepherdia argenta Buffaloberry, silver	Yes	Yes	Yes	Yes	Good nesting cover and food Thorns
Caragana arborescens Caragana-Siberian peashrub	Yes	Yes	Yes	Yes	Good nesting cover and food Seed Pods
Prunus fruticosa Cherry, Mongolian	Yes	Yes	Moderate	No	Good nesting cover and food Fruit Color
Prunus virginiana Chokecherry	Yes	Yes	Moderate	No	Excellent nesting cover and food Fruit
Cotoneaster integerrimus Cotoneaster, European	Yes	Yes	Moderate	No	Fair - cover Fruit Color
Ribes aureum Golden Current	Yes	Yes	Moderate	Yes	Excellent nesting cover and food Bright Golden Flower
Cornus sericea Dogwood, redosier	Yes	Yes	No	No	Excellent nesting cover and food Red Stems - Winter Color
Forsythia X 'Meadowlark' Forsythia, Meadowlark	Yes	Yes	Moderate	No	Bright Yellow Spring Flowers
Lonicera maackii Honeysuckle, Amur	Yes	Yes	Moderate	No	Good nesting cover and food Aphid Resistant
Lonicera korolkowi Honeysuckle, Blueleaf	Yes	Yes	Moderate	No	Good nesting cover and food Aphid Resistant
Amelanchier alnifolia Serviceberry	Yes	Yes	Moderate	No	Good nesting cover and food Fruit
Syringa vulgaris Lilac, Common	Yes	Yes	Moderate	Yes	Fair nesting cover
Prunus americana Plum, American	Yes	Yes	Moderate	No	Good nesting cover Fruit
Potentilla fruticosa Shrubby Cinquefoil	Yes	Yes	Yes	Moderate	Fair nesting cover
Spiraea X vanhouttei Spiraea, Vanhoutte	Yes	Moderate	Moderate	No	Good nesting cover and food Flower
Rhus aromatica Sumac, Fragrant	Yes	Moderate	Yes	No	Poor wildlife cover and food Fall Color
Rhus trilobata Sumac, Skunkbush	Yes	Yes	Yes	Yes	Excellent nesting cover and food Fall Color
Rhus glabra Sumac, Smooth	Yes	Yes	Moderate	No	Poor wildlife cover and food Fall Color
Rhus typhina Sumac, Staghorn	Yes	Moderate	Moderate	No	Fair nesting cover and food Seedheads and Fall Color

Descriptions of Upland Trees and Shrubs

Species	Mature Size 20 Yr. Height	Crown Spread	Growth Rate[1]	Flower[2]	Fruit Usable[3]	Fall Leaf Color	Suckers[4]	Plant Ind. Status[5]
Upland Small Trees								
Prunus maackii Chockcherry, Amur	15-25'	15-25'	Medium	Yes	No	Yellow	No	Upland
Malus hybrids Crabapple, flowering	10-15'	15-25'	Medium	Yes	Yes	Yellow to Red	No	Upland
Crataegus arnoldiana Hawthorn, Arnold	15-30'	15-25'	Slow	Yes	No	Yellow	No	Upland
Acer ginnala Maple, Amur	15-20'	15-20'	Medium	No	No	Yellow to Red	No	Upland
Acer tataricum Maple, Tatarian	18-30'	15-25'	Medium	No	No	Yellow	No	Upland
Sorbus aucuparia Mountain Ash	20-30'	15-25'	Medium	Yes	Yes	Red to Yellow	No	Upland
Cercis canadensis Redbud, Eastern	20-30'	20-25'	Medium	Yes	No	Yellow to Green	No	Upland
Upland Medium and Tall Trees								
Fraxinus pennsylvannica Ash, Green	35-65'	30-40'	Medium	No	No	Yellow	No	Upland
Populus tremuloides Aspen, Quaking	25-60'	30-30'	Fast	No	No	Yellow	Yes	FAC
Betula papyifera Birch, Paper	30-55'	20-40'	Medium	No	No	Yellow	No	Upland
Catalpa speciosa Catalpa, Northern	50-70'	30-50'	Fast	Yes	No	Yellow to Brown	No	Upland
Ulmus pumila Elm, Siberian	25-50'	20-40'	Medium	No	No	Brown	Moderate	Upland
Corylus colura Filbert	40-50'	20-30'	Medium	No	No	Yellow to Purple	No	Upland
Koelreuteria paniculata Golden Raintree	30-40'	30-40'	Fast	Yellow July	No	Yellow	No	Upland
Celtis occidentalis Hackberry	40-60'	25-45'	Medium	No	No	Yellow	No	FAC
Gleditisia triacanthos Honeylocust	30-50'	30-40'	Fast	No	No	Yellow	No	Upland
Tilia americana Linden, American	50-70'	30-50'	Medium	Yes	No	Brown to Yellow	Moderate	Upland
Tilia cordata Linden, Littleleaf	30-45'	20-30'	Medium	Yes	No	Brown to Yellow	Moderate	Upland
Acer species Maple, Norway/Silver/Sugar	40-65'	30-50'	Fast	No	No	Yellow to Orange	Moderate	Upland
Quercus macrocarpa Oak, Bur	40-70'	35-60'	Slow	No	No	Yellow to Brown	No	Upland
Quercus species Oak, Mongolian/Red/White	50-70'	50-70'	Slow to Medium	No	No	Brown to Yellow to Red	No	Upland
Populus species Poplar, Hybrids	40-60'	20-35'	Fast	No	No	Brown to Yellow	Moderate	FAC
Juglans nigra Walnut, Black	35-60'	30-50'	Medium	No	Yes	Brown to Yellow	No	Upland
Salix alba Golden Willow	40-55'	40-55'	Fast	No	No	None to Yellow	No	FAC
Salix pentandra Laurel Willow	25-40'	20-35'	Fast	No	No	Brown to Yellow	No	FAC

Descriptions of Upland Trees and Shrubs

Species	Commer. Available	Cold/Wind Tolerance	Drought Tolerance	Salinity Tolerance	Wildlife Value/Misc. Notes
Upland Small Trees					
Prunus maackii Chockcherry, Amur	Yes	Yes	Moderate	No	Fair wildlife food value Orange Bark
Malus hybrids Crabapple, flowering	Yes	Moderate	Moderate	No	Good wildlife food value Varied shape fruit, flowers
Crataegus arnoldiana Hawthorn, Arnold	Yes	Yes	Yes	Moderate	Good nesting cover and food value Thorns, Fruit
Acer ginnala Maple, Amur	Yes	Yes	Moderate	No	Fair wildlife nesting value Fall Color
Acer tataricum Maple, Tatarian	Yes	Yes	Moderate	No	Fair wildlife nesting value Fall Color
Sorbus aucuparia Mountain Ash	Yes	Moderate	No	No	Good wildlife food value Fruit, Flower
Cercis canadensis Redbud, Eastern	Yes	Moderate	Moderate	No	Short-lived to 50 years
Upland Medium and Tall Trees					
Fraxinus pennsylvannica Ash, Green	Yes	Yes	Yes	Yes	Fair wildlife food and cover Hardy Tree
Populus tremuloides Aspen, Quaking	Yes	Yes	No	No	Good wildlife food and cover Quaking Leaf
Betula papyifera Birch, Paper	Yes	Yes	No	No	Fair wildlife food White Bark
Catalpa speciosa Catalpa, Northern	Yes	Moderate	Moderate	Yes	Good wildlife food and cover Hugh leaf and showy flowers
Ulmus pumila Elm, Siberian	Yes	Yes	Yes	Yes	Fair wildlife food and cover
Corylus colura Filbert	Yes	Moderate	Moderate	No	Good wildlife nesting cover
Koelreuteria paniculata Golden Raintree	Yes	Moderate	No	No	Late summer yellow flowers Seed capsules persist over winter
Celtis occidentalis Hackberry	Yes	Yes	Moderate	No	Good wildlife food and cover Ridged Bark
Gleditisia triacanthos Honeylocust	Yes	No	No	No	Fair wildlife food value Seeds and thorns
Tilia americana Linden, American	Yes	No	No	No	Fair wildlife food and cover Flowers, Seeds
Tilia cordata Linden, Littleleaf	Yes	Yes	No	No	Fair wildlife food and cover Flowers, Seeds
Acer species Maple, Norway/Silver/Sugar	Yes	Moderate	No	No	Fair wildlife food and cover Soft Wood
Quercus macrocarpa Oak, Bur	Yes	Yes	Yes	No	Fair wildlife food and cover Acorn
Quercus species Oak, Mongolian/Red/White	Yes	Yes	Moderate	No	Fair wildlife food and cover Partial Leaf Retension
Populus species Poplar, Hybrids	Yes	Moderate	No	No	Fair wildlife food and cover Fast growth
Juglans nigra Walnut, Black	Yes	No	No	No	Good wildlife food and cover Wood, Nuts
Salix alba Golden Willow	Yes	Yes	No	No	Fair wildlife food and cover Yellow Stems
Salix pentandra Laurel Willow	Yes Limited	Moderate	No	No	Fair wildlife food and cover Shiny Green Leaf

Descriptions of Upland Trees and Shrubs

Species	Mature Size 20 Yr. Height	Crown Spread	Growth Rate[1]	Flower[2]	Fruit Usable[3]	Fall Leaf Color	Suckers[4]	Plant Ind. Status[5]
Upland Conifers								
Thuja occidentalis Arborvitae, American	15-40'	10-20'	Very Slow	No	No	Green	No	Upland
Pseudotsuga menziesii Douglas Fir	40-70'	20-30'	Slow	No	No	Green	No	Upland
Juniperus virginiana Eastern Red-Cedar	30-45'	15-30'	Medium	No	No	Green	No	Upland
Juniperus scopulorum Rocky Mountain Juniper	20-40'	12-20'	Medium	No	No	Green	No	Upland
Pinus mugo Mugo Pine	3-20'	5-30'	Slow	No	No	Green	No	Upland
Pinus ponderosa Ponderosa Pine	50-70'	25-30'	Medium	No	No	Green	No	Upland
Pinus nigra Austrian Pine	25-50'	20-35'	Medium	No	No	Green	No	Upland
Picea pungens Colorado Spruce	30-65'	15-25'	Slow	No	No	Green to Blue	No	Upland

Footnotes: This table does not include all possible selections available. Refer to "North Dakota Tree Handbook (with Idaho suppliment)" for additional species.

1. Growth Rate:
- **Slow** = less than 1 foot per year
- **Medium** = 1-2 feet per year
- **Fast** = greater than 2 feet per year

2. Flowers:
- **Yes** = showy/obvious
- **No** = unique/inconspicuous

3. Fruit:
- **Yes** = usable
- **No** = rarely or not used

4. Suckers:
- **Yes** = commonly develop
- **Moderate** = rarely develop
- **No** = none

5. Plant Indicator Status(Occurrence in Wetlands):
- **FACW** = facultative wet
- **FAC** = facultative
- **FACU** = facultative upland
- **Upland** = upland

Descriptions of Upland Trees and Shrubs

Species	Commer. Available	Cold/Wind Tolerance	Drought Tolerance	Salinity Tolerance	Wildlife Value/Misc. Notes
Upland Conifers					
Thuja occidentalis Arborvitae, American	Yes	Moderate	No	No	Good wildlife food and cover Winter Burn
Pseudotsuga menziesii Douglas Fir	Yes	Yes	No	No	Fair wildlife food and cover Winter Hardy
Juniperus virginiana Eastern Red-Cedar	Yes	Moderate	Yes	Yes	Excellent wildlife food and cover Wildlife Value
Juniperus scopulorum Rocky Mountain Juniper	Yes	Yes	Yes	Yes	Excellent wildlife food and cover Wildlife Value
Pinus mugo Mugo Pine	Yes	Moderate	Moderate	Moderate	Fair wildlife values Shape
Pinus ponderosa Ponderosa Pine	Yes	Yes	Yes	Moderate	Excellent wildlife food and cover Long Life
Pinus nigra Austrian Pine	Yes	Yes	Yes	Moderate	Good wildlife food and cover Calcium Soil Tolerant
Picea pungens Colorado Spruce	Yes	Yes	Moderate	Moderate	Good wildlife cover value Needle Color