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Guide to the Willows of Shoshone National Forest

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Introduction

Willows are one of the most prominent and significant components of the wetland vegetation in the mountains and valleys of the west. These shrubs and small trees provide food and habitat for a variety of wildlife species and serve as indicators of ecological conditions and the overall health of wetland environments. Due to their value, it is important that land managers and biologists be able to recognize and distinguish between the many different species of willow in their local area. Unfortunately, willow identification can be extremely difficult, especially for non-botanists who may be unfamiliar with willow terminology or the subtle distinguishing characteristics used in willow taxonomy.

This guide has been developed to assist managers and biologists with the identification of the 29 taxa of willows known or suspected to occur on the Shoshone National Forest (Figure 1). The guide contains identification keys to willows in flowering (pistillate) and non-flowering (vegetative) condition and an illustrated, 2-page discussion of each species with information on similar species, habitat, and range. Although an attempt has been made to make the keys and descriptions as non-technical as possible, unavoidably technical terms are included (and often illustrated) in a glossary. Additional sources of information on willow identification are listed in the reference section at the end of the guide.

The keys and descriptions in this guide employ the most consistent and reliable characteristics that we have found for identifying the willows of the Shoshone National Forest. These characteristics were derived from a thorough review of the willow literature, study of herbarium specimens, and field observations. The guide is not foolproof, however. Although a person using it can anticipate a reasonable degree of success, it is not always possible to identify every willow specimen. There is enough variability within each species that any given specimen may not display all of the characteristics presented herein.

Recognizing Willows

The first step in identifying a willow species is to determine that the plant in question is, in fact, a willow (a member of the genus *Salix*). While this may seem rather elementary, the task is not always as simple as it may seem. Many non-willow plants, including *Cornus*, *Betula*, *Alnus*, and *Populus*, occupy the same habitats as willows, and superficially may resemble them. The challenge is made even greater by the wide variety of growth forms exhibited by willows, ranging from low, prostrate shrubs barely 5 cm high, to large trees exceeding 20 meters in height. Determination relies on a number of characters; none of which are unique to willows but which collectively serve to distinguish the genus. These consist of the following:

- Willows are all shrubs or trees, although some alpine species may be only a few cm above the ground. With few exceptions, the branches are very flexible, and do not break cleanly.

- Unlike most plants, willows have separate "sexes". Pistillate plants ("females") only produce pistillate flowers (each consisting of a single pistil) and are the only willow plants that produce fruits (seed-bearing ripened pistils). Staminate plants ("males") produce pollen-bearing stamens, but never bear fruit. Pistillate and staminate flowers are borne in soft, often drooping, spike-like clusters called catkins. Both staminate and pistillate flowers lack the colored perianth parts (petals and sepals) that most flowers have to attract animal pollinators. In the place of perianth parts, willows have small scale-like bracts at the base of each flower and have a small gland on the catkin axis which lures insect pollinators to the stamens and pistils.

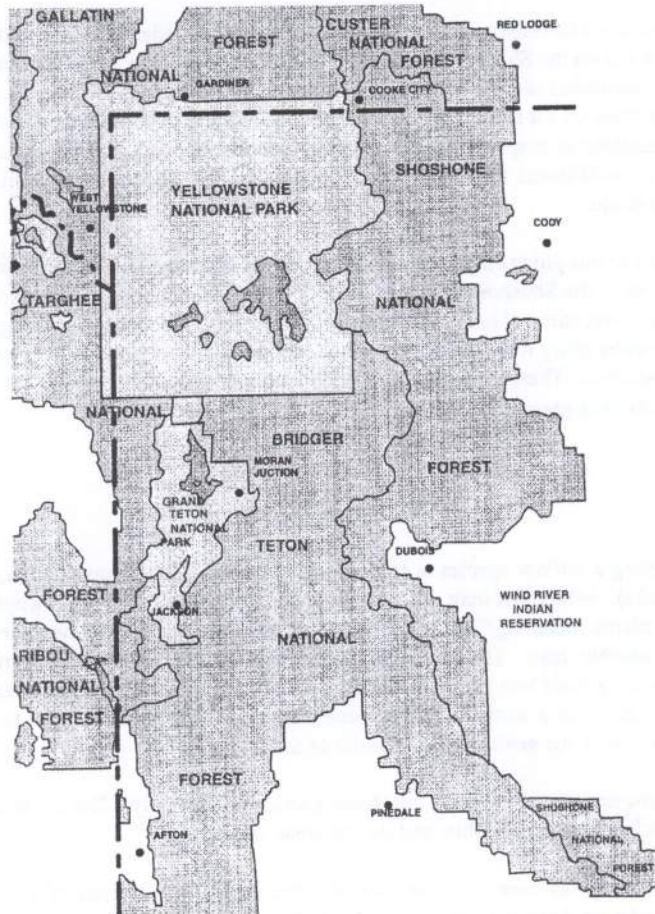
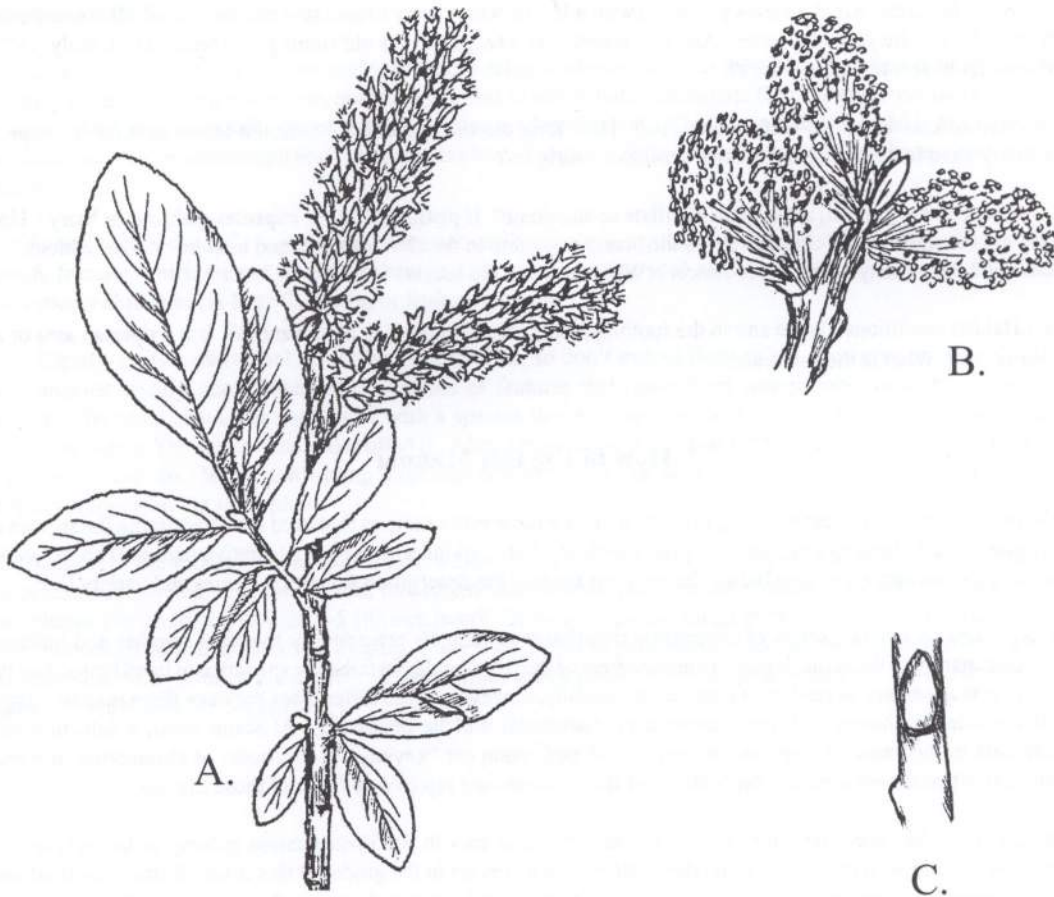


Figure 1: Study Area

- The seeds of willows are long-hairy and contained within a dry fruit called a capsule. At maturity, the capsule splits open and the two halves curl back, forming a broad "V" or a "rams-horn" shape.

- The leaves are simple (undivided) and alternately arranged on the stems. Each leaf has a well-developed blade, a petiole, and two stipules which may range in length from less than 1 mm to 12 mm or more.

- The buds of willows are unusual in that they are covered with a single, cap-like scale, rather than several overlapping scales as found on most plants. This condition can even be seen on specimens lacking buds by observing that each season's growth is not terminated by multiple bud scale scars, as is characteristic of most woody plants.



A. Branch of a willow with pistillate catkins. B. Staminate catkin. C. Bud scale.

Key Features to Observe on Willows in the Field

The likelihood of correctly identifying a willow specimen can be greatly increased if the following features are recorded in the field:

- Growth habit: Is the specimen a tree, low to medium shrub, or densely matted subshrub? How tall is the specimen?

- Leaf features: Are the leaves glaucous below, or at least obviously lighter beneath than above? Are the leaves the same color above and below?

- Stem features: Are the stems pruinose (with a bluish-white waxy bloom that can be rubbed off when fresh)? What color are the year old stems? Are the current year's twigs or year old stems pubescent? Do freshly-peeled branchlets have a distinctive odor?

- Are catkins borne on leafy branchlets? How long are the branchlets? Are the leaves similar in shape to ordinary stem leaves? Are the catkins sessile or nearly so?

- If catkins are present, is the plant pistillate or staminate? If pistillate, are the capsules glabrous or hairy? How long are the stalks of the capsules? Are the bracts persistent in fruit? What color and how hairy are the bracts? If staminate, how many stamens per flower? What color are the bracts?

- Habitat conditions: Is the site in the foothills, montane, subalpine, or alpine zones? Is it a riparian area or an upland site? What is the substrate?

How to Use this Manual

The process involved in determining the identity of a willow is the same as that used for determining the species of any plant. Dichotomous keys (one for plants with pistillate catkins and one for vegetative material) are provided to facilitate the operation, precluding the need for reading the description for every species and variety first.

A dichotomous key is a series of contrasting descriptive statements preceded by the same number and indented from the margin to the same degree. One statement of the pair should describe the specimen in hand better than the other. It is necessary to read both statements carefully, however, as the differences between them may be subtle. After making a choice, additional contrasting statements will be presented. At some point, a selection will terminate in the name of a species or variety. Identification (or "keying") is a process of elimination in which statements that do not describe the features of the specimen are rejected in favor of those that do.

Once a name has been determined from the key, the next step in the identification process is to compare the material in hand with the drawing and description of that species in the guide. If this is satisfactory, the final step is to compare the specimen to herbarium specimens that are known to be correctly identified. There are many intangible and difficult to describe features that collectively influence a plant's appearance, and comparison of an unknown collection with a known specimen can readily confirm or contradict a tentative determination.

When collecting specimens for identification it is very important to obtain material which is representative of the plant in question. It is also crucial to observe and record information in the field concerning features of the plant that may not be obvious from collected specimens. Some features (e. g., distinctive odors, substances deposited on surfaces) are often lost during drying, while others are easily forgotten (was it a shrub or tree?) months later.

Keying willows is an activity that requires patience and practice. Some additional tips for facilitating the learning process and increasing the chances of correctly identifying a species are provided below:

- Always read both of the contrasting statements in a key. One may appear to describe the specimen with a reasonable degree of accuracy, but the other may fit much better.

- If neither statement of a pair seems to fit better than the other, try both (one at a time of course). Eventually, you will arrive at a species under each path, and the drawings and descriptions will help you to decide which is more likely to be the correct determination.

- Consult the illustrated glossary and Figure 2 for the definitions of unavoidably technical terms used in the keys and descriptions.

- In all cases, willows are more easily and more reliably identified when they have both leaves and pistillate catkins. When collecting specimens, make every effort to obtain both. Staminate features are remarkably uniform in most willow species, making them of limited value in identification. If only staminate material is available, the specimen can still be identified using the vegetative key. Staminate features are included in the discussion for each species.

- Avoid "sucker shoots" — stems which are unusually vigorous, typically as a result of browsing. These often display features which are not generally characteristic of the species, such as unusually large leaves and stipules. Such shoots almost never bear flowering or fruiting catkins.

- Clearly, no two individual plants are exactly alike, so don't expect them to be. However, members of the same species usually share certain combinations of features that make them recognizable as members of that species. The more characters associated with a species that a person can find on an individual, the greater the likelihood that he/she has correctly identified it. Also, certain parts of the plant may not display the features well, while other parts do. When confirming a species determination, use several characters and check each one at several locations on the same plant.

- Because of the variability inherent in most willows, the leads in a key must address both the normal range and the occasional extreme. For this reason, measurements are often presented as a range, followed by a number in parentheses (for example, catkins 3-5 (8) mm long). In such cases, the range provided is the catkin length that most individuals of that species will display, while the number in parentheses indicates the upper extreme which has been observed. Similarly, a number in parentheses which precedes the range indicates the lower extreme (for example, leaf blades (3) 5-9 cm long).

Willow Terminology

(Terms which apply specifically to leaf shape are illustrated in Figure 2)

Anther: The pollen-bearing part of a stamen.

Appressed: Flattened and lying close to the surface (usually used in reference to hairs).



Blade: The flat, expanded part of a leaf.

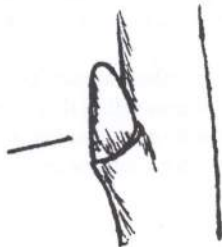


Bract: A modified, usually reduced leaf associated with a flower or group of flowers.



Branchlet: A small branch, usually referring to second, third or fourth-year stems.

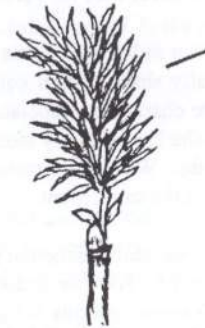
Bud: The dormant growing tip of a plant covered by a hardened, protective scale.



Capsule: A dry fruit which, at maturity, opens and releases the seeds. This is the fruit type produced by willows.



Catkin: A structure consisting of a group of flowers (usually unisexual) arranged along an elongate, flexible axis.



Ciliate: Fringed with hairs.

Decumbent: Describes a stem which creeps along the ground, with the tip pointed upward.

Deciduous: Describes plant parts that fall off at some point during each growing season.

Depressed: Flattened from above.

Entire: Describes leaf margins which lack teeth or other indentations or divisions

Epidermis: The outermost cell layer of a stem or leaf.

Exudate: A sticky or oily liquid, produced within a plant and expelled to the surface.

Flowering branchlet: A first-year, usually leafy, branch bearing a catkin at its tip.



Gland: A small swelling which usually secretes a liquid.



Glandular: Beset with glands.

Glabrate: Condition of having a few, sparsely distributed hairs (nearly glabrous).

Glabrous: Lacking hairs.

Glaucous: Condition in which a surface is coated with a light blue or whitish waxy substance which can be rubbed off with the fingers.

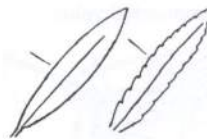
Inrolled: Curled or rolled inward at the edge.

Internode: The portion of a stem between two successive nodes.

Lateral: Borne on or at the side of a structure.



Margin: The outer edge of a structure, usually used with reference to a leaf or bract.



Mat-forming: Describes a plant with densely clustered stems which spreads out over the ground.

Midrib: The central vein running the length of a leaf.



Node: The point of attachment of a leaf or leaves on a stem.



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Pistillate: Condition in which a plant or plant part has female reproductive structures (pistils) only.

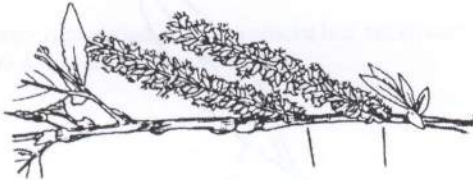
Pruinose: Condition in which twigs and branchlets are coated with a light blue to white waxy substance which can be rubbed off with the fingers (similar to glaucous but referring specifically to stems).

Pubescent: Condition of having hairs.

Reticulate-veined: Describes a leaf with many prominent, interconnected veins.



Sessile: Condition in which a plant part is attached directly to an axis with no supporting stalk.



Stamen: The pollen producing structures of a flower.

Staminate: Condition in which a plant or plant part has male reproductive structures (stamens) only.



Stipules: Small appendages at the base of a petiole



Sucker shoot: An unusually vigorous branch or stem that often emerges from a root crown as a response to heavy browsing. These stems may bear atypically large or toothy leaves or stipules.

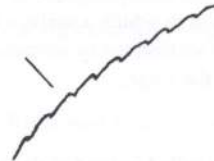
Terminal: Located at the tip of a structure.



Tomentose: Condition of having short, dense, woolly hairs.

Tomentum: Short, dense, woolly hairs

Toothed: Bearing small marginal indentations or lobes.



Twig: Stems produced during the current growing season.

Villous: With long, soft hairs.

Figure 2: Illustrated Leaf Terminology

Leaf shapes



Elliptic



Lanceolate



Linear



Lance-linear



Oblanceolate



Ovate



Obovate



Ovate-elliptic



Orbicular

Leaf tips



Acuminate



Acute



Obtuse

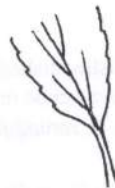


Rounded

Leaf bases



Abruptly contracted to petiole



Narrowly tapered to petiole

Key to Willows With Pistillate Catkins

1. Flower bracts yellow, green, or tan, deciduous when fruits are mature; tall shrubs or trees
 2. Leaf blades linear to linear-elliptic, usually over 6 times as long as wide; petioles mostly under 5 mm long (sometimes lacking), without conspicuous glands; plants medium to tall shrubs
 3. Leaves equally green above and below, often pubescent; flower bracts lance to lance-linear, pointed at tip, pubescent; capsules glabrous or pubescent..... *Salix exigua* var. *exigua*
 3. Leaves often glaucous or lighter-colored below, glabrous at maturity; flower bracts mostly obovate to broadly elliptic, glabrous or hairy only on the margins or at the base; capsules usually glabrous *Salix melanopsis*
 2. Leaf blades broadly lanceolate to ovate, long-acuminate, less than 6 times as long as wide; petioles over 6 mm long (at least on later leaves), with conspicuous glands; plants tall shrubs or trees..... *Salix lasiandra* var. *caudata*
1. Flower bracts dark brown, black, or reddish (may be yellowish in *S. bebbiana* and *S. geyeriana*, and light brown in *S. rotundifolia**), persistent when fruits are mature; mat-forming or low to tall shrubs (rarely trees)
 4. Capsules glabrous
 5. Mat-forming alpine shrubs; stems less than 8 cm high; leaves less than 1 cm long.....*Salix rotundifolia* var. *dodgeana*
 5. Erect shrubs, alpine or not; stems well over 8 cm high; leaves usually well over 1 cm long
 6. Lower leaf surfaces glaucous or lighter-colored than the upper leaf surface
 7. Catkins sessile or on flowering branchlets either without leaves or with small, narrow, bractlike leaves less than 3 (3.2) mm wide
 8. Some catkins terminal on branchlets; twigs of the year with dense, straight spreading hairs *Salix tweedyi*
 8. Catkins all lateral on branchlets; twigs of the year with sparse to dense, wavy appressed hairs*Salix pseudomonticola*

* In these cases, *S. bebbiana* can be distinguished by the long (2-5 mm) stalks supporting the capsules and white-streaked branchlets. *S. geyeriana* can be recognized by pruinose branchlets, densely pubescent twigs and catkins on leafy flowering branchlets. *S. rotundifolia* is a matted alpine shrub.

- 7. Catkins on flowering branchlets that have broad leaves more than 3 mm wide
 - 9. Leaf margins coarsely-toothed.....*Salix barclayi*
 - 9. Leaf margins finely-toothed or entire
 - 10. Leaf blades elliptic to obovate, mostly less than 3 times as long as wide, margins entire (occasionally fine-toothed); styles 0.7-1.2 mm; second and third year stems dark brown to reddish *Salix farriae*
 - 10. Leaf blades lanceolate to oblanceolate, mostly over 3 times as long as wide; margins consistently fine-toothed; styles 0.2-0.7 mm; second and third year stems yellow to whitish..... *Salix eriocephala*
 - 11. Year-old branchlets yellow, green, or whitish-gray..... var. *watsonii*
 - 11. Year-old branchlets reddish brown..... var. *mackenzieana*
- 6. Lower and upper leaf surfaces equally green, lower surface not glaucous
 - 13. Catkins (at least some) terminal on branchlets, sessile or nearly so; leaves with coarsely-toothed margins; stipules leafy, often long-persistent.....*Salix tweedyi*
 - 13. Catkins lateral on branchlets, usually on short to elongate leafy flowering stems; leaves entire or with rounded or fine teeth; stipules not leafy, mostly early-deciduous
 - 14. Catkins mostly less than 2 cm long; leaves silvery-hairy; margins entire (occasionally with small glands).....*Salix wolfii* var. *wolfii*
 - 14. Catkins mostly 2-9 cm long; leaves green, glabrous to pubescent but not silvery-hairy; margins lightly to moderately toothed
 - 15. Leaves usually glabrous, even when young, obtuse at tip; petioles and stipules mostly 1-5 mm long; shrubs less than 1 m high.....*Salix myrtilifolia* var. *myrtilifolia*
 - 15. Leaves pubescent when young, often remaining pubescent on midribs or glabrate on blades at maturity, mostly acute at tip; petioles and stipules often over 5 mm long; shrubs over 1 m high
 - 16. Leaves never glaucous, blades lanceolate to oblanceolate; pistillate catkins 1.5-3.5 cm; year-old branchlets yellow, orange, or brown.....*Salix boothii*
 - 16. Older leaves becoming glaucous; blades ovate to obovate; pistillate catkins 3.5-8 cm; year-old branchlets blackish.....*Salix barclayi*
- 4. Capsules pubescent
 - 17. Plants creeping, matted, alpine shrubs less than 10 cm high
 - 18. Blades shiny, bright green above, leathery, mostly rounded at tips; catkins on leafless stalks borne at the tip of the main stems; styles less than 0.5 mm long.....*Salix reticulata* var. *nana*
 - 18. Blades dull green, not leathery, mostly acute to obtuse at tips; catkins on leafy flowering branchlets borne below the tip of the main stems; styles 0.3-2 mm long

- 19. Leaves narrowly elliptic to elliptic, 2-6 mm wide; secondary veins generally obscure on leaf undersides; blades equally green above and below; old leaves long-persistent; catkins mostly less than 2 cm long.....*Salix cascadenis*
- 19. Leaves elliptic to ovate, 4-15 mm wide, secondary veins prominent on leaf undersides; blades lighter below than above; old leaves not persistent; catkins mostly over 2 cm long
 - 20. Plants tending to root from decumbent stems.....*Salix arctica* var. *petraea*
 - 20. Plants not tending to root from decumbent stems
..... prostrate variants of *Salix glauca* var. *villosa*
- 17. Plants erect shrubs, well over 10 cm high
 - 21. Year-old twigs pruinose (best observed when fresh, sometimes only evident behind buds)
 - 22. Catkins densely flowered, the axis mostly not visible, sessile or nearly so, usually appearing before the leaves
 - 23. Leaves glabrous to sparsely reddish hairy below, never densely silvery-hairy below; branchlets often only weakly pruinose*Salix planifolia*
 - 24. Plants 2-4 m high; leaf blades mostly 3 or more times longer than wide, often over 5 cm long var. *planifolia*
 - 24. Plants less than 2 m tall; leaf blades mostly less than 3 times as long as wide; rarely as much as 5 cm long..... var. *monica*
 - 23. Leaves densely silvery-hairy below; branchlets (at least some) usually strongly pruinose *Salix drummondiana*
 - 22. Catkins loosely flowered, the axis clearly visible, on leafy flowering branchlets more than 2mm long, usually appearing with or after the leaves
 - 25. Flower bracts light brown to tawny (occasionally darker), mostly twice or more as long as wide, acute-tipped, short-hairy; branchlets usually strongly pruinose, moderately to densely pubescent; leaves often persistently hairy on both surfaces.....*Salix geyeriana*
 - 25. Flower bracts dark brown or black, less than twice as long as wide, rounded at the tips, with hairs often 1-2 times longer than the bract itself; branchlets sometimes only weakly pruinose, generally sparsely pubescent to glabrous; leaves usually persistently hairy on lower surface only.....*Salix lemmonii*
 - 21. Year-old twigs not pruinose
 - 26. Leaf blades densely white-woolly (felt-like) beneath; twigs white-hairy.....*Salix candida*
 - 26. Leaf blades variously pubescent or glabrous but not densely white-woolly, twigs white-hairy or not
 - 27. Leaf blades obviously lighter below than above, often glaucous

- 28. Catkins (at least some) terminal on branchlets, essentially sessile, 3-9 cm long; buds and twigs covered with a sticky yellow exudate (causing plant press papers to stain yellow or green).....*Salix barratiana*
- 28. Catkins lateral on stems of the previous year, sessile or on leafy flowering branchlets, 0.5-6 cm long; buds and twigs without a sticky yellow exudate
- 29. Catkins on flowering branchlets with leaves more than 3 mm wide, appearing with the leaves
 - 30. Stalk of capsules 2-5 mm long; bark of second and third year stems often cracked and white-streaked *Salix bebbiana*
 - 30. Stalk of capsules mostly 2 mm or less; bark of older stems usually not cracked and white-streaked
 - 31. Twigs of the current year glabrous or only sparsely pubescent.....*Salix lemmonii*
 - 31. Twigs of the current year with long, soft woolly hairs
 - 32. Catkins mostly 0.5-2 cm long; petioles mostly 1-3 mm long; flowering branchlets 2-10 mm long.....*Salix brachycarpa*
 - 32. Catkins mostly 2-5 cm long; petioles mostly 3-15 mm long; flowering branchlets 3-16 mm long.....*Salix glauca* var. *villosa*
- 29. Catkins sessile or on branchlets with reduced, bract-like leaves less than 3 (3.2) mm wide, appearing before the leaves
 - 33. Twigs of the year and petioles moderately to densely hairy; leaf blades mostly obovate to oblanceolate; stalks of capsules up to 2 mm long; stigmas 0.5-1 mm long; year-old twigs yellowish to reddish brown, dull, and velvety-hairy; freshly-peeled bark often with a skunky odor; plants of upland sites.....*Salix scouleriana*
 - 33. Twigs of the year and petioles glabrous or nearly so; leaf blades mostly elliptic or narrowly oblanceolate; stalks of capsules mostly 1 mm long or less; stigmas usually less than 0.5 mm long; year-old twigs usually reddish, shiny and glabrous; freshly-peeled bark lacking skunky odor; plants of wet sites.....*Salix planifolia*
 - 34. Plants 2-4 m high; leaf blades mostly 3 or more times as long as wide, some 5 cm or longer.....var. *planifolia*
 - 34. Plants less than 2 m high; leaf blades mostly less than 3 times as long as wide, nearly all less than 5 cm long.....var. *monica*
- 27. Leaf blades about equally green above and below, never glaucous
 - 35. Catkins 4-9 cm long, essentially sessile at the tips of branchlets; styles 1-2.5 mm long; buds and twigs with sticky, yellow exudate (causing plant press papers to stain yellow or green)*Salix barratiana*
 - 35. Catkins 0.8-5 cm long, on short to elongate leafy flowering branchlets lateral on branchlets; styles 0.2-1.5 mm long; buds and twigs without sticky, yellow exudate

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- 36. Plants mostly 2-4 m high; catkins 1-5 cm long; some stipules over 3 mm long; mature leaf blades averaging less than 3 times as long as wide.....*Salix eastwoodiae*
- 36. Plants mostly less than 1 m (rarely to 2 m) high; catkins mostly less than 2 cm long; stipules rarely over 2.5 mm long; mature leaf blades averaging 3 or more times as long as wide.....*Salix wolfii* var. *idahoensis*

Key to Willows Lacking Pistillate Catkins, with Fully Expanded Leaves

- 1. Plants matted alpine shrubs, mostly under 8 (10) cm high.....Group I
- 1. Plants erect shrubs, alpine or not, usually over 10 cm high
 - 2. Leaf blades linear or linear-elliptic, at least 6 times as long as wide, mostly less than 10 mm wide
 - 3. Mature leaves usually silvery or pale green, not glaucous, often persistently hairy
.....*Salix exigua* var. *exigua*
 - 3. Mature leaves bright green (at least on live plants), generally glaucous below, glabrous or glabrate
.....*Salix melanopsis*
 - 2. Leaf blades elliptic to ovate or obovate, less than six times as wide as long, mostly more than 10 mm wide
 - 4. First and second year branchlets pruinose.....Group II
 - 4. First and second year branchlets not pruinose
 - 5. Leaves not glaucous, equally green on both surfaces, or nearly so; dense hairs never obscuring lower surface
 - 6. Leaf blades long-acuminate; petioles with small glands near base of blade.....*Salix lasiandra* var. *caudata*
 - 6. Leaf blades obtuse to acute, not acuminate; petioles lacking glandsGroup III
 - 5. Leaves glaucous below or with dense hairs obscuring the lower surface
 - 7. Leaves conspicuously pubescent on at least one surface.....Group IV
 - 7. Leaves glabrous or glabrate.....Group V

Group I: Plants matted alpine shrubs

- 1. Leaves about equally green on both surfaces, not glaucous
 - 2. Leaf blades mostly less than 8 mm long, mostly ovate but at least some orbicular.....*Salix rotundifolia* var. *dodgeana*
 - 2. Leaf blades mostly more than 8 mm long, mostly narrowly elliptic to rarely ovate.....*Salix cascadenis*
- 1. Leaves green above and glaucous below
 - 3. Leaf blades leathery and ovate, glossy green above, the tips mostly rounded, bases abruptly contracted to petiole, ovate, prominently reticulate-veined on undersurface.....*Salix reticulata* var. *nana*
 - 3. Leaf blades not leathery, dull green above, the tips mostly acute or obtuse, bases gradually tapered to the petiole, narrowly elliptic to ovate, weakly or not at all reticulate-veined on undersurface

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4. Leaf blades mostly 2-6 mm wide, narrowly elliptic; old leaves generally persisting; secondary veins mostly not visible *Salix cascadenis*
4. Leaf blades mostly 4-15 mm wide, elliptic to ovate; old leaves usually not persisting secondary veins usually visible
5. Plants tending to root from decumbent stems.....*Salix arctica* var. *petraea*
5. Plants not tending to root from decumbent stems..... prostrate variants of *Salix glauca* var. *villosa*

Group II: First and second year branchlets pruinose

1. Leaf undersurface obscured by dense, silvery pubescence; dark green upper surface sharply contrasting with lighter lower surface due to density of hairs on lower surface.....*Salix drummondiana*
1. Leaf undersurface hairy but not obscured; if upper surface contrasting with lower surface, then contrast due to glaucous condition of undersurface, not to pubescence
2. Twigs moderately to densely pubescent; leaf blades often persistently hairy on both surfaces *Salix geyeriana*
2. Twigs sparsely pubescent to glabrous; leaf blades becoming glabrous above
3. Mature leaf blades mostly narrowly elliptic, rarely any over 12 mm wide; branchlets usually strongly pruinose; second-year branchlets often light brown.....*Salix lemmonii*
3. Mature leaf blades mostly elliptic to ovate-elliptic, usually at least some over (12) 15 mm wide; branchlets usually weakly pruinose or pruinose only behind buds; second year branchlets almost always dark red or purple*Salix planifolia*
 4. Leaf blades mostly three or more times as long as wide, some over 5 cm long; plants 2 to 4 m highvar. *planifolia*
 4. Leaf blades mostly less than three times as long as wide, rarely 5 cm long; plants usually less than 2 m high.....var. *monica*

Group III: Leaf blades equally green on both surfaces

1. Leaf blades glabrous, even when young.....*Salix myrtillofolia* var. *myrtillofolia*
1. Leaf blades hairy, at least when young, hairs often persisting, especially along midveins
2. Buds and twigs with a thick, yellow, sticky exudate*Salix barrattiana*
2. Buds and twigs without a thick, yellow sticky exudate
3. Leaves mostly hairy on upper surface only; twigs of the year with long, dense, spreading pubescence*Salix tweedyi*
3. Leaves hairy on both surfaces or on undersurface only; twigs of the year glabrous or with short or appressed pubescence

- 4. Mature leaves sparsely hairy, usually more hairy on undersurface or hairy on undersurface only, often nearly glabrous
 - 5. Leaf blades lanceolate to oblanceolate, margins entire or fine-toothed; year-old branchlets yellow, orange, or brown.....*Salix boothii*
 - 5. Leaf blades ovate-elliptic to obovate, margins coarsely toothed (rarely entire); year-old branchlets blackish.....*Salix barclayi*
- 4. Mature leaves densely hairy, usually equally hairy on both surfaces, rarely nearly glabrous
 - 6. Plants usually 2-4 m high; some stipules over 3 mm; leaf blades averaging less than 3 times as long as wide.....*Salix eastwoodiae*
 - 6. Plants usually less than 1 m (rarely to 2 m) high; stipules usually less than 2.5 mm long; leaf blades averaging more than 3 times as long as wide..... *Salix wolfii*

Group IV: Leaf blades glaucous below, conspicuously pubescent on at least one surface

- 1. Leaves evidently pubescent on both surfaces
 - 2. Twigs of the current year with long, spreading hairs
 - 3. Buds and twigs with yellow, sticky exudate; stipules not persistent on second year branchlets*Salix barrattiana*
 - 3. Buds and twigs without yellow, sticky exudate; stipules persistent on second (third) year branchlets*Salix tweedyi*
 - 2. Twigs of the current year with short or appressed hairs
 - 4. Second and third year branchlets cracked, giving a white-streaked appearance; buds with depressed margins; twigs of current year usually reddish..... *Salix bebbiana*
 - 4. Second and third year branchlets not cracked and white-streaked; buds without depressed margins; twigs of current year usually grayish, yellowish, or brownish
 - 5. Leaves leathery, the upper surface depressed along veins, veins strongly raised on lower surface*Salix candida*
 - 5. Leaves not leathery, the upper surface smooth; veins only slightly raised on lower surface
 - 6. Petioles 1-3 mm long.....*Salix brachycarpa* var. *brachycarpa*
 - 6. Petioles 3-10 mm long.....*Salix glauca* var. *villosa*
- 1. Leaves glabrous or glabrate on upper surface (occasionally with a few hairs on upper midvein); lower surface usually at least slightly hairy *

* Occasional specimens of sparsely-pubescent *Salix brachycarpa* will key here, but can be distinguished by having very short (less than 3 mm) petioles.

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- 7. Undersurfaces of leaf blades obscured by dense, woolly pubescence.....*Salix candida*
- 7. Undersurface of leaf blades hairy but not obscured by dense, woolly pubescence
- 8. Twigs of the year and petioles glabrous or nearly so; bark of second and third year branchlets not cracking and white-streaked.....*Salix planifolia*
 - 9. Leaf blades mostly three or more times as long as wide, some over 5 cm long; plants 2-4 meters high var. *planifolia*
 - 9. Leaf blades mostly less than three times as long as wide, rarely over 5 cm long; plants less than 2 meters high.....var. *monica*
- 8. Twigs of the year and petioles hairy; bark of second and third year branchlets often cracking and white-streaked
- 10. Mature buds with depressed margins; freshly-peeled branchlets lacking a skunky odor; leaf blades mostly elliptic to ovate, rarely obovate, hairs on lower surface all white; marginal hairs usually present on some mature leaves, and noticeably longer than those of the lower surface.....*Salix bebbiana*
- 10. Mature buds lacking depressed margins; freshly peeled branchlets with a distinctive, skunky odor; leaf blades mostly ovate, some obovate, hairs on lower surface often reddish; marginal hairs usually absent on mature leaves or, if present, not noticeably longer than those of the lower surface.....*Salix scouleriana*

Group V: Leaves glaucous below, glabrous or glabrate at maturity

- 1. Twigs of the year glabrous or very sparsely pubescent (Do not confuse catkin branchlets with twigs of the year.) *
- 2. Leaf blades narrowly tapering to petiole, often with a few reddish hairs on undersurface
- 3. Mature leaf blades mostly elliptic to ovate-elliptic, at least some over (12)15 mm wide; second year branchlets dark red or purple.....*Salix planifolia*
- 4. Leaf blades mostly three or more times as long as wide, some over 5 cm long; plants 2-4 meters high.....var. *planifolia*
- 4. Leaf blades mostly less than three times as long as wide, rarely over 5 cm long; plants less than 2 meters high.....var. *monica*
- 3. Mature leaf blades mostly narrowly elliptic, rarely any more than 12 (15) mm wide; second year branchlets often brownish.....*Salix lemmonii*
- 2. Leaf blades (or many of them) abruptly contracting to petiole, lacking reddish hairs

* Occasional specimens of *Salix glauca* may key here. These can be distinguished by having leaves with entire margins, stout second-year branchlets, and absence of either reticulate venation or reddish hairs on the leaf undersurface.

- 5. Mature leaf blades mostly elliptic to ovate; margins evidently toothed
 - 6. Stipules conspicuous (up to 1 cm long) on normal growth*, at least some over 7 mm long; petioles and midribs often reddish.....*Salix pseudomonticola*
 - 6. Stipules small and inconspicuous on normal growth, rarely over 7 mm long; petioles and midribs usually green.....*Salix barclayi*
- 5. Mature leaves mostly lanceolate; margins entire or very finely toothed.....*Salix eriocephala*
 - 7. Year-old branchlets yellowish or greenish (occasionally ashy white)var. *watsonii*
 - 7. Year-old branchlets reddish-brown.....var. *mackenzieana*
- 1. Twigs of the season densely pubescent
 - 8. Leaf margins evidently toothed
 - 9. Some stipules at least 7 mm long; leaf midrib and/or petioles often red.....*Salix pseudomonticola*
 - 9. Stipules rarely over 7 mm long; leaf midrib and petioles usually green.....*Salix barclayi*
 - 8. Leaf margins entire or very finely toothed
 - 10. Leaf blades mostly ovate, some obovate, often with at least some reddish hairs on lower surface; freshly peeled branchlets with skunky odor; plants usually of upland habitats.....*Salix scouleriana*
 - 10. Leaf blades mostly elliptic to ovate, rarely obovate, hairs on lower surface all white; freshly peeled branchlets without skunky odor; plants usually of wet sites
 - 11. Plants tall shrubs usually over 1.5 m tall; buds with depressed margins; third and fourth year branchlets with a white-streaked appearance due to cracking of the bark.....*Salix bebbiana*
 - 11. Plants low shrubs, usually less than 1.5 m; buds without depressed margins; third and fourth year branchlets not white-streaked from cracking bark
 - 12. Leaf undersurface strongly reticulate-veined, usually totally glabrous; year-old branchlets mostly less than 2 mm thick.....*Salix farriae*
 - 12. Leaf undersurface not strongly reticulate-veined, usually with at least a few hairs; year-old branchlets mostly more than 2 mm thick.....*Salix glauca* var. *villosa*

* As opposed to "sucker shoots" described in the introduction

[The following text is extremely faint and largely illegible. It appears to be a list of species or descriptions, possibly including scientific names and their characteristics. Some words like "Willow", "Salix", and "corymbosus" are faintly visible.]

Willows of Shoshone National Forest

***Salix arctica* Pallas
var. *petraea* Anderss.
Arctic Willow**

Synonyms: *Salix anglorum*.

Taxonomy: Subgenus *Vetrix*, Section *Glaucæ*.

Description: Mat-forming shrub with creeping branches 1-5 (10) cm tall, these often rooting at the nodes; **twigs** yellowish and glabrous or glabrate when young, becoming brown with age; **leaves** with blades elliptic to ovate and generally pointed at tips, 1-4 cm long, 4-15 mm wide, upper leaf surface dull green, glabrous at maturity, lower surface usually glaucous or lighter than upper surface and often silky-pubescent when young, margins entire, ciliate, old leaves not persisting; petioles 1-5 mm long; stipules absent or tiny; **pistillate catkins** 1-5 (8) cm long and borne on lateral (sometimes appearing terminal), densely hairy and leafy flowering branchlets that appear with the leaves; capsules densely white hairy (becoming less hairy with age) and nearly sessile with styles (0.8) 1-1.5 mm long; **staminate catkins** up to 4 cm long; stamens 2 per flower, filaments glabrous; **flowering bracts** dark brown or black, rounded at apex, long-hairy, persistent in fruit.

Similar Species: *Salix reticulata* has leafless flowering branchlets, styles 0-0.5 mm long, and shiny, green, leathery leaves with rounded tips. *Salix cascadiensis* has narrower, more elliptic leaves that are long-persistent and catkins under 2 cm long. *S. rotundifolia* has short, few-flowered catkins, glabrous capsules, and leaf blades under 12 mm long. Prostrate forms of *S. glauca* tend to have brownish rather than black flowering bracts, larger and more tapered leaves, pointed buds, thinner pubescence on the capsules and stems that do not root at the nodes.

Habitat: Rocky alpine tundra, dry meadows, and fellfields on gentle slopes and flats. May be locally dominant in some cushion plant communities or co-occur with other dwarf alpine willows (especially *S. reticulata*). Occasionally found on moist, mossy banks of glacial streams and on solifluction terraces. Found on granitic, calcareous and volcanic substrates. Elevation 9700-13,400 feet.

Range: Circumboreal, south in North America to Quebec, California, and New Mexico. In Wyoming, known from the Absaroka, Beartooth, Bighorn, Medicine Bow, Teton, Wind River and Wyoming/Salt River Ranges.

Shoshone National Forest Distribution: Often locally abundant in the alpine zone of the Absaroka, Beartooth, and Wind River Ranges.

Notes: Some populations in the Beartooth Mountains have glabrous fruits and ciliate bracts (Hitchcock and Cronquist 1964). Hybrids between this species and *Salix glauca* and *S. brachycarpa* have been reported (Argus, 1965).



X 1

Salix arctica var. *petraea*: Mat-forming alpine shrub with dull green, elliptic to ovate, slightly pointed leaves, and pistillate catkins on leafy flowering branchlets. Illustration by W. Fertig

Salix barclayi Anderss.

Barclay's willow

Taxonomy: Subgenus *Vetrix*, Section *Cordatae*.

Description: Small to medium shrub usually 2-3.5 m tall (range 1-4 m); first year **twigs** blackish, glabrous to slightly pubescent with loosely appressed hairs, older twigs dark reddish, glabrous, and shiny; **leaves** with blades ovate-elliptic, 3-6 (10) cm long, 1-3 (5) cm wide, dull green above and glaucous or lighter-colored below (glaucous bloom better developed later in season), and mostly less than 3 times as long as wide, glabrous at maturity except for a dense band of short hairs on the midrib, sparsely to densely appressed-hairy when young, margins with coarse, often glandular teeth, especially on young leaves; petioles typically (3) 5-8 mm long, yellowish, and often hairy, stipules often persistent, leafy, 4-6 (9) mm long, lance-shaped with glandular margins; **pistillate catkins** 3.5-8 cm long on 6-20 mm long leafy branchlets and appearing with the leaves; capsules glabrous, up to 6 mm long, and borne on stalks 0.5-1.5 mm long, styles 0.7-2.5 mm long; **staminate catkins** 1-3 cm long, on leafy branchlets; stamens 2 per flower, anthers 0.5-1 mm long; **flowering bracts** dark brown to black and persistent in fruit, long pubescent.

Similar Species: *Salix farriae* has mostly entire leaves, shorter flowering branchlets and styles, and typically a shorter growth form. *S. pseudomonticola* has essentially sessile catkins and larger, more persistent stipules. *S. eriocephala* var. *watsonii* has more finely toothed and slender leaves and yellow or grayish first year stems. *S. boothii* differs in having non-glaucous leaves and shorter flowering branchlets. *S. tweedyi* has coarser gland-tipped teeth on the leaf margins.

Habitat: Montane stream banks, wet meadows, seeps, and swamps. Walford *et al.* (1997) describe a *Salix barclayi*/*S. wolfii* community type from the Clarks Fork Valley on saturated peat soils. Elevation 6500-9500 feet.

Range: Alaska south to British Columbia, Oregon, northern Montana, and northwest Wyoming. In Wyoming, it is restricted to the Yellowstone Plateau and the Absaroka and Beartooth ranges in Park and Teton counties.

Shoshone National Forest Distribution: Uncommon in the Beartooth Range and the Clarks Fork Valley and North Fork Shoshone River drainage in the Absaroka Range.



X 0.8

Salix barclayi: Mid-sized shrub with glaucous, toothed leaves, catkins on leafy flowering branchlets, glabrous and long-styled capsules and dark, long-hairy flower bracts. Illustration by W. Fertig.

***Salix barrattiana* Hook.**
Barratt Willow

Taxonomy: Subgenus *Vetrix*, Section *Lanatae*.

Description: Small to medium shrub 30-150 cm tall forming dense thickets; **twigs** stout, reddish orange to blackish, with conspicuously spreading-villous pubescence when young, mature twigs with a sticky yellow exudate, older bark with peeling "epidermis"; buds oily, tan, hairy; **leaves** with elliptic to broadly lance-shaped blades 2-6 cm long, 1-3 cm wide, margins smooth or minutely toothed, upper and lower surfaces gray-green and densely pubescent with long gray hairs (upper surface often darker than the lower); petioles 0.5-1.4 cm long; stipules inconspicuous and early deciduous; **pistillate catkins** about 4 cm long, sessile (or nearly so), erect, borne on tips of twigs of the previous year and appearing before or with the leaves; capsules pubescent, 5-6 mm long, stalks less than 1 mm long, styles 1-2.5 mm long; **staminate catkins** 2-4.5 cm long, 15 mm wide; stamens 2, glabrous; anthers 0.5-0.8 mm long; **flowering bracts** brown or black, pubescent, persistent.

Similar Species: *Salix planifolia* has capsules with shorter styles, catkins borne along the stems, rather than at the tip, and glossy, red stems without sticky stipules or buds. *S. tweedyi* has non-sticky twigs and buds, and glabrous capsules. *S. wolfii* lacks sticky twigs and has catkins less than 2 cm long, all borne along the stem (rather than at the tip). *S. eastwoodiae* and *S. brachycarpa* have catkins which are all lateral and borne on leafy branchlets, and lack sticky twigs and oily buds.

Habitat: Boggy lake shores, streambanks, and wet sedge meadows in cold, moist soil at timberline. Elevation 9800-10,000 feet.

Range: Alaska and northwest Canada south to British Columbia and northern Montana. Disjunct in the Beartooth Mountains along the Montana-Wyoming border.

Shoshone National Forest Distribution: The single known Wyoming population occupies an area of approximately 100 square meters along the Wyoming/Montana state line in the northern Beartooth Range.

Notes: This species is listed as a species of special concern by both the Wyoming and Montana Natural Heritage Programs.



Salix barrattiana: Low shrub with stout twigs covered with sticky, yellow exudate, gray-green, pubescent leaves with broadly-elliptic, often minutely-toothed blades, and erect, terminal catkins with pubescent capsules and flower bracts. Illustration by W. Fertig.

***Salix bebbiana* Sarg.
Bebb Willow**

Taxonomy: Subgenus *Vetrix*, Section *Vetrix*.

Description: Tall shrub or multi-stemmed tree, averaging 1-4 m tall (but reaching 9 m); stems may be up to 1 dm thick; **twigs** of the current year reddish-purple and densely pubescent with loosely or tightly appressed wavy-hairs; older twigs with cracked, gray bark, (appearing white-streaked); bud scales with depressed margins; **leaves** with elliptic, oval, or elliptic-obovate blades 1-7 cm long and (.6) 1-3 cm wide, pointed at the tip, margins entire or only slightly toothed (occasionally more deeply toothed on sucker shoots), upper leaf surface dark green, pubescent to glabrate, lower surface lighter green, usually glaucous and pubescent and with the veins prominently raised, first leaves of the season glabrous above and with long, straight silky hairs below, later leaves finely appressed hairy at first, becoming sparsely hairy or nearly glabrous with age; petioles 2-12 mm long, pubescent; stipules inconspicuous, typically less than 1 mm (except on sucker shoots); **pistillate catkins** 1.5-6 cm long, nearly sessile or on flowering branchlets 3-15 (30) mm long, appearing with the leaves; capsules finely pubescent, 5-10 mm long and long-beaked, borne on stalks 2-5 mm long, styles 0.1-0.4 mm long; **staminate catkins** (.5) 1-2 (4) cm long, appearing with the leaves on leafy flowering branchlets, stamens 2, anthers 0.4-0.8 mm long; **flowering bracts** pale brown or yellowish, often with reddish tips, usually pubescent, persistent in fruit.

Similar Species: *Salix scouleriana* has sessile or nearly sessile catkins, capsule stalks under 2 mm long, dark flowering bracts, broader and more blunt leaves with reddish-tinged hairs on the underside. *S. planifolia* has sessile catkins, capsules borne on stalks under 2 mm long, and stems without white streaks, and glabrous twigs and petioles.

Habitat: Occurs in a variety of habitats in the foothills and montane zones including stream banks, moist meadows, seepage areas, ditch banks, sandy beaches, narrowleaf cottonwood communities, aspen swamps, silver sagebrush meadows, alder thickets, and fens. May be locally abundant in *Salix boothii*/mesic forb, *Betula occidentalis*/*Cornus sericea*, and *Alnus incana*/mesic graminoid communities on volcanic or sedimentary alluvial soils of stream terraces and abandoned meanders (Walford *et al.* 1997). Elevation 4900-9100 feet.

Range: Eurasia, Alaska and Canada south to California, New Mexico, Indiana, and New Jersey. In Wyoming, known from all of the major mountain ranges and the Green River Basin (absent primarily from the Great Plains and Bighorn Basin).

Shoshone National Forest Distribution: Widespread in the foothills and montane zones of the Beartooth, Absaroka, and northern Wind River Ranges.



X 1

Salix bebbiana: Tall shrub with reddish-purple, densely-pubescent twigs, white-streaked branchlets, leaves with dark green upper surfaces and glaucous lower surfaces, pubescent capsules on long stalks, and pale brown or yellowish flower bracts. Illustration by W. Fertig.

***Salix boothii* Dorn**
Booth Willow

Synonyms: Formerly included in *Salix myrtillofolia* (Hitchcock et al. 1964); *S. pseudocordata*.

Taxonomy: Subgenus *Vetrix*, Section *Cordatae*.

Description: Small to large multi-branched shrub 3-6 m tall; stems rarely over 5 cm thick; **twigs** of the current year with fine appressed hairs when young, becoming glabrous with age, year-old stems yellow, orange or brown; **leaves** with blades narrowly elliptic to lance-shaped (rarely ovate), 1.5-8.5 cm long, 1-2.5 cm wide, about equally green on both sides, margins finely toothed, occasionally with fine gland-tipped teeth, first leaves of the season glabrous above and pubescent below with long straight hairs, later leaves finely pubescent, but becoming glabrate with age; petioles 5-10 mm long on older leaves; stipules small and deciduous, usually hairy, occasionally gland-toothed; **Pistillate catkins** 1-3.5 (4.5) cm long, on flowering branchlets 2-4 (5.5) mm long, usually appearing with or slightly before the leaves; capsules glabrous, 3-6 mm long, borne on stalks .5 to 2 mm long; styles under 1.5 mm; **staminate catkins** 1-2.5 cm long, appearing with or slightly before the leaves on leafy flowering branchlets; stamens 2, **flowering bracts** brown to black, usually pubescent, persistent.

Similar Species: *Salix myrtillofolia* is a low shrub not exceeding 1 m in height and has consistently glabrous, somewhat blunt-tipped leaves with petioles under 5 mm long. *S. eastwoodiae* has hairy capsules and more consistently gray-hairy leaves. *S. wolfii* var. *wolfii* is typically 1 m or less tall with catkins under 2 cm long and leaves with appressed silvery pubescence. *S. eriocephala* var. *watsonii* (*S. lutea*) has grayish or yellow twigs, nearly glabrous flowering bracts, and glaucous leaves. *S. barclayi* has larger catkins, darker year-old stems and broader leaves which are usually glaucous.

Habitat: Common on stream terraces and floodplains along narrow to medium stream channels on igneous, metamorphic, or sedimentary alluvium in narrow to broad valleys from the foothills to the lower subalpine zones. May be the dominant or codominant species in the following tall willow or riparian conifer community types (ct) on the Shoshone National Forest: *Picea engelmannii*/*Salix boothii* ct, *S. planifolia*/*Carex aquatilis* ct, *S. boothii*/*Carex rostrata* ct, *S. boothii*/mesic graminoid ct, *S. boothii*/mesic forb ct, *S. boothii*/*S. wolfii* ct and *S. boothii*/*S. farriae* ct (Walford et al. 1997). Elevation 6600-9480 feet.

Range: Southern British Columbia and southern Alberta to northeast California, Nevada, Utah and Colorado. In Wyoming it is common throughout the western 3/4 of the state.

Shoshone National Forest Distribution: Common in montane and lower subalpine zones in Absaroka, Wind River and Beartooth Ranges

Notes: Individuals of *S. boothii* with short catkins (under 2 cm long) can be distinguished from *S. wolfii* based on differences in leaf pubescence, capsule stalk length and general lack of pubescence on second and third year branchlets.



X 0.75

Salix boothii: Mid-sized to tall shrub with elliptic or lanceolate leaves which are green on both surfaces, and pistillate catkins on leafy flowering branchlets with glabrous capsules and brown or black flower bracts. Illustration by W. Fertig.

***Salix brachycarpa* Nutt.**
var. *brachycarpa*
Short-fruit Willow

Taxonomy: Subgenus *Vetrix*, Section *Glaucæ*.

Description: Low to medium shrubs mostly 0.3-1 m tall (occasionally as large as 1.5 m); **twigs** of the season reddish to yellowish with dense woolly hairs, older stems becoming less pubescent; **leaves** with blades elliptic to oblong, (1.5) 2-4 cm long, 0.6-1.6 cm wide, lower leaf surface lighter than the upper and usually glaucous and often grayish-hairy with fine, loosely appressed tomentum; petioles 0.5-3 mm long, reddish to yellowish and hairy like the stems; stipules usually less than 0.5 mm (larger on vigorous sucker shoots), entire to finely toothed, deciduous, internodes often very short, leaves appearing clustered or fan-like; **pistillate catkins** 12-23 mm long, appearing with the leaves on leafy flowering branchlets 2-13 mm long; capsules (4) 5-7 mm long, densely pubescent, sessile or on short stalks less than 0.5 mm long; styles 0.5-1 mm long; **staminate catkins** 4-10 mm long, on leafy flowering branchlets 1-5 mm long; stamens 2 per flower; **flowering bracts** yellowish to greenish or light brown with a reddish tip, pubescent with long hairs, persistent in fruit.

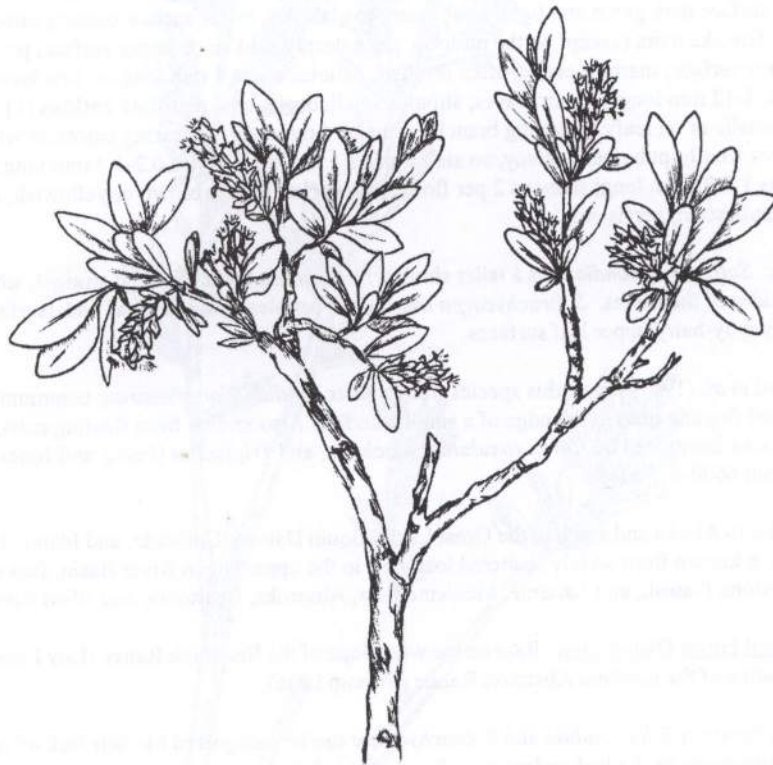
Similar Species: *Salix candida* has longer and narrower leaves that are densely white-woolly on the underside. *Salix glauca* has longer leaves and petioles and catkins 1.5-6 cm long. *S. arctica* is a mat-forming shrub less than 10 cm tall with oval, glabrate leaves. *S. barratiana* has longer petioles, sticky twigs, and sessile, terminal catkins.

Habitat: Occurs in alpine turf communities dominated by *Carex elynoides*, *Geum rossii* and *Potentilla fruticosa*, montane *Salix wolfii*/*Deschampsia cespitosa* communities on moist, hummocky alluvium (Walford *et al.* 1997), and *Picea glauca* swamp forests and marly fens (Fertig and Jones 1992). Elevation 6600-11,400 feet.

Range: Alaska and Canada south to California, Idaho, Utah, and Colorado. In Wyoming, it is known from the Absaroka, Bighorn, Teton, Wind River, Medicine Bow, and Laramie ranges and the Yellowstone Plateau.

Shoshone National Forest Distribution: Uncommon and widely scattered in the Beartooth Range, northern Wind River Range, and Clarks Fork River Valley.

Notes: Hybrid plants involving *S. brachycarpa* and *S. candida* can be recognized by their long leaves with sparse tomentum.



X 1

Salix brachycarpa var. *brachycarpa*: Low to medium shrub with densely tomentose twigs, small tomentose leaves with glaucous undersurfaces and very short (less than 3 mm) petioles and short catkins on leafy branchlets. Illustration by W. Fertig.

***Salix candida* Flugge ex Willd.
Hoary Willow**

Taxonomy: Subgenus *Vetrix*, Section *Vimen*.

Description: Low shrub 0.2-1.5 dm high; young **twigs** with dense, short white-woolly pubescence, some tomentum persisting on older growth, lower branches becoming light brown, mottled, and glabrous; **leaves** leathery with blades narrowly elliptic, oblong or oblanceolate, 5-9 cm long, 0.8-1.8 cm wide, upper surface dark green and lightly pubescent to glabrous, lower surface densely pubescent with white, felt-like hairs (except on the midrib), veins deeply sunken on upper surface, prominently raised on lower surface; margins entire, often inrolled; petioles about 1 mm long on first leaves of the season, 5-12 mm long on later leaves; stipules small, deciduous; **pistillate catkins** (1) 3-5 (6) cm long, sessile or on leafy flowering branchlets under 9 mm long, appearing before or with the leaves, capsules woolly-pubescent, tawny, on stalks under 1 mm long; styles 0.2-1.7 mm long; **staminate catkins** 1.5-2.5 cm long; stamens 2 per flower; **flowering bracts** brown or yellowish, rarely black, wavy-pubescent, persistent.

Similar Species: *Salix drummondiana* is a taller shrub with pruinose branchlets and straight, silvery hairs on the undersides of the leaves. *S. brachycarpa* has shorter petioles, glaucous leaf undersurfaces, and more densely gray-hairy upper leaf surfaces.

Habitat: Walford *et al.* (1997) report this species from a *Salix candida*/*Carex rostrata* community type on anchored floating mats at the edge of a small lake/fen. Also known from floating mats, and marl hummocks dominated by *Carex simulata*, *Eleocharis*, and *Triglochin* (Fertig and Jones 1992). Elevation 6600-7720 feet.

Range: Labrador to Alaska and south to the Great Lakes, South Dakota, Colorado, and Idaho. In Wyoming, this species is known from widely scattered locations in the upper Green River Basin, Jackson Hole, the Yellowstone Plateau, and Laramie, Medicine Bow, Absaroka, Beartooth, and Wind River ranges.

Shoshone National Forest Distribution: Rare on the west slope of the Beartooth Range (Lily Lake) and the Clarks Fork Valley of the northern Absaroka Range (Swamp Lake).

Notes: Hybrids between *Salix candida* and *S. brachycarpa* can be recognized by their lack of conspicuous white tomentum on the leaf undersides. *S. candida* is listed as a species of special concern by the Wyoming Natural Diversity Database.



X 0.9

Salix candida: Low shrub with elongate, leathery, densely tomentose leaves and twigs, short catkins with tomentose capsules and long-hairy flower bracts. Illustration by W. Fertig.

***Salix cascadensis* Cockerell**
Cascade Willow

Taxonomy: Subgenus *Vetrix*, Section *Glaucæ*.

Description: Creeping alpine shrubs typically under 4 cm tall; **twigs** yellow to yellow-green; **leaves** with blades narrowly elliptic, 3-20 mm long, 2-6 (7) mm wide, tips acute, entire, glabrous (except when very young), upper leaf surface green, glabrous, lower surface usually green (occasionally glaucous), old leaves often persist for more than one season, petioles 1-3 mm long, stipules tiny; **pistillate catkins** 6-20 mm long, on leafy flowering branchlets 2-20 mm long, appearing with the leaves; capsules pubescent (may become glabrate with age), 4-5 mm long, sessile; styles 0.3-1.2 mm long; **staminate catkins** 0.6-1.2 cm long; stamens 2 per flower; **flowering bracts** dark brown, pubescent with hairs longer than the bract, persistent in fruit.

Similar Species: *Salix arctica* var. *petraea* has wider leaves that are often hairy, glaucous below, and usually do not persist over one season, and longer catkins on more elongate flowering branches. *S. rotundifolia* often has shorter leaves, and glabrous capsules. *S. reticulata* has more rounded leaf tips and leafless flowering stems.

Habitat: Alpine or subalpine dry to moist meadows on volcanic or calcareous substrates. Elevation 8100-11,900 feet.

Range: Southern British Columbia and the Washington Cascades, irregularly east to Montana and Wyoming, south to Colorado and northeast Utah. In Wyoming, known from the Absaroka, Teton, Bighorn, and Medicine Bow ranges.

Shoshone National Forest Distribution: Relatively uncommon at the higher elevations of the southern Absaroka Range. Previous reports from the Beartooth Range appear to represent other taxa.

Notes: The leaf features of *Salix cascadensis* can intergrade with *S. rotundifolia*, making some vegetative specimens difficult to identify.



X 1

Salix cascadensis: Low, densely-matted, creeping alpine shrub with elongate, elliptic leaves which are green on both surfaces, and short catkins with hairy capsules and dark brown to black flower bracts. Illustration by W. Fertig.

***Salix drummondiana* Barratt**
Drummond Willow

Taxonomy: Subgenus *Vetrix*, Section *Vimen*.

Description: Medium to large shrub 1-6 m tall; **twigs** usually pruinose, finely pubescent or glabrate, becoming glabrous with age; **leaves** with blades narrowly elliptic to ovate or lanceolate, (1.5) 3-9 (11) cm long, 0.9-2.6 cm wide, margins entire (occasionally slightly toothed), usually slightly inrolled, upper surface mostly glabrous, dark green, lower surface densely silvery pubescent; petioles 2-8 (13) mm, loosely appressed-pubescent; stipules narrow, deciduous; **pistillate catkins** 1.5-4.5 (6) cm long, sessile or nearly so, appearing before or with the leaves; capsules densely short-hairy on stalks under 0.8 mm long; styles 0.5-1.8 mm long; **staminate catkins** 1.5-3 cm long, essentially sessile; stamens 2; anthers 0.3-0.6 mm long; **flowering bracts** brown or black, pubescent, persistent in fruit.

Similar Species: *Salix candida* has densely white-woolly leaf undersides and twigs and branchlets that are not pruinose. *S. geyeriana* and *S. lemmonii* have loosely-flowered catkins on leafy flowering branchlets, and leaves that are thinly-hairy on the lower surface.

Habitat: Often found as a dominant or secondary dominant in tall willow or riparian conifer communities on cobblestone or volcanic alluvium terraces in braided streams or small channels. Reported from *Picea engelmannii*/*Salix boothii*, *S. boothii*/*Carex rostrata*, and *S. drummondiana* community types in the Shoshone National Forest by Walford *et al.* (1997). Elevation 6600-10,100 feet.

Range: Eastern Washington, Alberta and British Columbia to California, Nevada, Utah and New Mexico, and east across southern Canada and the northern United States. In Wyoming, it is known from the mountains and high basins of the western part of the state (absent from the Great Plains and Black Hills).

Shoshone National Forest Distribution: Widely distributed in the foothills and montane zones of the Absaroka and Wind River Ranges.



X 0.9

Salix drummondiana: Many-branched shrub with pruinose twigs and branchlets, densely hairy lower leaf surfaces, and sessile catkins with tightly-packed, densely hairy capsules and dark, long-hairy flower bracts. Illustration by W. Fertig.

Salix eastwoodiae Cockerell ex Heller
Eastwood Willow

Taxonomy: Subgenus *Vetrix*, Section *Cordatae*.

Description: Medium-sized shrub 1-2 m (4m) high; first year **twigs** dark brown to black and slightly to moderately pubescent with thin whitish hairs; older stems yellowish-brown to black; **leaves** with lance-shaped to elliptic or oblanceolate blades 2-6 (10) cm long, 1-3 cm wide, pubescent (at least when young), non-glaucous, about equally green on the upper and lower surfaces; margins entire or often prominently gland-toothed (at least on younger leaves), glands arranged at right angles to the leaf margin, petioles 3-12 mm long, stipules often glandular-margined; **pistillate catkins** 1-5 cm long, on leafy flowering branchlets 3-12 mm long, appearing with or slightly before the leaves; capsules pubescent, on stalks 0.2-1.8 mm long; styles 0.4-1.5 mm long; **staminate catkins** 1-5 cm; stamens 2; anthers 0.3-1 mm long; **flowering bracts** brown or black, pubescent, persistent in fruit.

Similar Species: *Salix boothii* has sparsely pubescent green leaves and glabrous capsules. *S. wolfii* has catkins under 2 cm long, narrower leaves and shorter stipules. *S. glauca* has leaves that are lighter below than above.

Habitat: Found in hummocky open meadows or dense, low shrub thickets on granitic or volcanic substrates along small to medium stream channels or below small seeps. Reported from *Salix eastwoodiae*/mesic graminoid, *S. eastwoodiae*/*Carex aquatilis*, and *S. planifolia*/*Caltha leptosepala* community types on Shoshone National Forest (Walford *et al.* 1997). Elevation 8000-10,500 feet.

Range: Oregon to southwest Montana, south to California, Nevada, and northwestern Wyoming. In Wyoming, known from the Absaroka, Beartooth, Bighorn, Gros Ventre, Teton, and Wind River Ranges.

Shoshone National Forest Distribution: The majority of the known collections of *S. eastwoodiae* on the Forest are from the Beartooth Range in the vicinity of Beartooth Lake and Beartooth Pass. Populations are also known from the Brooks Lake/Togwotee Pass area, and the North Fork of the Shoshone River near the head of Kitty Creek. An atypical population having glabrate capsules is known from near Union Pass.

Notes: Traditionally, the presence or absence of glands on the leaf margins have been used to distinguish *Salix eastwoodiae* from *S. wolfii* and *S. boothii*. A thorough examination of available material has revealed that this character is highly variable in all three species and, therefore, not always reliable as a means for separating them.



X 0.75

Salix eastwoodiae: Mid-sized shrub with silvery-hairy leaves that are equally green on both surfaces, with glandular margins on younger leaves, and catkins on leafy branchlets with pubescent capsules and black flower bracts. Illustration by W. Fertig.

Salix eriocephala Michx.
var. *mackenzieana* (Hook.) Dorn
Mackenzie's Willow
var. *watsonii* (Bebb) Dorn
Yellow Willow

Synonyms: *Salix prolixa* [= var. *mackenzieana*]; *Salix lutea* [= var. *watsonii*]

Taxonomy: Subgenus *Vetrix*, Section *Cordatae*.

Description: Shrub to 8 m high; first year **twigs** reddish brown (var. *mackenzieana*) or yellowish, greenish, or occasionally ashy white (var. *watsonii*); older bark becoming silvery gray; **leaves** with blades lance-shaped to ovate, 2-8 (13) cm long, (0.8) 1-2.5 (3) cm wide, pointed at tip, glaucous below and dark green above, margins entire to slightly toothed, young blades pubescent, becoming glabrous or glabrate, petioles 3-12 (15) mm long; **pistillate catkins** 1-6 (9) cm long on short, leafy branchlets, rachis white-woolly, capsules glabrous, on stalks (1) 2-5 mm long, styles 0.2-0.7 mm long, **staminate catkins** 2-5.2 cm long, stamens 2 per flower; **flowering bracts** brown or black, glabrate, persistent in fruit.

Similar Species: *S. barclayi* has catkins on long leafy flowering branchlets, broader leaves, and dark older branchlets. *S. pseudomonticola* has broader leaves with rounded teeth and sessile catkins appearing before the leaves. *S. farriae* typically has glabrous leaves with entire margins.

Habitat: Riverbanks and streamsides in foothill and lower montane areas. Reported from *Populus angustifolia*/recent alluvial bar and *P. angustifolia*/*Cornus sericea* community types on cobbles or volcanic alluvium by Walford *et al.* (1997). Elevation 5600-7400 feet.

Range: Var. *mackenzieana*: Southern Yukon and the Northwest Territories south to northeastern California and northwestern Wyoming (northern Wyoming Range, southern Absaroka Range, Green River Valley, and Jackson Hole). Var. *watsonii*: California and eastern Oregon to Montana, Wyoming, and New Mexico. In Wyoming, it is found throughout the western mountains and basins, but is absent from the Black Hills and Great Plains.

Shoshone National Forest Distribution: Plants strongly resembling var. *mackenzieana* were discovered on the Shoshone National Forest in Rattlesnake Canyon in 1998. Another population is found along the East Fork of the Wind River, less than 1 mile south of the Forest Boundary. Var. *watsonii* is known from low elevation sites in the North Fork Shoshone River Valley and eastern foothills of the Absaroka Range.

Notes: Var. *mackenzieana* differs from var. *watsonii* in having reddish to reddish brown year-old branchlets, broader leaves, and more elongate capsules. Specimens of var. *mackenzieana* from the vicinity of the Forest appear to differ from var. *watsonii* only with respect to branchlet color. Var. *mackenzieana* is listed as a species of special concern by the Wyoming Natural Diversity Database.



X 0.80

Salix eriocephala: Mid-sized shrub with gray stems, leaves that are slightly toothed, glaucous on the undersurface, with blades that tend to contract abruptly to the petiole, and with catkins on leafy branchlets with long-stalked, glabrous capsules and dark, sparsely-hairy flower bracts. Year-old branchlets of var. *mackenzieana* are reddish brown, while those of var. *watsonii* are yellowish, greenish, or ashy-white. Illustration by W. Fertig.

Salix exigua Nutt.
var. *exigua*

Coyote Willow, Streambank Willow, or Sandbar Willow

Taxonomy: Subgenus *Salix*, Section *Longifoliae*.

Description: Medium to large shrubs (occasionally tree-like) 1.5-5 (8) meters tall forming extensive colonies from underground spreading roots; **twigs** of the current year often thinly to densely pubescent with appressed hairs, two-year old twigs glabrous, non-pruinose, light yellow to reddish brown; older twigs with outer transparent surface flaking off; **leaves** with blades linear to linear-elliptic, (3) 5-15 cm long, usually over 6 times longer than wide, generally with entire or few-toothed margins, usually pubescent at maturity with straight, appressed hairs, gray-green to yellow-green on upper surface and slightly lighter and duller (but not glaucous) on the underside; petioles very short to lacking, typically under 5 mm long; stipules small and inconspicuous or larger on sucker shoots; **pistillate catkins** 1.5-8 cm long, borne at tips of long, leafy branchlets or on shorter, leafy side branches 5-25 mm long; capsules glabrous or more often pubescent, 3-5 (6) mm long on stalks 0-1.5 mm long; styles less than 0.2 mm; **staminate catkins** 1.5-6 cm long; stamens 2; **flowering bracts** yellow or light brown, narrow, acute, usually pubescent; deciduous when fruits are mature.

Similar Species: *Salix melanopsis* typically has glabrous leaves with glaucous undersides, glabrous capsules, and broadly elliptic to obovate, blunt-tipped bracts that are glabrous or hairy only at the base and margins. *S. geyeriana* is a clumped shrub with pruinose twigs, longer petioles, and persistent flowering bracts.

Habitat: Stream, ditch, and reservoir banks, mostly in the foothills zone. May occur on recently formed alluvial bars or seasonally flooded terraces of volcanic or granitic alluvium in *Populus angustifolia* or *Salix exigua/Poa pratensis* community types (Walford *et al.* 1997). Elevation 5000-9200 feet.

Range: Alaska to New Brunswick, south to northern Mexico, Mississippi, and Virginia. In Wyoming, found throughout the eastern plains and central basins and the lower foothills of the western mountains.

Shoshone National Forest Distribution: Scattered in the lower foothills and montane zones of the Absaroka and Wind River ranges.

Notes: Shoshone National Forest material corresponds with the "typical" form of the species which differs from the more eastern "interior" form (var. *pedicellata*) in having shorter, sessile capsules, and more persistently pubescent, less toothed leaves. In Wyoming, *Salix exigua* intergrades with *S. melanopsis* with respect to most of their characteristic features. Vegetative specimens are especially difficult to distinguish, and determinations should be considered tentative until material with pistillate catkins is available.



X 1

Salix exigua var. *exigua*: Many-branched shrubs with numerous, slender stems with linear leaves, and catkins on leafy branchlets with glabrous capsules and light-colored flower bracts. Illustration by W. Fertig.

***Salix farriae* Ball**
Farr Willow

Taxonomy: Subgenus *Vetrix*, Section *Cordatae*.

Description: Low shrub 1-1.5 m tall (rarely up to 2 m tall); **twigs** sparsely to moderately pubescent with loosely appressed hairs, becoming glabrous with age; young twigs dull brown, green, red or black; older twigs becoming dull brown or reddish; **leaves** with elliptic to obovate blades 3-7 cm long, 1-3 (3.5) cm wide, glabrous at maturity (except occasionally for pubescence on the upper midrib), finely appressed hairy above when young, entire (except occasionally for leaves on vigorous shoots that may have inconspicuous teeth), upper leaf surfaces dull yellow-green, lower surfaces glaucous and glabrous; petioles 2-8 mm long; stipules small, deciduous; **pistillate catkins** 1-3 (4.5) cm long on leafy flowering branchlets 5-8 (15) mm long, appearing with the leaves; capsules glabrous, 4-6 mm long, on stalks 0.2-1 (1.5) mm long; styles 0.4-0.7 mm (rarely to 1.2 mm) long; **staminate catkins** 0.8-1.5 (2) cm long, appearing with the leaves on leafy flowering branchlets; stamens 2; **flowering bracts** brown or black, occasionally yellowish at base, pubescent with long silky hairs or glabrous, persistent in fruit.

Similar Species: *Salix barclayi* has conspicuously toothed leaves and catkins 3.5 to 8 cm long. *S. pseudomonticola* has toothed leaves and sessile catkins that appear before the leaves mature. *S. planifolia* has sparsely hairy leaves, pubescent capsules, and sessile catkins.

Habitat: Often found in willow thickets dominated by *Salix drummondiana*, *S. boothii*, and *S. wolfii* on volcanic silts along medium-sized streams and on hummocks in *Picea engelmannii*-*Pinus contorta* swamp forests (Fertig 1997). Walford *et al.* (1997) also report this species from the *Salix boothii*/*S. farriae* community type on volcanic terraces in wide valley bottoms. Elevation 6600-9000 feet.

Range: British Columbia to Alberta, south to Oregon, eastern Idaho, western Montana, and northwestern Wyoming. In Wyoming, it is known from the Beartooth, Absaroka, Gros Ventre and Wind River ranges and Jackson Hole.

Shoshone National Forest Distribution: Uncommon in the western Beartooth, northern Absarokas, Kisinger Lakes area (north of Dubois), and northern Wind River ranges.

Notes: Listed as a species of special concern by the Wyoming Natural Diversity Database.



X 1
Salix farriacae: Low shrub with essentially glabrous, entire leaves with glaucous undersurfaces, and catkins on leafy branchlets with glabrous capsules and dark, long-hairy flower bracts. Illustration by W. Fertig.



X 1

Salix farriacae: Low shrub with essentially glabrous, entire leaves with glaucous undersurfaces, and catkins on leafy branchlets with glabrous capsules and dark, long-hairy flower bracts. Illustration by W. Fertig.

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WG-51

Salix geyeriana Anderss.
Geyer Willow

Taxonomy: Subgenus *Vetrix*, Section *Vetrix*.

Description: Tall shrub averaging 3-4 m tall (to 7 m) with clustered, erect stems; young **twigs** moderately to densely pubescent; older twigs glabrate, reddish brown to blackish; branchlets bluish pruinose (at least when fresh); **leaves** with blades elliptic to lance-shaped, 2-8 cm long, 4-15 mm wide, entire (or nearly so), silvery or gray-green above and thinly to moderately hairy, early leaves glabrous above, silky-hairy below; later leaves sparsely to densely appressed hairy above, pubescent but lighter beneath, petioles 2-9 mm; stipules minute, inconspicuous; **pistillate catkins** 8-20 mm long, loosely flowered, appearing with the leaves on leafy branchlets up to 10 cm long; capsules pubescent, 3-6 mm long with a slender beak forming a full curl when opened, on stalks 1-3 mm long; styles 0.2-0.3 mm long; **staminate catkins** 1-1.5 cm long on leafy flowering branchlets to 5 mm long; stamens 2; **flowering bracts** tawny (but sometimes with black tips when young), 2 or more times as long as wide, short-hairy, persistent in fruit.

Similar Species: *Salix lemmonii* has short, blackish flowering bracts with hairs 1-2 times longer than the bract body, leaves becoming glabrous above, and glabrous to sparsely hairy twigs. *S. planifolia* has densely crowded, sessile catkins. *S. exigua* forms extensive, spreading colonies and has narrower leaves with shorter petioles and non-pruinose twigs. *S. drummondiana* has longer, sessile catkins and more densely silvery-pubescent leaf undersides.

Habitat: This species is often the dominant species in tall willow communities in mesic floodplains of wide valleys on volcanic or granitic alluvium. Walford *et al.* (1997) describe 4 major *S. geyeriana* community types from the Shoshone National Forest (*S. geyeriana*/*Carex rostrata* ct., *S. geyeriana*/mesic graminoid ct., *S. geyeriana*/mesic forb, and *S. geyeriana*/*Calamagrostis canadensis* ct.) which differ in the abundance of forbs and graminoids in the understory. *S. geyeriana* may also be locally abundant in the understory of *Picea engelmannii*/*Salix boothii* communities. Elevation 6000-10,700 feet.

Range: British Columbia to Montana, south to California, Colorado, and Nebraska. In Wyoming, known from all of the major mountain ranges except for the Black Hills.

Shoshone National Forest Distribution: Common in the foothill and montane zones of the Absaroka and Wind River Ranges.

Notes: Specimens that are quickly dried on a hot plant drier may lose the characteristic pruinose condition on the branchlet surfaces, but this condition is generally retained behind the buds.



X 1

Salix geyeriana: Tall shrubs with pruinose twigs, leaves which are glaucous on the undersurface and silvery-pubescent on both surfaces, and catkins on leafy branchlets, with tawny, short-hairy flower bracts. Illustration by W. Fertig.

Salix glauca L.
var. *villosa* (Hook.) Anderss.
Gray Willow, Grayleaf Willow

Synonymy: *S. glaucops*.

Taxonomy: Subgenus *Vetrix*, Section *Glaucæ*.

Description: Low to medium shrub, mostly less than 1 (2) m high; **twigs** mostly densely hairy, (occasionally sparsely so), dark gray, yellow, or reddish; **leaves** with blades mostly elliptic to oblanceolate, 3-8 cm long, 0.7-3.5 cm wide, the upper surface green, lower surface glaucous, both surfaces glabrous to sparsely hairy at maturity; margins entire or with shallow, occasionally glandular teeth; petioles 3-10 (16) mm long, yellowish to brownish; stipules less than 1 mm long and deciduous; **pistillate catkins** 2-5 (6) cm, appearing with the leaves on densely-pubescent, leafy flowering branchlets 0.5-3.5 mm long; capsules pubescent, 4-8 mm on 0-1.5 mm stalks; styles 0.3-1.5 mm; **staminate catkins** 12-30 mm long with 2 stamens per flower; **flowering bracts** light brown to black, hairy, persistent in fruit.

Similar Species: *Salix eastwoodiae* has broader leaves that often have glandular margins and are persistently hairy on both surfaces. *S. wolfii* has leaves that are silvery hairy on both surfaces. *S. brachycarpa* has catkins 0.5 - 2 cm long and petioles 1-3 mm. *S. arctica* generally has darker flowering bracts, smaller and less tapered leaves, rounded buds, denser pubescence on the capsules, and stems that root at the nodes.

Habitat: Alpine and subalpine meadows and slopes. Walford *et al.* (1997) describe a *Salix glauca* vegetation type composed of a low shrub layer of *S. glauca* and *S. planifolia* on subalpine benches and glacial moraines. Elevation 8500-12,500 feet.

Range: Circumboreal; extending south in North America to southern Canada and in the Rocky Mountains to northern New Mexico. In Wyoming, known from all of the high elevation mountain ranges (but absent from the Black Hills).

Shoshone National Forest Distribution: Widely distributed at higher elevations of the Beartooth, Absaroka, and Wind River ranges.

Notes: Low, dwarfed individuals of *Salix glauca* may strongly resemble *S. arctica*. Accurate determination of these individuals may not always be possible, especially if fruiting material is not available.



X 1

Salix glauca var. *villosa*: Low shrub with stout branchlets, strongly pubescent twigs, glaucous leaves, and catkins on leafy branchlets with hairy capsules and short, dark flower bracts. Illustration by W. Fertig.

***Salix lasiandra* Benth.
var. *caudata* (Nutt.) Sudw.
Whiplash Willow**

Taxonomy: Subgenus *Salix*, Section *Salicaster*.

Description: Tall shrub or tree with several main stems 3-6 (16 m) tall; stem diameter 10-30 cm: bark smooth and gray when younger, becoming dark and fissured with age; **twigs** of current year moderately to densely pubescent with spreading hairs (occasionally glabrous), yellow to reddish-brown; **leaves** with lance-shaped to elliptic blades 2-15 cm long, with long, pointed tips and fine, gland-toothed margins, about equally green above and below or slightly lighter below (but not glaucous), mostly glabrous (although some hairs may be present on the midrib); petioles (2) 6-8 mm long with 2 or more small glands on the upper side near the base of the leaf blade; stipules gland-toothed and deciduous; **pistillate catkins** 2-4.5 cm long, appearing with the leaves on leafy flowering branchlets 10-45 mm long; capsules glabrous, on stalks 0.7-2 mm long; styles 0.2-1 mm long; **staminate catkins** 1.5-3 cm long; stamens typically 5 (3-8), filaments hairy; **flowering bracts** yellow, pubescent at the base, deciduous in fruit.

Similar Species: *S. boothii* has more blunt-tipped, dull green, slightly pubescent leaves, lacks glands on the petioles, and has persistent, dark flowering bracts.

Habitat: Streambanks, shores, wet meadows, swamps and seeps, usually in sandy or gravelly soil. Walford *et al.* (1997) describe a *Salix lasiandra* community type on volcanic alluvial terraces in wide valleys. This species may also be abundant in *Populus angustifolia*/*Betula occidentalis* and *Salix boothii*/mesic forb communities on low elevation stream terraces. Elevation 4100-10,000 feet.

Range: British Columbia to Alberta, south to California and New Mexico. In Wyoming, it is known from all major mountain ranges except the Black Hills.

Shoshone National Forest Distribution: Locally common along lower elevation streams in the foothills of the Absaroka and Wind River ranges.

Notes: Peachleaf willow (*Salix amygdaloides*) may superficially resemble *S. lasiandra*, but differs in having buds with overlapping scale margins (unique among all willows in Wyoming), and glaucous leaf undersides. It is not currently known to occur on the Shoshone National Forest, but might be expected at low elevation sites near Cody or Lander.



X 0.75

Salix lasiandra var. *caudata*: Large shrub or small tree with long-acuminate leaf blades which are green on both surfaces, petioles with small glands, and catkins on leafy branchlets with glabrous capsules and yellow deciduous flower bracts. Illustration by W. Fertig.

Salix lemmonii Bebb
Lemmon Willow

Taxonomy: Subgenus *Vetrix*, Section *Vetrix*.

Description: Small to mid-sized shrub 1-3 (5) m high with crooked stems; young **twigs** glabrous to sparsely pubescent and becoming glaucous, chestnut red to purplish; older stems often white-pruinose; **leaves** with oblanceolate or elliptic blades 2-8 (10) cm long, 6-15 mm wide, pointed at tip, usually entire on margins (occasionally with minute teeth, especially late in the season), upper surface shiny green, finely pubescent with reddish hairs when young, but becoming glabrous at maturity, lower surface pale glaucous and sparsely pubescent with reddish hairs or glabrous, later leaves finely pubescent on both sides while expanding, becoming essentially glabrous on the upper surface at maturity; petioles 3-8 mm long, sparsely to densely pubescent; stipules minute and inconspicuous; **pistillate catkins** 1-2.5 (4) cm long, on short flowering branchlets under 1 cm long or nearly sessile, sparsely-flowered (at least at maturity), appearing with or slightly before the leaves; capsules pubescent, up to 7 mm long, on stalks (0.5) 1-2 (2.3) mm long (expanding at maturity); styles 0.2-0.7 mm long; **staminate catkins** mostly 1-1.5 cm long; stamens 2; **flowering bracts** dark brown or black with long hairs (nearly twice as long as the bract), persistent in fruit.

Similar Species: *Salix geyeriana* has silvery-pubescent leaves (with hairs persisting on the upper surface at maturity), narrow, short-hairy, tawny flower bracts, and more consistently hairy stems. *S. drummondiana* has leaves with dense silvery-white pubescence on the underside and densely-flowered, mostly sessile catkins.

Habitat: Well-drained stream banks and wet meadows in mountains. Usually in drier portions of wetlands. Elevation 6700-8800 feet.

Range: Oregon to Montana, south to California and Colorado. In Wyoming, it is most abundant in the Yellowstone Plateau and Jackson Hole areas, with additional populations in the northern Wind River and Bighorn mountains.

Shoshone National Forest Distribution: Known only from the upper Wind River Valley west of Dubois.

Notes: *S. lemmonii* and *S. geyeriana* are very closely related and identification of specimens can be complicated by hybridization in areas of contact. One of the characters traditionally used to distinguish them is the presence or absence of reddish hairs on the leaf undersurface. Our examination of specimens from the Rocky Mountain Herbarium reveals that both species may have this feature.



X 1

Salix lemmonii: Mid-sized shrub with pruinose stems, green, glabrous upper leaf surfaces and glaucous undersurfaces, and catkins on leafy branchlets with hairy capsules and dark, long-hairy flowering bracts. Illustration by W. Fertig.

***Salix melanopsis* Nutt.**
Dusky Willow

Synonyms: *Salix exigua* ssp. *melanopsis*, *Salix fluviatilis*.

Taxonomy: Subgenus *Salix*, Section *Longifoliae*.

Description: Medium to large shrubs forming extensive colonies from creeping root systems, stems 1.5-4 m tall; first year **twigs** orangish and often pubescent with loosely appressed wavy-curly hairs; older twigs becoming glabrous, with the outer transparent epidermis layer flaking off; **leaves** with blades that are linear to linear-elliptic, 3-6 cm long and usually well over 6 times longer than wide, glabrous above at maturity (except often on the midrib), glaucous or light-colored below, margins toothed; petioles 0.5-6 mm long; stipules 1-3 mm, quickly deciduous; **pistillate catkins** 2-4 cm long, appearing with or after the leaves on leafy, lateral flowering branchlets 0.5-3 cm long or at the tips of terminal leafy branches, capsules typically glabrous, on stalks under 0.7 mm, styles 0-4 mm long; **staminate catkins** 1.5-3.5 cm long, 2 stamens; **flowering bracts** rounded at the tip, glabrous or hairy at the base or margins, yellowish-greenish, and deciduous when fruits are mature.

Similar Species: *S. exigua* has leaves that are usually equally green above and below, pubescent at maturity, and with few or no marginal teeth, pubescent capsules, and pointed flowering bracts that are often hairy throughout.

Habitat: Walford *et al.* (1997) report this species from *Salix lasiandra* and *S. exigua*/*Poa pratensis* community types on volcanic or granitic alluvium of streamside terraces and gravel bars. In some areas, these stands may be seasonally flooded. *S. melanopsis* typically replaces *S. exigua* at higher elevations. Elevation 6100-9200 feet.

Range: British Columbia to Alberta, south to California, Utah, and Colorado. In Wyoming, known primarily from the northwest mountains, with scattered occurrences in the southern Bighorn and northern Uinta mountains.

Shoshone National Forest Distribution: Scattered throughout the montane valleys of the Absaroka and Wind River Ranges.

Notes: The name *Salix fluviatilis* has priority over *S. melanopsis* and may eventually replace it (Robert Dorn, personal communication). See "Notes" under *Salix exigua* regarding problems distinguishing between these two taxa.



X 0.75

Salix melanopsis: Many-branched shrub with narrow, elongate leaves that are glaucous below, and catkins on leafy branchlets with glabrous capsules and rounded, mostly glabrous flower bracts. Illustration by W. Fertig.

***Salix myrtilifolia* Anderss.**
var. *myrtilifolia*
Myrtleleaf Willow

Taxonomy: Subgenus *Vetrix*, Section *Cordatae*.

Description: Low shrub, often with trailing stems, usually less than 30 cm tall; may root along the decumbent stems; **twigs** green to reddish-brown, glabrous or sparsely pubescent with short curly hairs; **leaves** with blades narrowly elliptic to narrowly obovate, 1.5-7 cm long, 0.5-3 cm wide, equally green above and below, glabrous from the start, finely-toothed, tips often blunt or broad, petioles less than 5 mm long; stipules 0.5-5 mm long, quickly deciduous **pistillate catkins** 1.3-3 (4) cm long, on leafy flowering branchlets; capsules glabrous, pale yellowish-green, 3-6 mm long on stalks less than 1 mm long; styles less than 1 mm long; **staminate catkins** 1-2 cm long, stamens 2; **flowering bracts** dark, pubescent, persistent in fruit.

Similar Species: *Salix boothii* is a taller shrub with sparsely hairy leaves and petioles over 5 mm long. *S. wolfii* has silvery-hairy leaves. *S. eastwoodiae* has young leaves with conspicuously glandular toothed margins and mature leaves are gray pubescent.

Habitat: Edge of *Picea glauca* swamp forests and wet *Carex rostrata* marshes (Fertig and Jones 1992). Elevation 6600 feet.

Range: Alaska to Newfoundland south to southern Alberta and Manitoba. Disjunct in northwestern Wyoming and central Colorado. In Wyoming, it is known only from the Swamp Lake wetland in the Clarks Fork Valley.

Shoshone National Forest Distribution: Restricted to the Swamp Lake wetland in the Clarks Fork Valley.

Notes: Listed as Sensitive by US Forest Service Region 2 and tracked as a species of special concern by the Wyoming Natural Diversity Database. All fruiting plants found in Wyoming to date have been pistillate individuals with aborted capsules, suggesting that pollination is not occurring due to the absence of staminate plants (Fertig and Jones 1992; Mills and Fertig 1996).



X 1

Salix myrtillifolia var. *myrtillifolia*: Low, trailing shrub (under 30 cm tall) with narrowly elliptic, glabrous leaves that are equally green on both surfaces, and catkins on leafy branchlets with glabrous capsules. Illustration by W. Fertig.

Salix planifolia Pursh
var. *monica* (Bebb) Schneider
var. *planifolia*
Planeleaf Willow

Taxonomy: Subgenus *Vetrix*, Section *Vimen*.

Description: Low to medium-sized shrubs, 0.5-4 m high, often forming dense thickets; **twigs** shiny reddish to purple, glabrous, rarely slightly pruinose; **leaves** with blades elliptic, or lance-elliptic to ovate, 3-5 (8) cm long, 1-1.5 (2.2) cm wide, upper surface bright green and shiny, lower surface glaucous, glabrate or slightly pubescent, margins slightly inrolled, mostly entire, sometimes becoming toothed with age; petioles glabrous, 3-13 mm long; stipules mostly less than 1 mm long (up to 2 mm long on sucker shoots); **pistillate catkins** 1.5-6 cm long, sessile or nearly so, appearing before the leaves; capsules 4-6 mm long, hairy, on 1 mm stalks, styles 0.4-1.8 mm; **staminate catkins** 1-3 cm long, 2 stamens per flower; **flowering bracts** dark brown to black, long-hairy, persistent in fruit.

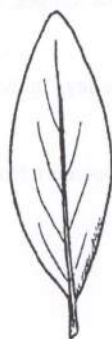
Similar Species: *Salix scouleriana* has broader leaves and glabrous twigs and petioles, and is usually found in drier, upland sites. *S. barrattiana* has terminal catkins on thick, hairy stems and produces oily or sticky yellowish buds and twigs. *S. glauca* has catkins produced with the leaves on long leafy flowering branchlets, more notably hairy leaves, and pubescent, non-shiny stems.

Habitat: Variety *monica* is a low-growing shrub of alpine and subalpine areas. Var. *planifolia* is the more common taxon at lower elevations, although it sometimes occurs in the alpine or subalpine. Walford *et al.* (1997) do not distinguish between these varieties and recognize 4 main *S. planifolia* community types, ranging from wet subalpine glacial valleys to montane streambanks, lakeshores, and wet meadows. This species is dominant or abundant in the following community and vegetation types on the Forest: *S. planifolia*/*Carex aquatilis* ct, *S. planifolia*/*Carex scopulorum* ct, *S. planifolia*/*Caltha leptosepala* ct, *S. planifolia*/*Deschampsia cespitosa* ct, *Salix candida*/*Carex rostrata* ct, and *Salix glauca* vt. Elevation 5000-12,400 feet.

Range: Northern Canada south to New England, California, and in the Rocky Mountains to New Mexico. In Wyoming, found throughout the mountains and higher valleys.

Shoshone National Forest Distribution: Both varieties are found commonly throughout the Beartooth, Absaroka, and Wind River ranges, with var. *monica* primarily found at higher elevations and var. *planifolia* in the foothills and montane zones. Both varieties may overlap in the subalpine and montane zones.

Notes: Traditionally, this species has been divided into 2 varieties, differing primarily in growth form, leaf proportions, and habitat. Intermediates between the two varieties are difficult to reliably distinguish, and Dorn (1997) reports that "on a continent-wide basis, var. *monica* cannot justifiably be recognized." Varieties are included here because of their traditional use in habitat descriptions, but the correlation between variety and site condition is moderate at best. Variety *monica* is recognized by its short stature (mostly under 2 m tall), and leaf blades mostly less than 5 cm long and less than 3 times as long as wide. In contrast, var. *planifolia* is a taller shrub (2-4 m tall) and has leaves mostly over 5 cm long and 3 or more times as long as wide.



var. *monica*

var. *planifolia*

X 0.80

Salix planifolia: Low to mid-sized shrub with essentially glabrous leaves that are bright green above, glaucous and glabrate below, shiny reddish twigs, and sessile catkins with hairy capsules and long-hairy flower bracts. Illustration by W. Fertig.

***Salix pseudomonticola* Ball**
Serviceberry Willow, False mountain willow

Synonyms: *Salix barclayi* var. *pseudomonticola*; sometimes included in *Salix monticola* (Hitchcock and Cronquist 1964).

Taxonomy: Subgenus *Vetrix*, Section *Cordatae*.

Description: Rounded shrub 1.5-6 meters tall; **twigs** sparsely to occasionally densely hairy, brown to yellowish or reddish; **leaves** with elliptic to ovate or obovate blades 3-8 (10) cm long, 1.2-3.5 (6) cm wide, glaucous below and nearly glabrous, generally thick and leathery, upper surface shiny green, often with conspicuously reddish midveins, margins coarsely to finely toothed; petioles 6-20 mm long, usually reddish while leaves are expanding; stipules (2) 4.5-10 mm long, persistent; **pistillate catkins** 1.5-7 cm long, sessile or on short, leafy branchlets, appearing before the leaves; capsules glabrous on stalks 0.8-2.5 mm long, styles 0.5-1.8 mm long; **staminate catkins** 1-4 cm long, stamens 2 per flower; **flowering bracts** brown to black, sometimes bicolored, long hairy, persistent in fruit.

Similar Species: *Salix barclayi* has catkins on leafy flowering branchlets that appear with the leaves. *S. eriocephala* var. *mackenzieana* has more elongated, narrower and less coarsely toothed leaves. *S. eriocephala* var. *watsonii* has yellow to grayish twigs. *S. tweedyi* has more coarsely toothed and prominently glandular leaves, and often has catkins at the tips of twigs from the previous season. *S. scouleriana* has hairy capsules and leaves which are hairy on the undersurface.

Habitat: Stream banks, swamps, and wet meadows. Elevation 6600 feet.

Range: Alaska to northwest Quebec, south to eastern Idaho, northern Wyoming, and South Dakota. In Wyoming, known only from scattered locations in the Bighorn and Absaroka Ranges, Jackson Hole, and the Yellowstone Caldera.

Shoshone National Forest Distribution: Restricted to the Clarks Fork and Sunlight Valleys in the northern Absarokas Range and Dick Creek area in the southeast Absaroka range.

Notes: Relatively uncommon in Wyoming. Very closely related to *S. monticola*, a southern Rocky Mountain taxon.



X 1

Salix pseudomonticola: Low to mid-sized shrub with glaucous, coarsely-toothed leaves, reddish petioles and midribs, large stipules, sessile catkins and glabrous capsules. Illustration by W. Fertig.

***Salix reticulata* L.
var. *nana* Anderss.
Snow Willow**

Synonyms: *Salix nivalis*.

Taxonomy: Subgenus *Vetrix*, Section *Chamaetia*.

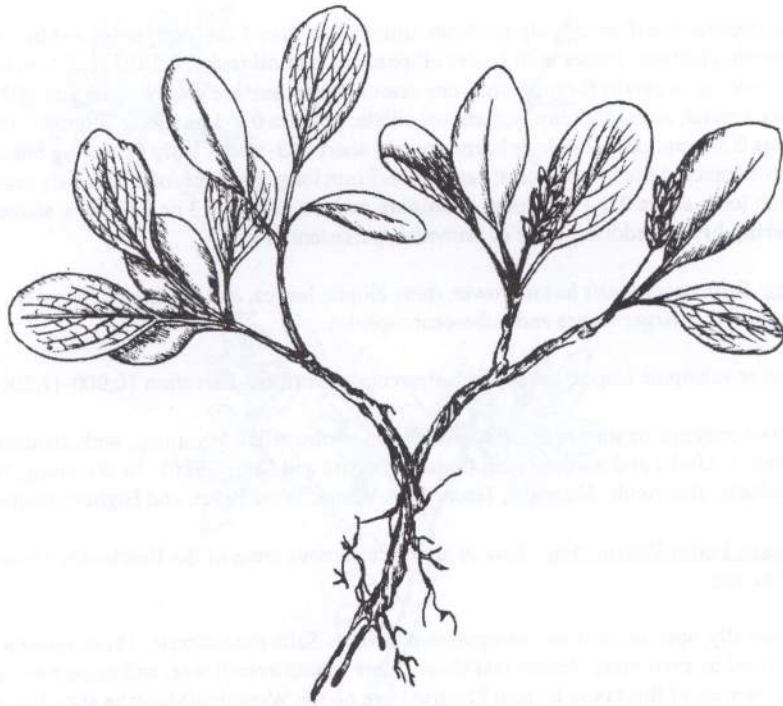
Description: Creeping, mat-forming, alpine shrubs under 8 cm high; **twigs** glabrous or sparsely hairy just below the catkins; **leaves** with blades elliptic to ovate and rounded at tips, 0.5-3.6 cm long, 0.3-3 cm wide, upper surface dark green, lower surface glaucous and prominently veined, glabrous or with long, silky hairs (when young) margins entire or nearly so; petioles yellowish, 1.5-7 mm long; stipules tiny; **pistillate catkins** 0.5-2 cm long on naked flowering branchlets, appearing with or after the leaves; capsules hairy, 2-4 mm long, on stalks 0-0.8 mm long, styles 0.2-0.4 mm long; **staminate catkins** 0.4-2 cm long, stamens 2 per flower; **flowering bracts** pale green or yellow, glabrous on outer surface, fine-hairy on inner, persistent in fruit.

Similar Species: *Salix rotundifolia* has glabrous capsules, and smaller, non-glaucous leaves. *S. arctica* has longer pistillate catkins with dark brown to black, long-hairy flowering bracts borne on leafy flowering branchlets, and narrower, more pointed leaves that often have ciliate margins. *S. cascadenis* has shorter, narrower, non-glaucous leaves that tend to persist for more than one season and catkins on short, leafy flowering branchlets. Stunted specimens of *S. glauca* have long, leafy flowering branchlets, dark flowering bracts, and leaves which are not prominently veined.

Habitat: Alpine or subalpine meadows on organic to gravelly sandy soil. Elevation 8100-13,200 feet.

Range: Circumboreal, extending in North America from southern British Columbia and Alberta to California, Nevada, Utah and New Mexico. In Wyoming, found in alpine areas of all the high mountain ranges.

Shoshone National Forest Distribution: Abundant in the alpine and upper subalpine zones of the Beartooth, Absaroka and Wind River Ranges.



X 1

Salix reticulata var. *nana*: Low, creeping, mat-forming alpine shrub with leathery, prominently veined, ovate leaves, and short catkins of hairy fruiting capsules on leafless branchlets. Illustration by W. Fertig.

Salix rotundifolia Trautv.
var. *dodgeana* (Rydb.) Murray
Dodge Willow

Synonyms: *Salix dodgeana*.

Taxonomy: Subgenus *Vetrix*, Section *Myrtosalix*.

Description: Creeping, mat-forming, alpine shrub, usually less than 5 cm high; **twigs** reddish, to brownish or yellowish, glabrous; **leaves** with blades elliptic, ovate or orbicular, 0.5-0.7 (1.2) cm long, 0.1-0.6 cm wide, tending to persist for more than one season, upper surface glossy green and glabrous, lower surface similar, margins entire, sometimes ciliate; petioles 0.8-3 mm long, stipules tiny; **pistillate catkins** 0.3-1 cm long, sessile or borne on very short (0.3-1 cm), leafy flowering branchlets that appear after the leaves at the tips of stems; capsules 4-7 mm long, glabrous, often reddish, sessile or on stalks to 0.5 mm long; styles 0.2-1 mm long; **staminate catkins** tiny with 3 or 4 flowers, stamens 2 per flower; **flowering bracts** reddish purple or brownish, persistent in fruit.

Similar Species: *Salix cascadenis* has narrower, more elliptic leaves, and pubescent capsules. *S. arctica* and *S. reticulata* have larger leaves and pubescent capsules.

Habitat: Alpine or subalpine slopes, usually on calcareous substrates. Elevation 10,000-11,200 feet.

Range: Regional endemic of southwestern Montana and northwestern Wyoming, with disjunct populations reported in Alaska and northwestern Canada (Porsild and Cody 1980). In Wyoming, it is known from the Gallatin, Beartooth, Absaroka, Teton, Gros Ventre, Wind River, and Bighorn ranges.

Shoshone National Forest Distribution: Rare in alpine calcareous areas of the Beartooth, Absaroka, and Wind River ranges.

Notes: Occasionally, specimens show introgression towards *Salix cascadenis*. These specimens can be recognized by their more slender leaf shape, more robust overall size, and more pubescent bracts. The type specimen of this taxon is from Electric Peak on the Wyoming/Montana state line in Yellowstone National Park.



X 1.3



X 1.3



X 2.5

Salix rotundifolia var. *dodgeana*: Low, creeping, mat-forming alpine shrub with mostly ovate, and tiny, sessile catkins with glabrous capsules and reddish purple flowering bracts. Illustration by W. Fertig.

***Salix scouleriana* Barratt ex Hook.**
Scouler Willow

Taxonomy: Subgenus *Vetrix*, Section *Vetrix*.

Description: Tall shrub or small tree to 20 m high; **twigs** yellow and pubescent when young, becoming glabrous at maturity, freshly-peeled bark of second and third year branchlets with a distinctive skunky odor; **leaves** with blades that are elliptic to obovate, 3-8 cm long, 1.5-3 cm wide, upper surface green, glabrous, lower surface glaucous, densely pubescent when young, becoming glabrate or glabrous at maturity, often with fine, persistent reddish hairs; margins entire or with small, rounded teeth; petioles 3-10 (18) mm long, densely pubescent (especially on the upper surface); stipules small, mostly less than 2 mm, quickly deciduous; **pistillate catkins** 1.5-5 (7) cm, sessile or on short (0-1.3 mm) branchlets with small, narrow, green bracts, appearing before the leaves; capsules densely hairy, 4.5-11 mm on stalks 0.8-2 mm long, styles 0.2-1.1 mm long; **staminate catkins** 1-3 cm long, stamens 2 per flower; **flowering bracts** dark brown to black with long, silky hairs, persistent in fruit.

Similar Species: *S. planifolia* has glabrous twigs and petioles, reddish branchlets and narrower leaves. *S. pseudomonticola* has glabrous capsules and more prominently toothed leaf margins.

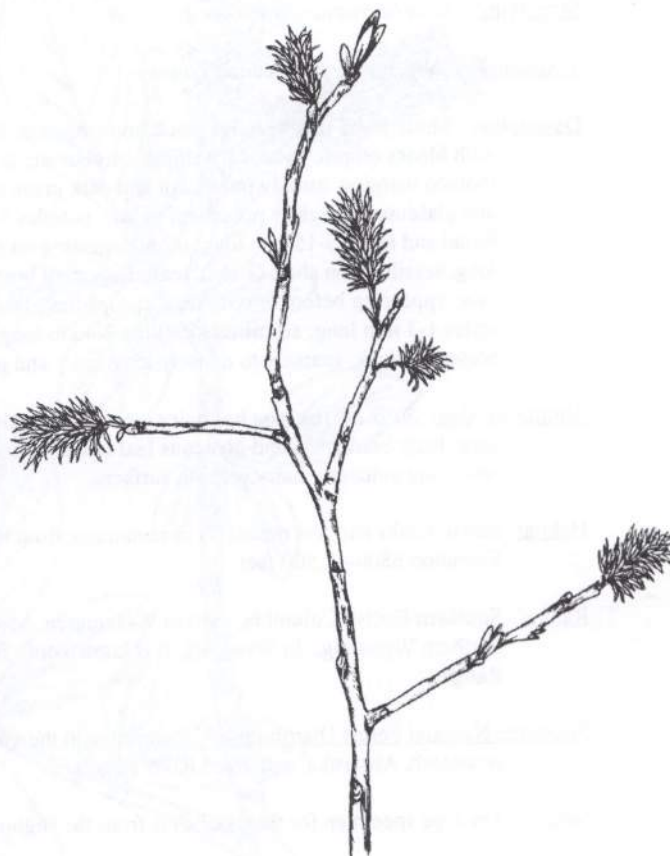
Habitat: Upland sites, usually on drier and more shaded sites than other willows. Elevation 4500-10,700 feet.

Range: Alaska and Yukon to California, Arizona and New Mexico, east to South Dakota and Manitoba. Widely distributed throughout Wyoming, but absent from the eastern plains.

Shoshone National Forest Distribution: Uncommon in forested areas of the foothills through montane the zones of the Wind River and Absaroka Ranges, occasionally in the subalpine.



X 0.8



X 0.7

Salix scouleriana: Medium to large shrub or tree with broadly elliptic to obovate, glaucous leaves, and nearly sessile catkins with hairy capsules and dark, long-hairy flower bracts. Illustration by W. Fertig.

***Salix tweedyi* (Bebb ex Rose) Ball**
Tweedy Willow

Synonyms: *Salix barrattiana* var. *tweedyi*.

Taxonomy: Subgenus *Vetrix*, Section *Lanatae*.

Description: Shrub 3-4.5 m tall; **twigs** stout, non-pruinose; first year twigs with long, spreading hairs; **leaves** with blades elliptic to broadly elliptic or obovate, 2-10 cm long, 2-5 cm wide, with finely glandular-toothed margins, usually pubescent and dark green above, equally green to lighter (but not glaucous) and glabrous to slightly pubescent below; petioles 5-12 (15) mm long and spreading hairy; stipules broad and leafy, 5-15 mm long, often persisting on second year branchlets; **pistillate catkins** 3-9 cm long, sessile or on short (1 cm), leafy flowering branchlets, often on the tips of twigs of the previous year, appearing before or with leaves; capsules glabrous, 4-7 mm long on stalks 0.2-1.2 mm long, styles 1-3 mm long; **staminate catkins** 2-4 cm long, stamens 2 per flower; **flowering bracts** dark brown to black, sparsely to densely long-hairy and persistent in fruit.

Similar Species: *Salix barrattiana* has hairy capsules and sticky twigs and buds. *S. barclayi* has catkins on long, leafy branchlets and glaucous leaf undersurfaces. *S. eastwoodiae* has hairy capsules and leaves which are evidently hairy on both surfaces.

Habitat: Streambanks and wet meadows in mountains from mid to high elevations (but below the alpine zone). Elevation 6800-12,500 feet.

Range: Southern British Columbia, eastern Washington, northern and central Idaho, western Montana and northern Wyoming. In Wyoming, it is known only from the northwestern mountains and the Bighorn Range.

Shoshone National Forest Distribution: Uncommon in the upper montane, subalpine, and alpine zones of the Beartooth, Absaroka, and Wind River ranges.

Notes: The type specimen for this species is from the Bighorn Mountains in Wyoming.



X 1

Salix tweedyi: Mid-sized shrub with broad, ovate, coarse-toothed leaves which are green on both surfaces, and long, stout catkins, some of which are terminal on thick branchlets, the rest of which are sessile and lateral. Illustration by W. Fertig.

Salix wolfii Bebb
var. *idahoensis* Ball
var. *wolfii*
Wolf Willow

Taxonomy: Subgenus *Vetrix*, Section *Cordatae*.

Description: Low shrub, averaging 1 m tall (0.5-2 m); **twigs** yellowish to reddish and thinly woolly-pubescent; **leaves** with blades elliptic to lance-shaped, usually somewhat acute, 2-6 cm long, 0.5-1.5 (2) cm wide, non-glaucous, equally silvery pubescent on upper and lower surfaces (pubescence mostly closely appressed and wavy), entire or occasionally with glandular margins, petioles pubescent, 1-4 (10) mm; stipules leaf-like, 1-3 (7) mm long, often glandular, deciduous; **pistillate catkins** 0.8-2 (4) cm long, densely congested, nearly sessile or on short, leafy flowering branchlets that appear with the leaves; capsules pubescent in var. *idahoensis*, glabrous in var. *wolfii*, borne on short stalks under 0.8 mm long, styles 0.2-1.3 mm long; **staminate catkins** (0.8)1-2 cm long; stamens 2 per flower, **flowering bracts** dark brown or blackish, persistent, woolly-pubescent, with the hairs exceeding the length of the bract.

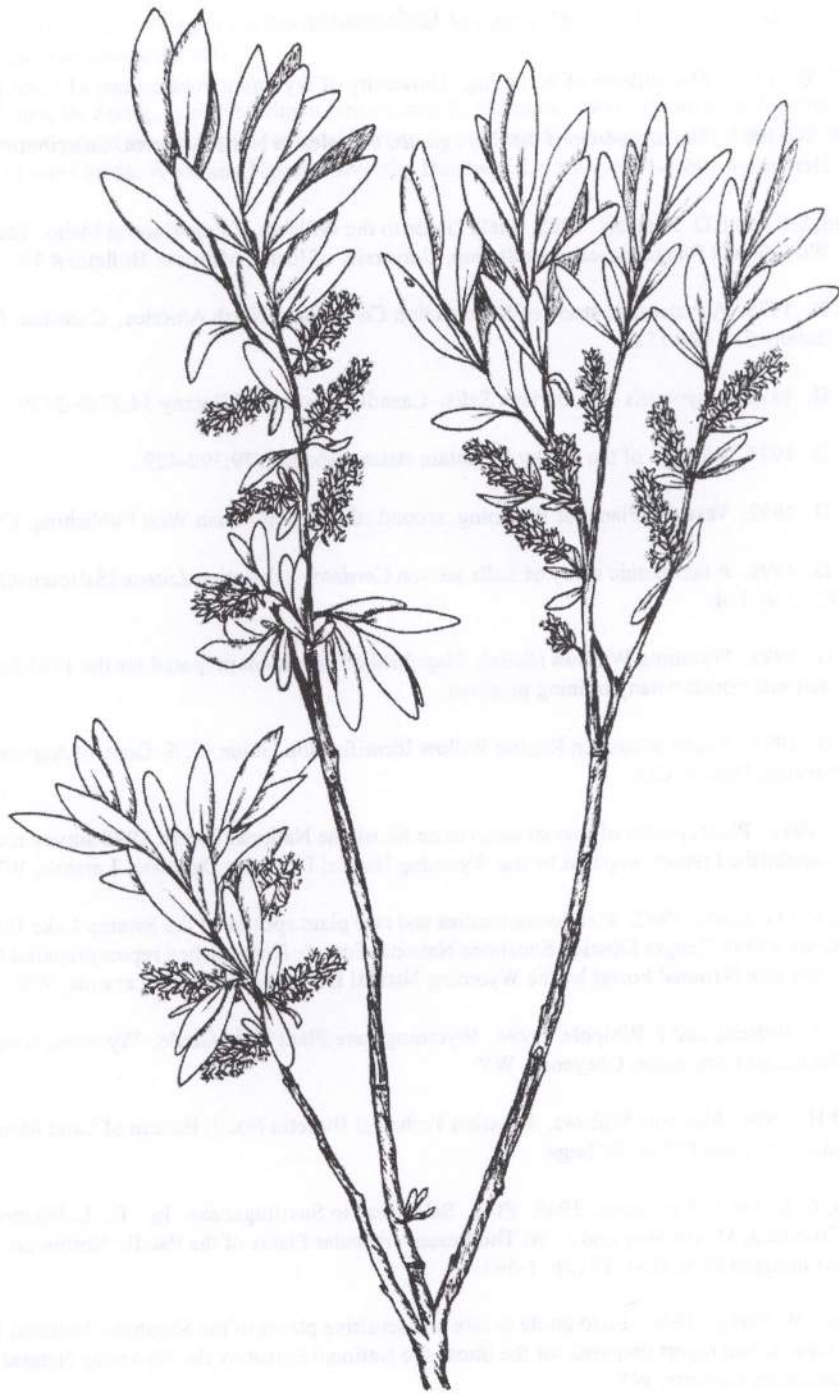
Similar Species: *Salix boothii* has broader, more sparsely pubescent leaves, mostly glabrous second and third year branchlets, catkins over 2 cm long, glabrous capsules, and is usually over 2 meters tall (at maturity). *S. myrtillofolia* has glabrous capsules and leaves. *S. brachycarpa* often has woolly leaves that are glaucous beneath, densely pubescent capsules, and yellowish to light brown flowering bracts. *S. eastwoodiae* typically has a taller stature, longer pistillate catkins, and pubescent capsules.

Habitat: Montane and subalpine wet meadows, streamsides, and fens, often in association with *Salix boothii*. Walford *et al.* (1997) recognize 4 major *S. wolfii* community types on the Shoshone National Forest, most of which occur in wet sediments along small to medium stream channels or in wet swales with high water tables. This species is the dominant or codominant willow in the following community types: *S. wolfii*/*Carex aquatilis* ct, *S. wolfii*/mesic forb ct, *S. wolfii*/*Deschampsia cespitosa* ct, *S. wolfii*/*Poa pratensis* ct, *S. planifolia*/*Caltha leptosepala* ct, and *S. boothii*/*Carex rostrata* ct. Elevation 6800-12,000 feet.

Range: Northeast Oregon to central Montana, south to Nevada and Colorado. In Wyoming, var. *wolfii* is found in the Absaroka, Beartooth, Bighorn, Medicine Bow, Salt River, Teton, Uinta, Wind River, and Wyoming Ranges and the Yellowstone Plateau. Var. *idahoensis* has a more restricted range in the northern Yellowstone Plateau, Teton Range, and northern Wind River Range.

Shoshone National Forest Distribution: Var. *wolfii* is common throughout the foothills and montane areas of the Beartooth, Absaroka and Wind River Ranges, while var. *idahoensis* appears to be restricted to the northern Wind River Range near Dubois.

Notes: Plants without pistillate catkins are extremely difficult to identify to variety. Var. *idahoensis* tends to have longer and broader leaves, but this feature can vary (especially on sucker shoots). See notes under *S. eastwoodiae* regarding use of glandular margins as a distinguishing feature.



X 0.8

Salix wolfii: Low shrub with elliptic, gray-green, silvery-pubescent leaves and short capsules with glabrous (var. *wolfii*) or pubescent (var. *idahoensis*) capsules and dark, woolly flower bracts. Illustration by W. Fertig.

References

- Argus, G. W. 1957. The willows of Wyoming. University of Wyoming Publications 21 (1-6):1-63.
- Argus, G. W. 1965. The taxonomy of the *Salix glauca* complex in North America. Contributions Gray Herbarium 196:1-142.
- Brunsfeld, S.J. and F.D. Johnson. 1985. Field Guide to the Willows of East-Central Idaho. Idaho Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow. Bulletin # 39.
- Dorn, R. D. 1975. A systematic study of *Salix* section *Cordatae* in North America. Canadian Journal of Botany 53:1491-1522.
- Dorn, R. D. 1976. A synopsis of American *Salix*. Canadian Journal of Botany 54:2769-2789.
- Dorn, R. D. 1977. Willows of the Rocky Mountain states. Rhodora 79:390-429.
- Dorn, R. D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.
- Dorn, R. D. 1995. A taxonomic study of *Salix* section *Cordatae* subsection *Luteae* (Salicaceae). Brittonia 47 (2): 160-174.
- Dorn, R. D. 1995. Wyoming Willows (*Salix*). Unpublished document prepared for the 1995 Bridger-Teton National Forest botany training program.
- Dorn, R. D. 1997. Rocky Mountain Region Willow Identification Guide. U. S. Dept. of Agriculture Forest Service, Denver, CO.
- Fertig, W. 1997. Plant species of special concern on Shoshone National Forest: 1996 survey results. Unpublished report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. and G. Jones. 1992. Plant communities and rare plant species of the Swamp Lake Botanical Area, Clark's Fork Ranger District, Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne, WY.
- Heinze, D.H. 1994. Montana Willows. Riparian Technical Bulletin No. 2, Bureau of Land Management, Montana State Office, Billings.
- Hitchcock, C. L. and A. Cronquist. 1964. Pt. 2. Salicaceae to Saxifragaceae. In: C. L. Hitchcock, A. Cronquist, M. Ownbey and J. W. Thompson. Vascular Plants of the Pacific Northwest. Univ. of Washington Publ. Biol. 17 (2): 1-597.
- Mills, S. and W. Fertig. 1996. Field guide to rare and sensitive plants of the Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Porsild, A.E. and W. J. Cody. 1980. Vascular Plants of Continental Northwest Territories, Canada. National Museums of Canada, Ottawa.

Scott, R. W. 1997. *The Alpine Flora of the Rocky Mountains: Volume 1 The Middle Rockies*. University of Utah Press, Salt Lake City, UT.

Walford, G., G. Jones, W. Fertig, Sabine Mellman-Brown, and K. Houston. 1997. Riparian and wetland plant community types of the Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie, WY.

Scott, R. W. 1997. *The Alpine Flora of the Rocky Mountains: Volume 1 The Middle Rockies*. University of Utah Press, Salt Lake City, UT.

Walford, G., G. Jones, W. Fertig, Sabine Mellman-Brown, and K. Houston. 1997. Riparian and wetland plant community types of the Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie, WY.