

GUIDE TO THE WILLOWS OF THE UMATILLA AND MALHEUR NATIONAL FORESTS

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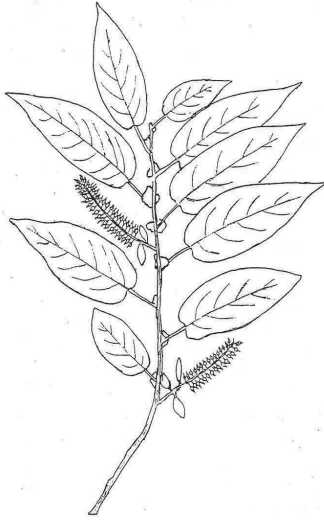


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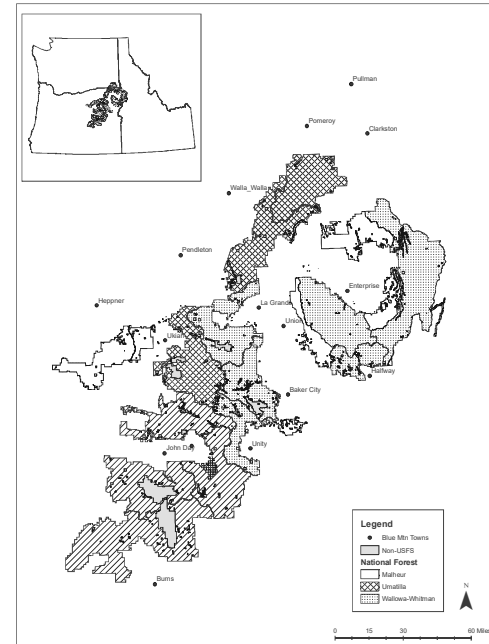
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Area of coverage: Malheur, Umatilla, and Wallowa-Whitman National Forests



INTRODUCTION (modified from Fertig and Markow, 1999)

Willows are among 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.

Previously, the only guide to the willows of this area which included illustrations and complete descriptions was found in Hitchcock et al. (1964). While the flora is still a valuable resource, much new information has come to light since its publication. Thus, it cannot be relied on as the definitive treatment of willows of the area. Additionally, acquisition of this new information has resulted in revised nomenclature, somewhat different from that provided in Hitchcock et al., and potentially confusing.

This guide has been developed to assist managers and biologists with the identification of the 22 taxa of willows known or suspected to occur on the Umatilla and Malheur National Forest by Wood, et al. (1998) and Wood, personal communication. Five additional species have been added for this edition (2008) to include the Wallowa-Whitman National Forest. The guide contains identification keys to willows in flowering (pistillate) and non-flowering (vegetative) condition and an illustrated discussion of each species with information on similar species and habitat. Although an attempt has been made to make the keys and descriptions as non-technical as possible, unavoidably technical terms are included. Additional sources of information on willow identification are listed in the reference section at the end of the guide.

Keys and descriptions in this guide employ the most consistent and reliable characteristics that we have found for identifying the willows of the Umatilla and Malheur National Forests. 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.

Nomenclature follows the checklist generated by Nelson and Hartman (1994) which recognizes names published in recent revision work for the genus. Synonyms are provided to allow for quick referencing of the more traditional names that may no longer be in use.

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.

-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 in most plants. This condition can be seen even on specimens lacking buds by observing that each season's growth is not terminated by multiple bud scales, as is characteristic of most woody plants.

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 of the staminate catkins?

-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 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. Make every effort to collect specimens with both leaves and pistillate catkins. 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).

A note on distribution information: This guide covers species found on the Malheur, Umatilla, and Wallowa-Whitman National Forests, including some low elevation species that are more common on lands adjacent to the forests. Distribution information was gathered from all available sources for the study area (Malheur, Umatilla, and Wallowa-Whitman National Forests).

WILLOW TERMINOLOGY

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. **Lateral:** Borne on or at the side

of a structure.

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: Bese with glands.

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

Glabrous: Lacking hairs.

Glaucus: 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.



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.



Stipe: The stalk that a pistil is borne on in many willow species, sometimes called a pedicel.

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

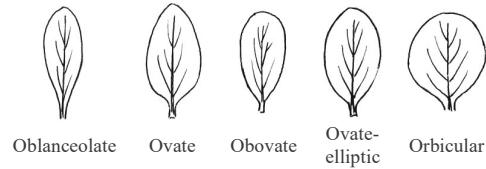
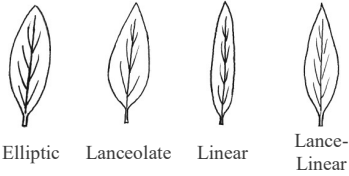
Toothed: Bearing small marginal indentations or lobes.



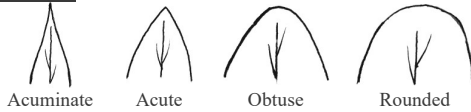
Twig: Stems produced during the current growing season.

Villous: With long, soft hairs.

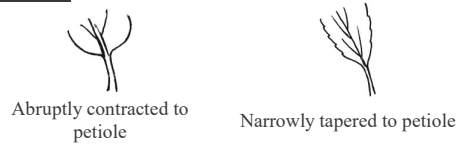
Leaf Shapes



Leaf Tips



Leaf Bases



LIST OF TAXA COVERED

Taxon	Equivalent name in Flora of the Pacific Northwest (Hitchcock & Cronquist, 1964)	Equivalent name in USDA PLANTS database (NRCS, 2008)
<i>Salix amygdaloides</i>	<i>S. amygdaloides</i>	<i>S. amygdaloides</i>
<i>S. arctica</i> var. <i>petraea</i>	<i>S. arctica</i> var. <i>petraea</i>	<i>S. petrophila</i>
<i>S. barclayi</i>	<i>S. barclayi</i>	<i>S. barclayi</i>
<i>S. bebbiana</i>	<i>S. bebbiana</i>	<i>S. bebbiana</i>
<i>S. boothii</i>	<i>S. mrytillifolia</i>	<i>S. boothii</i>
<i>S. brachycarpa</i> var. <i>brachycarpa</i>	<i>S. brachycarpa</i> var. <i>brachycarpa</i>	<i>S. brachycarpa</i> var. <i>brachycarpa</i>
<i>S. cascadenis</i>	<i>S. cascadenis</i>	<i>S. cascadenis</i>
<i>S. commutata</i>	<i>S. commutata</i>	<i>S. commutata</i>
<i>S. drummondiana</i>	<i>S. drummondiana</i>	<i>S. drummondiana</i>
<i>S. eastwoodiae</i>	None	<i>S. eastwoodiae</i>
<i>S. eriocephala</i> var. <i>mackenzieana</i>	<i>S. rigida</i> var. <i>mackenzieana</i>	<i>S. proluxa</i>
<i>S. eriocephala</i> var. <i>monochroma</i>	<i>S. rigida</i> var. <i>mackenzieana</i>	<i>S. monochroma</i>
<i>S. eriocephala</i> var. <i>watsonii</i>	<i>S. rigida</i> var. <i>watsonii</i>	<i>S. lutea</i>
<i>S. exigua</i> var. <i>exigua</i>	<i>S. exigua</i> ssp. <i>exigua</i>	<i>S. exigua</i>
<i>S. farriae</i>	<i>S. farriae</i>	<i>S. farriae</i>
<i>S. geyeriana</i>	<i>S. geyeriana</i>	<i>S. geyeriana</i>
<i>S. lasiandra</i> var. <i>caudata</i>	<i>S. lasiandra</i> var. <i>caudata</i>	<i>S. lucida</i> ssp. <i>caudata</i>
<i>S. lasiandra</i> var. <i>lasiandra</i>	<i>S. lasiandra</i> var. <i>lasiandra</i>	<i>S. lucida</i> ssp. <i>lasiandra</i>
<i>S. lasiolepis</i>	<i>S. lasiolepis</i>	<i>S. lasiolepis</i>
<i>S. lemmonii</i>	<i>S. lemmonii</i>	<i>S. lemmonii</i>
<i>S. melanopsis</i>	<i>S. exigua</i> ssp. <i>melanopsis</i>	<i>S. melanopsis</i>
<i>S. pseudomonticola</i>	<i>S. monticola</i>	<i>S. pseudomonticola</i>
<i>S. reticulata</i> ssp. <i>nivalis</i>	<i>S. nivalis</i> var. <i>nivalis</i>	<i>S. nivalis</i>
<i>S. scouleriana</i>	<i>S. scouleriana</i>	<i>S. scouleriana</i>
<i>S. sitchensis</i>	<i>S. sitchensis</i>	<i>S. sitchensis</i>
<i>S. vestita</i>	<i>S. vestita</i> var. <i>erecta</i>	<i>S. vestita</i>
<i>S. wolfii</i> var. <i>idahoensis</i>	<i>S. wolfii</i> var. <i>idahoensis</i>	<i>S. wolfii</i>

KEYS TO WILLOWS

(of the Umatilla, Malheur and Wallowa-Whitman National Forests)

Notes

- Use of leaf features requires mature, fully-expanded leaves.
- The term “branchlet” is herein used to refer to any stem produced over the most recent four or five growing seasons. “Catkin branchlets” are only those stems which support catkins, and length of each is measured from its point of attachment on the larger branchlet, to the first flower.
- The term “twig” is herein used to refer to only those stems produced during the current growing season.
- The term “usually” is herein used to refer to a character state **that has been found on the majority of plants examined**, but may be missing on occasional individuals, whereas “mostly” is used to refer to a character state **that has been found on a given plant**, on the majority of those structures to which the character state is applied, but may be missing from one or more of those structures.

Plants with pistillate catkins and expanded leaves

- 1a Low shrubs and low creeping shrubs of alpine habitats
 2a. Plants low creeping shrubs, generally < 10 cm tall
 3a Catkin branchlet leafless, yellow-greenish floral bracts, leathery, shiny green leaves *S. reticulata* ssp. *navalis* (*S. navalis* var. *navalis*, *S. navalis*)
 3b Catkin branchlets leafy, dark brown to black floral bracts, dull green leaves that are not leathery (known only from the Wallowa Mtns in our area)
 4a Catkins 1-5 cm long; Leaves not persisting more than one season, lower surface of leaves weakly glaucous to glaucous *S. artica* var. *petraea*
 4b Catkins 0.6 to 2 cm long; Leaves persisting more than one season, lower surface of leaves usually green..... *S. cascadiensis*
 2b Plants low shrubs, 4-40 cm; leaves are thick firm, veiny, dark green and glabrous above, glaucous and long white hairy below; catkins on hairy leafless peduncles *S. vestita*
 1b Plants erect shrubs or trees > 10 cm tall, usually below alpine habitats; leaves generally not leathery
 5a Catkins sessile or nearly so; catkin branchlet leaves (if any) small and bract-like, < 3 mm wide **Group 1**
 5b Catkins on leafy, flowering branchlets; catkin branchlet leaves well developed, 3 mm or more wide or, if less than 3 mm wide, then about as wide as vegetative leaves
 6a Leaf blades narrowly linear, at least 6 times as long as wide
 7a Capsules hairy; flower bracts mostly lanceolate or lance-linear, mostly pointed, and hairy throughout; stipes < 0.5 mm *S. exigua* var. *exigua*
 7b Capsules glabrous; flower bracts mostly obovate to broadly elliptic, blunt, glabrous or hairy at base or on margins only; stipes to 0.7 mm *S. melanopsis* (*S. exigua* ssp. *melanopsis*)
 6b Leaf blades not narrowly linear, < 6 times as long as wide.
 8a Capsules hairy **Group 2**
 8b Capsules glabrous **Group 3**

Group 1 Catkins sessile or leaves of catkin branchlets < 3mm wide

- 1a Capsules hairy
 2a 1st and 2nd year branchlets pruinose..... *S. drummondiana*
 2b 1st 2nd year branchlets not pruinose
 3a Leaf undersurface densely hairy, the hairs obscuring the surface
 4a Stigmas .5-1 mm; upper leaf surface glossy green; freshly-peeled branchlets with a skunky odor occasional forms of..... *S. scouleriana*
 4b Stigmas .2-.3 mm; upper leaf surface dull green; freshly peeled branchlets without a skunky odor *S. sitchensis*
 3b Leaf undersurface sparsely to moderately hairy, the hairs not obscuring the surface
 5a Stipes mostly 1-1.5 (2) mm; freshly peeled branchlets with a skunky odor; hairs (at least some) on leaf undersurface reddish (may be few on some individuals); hairs on twigs mostly stiff and spreading *S. scouleriana*
 5b Stipes mostly (2) 2.5-5 mm; freshly peeled branchlets without a skunky odor; hairs on leaf undersurface all white; hairs on twigs wavy or curly, and appressed *S. hebbiana*
 1b Capsules glabrous
 6a Leaf blades generally oblanceolate, mostly with revolute, entire (rarely toothed) margins; undersurface hairy; styles .3-.8 (rarely > 1) mm; 2nd and 3rd year branchlets not white-streaked due to cracking of bark..... *S. lasiolepis*
 6b Leaf blades broadly elliptic to ovate, margins not revolute, mostly coarsely toothed; undersurface glabrous; styles .7-1.8 mm; 2nd and 3rd year branchlets usually white-streaked due to cracking of bark..... *S. pseudomonticola*

Group 2 Catkins on leafy branchlets; capsules hairy

- 1a Undersurface of leaves densely hairy, the hairs obscuring the surface
 2a. Stigmas .5-1 mm; upper leaf surface glossy green; freshly peeled branchlets with a skunky odor occasional forms of..... *S. scouleriana*
 2b Stigmas .2-.3 mm; upper leaf surface dull green; freshly peeled branchlets without a skunky odor *S. sitchensis*
 1b Undersurface of leaves glabrous to moderately hairy, the hairs not obscuring the surface
 3a Twigs and second-year branchlets pruinose.
 4a Catkins mostly 1.5-3.5 (4.5) cm, elongate; floral bracts black or very dark brown; main stems usually upturned, loosely clustered; stipules sometimes present *S. lemmonii*
 4b Catkins mostly 1-1.5 (2) cm, often subglobose; floral bracts light to medium (occasionally dark) brown; main stems usually straight, tightly clustered; stipules absent *S. geyeriana*
 3b Twigs and second-year branchlets not pruinose.
 5a Leaves glaucous on lower surface, usually glabrous (or nearly so) on upper surface
 6a. Floral bracts yellow to light brown; leaves with all white hairs on undersurfaces.
 7a Stipes (2) 2.5-5 mm *S. hebbiana*
 7b Stipes 0.5 mm or less..... *S. brachycarpa*
 6b Floral bracts dark brown to black; leaves usually with at least some reddish hairs on undersurfaces; stipes 1-2 (2.5) mm.
 8a Leaf blades usually obovate to oblanceolate; freshly peeled branchlets with a skunky odor; plants usually in upland habitats..... *S. scouleriana*

- 8b Leaf blades usually lanceolate to narrowly elliptic; freshly peeled branchlets without a skunky odor; plants usually in riparian habitats..... *S. lemmonii*
- 5b Leaves green and hairy on both surfaces.
- 9a Catkin branchlets avg. > 1.5 cm long; catkins average 3 cm long; flowering branchlets 1-2.5 cm long, with well developed leaves, hairs of branchlets strongly spreading (tending to occur in patches) *S. commutata*
- 9b Catkin branchlets avg. < 1.5 cm long
- 10a Catkins average 2.5-3 cm long; flowering branchlets 0.8-1.5 cm long, with moderately well developed leaves, hairs of branchlets loosely appressed *S. eastwoodiae*
- 10b Catkins average 1.5 cm long; flowering branchlets 0.4-1.3 cm long with reduced leaves, hairs of branchlets appressed to loosely appressed *S. wolfii* var. *idahoensis*
- Group 3** Catkins on leafy branchlets; capsules glabrous
- 1a Mature leaves green on undersurface, not glaucous.
- 2a Leaves with two or more glands near the base of the blade; apex of blade acuminate, tapering to a narrow tip *S. lasiandra* var. *caudata* (*S. lucida* var. *caudata*)
- 2b Leaves without glands on the petioles; apex of blade acute or obtuse, not tapering to a narrow tip.
- 3a Leaves of catkin branchlets .8-2 cm wide; mature leaves usually hairy on both surfaces *S. commutata*
- 3b Leaves of catkin branchlets mostly < .8 mm wide; mature leaves usually glabrous, at least on upper surface.
- 4a Leaves tapering to base; stipes 1-2 (2.5) mm; hairs on twigs (if any) wavy and appressed; floral bracts hairy throughout *S. boothii*
- 4b Leaves, at least some, truncate or cordate at base; stipes (1.5) 2-3 mm; hairs on twigs (if any) stiff and spreading; floral bracts generally glabrous, at least on the distal end *S. eriocephala* var. *monochroma*
- 1b Mature leaves glaucous on undersurface.
- 5a Petioles with two or more glands near the base of blades *S. lasiandra* var. *lasiandra* (*S. lucida* var. *lucida*)
- 5b. Petioles without glands
- 6a Leaf blades narrowly tapering to a slender, acuminate apex; bases of blades tapering to the petioles; floral bracts white to yellow, deciduous..... *S. amygdaloides*
- 6b. Leaf blades broadly tapering to an acute or obtuse apex; bases of blades ± abruptly contracted to the petioles; floral bracts light brown to black, persistent.
- 7a. Leaf blades coarsely toothed, the teeth (at least on some leaves) averaging > 2 mm apart at mid-length
- 8a. Leaves of flowering branchlets (5) 6-9 (11) mm wide; peduncles (1) 5-30 mm long; stipules 1-2 (3) mm, deciduous; 2nd and 3rd year branchlets not white-streaked *S. barclayi*
- 8b Leaves of flowering branchlets 1-3 (5) mm wide; catkin branchlets 1-5 mm long; stipules 2-5 mm long, persistent; 2nd and 3rd year branchlets white-streaked *S. pseudomonticola*
- 7b Leaf blades entire or finely toothed, the teeth rarely averaging > 2 mm apart at mid-length.

- 9a Stipes .3-1.5 (2) mm; leaf margins entire, somewhat rolled; plants usually < 1 m high, strongly colonial; 3rd and 4th year branchlets reddish or brownish; vein reticulations usually conspicuous on upper leaf surface..... *S. farriae*
- 9b Stipes (1) mostly 1.5-4.5 mm; leaf margins mostly finely toothed, not rolled; plants usually well over 1 m high, growing as individuals or in groups of 2-6; 3rd and 4th year branchlets gray; vein reticulations usually obscure on upper leaf surface *S. eriocephala* (*S. rigida*)
- 10a Year-old (not current year) branchlets (at least some) reddish to reddish brown var. *mackenzieana* (*S. prolixa*, *S. rigida* var. *mackenzieana*)
- 10b Year-old branchlets yellow to (mostly) gray var. *watsonii* (*S. lutea*, *S. rigida* var. *watsonii*)

Plants with fully expanded leaves, lacking catkins

- 1a. Low shrubs and low creeping shrubs of alpine habitats
- 2a. Plants low creeping shrubs, generally < 10 cm tall
- 3a. Leaves are leathery, broad, obtuse, retuse, or rounded at tip and abruptly contracted to the petiole, green upper surface, lower surface strongly glaucous and strongly reticulate-veined and glabrous at maturity, lacking cilia on margins ... *S. reticulata* ssp. *nivalis* (*S. nivalis* var. *nivalis*, *S. nivalis*)
- 3b. Leaves are not leathery, narrower than above, tip can be acute,
- 4a. commonly with ciliate margins, weakly reticulate veined, weakly to moderately glaucous. leaves not persisting more than one season (known only from the Wallowa Mtns in our area) *S. arctica* var. *petraea*
- 4b. Leaves persisting more than one season, lower surface of leaves usually green *S. cascadenis*
- 2b. Plants low shrubs, 4-40 cm; leaves are thick firm, veiny, dark green and glabrous above, glaucous and long white hairy below; margins revolute and glandular *S. vestita*
- 1b Plants erect shrubs or trees > 10 cm high, usually below alpine; leaves not leathery.
- 5a Leaves green on both surfaces, not glaucous and not with undersurface obscured by hairs **Group 1**
- 5b Leaves glaucous on undersurface or with undersurface obscured by hairs **Group 2**
- Group 1** Leaves green on both surfaces, not glaucous and not with undersurface obscured by hairs
- 1a Petioles with 2 or more glands just below the blade; blades acuminate, narrowly tapering to a slender apex, the tip often hooked to one side *S. lasiandra* var. *caudata* (*S. lucida* var. *caudata*)
- 1b Petioles lacking glands; blades broadly acute or obtuse, the apex rarely hooked to one side.
- 2a Leaf blades narrowly linear, at least 6X as long as wide.
- 3a Leaf blades hairy; margins entire or remotely toothed *S. exigua* var. *exigua*
- 3b Leaf blades glabrous; margins mostly closely toothed *S. melanopsis*
- 2b Leaf blades narrowly elliptic to ovate, mostly 2-3 (4) X as long as wide.
- 4a Leaf blades hairy on both surfaces
- 5a Twigs with spreading, straight hairs (tending to occur in patches); leaf margins often coarsely gland-toothed, at least early in the season *S. commutata*
- 5b Twigs with loosely to tightly appressed curly or wavy hairs; leaf margins weakly gland-toothed, becoming ± entire later in the season *S. eastwoodiae*.

- 4b Leaf blades glabrous on both surfaces, or hairy on undersurface only
 6a Twigs (at least some) moderately to sparsely hairy, hairs of petiole mostly wavy and generally appressed..... *S. boothii* (*S. myrtilifolia*, *S. pseudocordata*)
 6b Twigs of current season glabrous, occasionally sparsely hairy; hairs of petiole mostly straight and spreading *S. eriocephala* var. *monochroma* (*S. monochroma*, *S. rigida* var. *monochroma*)

Group 2 Leaves glaucous on undersurface, or undersurface obscured by dense hairs

- 1a Leaf undersurface obscured by dense hairs
 2a 1st and 2nd year branchlets pruinose *S. drummondiana*
 2b 1st and 2nd year branchlets not pruinose
 3a Hairs of undersurface so fine as to impart a satiny sheen to surface; upper leaf surface dull green..... *S. sitchensis*
 3b Hairs of undersurface not so fine as to impart a satiny sheen to surface; upper leaf surface glossy green
 4a Freshly peeled branchlets with a skunky odor; leaf blades generally obovate; undersurfaces of leaves often with some reddish hairs occasional forms of *S. scouleriana*
 4b. Freshly peeled branchlets without a skunky odor; leaf blades generally oblanceolate; undersurfaces of leaves without (very rarely with) reddish hairs occasional forms of *S. lasiolepis*
 1b Leaf undersurface glabrous or hairy, but not obscured by dense hairs.
 5a Twigs and second-year branchlets pruinose
 6a Plants 1-3 (5) (avg. 2-2.5) m tall with numerous, slender, upcurving stems arising from a loose, basal cluster; twigs generally glabrous to sparsely hairy; mature leaves glabrous on upper surface; stipules sometimes present *S. lemmonii*
 6b Plants 2-6 (7) (avg. 3-4) m tall with numerous slender, straight, nearly erect stems arising from a tight basal cluster; twigs moderately to densely hairy; mature leaves generally with hairs on both surfaces; stipules absent *S. geyeriana*
 5b Twigs and second-year branchlets not pruinose
 7a Leaf blades narrowly linear, at least 6x as long as wide *S. melanopsis*
 7b Leaf blades lanceolate or narrowly elliptic, to ovate or obovate, mostly 2-3 (5) x as long as wide
 8a Petioles with 2 or more glands just below the blades *S. lasiandra* var. *lasiandra* (*S. lucida* var. *lucida*)
 8b Petioles without glands
 9a Leaf blades acuminate, tapering to a slender apex; each bud with an evident scale margin outlined against the bud surface *S. amygdaloides*
 9b Leaf blades acute to rounded, but not tapering to a slender apex; buds without scale margins outlined against the bud surface.
 10a Twigs glabrous or very sparsely hairy
 11a Leaf blades coarsely toothed, the teeth (at least on some leaves) averaging >2 mm apart at mid-length.
 12a Stipules 1-2 (3) mm, deciduous; 2nd and 3rd year branchlets not white-streaked. *S. barclayi*
 12b Stipules 2-5 mm long, persistent; 2nd and third year branchlets white-streaked. *S.*

- pseudomonticola*
 11b Leaf blades entire or finely toothed, the teeth, if any, rarely averaging > 2 mm apart at mid-length
 13a Leaf margins entire, somewhat rolled; plants usually < 1 m high, strongly colonial, 3rd and 4th year branchlets reddish or brownish; vein reticulations mostly conspicuous on upper leaf surface..... *S. farriae*
 13b Leaf margins mostly finely toothed, not rolled; plants usually well over 1 m high, growing as individuals or in groups of 2-6: 3rd and 4th year branchlets gray; vein reticulations mostly obscure on upper leaf surface *S. eriocephala* (*S. rigida*)
 14a Year-old (not current year) branchlets (at least some) reddish to reddish-brown var. *mackenzieana* (*S. prolixa*, *S. rigida* var. *mackenzieana*)
 14b Year-old branchlets yellow to (mostly) gray var. *watsonii* (*S. lutea*, *S. rigida* var. *watsonii*)
 10b Twigs moderately to densely hairy.
 15a Mature leaves glabrous or nearly so.
 16a Stipules 1-2 (3) mm, deciduous; 2nd and 3rd year branchlets not white-streaked *S. barclayi*
 16b Stipules 2-5 mm long, persistent; 2nd and third year branchlets white-streaked. *S. pseudomonticola*
 15b Mature leaves with at least some hairs on lower surface.
 17a Freshly peeled branchlets with a skunky odor; some (occasionally just a few) hairs on leaf undersurface rusty red; plants usually in upland habitats *S. scouleriana*
 17b Freshly peeled twigs without skunky odor; hairs on leaf undersurface all white; plants usually in riparian habitats.
 18a Leaf blades mostly elliptic to ovate; petioles with hairs wavy and appressed; 2nd and 3rd year branchlets white-streaked due to cracking of bark; mature buds with depressed margins *S. bebbiana*
 18b Leaf blades mostly oblanceolate, obovate, or oblong; petioles mostly with stiff, spreading hairs (tending to persist primarily on those leaves most distal on the branchlets); 2nd and 3rd year branchlets not white-streaked; mature buds lacking depressed margins *S. lasiolepis*

Plants with catkins, leaves not expanded

Identifying willows at the stage when only catkins are present can be a daunting and less than satisfying endeavor. However, the task is simplified when 1) there are a relatively small number of taxa to distinguish between, and 2) at least some of those taxa have one or more unique features that allow for quick identification. Relatively few of the willows in this area have catkins that emerge before the leaves. For identification purposes, young, partially-expanded leaves are generally not very useful as they typically bear little resemblance to mature, fully-expanded ones.

Most of the willows of the UNF will key out reasonably well, IF REPRESENTATIVE MATERIAL IS AVAILABLE, and if features of the whole plant have been noted. However, there are always going to be some individuals that cannot be convincingly identified, being atypical or missing crucial characters. This is true even for specimens in excellent condition. Eight species (*S. bebbiana*, *S. drummondiana*, *S. eriocephala*, *S. lasiolepis*, *S. lemmonii*, *S.*

pseudomonticola, *S. scouleriana*, and *S. sitchensis*) frequently (although, not always) have catkins developing before any trace of vegetative leaves appears, and plants in this condition can generally be quickly assigned to one of these species based on the following:

Plants with pistillate catkins, the leaves not beginning to expand

- 1a Ovaries hairy
 2a 1st and 2nd year branchlets pruinose
 3a Catkins sessile *S. drummondiana**
 3b Catkins on leafy branchlets *S. lemmonii*
- * Very early in the season, before the catkin branchlets have elongated, *S. lemmonii* will key here. However, even at this stage, small leaves can be observed at the base of the catkins, indicating that the catkins will be on leafy branchlets.
- 2b 1st and 2nd year branchlets not pruinose
 4a Stipes mostly 2.5-5 mm long..... *S. bebbiana*
 4b Stipes < 2.5 mm.
 5a Freshly peeled branchlets emitting a skunky odor .. *S. scouleriana*
 5b Freshly peeled branchlets not emitting a skunky odor.
 6a Terminal branchlets with spreading hairs *S. sitchensis*
 6b Terminal branchlets glabrous or with appressed hairs *S. lemmonii*
- 1b Ovaries glabrous
 7a Floral bracts glabrous, at least on distal 2/3..... *S. eriocephala*
 8a 2nd year branchlets yellowish or gray..... *var. watsonii*
 8b 2nd year branchlets reddish *var. mackenzieana or monochroma**
- *cannot distinguish without leaves
 7b Floral bracts hairy throughout
 9a 2nd and 3rd year branchlets white-streaked due to cracking of bark; styles .7-1.8 mm *S. pseudomonticola*
 9b 2nd and 3rd year branchlets not white-streaked; styles .3-.8 mm *S. lasiolepis*

Plants with pistillate catkins leaves not fully expanded

Note

- Measurements of catkins, catkin branchlets and branchlet leaves are those of fully expanded catkins. Those not yet developed will vary in length and width.
- Measurement of catkin branchlet length is from point of catkin attachment, to the first flower.
- Averages are for a whole plant or a major segment of it. (This does not necessarily require a large number of measurements. A few measurements and general observation of the character state throughout the plant will usually suffice.)

- 1a Plants low, creeping shrubs < 10 cm high, usually in alpine habitats *S. reticulata ssp. nivalis*
 1b Plants erect shrubs or trees > 10 cm high, usually below alpine.
 2a Freshly peeled branchlets with a skunky odor; stigmas .5-1 mm, > styles *S. scouleriana*
 2b Freshly peeled branchlets lacking a skunky odor; stigmas rarely > 5 mm, < styles.
 3a Twigs and/or second-year branchlets pruinose.
 4a Catkins sessile..... *S. drummondiana*
 4b Catkins on leafy branchlets.
 5a Catkins 1-2 (2.5) cm long; floral bracts usually light brown, twigs generally hairy; stems

- nearly erect, arising from a tight basal cluster *S. geyeriana*
 5b Catkins 2-5 cm long; floral bracts dark brown or black; twigs generally glabrous or nearly so; stems upturned, arising from a loose, basal cluster *S. lemmonii*
 3b Twigs and/or second-year branchlets not pruinose.
 6a Ovaries hairy **Group 1**
 6b Ovaries glabrous **Group 2**

Group 1 Ovaries hairy

- 1a Stipes mostly 2.5-5 mm; 2nd and 3rd year branchlets white-streaked due to cracking of the bark *S. bebbiana*
 1b Stipes mostly (.1) .5-2 mm; 2nd and 3rd year branchlets not white-streaked
 2a Leaf blades of catkin branchlets narrowly linear, at least 6x as long as wide *S. exigua var. exigua*
 2b Leaf blades of catkin branchlets lanceolate to ovate, mostly 2-4 (5) x as long as wide
 3a Hairs of ovaries very short (.1-.4 mm) and stiff, so dense as to obscure the ovary surface
 4a Terminal branchlets densely hairy *S. sitchensis*
 4b Terminal branchlets glabrous or nearly so *S. lemmonii*
 3b Hairs of ovaries wavy or curly, generally .5-1 mm, not so dense as to obscure the ovary surface
 5a Terminal branchlets hairy
 6a Hairs of terminal and/or second year branchlets strongly spreading, at least in part; catkin branchlets avg. > 15 mm long; catkins mostly (3) 4-8 cm long *S. commutata*
 6b Hairs of terminal and/or second year branchlets loosely appressed throughout; catkin branchlets avg. < 15 mm long; catkins mostly 1.5-3.5 (4) cm long *S. eastwoodiae*
 5b Terminal branchlets glabrous or nearly so *S. lemmonii*

Group 2 Ovaries glabrous

- 1a Catkins sessile or nearly so, the catkin branchlet leaves (if any) < 3 mm wide and < 2 cm long.
 2a 2nd and 3rd year branchlets white-streaked due to cracking of bark; styles .7-1.8 mm long floral bracts elongate, mostly about 2X as long as wide ... *S. pseudomonticola*
 2b 2nd and 3rd year branchlets not white-streaked; styles .3-.8 mm; floral bracts suborbicular, < 2x as long as wide *S. lasiolepis*
- 1b Catkins on leafy branchlets, the branchlet leaves > 3 mm wide or at least 2 cm long.
 3a Catkin branchlet leaves narrowly linear; at least 6x as long as wide *S. melanopsis*
 3b Catkin branchlet leaves not narrowly linear, mostly 2-4 (5) x as long as wide.
 4a Petioles of catkin branchlet leaves (and any other leaves that may be expanded) with 2 or more glands near the base of the blade *S. lasiandra**
- * Taxa which are distinguished on the basis of leaves being either green or glaucous on the undersurface can sometimes be recognized by the condition of the leaves on the catkin branchlets, in which the character state is usually that of the foliage leaves. However, early in the season, the glaucous condition has often not yet developed and its absence does not necessarily indicate that the specimen is a species or variety associated with non-glaucous leaf undersurfaces.
- 4b Petioles of catkin branchlets (or other) leaves without glands
 5a Catkin branchlets with some leaves > 10 mm wide
 6a Hairs of terminal and 2nd year branchlets spreading, at least in part *S. commutata*
 6b Hairs (if any) of terminal and 2nd year branchlets appressed *S. barclayi*

- 5b Catkin branchlets with leaves all < 10 mm wide
- 7a Floral bracts white to pale yellow, soon deciduous *S. amygdaloides*
- 7b Floral bracts brown or black, persistent.
- 8a Styles mostly (.5) .7-1.5 (2) mm long *S. barclayi*
- 8b Styles .3-7 (8) mm long.
- 9a Plants low-growing, usually < 1 m high; axis of most catkins only sparsely tomentose, not obscured by hairs *S. farriae*
- 9b Plants (unless very young) well over 1 m tall; axis of most catkins densely tomentose, mostly obscured by hairs, or nearly so.
- 10a Floral bracts glabrous, at least on the distal 2/3; hairs on twigs (if any) stiff and spreading..... *S. eriocephala*
- 11a 2nd year branchlets yellowish or gray *var. watsonii*
- 11b 2nd year branchlets reddish *var. mackenzieana* or *monochroma**
- *usually cannot distinguish without leaves. See * on pg 20.
- 10b Floral bracts hairy throughout or glabrous only at the tip; hairs on twigs (if any) wavy and appressed *S. boothii*
- Plants with staminate catkins, leaves not fully expanded**
- 1a Stamens 1 per flower *S. sitchensis*
- 1b Stamens 2 or more per flower
- 2a Freshly peeled branchlets emitting a skunky odor *S. scouleriana*
- 2b Freshly peeled branchlets not emitting a skunky odor.
- 3a Stamens 3-8 per flower; floral bracts white to yellow
- 4a Leaves of catkin branchlets with 2 or more glands on the petioles near the base of the blades..... *S. lasiantha**
- *usually cannot distinguish vars. without leaves; see * on pg 20
- 4b Leaves of catkin branchlets without glands on petioles *S. amygdaloides*
- 3b Stamens 2 per flower; floral bracts brown to black
- 5a 2nd and 3rd year branchlets pruinose
- 6a Catkins sessile or nearly so; filaments glabrous .. *S. drummondiana*
- 6b Catkins on leafy branchlets; filaments mostly hairy on lower 1/2
- 7a Main stems usually straight and densely clustered; floral bracts mostly light brown and pointed *S. geyeriana*
- 7b Main stems usually upcurving and loosely clustered; floral bracts dark brown or black, and broadly rounded *S. lemmonii*
- 5b 2nd and 3rd year branchlets not pruinose
- 8a Catkins sessile or catkin branchlet leaves < 3 mm wide and < 2 cm long **Group 1**
- 8b Catkins on leafy branchlets, the branchlet leaves either > 3 mm wide or > 2 cm long **Group 2**
- Group 1** Catkins sessile or catkin branchlet leaves < 3 mm wide and < 2 cm long.
- 1a 2nd and 3rd year branchlets white-streaked due to cracking of bark; floral bracts elongate, at least 2X as long as wide
- 2a Hairs of terminal branchlets wavy and appressed *S. bebbiana*
- 2b Hairs of terminal branchlets either straight and spreading, or absent *S. pseudomonticola*

- 1b 2nd and 3rd year branchlets not white streaked; floral bracts suborbicular, < 2X as long as wide *S. lasiolepis*
- Group 2** Catkins on leafy branchlets, the branchlet leaves > 3 mm wide or > 2 cm long.
- 1a Catkin branchlet leaves narrowly linear, mostly at least 6X as long as wide.
- 2a Floral bracts sharp-pointed, hairy throughout (or nearly so) *S. exigua var. exigua*
- 2b Floral bracts rounded, glabrous or hairy only at base or on margins *S. melanopsis*
- 1b Catkin branchlet leaves not narrowly linear, mostly 2-4 (5) X as long as wide.
- 3a Floral bracts glabrous, at least on the distal 2/3.
- 4a Plants usually < 1 m tall, strongly colonial forming patches 2-10 m across, with numerous stems; hairs (when present) on twigs wavy and appressed *S. farriae*
- 4b Plants usually well > 1 m tall, occurring as individuals or in groups of 2-6; hairs (when present) on twigs mostly straight and spreading *S. eriocephala*
- 5a 2nd year branchlets yellowish to gray *var. watsonii*
- 5b 2nd year branchlets reddish or reddish brown..... *var. mackenzieana* or *var. monochroma**
- *must have leaves to distinguish; see * on pg. 13.
- 3b Floral bracts hairy throughout.
- 6a 2nd and 3rd year branchlets white-streaked due to cracking of bark *S. bebbiana*
- 6b 2nd and 3rd year branchlets not white-streaked
- 7a 2nd year branchlets glabrous or nearly so
- 8a Plants usually < 1 m tall, strongly colonial forming patches 2-10 m across, with numerous stems..... *S. farriae*
- 8b Plants usually well > 1 m tall, occurring as individuals or in groups of 2-6
- 9a Hairs of catkin axis and floral bracts strongly wavy or curly *S. boothii*
- 9b Hairs of catkin axis and floral bracts straight and silky, or nearly so
- 10a Leaves of catkin branchlets without glands on margins, and usually with some red hairs on undersurface *S. lemmonii*
- 10b Leaves of catkin branchlets usually with glands on margins; hairs (if any) all white *S. barclayi*
- 7b 2nd year branchlets hairy.
- 11a Hairs of terminal branchlets spreading, at least in part; some catkin branchlet leaves > 12 mm wide..... *S. commutata*
- 11b Hairs of terminal branchlets all appressed; catkin branchlet leaves all < 12 mm wide *S. eastwoodia*

SPECIES DESCRIPTIONS

Salix amygdaloides Anderss.
Peachleaf willow

Synonyms: None

Habit: Tall shrub or small tree, 2-12 m tall, often with 2-4 leaning trunks.

Vegetative features

- Twigs slightly hairy early in the season, **soon becoming glabrous**; 2nd year branchlets generally white or light gray; **buds each with an evident scale margin overlapping the scale surface on the side facing the branch.**
- **Leaf blades mostly lanceolate to lance-elliptic**, varying to elliptic or ovate, **concavely narrowed to a long-acuminate tip**, (the tip tending to curve to one side), **glabrous, green on the upper surface, glaucous on the under surface**; margins finely toothed.

Floral features

- Staminate catkins 4-7 cm on leafy branchlets; stamens several, typically 5; filaments hairy near base.
- Pistillate catkins 5-10 cm, rather lax, expanding with the leaves, **on short to moderately long leafy branchlets** (the branchlet leaves sometimes deciduous by fruiting).
- **Ovaries/capsules glabrous**; capsules 5-7 mm; stipes 1-2 mm; styles .2-.4 mm.
- **Floral bracts white or yellowish**, hairy, soon deciduous.

Habitat: Found in open areas along stream banks at low elevation.

Distribution: Throughout our area, generally below 4500 feet elevation.

Similar species: *Salix lasiandra* var. *lasiandra* has two or more glands on the petioles near the base of the blades. Var. *caudata* has glands on the petioles, and leaf undersurfaces which are non-glaucous. No other willows in the area normally have leaves with long-acuminate apices.

Notes: While *Salix amygdaloides* is usually fairly distinctive, Hitchcock et al. (1964) note that "none of the characteristics distinguishing *S. amygdaloides* from *S. lasiandra* is so sharply defined as to avoid all difficulty in interpretation". Generally, the presence or absence of glands on the petioles is diagnostic, but *S. amygdaloides* will sometimes have a pair of small thickenings on the petiole, which could be interpreted as (and may actually be) glands. Additionally, there may be glands on the margins of the blade which attach so close to the petiole that they could be mistaken for petiolar glands. Perhaps the most diagnostic feature of this species is the bud scales with overlapping margins. No other willow species in the Pacific Northwest has this character.



Salix amygdaloides: Tall shrub or small tree with glaucous, narrowly-elliptic leaves, concavely narrowed to a long-acuminate tip, and long pistillate catkins on leafy branchlets, with glabrous capsules and pale, white-to-yellow floral bracts.

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

Synonyms: *Salix anglorum*.

Habit: Mat-forming shrub with creeping branches 1-5 (10) cm tall, these often rooting at the nodes.

Vegetative features:

–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.

Floral Features

–Staminate catkins up to 4 cm long; stamens 2 per flower, filaments glabrous.
–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**.
–Ovaries/capsules densely white hairy (becoming less hairy with age) and nearly sessile with styles (0.8) 1-1.5 mm long.
–**Flowering bracts dark brown or black**, rounded at apex, long-hairy, persistent in fruit.

Habitat: Rocky alpine tundra, dry meadows, and fell fields 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*). Found on Granitic, calcareous and volcanic substrates. Elevation 7600-9300 feet.

Distribution: Wallowa Mountains.

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.



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

Synonyms: None

Habit: Shrub (.5) 1-2.5 (5) m high

Vegetative features

- Twigs somewhat hairy with loosely appressed hairs when young, becoming glabrous; 2nd & 3rd year branchlets red to (usually) dark brown or purple.
- Leaf blades moderately to **broadly elliptic or ovate**, glaucous on under surface (not well developed when young); **margins coarsely** (sometimes finely) **serrate** (also not well developed when young), hairy on both surfaces when young, becoming glabrous at maturity except for a dense band of very short hairs on the upper midrib.
- Stipules small and inconspicuous on normal growth, to large and foliaceous on vigorous shoots, eventually deciduous; petioles 3-14 mm.

Floral features

- Staminate catkins 1-3 (4) cm on leafy branchlets; stamens 2, filaments glabrous.
- Pistillate catkins (1) 3-5 (8) cm, expanding with leaves on leafy branchlets (4)8-25 mm long, the **branchlet leaves often very broad**, (.8) 1-1.5 cm wide, and usually (not always!) serrate like foliage leaves.
- Ovaries/capsules glabrous, capsules 3-8 (9) mm, on **stipes** .4-1.5 (3) mm and often **short-hairy**; **styles long** (.5) .7-1.5 (2.5) mm.
- Floral bracts brown to black, with long, silky hairs.

Habitat: Stream banks and wet meadows, occasionally lakeside, often on soils with a thick organic layer, and generally in the mid to upper montane.

Distribution: Uncommon in the Wallowa Mountains and Blue Mountains.

Similar species: Brunsfeld & Johnson (1985) report *S. barclayi* to be the only upper elevation willow with evidently toothed leaves that are glaucous below occurring in east-central Idaho. This situation, in general, appears to be the case in our area as well, but the species can intergrade with several others. *S. farriae* has mostly (nearly always) entire, generally narrower leaf blades, with shorter petioles and styles, and generally shorter flower branchlets; *S. eriocephala* has gray older branchlets, mostly narrower leaf blades and shorter styles, and floral bracts which are glabrous above. Vegetatively, *S. pseudomonticola* is strikingly similar to *S. barclayi*, but has sessile or subsessile catkins, shorter styles, larger, more persistent stipules, white-streaked branchlets, and often occurs at lower elevations. Both species are very uncommon in the Blue Mountains.



Salix barclayi: Medium sized shrub with broadly elliptic to ovate, glaucous, coarsely toothed leaves, and catkins on leafy branchlets with broadly ovate branchlet leaves, glabrous capsules, and long styles.

Salix bebbiana Sarg.
Bebb willow

Synonyms: None

Habit: Large shrub or small tree, up to 9 m tall.

Vegetative features

- Twigs covered with wavy or curly tangled hairs; second and third year branchlets white-streaked as a result of cracking; buds with flattened or depressed margins and apices.
- Leaf blades mostly elliptic to ovate, varying to lanceolate, glaucous and hairy on the undersurface, deep green and mostly glabrous or very sparsely hairy on upper surface; margins mostly entire, occasionally finely-toothed.

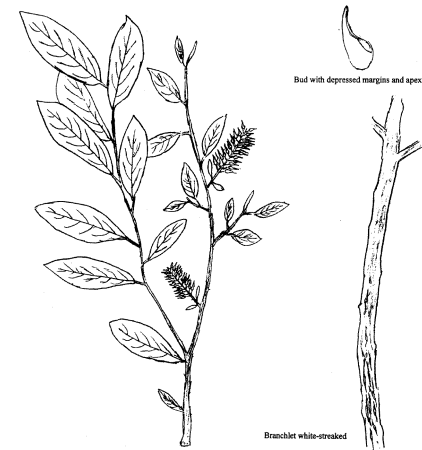
Floral features

- Staminate catkins 1-2.5 cm long, sessile or on short, leafy branchlets; stamens 2; filaments glabrous or nearly so.
- Pistillate catkins 3-5 (6) cm, expanding with the leaves on **short, leafy branchlets**, the branchlet leaves varying from small and bract-like to large and clearly recognizable as leaves.
- **Ovaries/capsules hairy**; capsules 5-9 mm long, **very slender**, rarely > 1.2 mm wide, even at maturity; **stipes (2) 2.5-5 mm**; styles .1-.4 mm.
- Floral bracts hairy, narrow, **yellow to light brown**.

Habitat: Stream banks from low to moderate elevation.

Distribution: Found throughout our area.

Similar species: *Salix scouleriana* has capsules on stipes less than 2 mm long, a skunky odor emitted from freshly peeled branchlets, generally obovate to oblanceolate leaf blades, and usually has reddish hairs on the leaf undersurface. *S. eriocephala* var. *watsonii* and var. *mackenziana* have glabrous capsules, dark brown to black floral bracts, and glabrous leaves and twigs. *S. lemmonii* has stipes mostly less than 2.5 mm, dark brown to black floral bracts, pruinose twigs, and leaves often with reddish hairs on the undersurface.



Salix bebbiana: Tall shrub with reddish-purple, densely-pubescent twigs, white-streaked branchlets; glaucous leaves, and catkins on leafy branchlets with hairy capsules on long stipes, and pale-brown floral bracts.

Salix boothii Dorn
Booth willow

Synonyms: *Salix pseudocordata*; *S. myrtilifolia*

Habit: Many-branched, rounded shrub 2-6 m tall.

Vegetative features

- **Twigs sparsely to moderately spreading-hairy**, occasionally glabrous; mature buds tending to have somewhat depressed or flattened margins and apices.
- Leaf blades mostly narrowly elliptic to elliptic (to ovate); **green on both surfaces, glabrous** or nearly so (very rarely with red hairs [= hybrid?]); **margins often with fine, gland-tipped teeth.**

Floral features

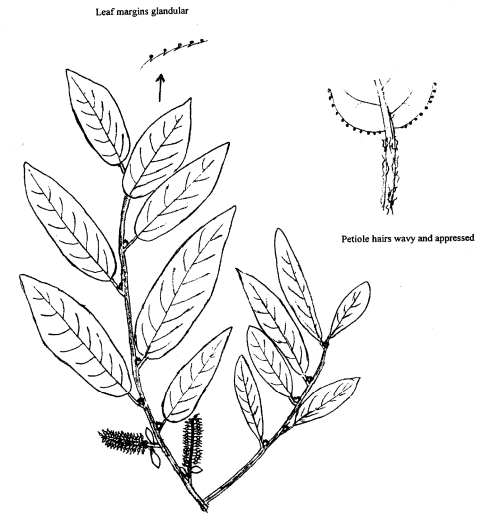
- Staminate catkins 1-2.5 cm long, on short, leafy flowering branchlets; stamens 2; filaments glabrous.
- Pistillate catkins (1) 2-4 (5.5) cm long, expanding with leaves **on short, leafy branchlets.**
- **Ovaries/capsules glabrous**; capsules (2.5) 3-6 mm; **stipes 1-2 (2.5) mm**; styles 0.2-1 (1.5) mm.
- **Floral bracts brown to black, covered with long, curly, tangled hairs.**

Habitat: Wet meadows, streamsides, and swamps at moderate elevation.

Distribution: Widespread throughout our area.

Similar species: *Salix boothii* is one of only three willows in the area characterized by leaves which are green and, glabrous on both surfaces, the other two being *S. lasiandra* var. *caudata* and *S. eriocephala* var. *monochroma*. *S. lasiandra* differs in having light-colored floral bracts, narrowly acuminate leaf tips, and glands on the petioles. *S. eriocephala* var. *monochroma* has generally longer (2-4 mm) stipes, and floral bracts which are mostly glabrous on the distal 2/3. Few vegetative features consistently separate the two. Dorn (1995) points out that *S. boothii* has stipules which are more often deciduous and, often, partly yellowish year-old branchlets. Other observable tendencies that may be useful include leaf bases which are more-or-less tapered (rather than truncated), and petiole hairs which tend to be wavy and appressed (rather than spreading).

Notes: This species would key in Hitchcock et al. (1964) as *S. myrtilifolia*, a mainly boreal species not known to occur in the area. Dorn (1975) separated these taxa on the basis of chemical, cytological and morphological features, and keys them as either having leaves glabrous from the start (*S. myrtilifolia*) or leaves hairy when young (*S. boothii*).



Salix boothii: Medium-sized to tall shrub with elliptic leaves which are green on both surfaces, and pistillate catkins on leafy flowering branchlets with glabrous capsules and brown or black floral bracts.

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

Synonyms: None

Habit: Low to medium shrubs mostly 0.3-1 m tall (occasionally as large as 1.5 m).

Vegetative Features:

–**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.

Floral features

–Staminate catkins 4-10 mm long, on leafy flowering branchlets 1-5 mm long; stamens 2 per flower.

–Pistillate catkins 12-23 mm long, appearing with the leaves on leafy flowering branchlets 2-13 mm long.

–Ovaries/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.

–Flowering bracts **yellowish to greenish or light brown** with a reddish tip, pubescent with long hairs, persistent in fruit.

Habitat: High meadow and alpine species, mostly growing over rocks in boggy meadows and lake borders at 5300-9000 feet.

Distribution: Wallowa Mountains.

Similar Species: *S. arctica* is a mat-forming shrub less than 10 cm tall with oval, glabrate leaves.



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 cascadenis Cockerell
Cascade Willow

Synonyms: None

Habit: Prostrate or creeping alpine shrubs typically under 4 cm tall.

Vegetative features:

- 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.

Floral features:

- Staminate catkins 0.6-1.2 cm long; stamens 2 per flower;
- Pistillate catkins 6-20 mm long, on leafy flowering branchlets 2-20 mm long, appearing with the leaves.
- Ovaries/capsules pubescent (may become glabrate with age), 4-5 mm long, sessile; styles 0.3-1.2 mm long.
- Flowering bracts dark brown, pubescent with hairs longer than the bract, persistent in fruit.

Habitat: Moist alpine meadows and rocky slopes, about 8000 feet.

Distribution: Wallowa Mountains.

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. reticulata* has more rounded leaf tips and leafless flowering stems.



Salix cascadenis: 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 commutata Bebb
Undergreen willow

Synonyms: None

Habit: Low to medium shrub, generally .5-1 (3) m tall.

Vegetative features

- Twigs densely pubescent with long, spreading hairs which tend to occur in dense patches, especially around the bases of petioles and persisting on 2nd and 3rd year branchlets.
- Leaf blades mostly ovate to broadly elliptic, varying to narrowly elliptic, green (not glaucous) and hairy on both surfaces (rarely nearly glabrous); margins generally with coarse, gland-tipped teeth, especially early in the season, often becoming fine toothed or more or less entire later in the season.

Floral features

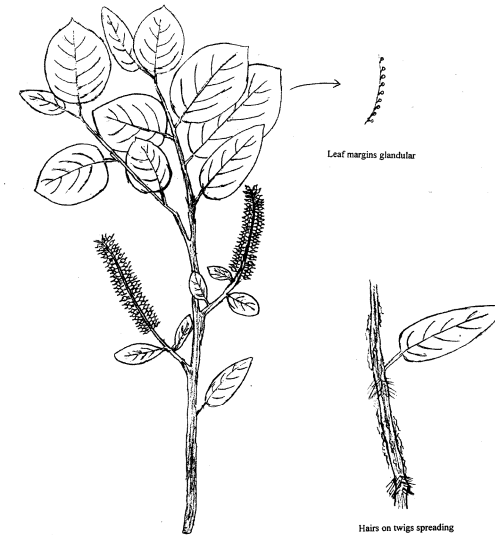
- Staminate catkins 1.5-2.5 cm long on leafy branchlets; stamens 2, sometimes united; filaments glabrous.
- Pistillate catkins 3-5 (8) cm long, expanding with the leaves on leafy branchlets 1-2.5 (3) cm long, the branchlet leaves often quite broad (1-2 cm).
- Ovaries/capsules glabrous or (rarely) pubescent; capsules 3-6 mm; stipes to 1 (1.5) mm; styles .5-1.2 mm.
- Floral bracts light to dark brown, with long, wavy hairs.

Habitat: Streamsides, lakeshores, and wet meadows at mid to high elevation, 5300 to 8200 feet.

Distribution: Mostly in the Blue Mountains and the Wallowa Mountains.

Similar species: *Salix eastwoodiae* differs in having narrower, more elliptic (than ovate) leaves, shorter catkins and catkin branchlets, appressed, wavy hairs on the twigs, and more finely toothed leaf margins. Near-glabrous leaved forms of *S. commutata* can be distinguished from *S. boothii* by the longer catkin branchlets, lighter colored floral bracts, and spreading (rather than appressed) hairs on the branchlets. *S. eriocephala* var. *monochroma* can be separated by having glabrous twigs, longer (1.5-4 mm) stipes, and darker floral bracts.

Notes: *Salix commutata* is very similar to *S. eastwoodiae*, and the distinction between them is not always clear. Brunsfeld and Johnson (1985) list several characters for separating them, but there is overlap in nearly all. Generally, orientation of the hairs on the twigs appears to be a reliable, season-long distinguishing feature, but even this condition is not evident on all specimens.



Salix commutata: Low to medium shrub with broadly ovate leaves which are green and hairy on both surfaces, and pistillate catkins on leafy branchlets, usually with glabrous capsules and brown, hairy floral bracts.

Salix drummondiana Barret ex Hooker
Drummond willow

Synonyms: None

Habit: Medium-size shrub, generally 2-4 (6) m tall.

Vegetative features

- Twigs green to purple, glabrous or sparsely hairy, **becoming strongly pruinose; 2nd and 3rd year branchlets also pruinose.**
- **Leaf blades mostly elliptic to oblong**, varying to narrowly elliptic or lanceolate, dark green and glabrous on the upper surface, **glaucous and densely silky hairy on the lower**; margins mostly entire and somewhat rolled.

Floral features

- Staminate catkins sessile, 1-2.5 (3) cm long; stamens 2, often united near base; filaments glabrous.
- Pistillate catkins 1.5-4 (6) cm long, **sessile, expanding before the leaves.**
- **Ovaries/capsules densely hairy**; capsules 3-4.5 (6) mm; stipes mostly .1 to .6 (rarely to 2) mm; styles .6-1.2 mm; stigmas often undivided.
- Floral bracts dark brown or black, with long hairs.

Habitat: Streamsides, lakeshores, and wet meadows at mid to high elevation.

Distribution: Blue Mountains and Wallowa Mountains.

Similar species: *Salix geeyeriana* and *S. lemmonii* are the only other willows in the area that have pruinose stems. Both have catkins on leafy branchlets, and neither have the dense, fine, silky hairs obscuring the leaf undersurface. *S. sitchensis* has similar hairs on the leaves, but also has catkins on leafy branchlets, densely hairy twigs, and lacks the pruinose condition.

Notes: The combination of pruinose stems, densely silky-hairy leaf undersurface, and sessile catkins which develop before the leaves makes *Salix drummondiana* one of the easiest of the willow species in the area to identify.



Salix drummondiana: Medium-size shrub with pruinose twigs and branchlets, sessile catkins, and elliptic leaves which are densely silky-hairy on the lower surface,

Salix eastwoodiae Cockerell ex Heller
Eastwood willow

Synonyms: None

Habit: Low to medium shrub, 1-2 (4) m tall.

Vegetative features

- **Twigs hairy with loosely appressed, curly or wavy hairs**, the hairs persisting for 2-3 years.
- **Leaf blades mostly broadly elliptic**, varying to ovate or obovate, or narrowly elliptic, **green and hairy on both surfaces**, the hairs tending to impart a silvery appearance to the leaves; margins generally gland-toothed, at least early in the season, becoming more or less entire later on.

Floral features

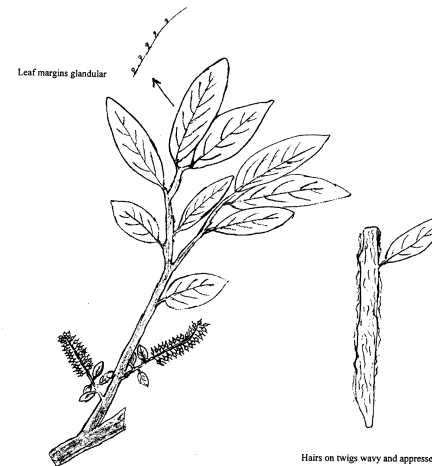
- Staminate catkins 1-2 (3) cm long on leafy branchlets; stamens 2; filaments glabrous or hairy.
- Pistillate catkins 1.5-4 cm long, expanding with the leaves **on leafy branchlets (3) 8-15 (20) mm long**.
- **Ovaries/capsules hairy** (rarely glabrous); capsules 3-5 (7) mm; stipes to 1.5 (1.8) mm; styles .4-1.2 (1.5) mm.
- **Floral bracts hairy, dark brown or black.**

Habitat: Stream banks and lakesides at moderate to high elevation.

Distribution: Mountains in our area.

Similar species: *Salix commutata* differs in having broader leaves, longer catkins, and twigs with hairs that are straight and spreading rather than curly or wavy, and appressed. No other willows in the area have leaves that are green and hairy on both sides, but see discussion under *S. commutata*.

Notes: Prior to Dorn's (1975) study of this group, *S. eastwoodiae* was not known to occur in the Pacific Northwest, and thus does not appear in Hitchcock et al. (1964), or any other flora of the area published before 1975. All material of *S. eastwoodiae* collected before that time was referred to either *S. commutata* or *S. wolfii*, both of which intergrade with *S. eastwoodiae*.



Salix eastwoodiae: Low to medium-sized shrub with non-glaucous, elliptic leaves which are hairy on both surfaces, with glandular margins (on younger leaves), and pistillate catkins on leafy branchlets, with pubescent capsules and black floral bracts.

Salix eriocephala Michaux
 Rigid Willow
 var. *mackenzieana* (Hook.) Dorn
 var. *monochroma* (C. R. Ball) Dorn
 var. *watsonii* (Bebb) Dorn

Synonyms: See below

Habit: Large shrub or small tree, generally 2-4 (9) m tall; stems sometimes 10 cm in diameter.

Vegetative features

- **Twigs glabrous** or nearly so, (rarely with widely spreading hairs); second and third year branchlets yellow or gray to dark red or brown, depending on variety
- Leaf blades generally broadly lanceolate to elliptic, at least some (usually many) **abruptly contracted to the petiole**, or even somewhat cordate at the base, **glabrous or nearly so, green on the upper surface, glaucous on the lower** (except var. *monochroma* which has blades green on both surfaces); margins are generally finely-toothed, varying to entire.

Floral features

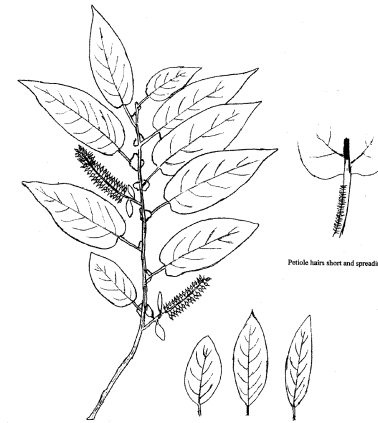
- Staminate catkins 2-5 cm long on very short, leafy branchlets; stamens 2; filaments glabrous, commonly united below.
- Pistillate catkins 3-6 (9) cm long, emerging before or with the leaves, **on short leafy branchlets**.
- **Ovaries/capsules glabrous**; capsules 3-7 mm; **stipes (1.5) 2-4 (4.5) mm**; styles .2-.7 mm.
- Floral bracts mostly dark brown to black, occasionally lighter, **glabrous, at least on upper 2/3, often hairy below**.

Habitat: Streamsides, lakesides, and wet meadows. Frequently found on gravel (alluvial) bars.

Distribution: Widespread in our area.

Similar species: *Salix bebbiana* has hairy twigs, leaves, and capsules. *S. scouleriana* has a skunky odor emitted from freshly peeled branchlets, generally obovate leaf blades, hairy twigs and capsules, and shorter stipes (up to 2 mm). *S. boothii* can be especially difficult to distinguish from var. *monochroma*. See comments under that species.

Notes: The willows described above are part of a complex of about half a dozen willow taxa that are not all clearly distinguishable. Var. *monochroma* keys out rather cleanly on the basis of non-glaucous leaves, but Hitchcock et al. (1964) do not recognize this taxon as anything more than a non-glaucous form of var. *mackenzieana*. Vars. *watsonii* and *mackenzieana* separate on color of



Salix eriocephala: Large shrub with grayish stems and leaf blades that are glabrous, finely toothed, and tend to abruptly contract to the petiole at the base, and with pistillate catkins on leafy branchlets with long-stalked, glabrous capsules and brown, sub-glabrous floral bracts. The second and third year branchlets (yellow or gray in var. *watsonii*, red or reddish brown in var. *mackenzieana*). Other characters including leaf length/width ratio are provided by Hitchcock et al. (1964), but there is so much overlap and inconsistency in character states that they are of limited value.

The nomenclature in this group has undergone considerable change over the years. Extensive discussion is provided by Hitchcock et al. (1964), Brunsfeld and Johnson (1985), and Dorn (1995). The names adopted by this guide follow Nelson and Hartman (in ed.) as abbreviated from Dorn (1995). Those synonyms most likely to be encountered in recent literature are provided below.

Salix eriocephala var. *mackenzieana*- Mackenzie willow
S. rigida var. *mackenzieana*
S. proluxa

Salix eriocephala var. *monochroma*- Greensides willow
S. rigida var. *mackenzieana*
S. monochroma

Salix eriocephala var. *watsonii*- Yellow willow
S. rigida var. *watsonii*
S. lutea

Salix exigua Nutt. var. *exigua*
Sandbar willow

Synonyms : *Salix exigua* ssp. *exigua* var. *exigua*.

Habit: Colonial, many-branched shrub (1) 2-3 m tall, often forming dense thickets, occasionally becoming tree-like and up to 8 m tall.

Vegetative features

- **Twigs pubescent with straight, appressed hairs.**
- **Leaf blades narrowly linear, varying to lance-linear or linear-elliptic**, silvery-hairy when young, sparsely so at maturity, **green on both surfaces**; margins entire or remotely toothed; **petioles very short (mostly < 5 mm, rarely to 6 mm).**

Floral features

- Staminate catkins on short, leafy branchlets; stamens 2, the filaments hairy near the base.
- Pistillate catkins 2-4 cm, emerging with or after the leaves, the first ones **on very short leafy branchlets** arising from branchlets of the previous year, **later ones much longer** arising from current year's growth.
- **Ovaries/capsules pubescent**; capsules 3-5 mm, sessile or on stipes to 2 mm; styles .2 mm.
- **Floral bracts yellow (occasionally light brown), sharp-pointed, pubescent and soon deciduous.**

Habitat: Stream banks, flood plains, lake shores, and ditches. Frequently found on gravel (alluvial) bars.

Distribution: Widespread in our area.

Similar species

Salix melanopsis differs in having glabrous ovaries and capsules, floral bracts which are rounded and glabrous (or hairy only near the base or along margins) and leaves which are essentially glabrous at maturity. The distinction is not nearly as clear-cut as the description implies, however. These two species intergrade in almost all character states, and it is often difficult to reach a satisfying determination.

Notes

The *Salix exigua/ melanopsis* complex is notoriously difficult, with several taxa being variously lumped and segregated by different authors. Not only does *S. melanopsis* present problems with identification, but Dorn (1998) recognizes other infraspecific entities of *S. exigua* which are documented to occur just outside the Umatilla NF. It is quite possible that these taxa do, in fact, occur within the boundaries of the Umatilla and/or Malheur National Forest, and future collections may disclose that there are additional willows to contend with.



Salix exigua var. *exigua*: Many-branched, colonial shrubs with numerous, slender stems and linear leaves, and pistillate catkins on leafy branchlets with glabrous capsules and pale floral bracts.

Salix farriae Ball
Farr's willow

Synonyms: None

Habit: Low shrubs, usually < 1 (rarely to 2) m tall, often forming dense clumps several meters across.

Vegetative features

- Twigs sparsely to moderately hairy with loosely appressed hairs, becoming glabrous.
- Leaf blades **elliptic to ovate or obovate**, glaucous on the lower surface, **usually entire-margined** (occasionally shallowly toothed) and glabrous on both surfaces; **veins on upper surface tending to be prominent**; stipules deciduous but, when present, **tending to be elongate and sharp-pointed**

Floral features

- Staminate catkins .8-1.5 (2) cm long on short, leafy branchlets; stamens 2; filaments glabrous.
- **Pistillate catkins (1) 1.5-3 cm long**, arising with the leaves **on short, leafy branchlets**, the branchlet leaves rather broad, 6-9 (11) mm wide.
- **Ovaries/capsules glabrous**; capsules (3) 4-6 mm; stipes mostly .2-1 (rarely to 2) mm; styles .3-1 mm.
- Floral bracts brown or black, glabrous to long silky hairy.

Habitat: Wet meadows and streambanks at mid to upper elevations.

Distribution: Heritage List 2 species. Found in the Wallowa Mountains and northern Umatilla National Forest.

Similar species: *Salix pseudomonticola* differs in having sessile catkins and toothed leaf margins. *S. lemmonii* is a taller plant with upcurved stems and pruinose branches. *S. scouleriana* is taller, has a skunky odor released from freshly peeled branchlets, and reddish hairs on the leaf undersurface. *S. eriocephala* (vars. *mackenzieana* and *watsonii*) is a taller plant with longer stipes, rounded stipules, finely-toothed leaf margins, and leaf veins which are obscure on the upper surface.

Notes: *Salix farriae* grades into a number of other species with respect to most character states. Examination of several different features is sometimes necessary in order to reliably identify this taxon. The species is known to a single site on the Umatilla National Forest, but is apparently more common in the neighboring Wallowa Mountains.



Salix farriae: Low-growing, nearly glabrous shrubs with entire, glaucous, prominently veiny leaves, and catkins borne on leafy branchlets.

Salix geyeriana Anderss.
Geyer willow

Synonyms: None

Habit: Shrub 1.5-4.5 (6) m tall, with numerous, slender, straight, nearly erect stems arising in a tight, basal cluster.

Vegetative features

- **Twigs usually densely hairy; twigs and second year branchlets pruinose**, usually strongly so.
- **Leaf blades lanceolate to elliptic, and sharply acute**, glaucous on the lower surface, usually hairy on both upper and lower surface, **the hairs imparting a silvery appearance to the leaves**; margins usually entire or inconspicuously toothed.

Floral features

- Staminate catkins 1-1.5 cm long on short, leafy branchlets; stamens 2; filaments hairy on lower 1/2.
- **Pistillate catkins 1-1.5 (2.5) cm long**, arising with the leaves on **short, leafy branchlets**.
- **Ovaries/capsules hairy**; capsules 3-6 mm; stipes 1-2.5 mm; styles .1-.8 mm.
- **Floral bracts hairy, usually narrow and light brown**, varying to dark brown or black, hairy.

Habitat: Wet meadows, streambanks and lakesides at low to mid elevation.

Distribution: Throughout our area, but more common in the southern half of the Blue Mountains.

Similar species: *Salix lemmonii* and *S. drummondiana* are the only other willows known to the area with pruinose twigs and branchlets. *S. lemmonii* differs in having shorter (1-3 m), upcurving stems from a loose basal cluster, longer (2-4.5 cm) pistillate catkins, dark brown or black floral bracts, leaves which are glabrous on the upper surface at maturity, and in sometimes having well-developed stipules. *S. drummondiana* has sessile catkins, and the lower surfaces of the leaves are obscured by fine, silky hairs

Notes: *Salix geyeriana* and *S. lemmonii* can generally be separated fairly reliably when pistillate catkins are available. However, attempts to distinguish between the two based on vegetative features alone are often frustrating, as most of the characters (particularly leaf pubescence) commonly used to separate them are at least somewhat variable. In these cases, as many characters as possible should be examined to increase the likelihood of accurate determination.



Salix geyeriana: Tall, upright shrubs with pruinose branchlets, leaves which are glaucous on the undersurface and silvery-hairy on both surfaces, and pistillate catkins on leafy branchlets, with hairy capsules and light-brown, hairy floral bracts.

Salix lasiandra Benth.
var. *caudata* (Nutt.) Sudw. - whiplash willow
var. *lasiandra* - Pacific willow

Synonyms: *Salix lucida* ssp. *caudata*; *S. lucida* ssp. *lasiandra*.

Habit: Shrub or small tree, 3-6 (15) m tall with stems up to 6 (usually 1-3) dm thick.

Vegetative features

- Twigs finely spreading hairy when young, becoming sparsely so with age, and **persisting on second and third year branchlets**.
- **Leaf blades lanceolate to narrowly elliptic, generally long-acuminate**, the apex tapering to a slender tip which is typically **bent to one side**, green on both surfaces (var. *caudata*) or glaucous on the undersurface (var. *lasiandra*), glabrous or nearly so at full maturity; margins finely toothed, the teeth mostly gland-tipped; **petioles with two or more glands near the base of the blade**.

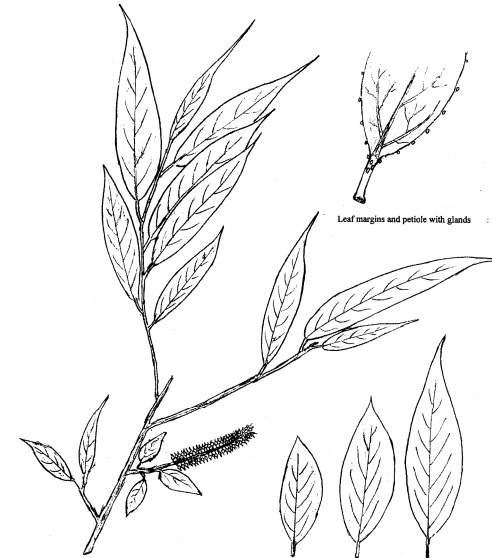
Floral features

- Staminate catkins 2-7 cm long, on leafy branchlets; stamens 3-8, typically 5; filaments hairy toward base.
- **Pistillate catkins 2-12 (mostly 3-6) cm on leafy branchlets 10-35 (45) mm long**
- Ovaries/capsules glabrous**; capsules 4-8 mm long, stipes .7-2 (4) mm; styles .5-1 mm.
- **Floral bracts yellow, hairy on lower portion**, glabrous on terminal portion, deciduous.

Habitat: Stream banks, flood plains, and lake shores at low to mid elevation. Streamsides, lakesides, and wet meadows. Frequently found on gravel (alluvial) bars with *S. exigua* and *S. eriocephala* in the *Salix exigua* plant association (Clausnitzer and Crowe; Wells).

Distribution: More common in the southern part of the Blue Mountains.

Similar species: *Salix amygdaloides* lacks glands on the petioles, and has evident bud scale margins, each overlapping the bud surface. See notes under that species.



Salix lasiandra: Large shrub or small to medium-sized tree with long-acuminate leaf blades, petioles with small glands, and pistillate catkins on leafy branchlets with glabrous capsules and pale, deciduous floral bracts.

Salix lasiolepis Benth.
Arroyo willow

Synonyms: None

Habit: Shrub or small tree, usually 1-6 m tall.

Vegetative features

- Twigs yellowish to reddish, **usually spreading-hairy**, but varying to appressed-hairy or (rarely) nearly glabrous.
- **Leaf blades generally oblanceolate**, varying to narrowly oblong or elliptic, the **undersurface glaucous** and sparsely to densely hairy, occasionally the hairs so dense as to obscure the surface; **upper surface glossy green**, usually glabrous; **margins revolute**, usually entire but occasionally shallowly toothed; petioles usually with spreading hairs, tending to disappear late in the season on all but those leaves most distal on the branchlets.

Floral features

- Staminate catkins 2.5-4.5 cm long, sessile or nearly so; stamens 2; filaments glabrous. - Pistillate catkins 2.5-6 cm long, emerging with or before the leaves, **sessile or nearly so**.
- **Ovaries/capsules glabrous**; capsules 3-5 mm long; stipes 1-2 (2.2) mm; styles .3-.8 mm.
- Floral bracts suborbicular, densely hairy, dark brown or black.

Habitat: Along streams at lower elevations, generally less than 4,000 feet.

Distribution: Documented from the Snake River Canyon, and along Meadow Creek and Bear Creek in Starkey Experimental Forest, as well as all districts on the Umatilla National Forest. More common near the Columbia Gorge and south of us in Harney (Alvord basin) and Malheur (Owyhee River and uplands) Counties. Also found in western Oregon, more common in California (Hitchcock, et al 1964).

Similar species: Typical *Salix lasiolepis* can be confused with *S. scouleriana* which differs in having hairy ovaries and capsules, a skunky odor emitted from freshly peeled branchlets, and reddish hairs on the leaf undersurface. Occasional individuals of both *S. lasiolepis* and *S. scouleriana* may have leaves with the undersurfaces obscured by dense hairs, thus resembling *S. sitchensis*. Such specimens of *S. lasiolepis* can be distinguished from *S. sitchensis* by having glabrous ovaries and capsules, shiny (rather than dull) upper leaf surfaces, and leaf undersurfaces which do not have a satiny sheen.



Salix lasiolepis: Medium-sized shrub to small tree with oblanceolate leaf blades which are glaucous and sparsely hairy below, and sessile pistillate catkins with glabrous capsules and dark, hairy, suborbicular floral bracts.

Salix lemmonii Bebb
Lemmon's willow

Synonyms: None

Habit: Shrub 1-3 m tall with numerous, slender, crooked, upturned stems, arising from a loose, basal cluster.

Vegetative features

- Twigs **mostly glabrous to sparsely pubescent**, occasionally moderately so, **becoming pruinose**; second year branchlets glabrous and usually **strongly pruinose**- Leaf blades **lanceolate to lance-elliptic**, varying to elliptic, shiny green and glabrous above, glaucous and hairy below (occasionally glabrous), generally some of the hairs rusty red; margins entire or inconspicuously toothed; stipules sometimes present, particularly late in the season.

Floral features

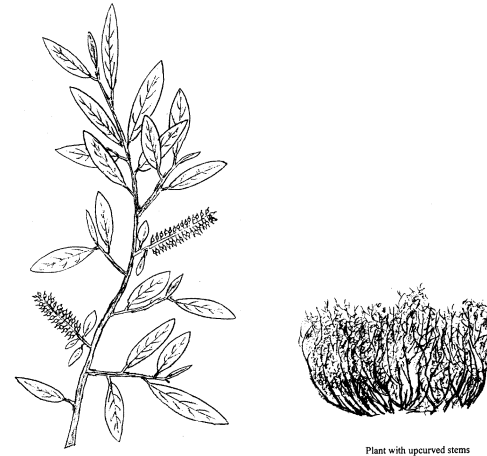
- Staminate catkins 1-2 (3.5) cm on leafy branchlets; stamens 2; filaments hairy on lower 1/2.
- **Pistillate catkins 2-5 cm**, emerging with the leaves **on short (to 1 cm), leafy branchlets**.
- **Ovaries/capsules hairy**; capsules 5-7 mm; stipes .5- 2.5 mm.long; styles .2-.9 mm. - **Floral bracts rounded, dark brown or black**, sparsely to moderately long-hairy.

Habitat: Streambanks, from low to moderate elevation in the mountains.

Distribution: More common in the southern half of our area, though found throughout.

Similar species: *Salix geyeriana* and *S. drummondiana* are the only other willows in the area that have pruinose branchlets. *Salix geyeriana* differs in having mostly shorter (1-2 cm) catkins, light brown, generally pointed floral bracts, leaves which are persistently hairy on the upper surface, and twigs which are moderately to densely hairy. Additionally, the growth form is that of a tall shrub with straight, densely-clustered stems. *Salix drummondiana* has sessile catkins, and dense, silky hairs obscuring the leaf undersurface.

Notes: *Salix lemmonii* is not always clearly distinguishable from *S. geyeriana*, especially in the absence of catkins. The density of hairs on twigs and leaves is variable enough in both species to cast doubt on its reliability as a separating feature. As many different characters as possible (including overall form) should be noted to increase the odds of correctly identifying the specimen. Specimens are sometimes encountered on which the branchlets are not pruinose. A field guide must accommodate this possibility by keying the species as both pruinose and non-pruinose.



Salix lemmonii: Medium-sized shrub with numerous, upcurved stems, pruinose branchlets, green, glabrous upper leaf surfaces and glaucous undersurfaces, and pistillate catkins on hairy branchlets with hairy capsules and dark, long-hairy floral bracts.

Salix melanopsis Nutt.
Dusky willow

Synonyms: *Salix exigua* ssp. *melanopsis*

Habit: Colonial, many branched shrub 2-3 (5) m tall.

Vegetative features

- Twigs sparsely to moderately pubescent, the hairs curly to wavy, and loosely appressed.
- Leaf blades mostly **narrowly linear, at least six times as long as wide**, varying to linear-elliptic, **glabrous or nearly so at maturity**, green on the upper surface, lighter or sometimes slightly glaucous on the lower surface; **margins generally coarsely toothed**, varying to entire; petioles very short (< 5 mm long).

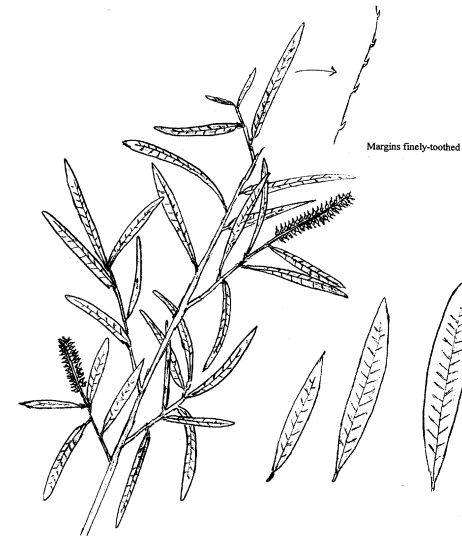
Floral features

- Staminate catkins 1.5 -3.5 cm long, on short, leafy branchlets; stamens 2; filaments hairy towards base.
- **Pistillate catkins 2-4 cm**, emerging with or after the leaves **on leafy branchlets**.
- **Ovaries/capsules glabrous**; capsules 3-6 mm; stipes to .7 mm; styles generally obsolete, the two stigmas lobed to the ovary, occasionally undivided and .2-.4 mm.
- **Floral bracts yellow, generally blunt at the tip, usually glabrous or hairy only at the base or along the margins**, soon deciduous.

Habitat: Streambanks, flood plains, lake shores, and ditches. Frequently found on gravel (alluvial) bars.

Distribution: Widespread in our area, though it appears to be more common on the Umatilla and Wallowa-Whitman National Forests.

Similar species: *Salix exigua* var. *exigua* differs primarily in having pubescent ovaries and capsules, persistently hairy leaves, and more pointed, more hairy floral bracts. See cautionary notes in discussion of that taxon.



Salix melanopsis: Many-branched shrub with narrow, elongate leaves, and pistillate catkins on leafy branchlets with glabrous capsules and rounded, usually glabrous floral bracts.

Salix pseudomonticola Ball
False mountain willow

Synonyms: *Salix monticola*

Habit: Shrub 1-5-4 (6) m tall.

Vegetative features

- Twigs sparsely to densely hairy, the hairs sometimes persistent on 2nd year branchlets; 2nd and 3rd year branchlets white-streaked due to cracking of bark.
- Leaves tending to be red-tinged while expanding; **blades mostly elliptic, ovate or obovate**, glabrous or nearly so, **green on upper surface, glaucous on the lower**; **margins conspicuously toothed**, varying to nearly entire; petioles and midribs (less so than petioles) tending to be red; base of blades often truncate or cordate.

Floral features

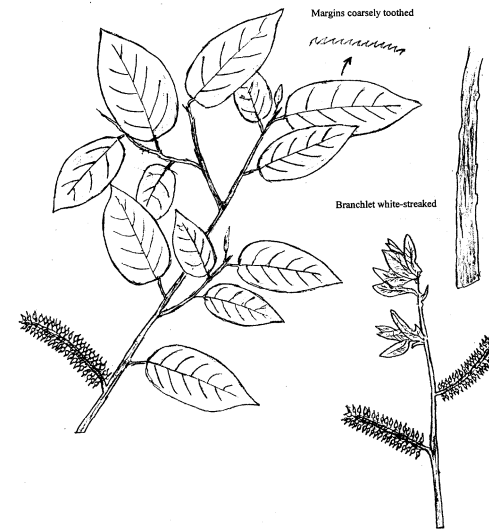
- Staminate catkins 1-3.5 cm long, sessile or nearly so; stamens 2; filaments glabrous.
- **Pistillate catkins 1-6 (9) cm long**, emerging before the leaves, **sessile or on short (< 1 cm) branchlets with small, bract-like leaves, or none at all**.
- **Ovaries/capsules glabrous**; capsules 3-6 mm long; stipes .5-2 (2.5) mm; styles often conspicuously elongate (.7-1.8 mm).
- Floral bracts brown to black, long-hairy.

Habitat: Streambank, swamps, and wet meadows at moderate elevation.

Distribution: Documented from the southeastern portion of the Umatilla National Forest and the Wallowa Mountains.

Similar species: *Salix eriocephala* (vars. *watsonii* and *mackenzieana*) can strongly resemble *S. pseudomonticola*, but differs in having catkins on leafy branchlets, stipes 2-4.5 mm long, styles 0.2-0.7 mm, and glabrous twigs. *S. scouleriana* can also resemble *S. pseudomonticola*, especially before the leaves have expanded, but differs in having hairy ovaries, and a skunky odor emitted from freshly peeled branchlets.

Notes: Reports of *Salix monticola* (a southern Rocky Mountain species) for the Umatilla National Forest have been based on nomenclature provided by Hitchcock et al. (1964), and have subsequently been determined to be *S. pseudomonticola* (Dorn, 1975). A brief, concise discussion of the taxonomy of these species is provided by Brunfeldt and Johnson (1985).



Salix pseudomonticola: Low to medium-sized shrub with white-streaked branchlets, glabrous, glaucous, coarsely toothed leaves, the bases abruptly contracted to the petiole, and sessile pistillate catkins with glabrous capsules and dark, long-hairy floral bracts.

Salix reticulata L. ssp. *nivalis* (Hook.) A. & D. Love and Kapoor
Snow willow

Synonyms: *Salix nivalis* var. *nivalis*; *S. reticulata* var. *nana*.

Habit: **Matted shrub, 1-4 (8) cm tall**, spreading at or below ground level.

Vegetative features

- Twigs usually glabrous, sometimes sparsely hairy just below the catkins; **bud scales persisting for several years, imparting a coarse, scaly appearance to the stem.**
- **Leaf blades broadly elliptic to ovate**, rounded or, less often, somewhat acute at the apex, **thick and leathery**, abruptly contracted to the petiole, glabrous, dark green on the upper surface, **strongly glaucous and conspicuously reticulate-veiny on the undersurface**; **margins entire.**

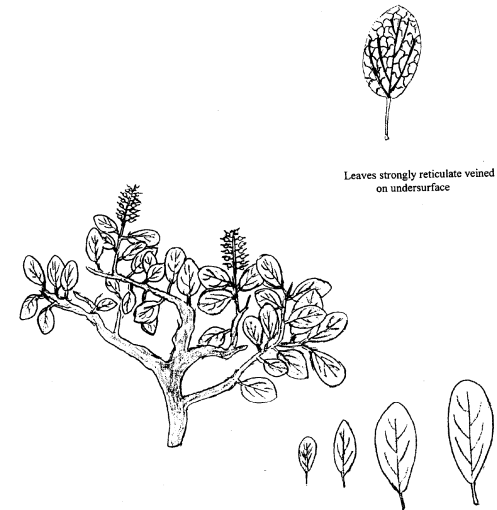
Floral features

- Staminate catkins 4-8 mm long, very slender; stamens 2; filaments hairy at the base.
- **Pistillate catkins 5-10 (12) mm long**, emerging with or after the leaves, **on basally leafy branchlets** (the branchlets themselves leafless).
- **Ovaries/capsules hairy**, capsules 3-5 mm, sessile or on stipes up to .5 mm; styles .2-.4 mm.
- **Floral bracts yellow or greenish, often tinged with red, glabrous on the outer surface, generally finely hairy on inner surface and along margins.**

Habitat: Meadows, slopes and ledges at high elevation, near or above timberline.

Distribution: Alpine in our area.

Similar species: *Salix arctica* with longer (10-30 mm) catkins, dark brown or black floral bracts, and more pointed, non-leathery leaves is known to the Wallowa Mountains, and may eventually show up in the Blue or Strawberry Mountains.



Leaves strongly reticulate veined on undersurface

Salix reticulata ssp. *nivalis*: Low, creeping, mat-forming alpine shrub with ovate, leathery leaves the undersurface glaucous, and short catkins with hairy capsules and greenish, sparsely hairy floral bracts.

Salix scouleriana Barratt ex Hook.
Scouler willow

Synonyms: None

Habit: Large shrub or tree 2-12 (15) m tall, with stems commonly 10 (occasionally 20) cm thick.

Vegetative features

- **Twigs with appressed to (usually) spreading hairs**; 2nd and 3rd year branchlets often white streaked due to cracking of the bark; **freshly peeled branchlets emitting a skunky odor**.

- **Leaf blades generally obovate to broadly oblanceolate** with rounded tips, varying to elliptic with somewhat pointed tips, **shiny green and glabrous on upper surface** (occasionally with hairs along midrib), **glaucous and sparsely to moderately hairy on under surface**, (see discussion regarding leaf pubescence below) usually at least **some hairs rusty red**; margins generally revolute, entire or occasionally finely toothed, rarely coarsely toothed; petioles usually with a mixture of appressed and spreading hairs.

Floral features

- Staminate catkins 1-3 (4) cm, sessile or nearly so; stamens 2; filaments glabrous or hairy near base.

- Pistillate catkins 2-6 (8) cm long, expanding before or with the leaves, **sessile or on short branchlets, the branchlet leaves small and bract-like, seldom over 7mm long or 3 mm wide**.

- **Ovaries/capsules hairy**; capsules 5-8 mm long, **long-beaked, with unusually long (.5-1 mm)**

stigmas; stipes 1-1.5 (2) mm; styles .2-.5 (1.1) mm.

- **Floral bracts dark brown to black**, pubescent with long silky hairs.

Habitat: Stream banks, lake shores, and other riparian habitats, but more often on upland, usually forested sites.

Distribution: Ubiquitous throughout our area.

Similar species: *Salix bebbiana* differs in a variety of floral characteristics including much longer (2-5 mm) stipes, catkins on leafy branchlets, shorter (.2-.5 mm) stigmas, and yellow to light brown floral bracts. However, the two species do not always sort out well based on vegetative features. While *S. scouleriana* usually has leaf blades that are broadest above the middle, occasional plants will display leaves which lack this distinctive character, and are quite similar in appearance to those of *S. bebbiana*. In these cases, and lacking pistillate catkins, the skunky odor, reddish hairs on the leaf undersurfaces, and buds without depressed margins and apices will, in most cases, be sufficient to distinguish *S. scouleriana*. *Salix lasiolepis* can also intergrade with respect to vegetative features. The skunky odor, reddish



Salix scouleriana: Large shrub or tree with a skunky odor, broadly elliptic to obovate, glaucous leaves, and nearly sessile catkins with hairy capsules and dark, hairy floral bracts. Hairs on the leaf under-surface, and upland habitat of *S. scouleriana* are among the more reliable of a poor selection of alternatives.

Notes: Typical *Salix scouleriana* can usually be recognized without difficulty, based on its distinctive form, unusual leaf shape, and other unique features. However, there are individuals scattered across the Pacific Northwest that strongly resemble typical *S. sitchensis* and occasional forms of *S. lasiolepis*, in having leaf undersurfaces with such dense pubescence as to completely obscure the surface. These individuals of *S. scouleriana* will separate reasonably well from *S. sitchensis* on a combination of floral and vegetative features (as indicated in the key) including style length, upper leaf surface color, skunky odor, and differences in reflective characteristics of the hairs on the lower leaf surface. *S. scouleriana* can be distinguished from similarly abnormal *S. lasiolepis* on hairy vs. glabrous capsules when pistillate material is available. Otherwise, the skunky odor and (often) upland habitat will generally be enough to separate the species. Additionally, *S. scouleriana* often has 2nd and 3rd year branchlets which are white-streaked, due to cracking of the bark (rarely seen in *S. lasiolepis*), but the feature is not as consistent for this species as it is for *S. bebbiana*. Curiously, the reddish hairs which are characteristic of “normal” *S. scouleriana*, are frequently absent on the densely pubescent material, and thus cannot be depended on as a distinguishing feature. However, when present, they will usually separate the two species.

Salix sitchensis Sanson ex Bong.
Sitka willow

Synonyms: None

Habit: Shrub or small tree with smooth, gray bark.

Vegetative features

- **Twigs densely spreading hairy**, some of the hairs persisting on 2nd year branchlets.
- **Leaf blades mostly obovate to broadly oblanceolate**, varying to elliptic, the **undersurface obscured by fine hairs, imparting a satiny sheen to the surface**; upper surface dull green (rarely shiny), thinly hairy or glabrous; margins entire or with small glands.

Floral features

- Staminate catkins 2.5-5 cm long, emerging before or with the leaves, mostly on short (< 1 cm) leafy branchlets; **stamens 1**; filaments glabrous.
- **Pistillate catkins 2-8 (11) cm long**, emerging before or with the leaves, **sessile or on short (up to 2 cm) leafy branchlets**, the branchlet leaves up to 12 (mostly 2-6) mm wide.
- **Ovaries/capsules densely hairy**, the hairs obscuring the ovary surface, becoming less dense and mostly not obscuring the capsule surface at maturity; capsules 3-5.5 mm long; stipes < 1 mm; styles .3- .8 (1.2) mm.
- Floral bracts long-hairy, light to dark brown or black.

Habitat: Streamsides and moist woods from the lowlands to moderate elevations.

Distribution: Throughout our area, but appears to be more prevalent in the northern half.

Similar species: *Salix sitchensis* is one of four willows (the others being *S. drummondiana* and occasional forms of *S. lasiolepis* and *S. scouleriana*.) in the area characterized by pubescence so dense that it obscures the lower surface of the leaf. The problem is compounded by the fact that all three typically have obovate to oblanceolate leaves. However, *S. sitchensis* will separate from *S. lasiolepis* on hairy (*S. sitchensis*) vs. glabrous (*S. lasiolepis*) capsules, and from *S. scouleriana* based on absence of a skunky odor (*S. scouleriana*) emitted from freshly peeled branchlets. Additionally, the reflective character of the hairs on the undersurface imparts a unique, satiny sheen to the leaves of *S. sitchensis*, and the upper surface is dull green rather than shiny.

Notes: The densely hairy twigs and satiny, obovate to oblanceolate leaves makes typical *S. sitchensis* relatively easy to recognize in the field. However, as with most willows, there is great variation in leaf size and shape so other characters must be examined closely.



Salix sitchensis: Shrub or small tree with smooth gray bark, branchlets with dense, spreading hairs, leaves with a satiny sheen on undersurface, and long pistillate catkins with densely hairy capsules and long-hairy, brown or black floral bracts.

Salix vestita Pursh
Rock willow

Synonym: *S. fernaldii*

Habit: Dwarf shrub, prostrate or creeping or erect, 4 - 40 or more cm tall.

Vegetative features

– **Twigs shining, crooked, angular, brown**, glabrous or villous-puberulent
– Leaves elliptic ovate or obovate to nearly orbicular, 2 - 6 cm long, 1-4 cm wide; **veiny, thick, firm**; dark green and glabrous above, glaucous and long-white-hairy beneath; **margins revolute and glandular**; petioles stout, mostly 4-10 mm long; stipules absent.

Floral features

– Staminate catkins 1.5-3.5 cm long, stamens usually 2, sometimes 4, filaments hairy below.
– **Pistillate catkins 2.5 cm long at maturity, appearing after the leaves on hairy leafless peduncles.**
– Ovaries/ capsules sessile or nearly so, tomentose, about 4 mm long, style nearly obsolete.
– Floral bracts brown, persistent, hairy all over or just at the tip.

Habitat: Commonly near or above timberline. Open moist rocky slopes, streambanks and meadows, 5500 to 9200 feet.

Distribution: Wallowa Mountains.

Similar Species: *S. nivalis* is a mat forming plant up to 4 inches tall.



Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 603. Courtesy of [Kentucky Native Plant Society](#). Scanned by [Omnitek Inc.](#)

Salix wolfii Bebb var. *idahoensis* Ball
Wolf Willow

Synonyms: None

Habit: Low shrub, averaging 1 m tall (0.5-2 m).

Vegetative features

–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.

Floral features:

–Staminate catkins (0.8)1-2 cm long; stamens 2 per flower.

–Pistillate catkins 0.8-2 (4) cm long, densely congested, nearly sessile or on short, leafy flowering branchlets that appear with the leaves.

–Ovaries/ capsules pubescent in var. *idahoensis*, borne on short stalks under 0.8 mm long, styles 0.2-1.3 mm long.

–Flowering bracts dark brown or blackish, persistent, woolly-pubescent, with the hairs exceeding the length of the bract.

Habitat: Montane and subalpine wet meadows, streamsides, and fens.

Distribution: Wallows Mountains. Documented from the Hurricane Creek Meadow complex.

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. myrtilifolia* 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.

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.



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

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ADDITIONAL NOTES ON TAXA

- S. amygdaloides* - Leaf shape highly variable Bud feature usually not evident when plants in flower. Pistillate catkin branchlets often totally glabrous, staminate one usually so, at least below. Petiole and branchlet hairs wavy, glassy, very quickly becoming glabrous. Ovaries tending to abruptly contract to a "neck" (not evident on dehiscent capsules). Leaves usually more elliptic to ovate than lanceolate. 2nd year branchlets usually light gray to white.
- S. bebbiana* - Petiole hairs mostly wavy and appressed, but often short and somewhat spreading.
- S. boothii* - Petiole hairs wavy and appressed, becoming glabrous. Appressed hairs on petioles best seen early in season but evident all season long. Separates from *S. monochroma* on: scales hairy throughout or sometimes glabrous at the very tip. *S. monochroma* - scales glabrous or hairy only on the bottom 1/3, occ fuzzy margined throughout.
- S. boothii/S. commutata* - lots of overlap in leaf pubescence. Can generally separate on: *S. commutata* - leaves more broadly ovate; 2nd year branchlets more hairy and with spreading hairs; stipes mostly (to 1.5 mm) 1-2.5 mm in *S. boothii*. *S. boothii* often hairy on both sides while catkins still on.
- S. commutata* - Twig and branchlet hairs long and wavy with patches so straight and spreading hairs, often persistent to 2nd or 3rd year. Occasionally, leaves, twigs, branchlets glabrous. Overall, differs from: *S. eastwoodiae* in having more broadly ovate leaves, longer catkins on longer catkin branchlets, twigs and branchlets with hairs spreading Hairs on branchlets very much like *S. eastwoodiae* but with patches of spreading hairs also.
- S. eastwoodiae* - 2nd year branchlets almost always very dark red to reddish brown. Twig and petiole hairs long and wavy, often persistent.
- S. eriocephala* - Tendency toward red petioles, and, red midveins, blades oft. red while expanding. Catkin branchlet leaves may be gland-margined or not. Hairs of twigs and petioles short and mostly spreading, becoming glabrous except on most terminal leaves.
- S. exigua* - If floral bracts densely hairy but only on margins, probably a hybrid of *S. exigua* and *S. melanopsis*. Hairs on leaf undersurface still persist in August. Generally impart a silvery sheen which could be interpreted as glaucous. Occ. so dense as to obscure lower leaf surface, esp. early in season. Teeth on most leaves remote or absent, occ. some quite toothy, esp. on staminate specimens. Hairs on ovary may be quite sparse. Floral bracts may be quite broad but still acute. Hairs on twigs and branchlets short, straight, appressed. Petioles very flat.
- S. farriae* Twigs may be moderately hairy esp. on young growth, or nearly glabrous, Nearly always have entire or very finely toothed margins. Scales very short, barely as long as the stipes. Separates from *S. eriocephala* on: Leaves generally lighter. Catkin axis not obscured by tangled, wooly hairs. Hairs on twigs (when present) wavy and appressed. Stipules sharp pointed. Stipes .3-1.5 (2) mm long. Vein reticulations prominent on upper leaf surface. Plants usually .5-1.5 (2) m tall. Plants colonial Leaf margins entire, rolled.
- S. geyeriana* - Twig and leaf pubescence variable. May be short and curly or more or less straight and somewhat spreading, occ. short and stiffly spreading. Some specimens with leaves glabrous on both sides, others with glabrous twigs. Style length inconsistent. Not

good character. Year-old branchlets usually dark red-purple, or some shade of brown, oft. shiny. Floral bracts usually light to medium brown, generally elongate but sometimes rounded at tip. Staminate ones oft. short, obtuse, light below, dark above. Catkins mostly 1-1.5 cm long, subglobose, rarely > 2 cm. Jepson Manual: Leaf blades 32-74 mm long. Stipules absent or vestigial.

S. lasiandra - Young leaves sometimes with long red hairs. Pistillate catkin axis only sparsely hairy, readily visible. 2nd year branchlets mostly reddish brown, sometimes light reddish green. Hairs of twigs and petioles either curly and appressed or short and spreading or both. May be quite dense when young, tends to persist much longer than *S. amygdaloides*. Blades of catkin branchlets sometimes elliptic or ovate. Leaf margins esp. glandular when young.

S. lasiolepis - Strong tendency for 2nd and 3rd year branchlets to be strongly furrowed. One collection from Umatilla River, 5 miles east of Pendleton. Hairs of twigs and petioles straight and spreading, sometimes curly and appressed, rarely glabrous.

S. lemmonii - Some red hairs usually present below, even when leaves almost totally glabrous. Floral bracts very rounded and dark. Hairs very straight. New twigs may be as hairy as *S. geyeriana* early in season. Jepson Manual reports leaf blades 44-102 mm long, stipules vestigial on early leaves, leafy later on. Hairs of T. and P. mostly wavy and appress, becoming glabrous.

S. melanopsis - Hairs on leaves persist right up to maturity. Collection from "swampy meadow at Ukiah"

S. pseudomonticola Petioles with stiffly spreading hairs when young, glabrous or glabrate later. 2nd year branchlets very dark reddish brown above, becoming lighter, yellowish below (fairly consistent). Very consistently white-streaked. Hairs of T. and P. mostly spreading, quickly becoming glabrous.

S. scouleriana Catkins usually much thicker than those of *S. sitchensis*. When dense hairs rubbed off undersurface, evidently glaucous; not evident on *S. sitchensis*. "*S. sitchensis* distinguished from *S. scouleriana* by short stigmas and mostly styles." Margins revolute. Stipules quickly deciduous. Hairs of T. and P. mostly spreading, some curly and appressed.

S. sitchensis Catkins generally much narrower than those of *S. scouleriana*. When dense hairs rubbed off undersurface, light colored but not evidently glaucous. Branchlets tending to be white-streaked. Hairs of T. and P. mostly straight and spreading or straight and appressed, persisting to 2nd year. Main lateral veins much straighter than *S. lasiolepis*, and come all the way out to margins, curve and follow them.

Species with light/pale floral bracts

S. amygdaloides bracts decid., densely hairy; stamens 3-8; capsules glabrous.

S. exigua exigua bracts deciduous, sharp pointed, hairy; stamens 2; capsules hairy.

S. melanopsis - bracts decid., blunt, glabrous; stamens 2; capsules glabrous

S. lasiandra - Bracts hairy below, glabrous above (throughout when immature), decid.; stamens. 3-8; capsules glabrous

Capsules hairy = *S. exigua* var. *exigua*

Capsules glab. Bracts hairy throughout = *S. amygdaloides*

Bracts glab. or hairy on lower portion only: Leaf blades >6X as long as wide; petioles not glandular = *S. melanopsis* Leaf blades <6X as long as wide; petioles glandular = *S. lasiandra*

PHOTOS



Photo 1: *Salix amygdaloides* - leaves green above, glaucous below.



Photo 2: *Salix amygdaloides* - catkins on leafy branchlets.



Photo 3: *Salix arctica* var. *petraea* - Mat-forming alpine shrub with dull green, elliptic to ovate, slightly pointed leaves, and pistillate catkins on leafy flowering branchlets.



Photo 4: *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



Photo 5: *Salix bebbiana* - catkins on leafy branchlets.



Photo 6: *Salix bebbiana* - leaves green above, glaucous below.

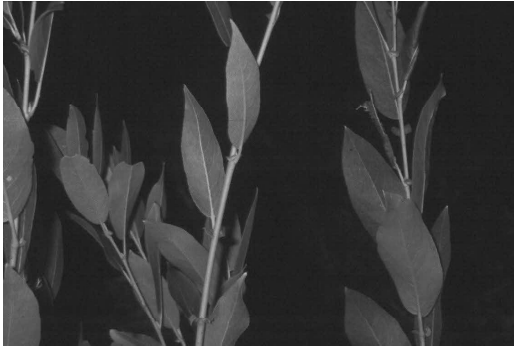


Photo 7: *Salix boothii* - leaves green and glabrous on both surfaces.



Photo 8: *Salix boothii* - catkins on leafy branches



Photo 9: *Salix brachycarpa* -Low to medium shrub with small tomentose leaves with glaucous undersurfaces.



Photo 10: *Salix brachycarpa* - Very short petioles and short catkins on leafy branchlets.



Photo 11: *Salix commutata* - catkins on leafy branchlets.

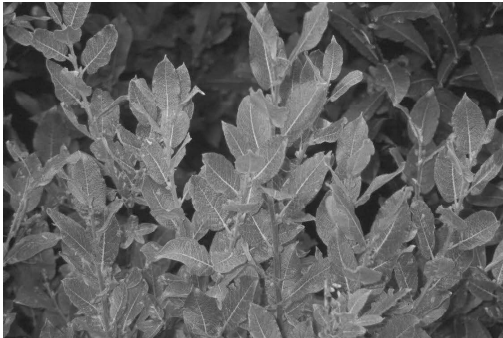


Photo 12: *Salix commutata* - leaves green and hairy on both surfaces.



Photo 13: *Salix drummondiana* - twigs pruinose, leaves green above, silky hairy below.



Photo 14: *Salix eastwoodii* - Silvery-hairy leaves that are equally green on both surfaces, and catkins on leafy branchlets.



Photo 15: *Salix eriocephala* var. *mackenzieana* - second -year branchlets reddish, catkins on leafy branchlets.



Photo 16: *Salix eriocephala* var. *monochroma* - leaves green and glabrous on both surfaces.



Photo 17: *Salix eriocephala* var. *watsonii* - leaves green above, glaucous below.



Photo 18: *Salix eriocephala* var. *watsonii* - second-year branchlets gray.



Photo 19: *Salix exigua* var. *exigua* - growth form.

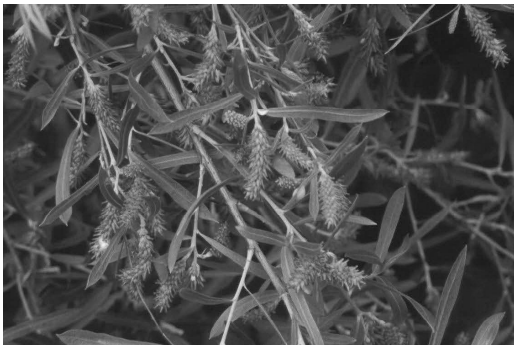


Photo 20: *Salix exigua* var. *exigua* - catkins on leafy branchlets.



Photo 21: *Salix farriae*- low colonial growth form



Photo 22: *Salix farriae* - leaves glabrous, green above, glaucous below. Catkins on leafy branchlets.



Photo 23: *Salix geyeriana* - twigs pruinose, leaves silvery-hairy, catkins on leafy branchlets.



Photo 24: *Salix lasiandra* var. *caudata* - leaves green on both sides, tips acuminate



Photo 25: *Salix lasiandra* var. *caudata* - catkins on leafy branchlets



Photo 26: *Salix lasiandra* var. *caudata* - growth form.



Photo 27: *Salix lasiandra* var. *lasiandra* - leaves green above, glaucous below.



Photo 28: *Salix lasiolepis* - leaves narrowly elliptic green above, glaucous below.



Photo 29: *Salix lemmonii* - twigs pruinose.



Photo 30: *Salix lemmonii* - growth form, stems upcurved.



Photo 31: *Salix melanopsis* - catkins on leafy branchlets.



Photo 32: *Salix pseudomonticola* - leaves green on upper surface, glaucous on the lower; margins conspicuously toothed.

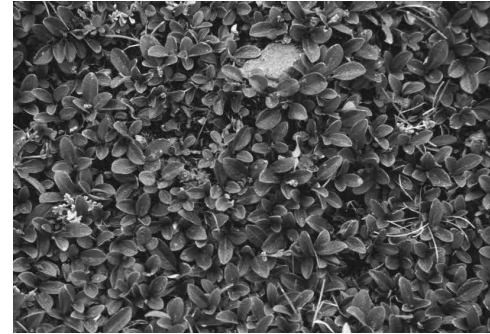


Photo 33: *Salix reticulata* ssp. *nivalis* - low matted growth habit.



Photo 34: *Salix reticulata* ssp. *nivalis* - leaves green above, glaucous below, catkins on basally leafy branchlets.



Photo 35: *Salix scouleriana* - leaves obovate, green above, glaucous below.



Photo 36: *Salix scouleriana* - catkins sessile, emerging before the leaves.



Photo 37: *Salix sitchensis* - leaves green above, silky hairy below.



Photo 38: *Salix sitchensis* - catkins on leafy branchlets, emerging before the leaves.



Photo 39: *Salix vestita* - alpine dwarf shrub, leaves dark green and glabrous above, glaucous and long-white-hairy beneath; pistillate catkins on hairy leafless peduncles.



Photo 40: *Salix wolfii* var. *idahoensis* - Low shrub with elliptic, gray-green, silvery-pubescent leaves and pistillate catkins densely congested, nearly sessile or on short, leafy flowering branchlets