TECHNICAL NOTES

U. S. DEPT. OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE
Portland, Oregon September 2010

PLANT MATERIALS NO. 40 – Supplement D

Introduction to Kincaid's Lupine, a Federally-listed Threatened Plant, and a Photo Key to the Lupines that Occur within its Range

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- Use of line drawing illustrations for all species courtesy of the University of Washington Press per C.L. Hitchcock and A. Cronquist. 1961. Vascular Plants of the Pacific Northwest. Part 3; Saxifragaceae to Ericaceae.
- Most species descriptions and maps of Washington plant distributions courtesy of the Washington University Herbarium, Burke Museum: http://biology.burke.washington.edu/herbarium/imagecollection.php
- * Maps of Oregon plant distributions courtesy of the Oregon Flora Project: http://oregonflora.org/atlas.php

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The purpose of this technical note is to provide information about Kincaid's lupine, a federal and state-listed Threatened species, and to provide information on how to identify the species from other co-occurring lupines within the species' range.

A special thanks to all who contributed use of photographs for this publication including: Gerald D. Carr, Rod Gilbert, Steve Gisler, Tom Kaye, Ben Legler, Robert Preston, Andy Robinson, Paul Slichter and Mark Turner.

We welcome your comments for improving any of the content of this publication for future editions. Please contact kathy.pendergrass@or.usda.gov

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Brief Introduction to Kincaid's lupine:

Family: Fabaceae – Pea or Legume Family

Species Status: Kincaid's lupine (*L. oreganus* – as recognized by the Oregon Flora Project) was federally listed as Threatened, without critical habitat, on January 25, 2000 (U.S. Fish and Wildlife Service 2000). The species is also State-listed as Threatened in both Oregon and Washington. Critical Habitat was listed for the species on October 31, 2006 (U.S. Fish and Wildlife Service 2006). A Final Recovery Plan is completed for the species and contains a valuable synthesis about the species ecology and recovery needs (U.S. Fish and Wildlife Service 2010).

Threats: Habitat loss has been deemed the largest and generally most irreversible cause of the species' decline. Although many populations of Kincaid's lupine occur in the Willamette Valley, most sites are located on private property and few are protected or managed to maintain the species over time. This species requires open prairie-like habitat to thrive. Cessation of Native American burning practices has resulted in succession toward woodland habitats and further habitat loss for this species.

Range of the Species: The species is currently distributed from Douglas County, Oregon, north to Lewis County, Washington. It was historically documented to occur on Vancouver Island, British Columbia but has not been located there since the 1920's. In Oregon, populations are located in the in the Willamette and Umpqua Valleys where it has been reported to occur in Benton, Douglas, Jackson, Josephine, Lane, Linn, Marion, Multnomah, Polk, Washington, and Yamhill Counties. In Washington, it occurs in the Southwest Washington physiographic province where it is known from two populations in Lewis County.

Habitat: This species is associated with upland prairie and oak savanna habitats but can also be found on disturbed sites such as roadcuts and ditchbanks. As of 2003, the species had been located on 48 different soil types.It often occurs on heavy soils with mesic to slightly xeric moisture regimes. In the Umpqua valley it is found on serpentine soils.

Bloom Timing and Surveys: The species blooms from April to June, reaching its peak blooming period during the latter half of May. This peak blooming period is the best timeframe to conduct field surveys to determine its presence.

Other: This species is the primary larval host plant of the endangered Fender's blue butterfly (*Icaricia icarioides fenderi*). Fender's blue butterfly larvae also hosts on spurred and sickelkeel lupines. Kincaid's lupine occasionally hybridizes with spurred lupine (*Lupinus arbustus,* in floras as *L. laxiflorus*).

Synonyms: *Lupinus oreganus* var. *kincaidii*, *L. sulphureus* var. kincaidii, *L. sulphureus* ssp. *kincaidii*, *L. oreganus*)

Associated Species:

Roemer's fescue (*Festuca roemeri*)
California oatgrass (*Danthonia californica*)
Cat's ear lily (*Calochortus tolmei*)
Oregon sunshine (*Eriophyllum lanatum*)
Strawberry (*Fragaria virginiana*)
Oregon iris (*Iris tenax*)
Woodland star (*Lithofragma parviflora*)
Slender cinquefoil (*Potentilla gracilis*)
Self-heal (*Prunella vulgare*)
Rose checker-mallow (Sidalcea malviflora ssp. virgata)

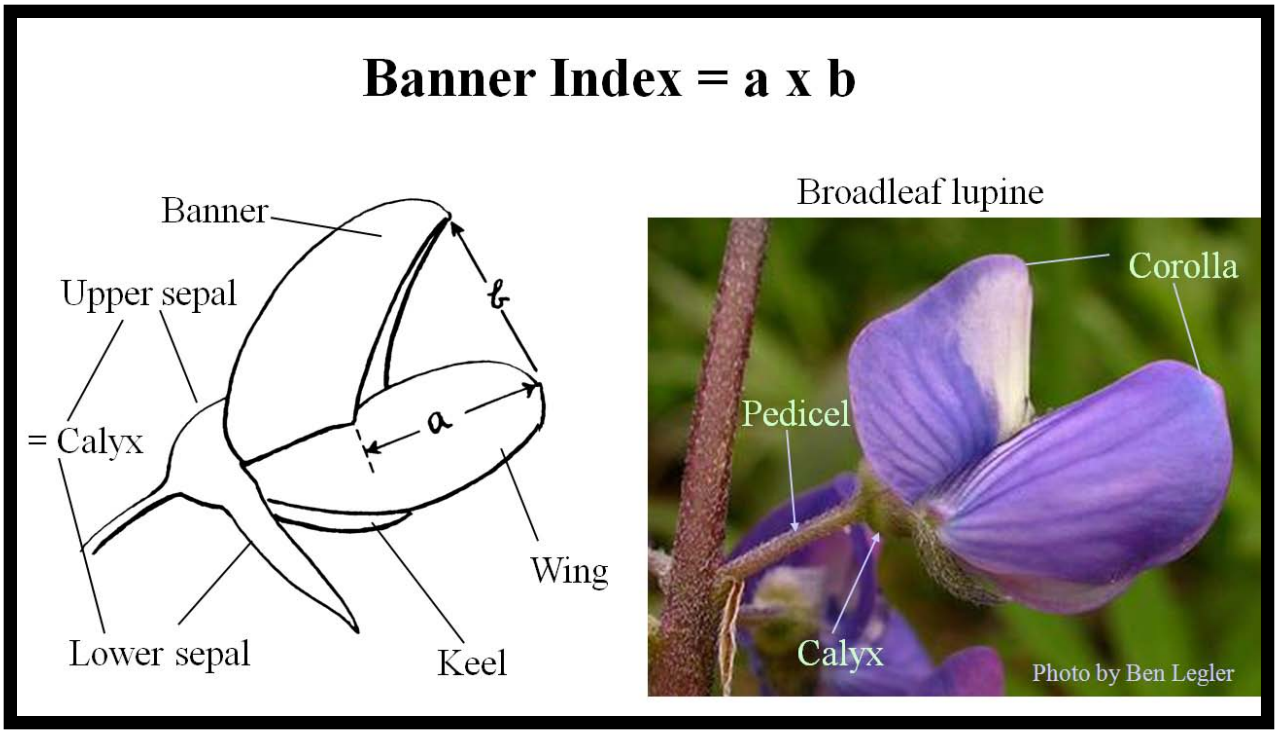


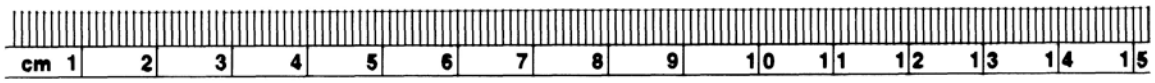
Figure 1: Lupine Flower Terminology

PLANT KEY: SPECIES OCCURRING WITHING THE RANGE OF KINCAID'S LUPINE

This key is provided to help identify lupines within the range of where Kincaid's lupine populations are known to occur. This is a dichotomous (two-way) key where you have a choice between two options (a couplet) at each entry of the key. You pick the best choice of each couplet (e.g. 1a versus 1b) that most accurately describes the unknown lupine that you are trying to identify, then follow the next couplet and make your next best choice until you arrive at a species. For example, if 1a. describes your species best, (between 1a and 1b), read couplets 2a and 2b to determine which one best fits your unknown lupine and go to the next couplet below that choice (3a and 3b) until you arrive at a determined species. Refer to the following identification pages to see if your unknown plant actually matches (photos, descriptions, distribution) the species that you arrive at in this key.

dm = decimeter (1 dm = 10 centimeters), cm = centimeter (1 cm = 10 millimeters), mm = millimeter
1 inch = approximately 2.5 cm

Below is a millimeter ruler to measure your unknown plant



Key for West-side Lupines within the range of Kincaid's lupine

la Plant with an Annual Life Cycle; generally less than 45 cm (18 inches) tall (grows, sets seed a nd di es dur ing a spring-summer season; l eaves ar e generally t urning brown b y seed maturation, plant is generally easy to pull out of the ground since it doesn't dedicate resources to developing an extensive root system).

2a Banner scarcely reflexed (narrow angle between banner and wings, flowers 5-7 mm, pedicels 1-2 mm.....Small flowered lupine (*L. micranthus*)

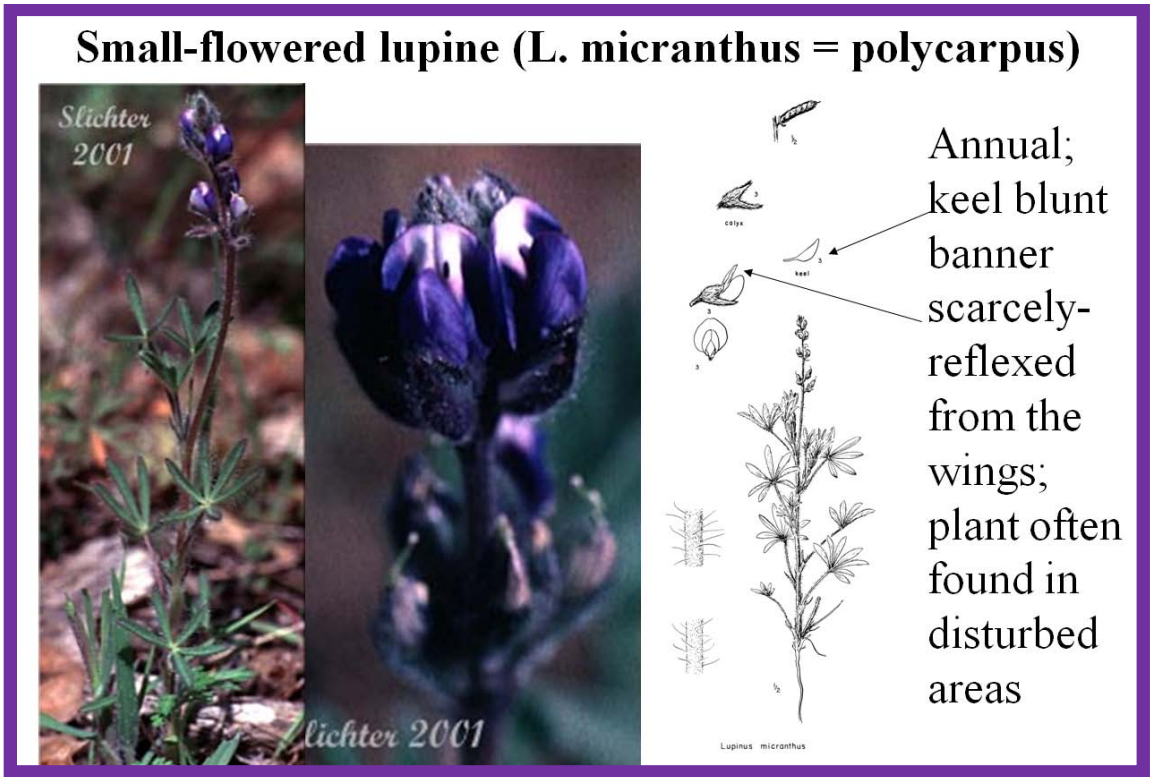


Figure 2. Photographs of whole plant (left) and close-up of flowers (middle), and drawing of plant and diagnostic characteristics (right) of small-flowered lupine.

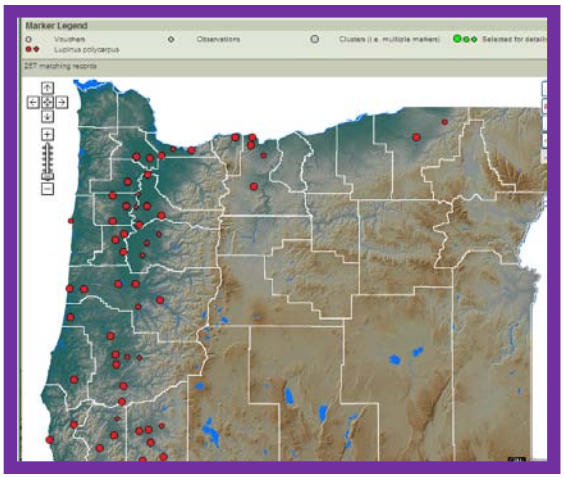


Figure 3. Distribution of small-flowered lupine in Oregon. Washington taxonomists consider Lupinus bicolor synonymous with L. polycarpus (=L. micranthus).

2b Banner reflexed (wide angle between banner and wings), flowers > 7 mm, pedicels 2-5 mm

3a Flowers 6-9 mm, banner often longer than broad, often < the keel

……..…Miniature lupine (*L. bicolor*)

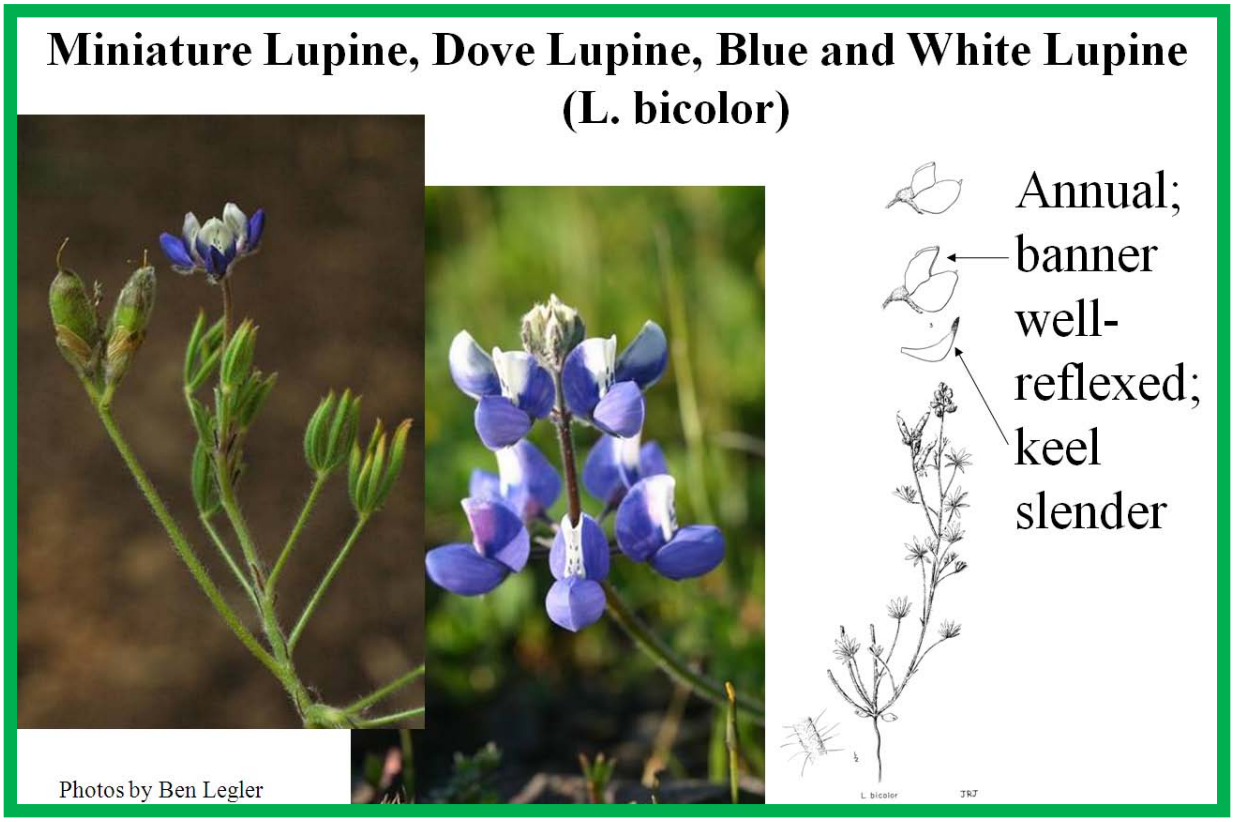


Figure 4. Photographs of plant (left) and close-up of flowers (middle), and drawing and diagnostic characteristics (right) of blue and white lupine.

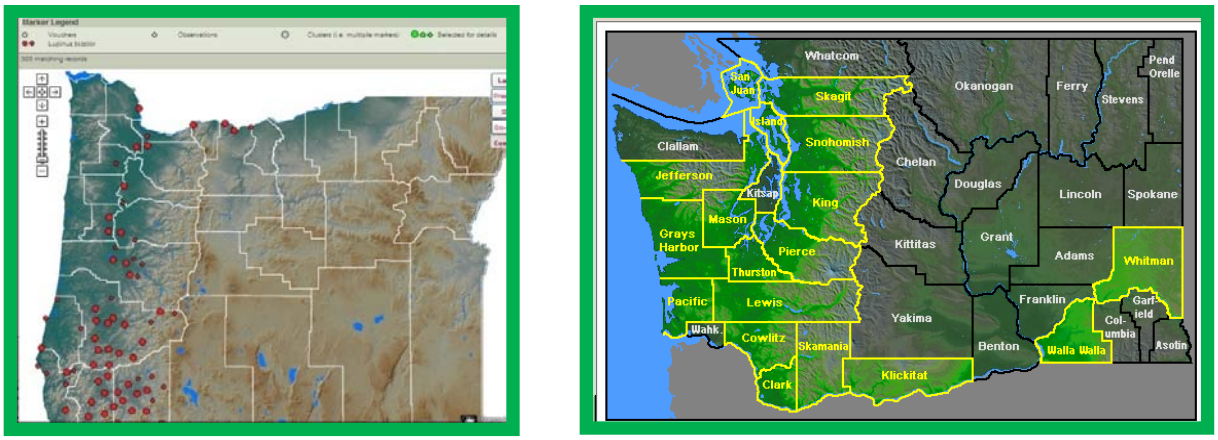


Figure 5. Distribution of blue and white lupine in Oregon and Washington. Washington taxonomists consider Lupinus bicolor synonymous with L. polycarpus (=L. micranthus).

3b Flowers 10-13 mm, banner as broad as long, not < than the keel
……..Fleshy lupine (*L. affinis)*

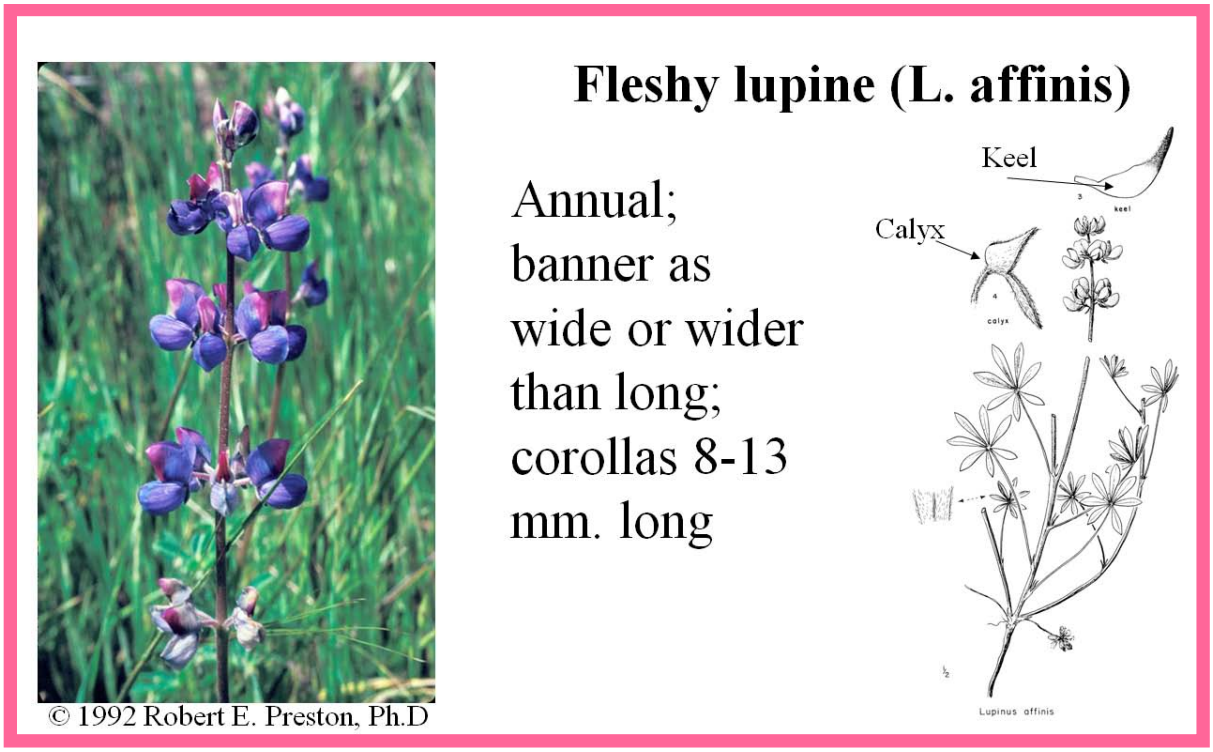


Figure 6. Photograph of whole plant (left) and drawing of plant and diagnostic characteristics (right) of fleshy lupine.

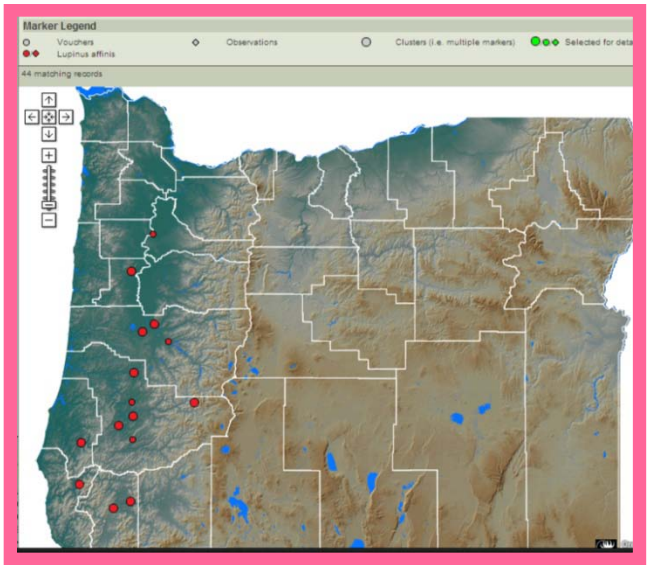


Figure 7. Distribution of fleshy lupine in Oregon. Washington taxonomists either don't recognize L. affinis or the species doesn't occur in Washington.

lb Plant with a Perennial Life Cycle (leaves generally remain green after seed maturation); **plants are generally taller**, although some perennials are under 45 cm height [18 inches], e.g. Pacific lupine)

4a Calyx distinctly spurred…….Spurred lupine (*L. arbustus*)
(hybrids between Kincaid's and spurred lupine may show a spurred calyx)

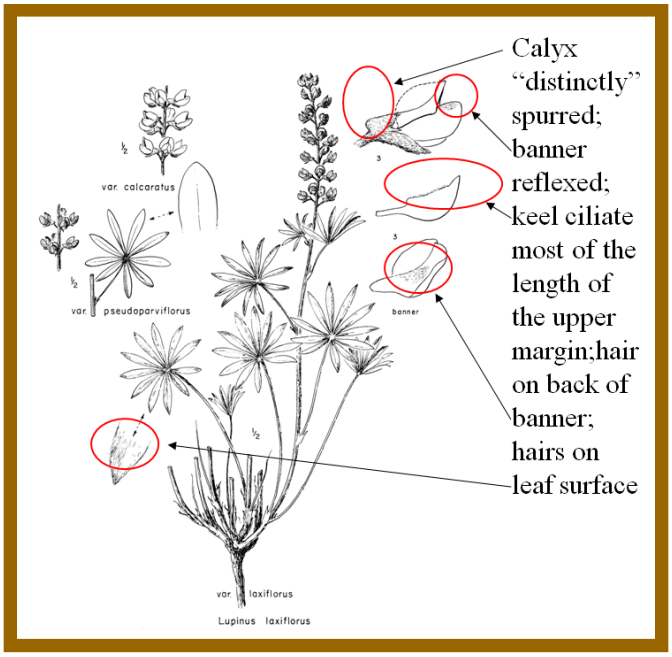


Figure 8. Drawing and diagnostic characteristics of spurred lupine.

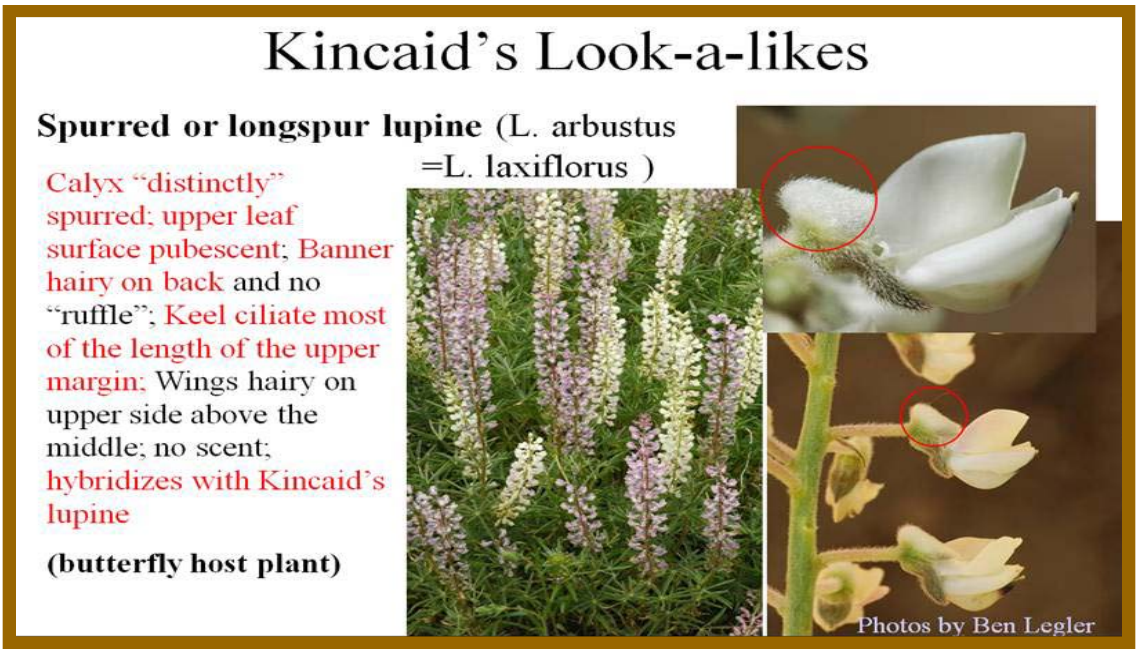


Figure 9. Photographs of plant (left), individual flower showing spur (upper right), and several flowers up-close (lower right) of spurred lupine.

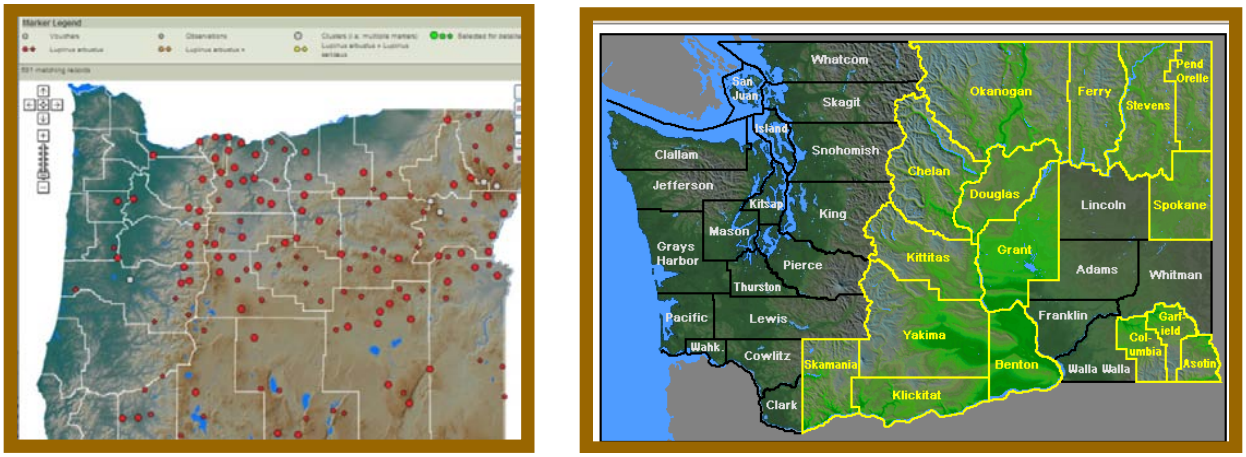


Figure 10. Distribution of spurred lupine in Oregon and Washington.

4b Calyx not spurred, though sometimes swollen

5a Plants large, up to 1 m (3 feet) tall, at least some leaves with more than 10 leaflets; leaflets 5-10 cm long, flowers *1-1.5* cm. long; stems erect, usually unbranched, often hollow.....Large-leaved lupine (*L. polyphyllus)*

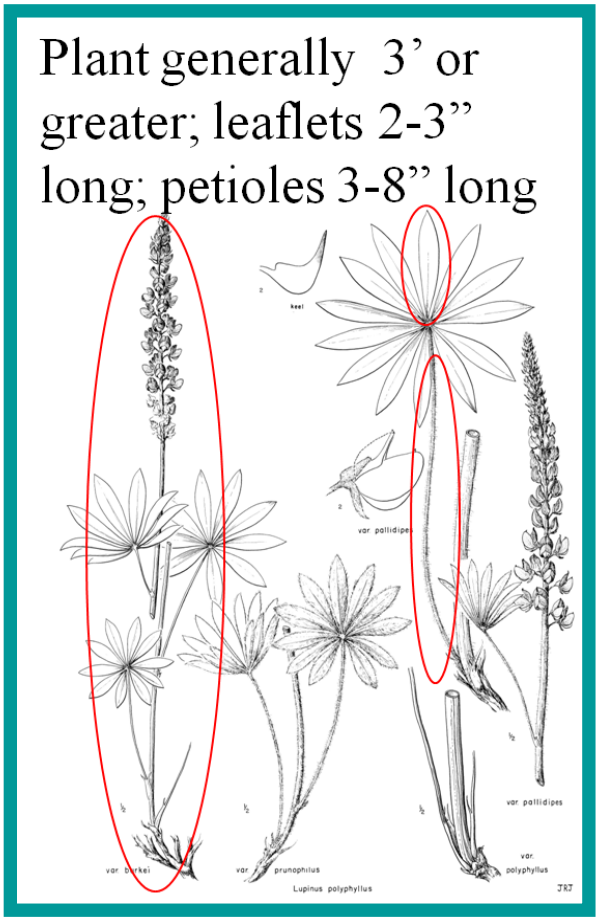


Figure 11. Drawing and diagnostic characteristics of large-leaved lupine.

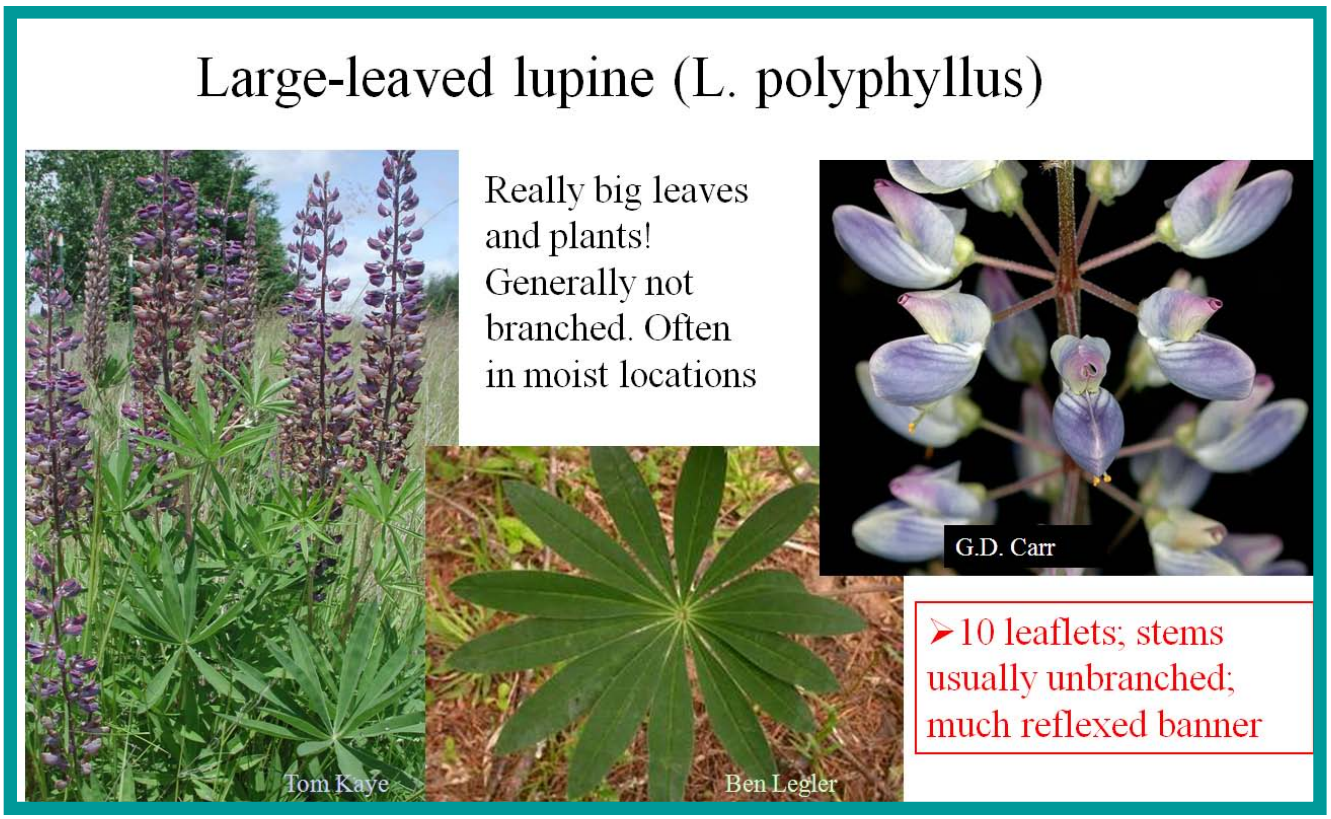


Figure 12. Photographs of plant (left), individual leaf (middle), close-up of flowers (right), and of large-leaved lupine.

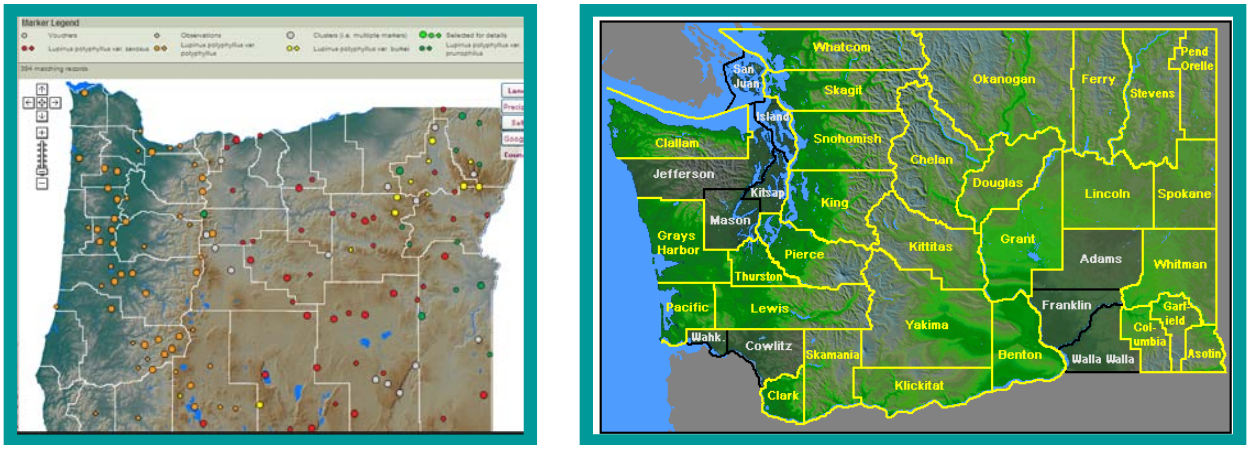


Figure 13. Distribution of large-leaved lupine in Oregon and Washington.

5b Plant shorter than 1 m, leaflets less than 6 cm long,
generally with fewer than 10 leaflets or otherwise not as above
6a Keel not ciliate (no hairs on upper margin of keel)
7a. Banner index >15 and without "ruffle", keel bent and early exposed for most of its length, upper leaf surfaces pubescent
……...Sickle-keel lupine *L. albicaulis*

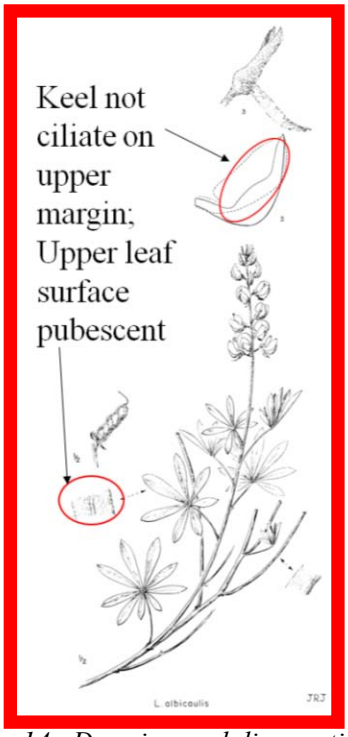


Figure 14. Drawing and diagnostic characteristics of sickle-keeled lupine.

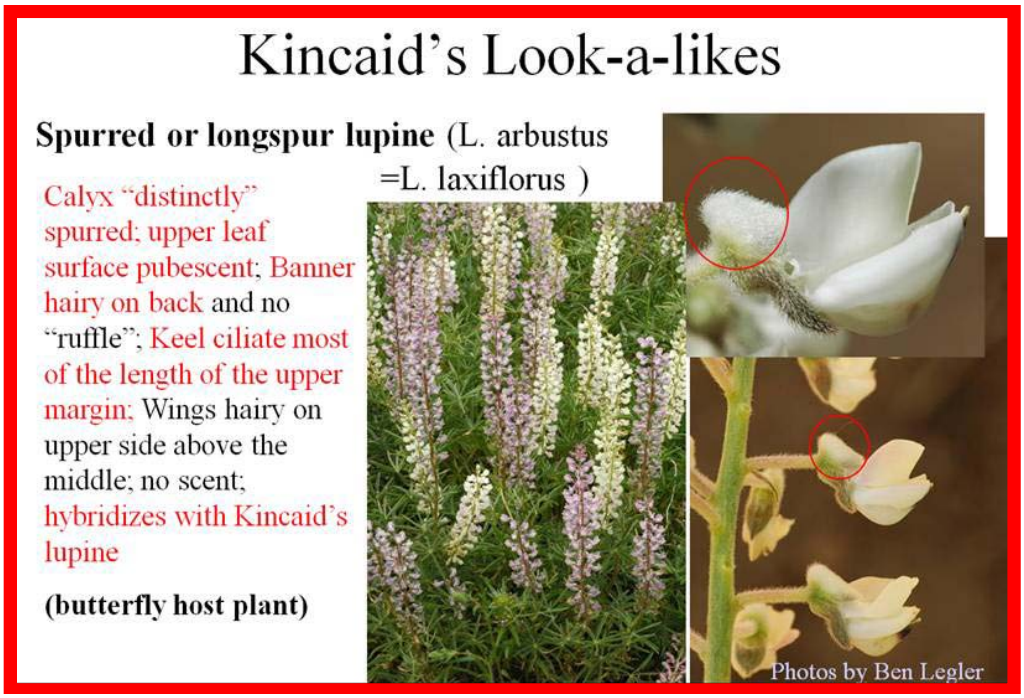


Figure 15. Photographs of plant (left) and close-up of flowers (right) of sickle-keel lupine.

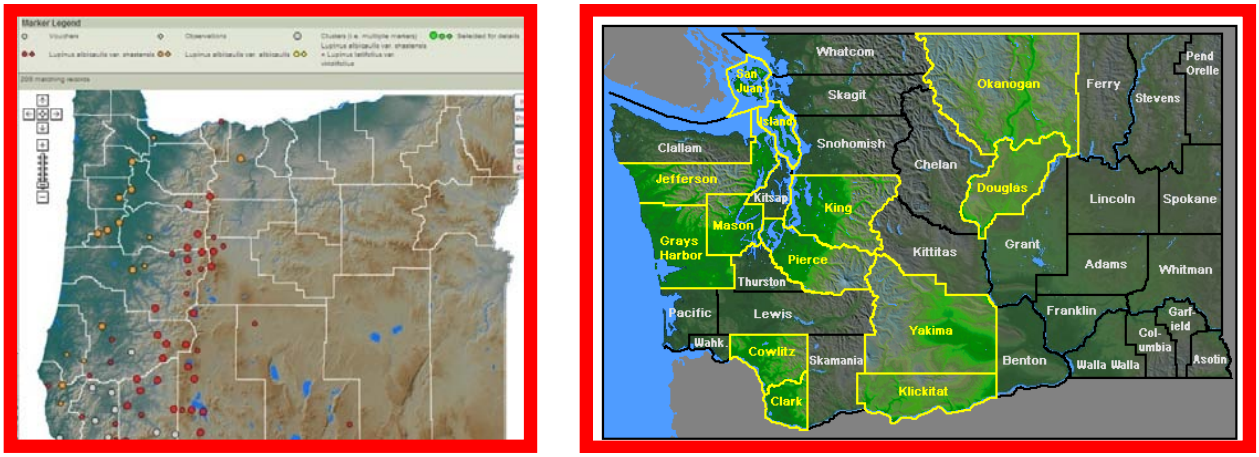


Figure 16. Distribution of sickle-keel lupine in Oregon and Washington.

7b. Banner index < 15 and with a "ruffle", only slightly reflexed; upper leaf surfaces hairless

…… Kincaid's lupine (*L. oreganus* var. *kincaidii,* = L. sulphureus var. kincaidii = L. sulphureus ssp. kincaidii = *L. oreganus*)

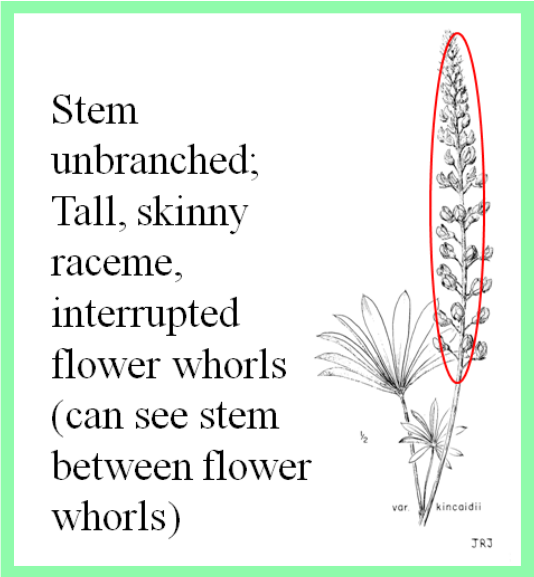


Figure 17. Drawing and diagnostic characteristics of Kincaid's lupine.

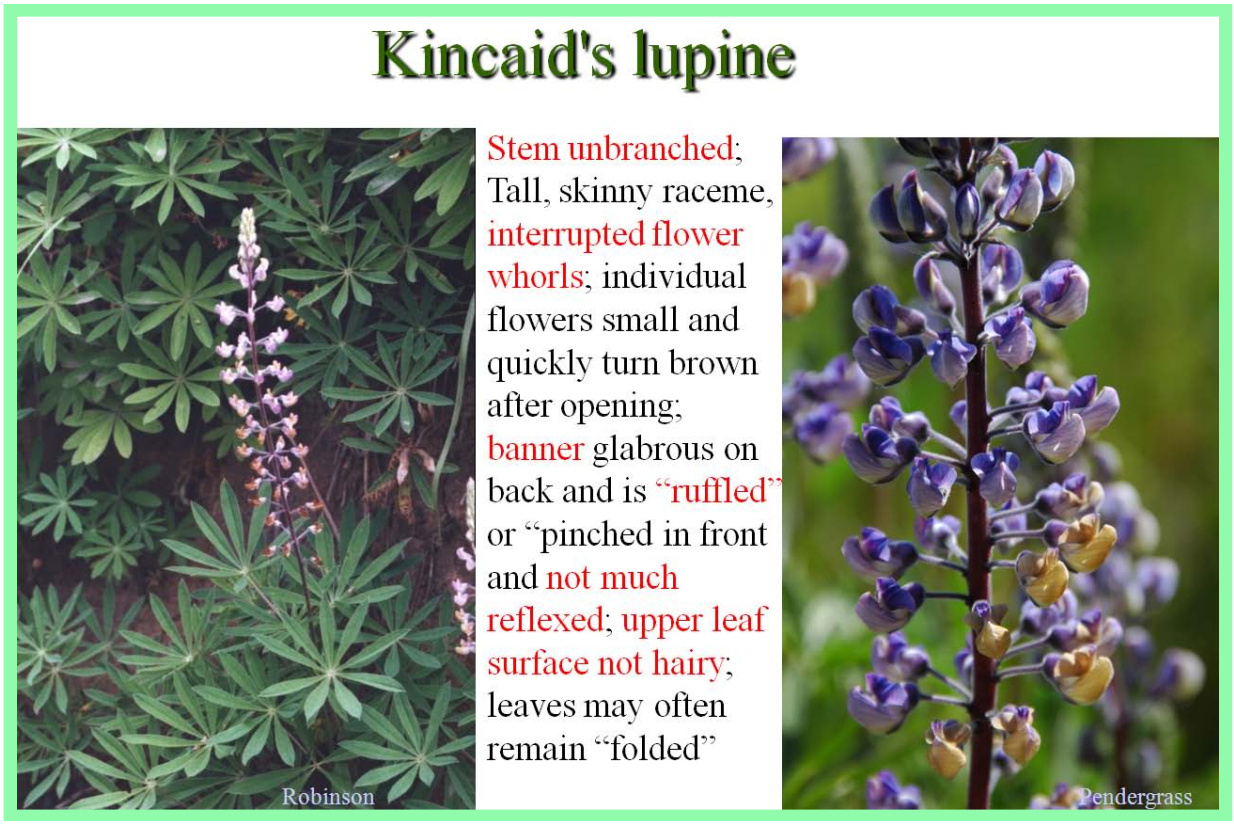


Figure 18. Photographs of plant (left) and close-up of flowers (right) of Kincaid's lupine.

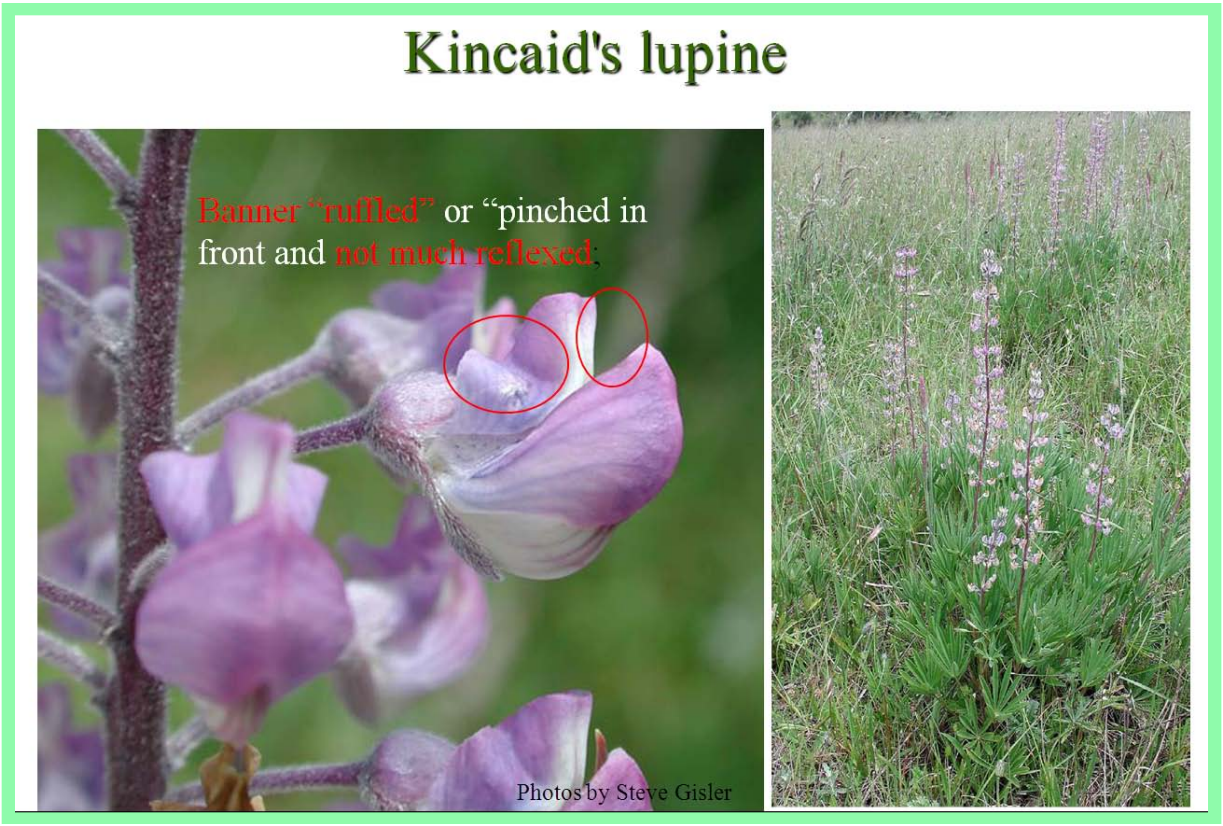


Figure 19. Photographs of flowers close-up (left) and entire plant (right) of Kincaid's lupine.

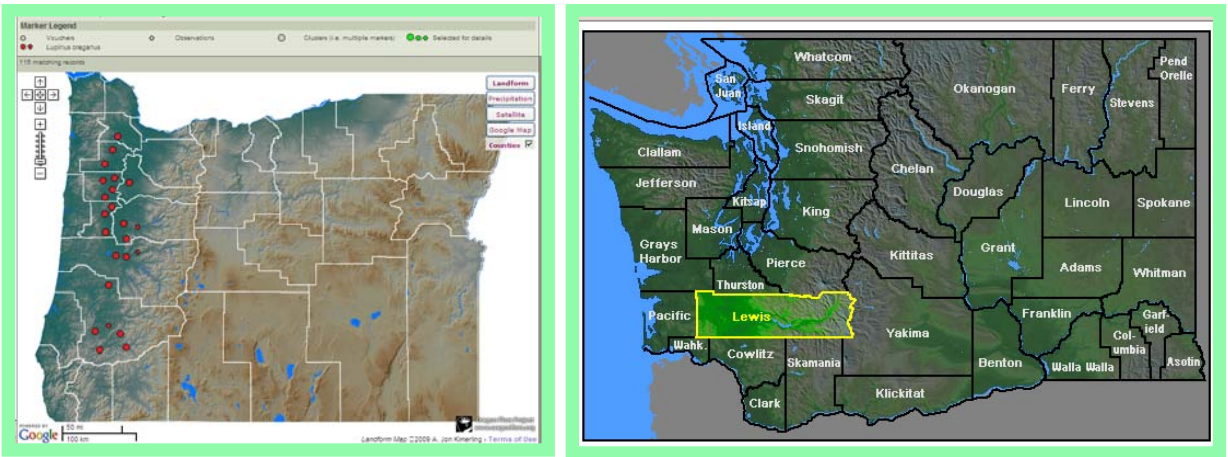
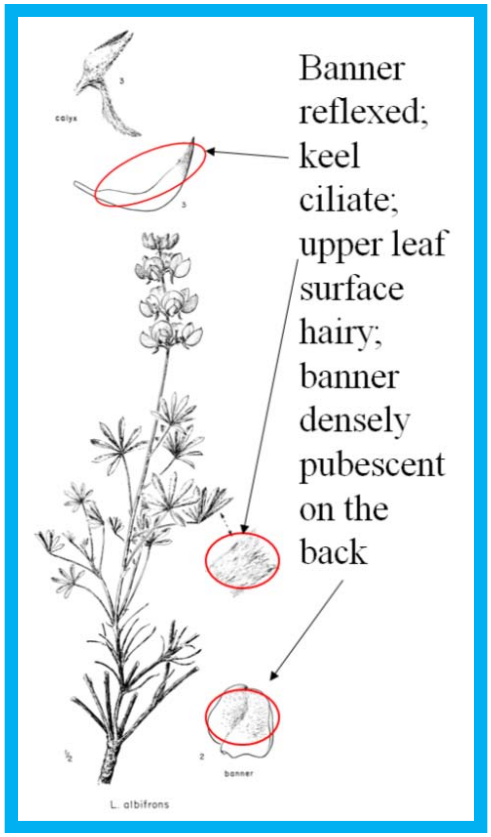


Figure 20. Distribution of Kincaid's lupine in Oregon and Washington.

6b Keel ciliate on the upper margin for at least part of its length
8a Banner densely pubescent on the back.....Silver lupine (*L. albifrons*)



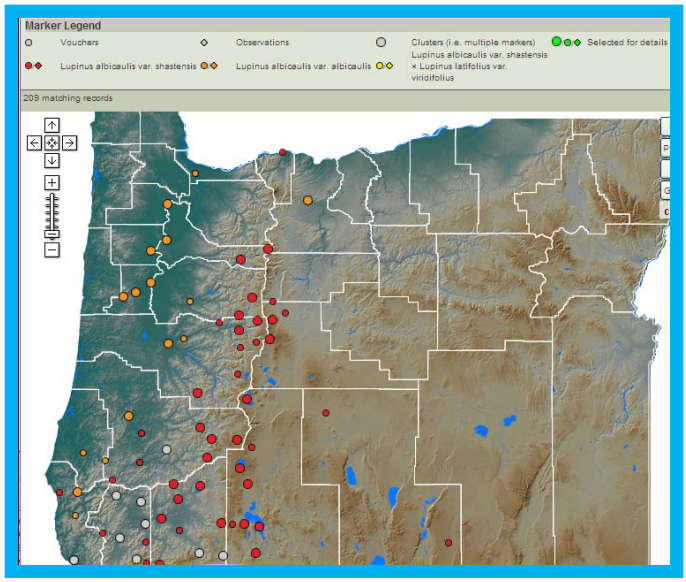


Figure 21. Drawing and diagnostic characteristics (left) and distribution in Oregon of silver lupine. Either not recognized or present in Washington.

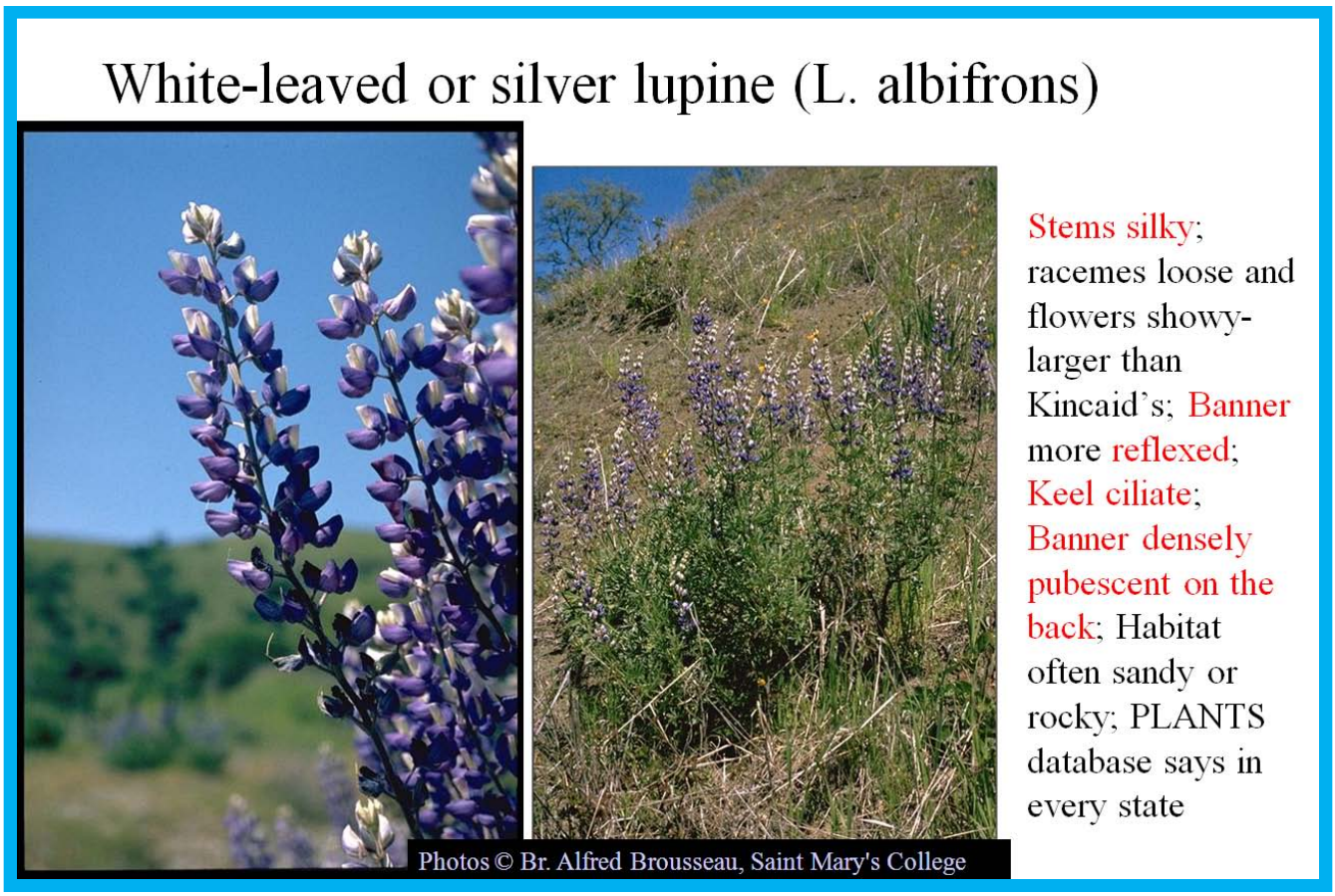


Figure 22. Photographs of flowers (left) and plant (right) of silver lupine.

8b Banner glabrous on the back

9a Stems many from the base, typically unbranched; plants low, tufted, densely pubescent; inflorescence dense……Pacific lupine (*L. lepidus*)

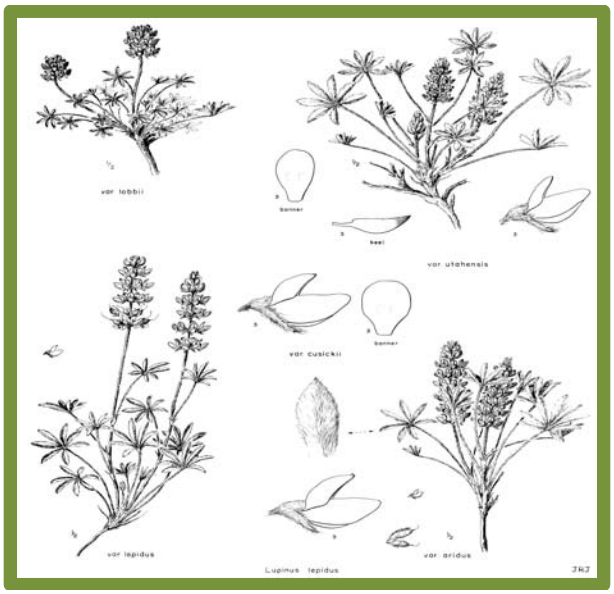


Figure 23. Drawing of varieties of Pacific lupine.

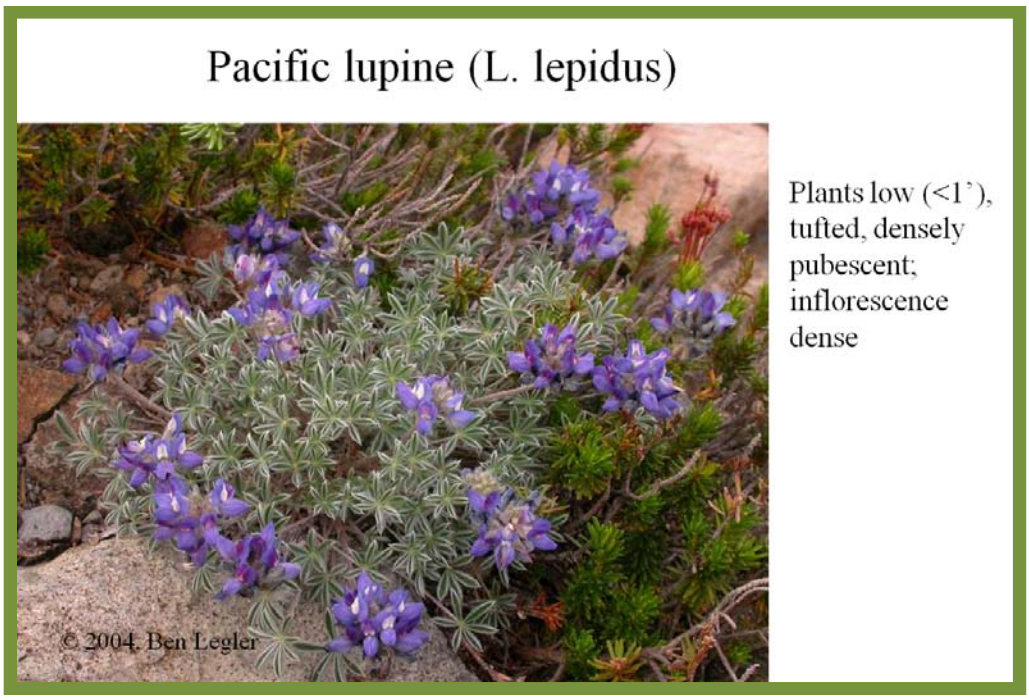
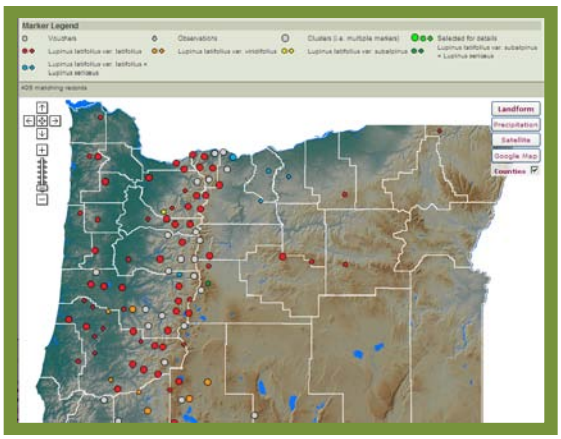


Figure 24. Photograph of plant of Pacific lupine and diagnostic characteristics.



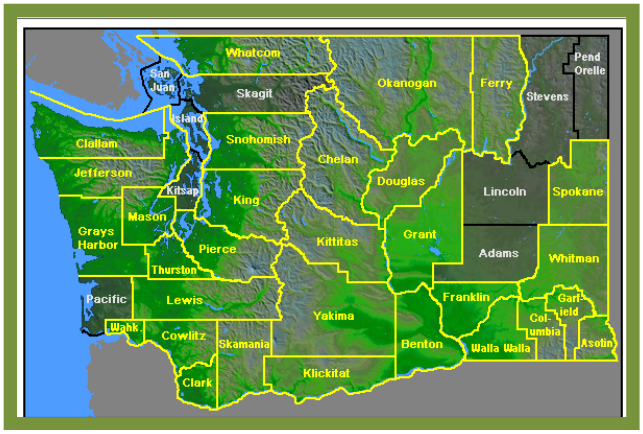


Figure 25. Distribution of Pacific lupine in Oregon and Washington.

9b Not as above in all points

10a Upper calyx lip much wider than the lower

……..……..Broadleaf lupine (*L. latifolius*)

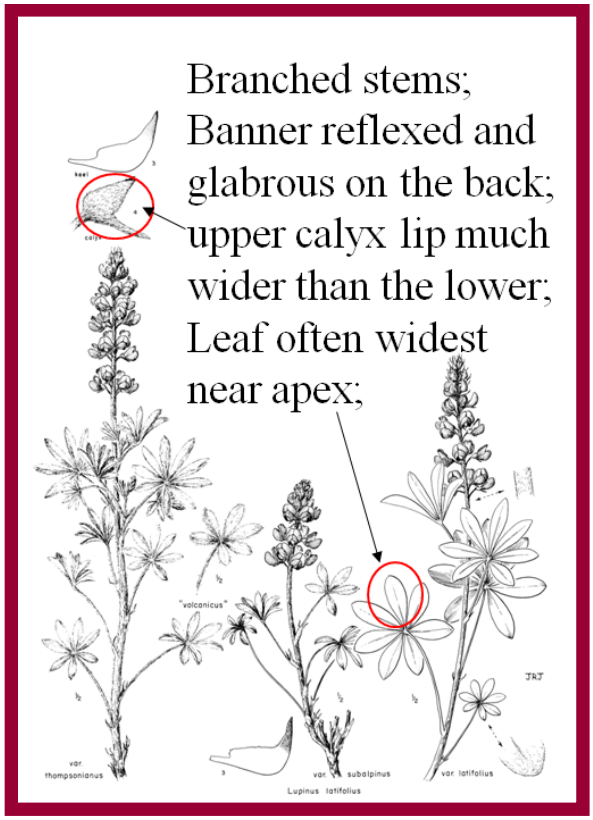


Figure 26. Drawing and diagnostic characteristics of broadleaf lupine.

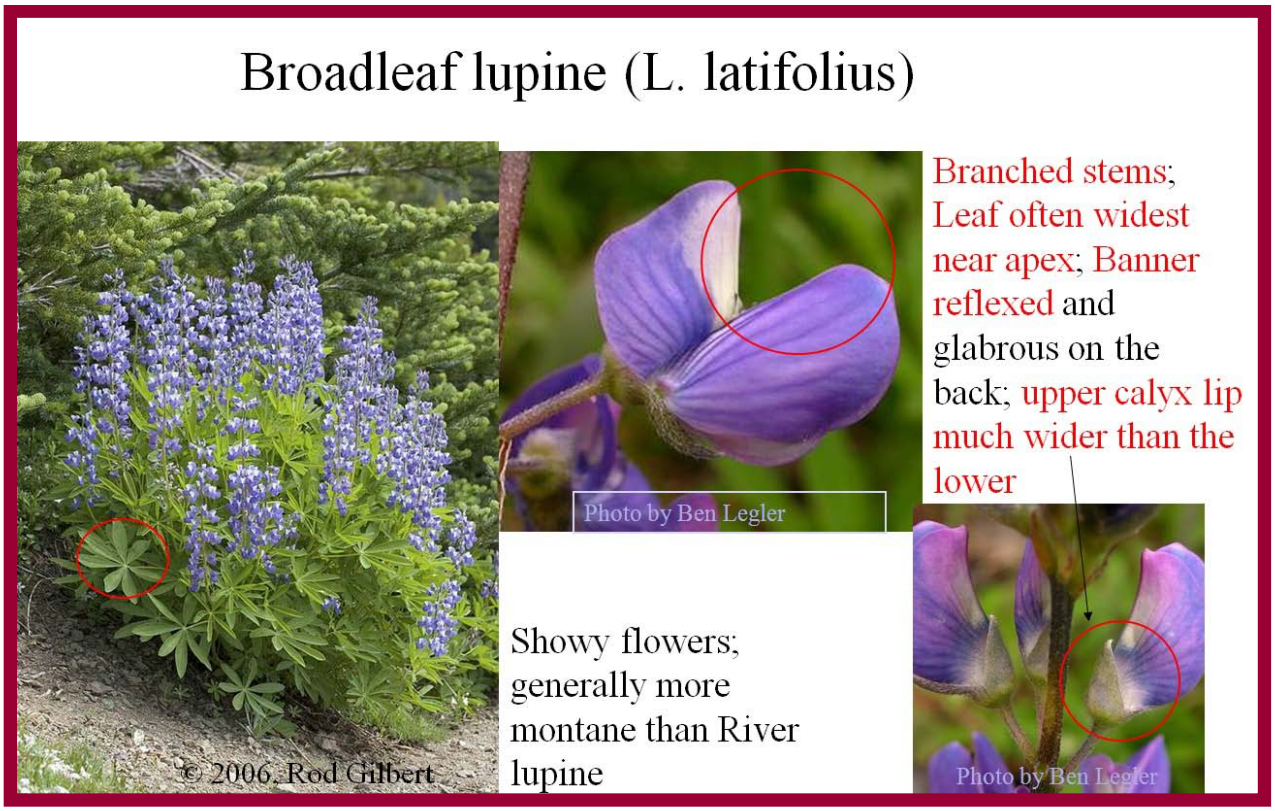


Figure 27. Photographs of plant (left) and close-up of flowers (middle), and close-up of calyx lips of broadleaf lupine.

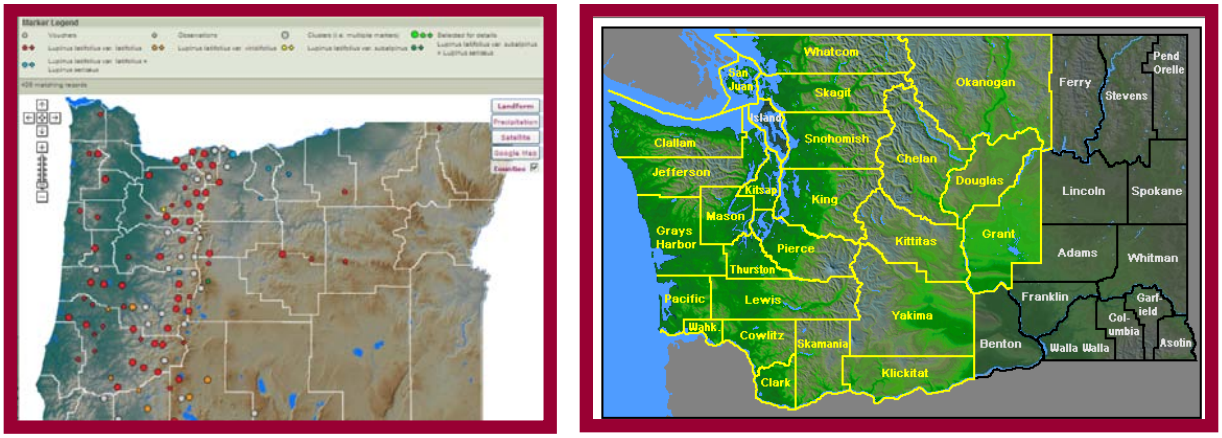


Figure 28. Distribution of broadleaf lupine in Oregon and Washington.

10b Upper calyx lip not much wider than the lower, although shorter…..……..River lupine (*L. rivularis)*

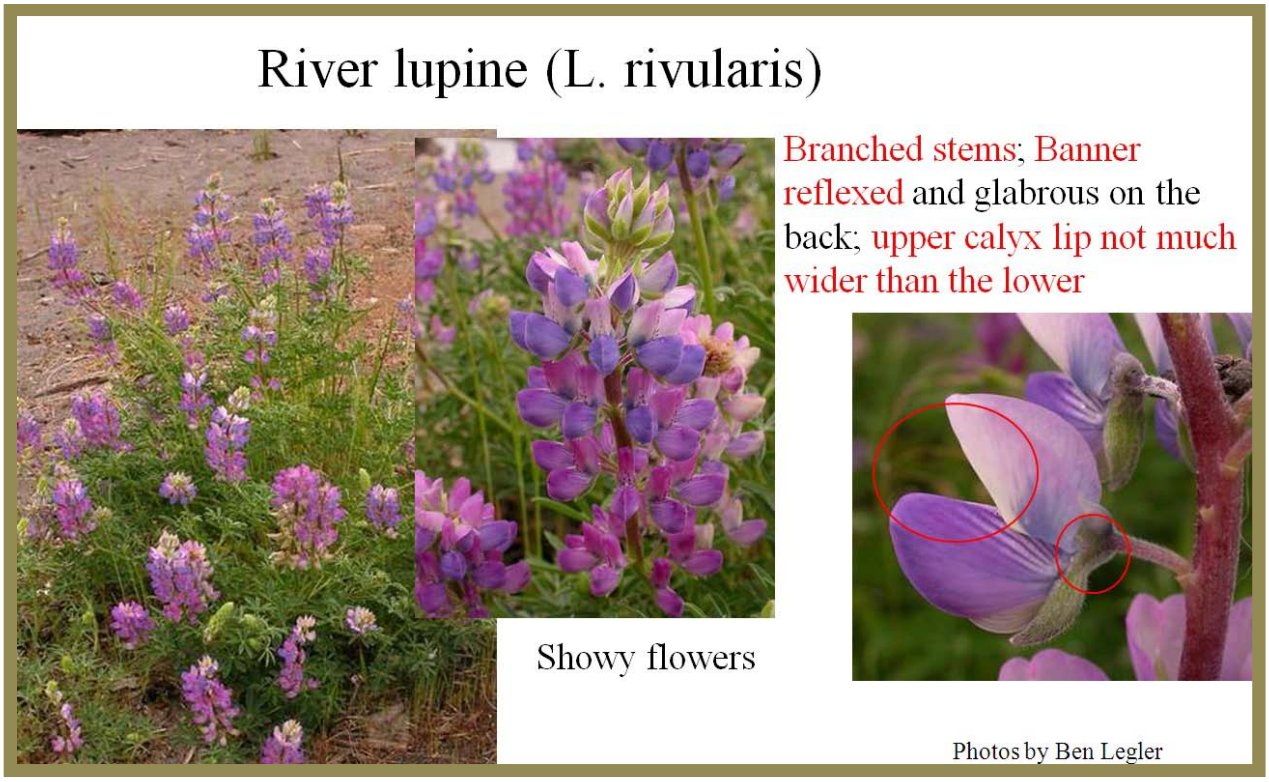


Figure 29. Photographs of plant (left), close-up of flowers (middle), and close-up of individual flower and calyx of river lupine.

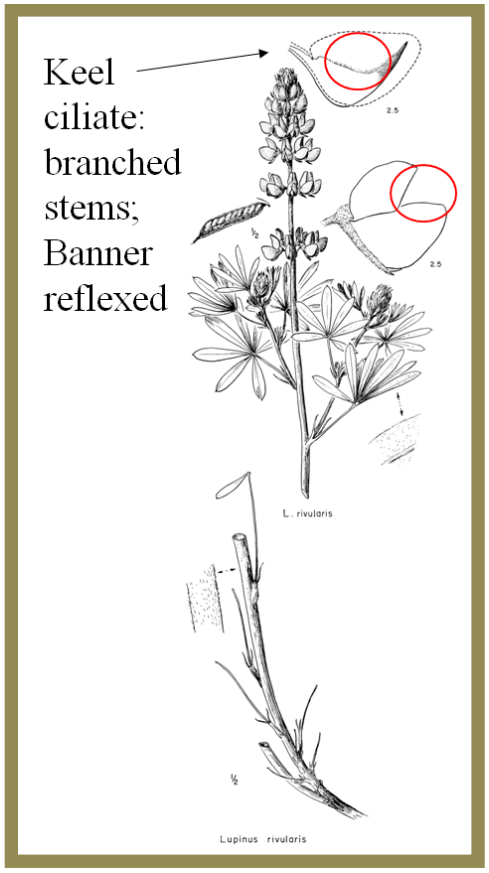


Figure 30. Drawing and diagnostic characteristics of river lupine.

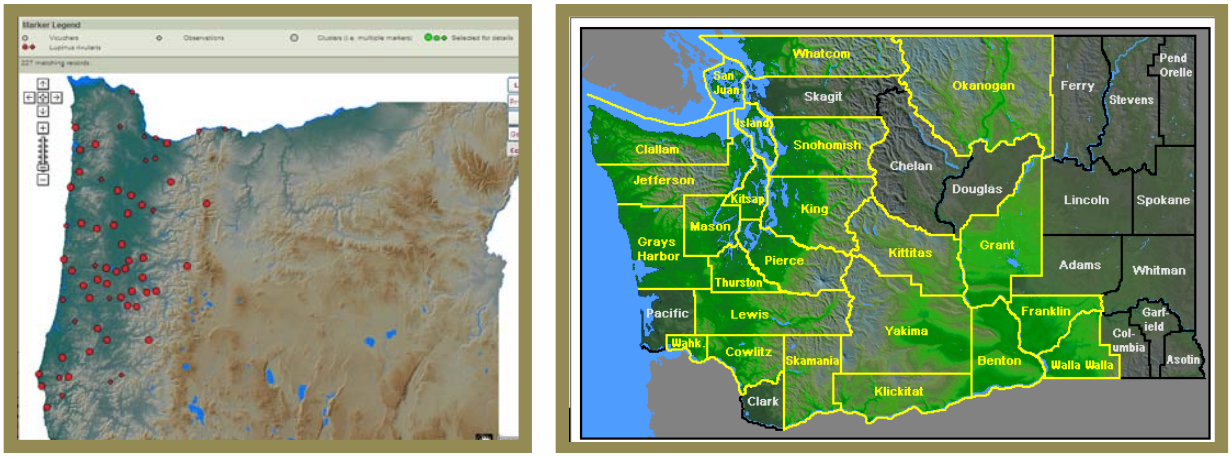


Figure 31. Distribution of river lupine in Oregon and Washington.

References and for further information:

- U.S. Fish and Wildlife Service. 2010. Final Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. U.S. Fish and Wildlife Service, Portland, Oregon. http://www.fws.gov/oregonfwo/Species/PrairieSpecies/Documents/PrairieSpeciesFinalRecoveryPlan.pdf
- U.S. Fish and Wildlife Service. October 31, 2006. Designation of Critical Habitat for the Fender's blue butterfly (Icaricia icarioides fenderi), Lupinus sulphureus ssp. kincaidii (Kincaid's lupine), and Erigeron decumbens var. decumbens (Willamette daisy); Final Rule. http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006_register&docid=fr31oc06-14
- U.S. Fish and Wildlife Service. January 25, 2000. Endangered Status for *Erigeron decumbens* var. *decumbens* (Willamette Daisy) and Fender's Blue Butterfly (*Icaricia icarioides fenderi*) and Threatened Status for *Lupinus sulphureus* ssp. *kincaidii* (Kincaid's Lupine). Federal Register 65:3875-3890 http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2000_register&docid=fr25ja00-19
- T&E Plant Survey Form – Use this to document Endangered Species compliance during conservation planning in Oregon (go to eFOTG click on Oregon map, then any county, go to Section II., then Threatened & Endangered Spp folder; then in 2. Conservation Planning Guidance)
- Oregon Flora Project – Rare Plant sheet on Kincaid's lupine: http://www.oregonflora.org/rarepdfs/lupsulkin2.pdf
- Oregon Natural Heritage website – Specific information on individual plant species: http://oregonstate.edu/ornhic/plants/view_plants2.php
- Oregon Field Office of U.S. Fish and Wildlife Service information: http://www.fws.gov/oregonfwo/Species/Data/KincaidsLupine/
- State of Oregon Listed Plants: http://oregon.gov/ODA/PLANT/CONSERVATION/statelist.shtml
- Field Guide to Selected Rare Plants of Washington http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/lusuki.pdf
- Photos and distribution in Washington http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Lupinus&Species=oreganus&Trinomial=kincaidii