Interim Management Protocol for *Rubus nivalis*
BC Timber Sales Strait of Georgia Operating Areas – version 1.0

M. Symon, R.P.F., November, 2007

Introduction

The Committee on the Status of Endangered Wildlife in Canada (COSEWC) lists species at risk (SAR) as extirpated, endangered or threatened species or a species of special concern. A COSEWIC designation affords legal standing to the species. Under British Columbia's Forest and Range Act Practices Act (FRPA), species at risk can be designated as Identified Wildlife if the species requires special management to address the impacts of forest (or range) activities.

Rubus nivalis (snow bramble), an evergreen trailing raspberry found at mid elevations at limited locations in British Columbia (Figure 1), is described as rare in southern BC (Douglas, Meidinger, and Penny, 2002). While the distribution of *Rubus nivalis* ranges across seven biogeoclimatic zones, the plant's occurrence in British Columbia is not well documented (BC Conservation Data Centre). In 2006, the species was recorded in fewer than twenty locations in southern BC. A proportion of these locations occurred in BC Timber Sales (BCTS) Strait of Georgia operating areas.

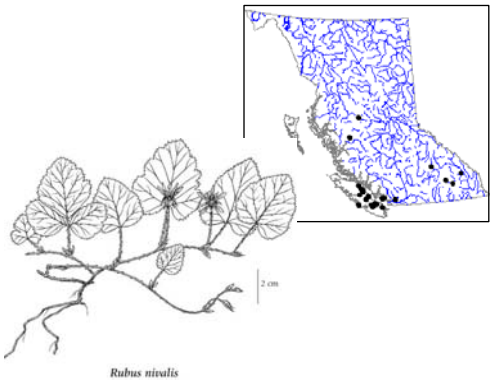

Figure 1. Line diagram and provincial distribution map of *Rubus nivalis* (from E-Flora of BC)

The following status information is provided for *Rubus nivalis*:

- G4 - Global status - (Apparently secure) – uncommon but not rare; some cause for long-term concern due to declines or other factors
- S2 - Provincial status - (Imperiled) – imperiled because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province (or nation)
- Red-listed – Conservation Data Centre – indigenous species that are extirpated, endangered, or threatened in British Columbia
- COSEWIC - Unlisted

In the absence of a COSEWIC designation, *Rubus nivalis* is not listed as a species at risk in BC's Forest and Range Practices Act (FRPA). While it is not covered under present legislation, its designation as a red-listed species provides advisory protection status as a species at risk.

BC Timber Sales (BCTS) is bound by due diligence under their Environmental Management System (EMS) to address species at risk in its operating areas. The following protocol was developed to manage *Rubus nivalis* in BCTS Strait of Georgia operating areas. As new information becomes available, or as new policy is implemented, BCTS will alter the protocol to meet new requirements.

Approach

Management protocol for *Rubus nivalis* has the following objectives:

1. To alert forest planners of potential locations of *Rubus nivalis*, a species at risk, within specific BEC variants in BCTS Strait of Georgia operating areas
2. To ensure areas planned for development where there is a likelihood of locating *Rubus nivalis* are adequately assessed and surveyed for the species.
3. To reduce the likelihood of loss of current populations of *Rubus nivalis* as a result of BCTS forest activities.
4. To retain populations of *Rubus nivalis* well distributed across the narrow range of the species.
5. To minimise timber supply impacts through leveraging existing leave areas.
6. To monitor management practices in order to evaluate the long-term effects of forest activities on the species.

Ecological Baseline Information

Rubus nivalis occupies moist forests and glades in the montane zone from British Columbia to Washington, Oregon, California, and Idaho (Douglas et al., 2002; Hitchcock and Cronquist, 1973; Kartesz, 1994). The extent of the species in the Pacific Northwest is not well known (op. cit.). The United States Department of Agriculture notes that while *Rubus nivalis* may be found between elevations of 1085-1350 m a.s.l. (above sea level) in California, its presence in the state is rare, and it is more common in other Pacific Northwest states. In Washington State, *Rubus nivalis* and associated plant species have been the subject of limited trials studying extirpation rates of late-seral species in variable retention treatments in mid elevation forests (Halpern et al., 2005).

As one of nearly 4,600 plant species introduced to the Hawaiian Islands, *Rubus nivalis* is considered a problem alien plant at high elevations on Maui and Hawaii, where it is reportedly displacing native flora (Smith, C., 1998).

Species-specific information about *Rubus nivalis* in British Columbia is limited (E-Flora of BC). Biophysical data for the species is based on only three documented locations (in the CWH) (BEC database).

BCTS Powell River operating area was recently informed about the presence of *Rubus nivalis* in proposed harvest areas at Mt. Elphinstone. A small-scale field study authorised by BCTS indicated *Rubus nivalis* has specific ecological requirements (Symon, M., 2007). Approximately 30 populations of *Rubus nivalis* were found within a 5-km radius within a narrow elevational range in the CWHdm. Typical characteristics of *Rubus nivalis* locations at Mt. Elphinstone include:

- Diffuse populations (scattered distribution: <5 to 15 populations/ha; size of individual populations ranges from < $1m^2$ to 0.02 ha)
- Restricted elevational range (mid-elevation [montane sites]: 480-620 m a.s.l.)
- Southwest aspect predominant
  (a 1953 CDC element occurrence for the upper Memekay area on Vancouver Island records *R. nivalis* on a north aspect)
- Moderately sloping, concave slopes (averaging 30% slope gradient)
- Shade-tolerant: associated forest stand structure: older mature to mature Fd(CwHw) (with >75% canopy closure)
- Soil Nutrient Regime: Medium to Rich

- Soil Moisture Regime: Fresh to Moist
- Typical site series: CWHdm 01/05/03/(06)
- Sparse to dense shrub layer dominated by GAULSHA, RUBUURS, POLYMUN
- Sparse to moderately dense moss layer: PLAGUND, RHTILOR, HYLOSPL
- Coarse Woody Debris (CWD) and Small Woody Debris (SWD) moderate to high – some sites have had recurrent windthrow
- Lignomor/Hemimor Humus types

The majority of populations of *Rubus nivalis* at Mt. Elphinstone was found in timbered areas near recently harvested blocks. A small proportion of populations was located in harvested blocks. Where recent harvesting has occurred, BCTS has endeavored to secure known populations of *Rubus nivalis* in Wildlife Tree Patches.

Populations of *Rubus nivalis* in clearcut openings and on exposed edges of Wildlife Tree Patches frequently, but not always, exhibit signs of reduced vigour (red-purple leaf colouration; reduced leaf size) that may be associated with the plant's response to conditions with increased light. More work is required to assess populations within cutblocks.

Rationale: The potential occurrence of *Rubus nivalis* within a particular BEC variant is established through identification of the species' habitat capability.

Assessment Requirement

The requirement to assess an area for *Rubus nivalis* populations is indicated when BCTS proposes development at specific sites in the following BGC variant in the Powell River operating area:

- ❖ CWHdm – between app. 450 to 650 m a.s.l. (to be assessed on a site-by-site basis)

Due to limited information about *Rubus nivalis* in other operating areas of BCTS Strait of Georgia Business Area, general reccies are recommended when sites are proposed for development at middle elevations in the following biogeoclimatic units:

- ➢ CWHmm1
- ➢ CWHmm2
- ➢ CWHvm1
- ➢ CWHvm2
- ➢ CWHxm

Rationale: Areas planned for development where there is a likelihood of finding *Rubus nivalis* should be evaluated for comparison with biogeoclimatic variants and site factors associated with documented locations.

Survey Intensity

Inventory requirements for *Rubus nivalis* should be based on the following procedure:

1. Pre-mapping: Landscape Level
   Determine if the area proposed for development is classified in a biogeoclimatic variant where there is a likelihood of finding *Rubus nivalis* (see above).

2. General Field Assessment
   Evaluate biophysical site factors (see Ecological Baseline data) to assess the potential for local *Rubus nivalis* sites.

3. Prioritise Areas to be surveyed
   Prioritise areas to be surveyed on a landscape and stand level basis.
   Incorporate practical criteria (i.e., harvest year, availability of funds and resources for surveys, number of known populations in area, terrain type, etc.).

4. Field Surveys
   Implement field surveys when:
   -*Rubus nivalis* populations are located, and/or
   -Biophysical site factors are favourable for finding populations of *Rubus nivalis*

   Conduct surveys in the general locale (100 to 200 m [horizontal] from proposed block/road layout) and at the stand level (proposed block/road layout).
   Use grid surveys with closely aligned parallel transects (15 m or less) spaced over an identified project site. Ideally, use a three-person survey crew.
   (Productivity of grid surveys is highly dependent on terrain, manpower, understorey, coarse woody debris, and weather.)

5. Population Site Assessment
   For each *Rubus nivalis* population located, record habitat capability features:
   -general location
   -elevation
   -aspect
   -slope
   -key microsite topographic features (i.e., mid-slope, bench, etc.)
   -qualitative soil moisture and nutrient regime classification
   -stand type, structure; species composition
   -canopy closure %
   -humus type
   -associated understorey species
   -percent of Coarse Woody Debris (CWD) and Small Woody Debris (SWD)
   -extent of population (L x W area measurement: m^2)
   -vigour of population (leaf size and colouration; population density)
   -replicable photograph

6. GPS location
   Where possible, GPS location of *Rubus nivalis* population
   If GPS is not available (i.e., under thick canopy), record directions of location (i.e., plant is 40 m at 315^o from the 1+250 road location)

Rationale: *Rubus nivalis* appears to have specific site requirements. Identified biogeoclimatic variants and a favourable suite of habitat features will trigger the requirement for a detailed survey. Systematic surveys in areas where there is a likelihood of locating the species are critical to determining the extent of *Rubus nivalis*. Site characteristics of populations located through the survey process need to be recorded and evaluated for comparison with known site types.

Reporting

Survey data (including relevant mapping) will be promptly supplied to the BCTS area forester who will ensure that data is forwarded to Ministry of Environment Conservation Data Centre.

Rationale: Prompt reporting of species at risk is vital to BCTS activities.
Monitoring species at risk is a core activity of the Ministry of Environment, and all information on the location and status of *Rubus nivalis* populations is critical to the long-term management of the species.

Management

Currently there is little information regarding most plant species at risk in BC, particularly habitat information (Woutenberg, A. 2006). Management of *Rubus nivalis* in BCTS operating areas should be sufficiently broad to potentially address essential site characteristics at both the landscape level and stand level.

In the absence of detailed information about *Rubus nivalis* in British Columbia, the following strategies are intended as interim guidelines for management of the species in BCTS Strait of Georgia operating areas:

- Where two or more populations of healthy* *Rubus nivalis* occur in a proposed block or within 50 m of proposed road layout, the forester/biologist will cooperate with BCTS to consider re-designing road and/or block layout to minimise the impact on local populations.

  * healthy populations of *Rubus nivalis* measure >1 m^2; healthy plants exhibit vibrant green leaf colour with few signs of discoloration (i.e., red or purple leaf colour)

- Clustered populations of *Rubus nivalis* at proposed harvest areas should be located in Wildlife Tree Patches and/or Wildlife Habitat Areas.

  Consider important stand attributes and methods for retaining these attributes in the establishment of Wildlife Tree Patches. Wildlife Tree Patches should incorporate essential habitat requirements of *Rubus nivalis* (i.e., fresh to moist, medium to rich sites with sufficient crown closure on southwest aspects).

  Minimum size of Wildlife Tree Patch should be 0.25 ha to mimic the "interior effects" (shading) of a fully stocked mature forest.

  Rubus nivalis populations should not be situated on south-facing edges of WTPs in order to avoid drying conditions and over-exposure.

- *Rubus nivalis* has been reported in some take-back areas of TFL 39 within the Powell River operating area. Monitoring of identified patches retained in BCTS blocks (and adjacent areas) is recommended to assess the vigour of the species.

- Collaboration between BCTS and professionals is recommended to determine links, if any, between *Rubus nivalis* and wildlife SAR (red-tailed frog, coastal tailed frog, northern goshawk) at Mt. Elphinstone. (See Wilson, S. 2006; Wind, E. June 2006; Wind, E. July 2006) Management protocol for vegetation SAR could be extended to potentially address common habitat features for wildlife SAR.

- As the survey process develops, rate the risk of *Rubus nivalis* occurring in a particular BEC variant as High, Moderate-High, Moderate, or Moderate-low, Low, or Nil. Risk assessment should be based on field assessment.

Rationale: Management strategies for *Rubus nivalis* are critical to the long-term viability of the species in BCTS Strait of Georgia Business Area.

Species at risk are indicators of the integrity of ecosystems. Compared with the limited number of locations where *Rubus nivalis* is documented in BC, the recent finding of "diffuse" populations at Mount Elphinstone might suggest the area is a "key site for the species in BC" (Hebda, R. Dr., personal discussion).

Global warming is predicted to reduce the extent of certain biogeoclimatic variants, including CWHdm. A climate shift at the narrow elevational range of *Rubus nivalis* may severely affect the ability of the plant to cope with warmer, drier conditions.

Monitoring

Long term biological monitoring of *Rubus nivalis* will be conducted using standard photopoint monitoring procedures. Photopoint monitoring is both a qualitative and quantitative tool for evaluating the success of management decisions. Monitoring of populations in timbered areas should be considered every five years. Monitoring of populations in harvested areas (including populations in existing and proposed harvest blocks) should be conducted at least every other year.

Standard photopoint monitoring should be refined to incorporate landscape scenes with close-up images of *Rubus nivalis*.

Rationale: Photopoint monitoring is a standardised procedure for taking precisely replicable photographs of resources that require long term management (Hall, F. 1997). Due to limited documentation of *Rubus nivalis* in British Columbia, the response of *Rubus nivalis* populations to harvesting and silvicultural management must be monitored. The need to monitor the response of *Rubus nivalis* populations to increased light in cutover areas is particularly important.

Adaptive Management

This protocol will be revised every five years (or as required, through continuous improvement) based on monitoring results and available literature related to *Rubus nivalis* site requirements and management.

Rationale: Adaptive resource management is a decision-making process that allows resource managers to make decisions when confronted by ecological complexity, stochastisity and uncertainty (Haney and Power, 1996; McLain and Lee, 1996). Specific action is required to protect and enhance populations of species at risk. Innovative and creative management strategies are intrinsic to the long-term viability of *Rubus nivalis.*

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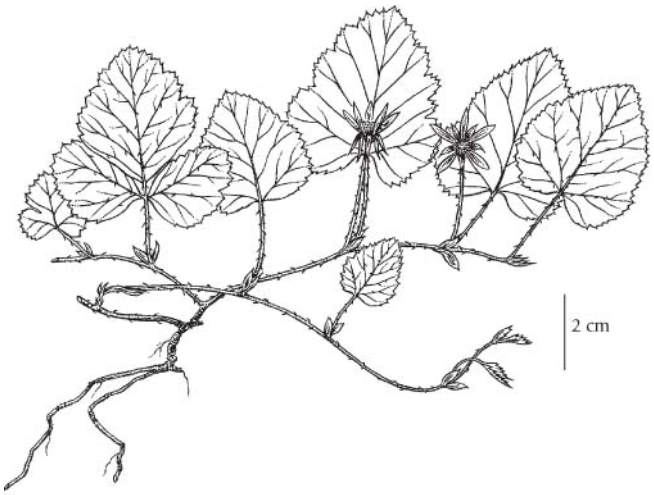
Appendix 1. Identification Guide to *Rubus nivalis*.



Rubus nivalis

Rubus nivalis Dougl. ex Hook.

snow bramble

Rosaceae

SPECIES INFORMATION

General:

Perennial, with slender trailing stems and erect flowering branches; stems somewhat woody, trailing, stolon-like, to 2 m long, often rooting at the nodes, fine-hairy and armed with short recurved prickles.

Leaves:

Alternate, deciduous, long-stalked, simple (rarely divided into 3 leaflets), the blades egg-heart-shaped, 3-6 cm long, sometimes 3-lobed, double-saw-toothed, green on both surfaces, smooth to sparsely hairy above and below, the leaf-stalks and veins beneath prickly; stipules membranous, narrowly egg-shaped.

Flowers:

Inflorescence of 1 (or 2) long-stalked flowers in leaf axils, the stalks not glandular; corollas pink to purple, the petals 5, lance-elliptic, 6-10 mm long, erect; calyces soft-hairy and sometimes bristly, 5-lobed, the lobes lance-egg-shaped, 6-9 mm long, bent back; ovaries superior; stamens about 15, the filaments slender, not flattened.

Fruits:

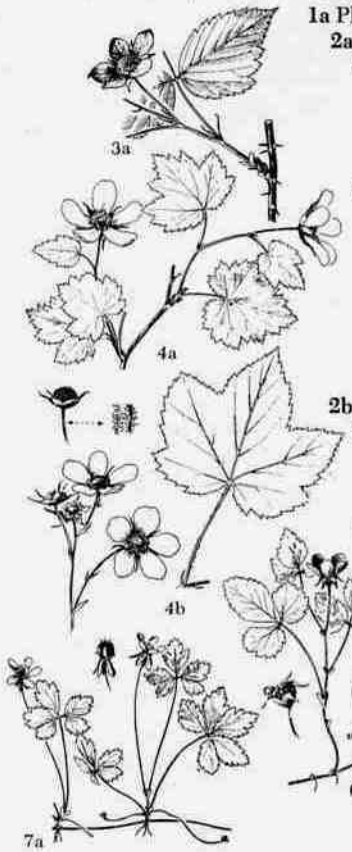
Drupelets, minutely hairy, few to several in a red hemispheric cluster like a rudimentary raspberry, the berries about 0.5 cm wide.

Source: Illustrated Flora of British Columbia

Key to Rubus (The Raspberry Clan) in the Pacific Northwest

Rubus L. Bramble; Blackberry; Raspberry

Fls rather large, complete or sometimes ♀♂ or ♀, ♂, perig, solitary to clustered; calyx ebracteate, lobes 5 (6–7), persistent, hypan camp to saucer-like, disc-lined; petals white to red, as many as sepals; stamens (15) 40 to > 100, inserted with petals at edge of hypan; pistils ∝, on ± hemispheric, often fleshy recep; ovary 2-ovulate; fr an aggregation of weakly coherent drupelets, often remaining attached to the fleshy recep; per shrubs or vines, often strongly armed with prickles or bristles, with alt, simple to ternate or pinnate, deciduous or evergreen lvs, mostly with evident stips. (Roman name). (*Ametron, Batidaea, Bossekia, Cardiobatus, Comarobatia, Comaropsis, Dalibardia, Manteia, Melanobatus, Parmena, Psychrobatia, Rubacer*).



1a Pl unarmed

2a Sts erect, woody, rarely < 0.5 m tall

3a Petals red; lvs trifoliolate; fr salmon or yellowish, drupelets gen not coherent to recep; pl 1–3 (5) dm; moist woods to stream banks or swamps, lowl to midmont; Alas to nw Cal from coast to Cas; frs edible, pl rather orn, but difficult to eradicate; salmonberry
1 R. spectabilis Pursh

3b Petals white; lvs palmately lobed

4a Fls solitary; lf bl mostly < 5 cm; styles hairy full length; twigs and peds puberulent but not stipitate-glandular; thickets on canyon sides along SR, Wallowa Co, Ore, and Idaho Co, Ida; Bartonberry
2 R. bartonianus Peck

4b Fls 2–9, loosely cymose; lf bl 5–25 cm; styles glab distally; twigs stipitate-glandular; moist to dry, wooded to open areas from near sea level to subalp; Alas to s Cal, from coast to GL, Wyo, Colo, NM, and n Mex; thimbleberry, frs ± edible **3 R. parviflorus** Nutt.

2b Sts ± trailing, scarcely woody, prob always < 0.5 m tall

5a Pl ♀, ♂; lvs broadly cordate-reniform to semiorbicular, 4–10 cm broad, shallowly (3) 5-lobed; fls solitary on erect lfy brs; circumboreal, s to VI, Me, and NY but not known to reach our area; cloudberry
4 R. chamaemorus L.

5b Pl ♀; lvs compound (except in *R. pedatus*)

6a Petals ± reddish-tinged, (8) 10–16 mm; pl not stoloniferous, but strongly rhizomatous; ann fl sts erect, 2–15 cm; mt meadows and bogs or woods to alp tundra; Alas to VI, e to Newf, Lab, and Minn, and s in RM to Mont, Wyo, and Colo; nagoonberry
5 R. acaulis Michx.

6b Petals white, mostly < 8 mm; pl gen stoloniferous and trailing, but not rhizomatous (except *R. pubescens*)

7a Lflets 5, or only 3 but basal pair deeply divided; pl mat-forming, erect sts scarcely 2 cm; filaments filiform; pistils 3–6, ovary glab; moist areas, open banks to dense for, from near sea level to near timberl; Alas to s Ore, from near coast to w Mont and n Ida; excellent trailing orn; fivelvd bramble, strawberry b.
6 R. pedatus J. E. Smith

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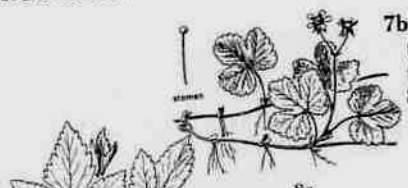

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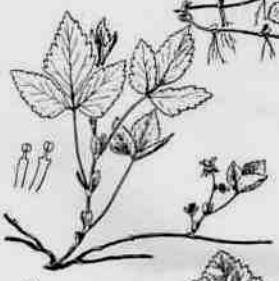

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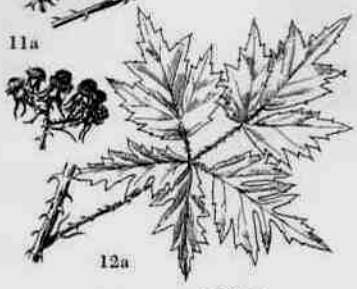

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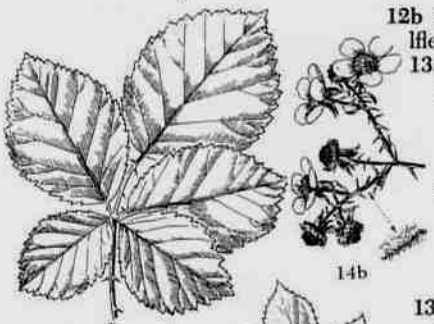

14b

14a 13b

7b Lflets no > 3, sometimes bls merely deeply 3-lobed; pl sometimes with ± erect sts > 2 cm; filaments sometimes flattened and toothed near tip; pistils 7–∝; ovary sometimes pubescent

8a Lvs in part simple and merely deeply lobed; pistils 7–15, ovaries strongly pubescent; filaments slender, not flattened; pl non-rhizomatous; moist to dry woods, mont to subalp; BC to n Cal, in both Cas and OM; excellent trailing orn; dwarf bramble **7 R. lasiococcus** Gray

8b Lvs 3-foliolate; pistils 20–30, ovaries glab or only weakly pubescent; filaments broad and flattened, with square shoulder or 2 teeth near tip; pl ± rhizomatous; clearings and burns to deep for, gen where moist; BC to nc Wn, e to Newf and Lab, and to Ia, Wisc, Ind, and in RM to n Colo, not known from Ida; dwarf red blackberry *(R. transmontanus, R. triflorus)* **8 R. pubescens** Raf.

1b Pl armed with bristlelike to stout and often curved prickles

9a Lvs in part simple and cordate, evergreen, glossy, 3–6 cm; stips ovate-lanceolate, slenderly acuminate; sts trailing, armed with small, hooked prickles; petals gen pink to purple (white); stamens ca 15; pistils 4–9, drupelets red, 3–5 mm; open to shaded and gen moist slopes in the mts; BC s in OM and Cas to sw Ore, e to Ida; snow bramble, snow dewberry *(R. pacificus)*; excellent trailing orn shrublet **9 R. nivalis** Dougl.

9b Lvs mostly compound, if evergreen the lflets gen dissected; stips often slender or adnate to petiole; petals mostly white; sts sometimes erect or with large prickles; stamens and pistils mostly ∝

10a Recep fleshy, forming part of the blackberry-like fr; sts trailing or clambering, strongly armed with gen flattened or hooked prickles; petals white or pale pink

11a Pl partially or wholly ♀, ♂, the ♀ fls with rudimentary stamens, the ♂ fls with nonfunctional pistils; sts slender, trailing, armed with slender and scarcely flattened prickles, lvs trifoliolate (or some simple), deciduous; abundant on prairies, burns, and clearings, but also in open to rather dense woodl, from near the coast to midmont; BC to n Cal, e to Ida; Douglasberry, Pacific blackberry, dewberry—our only native blackberry *(R. helleri, R. macropetalus, R. vitifolius)*; ours the var. *macropetalus* (Dougl.) Brown **10 R. ursinus** Cham. & Schlecht.

11b Pl ♂; lvs gen 5-foliolate; sts thick, often clambering to erect, armed with large, often flattened prickles; lvs various

12a Lvs evergreen, greenish on both surfaces although hairy beneath; lflets laciniate to dissected; of European origin, widely escaped w Cas, BC to Cal, occ e to Ida; evergreen blackberry **11 R. laciniatus** Willd.

12b Lvs deciduous or only partly evergreen, gen white beneath; lflets merely toothed

13a Lvs grayish- or white-tomentose beneath

14a Infl and esp peds stipitate-glandular; prickles straight; of European origin, very sparingly estab w Cas, as in Grays Harbor Co, Wn, and at Salem, Ore; European blackberry **12 R. vestitus** Weihe & Ness

14b Infl and peds eglandular; prickles hooked; intro from Old World and a serious pest in many areas, esp w Cas, from BC to Cal, also along SR in Wn, Ore, and Ida; Himalayan blackberry *(R. fruticosus, R. procerus)* **13 R. discolor** Weihe & Nees

13b Lvs soft-pubescent but not at all tomentose beneath, 3–5-foliolate; prickles mostly straight; European in origin, sparingly intro and estab in w Wn; large-lvd blackberry **14 R. macrophyllus** Weihe & Nees

10b Recep dry or *(R. spectabilis)* slightly succulent, gen not forming part of the raspberry-like fr, or if part of fr, petals pink; sts mostly erect or arching; prickles mostly straight and not flattened

15a Petals pink to red, gen > 1.5 cm; fr salmon-colored or red, drupelets imperfectly coherent; sts erect, not vinelike, often armed only near base; lvs not prickly (see lead 3a) **1 R. spectabilis** Pursh

Source: Flora of the Pacific Northwest