

Vascular plants of Saturna Island, British Columbia

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A list of 455 taxa of vascular plants is given for Saturna Island, off the southern tip of Vancouver Island, British Columbia. The island is made up of two glacially sculptured sandstone ridges covered with a thin mantle of glacial till with some marine clay deposits in low-lying areas. The climate is characterized by mild winters, cool, dry summers and low total precipitation. The island is in the dry subzone of the Coast Douglas-fir biogeoclimatic zone; Garry oak and arbutus are present on xeric sites. A provisional description of plant communities is given.

KEY INDEX WORDS: *Arbutus, Canada, Douglas-fir, Oak, Saturna Island, vascular plants.*

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Introduction

Saturna Island, easternmost of British Columbia's Gulf Islands, lies in the Strait of Georgia off southern Vancouver Island (Fig. 1). The island is 12.7 km from east to west and 4.4 km from north to south. The landscape is made up of two cuestas running east to west with steep south faces. Maximum elevation is 380 m. Between these highlands is a deep valley and below the south ridge a narrow bench runs the length of the island (Fig. 2). Samuel Island and Tumbo Island, separated from Saturna by narrow straits, are also included in the area covered by this study.

The 3 140 ha of the island are predominantly covered by second-growth forest with approximately 260 ha of open bedrock outcrop. Cleared farm fields cover 200 ha; 310 ha have been subdivided for residential or industrial use, but most of this land remains under forest cover. There are 33 km of roadway on the island.

The earliest white settlers arrived on the island in 1860. The small areas of lowland were first cleared and remain the principal areas of residence and farming. There has been little human activity, other than logging, in the uplands. Previous to white settlement, Indians periodically set fire to the vegetation to encourage game. Fire-scarred veteran Douglas-firs (*Pseudotsuga menziesii*) are found throughout. There have been several major fires since settlement. Virgin stands of forest burned in these fires have been thereby preserved from logging and are now in various

stages of natural secondary succession. There has been a band of feral goats on the open faces of the southern ridge since 1900.

Several early plant collectors, including Eugene Bourgeau, David Lyall, and C. V. Piper, worked in the area and possibly made collections on the island, but no records of these have been found. The first known collections for the island were made by A. H. Hill in 1895. R. W. Carter and J. M. Macoun, during their work on the flora of Vancouver Island, collected from the Gulf Islands between 1912 and 1920 but give no records specifically for Saturna (Carter and Newcombe, 1921). More recent contributions have been made by F. Perry, R. W. Pillsbury, T. R. Ashlee, and J. A. Calder, but no systematic collections have been made before the present study and the vascular flora of the island has remained almost unknown.

Geology and Soils

The bedrock of the island has been described by Clapp (1913), Muller and Jeletzky (1970), and Muller (1971). The Nanaimo series sandstone, shales, and conglomerates, which make up the island, have been faulted, folded, and eroded differentially to form the two massive sandstone ridges which dominate the landscape. The central valley is an eroded anticline stretching across the island to form deep, sheltered inlets at both ends. North to south-running faults form several low, steep-sided passes across the ridges and a series of scarps across the western end of the island.

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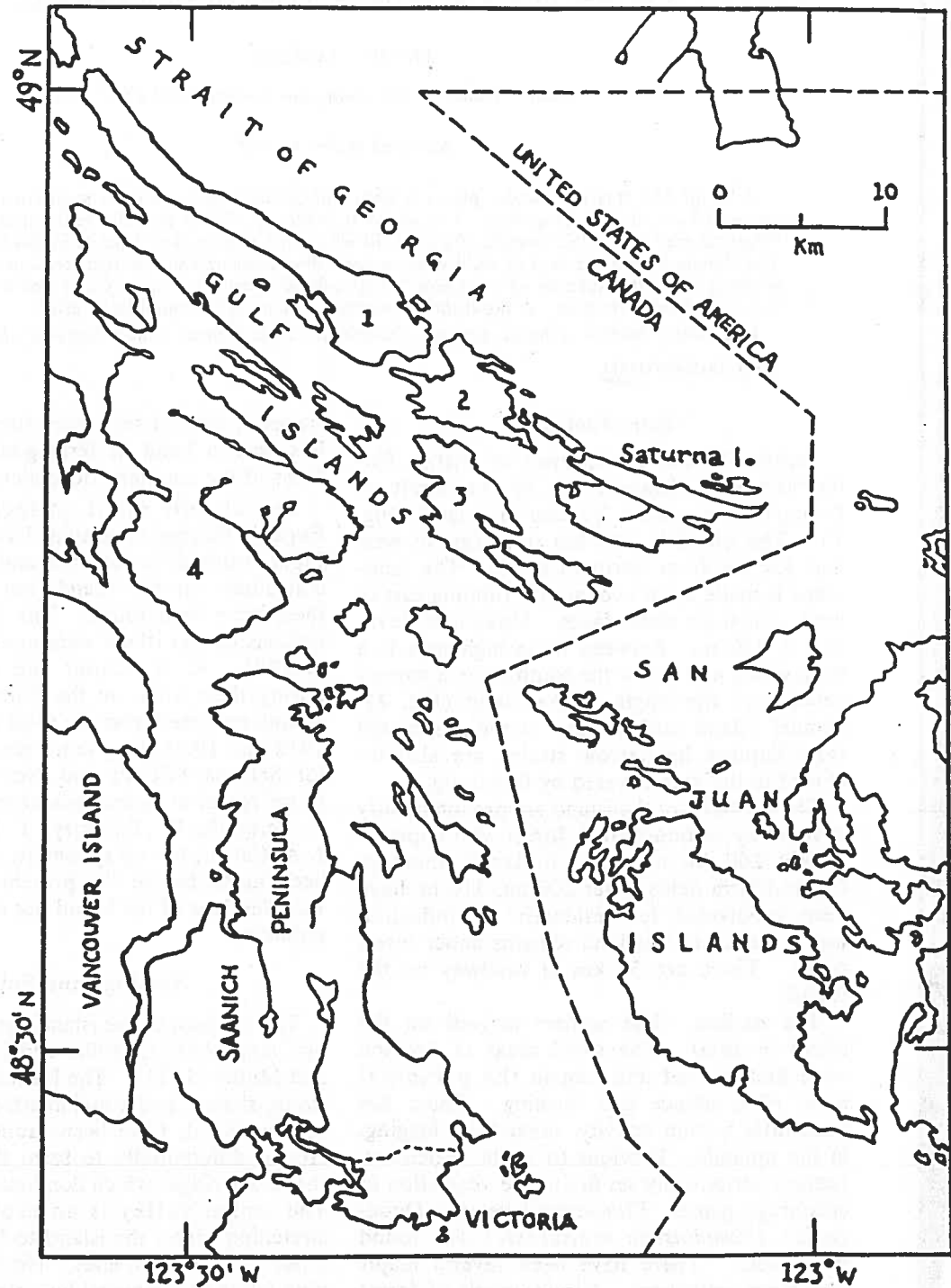


FIGURE 1. Saturna Island, in the Strait of Georgia. Other Gulf Islands are: 1—Galiano Island; 2—Mayne Island; 3—North and South Pender Islands; 4—Saltspring Island.

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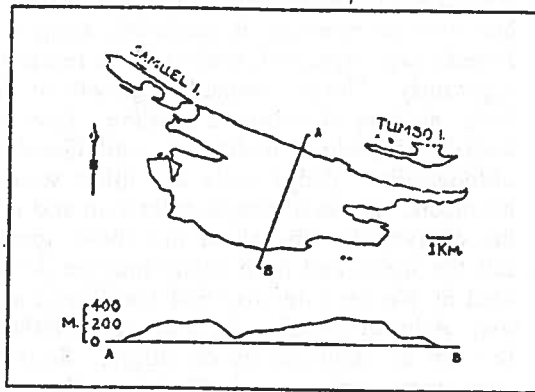


FIGURE 2. Cross-section of Saturna Island. Horizontal and vertical scales are equal.

Pleistocene glaciers flowing from the northwest smoothed the north sides of the ridges and plucked the south faces leaving steep, rocky bluffs (Armstrong *et al.*, 1965). As the glaciers receded, approximately 13 500 years ago, the island rose isostatically leaving several well-defined wave-cut terraces below 120 m elevation (Prest, 1969; Mathews *et al.*, 1970).

Soils are mainly dystric brunisols developed on compact glacial till. Sombric brunisols occur on areas of glacial outwash and shale outcrops. Below 100 m elevation in areas of low relief there are deposits of marine clays and silts which have developed humic eluviated gleysols. There are no podzols. (Day *et al.*, 1959; Canada Dept. of Agriculture, 1974; Lord, 1975).

Climate

The climate of the island is characterized by a period of marked summer drought and mild, wet winters (Köppen Csb). Kerr (1951) classifies the climate of the Georgia Strait area as *Transitional between Cool Mediterranean and Maritime* with the outstanding characteristics of summer deficiency of moisture, low annual precipitation, and high totals of sunshine. The nearest station for which weather statistics are available is Pender Island, 3 km to the west, with adjusted mean annual precipitation, 736 mm; mean annual temperature, 9.7 C; and driest month, July, with 17 mm precipitation (B.C. Dept. of Agriculture, undated). Prevailing winds are from the southwest in summer and from the southeast in winter.

Vegetation

Krajina (1969) places the island in the Garry oak–Douglas-fir subzone of his Coastal Douglas-fir biogeoclimatic zone. The dominant forest tree is Douglas-fir. Red cedar, grand fir, and western hemlock are also present. Garry oak and arbutus are found on xeric sites and red alder, broad leaf maple, and lodgepole pine are common seral trees. There are a large number of spring flowering species.

Plant communities and succession in the zone have been described by Mueller-Dombois (1965), Krajina and Spilsbury (1953), Szczawinski and Harrison (1972), Roemer (1972), and Fonda and Bernardi (1976). Work on Gulf Island plant associations is incomplete but it is thought that a provisional, verbal description of the vegetation types which occur will be of interest, especially in noting habitats which are limited or lacking in this small area.

There are five basic divisions of land types—*bedrock outcrop*, *dry transition forest*, *mesic forest*, *swordfern forest*, and *wetlands*. The vegetation types described here represent distinct landforms and soils only; these descriptions are not complete in detail and no attempt to assign alliance, association, or subassociation ranks is made.

Bedrock outcrop communities occur principally on the face of the southern ridge, with smaller areas on the northern ridge and the western and eastern ends of the island. Exposure is south to southwest, slopes are moderately to extremely steep (slope classification follows Canada Dept. of Agriculture, 1974), and soils are thin and poorly developed. Desiccation from exposure and the prevailing winds is marked. Areas of shallow, fine colluvium are characterized by a community including *Bromus sterilis*, *B. tectorum*, *B. mollis*, *Stipa lemmonii*, *Poa scabrella*, *Danthonia californica*, *Trifolium microcephalum*, *T. tridentatum*, *Plagiobothrys tenellus*, and *Carex pensylvanica*. Small groves of *Quercus garryana* and *Pseudotsuga menziesii* occur on pockets of deeper soil or where there is seepage, but because of goat grazing there are no seedling or young trees. Bare rock outcrops are characterized by *Rhacomitrium canescens*, *Polytrichum piliferum*, *P. juniperinum*, *Grimmia* spp., *Hedwigia ciliata*,

crustose and foliose lichens, *Selaginella wal-lucei*, *Aira praecox*, *Mimulus alsinoides*, *Collin-sia parviflora*, and *Saxifraga intergrifolia*. Escarpments with southern exposure are char-acterized by the species of bare rock and *Sedum spathulifolium*, *Pachystima myrsinites*, *Holodis-cus discolor*, *Symphoricarpos albus*, scrubby *Quercus garryana*, *Opuntia fragilis*, *Plectritis congesta*, and *Camassia leichlinii*. Escarp-ments with west to northwest to northeast ex-posure are characterized by *Sedum spathuli-folium*, *Pachystima myrsinites*, *Symphoricarpos albus*, *Montia parvifolia*, *Polypodium glycy-rhiza*, *Heuchera micrantha*, *Delphinium men-ziesii*, *Isoethecium stoloniferum*, and *Rhytidia-delphus triquetrus*. Dwarfed *Pseudotsuga menziesii* and *Arbutus menziesii* occur on ledges.

In spite of grazing and the resultant domi-nance of alien *Bromus* species over the areas of fine colluvial soil there are still a number of relatively rare species occurring in this division, including *Meconella oregana*, *Crocidium mul-ticaule*, *Idahoia scapigera*, *Myosurus minimus*, and *Microseris lindleyi*. A second group of species found in this division are possibly, with the above, relicts of the warmer, drier hypsi-thermal period which followed the last glacia-tion and lasted until approximately 4 000 years ago (Detling, 1968; Hansen, 1947; Heusser, 1960). This group includes *Quercus garryana*, *Lupinus bicolor*, *L. micranthus*, *Linanthus bi-color*, *Orthocarpus attenuatus*, *Phacelia linearis*, *Juniperus scopulorum*, *Opuntia fragilis*, *Prunus virginiana*, and *Zygadenus venenosus*. These species are characteristic of warmer and drier habitats east of the Cascades or to the south and occur only on isolated xeric sites in the Puget Sound-Georgia Strait area.

Dry transition forest occurs on steep to very steep slopes with southwest to southeast exposure. It is closely related floristically to the *Mesic forest* but the understorey growth is less vigorous and species more tolerant of xeric conditions are dominant. *Pseudotsuga men-ziesii* is the dominant tree and is able to repro-duce under its own canopy throughout this division. Areas of deep, fine colluvium are characterized by *Festuca occidentalis*, *Trisetum canescens*, *Bromus vulgaris*, *Melica subulata*, *Sanicula crassicaulis*, *Hieracium albiflorum*,

Campanula scouleri, *Madia madioides*, *Osmo-rhiza chilensis*, and *Lonicera hispidula*. Dwarfed *Quercus garryana* and *Arbutus men-ziesii* rarely occur. Soils are sombric brunisols. Ridges are characterized by the above species, but *Arbutus menziesii* is dominant, along with *Pseudotsuga menziesii*, and is able to reproduce vigorously. There is some low growth of *Berberis nervosa*, *Gaultheria shallon*, *Trientalis latifolia*, *Pteridium aquilinum*, and *Goodyera oblongifolia*. Ridge soils are lithic sombric brunisols. Areas of coarse colluvium and talus are characterized by all of the above species, but the shrub and herb layers may be domi-nated by *Berberis nervosa* and *Gaultheria shallon*. *Arbutus menziesii* is a canopy dominant, but not as abundant as on ridges. Soils are very stony sombric or dystic brunisols.

Mesic forest covers approximately 75 per cent of the island. Slopes are moderate to steep. Lowland areas with gently rolling topog-raphy and southerly exposure are characterized by *Pseudotsuga menziesii*, *Thuja plicata*, *Gaul-theria shallon*, *Berberis nervosa*, *Rosa gym-nocarpa*, *Lonicera hispidula*, *Linnæa borealis*, *Festuca occidentalis*, *F. subuliflora*, *Trientalis latifolia*, *Eurhynchium oreganum*, and *Hylo-comium splendens*. *Pseudotsuga menziesii* is able to reproduce here under its own canopy and on exposed sites *Pinus contorta* is a com-mon seral tree. Soils are sombric brunisols over shale, till, or outwash. Large areas of upland, moderately to strongly sloping to the north (Fig. 2), are characterized by *Pseudo-tsuga menziesii*, *Tsuga heterophylla*, *Thuja pli-cata*, *Gaultheria shallon*, *Rosa gymnocarpa*, *Festuca subuliflora*, *Listera cordata*, *Eurhyn-chium oreganum*, and *Hylocomium splendens*. *Pseudotsuga menziesii* does not reproduce under its own canopy in this forest type; only *Tsuga heterophylla* and *Thuja plicata* occur as understorey trees. Small areas above 300 m elevation on the south ridge have remained unburned long enough to reach a climax state, with only *Tsuga heterophylla* and *Thuja plicata* in the canopy. *Gaultheria shallon* and the other vascular species are eliminated and the ground cover consists of *Eurhynchium ore-ganum*, *Hylocomium splendens*, and *Plagio-thecium undulatum*. Here soils are dystic brunisols over till.

Stony ravines, there is growing istic sp *plicata*, *Rubus Adenoc trifoliat* *Telima opteris lepis m* The cli seral tr *menzie*. land se eluviate compac slopes, than or *phylla* dead v some g

Wet elevatic hu natu. at several artificia *polysep emersu Carex* land co just be late su *obrupt* *Mentha tis laxa lata*, *F Eleoche* There coves, is smal strand Harris *Salicor gularia byei*, *Scirpu nuttall*

compare Sullivan, 1979,
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Swordfern forest occurs on lower slopes, in ravines, and on benches and flats where ever there is available soil moisture throughout the growing season (McMinn, 1965). Characteristic species are *Pseudotsuga menziesii*, *Thuja plicata*, *Abies grandis*, *Sambucus racemosa*, *Rubus spectabilis*, *Polystichum munitum*, *Adenocaulon bicolor*, *Achlys triphylla*, *Tiarella trifoliata*, *Montia siberica*, *Trisetum cernuum*, *Telima grandiflora*, *Athyrium filix-femina*, *Dryopteris austriaca*, *Plagiomnium insigne*, *Leucolepis menziesii*, and *Eurhynchium praelongum*. The climax dominant tree is *Thuja plicata* and seral trees are *Alnus rubra* and *Pseudotsuga menziesii* occurring on gently sloping to flat lowland soils which are poorly drained humic eluviated gleysols overlying marine clays or compact till. On moderate to steep lower slopes, growth of all species is less vigorous than on lowlands; there is some *Tsuga heterophylla* and *Gaultheria shallon* occurring on dead wood. Soils are dystic brunisols with some gleying over till or shale.

Wetlands occur in shallow depressions at all elevations. Soils are very poorly drained terric humisols over till or marine clays. There are no natural lakes on the island although there are several fens in which the water level has been artificially raised. *Typha latifolia*, *Nuphar polysepalum*, *Potamogeton natans*, *Sparganium emersum*, and *Lemna minor* occur in these. *Carex obnupta* fen is the most common wetland community. The water table is usually just below the surface of these fens during the late summer. Characteristic species are *Carex obnupta*, *C. vesicaria*, *Scirpus microcarpus*, *Mentha arvensis*, *Cenanthe sarmentosa*, *Myosotis laxa*, *Ranunculus flammula*, *Veronica scutellata*, *Puccinellia pauciflora*, *Juncus effusus*, *Eleocharis palustris*, and *Calliargon giganteum*. There are small areas of salt marsh in protected coves, but the number of species represented is small compared to the known salt marsh and strand flora of the region (Szcawinski and Harrison, 1972). Characteristic species are *Salicornia virginica*, *Distichlis spicata*, *Spergularia marina*, *Plantago maritima*, *Carex lyngbyei*, *Atriplex patula*, *Triglochin maritimum*, *Scirpus maritimus*, *Jaumea carnosa*, *Puccinellia nuttalliana*, and *Agrostis alba* var. *palustris*.

Rare and Absent Species

There are a number of species which commonly occur on the adjacent islands but are either very rare on Saturna or absent. Most striking is the absence of *Lysichitum americanum* Hultén and St. John. A search of all wetlands and drainages which could be located on air photos of the island failed to find this species, which is abundant on the other Gulf Islands. *Chimaphila umbellata* (L.) Bart. was not found, although it is common on all adjacent islands. *Vaccinium ovatum* Pursh is abundant along the gulf coasts of Galiano and Mayne Islands but is absent from similar habitats on Saturna and has not been reported from the San Juan Islands. *Arctostaphylos columbiana* Piper and *A. uva-ursi* (L.) Spreng. occur on rock outcrops on Galiano and Salt-spring Islands but are absent from similar habitats on Saturna. *Maianthemum dilatatum* (Wood) Nels. & Macbr. and *Osmaronia cerasiformis* (T. & G.) Greene, common on the Saanich Peninsula and occasional on the islands to the west, are absent. *Camassia quamash* (Pursh) Greene and *Sisyrinchium douglasii* A. Dietr., both common on the Saanich Peninsula, were not found and have not been reported for any of the Gulf Islands. *Spiraea douglasii* and *Populus balsamifera*, relatively common on the other Gulf Islands and the San Juan Islands, were each found at only one site. *Cornus nuttallii*, common on the islands to the west of Saturna, is represented by fewer than 10 individuals and is rare on the San Juan Islands.

The Vascular Flora

The list presented here represents collections, at all seasons, between April 1973 and October 1976. In addition to collections made opportunistically throughout the study area, transects at 0.8-km intervals were checked and complete collections were made from 49 0.1-ha plots distributed through the range of vegetation types.

Voucher specimens, except as noted, are deposited in the herbarium of the British Columbia Provincial Museum, Victoria (V). Authority for nomenclature and author citations is Hitchcock and Cronquist (1973) and the order of families in that work is followed. Each

taxon is given a subjective abundance rating and vegetation types in which it occurs are noted. Abbreviations are as follows: 1—very rare, collected three times or less; 2—rare, seen more than three times but very restricted in habitat or extremely sparsely distributed; 3—occasional, regularly occurring in one or more vegetation types but thinly distributed; 4—common, regularly occurring throughout one or more vegetation types; 5—abundant in one or more vegetation types; B—*Bedrock outcrop*; T—*Dry transition forest*; M—*Mesic forest*; S—*Swordfern forest*; W—*Wetland*; Ws—*Salt marsh*; R—roadside, disturbed ground on farm fields. Brackets indicate limited occurrence.

			Pinaceae	
			<i>Abies grandis</i> (Dougl.) Forbes	4, S
			<i>Picea sitchensis</i> (Bong.) Carr.	1, S
			<i>Pinus contorta</i> Dougl.	3, M(B)
			<i>Pseudotsuga menziesii</i> (Mirbel) Franco.	5, MTSB
			<i>Tsuga heterophylla</i> (Raf.) Sarg.	5, MS
			Salicaceae	
			<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> (T. & G.) Brayshaw	1, W
			<i>P. tremuloides</i> Michx.	2, W
			<i>Salix lasiandra</i> Benth.	3, W
			<i>S. scouleriana</i> Barratt	3, TM
			Betulaceae	
			<i>Alnus rubra</i> Bong.	2, SWR
			<i>Betula papyrifera</i> var. <i>commutata</i> (Regel) Fern	1, W
			Fagaceae	
			<i>Quercus garryana</i> Dougl.	4, B(T)
			Urticaceae	
			<i>Urtica dioica</i> var. <i>lyallii</i> (Wats.) Hitchc.	5, SR
			Polygonaceae	
			<i>Polygonum achoreum</i> Blake	1, R
			<i>P. aviculare</i> L.	3, R
			<i>P. convolvulus</i> L.	3, R
			<i>P. persicaria</i> L.	3, R
			<i>P. spargulariaeforme</i> Meisn.	2, B
			<i>Rumex acetosella</i> L.	4, BRT
			<i>R. conglomeratus</i> Murr.	3, W
			<i>R. crispus</i> L.	3, RW
			<i>R. obtusifolius</i> L.	3, R
			<i>R. occidentalis</i> var. <i>procerus</i> (Greene) Howell ¹	
			<i>R. salicifolius</i> Weinm.	2, WWs
			Chenopodiaceae	
			<i>Atriplex patula</i> var. <i>hastata</i> (L.) Gray	4, Ws
			<i>Chenopodium album</i> L.	3, R
			<i>Salicornia virginica</i> L.	5, Ws
			Portulacaceae	
			<i>Calandrinia ciliata</i> (R. & P.) DC.	4, B
			<i>Montia dichotoma</i> (Nutt.) Howell	3, B
			<i>M. fontana</i> var. <i>tenerrima</i> (Gray) Fern. & Wieg.	3, R(B)
			<i>M. linearis</i> (Dougl.) Greene	3, B
			<i>M. parvifolia</i> var. <i>flagellaris</i> (Bong.) Hitchc.	4, B
			<i>M. perfoliata</i> (Donn) Howell	4, BTR
			<i>M. siberica</i> (L.) Howell	4, SR
			<i>Portulaca oleracea</i> L.	1, R
			Lycopodiaceae	
			<i>Lycopodium clavatum</i> L.	2, M
			Selaginellaceae	
			<i>Selaginella wallacei</i> Hieron.	5, B
			Equisetaceae	
			<i>Equisetum arvense</i> L.	3, WR(S)
			<i>E. hyemale</i> L.	3, WS
			<i>E. telmateia</i> var. <i>braunii</i> Milde	3, WR
			Ophioglossaceae	
			<i>Ophioglossum vulgatum</i> L.	1, W
			Polypodiaceae	
			<i>Adiantum pedatum</i> L.	2, S
			<i>Athyrium filix-femina</i> (L.) Roth.	4, S(W)
			<i>Blechnum spicant</i> (L.) Roth.	2, S(M)
			<i>Cystopteris fragilis</i> (L.) Bernh.	2, T
			<i>Dryopteris austriaca</i> (Jacq.) Woynar	3, SM
			<i>Pityrogramma triangularis</i> (Kaulf.) Maxon.	3, B
			<i>Polypodium glycyrrhiza</i> D. C. Eat.	4, B(T)
			<i>Polystichum munitum</i> (Kaulf.) Presl	5, SM(T)
			<i>Pteridium aquilinum</i> var. <i>pubescens</i> Underw.	4, MTS(B)
			Taxaceae	
			<i>Taxus brevifolia</i> Nutt.	3, M
			Cupressaceae	
			<i>Juniperus scopulorum</i> Sarg.	3, B
			<i>Thuja plicata</i> Donn.	5, MS(T)

¹ Collected by T. R. Ashlee (M. A. M. Bell, pers. comm.).

Caryophyllaceae		
<i>Arenaria macrophylla</i> Hook.	3, TM(B)	<i>C. pulcherrima</i> var. <i>tenella</i> (Pursh)
<i>A. serpyllifolia</i> L.	3, B	Hitchc.
<i>A. stricta</i> Michx.	2, T(B)	<i>Draba verna</i> L.
<i>Cerastium arvense</i> L.	4, B	
<i>C. semidecandrum</i> L.	3, B	<i>Idahoia scapigera</i> (Hook.) Nels & Macbr.
<i>C. viscosum</i> L.	4, RBT	<i>Lepidium campestre</i> (L.) R. Br.
<i>Dianthus armeria</i> L.	1, R	<i>L. virginicum</i> var. <i>menziesii</i> (DC.)
<i>Lycnluis coronaria</i> (L.) Desr.	2, R(B)	Hitchc.
<i>Sagina procumbens</i> L.	2, R	<i>L. v. var. pubescens</i> (Greene) Hitchc.
<i>Silene antirrhina</i> L.	3, B	<i>Neslia paniculata</i> (L.) Desv.
<i>S. gallica</i> L.	3, BR	<i>Raphanus sativus</i> L.
<i>Spergula arvensis</i> L.	1, R	<i>Rorippa curvisiliqua</i> (Hook.) Bessey
<i>Spergularia marina</i> (L.) Griseb.	4, W _s	<i>R. nasturtium-aquaticum</i> (L.) Schinz
<i>S. rubra</i> (L.) Presl	3, R	& Thell.
<i>Stellaria calycantha</i> var. <i>bongardiana</i>		<i>Sisymbrium altissimum</i> L.
Fern.	2, W	<i>S. officinale</i> (L.) Scop.
<i>S. crispa</i> Cham. & Schlect.	3, W	<i>Thalspi arvense</i> L.
<i>S. longipes</i> Goldie	1, W	<i>Thysanocarpus curvipes</i> Hook.
<i>S. media</i> (L.) Cyrill.	4, R	
<i>S. nitens</i> Nutt.	3, B	Crassulaceae
		<i>Sedum lanceolatum</i> var. <i>nesioticum</i>
		(Jones) Hitchc.
		<i>S. spathulifolium</i> Hook.
		Saxifragaceae
		<i>Heuchera micrantha</i> var. <i>diversifolia</i>
		(Rydb.) R. B. & L.
		<i>Lithophragma parviflora</i> (Hook.) Nutt.
		<i>Saxifraga caespitosa</i> var. <i>subgemmifera</i>
		(Engl. & Irmsch.) Hitchc.
		<i>S. intergrifolia</i> Hook.
		<i>S. rufidula</i> (Small) James Macoun
		<i>Tellima grandiflorum</i> (Pursh) Dougl.
		<i>Tiarella trifoliata</i> L.
		<i>T. t. var. laciniata</i> (Hook.) Wheel.
		Grossulariaceae
		<i>Ribes divaricatum</i> Dougl.
		<i>R. lacustre</i> (Pers.) Poir.
		<i>R. sanguineum</i> Pursh
		Hydrangeaceae
		<i>Philadelphus lewisii</i> Pursh
		Rosaceae
		<i>Alchemilla occidentalis</i> Nutt.
		<i>Amelanchier alnifolia</i> var. <i>semiintegri-</i>
		<i>folia</i> (Hook.) Hitchc.
		<i>Crataegus douglasii</i> Lindl.
		<i>C. monogyna</i> Jacq.
		<i>Fragaria vesca</i> var. <i>bracteata</i> (Heller)
		Davis
		<i>Geum macrophyllum</i> Willd.
		<i>Holodiscus discolor</i> (Pursh) Maxim.
		<i>Physocarpus capitatus</i> (Pursh) Kuntz
		<i>Potentilla pacifica</i> Howell
		<i>P. recta</i> L.
		<i>Prunus domestica</i> L.
		<i>P. emarginata</i> var. <i>mollis</i> (Dougl.)
		Brew.

<i>P. virginiana</i> var. <i>denissa</i> (Nutt.) Torr.	2, B		
<i>Pyrus fusca</i> Raf.	2, W		
<i>P. malus</i> L.	2, R		
<i>Rosa elganteria</i> L.	3, R		
<i>R. gymnocarpus</i> Nutt.	3, MT		
<i>R. nutkana</i> Presl.	3, SR		
<i>Rubus discolor</i> Weihe & Nees	3, R		
<i>R. laciniatus</i> Willd.	2, R		
<i>R. leucodermis</i> Dougl.	3, MTR		
<i>R. parviflorus</i> Nutt.	3, SR		
<i>R. spectabilis</i> Pursh	4, SR		
<i>R. ursinus</i> Cham. & Schlecht.	4, MTR		
<i>Sanguisorba minor</i> Scop.	2, R		
<i>Sorbus aucuparia</i> L.	2, R		
<i>Spiraea douglasii</i> Hook.	1, W		
Leguminosae			
<i>Cytisus scoparius</i> (L.) Link.	3, R(T)		
<i>Lathyrus japonicus</i> Willd.	2, W _s		
<i>L. nevadensis</i> ssp. <i>lanceolatus</i> var. <i>pilosellus</i> (Peck) Hitchc.	3, T		
<i>Lotus micranthus</i> Benth.	3, TB		
<i>Lupinus bicolor</i> Lindl.	2, B		
<i>L. micranthus</i> Dougl.	2, B		
<i>Medicago sativa</i> L.	2, R		
<i>Trifolium dubium</i> Sibth.	4, RB		
<i>T. hybridum</i> L.	3, R		
<i>T. incarnatum</i> L.	2, R		
<i>T. macraei</i> H. & A.	3, B		
<i>T. microcephalum</i> Pursh	5, B		
<i>T. microdon</i> H. & A.	4, B		
<i>T. oliganthum</i> Steud.	3, B		
<i>T. pratense</i> L.	2, R		
<i>T. repens</i> L.	3, R		
<i>T. tridentatum</i> Lindl.	4, B		
<i>T. variegatum</i> Nutt.	3, B		
<i>Ulex europaeus</i> L.	2, R		
<i>Vicia americana</i> var. <i>truncata</i> (Nutt.) Brew.	3, T		
<i>V. cracca</i> L.	3, R		
<i>V. gigantea</i> Hook.	2, W _s		
<i>V. hirsuta</i> (L.) S. F. Gray	4, R(T)		
<i>V. sativa</i> var. <i>angustifolia</i> (L.) Wahlb.	3, TR		
Geraniaceae			
<i>Erodium cicutarium</i> (L.) L'Her.	4, BR		
<i>Geranium dissectum</i> L.	2, RB		
<i>G. molle</i> L.	4, BTR		
Euphorbiaceae			
<i>Euphorbia cyparissias</i> L.	1, R		
<i>E. peplus</i> L.	2, R		
Callitrichaceae			
<i>Callitriche heterophylla</i> var. <i>bolanderi</i> (Hegelm.) Fassett	2, W		
Celastraceae			
<i>Pachystima myrsinites</i> (Pursh) Raf.	3, B(T)		
		Aceraceae	
		<i>Acer glabrum</i> var. <i>douglasii</i> (Hook.) Dippel	2, S
		<i>A. macrophyllum</i> Pursh	4, S(BT)
		Malvaceae	
		<i>Malva sylvestris</i> L.	1, R
		Hypericaceae	
		<i>Hypericum anagalloides</i> C. & S.	2, RW
		<i>H. perforatum</i> L.	1, R
		Violaceae	
		<i>Viola adunca</i> Sm.	1, M
		<i>V. macloskeyi</i> Lloyd	2, W
		<i>V. palustris</i> L.	2, W
		<i>V. sempervirens</i> Greene	2, M
		Cactaceae	
		<i>Opuntia fragilis</i> (Nutt.) Haw.	2, B
		Elaeagnaceae	
		<i>Shepherdia canadensis</i> (L.) Nutt.	3, T
		Onagraceae	
		<i>Circaea alpina</i> L.	3, S
		<i>Clarkia amoeba</i> var. <i>caurina</i> (Abrams) Hitchc.	3, B
		<i>Epilobium angustifolium</i> L.	3, R
		<i>E. minutum</i> Lindl.	3, B
		<i>E. paniculatum</i> Nutt.	2, BR
		<i>E. watsonii</i> var. <i>parishii</i> (Trel.) Hitchc.	3, WR
		Hippuridaceae	
		<i>Hippuris vulgaris</i> L.	1, W
		Araliaceae	
		<i>Hedera helix</i> L.	2, R(S)
		Umbrelliferae	
		<i>Caucalis microcarpa</i> H. & A.	1, B
		<i>Conioselinum pacificum</i> (Wats.) Coult. & Rose.	2, W _s
		<i>Daucus carota</i> L.	3, R
		<i>D. pusillus</i> Michx.	3, B
		<i>Lomatium nudicaule</i> (Pursh) Coult. & Rose.	1, B
		<i>L. utriculatum</i> (Nutt.) Coult. & Rose.	2, B
		<i>Oenanthe sarmentosa</i> Presl.	4, W
		<i>Osmorhiza chilensis</i> H. & A.	4, TR
		<i>Sanicula crassicaulis</i> Poepp.	3, TB
		Cornaceae	
		<i>Cornus nuttallii</i> Aud.	2, M
		<i>C. stolonifera</i> var. <i>occidentalis</i> (T. & G.) Hitchc.	1, W

Ericaceae		Solonaceae	
<i>Allotropa virgata</i> T. & G.	1, M	<i>Solanum dulcamara</i> L.	1, W
<i>Arbutus menziesii</i> Pursh	5, T	<i>S. nigrum</i> L.	1, W _s
<i>Chimaphila menziesii</i> (R. Br.) Spreng.	1, M	<i>S. sarrachoides</i> Sendt.	2, R(B)
<i>Gaultheria shallon</i> Pursh	5, MT(S)		
<i>Monotropa uniflora</i> L.	3, MT	Scrophulariaceae	
<i>Pyrola aphylla</i> Smith	2, MT	<i>Castilleja hispida</i> Benth.	3, BT
<i>P. picta</i> Smith	2, M	<i>Collinsia grandiflora</i> Lindl.	3, B
<i>Vaccinium parvifolium</i> Smith	2, M	<i>C. parviflora</i> Lindl.	5, B
		<i>Digitalis purpurea</i> L.	3, RM
Primulaceae		<i>Minulus alsinoides</i> Dougl.	4, B
<i>Dodecatheon pulchellum</i> (Raf.) Merril	1, B	<i>M. guttatus</i> var. <i>depauperatus</i> (Gray)	
<i>Trientalis arctica</i> Fisch.	1, W	Grant	3, B
<i>T. latifolia</i> Hook.	4, MT	<i>M. g.</i> var. <i>guttatus</i> DC.	2, B
		<i>M. moschatus</i> var. <i>sessilifolius</i> Gray	3, W
Gentianaceae		<i>Orthocarpus attenuatus</i> Gray	2, B
<i>Centaureum umbellatum</i> Gilib.	1, R	<i>O. pusillus</i> Benth.	2, R(B)
		<i>Parentucellia viscosa</i> (L.) Car.	1, R
Convolvulaceae		<i>Rhinanthus crista-galli</i> L.	3, R
<i>Convolvulus arvensis</i> L.	1, R	<i>Verbascum blattaria</i> L.	1, R
		<i>V. thapsus</i> L.	3, RT(BM)
Cuscutaceae		<i>Veronica americana</i> Schwein.	3, WR
<i>Cuscuta salina</i> Engelm.	2, W _s	<i>V. arvensis</i> L.	3, BTR
		<i>V. peregrina</i> var. <i>xalapensis</i> (H.B.K.) St. John & Warren	1, R
Polemoniaceae		<i>V. scutellata</i> L.	3, W
<i>Collomia heterophylla</i> Hook.	2, M	<i>V. serpyllifolia</i> L.	3, R(S)
<i>Linanthus bicolor</i> (Nutt.) Greene	2, B		
<i>Microsteris gracilis</i> (Hook.) Greene	2, B	Orobanchaceae	
<i>Navarretia squarrosa</i> (Esch.) H. & A.	3, R	<i>Orobanche californica</i> Cham. & Schlecht. ²	
		<i>O. uniflora</i> var. <i>purpurea</i> (Heller) Achey	3, B
Hydrophyllaceae			
<i>Nemophila parviflora</i> Dougl.	3, BSR	Plantaginaceae	
<i>Phacelia linearis</i> (Pursh) Holz.	1, B	<i>Plantago lanceolata</i> L.	3, R
		<i>P. major</i> L.	3, R
Boraginaceae		<i>P. maritima</i> ssp. <i>juncooides</i> (Lam.) Hult.	3, W _s
<i>Amsinckia menziesii</i> (Lehm.) Nels. & Macbr.	1, BT	<i>P. pusilla</i> Nutt.	2, B
<i>Myosotis discolor</i> Pers.	4, BR		
<i>M. laxa</i> Lehm.	4, W	Rubiaceae	
<i>Plagiobothrys scouleri</i> (H. & A.) Johnst.	2, B	<i>Galium aparine</i> var. <i>echinosperrum</i> (Wallr.) Farw.	3, BT
<i>P. tenellus</i> (Nutt.) Gray	4, B	<i>G. trifidum</i> L.	3, W
		<i>G. triflorum</i> Michx.	3, S(R)
		<i>Sherardia arvensis</i> L.	3, RB
Labiatae			
<i>Lanium amplexicaule</i> L.	1, R	Caprifoliaceae	
<i>Lycopus uniflorus</i> Michx.	1, W	<i>Linnaea borealis</i> var. <i>longiflora</i> Torr.	3, M(T)
<i>Marrubium vulgare</i> L.	2, BR	<i>Lonicera ciliosa</i> (Pursh) DC.	2, M
<i>Melissa officinalis</i> L.	1, R	<i>L. hispidula</i> (Lindl.) Dougl.	5, TM(B)
<i>Mentha arvensis</i> L.	4, W	<i>L. involucrata</i> (Rich.) Banks	1, W
<i>M. spicata</i> L.	1, R	<i>Sambucus racemosa</i> var. <i>arborescens</i> (T. & G.) Gray	3, S
<i>Prunella vulgaris</i> L.	3, R	<i>Symphoricarpos albus</i> var. <i>laevigatus</i> Fern.	3, B(R)
<i>Satureja douglasii</i> (Benth.) Briq.	3, TM		
<i>Stachys cooleyae</i> Heller	3, WR		

² Reported for Saturna Island by R. W. Pillsbury (*pers. pap.*), but no voucher specimen could be found. Collections for South Pender and Mayne Islands exist.

Valerianaceae					
<i>Plectritis congesta</i> (Lindl.) DC.	4, B	<i>S. sylvaticus</i> L.	2, R		
		<i>S. vulgaris</i> L.	2, R(T)		
Campanulaceae		<i>Solidago canadensis</i> var. <i>salebrosa</i> (Piper) Jones	1, R		
<i>Campanula scouleri</i> Hook.	3, TM	<i>Sonchus arvensis</i> L.	2, W _s		
<i>Triodanis perfoliata</i> (L.) Nieuwl.	1, B	<i>S. asper</i> (L.) Hill	3, RB		
		<i>S. uliginosus</i> Bieb. ⁴			
Compositae		<i>Taraxacum laevigatum</i> (Willd.) DC.	3, BR		
<i>Achillea millefolium</i> ssp. <i>lanulosa</i> (Nutt.) Piper	3, RB	<i>T. officinale</i> Weber	3, R		
<i>Adenocaulon bicolor</i> Hook.	4, S	<i>Tragopogon pratensis</i> L.	1, R		
<i>Agoseris grandiflora</i> (Nutt.) Greene	2, B	Juncaginaceae			
<i>A. heterophylla</i> (Nutt.) Greene	2, B	<i>Triglochin maritimum</i> L.	3, W _s		
<i>Ambrosia chamissonis</i> var. <i>bipinnatisecta</i> (Less.) J. T. Howell	2, W _s	Potamogetonaceae			
<i>Anaphalis margaritacea</i> (L.) B. & H.	3, R	<i>Potamogeton natans</i> L.	4, W		
<i>Arctium minus</i> (Hill) Bernh.	2, R	<i>P. pusillus</i> L.	1, W		
<i>Artemisia suksdorfii</i> Piper	1, B	Zosteraceae			
<i>Aster eatonii</i> (Gray) Howell ¹		<i>Phyllospadix scouleri</i> Hook.	2, W _s		
<i>A. hesperius</i> Gray	2, W	<i>Zostera marina</i> L.	4, W _s		
<i>A. subspicatus</i> Nees	1, W _s	Juncaceae			
<i>Bellis perennis</i> L.	4, R	<i>Juncus articulatus</i> L.	3, WR		
<i>Centaurea cyanus</i> L.	2, R	<i>J. balticus</i> Willd.	2, W _s		
<i>Chrysanthemum leucanthemum</i> L.	3, R	<i>J. bolanderi</i> Engelm.	1, R		
<i>Cichorium intybus</i> L.	3, R	<i>J. bufonius</i> L.	3, R		
<i>Cirsium arvense</i> var. <i>horridum</i> Wimm. & Grab.	3, R	<i>J. effusus</i> var. <i>compactus</i> Lejeune & Court.	3, RW		
<i>C. brevistylum</i> Cronq.	2, R	<i>J. e.</i> var. <i>pacificus</i> Fern. & Wieg.	2, R		
<i>C. vulgare</i> (Savi) Tenore	4, R	<i>J. ensifolius</i> Wikst.	3, R		
<i>Conyza canadensis</i> (L.) Cronq.	1, R	<i>J. tenuis</i> Willd.	4, R		
<i>Crepis capillaris</i> (L.) Wallr.	3, R	<i>Luzula campestris</i> var. <i>multiflora</i> (Ehrh.) Celak.	4, TB		
<i>Crocidium multicaule</i> Hook.	1, B	Cyperaceae			
<i>Eriophyllum lanatum</i> (Pursh) Forbes.	3, B	<i>Carex canescens</i> Bailey	1, W		
<i>Eupatorium maculatum</i> L. ³		<i>C. cusickii</i> Mack.	3, W		
<i>Filago germanica</i> (L.) L.	3, R	<i>C. deweyana</i> Schw.	3, SR		
<i>Gnaphalium microcephalum</i> var. <i>thermale</i> (E. Nels.) Cronq.	2, R	<i>C. lyngbyei</i> var. <i>robusta</i> (Bailey) Cronq.	3, W _s		
<i>G. palustre</i> Nutt.	2, R	<i>C. muricata</i> L.	1, W		
<i>G. purpureum</i> L.	2, RB	<i>C. obnupta</i> Bailey	5, W		
<i>G. uliginosum</i> L.	2, R	<i>C. pachystachya</i> Cham.	3, R		
<i>Grindelia integrifolia</i> var. <i>macrophylla</i> (Greene) Cronq.	3, B	<i>C. pennsylvanica</i> var. <i>vespertina</i> L. H. Bailey	3, B		
<i>Hieracium albiflorum</i> Hook.	3, T	<i>C. sprengei</i> Dewey	1, W		
<i>Hypochaeris glabra</i> L.	2, B	<i>C. vesicaria</i> var. <i>major</i> Boott	5, W		
<i>H. radicata</i> L.	3, RB(T)	<i>Eleocharis palustris</i> (L.) R. & S.	4, WR		
<i>Jaumea carnosa</i> (Less.) Gray	2, W _s	<i>Scirpus acutus</i> Muhl.	2, W		
<i>Lactuca muralis</i> (L.) Fresen.	3, SMR(T)	<i>S. americanus</i> Pers. ¹			
<i>L. serriola</i> L.	1, R	<i>S. cyperinus</i> (L.) Kunth	1, R		
<i>Lapsana communis</i> L.	2, R	<i>S. maritimus</i> var. <i>paludosus</i> (A. Nels.) Kuek.	2, W _s		
<i>Madia exigua</i> (J. E. Smith) Gray	2, R	<i>S. microcarpus</i> Presl	4, W		
<i>M. gracilis</i> (J. E. Smith) Keck	3, B				
<i>M. madioides</i> (Nutt.) Greene	3, T				
<i>M. sativa</i> Mol.	2, R				
<i>Matricaria maritima</i> L.	1, R				
<i>M. matricarioides</i> (Less.) Porter	3, R				
<i>Microseris lindleyi</i> (DC.) Gray	1, B				
<i>Senecio jacobaea</i> L.	2, R				

¹ Collected by T. R. Ashlee (M. A. M. Bell, pers. comm.).³ Reported by Piper (1906) for Saturna Island.⁴ Collected by T. P. Sullivan (UBC).

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Gramineae			
<i>Agropyron repens</i> (L.) Beauv.	2, R	<i>P. trivialis</i> L.	3, RS
<i>Agrostis alba</i> L.	5, R	<i>Polypogon monspeliensis</i> (L.) Desf.	1, W
<i>A. a. var. palustris</i> (Huds.) Pers.	5, W W _s	<i>Puccinellia nuttalliana</i> (Schult.) Hitchc.	2, W _s
<i>A. diegoensis</i> Vasey	2, R	<i>P. pauciflora</i> (Presl) Munz	4, W
<i>A. exarata</i> var. <i>monolepsis</i> (Torr.) Hitchc.	2, R (B)	<i>Stipa lemmonii</i> (Vasey) Scribn.	4, B
<i>A. scabra</i> Willd.	2, R	<i>Trisetum canescens</i> Buckl.	3, T
<i>A. tenuis</i> Sibth.	5, R	<i>T. cernuum</i> Trin.	3, S
<i>A. thurberiana</i> Hitchc.	1, R		
<i>Aira caryophyllea</i> L.	3, BR	Sparganiaceae	
<i>A. praecox</i> L.	3, BR	<i>Sparganium emersum</i> Rehmman	3, W
<i>Alopecurus geniculatus</i> L.	3, R		
<i>Anthoxanthum odoratum</i> L.	4, B (R)	Typhaceae	
<i>Arrhenatherum elatius</i> (L.) Presl	2, R	<i>Typha latifolia</i> L.	4, W
<i>Bromus carinatus</i> H. & A.	1, B		
<i>B. commutatus</i> Schrad.	2, R	Lemnaceae	
<i>B. inermis</i> Leys.	2, R	<i>Lemma minor</i> L.	3, W
<i>B. mollis</i> L.	4, BR		
<i>B. pacificus</i> Shear	3, BTR	Liliaceae	
<i>B. rigidus</i> Roth	3, B	<i>Allium acuminatum</i> Hook.	3, B
<i>B. sitchensis</i> Trin.	2, BR	<i>A. cernuum</i> Roth	3, B
<i>B. sterilis</i> L.	5, BR	<i>Brodiaea coronaria</i> (Salisb.) Engl.	2, B
<i>B. tectorum</i> L.	4, B	<i>B. hyacinthina</i> (Lindl.) Baker	2, R
<i>B. vulgaris</i> (Hook.) Shear	3, TM	<i>Camassia leichlinii</i> (Baker) Wats.	3, B
<i>Calamagrostis canadensis</i> var. <i>acuminata</i> Vasey	1, W	<i>Erythronium oregonum</i> Applegate	3, B
<i>Cynosurus cristatus</i> L.	4, R	<i>Fritillaria lanceolata</i> Pursh	3, B
<i>C. echinatus</i> L.	1, R	<i>Lilium columbianum</i> Hanson	2, M
<i>Dactylis glomerata</i> L.	3, R (T)	<i>Zygadenus venenosus</i> Wats.	2, B
<i>Danthonia californica</i> Boland.	2, B		
<i>Deschampsia elongata</i> (Hook.) Munro	3, R	Iridaceae	
<i>Distichlis spicata</i> var. <i>borealis</i> (Presl) Beetle	5, W _s	<i>Sisyrinchium angustifolium</i> Mill.	2, R
<i>Elymus glaucus</i> var. <i>breviaristatus</i> Davy ⁴	4, BTR		
<i>E. g. var. jepsonii</i> Davy	2, W _s	Orchidaceae	
<i>E. mollis</i> Trin.	3, BR	<i>Calypso bulbosa</i> (L.) Oakes.	3, TM
<i>Festuca bromoides</i> L.	3, B	<i>Corallorhiza maculata</i> Raf.	3, TM
<i>F. megalura</i> Nutt.	2, T	<i>Goodyera oblongifolia</i> Raf.	3, MT
<i>F. microstachys</i> Nutt.	3, B	<i>Habenaria elegans</i> (Lindl.) Boland.	3, T
<i>F. myuros</i> L.	5, TM	<i>H. unalascensis</i> (Spreng.) Wats.	1, R
<i>F. occidentalis</i> Hook.	2, R	<i>Listera cordata</i> (L.) R. Br.	3, M
<i>F. ovina</i> var. <i>rydbergii</i> St.-Yves	1, R	<i>Spiranthes romanzoffiana</i> Cham.	2, R
<i>F. pratensis</i> Huds.	3, B		
<i>F. rubra</i> var. <i>littoralis</i> Vasey	2, S		
<i>F. subulata</i> Trin.	3, M (S)		
<i>F. subuliflora</i> Scribn.	3, RB		
<i>Holcus lanatus</i> L.	2, W _s		
<i>Hordeum brachyantherum</i> Nevski	3, R		
<i>H. murinum</i> L.	2, BT		
<i>Koeleria cristata</i> Pers.	3, R		
<i>Lolium perenne</i> L.	2, T		
<i>Melica harfordii</i> Boland.	3, TM		
<i>M. subulata</i> (Griseb.) Scribn.	2, WR		
<i>Phalaris arundinacea</i> L.	2, R		
<i>Phleum pratense</i> L.	3, R		
<i>Poa annua</i> L.	2, W		
<i>P. compressa</i> L.	3, T (R)		
<i>P. howellii</i> Vasey & Scribn.	4, RB		
<i>P. pratensis</i> L.	2, B		
<i>P. scabrella</i> (Thurb.) Benth.			

⁴ Collected by T. P. Sullivan (UBC).

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Addendum

Three additional records for Saturna Island have been added since this paper was accepted. *Camassia quamash* (Pursh) Greene is represented by approximately a dozen individuals distributed along the crest of the south ridge. *Lithophragma bulbifera* Rydb. occurs as a small population, sparsely distributed over the eastern face of the south ridge. *Montia spathulata* (Dougl.) Howell was found at a single site on a logged-over slope.