

menziesia

Newsletter for the NPSBC Native Plant Society of British Columbia
Spring 2003

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The new federal Species at Risk Act (SARA) and British Columbia plants

By David F. Fraser

On December 12, 2002, the federal Species at Risk Act (SARA) received Royal Assent. The new legislation will come into force in 2003. The act has already had an interesting history, with several predecessors dying on the order table over a nine-year period, and this version receiving one of the longest deliberations by a Standing Committee in the history of Canadian legislation. The Act was also modified in its last week in the house, resulting in changes that considerably strengthened the act.

The protection of wildlife is a shared responsibility among provinces, territories and the Government of Canada. The *Accord for the Protection of Species at Risk*, agreed to in 1996, commits the federal government and the provinces and territories to establish complementary legislation and programs to protect Canada's species at risk. The Species at Risk Act is the federal government's legislative response to the commitments under "the Accord".

The act recognizes the 25-year history of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and COSEWIC is established by legislation for the first time. Operating at arm's length from governments, COSEWIC is tasked with assessing and classifying wildlife

species (including plants) using the best available scientific, community and aboriginal traditional knowledge. In total, COSEWIC has assessed close to 600 species.

COSEWIC's categories have been accepted by the act, and a species can be determined to be in one of the following categories: extinct, extirpated, endangered, threatened, special concern, not at risk or data deficient. COSEWIC's designations will usually be based on status reports commissioned by the committee, however the act makes provisions for unsolicited reports and emergency designations as well.

COSEWIC assessments will be published in the SARA public registry. SARA requires that the federal Minister of the Environment publish a response within 90 days, and that the Governor-in-Council has nine months to make a decision on whether to add the species to the legal list. This listing process acknowledges that adding species to the legal list could have potential serious economic and social implications for Canadians.

As soon as a species is added to the legal list, a number of binding provisions take effect, such as automatic prohibitions against killing or harming aquatic species, migratory bird species and all species on federal lands, and



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Events

Victoria, Tues, Apr 15

Botany Night. Speaker: Nick Page.

Sandy beaches on the west coast of Vancouver Island support a distinctive plant community that is adapted to unique environmental conditions near the shore. There are a range of interesting plants that are confined to the narrow strip of beach ridges, dunes, and meadows between the upper extent of tides and waves and the dense Sitka spruce dominated forest inland. The presentation will focus on the rare and unusual plants of this ecosystem, and will give an overview of recent research on spatial patterns of the native and exotic plants species.

Swan Lake Nature House, 7:30 p.m.

Richmond, Wed, April 16

From Tulip Trees to Sand Plains:

Investigating patterns of biodiversity in Carolinian

Canada. Speaker: Dr. Brian Klinkenberg, Associate Professor, Department of Geography, UBC, Faculty Associate, UBC Centre for Applied Conservation Research. The Carolinian Zone of Canada is one of

the most intensely developed regions in the country. It is also home to more rare, threatened and endangered species than any other region. Investigations into the distribution of rare species in the Carolinian Zone show that they are not randomly distributed in the landscape, but follow important patterns. In this lecture, we will examine these patterns and their implications for biodiversity protection and nature reserve design. Richmond Nature Park, 7:30 pm. Admission by donation. Call 604-718-6188 for further information.

Victoria, Thurs, Apr 17

New Initiatives in Tropical Forest

Management: a Community

Approach. Speaker: John Dick, MSc. Sponsored by the Native Plant Study Group. \$15 annual membership, \$10 for students or a \$2 drop-in fee. For more information, contact Susan Bastin at 361-3122.

Vancouver, Sun, May 4

Ecological Gardening. Eva

Antonijevic will show you how you

See 'Events' on p 11

NPSBC Annual General Meeting 2003

Attention all NPSBC members: Please mark your calendars, as this will be an AGM you do not want to miss!

Although we are still working out the details, we are happy to announce our AGM will be held on Galiano Island on September 13, 2003. The Galiano Conservancy Association (member of NPSBC) have graciously agreed to provide us with a variety of guided tours of their spectacular little island. There are a tremendous range of choices, both for the somewhat adventurous, and for those of us looking for a leisurely stroll.

Watch for further details in the next *Menziesia* and check the NPSBC web site for details as they are confirmed. This will include travel information, accommodation (for those wishing to make it a Gulf Island get-away weekend) and a taste of some of the sites planned in the guided tours. Keep checking for information.

Non-members are most welcome. If you are not connected to the Internet, please call Susan Bastin at 250-361-3122 for further information. ✍

NPSBC workshops 2003

Grass Identification Workshop

Where: Camosun College, Victoria

When: May 17-18, 2003

Instructors: Dr. David Blundon (Camosun College) and Perry Grilz (BC Ministry of Forests)

Objective: This Grass Identification Workshop has application to participants throughout all of BC. The main objective of this workshop is to give the basic knowledge and skills required to use a taxonomic grass key (Volume 7: Illustrated Flora of BC) so that participants will be able to begin identifying grasses anywhere in BC. The workshop will use a combination of both lab and field sessions. Grass identification is not as hard as you may think. Come and enjoy this two-day workshop.

Required equipment: Please bring appropriate field wear for all weather conditions, a hand lens, and notebook plus scotch tape.

Cost: Non-members of NPSBC - \$100.00, non-member students - \$70.00, and members of. All participants will receive a free copy of Vol 7: Illustrated Flora of BC (a \$40.00 value). Students and non-members receive a one-year paid membership to NPSBC.

Registration: Don't be disappointed - register early (limited to 24 participants). Deadline for registration is May 5, 2003. Reserve your seat by e-mailing or phoning Perry Grilz and then send your registration to: Perry Grilz, BC Ministry of Forests, 1011 4th Avenue, Prince George, BC, V2L 3H9. Make cheques payable to: NPSBC (Mark envelope: Grass Identification Workshop). **Inquiries:** E-mail: Perry.Grilz@gems2.gov.bc.ca or phone: 250-565-6100 (Perry Grilz)

Botanical Illustration for Beginners

Where: UBC Botanical Garden, Vancouver

When: Sunday June 15, 2003

Instructor: Lyn Noble

Registration Coordinator: Erin Skelton, Tel.: 604-228-8879

Send registration form and cheques to: NPSBC Botanical Illustration, 3860 West 19th Ave., Vancouver BC V6S 1C8

Cost: Non-members \$70 (includes membership), members \$40.

Description: This one-day workshop will give you the basic sketching skills and an overview of Botanical Art with an emphasis on native plants. Weather permitting the course will take place in the garden. If rain persists, we will be in the Garden Pavillion. Lyn Noble is a Canadian botanical illustrator whose paintings of North American wildflowers have been shown locally and abroad, including Britain's Royal Horticultural Society where they received several top medals. Her work has been published in various books and magazines.

Course materials to bring: Sketch pad, HB pencil, kneaded eraser. Please bring your own lunch to this workshop.

Note: Anyone wanting to explore watercolours should phone Lyn Noble at 604-921-9536.

Identifying Aquatic Plants

Where: Chilliwack Sr. Secondary School (and local field trip)

When: September 12-14, 2003

Instructors: Dr. Adolf Ceska and Oluna Ceska

Registration Coordinator: Brenda Ramsay Tel.: 250-638-8436

Send registration forms and cheques to: Aquatic Plant ID Workshop, 4822 Sunset Drive, Terrace, BC V8G 1C6

Cost: Non-members \$80.00 (includes membership), members \$60.00.

Description: Identifying aquatic vascular plants – sometimes called aquatic macrophytes. This workshop will fill early, so register early to get your seat.

Recommended equipment: Please bring waterbottle, lunch, hand lens, notebook and pencil, rain gear, gumboots (keeners may wish to bring hip or chest waders).

Mosses and Bryophytes

Where: UBC (meet in front of the bookstore)

When: October 4 and 5, 2003, 9 am - 5 pm.

Instructors: Dr. Wilf Schofield and Shona Ellis

Registration Coordinator: Shona Ellis

Send registration to: Workshop, 208-1350 Comox St., Vancouver BC V6E 4E1

Cost: Non-members of NPSBC \$80.00, non-member students \$50.00, and members of NPSBC \$60.00.

Tentative schedule: Saturday, Oct 4 - Field trip around UBC campus in the morning, identification in the lab in the afternoon, Sunday, Oct. 5 - Field trip to higher elevation (perhaps lab work, depending on weather)

Recommended books and equipment: "Some Common Mosses" by Dr. W.B. Schofield (Royal British Columbia Museum Handbook), "Field guide to Liverwort Genera of Pacific North America" by Dr. W.B. Schofield, hand lens (x10), appropriate footwear, waterbottle. Please bring your own lunch to this workshop.

2004 NPSBC calendar project

We're embarking on production of our first-ever calendar for and by members of the Native Plant Society. This is a pilot project for what we hope will become an annual fund raiser and enjoyable activity involving as many of our members as possible.

Have any of you taken photographs that you'd be willing to submit for inclusion in the calendar? What we need are good, clear photos of whole plants, close-ups of flowers, fruit or foliage, and habitat shots, with identification of each species and locale. Horizontal pictures are best, but if they are vertical we could put two side-by-side on a page showing two species in the same genus, a whole tree with a close-up of its foliage, two species that could be confused (with identifying characteristics clearly shown on each) or a plant and its habitat. There are all kinds of possibilities. We might even include a mystery photo to see if anyone can correctly identify an unnamed plant. This is our own project so we can let our imaginations run wild to create something both beautiful and informative for all of us to enjoy.

Submissions can be in the form of colour prints and slides sent by regular mail or digital and scanned photos sent by e-mail. Please send regular mail to

Virginia Skilton
933 161A Street
Surrey, BC V4A 8R4

or e-mail to dvsilton@shaw.ca

It is best to send copies of prints and slides rather than originals, though we will treat them all carefully and return if requested. Make sure your name is on each photo. A few written sentences about the plant would also be appreciated as we plan to include bits of interesting information about native plants as well as their pictures. Final date for submissions is July 15, 2003.

The finished products will be ready by October in plenty of time to purchase them for ourselves or as gifts for family and friends. The format will be 8.5 x 11 inches, coil bound with one photo page and one calendar page for each month and one photo on the front cover. The cost will be about fifteen dollars. An order form will be included in the Fall issue of *Menziesia*.

Send your submissions as soon as possible and help make this project a big success! As an added incentive, any contributor who has one or more photos chosen for printing will receive a free copy of the calendar. Helping the NPSBC and getting a free calendar as well? What more could one ask? ✍

Gardening for Wildlife - a fund raiser with an educational spin

The Swan Lake Christmas Hill Nature Sanctuary, a nature education centre located just 8 kilometres from downtown Victoria, is developed and operated by a registered charitable organization, which employs a small staff to deliver nature programs, maintain the site and facilities, and restore and maintain the natural habitat with the assistance of community volunteers.

The Nature Sanctuary has a large, well-established native plant garden adjacent to the Nature House, first created in 1984 as a way to display the range of native plants that would be found throughout the sanctuary. This development coincided with a growing community interest in using native plants in gardens, and we began to see this as a way to encourage and assist people looking for ways to improve habitat for wildlife in their backyards. Our vision was the extension of the wildlife-friendly, native habitat of the sanctuary into backyards throughout the community in a patchwork quilt, replacing water and drug-hungry lawns and invasive exotic plants.

As the community's desire to use native plants grew, so did the thirst for knowledge of how to use native plants in a garden setting, and for sources of plant material. In 1995 we decided to try to meet these needs with a native plant gardening sale and demonstration, stemming in part from a concern about a growing trend for collection from the wild. A two-day event where you could purchase native plants and attend informative workshops seemed to be the answer, and in April of 1996, our first event was a huge success.

The educational approach to the event has contributed to that success. For example, we arrange the plant material in three rows, based on sun/shade regimes, allowing customers to determine groupings of plants that would be appropriate for their particular yard conditions.

Workshops include such topics as planning and designing, eliminating lawn areas, propagating native plants, creating special habitats, and attracting beneficial insects and other wildlife. (These workshops are sponsored by a number of organizations, including the NPSBC). Displays on naturescaping, waterwise gardening, composting and attracting wildlife abound. This spring we are enlarging the program with a series of more in-depth sessions leading up to the plant sale (details available at www.swanlake.bc.ca)

On April 26 and 27, 2003, from 10:00 a.m. to 3:00 p.m., the Swan Lake Christmas Hill Nature Sanctuary will be conducting its 8th annual native plant gardening sale and demonstration. The weekend event includes a sale of over 4,000 plants (over 100 species) native to southern Vancouver Island, and a series of presentations on gardening with native plants. Plant list and presentation schedule can be found at www.swanlake.bc.ca, or by phoning (250) 479-0211. ✍

Swan Lake Christmas Hill
Nature Sanctuary
3873 Swan Lake Road
Victoria, BC V8X 3W1

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against destruction of their residences. The act is designed as “safety net legislation” and, the Minister of the Environment must recommend an emergency order to protect a listed species or its habitat if he or she believes that a species faces imminent threats to its survival or recovery. These provisions, which must go through federal cabinet, can apply to provincial Crown or private lands.

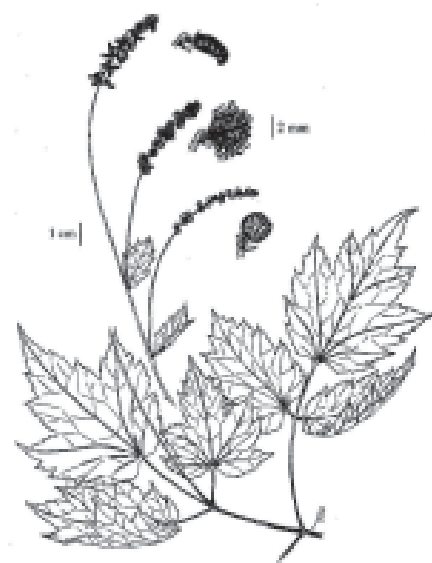
Mandatory recovery strategies will be required within specific time periods for all species listed as extirpated (2 years), endangered (1 year), threatened (2 years) or of special concern (management plans within 3 years). These strategies assess the biological feasibility of recovery, set goals for recovery activities and may be used to identify critical habitat. Action plans follow that outline the in the ground activities necessary to achieve the goals set out in the Recovery Strategies, deal with the socio-economic costs of recovery implementation and can identify critical habitat for the species.

The Act has been widely criticized by some environmental groups because the ultimate decision to place species on the legal list is left to cabinet, rather than to COSEWIC. It should be noted however, upon proclamation, 233 species (96 of them plants) will be included on Schedule 1, the list of wildlife species at risk - is all of the species that COSEWIC had assessed to the end of 2001 with the criteria-based system that it adapted from the IUCN. Since then, and as the legislative process to enact SARA has continued, COSEWIC has continued its job of assessing species.

The act calls for recovery strategies, action plans and management plans to be prepared in

cooperation with affected provinces, territories, aboriginal organizations, landowners and other affected parties “to the extent possible”. The minister may accept recovery strategies prepared by others in lieu of preparing one himself. Currently there are recovery strategies under preparation for 24 of 27 plants, moss and lichen spp listed by COSEWIC as endangered or threatened in British Columbia. Recovery planning is also underway for a large number of other species (especially those associated with Garry Oak and related ecosystems) that are on the provincial red list, but have not been assessed by COSEWIC. Recovery planning for nationally listed species is coordinated by RENEW (Recovery of Nationally Endangered Wildlife) a cooperative federal, provincial, territory program with a secretariat housed by the Canadian Wildlife Service.

If the cooperative approach under the Act fails or the laws of a province fail to adequately protect the species, SARA provides for the Government of Canada to protect critical habitat of species at risk. Under the Act, critical habitat is defined as habitat necessary for the



Tall bugbane (*Cimicifuga elata*)

survival or recovery of a species.

SARA contains provisions for compensation should it become necessary to apply the critical habitat prohibitions. When these prohibitions are used, people will be able to apply for compensation for losses suffered as a result of an extraordinary impact. The federal government will be developing general compensation regulations that will set out the procedures for making an application for compensation. Claims will be addressed on a case-by-case basis.

The Act mandates the establishment of a National Aboriginal Council on Species at Risk to advise the Minister on the administration of the Act, and to provide advice to the federal, provincial, territorial ministers through the recently created Canadian Endangered Species Conservation Council.

For plants, the prohibitions on wilful killing, protection of the residence and the critical habitat provisions will be new protections for species in British Columbia. The provincial government is investigating what measures will be to meet the its commitment to the Accord and to encourage consistency with SARA. These may include changes to legislation, as well as changes to programs and policy.

Table 1. The following British Columbia species occur on schedule 1 of the Species at Risk Act (SARA) and will be immediately come under the provisions of the act upon proclamation:

- SARA ENDANGERED PLANTS
Ammania, Scarlet (*Ammannia robusta*) *
Balsamorhiza, Deltoid (*Balsamorhiza deltoidea*) *
Bugbane, Tall (*Cimicifuga elata*) *
Buttercup, Water-plantain (*Ranunculus alismifolius* var. *alismifolius*) *

Fern, Southern Maidenhair (*Adiantum capillus-veneris*) *
 Lotus, Seaside Birds-foot (*Lotus formosissimus*) *
 Lupine, Prairie (*Lupinus lepidus* var. *lepidus*) *
 Owl-Clover, Bearded (*Triphysaria versicolor* ssp. *versicolor*) *
 Paintbrush, Golden (*Castilleja levisecta*) *
 Sanicle, Bear's-foot (*Sanicula arctopoides*) *
 Toothcup (*Rotala ramosior*) *
 Woolly-heads, Tall (*Psilocarphus elatior*) Pacific population *

SARA ENDANGERED LICHENS
 Seaside Centipede (*Heterodermia sitchensis*) *

SARA ENDANGERED MOSSES
 Moss, Poor Pocket (*Fissidens pauperculus*) *
 Moss, Rigid Apple (*Bartramia stricta*) *

SARA THREATENED PLANTS
 Aster, White-top (*Sericocarpus rigidus*=*Aster curtus*) *
 Corydalis, Scouler's (*Corydalis scouleri*) *
 Fern, Mexican Mosquito (*Azolla mexicana*)
 Lily, Lyall's Mariposa (*Calochortus lyallii*)*
 Orchid, Phantom (*Cephalanthera austiniiae*)
 Sanicle, Purple (*Sanicula bipinnatifida*) *
 Violet, Yellow Montane (*Viola praemorsa* ssp. *praemorsa*) *

SARA THREATENED MOSSES
 Moss, Haller's Apple (*Bartramia halleriana*) *

SARA SPECIAL CONCERN PLANTS
 Beggarticks, Vancouver Island (*Bidens amplissima*)
 Fern, Coastal Wood (*Dryopteris arguta*)

Table 2. COSEWIC has assessed a number of other species of plants since Schedule 1 was prepared and these species will be put before cabinet for legal listing shortly after proclamation.

COSEWIC ENDANGERED PLANTS
 Lipocarpha, Small-flowered (*Lipocarpha micrantha*) *
 Lupine, Streambank (*Lupinus rivularis*)

COSEWIC ENDANGERED MOSSES
 Margined Streamside Moss (*Scouleria marginata*)
 Silver-haired Moss (*Fabronia pusilla*)

Table 3. Plant species assessed by COSEWIC under older criteria that require reassessment before they can be put forward for legal listing.

COSEWIC SPECIAL CONCERN PLANTS
 Helleborine, Giant (*Epipactis gigantea*)
 Meadowfoam, Macoun's (*Limnanthes macounii*) *



Toothcup (*Rotala ramosior*)

COSEWIC SPECIAL CONCERN LICHENS
 Cryptic Paw (*Nephroma occultum*)
 Oldgrowth Specklebelly (*Pseudocyphellaria rainierensis*)
 Seaside Bone (*Hypogymnia heterophylla*) ✗

* Recovery planning is being addressed by an existing recovery team.

For more information there are a number of useful websites:

- For information on the status of species and the background materials that are available contact the BC Species Explorer site. <http://srmwww.gov.bc.ca/atrisk/>
- For information on COSEWIC: <http://www.cosewic.gc.ca/index.htm>
- For information on the Species at Risk Act: <http://www.speciesatrisk.gc.ca/indexe.cfm>
- For information on RENEW: <http://www.speciesatrisk.gc.ca/species/efforts/indexe.cfm>

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stay together
 learn the flowers
 go light

~Gary Snyder,
 from *Turtle Island*

What's in a checklist?

Ecology and biodiversity of Richmond at a glance

By Rose Klinkenberg, Brian Klinkenberg and Frank Lomer

Understanding the ecology and biodiversity of a region is important both scientifically and from a planning perspective. This is especially true in urban or near urban areas where natural areas and significant ecosystems face continuous threats from development and changes to the natural regimes that support them. In Richmond, BC, this is particularly true, as urban and agricultural expansion and dyking for flood control have altered the natural face of the municipality.

Richmond is an island municipality located in the delta of the Fraser River, a municipality heavily influenced by the rushing waters of the Fraser River and the daily influx of tides. It is comprised of 17 delta islands—more or less—ranging in size from Lulu Island, the largest and most developed (and dyked) island, to tiny Lion and Don Islands, which are routinely inundated by flood waters. The municipality supports several key natural areas, including Iona Beach, the Lulu Island Bog, Sturgeon Banks, Shady Island, and many more, including the narrow bands of shoreline meadows found along the banks of the Fraser. A cluster of Richmond's islands form the South Arm Marshes Management Area, and one small island, Swishwash Island, is a nature reserve managed by the Nature Conservancy of Canada.

This interesting position in the landscape, and the unusual island nature of the municipality, makes

Richmond intriguing botanically. It is a place subject to migrations of species both from natural movement of species downriver and via ocean currents, and from inadvertent migration in shipping ballast, horticultural and agricultural imports, and other anthropogenic means.

In 1999, we realized that no single compilation of the vascular plants of Richmond or the delta existed. In the past, single site-specific lists of plants had been prepared for key natural areas, such as the Richmond Nature Park/Lulu Island Bog. This prompted us to begin compiling information on the vascular plants of Richmond, and to begin documenting occurrences, both as a baseline for future work, and as historical documentation of what exists at this point in time.

We were lucky in that one of us (Lomer) had already done extensive work on the plants in the delta and had numerous species records for Richmond. We added to this information from existing site lists, such as those by Terry Taylor for the Lulu Island Bog, specimen records from the UBC Herbarium database and additional records by observers such as Don Benson. We then began searching for those species obviously missing from the lists, and began collecting vouchers to document occurrences of both representative species and significant species throughout Richmond. The result of this is the first draft checklist of the vascular plants of the islands of Richmond (and, essentially, of the delta). To date, 592 species of vascular plants have been recorded

for Richmond and there is no doubt that this list will grow as we identify gaps and search for additions. At this point, records are biased heavily towards Lulu Island, where most of the botanical activity has occurred, and where there is greatest access.

Approximately half of the species on the list are introduced species of European and Asian origin, with a few from other locations. The other half are species native to the region and representative of the natural habitats of the islands, particularly wetland habitats, riverine communities and sand dune systems. The compilation has resulted in the recognition of fifteen rare species in the municipality (see the list presented below).

In reviewing the Richmond checklist, we can see that it, like most checklists, provides an example of how a checklist can function as a window into the ecology of a region or site, and can provide insight into the dynamics that have occurred there. Because of this, a plant checklist is an important and powerful planning tool, and with a checklist alone, expert botanists can derive a fair amount of information about a site or region. To the expert eye, a checklist can indicate what type of habitats or plant communities are found, the condition of these habitats, and their relative health and diversity. It can show how disturbed a site or region is, what types of disturbance there is, and can provide clues to plant species migrations.

Using the Richmond vascular plant checklist as an example (it can be found on the web at: <http://www.geog.ubc.ca/richmond/city/richmondchecklst.pdf>), we can infer quite a bit about the ecology of Richmond.

For example, looking at the clues in the Richmond list, we can tell that it is a place of primarily wetland habitats that include bogs (e.g. *Rhododendron groenlandicum*,

Kalmia polifolia), fens (e.g. *Rhynchospora alba*, *Dulichium arundinaceum*), marshes (e.g. *Typha latifolia*, *Lycopus uniflorus*), and shoreline meadows (e.g. *Platanthera dilatata*, *Menyanthes trifoliata*). We can tell that there is some representation of sand dunes and associated meadows (e.g. *Leymus mollis*, *Carex macrocephalus*). We can also tell that it has a strong complement of alien species originating both from Europe and Asia (e.g. *Convolvulus sepium*, *Trifolium arvense*, and many others), and other regions (e.g. *Myriophyllum aquaticum*). And we can decipher that these have arrived here by several means, such as via horticultural activities (e.g. *Calluna vulgaris*, *Betula pendula*), the aquarium/pond industry (e.g. *Myriophyllum aquaticum*), agriculture (e.g. *Vaccinium corymbosum*), highway maintenance (e.g. *Lupinus arboreus*), etc.

In addition, we can tell that the municipality supports both invasive species (*Lythrum salicaria* and *Rubus armeniacus*) and rare species (e.g. *Bidens amplissima*, *Lilaea scilloides*).

To the untrained eye, however, a checklist is just a list. It requires a degree of interpretation to make it work at all levels, including the expert botanist, the municipal planner and the general public. If its purpose is to be more than just a list, more than just a documentation of species occurrence, then that interpretation is crucial. Information should be provided that tips off the planner to the importance of the species. The key interpretive information that could be included in a checklist includes documentation of which species in a checklist are rare, which are native or alien, and which are invasive. It is also important to maintain a background database of records, or annotations, that indicate where the record for a given species

comes from. That is, who the observer was, when it was observed, was a voucher collected, where it was deposited. This way, those interested in rare species or studying the floristics of the region, for example, can follow the trail to the source and determine if the record is accurate and reliable.

The draft vascular plant checklist for Richmond has allowed us to obtain an initial overview of the ecological dynamics of this island municipality, and to obtain an understanding of the diversity of wetland habitat types, and other habitat types, that occur here. This information allows us to assess which natural areas are significant, and the degree to which alteration has occurred. It allows us to place plant species in perspective in terms of their significance, and provides a benchmark in environmental planning that can function as a guideline for such activities as plantings in parks and roadsides, allowing us to be aware of invasive species, and to



False pimpernel
Lindernia dubia var. *anagallidea*

select for native species that are both suitable for our landscape, and native to the site types which occur here.

There is no doubt that our checklist will grow, and that new alien species will be found. It is this dynamic nature of Richmond and her islands that makes maintaining a plant checklist important. In the future, we will be able to look back and see what changes have occurred over time, and if the shift in composition has been away from native species and more towards alien species, or if our native wetland species will hold their own because of the very special site dynamics of the places where they live.

Rare, Threatened or Endangered Species of Richmond

- Bidens amplissima* (Vancouver Island beggarticks) Blue list
- Caltha palustris* ssp. *asarifolia* (Marsh marigold) Blue list
- Carex interrupta* (green-fruited sedge) Red list**
- Elatine rubella* (Three-flowered waterwort) Blue list
- Eleocharis parvula* (Small spike-rush) Blue list
- Elodea nuttallii* (Nuttall's waterweed) Blue list
- Epilobium ciliatum* ssp. *watsonii* (Purple-leaved willow-herb) Blue list
- Glyceria occidentalis* (Western manna grass) Blue list
- Juncus oxymeris* (Pointed rush) Blue list
- Leersia oryzoides* (Rice cutgrass) Blue list
- Lilaea scilloides* (Flowering quillwort) Blue list
- Lindernia dubia* var. *anagallidea* (False pimpernel) Red list**
- Myriophyllum ussuriense* (Ussurian water-milfoil) Blue list
- Platanthera dilatata* var. *albiflora* (White bog orchid) Blue list
- Salix sessilifolia* (Soft-leaved sandbar willow) Blue list

Naming plants: from polynomials to binomials to phylocode

By Gail A. Baker and Rhoda M. Love

Knowing what a plant is called is important to us all. We need to know what to ask for at the market or the garden store. Usually we first learn common names such as lettuce, carrot, or Oregon grape; but we are also aware of official designations assigned by western science that consist of unique combinations of two words, the generic and specific epithets, or binomial. Cultivated lettuce is *Lactuca sativa*, carrot is *Daucus carota*, the Oregon state flower is *Berberis aquifolium*. Binomials go back to identifiers coined by Linnaeus, the Swedish “father of taxonomy,” who lived 250 years ago. In his time, scientists identified plants using polynomials or multi-word descriptions. However, Linnaeus and his students devised the shortened two-word Latin name for each taxon, which quickly became popular and evolved into the system used worldwide today to assign names, and place species in genera, families, and higher ranks. (Raven, 1999).

Now, after two and a half centuries, a change is brewing. Articles entitled “Linnaeus’ Last Stand?” (Pennisi, 2001); Is it “So Long, Linnaeus?” (Withgott, 2000); and “Biologists Urged to Retire Linnaeus” (Pennisi, 1996) alert us to the fact that Linnaeus’ nomenclature is being called into question by a new breed of taxonomists. The debate centers on evolutionary associations revealed by modern molecular techniques, and how these revelations may affect scientific names and ranks. Of course, with

the publication of Darwin’s *Origin of Species* in 1859, systematists began, insofar as possible, to use phylogenetic principles in taxonomy. Their goal was to place species in a given genus or family when they saw evidence of a shared common ancestor. (Linnaeus himself knew nothing of evolution, but he was a shrewd observer of morphological characters, and many of his groupings are upheld by molecular techniques.) Thus the goal of making taxonomy reflect phylogenetic relationships is nothing new. Nevertheless, the inclusion of modern DNA analyses have led some present workers to propose a new taxonomic system.

The new system, called “PhyloCode,” may offer an alternative to the current taxonomic hierarchy. PhyloCode is based on the use of certain genetic markers coupled with the computerized production of cladograms which graphically show the “distance” between certain chosen taxa. The more markers two species share, the closer they will fall on the cladogram, and the “closer” they are presumed to be to a common ancestor. Biologists are presently making ever-increasing use of the new tool, called “cladistics,” to reveal relationships. Often the analysis confirms the correctness of taxonomy based on morphology; however DNA techniques may reveal kinships (or lack of them) that have not been apparent using traditional methods.

For example, botanists have long been aware of a close phylogenetic relationship between the families Papaveraceae (the poppy family) and Fumariaceae (the bleeding heart

family). Although members of the two families appear distinct, there are similarities in the leaves, and many members of both families have 2 sepals which fall as the flower opens. However, because of the distinct zygomorphic flower of *Dicentra* and its relatives, the families have usually been kept separate. During the preparation of the Jepson Manual, genetic analysis revealed that “the Fumariaceae is more closely related to the genus *Papaver* than *Papaver* is to other genera traditionally placed in the Poppy Family such as *Eschscholzia*.” Thus, if the authors retained a separate family Fumariaceae, they would be forced to add a new family Eschscholziaceae (California Poppy Family). Instead, they chose what they call “the conservative course” and submerged the Fumariaceae in the Papaveraceae, although, as they state, “an attractive and popular family was lost” (Hickman, 1993). For some other surprising recent genetic findings, in the family Portulacaceae, see Chambers, 2002.

We all agree that any classification system should reflect phylogeny. However, because classical taxonomy was not originally based on genetics, some argue that the old system cannot incorporate new information from genetic analyses. (deQueiroz & Gauthier, 1994; Brummitt, 1997; Cantino, 2000). In addition, proponents of the new taxonomy claim a certain amount of trouble fitting their new groups of closely-related organisms, or “clades,” as they are called, into the traditional framework. In other words, the major controversy between the traditionalists and the

geneticists seems at present to boil down to a problem with names. Perhaps it is the ancient question, “What is a species?” with a new twist. Most PhyloCode advocates claim they can adjust their clades to the standard categories of Division, Class, Order, and Family, but they admit to a tendency to wish to discard or alter the current genus and species designations. This suggestion produces anguish on the part of traditional taxonomists, who are of course dealing with 250 years of literature in which each species is identified by its unique binomial. For an overview of the differences between the historic system of classification and PhyloCode, see the 2001 article by Elizabeth Pennisi.

A considerable body of recent literature—much of it heated—has been generated about the relationship of nomenclature to phylogeny. (Nixon & Carpenter, 2000.) As in any debate there is polarization, with one end of the spectrum represented by those wishing to retain the current system exclusively and the other by those urging complete replacement with PhyloCode. Cooler heads urge adoption of a dual system wherein the two would function in tandem, at least for the near future, with regular evaluation of the utility of each

system (Brummitt, 1997, Cantino, 2000). Two famous biologists, Paul Ehrlich of Stanford and E. O. Wilson of Harvard, have indicated that taxonomists should not be engaging in this debate at this time, but rather should focus on describing the Earth’s diversity. Cladistics advocate, Brent Mishler of Berkeley, counters by suggesting that PhyloCode might improve the categorization and conservation of biodiversity. What the debate suggests is that we, as plant enthusiasts, should make ourselves familiar with both traditional taxonomy and the new system in order to follow the ongoing dialogue. Perhaps you hope, as we do, that the outcome will be a compromise acceptable to both groups.

In March 2001 members of the systematics community came together in Washington DC to examine the relevance of Linnaean binomials and hierarchical ranks in the light of the recent advances. The presentations from the first “Smithsonian Botanical Symposium: Linnaean Taxonomy in the 21st Century” can be found on persoon.si.edu/sbs/ and in the February 2002 issue of *Taxon*. A follow-up workshop was held in June 2002 to develop specific

recommendations for the integration of traditional Linnaean nomenclature and modern cladistics. The recommendations will be published in a forthcoming issue of *Taxon*. This is an exciting time in the biological sciences. It is thrilling that the tools of modern genetics are providing us with powerful new evolutionary insights. Our wish is that classical taxonomists and PhyloCode advocates continue to join forces as part of a single group of systematists whose ultimate goal is the development of the most phylogenetically-powerful naming system we can devise. ✍

Acknowledgments

The Smithsonian Botanical Symposium: Linnaean Taxonomy in the 21st Century. 30-31 March 2001 was organized and sponsored by various individuals and organizations only a few of which are noted here. Among them were organizers Paula DePriest & Sue Lutz, and sponsors the Hunt Institute for Botanical Documentation, the United States Botanic Garden, and the International Association for Plant Taxonomy. For a complete list see the Smithsonian Department of Botany publication *The Plant Press* 2001, 4(2).

The opportunity to attend the Symposium was made possible for GAB by support from the Smithsonian and Lane Community College Special Projects Fund through M. Spilde. This article is partially excerpted from a research article developed during sabbatical leave by GAB, and a handout developed by RML for her Field Botany Workshop at the Mount Pisgah Arboretum.

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“Events” cont’d from p. 2

can have a healthy, pesticide-free garden. Topics include organic fertilizers, soil amendments, composting, cultural practices, watering techniques and selection of native and other water-conserving plants. VanDusen Botanical Garden. 1 to 3:30 pm. Phone 604-257-8151 or email educate@vandusen.org for more information.

Victoria, Thurs, May 15
The Biogeography of the Slim Leaf Onion (*Allium amplexans*).
 Speaker: Erica Wheeler, BSc., Masters candidate in the Biology Dept., UVic. Sponsored by the Native Plant Study Group. \$15 annual membership, \$10 for students or a \$2 drop in fee. For more information, contact Susan Bastin at 361-3122.

Drawing: Rare Native Vascular Plants of British Columbia

Needle-leaved navarretia (*N. intertexta*) in the southern Interior

By Malcolm Martin

More often than not members of the Phlox family (Polemonaceae) show a pronounced preference for dry, exposed places rather than the deep, fertile and well-watered soils favoured by many herbaceous plants. Low cushions of dwarf phloxes on rocky ridges, spiny leaves of *Leptodactylon* shrubs on semi-arid slopes and narrow leaves of the multitude of desert-living *Gilia* all speak of the need to resist the drying influence of exposure, so it comes as an anomaly to find in the genus *Navarretia* an ambivalent attitude to moisture, some species opting for the family’s spartan life-style while others have developed a definite need for wetness.

In California this has led to an interesting set of vernal pool specialists, many narrowly endemic, as in the past each became localized around its nearest wet area and separated from relatives when the American south-west became progressively drier. So adapted to water did some of these become that germination and early growth now takes place as an temporary aquatic below the surface of pools of winter rainfall, with maturity and flowering occurring only later as the pool dries.

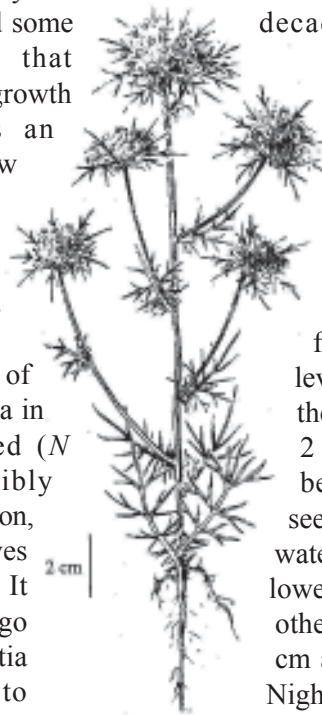
Three annual members of *Navarretia* reach Canada in BC, one - Skunkweed (*N. squarrosa*) - possibly through human intervention, and the other two, natives of intriguing rareness. It was only three years ago that Mountain Navarretia (*N. divaricata*) came to

light in dry grassland at a single location near the international boundary. The third species, Needle-leaved Navarretia (*N. intertexta*), has a longer history in this province but remains sparse and shows a definite partiality for moisture. The latter two are both Red-listed in BC.

Several years ago Needle-leaved Navarretia was found at a new location just east of the Okanagan Valley at about 1400 m and the opportunity has been taken to carry out some simple studies that might help in understanding its habits as a rare plant and possible management requirements. These form the subject of this article. At the coast this species has been known at a few sites for many years on grassland ‘balds’ near the coast of south-east Vancouver Island. As data from that area would be affected by differences in climate, length of season and growing conditions they is not included, neither are those from the only intervening station, near Hat Creek, which has not been visited in recent decades and for which no information is available.

Seeding

In order to examine the part played by water in germination of this species a small frame was made to hold soil from the field location with three levels, the second 2 cm above the first and the third another 2 cm higher. After having been wintered outside, the seeded frame was placed into water on April 5th so that the lowest level was just awash, the other levels therefore being 2 cm and 4 cm above the water. Night frost continued until April



23/24. By April 19th the first pair of simple linear leaves was about 5 mm tall growing from seed at the inundated level, at which time germination had not started in the second and third levels. On April 28th these leaves were 20 mm long and first-pair leaves from plants on the levels above water were at 12 mm. A second pair of opposite leaves began to show on farthest developed plants on May 3rd and a third one week later, it being alternate in position as were all subsequent leaves. It was apparent that inundated seeds produced plants earlier than those from higher levels where stage of development remained behind until mid-May, however, their catching up and eventually surpassing the early plants was considered to be due to the greater depth of soil availability they enjoyed and not because of height above water level. During this time wild plants in the field (900 m higher in altitude) were registering a growth stage about 2 weeks behind those of the study.

It was only on the second leaves, also linear, that tiny thread-like lobes formed near their base, becoming two pairs of lobes on the third leaves and proliferating thereafter to form the elaborate trident-like pattern of mature leaves. Spencer and Rieseberg (Evolution of Amphibious Vernal Pool Specialist Annuals) suggest that simple, upright, first leaves may be a selected growth form for species of *Navarretia* that begin as submerged juveniles as the cylindrical shape gives structural support in water.

Flowering

Long and narrow tubular throats are characteristic of the Phlox family, particularly of its small annual members, and although flowers are usually bright and colourful and presumably attractive to insects, this construction can present physical problems to insect pollination. In the case of Needle-leaved *Navarretia* the flowers are a pale lilac and project

obviously from the calyx. Prior to anthesis the frame containing study plants examined indicating high success in self-pollination. In the field, ripening of seeds depended to some extent on location as plants growing where dampness lingered remained green and flowering longer into the season whereas those growing peripherally dried and matured earlier as ground moisture evaporated. By the end of August seeds were dry and brown.

An average well-grown plant was found to have 12 capsules in the largest head, surrounded by 3 other flowering heads with 9 capsules completing the central complex, and 3 secondary heads on lower branches each carrying 4 capsules. At 4 seeds per capsule (occasionally 3) this plant produced 130 seeds. Higher and lower totals would be found on further examination.

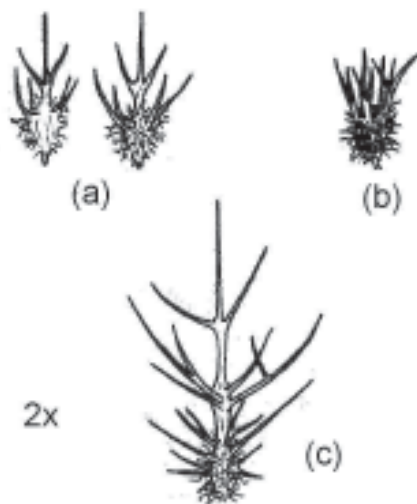
Seed retention

Construction of the mature heads presents an interesting proposition. Individual seeds were found to vary in size (1.75 mm to 2.25 mm), all packaged within a flimsy membranous capsule that with time breaks down by tearing rather than splitting to release seeds. It is securely held in the calyx tube made up from 5 upright, sharply pointed sepals linked to half their length by a membranous girdle fringed with flattened (ribbon-like) hairs (see [a] below). This in turn is closely invested by 2 spiny bracts (inside and outside

views shown in [b]), and further by several trident-shaped sharp-pointed leaves (see [c]). Altogether this intricate framework forms an effective cage around the seeds, apparently preventing their escape as well as providing an impressive defence. Additionally, the surface of each seed becomes mucilaginous when wet which further hinders seed dispersal.

After the considerable pains taken by high school biology to point out many diverse and effective ways plants have conjured up to distribute seeds away from the parent it seems a contradiction to find one just as avidly dedicated to retaining them. Similar strategies can be found in other plants of narrow habitat tolerances - sand dune inhabitants, for instance, would be ill-served by a dynamic seed distribution system that cast seeds off the dunes they are adapted to and onto desert floor where they would lose their competitive advantage. In the same way, *Navarretia*'s future can be assured only by restricting each new crop of seeds to the same small patches of seepage and damp shallow swales that the parents live in.

Seed defence is another strategy not infrequently coupled with long-term seed retention. During the growing and flowering period all green parts of Needle-leaved *Navarretia* remain soft and fairly succulent, becoming hard and sharp only on drying and maturation of the seeds. At that stage each plant's ample armaments provide a definite deterrent to grazing. To gauge how quickly structure of plants in a dry state might break down under fall rainfall, a mature plant was suspended upside down in water. No change was noticed to its structure or hardness after one week nor was there any inclination for seed to drop out. It is unlikely that winter frosting would be the triggering requirement as Vancouver Island populations near the ocean would seldom experience that treatment.



See "*Navarretia*" on p. 15

Alien plant invaders

Common tansy

(*Tanacetum vulgare* L.)

By Carmen Minor, Weed Control Program, BC Ministry of Forests

Description

Tanacetum vulgare is an aromatic perennial forb in the Asteraceae family. This native European plant was introduced to North America as an ornamental plant and was used for medicinal purposes. This plant can be identified by its yellow button-like flowers arranged in showy flat-topped clusters. Common tansy has a stiff woody stem which is often purplish red in colour and dotted with glands. The fernlike leaves are alternate and deeply divided into narrow, individual leaflets (A Guide to Weeds in British Columbia, 2002). The leaves emit a spicy aroma. Height ranges from 1.5 to 6 feet tall (Mayerle, 2002).

Biology

Common tansy is a prolific seed producer and will also reproduce from its spreading root system. Flowers appear in July to September (A Guide to Weeds in British Columbia, 2002). Once established, common tansy increases in density and abundance. It is extremely competitive, displacing the native vegetation (Turner, 2002).

Range

Common tansy is very common in British Columbia, south of 55° N. It is present in all agricultural regions of the province and is a major concern in the Kootenay, Okanagan and Omineca regions (A Guide to Weeds in British Columbia, 2002).

Habitat

Common tansy prefers disturbed

sites along roadsides, streambanks and pastures (A Guide to Weeds in British Columbia, 2002). Flowing water in ditches and streams quickly disperses seed (Elpel, 2000). Seed can also be spread with drifting snow (Mayerle, 2002). It favours full sun and fertile, well-drained soils (A Guide to Weeds in British Columbia, 2002).

Impacts

Horses and cattle will forage on the young leaves of tansy, but this plant can be toxic to these animals in large amounts. It can also be toxic to humans even though it is used medicinally in small amounts. Goats and sheep graze common tansy enthusiastically (Elpel, 2000).

Known Controls

Mechanical Controls: Pulling and mowing has little effect except to limit the seed production (Elpel, 2000) However, tansy does not tolerate tillage (Mayerle, 2002).



Fire: Controlled burns of dense patches of dried tansy stalks may reduce fire danger later in the season and facilitate control through herbicide applications and grazing. Repeated burns may increase weed habitat (Elpel, 2000).

Grazing: Goats and sheep effectively remove tansy, thus reducing seed production and spread. Grasses are allowed to flourish with the increased light (Elpel, 2000).

Chemical Controls: Tansy is easily controlled with common herbicides like 2,4-D or a blend of 2,4-D and clopyralid (Curtail), or picloram (Tordon 22K). Repeat treatments may be necessary to kill vegetative regeneration from the roots. Special care must be taken when applying herbicides along ditch banks and creeks to avoid contaminating the water (Elpel, 2000).

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Letters

Dear Editor,

It was great to read the review of my book, 'HOW TO GET YOUR LAWN OFF GRASS' in the Fall 2002 edition of *Menziesia*. Thanks to Edward van Veenendaal for his words, and the wonderful photos of his garden that grace the pages of the book.

One comment, though. "Off Grass" was intentionally written for novices, to encourage them to leave their exotics behind, and gradually become 'seasoned' native plant gardeners. When I was starting out, detailed horticultural tomes scared me off, and all the Latin and horticultural terms convinced me that it is a world too foreign to enter at all, let alone with ease. That's why "Off Grass" lists only 15-20 of the hardiest plants for each floristic province, and a fat Resources Directory for those who get bitten, and want to learn more.

Carole Rubin
Sechelt, BC

Dear Editor,

I am not a botanist, but from a naturalists point of view I find Stephen Jay Gould's argument lacking in one rather large and important area: the role of plants in the 'local' ecology as a whole. From Pat Woodward's commentary (*Menziesia*, Winter 2003), it appears to me that he is treating plants as if they exist in a sort of vacuum unrelated to any other living things and the fulfilment of their needs in that ecological system.

Yes, I agree that there are many non-native plants that will fulfil some, in some cases all, of the needs of some creatures; however, we all know of creatures (invertebrates, mammals, birds, reptiles, you name it) which cannot survive without certain native plant species or plant communities. Not surprisingly, these

tend to be critters on the Red and Blue lists, in the majority of cases because of the decimation of habitats including the native plant species they require. In the South Okanagan, the huge loss of antelopebrush and associated plant species is one such case. In this respect, Mr. Gould's argument, logical from a biological or evolutionary theory point of view though it may be, seems to me to fall far short of reality.

I for one, living in an area with the greatest number of Red and Blue-listed species in the province, will continue to recommend that people plant species native to this area in particular those of use to these threatened and endangered creatures or themselves in this category. Of course there are other species that we humans find particularly pleasing that may also be of use to some other creatures, but that would seem to be of quite secondary significance from an ecological point of view.

Eva Durance
Penticton, BC

Dear Editor,

In Volume 8, Issue 1 of *Menziesia*, Pat Woodward asks for comments on statements regarding native plants made by former U.S. President Bill Clinton and recently deceased eminent biologist Stephen Jay Gould. Pat's short article raises the matter of significance of distinguishing plants which are "native" and those "which are not" and also in our province with a native flora which cannot be much older than 10 or 12 thousand years in place (that is a flora established since deglaciation began and a flora the components of which have probably established by stages [with some quite recent]).

But back to the two statements, Gould is of course right in criticizing Clinton's statement made with his heart in the right place but certainly one for which there can be little substantiation. Although Gould as a paleontologist and looking at the very

long term does those of us a disservice who have to live in the present, especially in BC where our flora is dynamic with changing migration patterns (for example Idaho fescue or *Bassia* perhaps did not occur early in my lifetime in the Kamloops area or in the Nicola valley but no doubt in my mind would have arrived in due course from Washington State if *Homo sapiens* had not been around). Admittedly "native" is a fuzzy but useful term enabling us to separate off a species group obviously introduced for agricultural ends with new sets of problems associated with disease and pests etc. as "weeds" or "aliens" or "adventures" or "introductions" and interrelationships of "native" and "alien" ecologically.

Just to be mischievous as Pat was, maybe it is time to recognize *Poa pratensis* and *Trifolium repens* as natives – they are now so well established in remote "undisturbed" habitats of BC, they seem to be here to stay? But a look at their DNA might show up some "native" DNA in them. I will continue my support of the Native Plant Society of BC, fuzziness be damned.

Bert Brink
Vancouver, BC

Dear Editor,

Receiving my very first copy of *Menziesia* this week I was intrigued to see the submission from Pat Woodward entitled "Native plants - not necessarily environmentally and economically beneficial?" describing excerpts from the book "An Evolutionary Perspective on the Concept of Native Plants" by S. J. Gould.

Not being a scientist and somewhat new to the field of restoration and botany and not having read the book, I wonder if Mr. Gould has overlooked the role of interconnectedness and interdependence of species and location in their "natural"

landscapes? He appears to take the argument for using (or not) native plants without consideration of ecosystem health.

Although some plants are aggressive colonizers, able to survive over a wide range of conditions and others are narrowly adapted to specific regimes, an ecosystem, especially a late seral one, has evolved to meet the needs of an entire community of plants and animals. To consider the evolution of plants without considering the evolution of ecosystems would be like studying a city by viewing only the buildings. The richest natural biodiversity of any given locale requires the full complement of native pollinators, seed dispersers and soil microbial life. Plants are not self-contained islands (and cities are not just buildings), many need the assistance of invertebrates, birds and small and large mammals to survive as well as prevailing wind patterns, hydrological systems and other geological processes. Although life is dynamic, from our human lifespan perspective - it achieves a certain balance.

Here on southern Vancouver Island the Garry oak moss balds have a fantastic array of winter annuals and spring blooming flowers. What is the environmental cost of introducing broom (*Cytisus scoparius*) to this ecosystem? Broom can eradicate this native ecological community as it works to change the soil chemistry, the hydrology, the light and temperature available. All too quickly our historic plant community is weakened and destroyed, some plant, bird and invertebrate species are extirpated or worse yet, become extinct and we are left with a new community that is much reduced in biological diversity. The economic cost? What will future generations decide was a critical attribute that has now disappeared? Do we have the knowledge to even

guess at the long term economic costs? If we cherish the original ecosystems, restoration can be a very expensive proposition.

Using native plants will not restore an ecosystem, it is a much more complicated process than that. However, we can garden to reduce the onslaught of invasive species into any remaining functioning original ecosystems. We can resist planting exotics that are known to "escape" into the landscape, we can resist introducing non-native birds, fish, amphibians and animals into the landscape, we can plant native species that are locally adapted to site conditions, thereby supplying some missing components of the original ecological communities. Consider when gardening if you are contributing to the overall health of any adjacent still functioning native ecosystems. In this way we can take small steps towards healing communities out of balance with their historic landscapes.

Moralea Milne
Metchosin, BC

"Navarettia" cont'd from p. 12

Management

In order to safeguard Red-listed plants it is necessary to have some understanding of their environmental requirements and, by management, to prevent these being unnaturally altered. The subject location encompasses a series of small grassy openings in dry forest along the upper edge of a lava cliff. Snowmelt from the surrounding area moves towards the cliff edge, coming to the surface in a number of small seepages as soil depth diminishes near the cliff top. It is in these seasonally wet areas that Needle-leaved *Navarretia* occurs. Not all seeps are used, however, and the reason for that needs further study.

As seed germination and early growth of this species appear to need adequate moisture, management

actions should seek to prevent any diminishing of supply from the up-slope direction either by blockage, diversion or possibly due to logging operations. Whether under extreme conditions one or more years of annual growth and seeding could be omitted would depend on the length of time seeds remain viable and whether a seed bank remains in the ground. This, too, has not been examined.

Lastly, in considering the long-term vulnerability of Needle-leaved *Navarretia* another factor arises from self-pollination. In the normal course of events there are advantages to a plant species in out-crossing because of the genetic variation it brings forth, some of which may be helpful in producing variants better able to survive changed growing conditions in the future. Without that ability self-pollinated annuals would appear to be particularly at risk from global climatic shifts that may be taking place.

While the observations above lack the procedural rigour for them to be technically acceptable they provide preliminary background material and point to directions that a scientific study could profitably take. Red- and Blue-listed plants occur in all parts of BC and research done on them in other parts of North America may not necessarily be entirely correct for this province. By doing simple studies of their own NPSBC members can provide useful local observations as well as increasing their personal interest in native plants. ✍

The property referred to above was put forward as an ecological reserve proposal in 1996 and verbally deemed suitable at that time. As the Okanagan-Shuswap LRMP was upcoming it was required to go through that process and was accepted as a Goal 2 unit of highest priority in the final plan which received Cabinet approval two years ago. Now, 7 years after the original proposal, this property still awaits legal designation.

NPSBC new members

Since December 15, 2002:

Eva Nagy, North Vancouver
Katherine Enns, Castlegar
Niki Bhabra, Richmond
Judith Walker, Comox
Terry McIntosh, Vancouver
Nikaiah Jaguar, Vancouver
Mark van Kleunen, Vancouver
Quentin Cronk, Vancouver
Deb and Dave Clements, Langley
Moralea Milne, Victoria
Andrew Hill and Andrea Seale, Vancouver

Welcome Spring!



Natural Habitat Gardens offer a variety of native plants that are suited to a wide range of ecological conditions. Habitat packages to attract songbirds, butterflies, and hummingbirds are available. For more information, please contact:

Trish Wallensteen, Natural Habitat Gardens
RR 1, S14, C12 Sorrento, BC V0E 2W0
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Garden Naturally *with* Native Plants



1770 Corrigan Road
Denman Island, BC

Catalogue available

250 335.1379
harr@island.net

Spring Native Plant Sale

Trilliums, Erythroniums, Shooting Stars and more

Mother's Day Weekend
May 10-11, 2003, 10 a.m. - 4 p.m.

Mark your calendar,
pack a picnic and carpool out to

Pacific Rim Native Plant Nursery

where the garden meets the wild
44305 Old Orchard Road, Chilliwack.
Details and a map at www.hillkeep.ca

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Marian Wilkins, Vancouver
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Chris Sears, Vancouver
Michael Mills and Patricia Campbell, Roberts Creek
George Oxby, Victoria
Jules Thomson, Victoria

Mission Statement

The purpose of the NPSBC Native Plant Society of British Columbia is to encourage knowledge, appreciation, responsible use and conservation of British Columbia's native plants and habitats.

Menziesia is published 4 times a year by the NPSBC. Upcoming submission deadline: June 15 (Summer). Subscription is included in membership to the NPSBC. Annual membership fees are: \$20 - Individual; \$30 - Household; and \$75 - Sustaining member.

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