

Douglasia

VOLUME 31, NO. 4 FALL 2007



Journal of the
WASHINGTON
NATIVE PLANT
SOCIETY

*To promote the appreciation
and conservation of Washington's
native plants and their habitats
through study, education,
and advocacy.*

Pilot grazing project

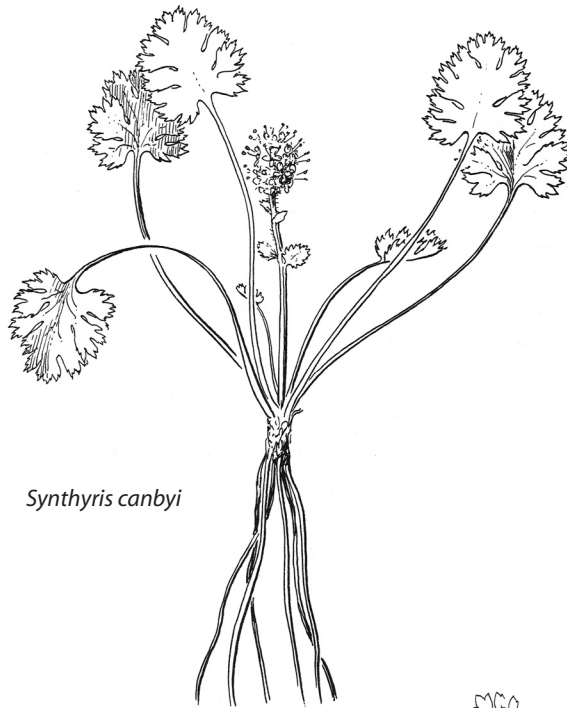
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Synthyris canbyi



Synthyris dissecta

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Douglasia (ISSN 1064-4032) is published quarterly by the Washington Native Plant Society. See inside back cover for a WNPS directory and for subscription and membership information. *Douglasia* logo designed by Louise Smith of Seattle. Printed on acid-free paper using 30% post-consumer waste.

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* To become a WNPS Fellow is the highest honor given to a member by our Society. This title is given to those who have made outstanding contributions to the understanding and/or preservation of Washington's flora, or to the success of WNPS.

** Deceased

Editor's note

Fall couldn't wait to get here this year it seems. But that's okay; it's a beautiful time of year.

I wanted to write the Editor's Note this time because I wanted to personally (at least in writing) let you know that this is my last issue as managing editor for *Douglasia*. I've been honored to serve in this position for the past four years, and as much as I've enjoyed it—and I've enjoyed it greatly—it is a major time-commitment. I've decided to pursue other opportunities, but will always have fond memories of this job and the many enthusiastic WNPS members I've met along the way. I was new to WNPS when I started, and what has struck me most is the energy and passion of the members. It's a very uplifting organization and the native plants of Washington are fortunate to have such stalwart defenders.

Douglasia's new managing editor, beginning with the next issue, will be Cindy Spurgeon, whom many of you already know. Cindy brings an avid interest in native plants—she's been a member of WNPS for many years and is a graduate of WNPS's Native Plant Stewardship program—and that along with her editing experience is a winning combination. (Learn more about Cindy in Kathy Murray's article on the next page.)

Thanks once again to the many authors and countless behind-the-scenes folks who contribute to the making of *Douglasia*—especially to Catherine Hovanic who has been such a steady support throughout these past 17 issues. Happy trails to you all.

Karen Gatrell

WNPS State Board of Directors: Meetings 2008

April 12, 2008

October 18, 2008

For more information on agenda and location contact the WNPS office two weeks ahead of the meeting date.



The Washington Native Plant Society is an affiliate of Earth Share of Washington.

www.wnps.org

Douglasia staff changes

by Kathy Murray, WNPS Editorial Board Chair

For the past four years, *Douglasia* readers have benefited from the excellent work of Managing Editor Karen Gatrell, who has spent untold hours putting each issue together. Karen has decided to pursue other opportunities requiring more of her time. We appreciate all the time she has committed to *Douglasia* and wish her all the best in her new endeavors.

The Washington Native Plant Society is fortunate to have many gifted members, and one long-time member, Cynthia Spurgeon, has stepped forward to fill the position of Managing Editor.

Cindy is uniquely qualified. She has a background in the horticulture industry, where she worked in both retail and wholesale nurseries. In one position she worked for a nursery that specialized in low-maintenance and drought-tolerant plants and she noted that “using native plants was a natural

fit in promoting the nursery’s objectives.”

In 1999, she completed the WNPS Native Plant Stewardship Training program. That year she also began volunteering with the University of Washington Herbarium and began her involvement with the Central Puget Sound Chapter’s native plant sale. More recently she began contributing a monthly column on native plants to the *Seattle Times*.

Cindy recently completed a University of Washington Certificate Program in Editing. She’s now a freelance editor, working primarily with a group at the University of California, Irvine, involved with research on malaria and mosquito control in Africa.

In her spare time, Cindy spends as much time as possible outdoors—hiking, kayaking, and hunting for native plants.

Thank you Karen for your four years’ of dedication to *Douglasia* and generous service to the Washington Native Plant Society. We will miss working with you. And welcome, Cindy.



WNPS Call for proposals

by Pam Camp

The WNPS Research and Inventory Committee has a yearly budget that it disburses to worthy proposals that foster the aims of the Washington Native Plant Society, that is, “to study and conserve native plants.” We are interested in supporting projects that extend our knowledge of the biology of native species or that inventory the flora of an understudied area. Special consideration will be given to proposals investigating the oak or shrub steppe ecosystems or invasive species. Another priority is to support research efforts of graduate students and to help develop the careers of botanists who are interested in native plants.

To receive full consideration, proposals should be submitted by **January 15** of each year. Members of the Research and Inventory Committee will review the proposals and a decision will be made by April 1. Proposals received after the January date may be considered later if any funds remain after the first round of awards. Proposals should request no more than \$1,000 to \$1,500, except in unusual circumstances. In general, half of an award is paid when the proposal is funded and the second half is paid when the project has been completed and a final report has been submitted.

Proposals should be about 4-8 pages in length and include the following information:

- **Introduction:** Objectives and significance of the proposed research
- **Methods:** Brief description of study areas, species, techniques, data collection and analysis
- **Timetable of proposed research:** In general, research and reports should be completed within 2 years.
- **Budget:** Personnel, equipment, and supply costs
- **Products:** What will result from the proposed research? We expect, at minimum, a project report and a brief account for publication in *Douglasia*. The preferred result is a publication in the peer-reviewed scientific literature.
- **Curriculum vitae** of all project personnel

Proposals will be rated by members of the Research and Inventory Committee based on (1) appropriateness of the project to the aims of WNPS, (2) adequacy of proposed methods to the project’s aims, (3) researcher’s experience in the types of research proposed, and (4) importance of the research in relation to the requested funds.

Submit five copies of your proposal to:

Pamela Camp, Chair
Bureau of Land Management
915 Walla Walla
Wenatchee, WA 98801
(509) 665-2100
email: p1camp@or.blm.gov

Conservation update

*by John H. Browne, Jr., Conservation
Committee Co-Chair*

Biodiversity may not make the world go ‘round, but it’s certainly a major factor in maintaining one’s abiding interest in this place we make our home. I’m going to make the unresearched assertion that, to a great majority of humans (including myself), the “diversity” we have in mind consists of the various living things that we can perceive with the unaided human eye—the mega-fauna, trees, the obviously flowering plants, the insects and other invertebrates that sport common names, maybe some seaweed—and blithely ignores the myriad creatures who allegedly inhabit about any handful of fertile soil on the planet, and who dwarf us, both in terms of their numbers and their tribal identities. There are scientists who have proposed that our Northwest forests may have a greater biomass beneath the forest floor than above it. As more research makes more such information available, does it become a cultural responsibility to promote a reality-based worldview that encourages this kind of awareness? Or is it simply esoterica better left to the community of “life scientists” to delineate, sort out, and put on a shelf somewhere?

There’s an area of regional interest—the federal forestlands—where the question of how best to proceed toward a biodiverse community that will, some day, include forests that resemble those that were logged by Euro-American settlers, may result in a return to more intense logging of those forests... by “thinning” the (mostly) Douglas-fir plantations that were planted where the “old-growth” was removed. As someone who participated in the replacement of diverse forest communities with a single species, my own feelings are a bit confused, having realized, quite a while ago, that replacement of forests with “plantations” of the single most valued species was a lousy idea from the perspective of the majority of interests in the existence of forests. But the idea that someone’s gonna whack “my 40 year-old babies” to send off to a stud mill, or grind up to cook into methanol, or hog fuel, to let some light into the old plantation, is surely not the end I’d planned for them when they were very young (if I’d had a plan at all). Most of the research and speculation on succession of these plantations points towards thinning as the best way to hasten the process of a return to something like the climax forest conditions of the past, since thinning offers an opportunity to provide

room (and light) for greater plant diversity; and there’s an economic incentive as well (although not of the same magnitude as the clearcut management of private timber plantations, since the maximum clearing size proposed in most federal research studies is around four acres). Many people in timber-dependent rural communities are hoping that this will be part of a sustainable economic future for them... and perhaps it will.

Some questions have to be addressed, though. In the last few years there have been efforts to improve water quality and anadromous fish migration capabilities in the region, in part by “retiring” logging roads, removing culverts, stabilizing old roadfill, and replanting where necessary. In many cases, the roads that most need retirement are the ones leading to old log landings that will likely be needed to facilitate these proposed thinning projects. Selective logging requires more planning and “creative input” generally, when compared with clearcutting. New machinery and technology will answer some of the problems (and so will old technologies, e.g., horse logging, in some instances). There have been small projects in my neighborhood that are providing a living laboratory for those who want to see the progress resulting from small-scale selective logging to promote a more rapid succession to old-growth conditions. My general sense has been “so far, so good”... and I’m hopeful for a positive outcome. In the very short term, with a summer like this one, there’s an abundant berry crop that begs examination.

There’s another side to biodiversity, however (life is never simple, is it?), and it has provided numerous advertisements for itself: the bright yellow bloom on the broom, in spring; meadows and clearcuts that appear to be filled with fireweed, which, upon a closer look turn out to be foxglove; the mountain highways lined with daisies and splashes of St. John’s-wort; great patches of the downy rosettes of mullein; the shimmer of seemingly endless acres of cheatgrass; the hot pink stars and lacy foliage of herb-Robert; trifoliate carpets of creeping buttercups; and so many others. Some of these invaders are classified as “noxious weeds,” a legal definition, sometimes demanding specific treatment by landowners and managers. Some are beyond management, in any realistic sense. Some are still turning up “for sale” (I saw English ivy, imports from Canada, in a grocery store last week). Well... isn’t this also “biodiversity”? Unfortunately, it is.

An excellent report that documents both extent and effect of these invasives was prepared as input to the Interior Columbia Basin Ecosystem Management Project by George Wooten and Peter Morrison, who

state in the introduction that "... this is the second most important cause of species endangerment (after habitat loss)..." "Land management" in its myriad forms—from logging to grain production to pasture enhancement to road-building to landscaping to grazing practices to oyster cultivation, etc.—has been the primary mode of invasive plant transmission to our various ecosystems. As the aforementioned report makes clear, these problems generally begin slowly, and aren't perceived as problematic until it's too late to make a decisive difference. While the state-mandated "Noxious Weed Control" program has been effective in some instances, the continuing spread of troublesome introduced species goes on... and education of the general public about this issue is barely addressed, and woefully underfunded. We might consider some sort of citizen volunteer program, similar to the "trash patrols" that are becoming more ubiquitous (with the signs that advertise the individuals, families or groups doing the work), that will target invasive plant removal along our roads (which are probably the principal vector of the spread of these invaders). One of my favorite methods of recycling plastic grocery bags has been to fill them with herb-Robert, while on a walk. I can tie them shut and toss them, or dump the contents into a larger container and fold the bag up and put it in my pocket for another time. I understand that the bags' days may be numbered as a free item at the check-out station... but I'm planning to get a little more mileage out of mine, while there's still time. Will there be gratuitous public weeding in your future? Sure hope so...



Seeking a layout editor for *Douglasia*

An experienced graphic designer is needed for *Douglasia* beginning in April 2008. The graphic designer works with the managing editor to design and produce *Douglasia* quarterly. A modest honorarium is provided quarterly for this work. The publication varies between 28 and 32 pages and takes approximately 20 hours to produce per quarter for an experienced layout editor. Publication is currently produced using Adobe InDesign and Photoshop CS. Current templates are available. Interested designers please contact Catherine Hovanic at 206-527-3210, 1-888-288-8022, or wnps@wnps.org



Pilot grazing project at the Chief Joseph Wildlife Area

by Mike Marsh, WNPSC Conservation Committee Co-Chair



Kelly Creek from plateau. PHOTO: MIKE MARSH

In June of this year, several members of the Washington Native Plant Society visited lands that have been grazed in Asotin County under the Washington Department of Fish and Wildlife's (WDFW) pilot grazing program. This program began out of the Governor's Working Lands Initiative, which sought to develop a cooperative relationship between private and public landowners that would benefit the natural resources of the state. Each agency was directed to find ways of doing this without jeopardizing the agency's purpose.

One way the WDFW decided to do this was to study a phenomenon brought to their attention by private landowners: wildlife such as deer and elk were not utilizing WDFW lands but instead were utilizing private lands that had been managed to some extent. Only two sites are currently in the pilot grazing program and both of them are part of the Chief Joseph Wildlife Area in Asotin County. One is in the Pintler/Kelly Creek watershed and the other is referred to as the Smoothing Iron allotment, which is part of a 9,000-acre ranch recently acquired by WDFW. Both of these sites had been previously grazed before WDFW acquisition.

As a result of numerous contacts from individuals with the Western Watershed Project and others who are concerned about the effect that these pilot grazing projects would have on the native flora of these state lands, we decided to take a look at the area while we were taking part in this year's Botany Washington in

southeastern Washington. WNPS members who traveled to Asotin County for the purpose of viewing these pilot grazing projects were Mike Marsh, Catherine Hovanic, Bill Brookreson, and Jane Marsh.

Early morning reconnaissance

On the morning of June 25th, we drove up the Meyer's Ridge road on the west side of the Pintler and Kelly Creek watersheds for a view from above. The rim of Meyer's Ridge is at about 800 meters, or 2,600 feet above sea level, while the mouth of Kelly Creek is at 500 meters and the mouth of Pintler Creek where it joins Asotin Creek is at 340 meters. We climbed the fence on special ladder stiles onto a flat plateau. We saw about four kinds of bunch grass, including blue bunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), Sandberg's bluegrass (*Poa secunda*), and possibly bottlebrush squirrel tail (*Elymus elymoides*; *Sitanion hystrix* as per Hitchcock). Only the blue bunch wheatgrass and the Sandberg's bluegrass were flowering. Blooming forbs included threadleaf fleabane (*Erigeron filifolius*), mariposa lily (*Calochortus* sp.), shaggy fleabane (*Erigeron pumilus*), probably salsify (*Tragopogon* sp.), common stork's bill (*Erodium cicutarium*), wooly plantain (*Plantago patagonica*), and the hairy blue vetch (*Vicia*



Calochortus macrocarpus, believed to be var. *maculosus* (Nez Perce Mariposa lily, or green-banded star tulip per Hitchcock), state-endangered species found by Mel Asher on Kelly Creek after our visit. PHOTO: MEL ASHER

villosa) that clothed hillsides east of Walla Walla. Woody species included grey (*Chrysothamnus nauseosus*) and green (*C. viscidiflorus*) rabbitbrush, and prickly pear (*Opuntia polyacantha*). Cheatgrass (*Bromus tectorum*) was dominant on much of the range, and cattle paths ringed the steep slopes, but the bunch grass complex described here was seen even on the tops of some benches.



Plateau and draw topography above Pintler Creek. PHOTO: CATHERINE HOVANIC



Reed canary grass in Kelly Creek. PHOTO: MIKE MARSH

Project overview presented by WDFW

After a high point overview of the areas we planned to visit and after taking some pictures, we returned to Asotin where we were met by representatives of the WDFW who had agreed to show us some of the areas that had been grazed under their pilot grazing program. Joining us for the day were Mel Asher, vegetation monitoring specialist; Bob Dice, the area manager; and Mark Quinn, Lands Division Manager.

Some of the WDFW lands in this county were purchased, with funds provided by the Bonneville Power Administration, as mitigation for construction of the Snake River dams. The Smoothing Iron allotment part of the Schlee Ranch is an example and was acquired recently. The Pintler Creek and Kelly Creek lands, which our group visited, were acquired earlier through the Washington Wildlife and Recreation Grant Program. According to WDFW, this land had been grazed for many years by the private landowners but had not been grazed since its acquisition by WDFW in the early 1990s, until 2006, when the pilot grazing project was begun. A monitoring process called a Habitat Evaluation Protocol was carried out on the Pintler wildlife area in 1992, and since 2006 Mel has been measuring the habitat with some of the methods recommended in the Jornada Monitoring protocols, including photopoints, permanent line point intercept transects (in which species that are touched by pins hanging at one-meter intervals along a 50-meter tape are recorded), and 10- by 30-meter quadrats which are searched to provide species richness data. Mel has found the annual invasive cheatgrass on south-facing slopes, and Japanese brome (*Bromus arvensis*) and North Africa grass (*Ventenata dubia*) on north-facing slopes.

Site observations

We drove down into Kelly Creek and walked upstream about 300 yards to view one of the sites where cattle had gotten into the creek bottom. Reed canary grass (*Phalaris arundinacea*), which had been grazed down to water level while cattle were present, had grown one foot high. The situation was similar to that seen in photos taken by Katie Fyte on the “wildwolves” web site at <http://wildwolves.homeip.net/PintlerImages/index.htm>.

The creek here is in rocky terrain, and presumably would have a gravel/cobble bottom were it not for thick sediment coating the bottom. Kelly Creek presently is non-fish-bearing because it goes underground before reaching Pintler Creek. We drove downstream in the steep draw and stopped to view a one-meter square utilization cage, which was set up to provide a comparison of ungrazed vegetation with the grazed land around it. This cage contained what may have been bluebunch wheatgrass, with bunch grasses cropped short around it. Another utilization cage contained cheatgrass. Mel remarked that Idaho fescue is preferred by cattle over bluebunch wheatgrass. Creekside vegetation included basin wild rye (*Leymus cinereus*), which had also been grazed closely. Creekside shrubs included squaw currant (*Ribes cereum*), mock orange (*Philadelphus lewisii*), alder (*Alnus* sp.), ocean spray (*Holodiscus discolor*), and hawthorn (*Crataegus douglasii*).

The north (south-facing) slope of Kelly Creek is the picture of good bunch grass. Cattle are unable to enter there because of basalt outcrops and steep slope. It provides a stark contrast to the north-facing slopes where cattle graze. An interesting part of the north slope included a ravine with a very light-colored area of grass



Livestock utilization cage. PHOTO: MIKE MARSH

on the southwest face of the ravine. Mel said it is probably Idaho fescue, and a telephoto shot bears this out, while the rest of the slope appears to be bluebunch wheatgrass. Mel suggested that a soils difference might account for the different plant community on this slope. The south (north-facing) slope is not as steep, and its vegetation consists of cheatgrass, probably with the North Africa grass and the Japanese brome mixed in, although I neglected to ask Mel to show me these grasses which she indicated occurred on the grazed slopes.

We did not climb slopes to see how much utilization there had been on uplands, and we did not visit any springs, although I had originally asked to see some. The

visited the area, it was found that cattle were in Pintler Creek. The creek had been declared priority habitat for salmonid fish because juvenile endangered steelhead were found there in 2001. Upon finding this out, the WDFW had the cattle quickly moved into Kelly Creek Canyon and fenced there by electric fence. The cattle spent the rest of their time in Kelly Creek, an area of about 1300 acres.

Cattle could not get into much of the Kelly Creek riparian area because the banks were steep and were armored with hawthorn and other thick woody brush such as mock orange, alder, and cherry. In one area where cattle had access, reed canary grass had been grazed down to nubbins. When we arrived, this grass was a foot tall

again. A lot of cheat grass, helped by late spring moisture, had resprouted after cattle were removed on May 30. Our hosts kept on saying, "See how it comes back," but not "How would it have looked without the grazing pressure?" The local presence of reed canary grass is, of course, a consequence of past grazing and other agricultural activities.

General discussion and possible follow-up

Mel is a good botanist and able to get the rather complex monitoring protocol done in several areas across the state. She actually would welcome capable volunteer help, I think, and thus more would be accomplished. Of course, the state should provide additional funding for more personnel for site management and for monitoring.

The question I ask is, how will a grazing program be successful in other areas if the landowner and the state agency aren't as attentive as they have been during this experimental project? And even though the owner of this land was reportedly careful and conservative, there were still problems: the landowner initially released significantly more cow-calf pairs than he was supposed to, and he did not take enough of them off when he was called on this a few days later.

At day's end, Mark Quinn asked whether we were satisfied, and by implication, whether we would oppose the pilot grazing project. He talked again about the constraints



South-facing slope above Kelly Creek. PHOTO: MIKE MARSH

walk to a spring at the top of Kelly Creek was said to be a half mile, but due to time limitations we chose to turn around so we would have time to get down Kelly Creek to its junction with Pintler Creek.

Recent grazing history under the pilot project

On April 1, 2007, nearly 400 cow-calf pairs were introduced to the Pintler and Kelly Creek areas. The goals of the grazing program are to reduce the dominance of bunch grasses and thereby increase forb diversity for elk.

On April 12, the day that the Western Watershed Project

that he works under, that the political pressure to conform to Cattlemen's Association desires is very strong, and that it has been made plain to him that WDFW will not be able to purchase certain lands if they do not agree to let them be grazed. Rural community support figures prominently in funding proposals for many land acquisitions. He stated that there is pressure to provide more lands for grazing. Most of the current buys that they are making are private land. "If we make an agreement to allow grazing for the current owner's life, the land is the state's (the people's) forever." Mark stated that they will work to maintain all lands on a trend of ecological improvement. In answer to my email questions after our visit, Mark wrote:

"The owner of this particular property did not reserve a grazing right. Sometimes they do and sometimes they don't. In some cases they ask for a life estate (grazing privileges for the rest of their life). Each transaction is different and depending on what the seller reserves, that is factored into the acquisition price. We are in the process of closing a transaction in Okanogan County right now and the seller is reserving grazing privileges as part of his life estate. If we do grant a grazing right that is not part of the legal acquisition, we can do it for a period of five years; this is a more informal method that comes into play if the former landowner requests it. That is different than if the grazing is identified as a legal part of the purchase transaction."

I told him that I totally support his desire to secure land from development and have it on a trend of ecological improvement, but I stated two things about monitoring. First, the initial monitoring should be done before the first grazing takes place, and this should be the most complete and thorough monitoring, to establish initial conditions. Second, monitoring should continue to be done as planned and as frequently as planned, and monitoring procedures should not be changed. I would also add that if a new, better procedure is developed, it should be used and carried out along with the previous monitoring procedure for two or three years so that comparable results are obtained.

I do not believe that cattle grazing is a good thing for native landscapes in very many cases, contrary to what is claimed by livestock interests. In fact, I think that it is detrimental in nearly all cases. I think that each of the trials that have been cited as evidence that cattle grazing is helpful has been a special situation with special objectives other than the restoration of native species diversity. Likewise, I think that the only time we should use cattle grazing as a treatment of wildlife lands would be one of those same special cases where repeated experimental

work has shown that it results in mitigation of a particular type of ecological damage, and not because a particular rancher wants it. We can also ponder the question of whether the Governor's initiative to favor one industry group is the best use of lands purchased for the benefit of all citizens.

In general, cattle grazing, as Mark acknowledges, will set back attainment of better conditions for native habitat temporarily, at least, and with unknown consequences for unknown or rare species, although Mel thought that sites that have experienced heavy grazing for 50 or more years would not likely have many rare species. In any event, I believe that the main aim of a wild lands program should be to protect the "best" or most intact native habitats, and to connect them with others by landscapes which are allowed to recover from past grazing and other abuses, thereby encouraging population growth, migration and genetic interchange among native plants and animals.



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WNPS coordinates Grazing Lands Forum

by Catherine Hovanic



Lupine at the Arid Lands Ecology Reserve. PHOTO: MIKE MARSH

A Grazing Lands Forum was coordinated and sponsored by the Washington Native Plant Society in Yakima on September 26, 2007. The forum was held in conjunction with the Society for Ecological Restoration Northwest and the Society for Wetland Scientists (Pacific Northwest) Annual Conference. Because WNPS sponsored a number of sessions on shrub steppe during this conference, we thought it appropriate and important to also address livestock grazing on public lands by organizing and inviting panelists to a forum on the subject.

The history of permitting grazing on state lands and the science behind this practice was explored, as well as recent state policy with respect to grazing. Panelists discussed the potential impacts and benefits of grazing, and how wildlife and the native flora may be affected. The importance to livestock ranchers of gaining access to these lands also received attention.

Permitting grazing on public lands in Washington has a long history and includes both federal and state-owned lands. We didn't think it was realistic to try and have panelists for all of the federal and state agencies who lease or permit grazing on public lands in Washington. So we invited just Washington State Fish and Wildlife and the Washington State Department of Natural Resources to tell us a little bit more about their programs and policies for grazing state lands under their responsibility. Within the time allotted, we hoped to explore some of the history and scope of leasing and permits and the scientific and other factors that agencies consider in the decision-making process.

We also invited other panelists in the area of range ecology, plant ecology and conservation to discuss the potential impacts and benefits of grazing, and how wildlife and the native flora may be affected. And we were pleased to have Jack Field from the Washington Cattlemen's Association who provided perspectives on the importance of public-lands grazing to Washington cattlemen.

Panelists who participated included Rocky Beach, Wildlife Diversity Division Manager for the Washington Department of Fish and Wildlife; Milt Johnson, Assistant Regional Manager for the Washington Department of Natural Resources; Jack Field, Executive Vice-President for the Washington Cattlemen's Association; George Wooten, Botanist and Conservation Associate with Conservation Northwest; Michael Martin, Conservation Chair for the Yakima Audubon Society; Andy Stepniewski also with the Yakima Audubon Society; and Kevin Guinn, Area Resource Conservationist with USDA-NRCS in Ephrata.

The forum was an opportunity to exchange information about grazing on state lands in Washington. Our goal was to provide a balanced discussion to inform natural resource professionals and the public about these topics. The forum was open to conference participants and the general public. We were particularly pleased by an attendance of well over 100 people and a "standing room only" audience.

Panelists set the tone for a productive evening by preparing excellent presentations and by engaging in thoughtful and forthright interaction with each other and with the audience. Audience interest was high and questions lasted for well over an hour following the presentations. WNPS plans to post a transcript of the forum and the panelist presentations on the WNPS website. You will find them linked under shrub steppe on the WNPS web site at http://www.wnps.org/ecosystems/shrubsteppe_eco/shrubsteppe.htm.

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Plant lists available online

Before you set out on your next hike, check out the "Native Plant Lists" link at the WNPS web site www.wnps.org. Here you'll find plant lists from more than 500 sites throughout the state, compiled by some of the most respected names in Washington botany. Updates will be done once a year and members are invited to contribute their own lists. If you have suggestions about the plants lists or would like to contribute a plant list, please contact Don Knoke at donknoke@yahoo.com.

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STUDY WEEKEND

REPORTS



It was a dark and stormy morning, rain came down in buckets . . . and WNPS Study Weekend searchers for their field trip guides at this year's Study Weekend held July in the North Cascades.



Botanical photography

by Jack Kintner, WNPS Koma Kulshan Chapter

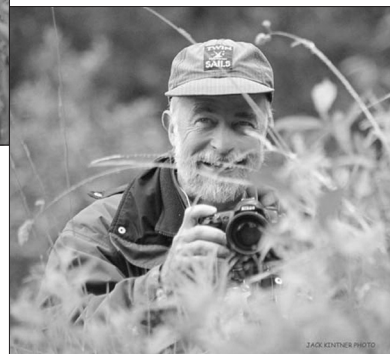
About a dozen of us met Bellingham photographer Mark Turner in the upper parking lot at the Mt. Baker Ski Area on the second day of the gathering for a day of botanical photography. “We had plan A,” he shouted over the wind and stinging rain, “and plan B. This will be plan C!” So instead of wandering around Artist’s Point or Picture Lake, we headed back down to the Hannegan Pass road.

As a professional photographer I learned more on this trip with Turner than on most of the seminars I’ve taken. Here are the top ten reasons this day alone was worth the whole trip:



Mark Turner explains digital photography to Study Weekend student. PHOTO: JACK KINTNER

10. Photography is like birding in that a rank amateur can show you something you’ve never seen or thought of doing. We had people who didn’t know an f-stop from a pixel but who could see like Ansel Adams.
9. It was an entire day without equipment snobs. Yea!
8. The colors were muted but the rain made them much richer and deeper—everything was wet and most plants were covered with what Myron Gauger called “pregnant bubbles.”



Myron Gauger pauses to have his picture taken. PHOTO: JACK KINTNER



Photographer Mark Turner explains how to best photograph botanicals. PHOTO: JACK KINTNER

7. We went so slowly that trees grew rings before we moved more than a mile. People shared discoveries, made helpful suggestions, kept out of each other's way. It felt like everyone wanted everyone else to see everything.
6. And if you wondered just what kind of plant you were looking at (I, a rookie at this kind of thing, did), six people gave a committee report on everything you could possibly want to know about it, like an audio identification guide.
5. With this many plant people around nothing escaped our group's searching eyes and patient feet.
4. Lots of good specimens of everything from clusters of red baneberry (*Actea rubra*) covered in raindrops to bright individuals of scarlet Indian paintbrush (*Castilleja miniata*), red columbine (*Aquilegia formosa*) and even a fairly large *Epilobium latifolium* in a sandy little hollow next to a small loop of the Nooksack.
3. I got home with nothing broken or missing, nor did my batteries fail.
2. Turner's a good teacher, and works with the patience of a beekeeper and the enthusiasm of a good camp counselor.
1. Met lots of new friends.

Goat Mountain, Take One

(led by Lyle Anderson and Allan Richardson)

by Lyle Anderson, WNPS Koma Kulshan Chapter

Amazingly enough, we had a full house (12) in our group—surprising, considering the rain and wind at the sign-up area. However, like our trip, the weather was reportedly fine for all outings at the “lower” elevations. Botanizing began right at the trailhead with several clusters of coral root (*Corallorhiza maculata*), all at fruit stage. Three different violets were seen: pioneer

violet (*Viola glabella*), darkwoods violet (*V. orbiculata*) and marsh violet (*V. palustris*). Pyrolas and Pipsissewas were in abundance with some members debating whether we were seeing pink pyrola or greenish pyrola (*P. asarifolia* or *P. chlorantha*). Everyone was enthralled upon encountering a prime specimen of pinesap (*Monotropa hypopithys*). The group eventually made it out of the forest and up to the lower meadows (about 2 miles and 4! hours later) where we had lunch among a carpet of Veratrum, Sitka valerian (*Valeriana sitchensis*) and bracted lousewort (*Pedicularis bracteosum*), with a couple of *Aster* spp. that kept everyone occupied while munching. We got up to a prominent lookout, where everyone was marveling at the view of Mt. Baker, until Allan wandered over and informed us that we were looking at Mt. Shuksan! On the way down, a *Botrychium multifida* was found hiding under the Valerian and the youngest member of our group showed us a copperbush flower (*Elliotia pyroliflorus*; *Cladothamnus pyroliflorus* in Hitchcock) that I don't believe anyone else in either group had seen.

Goat Mountain, Take Two

(led by Walt Lockwood)

by Catherine Hovanic, WNPS Administrator

We were the Cougar Divide Field Trip who didn't go to Cougar Divide. It all started out at the WNPS Study Weekend Field Trip designated meeting site on Saturday, July 21, 2007. The rain- and wind-swept parking lot filled with over 125 Study Weekend participants dressed in all manner of rain gear looking for their courageous guides. Our group congregated around Walt Lockwood who would guide us in his beloved North Cascades where he has hiked and photographed for many years. Walt described, so compellingly, a number of drawbacks to the



Western mountain ash. PHOTO: CATHERINE HOVANIC



The Goat Mountain team takes a short break but are never far from their floras and hand lenses. PHOTO: ANN WEINMANN

Cougar Divide field trip, so that our group eagerly seized upon an alternative trip to Goat Mountain without asking any probing questions like what is the elevation gain?

Our group numbered ten and since there was already another field trip scheduled for Goat Mountain being led by Lyle Anderson and Allan Richardson, we scurried ahead to separate ourselves on the trail. Up, up, up through evergreens we climbed crossing several small streams with what we believed to be the shiny gray luster of galena.

In the understory, all along the way, we found wild ginger (*Asarum canadense*) galore with nearly all of it in flower. There was an abundance of western bunchberry (*Cornus unalaschensis*), dull Oregon grape (*Mahonia nervosa*), pathfinder (*Adenocaulon bicolor*), and little ericaceous treasures such as pink pyrola (*Pyrola asarifolia*), little prince's pine (*Chimaphila menziesii*), slidebells wintergreen (*Orthillia secunda*), and the saprophytic coral root in fruit (*Corallorhiza trifida*, *C. maculata* and *C. mertensiana*).

Walt, who has become fascinated by lichens, shared with us his knowledge. We learned

about the rag lichens (*Platismatia* spp.), tube lichens (*Hypogymnea* spp.) and the cup forming lichens (*Cladonia* spp.). We also found abundant bright green slabs of *Peltigera* and trees draped with *Usnea*, *Bryoria*, and *Allectoria*. One lichen had the ignominious common name of fairy barf, which didn't seem respectful of the beautiful green sheen it imparted to logs and rocks it covered.



Indian paint brush (*Castilleja parviflora*).

PHOTO: CATHERINE HOVANIC

Up, up, up we climbed past the Mt. Baker Wilderness sign and through slide alder (*Alnus sinuata*). We began to see more Columbia lilies (*Lilium columbianum*), twisted stalk (*Streptopus amplexifolius*), Sylvan goatsbeard (*Aruncus sylvestre*), greenish wintergreen (*Pyrola chlorantha*), sickletop lousewort (*Pedicularis racemosa*) and mountain valerian (*Valeriana sitchensis*) along the trail.

By now, we were beginning to wonder just how long this trail to the meadows was going to be and just how much elevation had been packed into it. Eventually evergreens did give way to deciduous trees, blueberry shrubs and mountain ash. Now, we began to see the bracted lousewort (*Pedicularis bracteosa*), exquisite clumps of Indian paint



Botanists Dixie Llewellyn, Lyle Anderson, and Allan Richardson are assisted by Ann Weinmann in keying out a species of *Pyrola*. Note the absence of Hitchcock and Cronquist and the presence of Pojar and MacKinnon. Times they are a changin'.

PHOTO: FRED WEINMANN

brush (*Castilleja parviflora* var. *albida*) and lupines (*Lupinus* sp.), subalpine meadows with beautiful displays of purple penstemon (*Penstemon serrulatus* and *P. procerus*) and rock faces painted yellow with sedum. We also saw mapleleaf currant (*Ribes howellii*) in bloom.

Trail descriptions describe Goat Mountain Trail as “a steady climb up the side of a mountain,” and “the climb is extremely strenuous, with more than 2,900 feet of elevation gain in just three miles.” Somewhere along the trail it dawned on me why it’s called “Goat Mountain.” Then I find out there are people who do this trail for fun on New Year’s Day and camp out in the snow on New Year’s Eve. They’re heartier and better than me. You can see just such an adventure at <http://www.turnerphotographics.com/outrec/goat/outgoat.htm>.

Bagley Lakes

by Marie Hitchman, WNPS Koma Kulshan Chapter

On Saturday, setting out from the upper parking lot at Heather Meadows, our group met the lichen group on the trail. Fred Rhoades showed us a delightful liverwort (*Marchantia polymorpha*) with umbrella-like sex organs. Nearby was the bright light-green fountain moss (*Philanotus Fontana*).

Our group moved on down the trail. Before crossing the Bagley Lake dam we stopped to admire a wet area lined with marsh violet (*Viola palustris*) and found an elephanthead lousewort (*Pedicularis groenlandica*) in full

bloom. After crossing the dam we found the trail was lined with huckleberries (*Vaccinium* sp.), white rhododendron (*Rhododendron albiflorum*), and false azalea (*Menziesia ferruginea*). Stopping at a lovely rock waterfall, we found a mineral-rich area bursting with plants. We saw five species of fern, including northern holly-fern (*Polystichum lonchitis*) and cascade rock brake (*Cryptogramma crispata*). Also, in this same area, bleeding heart (*Dicentra formosa*), leatherleaf saxifrage (*Leptarrhena pyrolifolia*), pioneer violet (*Viola glabella*), high mountain cinquefoil (*Potentilla flabellifolia*), alpine miterwort, (*Mitella pentandra*), alpine mountain sorrel, (*Oxyria digyna*), and alpine speedwell (*Veronica wormskejdii*) were blooming. Nearby were slide alder (*Alnus sinuata*) and *Ribes laxiflora*. After crossing two snowbanks we were at another rocky area. Arctic sweet coltsfoot (*Petasites frigidus* var. *nivalis*), Eschscholtz’s buttercup (*Ranunculus eschscholtzii*), darkwoods violet (*Viola orbiculata*), green false hellebore (*Veratrum viride*), clubmoss (*Lycopodium* sp.) and two vegetative fronds of the evergreen grape fern (*Botrychium multifidum*) were emerging after the snow melt. Partridgefoot (*Luetkea pectinata*) and rusty saxifrage (*Saxifraga ferruginea*) were in full bloom along the trail. Western pasqueflower (*Anemone occidentalis*) had lost its petals and was forming its plumose seed head.

Snowbanks ahead forced a retreat to the firs to dry out from the wind and rain. After lunch about half of our group ventured forth around Picture Lake to admire the alpine laurel (*Kalmia microphylla*) which bordered the edge in delicate pink with many rose-pink saucer-shaped flowers floating like miniature boats. Some of the white avalanche lily (*Erythronium montanum*) were still in bloom. We found several robust specimens of slender bog orchid (*Platanthera stricta*) along the road and admired the copper bush (*Elliotia pyroliflorus*; *Cladothamnus pyroliflorus* in Hitchcock) before returning to the lodge.

On Sunday, four hearty souls started down the trail again in even heavier rain. We were stopped in our tracks at the lower Bagley dam because over a foot of water was pouring over the bridge and it was unsafe to cross. What a surprise that the lake level had risen so much overnight with all that rain and snow melt.

We retreated to Picture Lake to admire the *Kalmia microphylla* and other plants there. We found sticky tofieldia (*Tofieldia glutinosa*) blooming near the viewing platform. We sorted out the differences between showy sedge (*Carex spectabilis*), Merten’s sedge (*C. mertensii*), and lakeshore sedge (*C. lenticularis*) before heading to the Austin Pass visitor center for lunch. On the drive home I thought what a wonderful, wet and wild weekend it had been.

Heliotrope Ridge

by William Smothers, Olympic Peninsula Chapter

On Saturday, July 21, seven intrepid hikers joined James Duemmel, intent on seeing the Coleman glacier up close. By day's end we had been rewarded with fair weather (really!!), adventurous stream crossings, and compelling botanizing. James thoughtfully shared his personal plant list and patiently added to our knowledge of twisted stalk (*Streptopus lanceolata*), saxifrage (*Saxifraga* spp.), and miterwort (*Mitella* spp.) varieties. He even added spotted coralroot (*Corallorhiza maculata* ssp. *mertensiana*) and pinesap (*Monotropa hypopithys*) to his personal plant list for this climber's route to the summit of Koma Kulshan.



Twisted stalk (*Streptopus lanceolata*). PHOTO: WILLIAM SMOTHERS

Ethnobotany and Nooksack place names

Led by and reported by Allan Richardson, WNPS Koma Kulshan Chapter

Our group kept getting bigger as other trips were cancelled due to the non-stop rain. We began with an indoor talk about places named in the original Nooksack language, such as Kw'elástem7ey ('service berry place'), Xwmólsemelhp ('always tall marsh blueberry bushes'), and Nuxwsá7aq ('always bracken fern roots'), which is now Nooksack in English. I also shared that in the Nooksack language "Kulshan" is Kwelshán ('shooting place') and names the high snow-free slopes of Mt. Baker where they hunted with bow and arrow.

The field trip was relocated to the Horseshoe Bend Trail at low elevation next to the Nooksack River where

it was still wet and also very noisy due to the high water. We walked about half a mile in 2-1/2 hours as we discussed native uses of many plants growing in the lush forest. We talked about the importance of devil's club (*Oplopanax horridum*) for spirit protection and medicine, the preparation and required cooking of red elderberries to turn them in to a good food source, and the strength and multiple practical uses of Pacific yew (*Taxus brevifolia*). Also, we sampled and appreciated the throat-soothing qualities of licorice fern rhizomes (*Polypodium glycyrrhiza*) and the good flavor of swamp gooseberries (*Ribes lacustre*). In the narrower realm of botany we observed large numbers of Indian-pipe (*Monotropa uniflora*) and puzzled over the identification of small ferns that might have been oak fern (*Gymnocarpium dryopteris*) or narrow beech fern (*Thelypteris phlegopteris*). This was a great group to lead—they knew almost all of the plants and had a stream of questions about native uses of the plants.

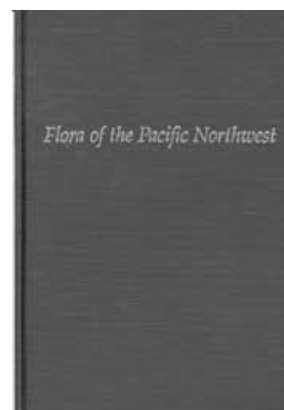
Twin Lakes, Introduction to Hitchcock

by Ellen Kuhlmann, WNPS Koma Kulshan Chapter

Several stalwarts who wished to join the Hitchcock savvy club gathered around a picnic table at the Glacier Forest Service office Saturday morning for an overview and introduction to the inscrutable icon of PNW flora. After an explanation of the organization, quirks, and features of the flora, we worked our way, slowly, through the artificial key to families, then the species key of *Hypericum*, to reach the correct identification of *Hypericum perforatum* (St. John's wort).

After that tough assignment, we drove to Twin Lakes, elevation 5200 feet, marvelling at the nearly vertical, verdantly green slopes, waterfalls, and views (exposed by holes in the clouds) along the way. Snow still surrounded us in patches as we repeated the morning's exercise on *Ranunculus escholtzii* (subalpine buttercup) and *Potentilla flambellifolia* (fan-leaf cinquefoil). The fan-leaf cinquefoil had particularly lovely deep golden flowers. We also found *Castilleja parviflora* v. *albida* (small-flowered paintbrush) just starting to bloom.

We ended the day by botanizing near the Tomyhoi Lakes



Courtesy of University of Washington Press

trailhead, where the workshop attendees either keyed out a plant on their own—one couple successfully keyed *Penstemon serrulatus* (Cascade penstemon) which was a great triumph—or just mellowed out and let all the insider information percolate and jell for future use. Hitchcock is a dish best eaten slowly, and keeps indefinitely for future keying pleasure.

Lower Yellow Aster Butte Trail

by Melinda Bronsdon, WNPS Central Puget Sound Chapter

Our planned destination on Table Mountain was still covered with snow so our group headed west to the lower part of the Yellow Aster Butte Trail for a damp but rich walk to a lovely subalpine meadow. As we approached the trailhead, we spotted common field horsetail (*Equisetum arvense*) and oxeye daisy (*Leucanthemum vulgare*) in the ditches and purple penstemon (*Penstemon* spp.) along the road. The trail began through a mixed forest of firs and hemlock where we discovered patches of bunchberry (*Cornus canadensis*), woodland strawberry (*Fragaria vesca*) and five-leaved bramble (*Rubus pedatus*), deer fern (*Blechnum spicant*), sword fern (*Polystichum munitum*) and lady ferns (*Atthyrium filix-femina*), huckleberry (*Vaccinium* spp.), copperbush (*Cladothamnus pyroliflorus*), queen's cup (*Clintonia uniflora*), rattlesnake plantain (*Goodyera oblongifolia*), Northern twayblade (*Listera caurina*), enchanter's nightshade (*Circaea alpina*), one-sided wintergreen (*Orthilia secunda*), sweet cicely (*Osmorhiza chilensis*) and Western meadowrue (*Thalictrum occidentale*). Co-leader Bob Lemon gave us an enlightening discourse on bark beside huge fallen logs from the winter storms. The trail criss-crossed a rocky exposed slope where we discovered cow-parsnip (*Heracleum lanatum*), tiger (Columbia) lilies (*Lilium columbianum*), paintbrush (*Castilleja* spp.), thistle, arctic lupine (*Lupinus arcticus*), Merten's sedge (*Carex mertensii*), bleeding heart (*Dicentra formosa*), hedge nettle (*Stachys cooleyae*), fireweed (*Epilobium angustifolium*), red columbine (*Aquilegia formosa*), mountain buttercup (*Ranunculus eschscholtzii*), yarrow (*Achillea millefolium*), orange hawkweed (*Hieracium aurantiacum*), avens (*Geum* spp.), Sitka mountain-ash (*Sorbus sitchensis*), two species of Spirea (*douglasii* and *densiflora*), and Sitka valerian (*Valeriana sitchensis*). The usual salmonberry (*Rubus spectabilis*) and thimbleberry (*Rubus parviflorus*) were not overlooked for their berries.

The highlight of our upward trek was the discovery of a bed of white rein orchids (*Platanthera dilatata*) with their wonderful fragrance. We also found a few green slender

rein orchids (*Platanthera stricta*) nearby. Moving back into the semi-forest, we passed Oregon boxwood (*Pachistima myrsinites*), stink currant (*Ribes bracteosum*), fairybells (*Disporum* spp.), rosy twisted stalk (*Streptopus roseus*), false Solomon's seal (*Smilacena racemosa*) and starry false Solomon's seal (*Smilacena stellata*). The tri-leaf remains of huge trilliums along with devil's club (*Oplopanax horridus*) were observed and we noted six saxifrages: foamflower (*Tiarella trifoliata*), youth-on-age (*Tolmiea menziesii*), fringe-cup (*Tellima grandiflora*), Alaska (*Saxifraga ferruginea*), Merten's (*S. mertensiana*) and leatherleaf saxifrage (*Leptarrhena pyrolifolia*).

We arrived at the meadows for lunch beneath a clump of giant firs. The rain had stopped somewhere along the way and we enjoyed a cool but dry afternoon. After lunch, we wandered in the meadows, enjoying the views of peaks around us and the new flora at our feet. The lovely alpine marsh-marigold (*Caltha leptosepala*) and tiny partridge foot (*Luetkea pectinata*) dominated the rivulets across the meadow and the pink and white heathers were blooming all around. Occasionally we spotted a harebell (*Campanula rotundifolia*). False hellebore (corn lily) (*Veratrum viride*) was just poking upward through the still-matted surface among tiny matchstick lichen with its red tips.

In all we found more than 70 species and enjoyed making new friends in our group. Our trip leaders, Annie Prevost and Bob Lemon, did a superb job of preparing a plant list and preview of the trip. We returned to the lodge before the deluge began again and a great day was had by all.

✍



Dr. Rich Fonda describes plant community patterns along the Excelsior Ridge Trail. PHOTO: ANALIESE BURNS

Synthyris lanuginosa: The origin of an Olympic Mountains endemic

by K. Marlowe, WNPS Member At-Large

The *Synthyris* (cut-leaf kittentail; Plantaginaceae) endemic to the Olympic Mountains has been known by different names including *S. pinnatifida* var. *lanuginosa* (Piper) Cronquist (Hitchcock et al. 1959), *S. dissecta* var. *lanuginosa* (Piper) Schaack (Schaack 1983), and *S. lanuginosa* (Piper) Pennell & Thompson (Pennell 1933). Hufford and McMahon's 2004 phylogenetic study showed the Olympic Mountain *Synthyris* to be more closely related to *S. dissecta* and *S. canbyi* than to *S. pinnatifida*. Because the Olympic Mountain populations were less closely related to *S. dissecta* than was *S. canbyi* and more genetically differentiated, they followed the Pennell & Thompson treatment of the northwestern Washington populations as the species *S. lanuginosa*. *Synthyris dissecta*, *S. canbyi*, and *S. lanuginosa* compose the dissected leaf lineage (section *Dissecta*). *Synthyris canbyi* is restricted to the Mission, Swan, and Jocko mountains of western Montana. *Synthyris dissecta* is the most widespread species of the section, consisting of populations in southwestern Montana and adjacent Idaho. With its densely tomentose (woolly) shoots, *S. lanuginosa* is distinct from the Northern Rocky Mountain species. Both *S. canbyi* and *S. lanuginosa* are conservation concerns because of their small population sizes and potentially declining number of individuals. This alpine/

timberline lineage consists of rhizomatous, herbaceous perennials that have capsular fruits and small discoid seeds that are not specialized for long-distance dispersal by wind or animals. Through short-distance seed dispersal and elongation of their rhizomes, however, they are able to migrate short distances over time. Because these plants are currently stranded on high-elevation peaks and have limited migration opportunities, we might wonder what processes led to the current ~750km disjunction between *S. lanuginosa* and its closest relatives. One aspect of my dissertation research focused on the origin of the Northern Rocky Mountains-Olympic Mountains disjunction in section *Dissecta* as well as inferring modes of speciation in the lineage.

In order to address the issues above I used phylogeographic methods that identify significant associations between geographic distribution and genetic diversity. I collected leaf material from populations across the distributional range of the species of section *Dissecta*, including four populations of *S. lanuginosa* (located at Obstruction Point, Eagle Point, Dinosaur Back Ridge, and Marmot Pass), ten populations of *S. dissecta*, and two populations of *S. canbyi*. I extracted DNA from twelve individuals from each of the sixteen populations (except for populations where fewer than twelve individuals were found) for a total of 302 individuals. For each individual I determined the DNA sequence of the *trnT-trnL* and *psbA-trnH* intergenic spacers, two chloroplast gene regions that have been found to be informative in several evolutionary studies. I identified 22 unique DNA sequences (haplotypes) for the individuals sampled. Three haplotypes (A, B, and M in Figure 1) were recovered from the four populations of *S. lanuginosa* and were exclusive to

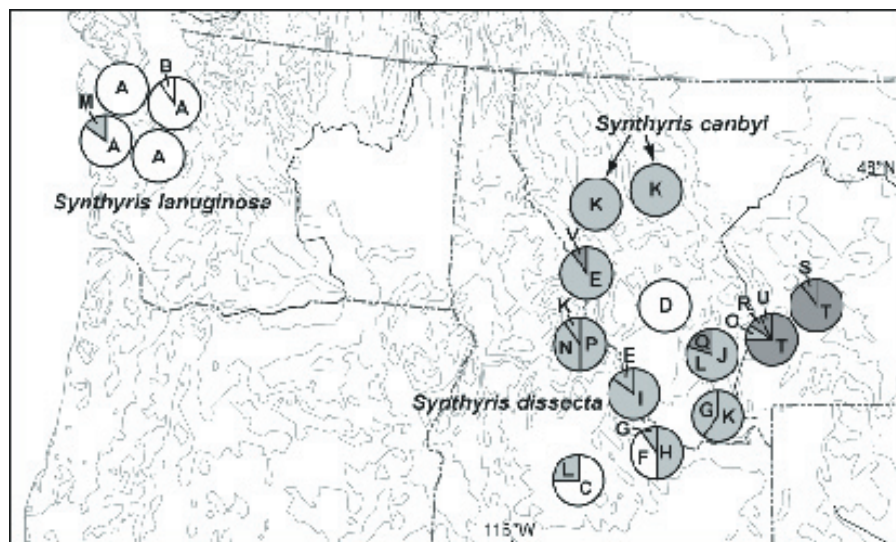


Figure 1. Geographic distribution of 22 plastid haplotypes recovered in *Synthyris* section *Dissecta*. The sectors of the pie approximate the frequency of a particular haplotype. Pie shading schemes (dark, medium, or no shading) indicate haplotypes that share recent common ancestors.

this species. Haplotype A, the most common *S. lanuginosa* haplotype, was shared by 45 out of 48 individuals among the four *S. lanuginosa* populations. Low haplotype diversity such as this is characteristic of small populations experiencing a genetic bottleneck. That is, because of its low number of individuals in isolated populations, *S. lanuginosa* may have experienced a reduction in population numbers to a level insufficient to maintain the diversity in the population. The less abundant haplotypes B and M may have arisen via relatively recent mutations.

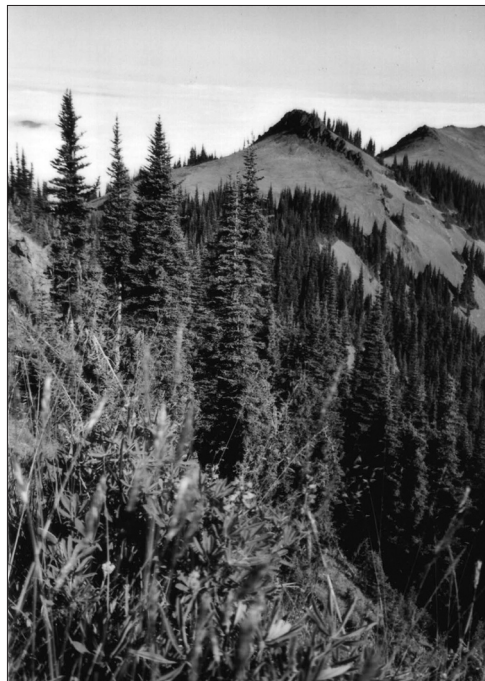
To infer evolutionary relationships among the haplotypes, I constructed a genealogy, or phylogenetic tree, based on shared-derived mutations. The phylogenetic results find broad sharing of haplotypes among species, which is consistent with having a widespread, panmictic ancestor preceding isolation and speciation in section *Dissecta*. My analyses of molecular variance, which determine how genetic variation is partitioned, were also consistent with the hypothesis of a widespread ancestor, finding much greater variation among populations than among species.

To identify possible evolutionary processes that led to speciation within the group, I constructed a haplotype network and performed a nested clade analysis (NCA; Templeton et al. 1995) for the three species. NCA is used to test for an association between geography and haplotype distribution, and these patterns can be associated with possible evolutionary processes. The initial speciation event in the clade giving rise to *S. lanuginosa*

in the Olympic Mountains and its sister clade in the Northern Rocky Mountains was inferred from the NCA to result from allopatric fragmentation. In other words, geographic isolation separated populations of the two regions in a manner that prevented gene flow. Allopatric fragmentation has been inferred to explain disjunctions between the Rocky Mountains and the Olympic/Cascade ranges in several organisms including plants (Brunsfield and Sullivan 2006; Buckingham et al. 1995), lichens (Glew 1994), and animals (Demboski and Cook 2001; Good and Sullivan 2001; Wilke and Duncan 2004; Carstens et al. 2005). A couple of different hypotheses have been proposed by several authors to explain this distribution. One possibility is that the disjunction was associated with drying of the Columbia Plateau coincident with the uplift of the Cascade Range, followed by loss of intervening populations. A second possibility, and one that might be more plausible for these alpine plants, is that ancestral populations were once continuous across higher elevations in Canada, but glaciation at the beginning of the Pleistocene eradicated these higher-latitude populations, causing the disjunction. Several studies find evidence of high-elevation areas that remained ice-free (“nunataks”) during glaciations both in the Olympic Mountains and Northern Rocky Mountains where populations in the disjunct regions could have survived glaciations. My research revealed unique haplotypes and low haplotypic diversity in *S. lanuginosa* populations that are consistent with persistence in nunatak refugia in the Olympic Mountains.

Interestingly some Idaho populations of *S. dissecta* such as those I collected from the White Cloud Range have tomentose shoots very similar to shoots of *S. lanuginosa*. Individuals from other populations of *S. dissecta* and those of *S. canbyi* I sampled have shoots ranging from glabrous to villous. This raises the possibility that some populations of *S. dissecta* in Idaho might be the closest relatives of the disjunct populations in the Olympic Mountains. Haplotype C (Figure 1) from the tomentose *S. dissecta* individuals is one mutational step away from *S. lanuginosa* haplotype A, which is a signal indicating the tomentose *S. dissecta* variants may represent relict intermediates between *S. lanuginosa* and *S. dissecta*. The story is unclear, however, because *Synthyris lanuginosa* haplotype M (Figure 1) is one mutational step away from *S. dissecta* haplotypes K and N found in more northern populations composed of glabrous individuals. Studies of leaf vestiture would be beneficial to understand the variation found among populations of *S. dissecta* and whether any extant populations have relictual genetic signatures of the

Populations of *Synthyris lanuginosa* are found at treeline in some areas of northeastern Olympic National Park such as this ridge north of Blue Mountain.
PHOTO: K. MARLOWE





Synthyris lanuginosa. PHOTO: RICHARD RAMSDEN

initial divergence of the Olympic and Northern Rocky Mountain lineages.

This research has provided us with a snapshot of the genetic diversity in contemporary *S. lanuginosa* populations, and given us some ideas as to how these species may have attained their present distribution. Lastly, we have demonstrated that Pleistocene glaciations probably played an important role in species origins and in shaping present distributions in section *Dissecta*.

Acknowledgements

We thank Eric Roalson, Michael Webster, Craig Steele, Matthew King for their helpful discussions, technical assistance, and support; Peter Stickney, Ed Schreiner (National Park Service), U.S. Forest Service, and The Confederated Salish and Kootenai Tribes of the Flathead Nation for locality information and issue of collecting permits; and Alan Thomson for assistance with field collections. This project was supported by awards from NSF (DEB0608026), Washington Native Plant Society, American Society of Plant Taxonomists, Northwest Scientific Association, and the Rexford Daubenmire Grant for Graduate Education and Betty W. Higinbotham Trust from Washington State University.

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This research was supported in part by a grant from the Washington Native Plant Society.

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2007 WNPS Annual Backpack Report

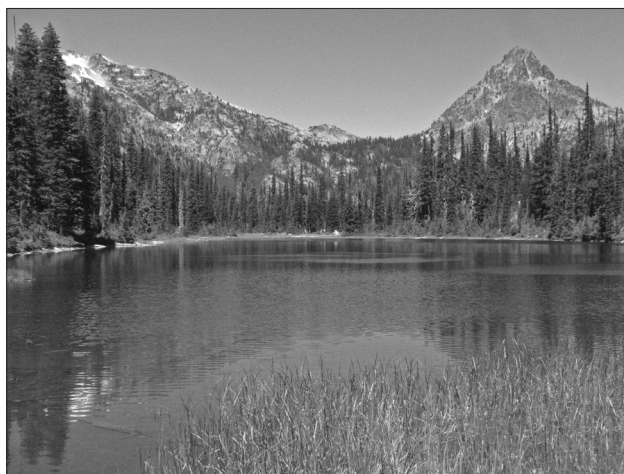
by Don Knoke, WNPS Central Washington Chapter

Nine hikers assembled on the warm morning of July 29th at the end of the Cle Elum River Road, ready to search for flowers in bloom along the trail to Squitch Lake. First-timers Lyle Anderson and James Coleman joined the regulars, Julia Bent, Jim Riley, Bob Tokach, Mike Wright, Alex Wright, Stu Knoke and Don Knoke. The hikers made note of the many flowers blooming around the trailhead, and slowly started to climb, trying to identify every plant along the trail. Pink wintergreen (*Pyrola asarifolia*) was blooming at several locations along the trail, and several ferns more common west of the Cascades, such as oak fern (*Gymnocarpium dryopteris*), lady fern (*Athyrium filix-femina*) and deer fern (*Blechnum spicant*) were observed. The sharp eyes in the group spotted two species of twayblade, *Listera caurina* and *L. cordata*.

Since the trail didn't go to Squitch Lake and the trail from there to the two Deer Lakes is abandoned and unmarked, the hikers kept a sharp lookout for the old trail, and managed to find it and Squitch Lake as well. They were greeted at the lake by swarms of mosquitoes, but also found ladies-tresses (*Spiranthes romanoffiana*) and alpine laurel (*Kalmia microphylla*) blooming in the wet meadow by the lake, and buckbean (*Menyanthes trifoliata*) and yellow pond lily (*Nuphar polysepala*) blooming in the water. The many graminoides in the area remained unidentified.



(Left to right, standing) Jim Riley, Stu Knoke, James Coleman, Alex Wright, Don Knoke, Mike Wright, Bob Tokach, and (kneeling) Lyle Anderson and Julia Bent, with four-legged companions Missy, Tiger and Quila. PHOTO: JIM RILEY



One of the two Deer Lakes; the lakes are separated by a strip of timber. PHOTO: JIM RILEY

The old trail to the top of the ridge did not meet the grade requirements of newer trails, but it seemed gentle when compared with the trail going down the other side of the ridge. A fifth species of lousewort (*Pedicularis ornithorhynchus*) was found by a little pond near the top of the ridge, as were two species of heather (*Cassiope mertensiana* and *C. stellariana*). The large damp meadow at the foot of the hill was well populated by Sitka burnet (*Sanguisorba sitchensis*) and sprinkled with bright blue monkshood (*Aconitum columbianum*) and bright red common paintbrush (*Castilleja miniata*). The trail across Spinola Creek was made for horses, and the hikers devised various methods for negotiating the knee-deep water.

Deer Lakes provided ample camping opportunities—a choice of dry meadow or level, clear area under trees—and a handy water source: the stream coming from Lake Vicente. It also provided mosquitoes. Since the hikers arrived at the camping spot about noon, there was time to explore the Pacific Crest Trail south after lunch, where it was carved out of a steep slope of solid rock. This habitat provides some new species, such as Columbia lewisia (*Lewisia columbiana*), large-flowered thoroughwort (*Brickellia grandiflora*), cliff penstemon (*Penstemon rupicola*) and Leiberg's fleabane (*Erigeron leibergii*).



Lake Vicente. PHOTO: JIM RILEY

The next morning the hikers packed a lunch and headed for Lake Vicente. The wet meadow below the lake was populated by two species of monkey flower (*Mimulus lewisii*, *M. tilingii*), two species of

>

Starflower Foundation presents WNPS with extraordinary gift

by Catherine Hovanic

You definitely have a reason to check out the Washington Native Plant Society's web site now where you will find some fabulous new content for those interested in gardening with native plants, for those working with school-aged children and for those interested in habitat restoration using native plants.

For over a decade, Starflower Foundation partnered with community and school groups, city agencies, volunteer organizations, local businesses and landscape designers to create Pacific Northwest native plant communities. The foundation supported 18 urban habitat-restoration projects, worked with schools developing native plant curricula for teachers, and kept a database of information on some 200 native plants including over 1,000 photos.

Starflower Foundation will cease operations in December 2007 and it is their wish that their work and what they have learned be shared with others. Over the past six months they have contracted with web professionals to develop content for the Washington Native Plant Society's web site. They have worked closely with our webmaster, Michelle Margroff, to ensure a smooth transition.

Soon, you will be able to look up over 200 native plant species in an Image Herbarium. There you will find great photographs with identification aspects featured and be able to learn about their morphological characteristics,

when they flower, what their fruits look like, their ecology, habitat preferences, and wildlife and ethnobotanical values.

But that's not all. There will also be web content on Quick and Easy Habitat Education Activities. Here, teachers and others will have access to a plethora of outdoor education activities for teaching children about the ecology of native plants and wildlife of the Pacific Northwest. Grade-level appropriate lessons are arranged in sequential learning units. Activity sheets, identification cards, and native plant-of-the-month posters are all available to download and use in the classroom or with children at home.

Finally, documentation of restoration projects designed and implemented by the Starflower Foundation over a period of ten years will be available as Adobe PDF on the WNPS web site. You can learn about some major projects in Seattle parks from start to finish including projects at Colman Park, Frink Park, Genesee Park, Greg Davis Park, Seward Park, Madrona Park/Madrona Ravine, Warren G. Magnuson Park, Pritchard Island Beach Park, and Roxhill Park.

Links to the Image Herbarium, the Quick and Easy Habitat Education Activities, and Native Plant Habitat Restoration Documentation will be featured on the WNPS home page at www.wnps.org.

This is an extraordinary gift to the Washington Native Plant Society, but more importantly it is an extraordinary gift of educational materials to the public. We have the Starflower Foundation, and its founder Ann Lennartz, to thank.



Annual Backpack continued from previous page

saxifrage (*Saxifraga arguta* and *S. ferruginia*) and a sprinkling of other colorful flowers. Bitter fleabane (*Erigeron acris*) was found growing in the rock-face below the lake that passed for a trail. A little seep above the lake was covered with common butterwort (*Pinguicula vulgaris*) in bloom and the leaves of sweet coltsfoot (*Petasites frigida*).

Some of the best flowers were found in the rock fields at the head of the lake, not far from the snow banks which were ten feet deep in places. Scattered among the rocks were alpine spring beauty (*Claytonia megarhiza*), mountain sorrel (*Oxyria digyna*), modest buttercup (*Ranunculus*

verecundus) and Sitka mistmaiden (*Romanzoffia sitchensis*). The prize find was Drummond's anemone (*Anemone drummondii*), with several large flowers open.

The last morning the hikers found clear, blue skies, a layer of fog on the lake . . . and frost on the meadow. The tents were packed a little damp, and the hikers took the flat Pacific Crest Trail to the top of the ridge, with a cooling breeze making the climb less painful. Since this was new territory, a few new species were found, including tiger lily (*Lilium columbianum*) in bloom. Two hundred fifty vascular plant species were identified during this trip.



How important is insect herbivory to plant rarity?

by Julie K. Combs

Plant rarity can be caused by a number of factors. Determinants of plant rarity can be broadly categorized as historical (e.g., taxon age), genetic (e.g., inbreeding depression), environmental (e.g., climate or edaphic conditions), ecological/biological (e.g., species interactions or individual life-history traits), and human-driven (e.g., habitat destruction or modification). The pathways to rarity are usually complex and interactive so when biologists search for reasons why some species are limited while others are widespread, it is important to keep in mind that rarity factors often fall along a continuum, some factors being more important than others. For example, for some species habitat loss may be the primary explanation of rarity compared to a secondary factor of competition with a nonnative species. While the causal factors of rarity may be apparent for some plant species, for others the reasons are far less clear.

Perhaps one of the most straightforward explanations for the delimitation of plant abundance and distribution are edaphic endemics—plants restricted to a certain soil type. Edaphic endemics evolve on unusual soils and as a consequence are physiologically united with these areas. Serpentine endemics are one example. Serpentine soil is characterized by high magnesium and low calcium content and can lack essential macronutrients such as nitrogen and phosphorus. While there are numerous examples of edaphic serpentine endemics in California,

Washington State harbors just a few, such as the state-listed rare species Thompson's pincushion (*Chaenactis thompsonii*). The populations of this species are mainly known from serpentine patches in the mountains of central and northwestern Washington. The American botanist and geneticist George Ledyard Stebbins called these areas ecological "traps" or "islands." Environmental factors such as these are solid explanations for why some species are rare, but what about plants that are not tightly aligned with a specific soil type?

In my dissertation work at the University of Washington I am examining the relative role insect herbivory may play in limiting the persistence of rare plant species. This question arose from foundational work I conducted as a master's student. In my master's work, I found that insect damage was far more severe in the rare species, *Astragalus sinuatus* (Family: Fabaceae), versus the two more common *Astragalus* species (*Astragalus purshii* and *Astragalus leibergii*) that co-occur at the same site. These observational results led me to hypothesize that insect herbivory may be one reason why *Astragalus sinuatus* is so narrowly distributed and also supports a general but rarely tested theory put forth by other scientists that suggests insect herbivory as a potential determinant of plant rarity. However, while some cite insect herbivory as a potential cause of plant rarity, others suggest that rare plants may go unnoticed by insects and are therefore safe from insect herbivores. Currently, there is little empirical evidence to support either theory and therefore scientists cannot make formal predictions about the degree to which insect herbivores regulate rare plant populations. A primary objective of my research is to provide evidence that will either support the theory that rare plants go unnoticed by insect herbivores



Rare-common pair in Chelan County, Washington. The more common *Astragalus leibergii* is to the left and the rare *Astragalus sinuatus* is shown to the right. *Pseudoroegneria spicata* (formally known as *Agropyron spicatum*) or bluebunch wheatgrass can be seen in the background of both photos. PHOTO: JULIE COMBS

or are more susceptible to insect predation.

I am studying five rare-common pairs in genus *Astragalus* L. to better understand how insect seed predators may contribute to patterns of rarity. Two key points in my research design are that rare-common pairs are in the same genus and they co-occur at the same site. Studying rare-common pairs that are closely related and share a local environment allows me to control herbivory factors related to habitat and phylogenetic differences. In other words, by studying related rare-common pairs in a locally shared environment I can eliminate differences in insect damage that may otherwise be attributed to habitat and phylogenetic differences.

There are many types and definitions of rarity; in this study my comparisons are based on rarity defined by distributional differences. For example, the global distribution of *A. speirocarpus* occurs in five Washington counties while its comparative common counterpart, *A. filipes*, occurs from British Columbia to Baja, California. Similarly, the rare *A. sinuatus* is a local endemic restricted to a 10-square-kilometer area in Chelan County compared to the more widespread *A. leibergii* distributed throughout six Washington counties.

The rare-common species contrasts are located east of the Cascades in Washington and Oregon in five locations. The rare-common contrasts are:



The left side of this photo shows beetle larvae inside the pod—many seeds are damaged but two seeds are left uneaten. The right side shows moth larvae that consumed all the seeds within the pod. Both examples of herbivory are from the rare species, *Astragalus sinuatus*. PHOTO: JULIE COMBS

herbivores are specialist seed-eating bruchid beetle larvae (Order: Coleoptera), seed-eating wasp larvae (Order: Hymenoptera), seed-eating fly larva (Order: Diptera), moth larvae (Order: Lepidoptera) and adult stink bugs (Order: Hemiptera). Identifying the type of insect consuming the seeds is a critical step in understanding why seeds inside some pods are totally consumed while other pods contain a portion of uneaten seeds alongside damaged seeds. For example, specialist beetle larvae typically consume one to several seeds within one pod leaving some undamaged; in contrast, Lepidoptera larvae are more voracious, typically consuming all seeds within one pod.

Rare species	Common species
<i>Astragalus sinuatus</i> Piper (Whited's milkvetch)	<i>Astragalus leibergii</i> Jones (Leiberg's milkvetch)
<i>Astragalus columbianus</i> Barneby (Columbian milkvetch)	<i>Astragalus purshii</i> Dougl. (Woolly-pod milkvetch)
<i>Astragalus columbianus</i> Barneby (Columbian milkvetch)	<i>Astragalus succumbens</i> Dougl. (Crouching milkvetch)
<i>Astragalus howellii</i> Gray (Howell's milkvetch)	<i>Astragalus conjunctus</i> Wats. (Stiff milkvetch)
<i>Astragalus speirocarpus</i> Gray (Spiral-pod milkvetch)	<i>Astragalus filipes</i> Torr. (Basalt milkvetch)

One method I am using to assess the impact of insect herbivory is to look at the damage insects have on seeds. In many cases, seeds are the primary means by which plant populations persist overtime. In my master's work, I found that insect herbivores consume approximately 80% of seeds produced by *Astragalus sinuatus*, which likely influences the long-term population dynamics of this rare species. In the lab, I quantify the number of seeds eaten per rare-common pair and determine what type of insect is responsible.

My preliminary results show that the primary insect

Results from my first field season suggest that rare plants are not more susceptible to insect damage compared to their geographically widespread, related counterparts. However, in four out of five sites one *Astragalus* species was damaged more severely by insect herbivores compared to its co-occurring pair. These results suggest that insects do prefer one species over the other, but why? This is the question that will keep me occupied for the next two seasons. Reasons for differences in the level of insect damage may include species morphology or genetic or chemical disparities. One common reason for differences

Julie
Combs
manually
removes
insect
herbivores
from
*Astragalus
sinuatus*
with an
aspirator.
PHOTO: JULIE
COMBS



in insect damage between plants is the difference in plant phenology; however, the rare-common *Astragalus* pairs in this study share a similar blooming and development period so this explanation does not seem plausible at this time. Since patterns of herbivory are often complex and interrelated, my research approach will address additional contributing factors such as plant morphology (e.g., pod thickness), chemical content (e.g., alkaloid profiles) and genetic analysis (e.g., plant phylogeny). My objective is to develop a comprehensive narrative about the mechanistic factors influencing the degree of insect damage in rare-common plant pairs, and in a broader sense to address the questions of why insects would choose one related host plant species over another. My overall goal is to add to the academic discussion of plant rarity, but more urgently I hope my research can assist land managers in the development of conservation management plans aimed at preserving rare species.

Acknowledgement

I would like to thank the Washington Native Plant Society for supporting my doctoral research and most especially Pam Camp and David Wilderman, two extremely knowledgeable and dedicated public land managers working to restore and preserve rare plant species in Washington State.

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This research was supported in part by a grant from the Washington Native Plant Society.

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If you're one of those people who enjoy looking at gorgeous plants, we've got the perfect way to indulge your fancy. The 2008 WNPS Photo Calendar has some great photos to show off Washington's botanical beauty. The cover photo features Richard Ramsden's striking photo of smooth douglasia (*Douglasia laevigata*) with its rich rose-pink petals, and includes floral close-ups and inspiring landscapes by this year's winning photographers: Kathryn Beck, Rod Gilbert, David Hagen, Richard Ramsden, and Alan Yen. Each photo is accompanied by descriptive text and the combination is sure to please and inspire you each month.

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Mark Turner and Ellen Kuhlmann served as photo judges for photo selection and guided the project to print. Graphic design was done by Kim Galimanis, 4 Point Design.



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The Washington Native Plant Society is looking for your great photos of Washington wildflowers and native plant landscapes. We know our membership has great photographic talent so we encourage you to send in up to five of your best photos.

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The photo contest is open to all WNPS members. Both amateur and professional photographers may enter.

Photo contest deadline is January 19, 2008.

More details and contest rules can be found on our web site at www.wnps.org under What's New.



Garlic mustard (*Alliaria petiolata*)

by Alison Halpern, Washington State Noxious Weed Control Board

First off, I would like to thank all of the WNPS members who have provided distribution information for the noxious weeds featured in *Douglasia* this year. Your help in locating new sites has been invaluable to us. That said, I would not be disappointed if I hear of no new sightings of this issue's featured noxious weed—not because I don't appreciate your efforts, but because I really and truly hope that there aren't any undocumented populations lurking out there.

Garlic mustard, *Alliaria petiolata*, is an extremely invasive herbaceous plant of the forest understory, where it can completely dominate the forest floor, outcompeting native species and replacing the diverse assemblage with a complete monoculture. It is a serious problem of the East Coast and the Midwest, and if you hail from back East like I do, you've probably seen how this herbaceous biennial can completely transform the forest floor. Fortunately, garlic mustard is not as prominent here in the West. Until very recently, it was believed that this Class A Noxious Weed was only limited to some urban parks in the Seattle area and also a few sites in Clark County. However, with this noxious weed already invading areas in both northwest Oregon and in British Columbia, new infestation sites in Washington seemed inevitable. Recently, Skamania County Coordinator Sarah Prince discovered a few small patches growing in her county and



PHOTO: KING COUNTY NOXIOUS WEED CONTROL BOARD ARCHIVES



PHOTO: KING COUNTY NOXIOUS WEED CONTROL BOARD ARCHIVES

has already begun both eradication and education efforts.

Garlic mustard, a member of the Brassicaceae family, is a biennial that forms a basal rosette the first year, and the mature plant attains a height of 2.5 – 3 feet the second year. Garlic mustard is typically hairless, although some simple hairs may be present. Basal leaves are reniform and caudal leaves are more deltoid in shape; both forms of leaves are between 3-6 cm in width and length and are coarsely toothed. Flowers are 4-merous and occur in racemes; petals are white and about 5-6 mm long. Fruits are cylindrical or quadrangular, and the seeds contained therein are small, black, 3 mm long, and arranged in a single row. While garlic mustard's leaves may resemble those of some native species with which it is often associated such as *Viola* and *Saxifraga* spp., the strong, pungent aroma of garlic is unmistakable when its leaves are crushed.

This herbaceous noxious weed typically occurs in moist, shaded areas, such as forest understories, clearings, edges, and along trails. It is also found along streambanks and roadsides. While garlic mustard is more than capable of outcompeting native flora of forest communities, it also thrives and spreads rapidly in disturbed areas. If you think you have seen this Class A noxious weed, please contact your county noxious weed control board or you can email us directly at noxiousweedws@agr.wa.gov or give us a call at 360-902-2082.



Invasive species update

The following is excerpted from "Invasive News in a Nutshell #17" by Joan Cabreza, Regional Invasive Species Coordinator, EPA, submitted to *Douglasia* by Jane Wentworth.

Washington Invasive Species Council

The new Washington State Invasive Species Council sent a questionnaire to a variety of state and regional groups to begin to piece together a more complete picture of invasive species activity in Washington, and work has begun on a state strategic plan. Meeting minutes, council member profiles, and other information are available on the new web site at www.rco.wa.gov/invasive_species/default.htm.

New web site

Canada is now online with Habitattitude and the Pet Industry Joint Advisory Council USA. This new web site was funded by Environment Canada's Invasive Aquatic Species Partnership Program, and the Canadian Council of Fisheries and Aquaculture Ministers' Aquatic Invasive Species Task Group. The purpose of the site is to educate and inform the pet and water garden community in Canada about the dangers of releasing exotic plant and animal species. Visit the site at www.habitattitude.ca.

Interesting article

An article in *Conservation Magazine* (April-June 2007, Vol. 8, No. 2), "Do Biological Invasions Decrease Biodiversity?", is in the form of a round-table with James H. Brown, Dov F. Sax, Daniel Simberloff, and Mark Sagoff discussing some commonly held assumptions about invasive species. Check out the article at www.conbio.org/CIP/article82ali.cfm.

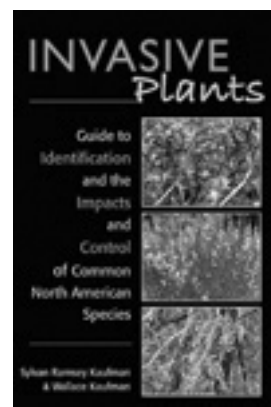
Sign up for WNPS list serve

Want to get involved with discussions about native plants and related issues with other WNPS members? The WNPS list serve offers announcements, news, and discussion relevant to native plants and the WNPS membership.

How to sign up: Email wnps@wnps.org and ask Catherine Hovanic to be added to the list. You must be a current WNPS member. Catherine will forward your request to our list provider who will add you to the list and email you with instructions for posting and unsubscribing.

New invasive plant books

Invasive Plants: A Guide to Identification, Impacts, and Control of Common North American Species by Sylvan and Wallace Kaufman is available through Stackpole Books. Most of the book functions as a field guide to the most common plant invaders across North America. Each entry has a short description of the plant, identifying characteristics, photos, habitat and range information, and a summary of impacts and management.



Weeds of California and Other Western States by Joe DiTomaso and Evelyn Healy is a big two-volume set, with an accompanying CD of all of the photos. It includes photos of all plant life stages, tables and detailed technical descriptions, and compares closely-related and often-confused species, and is a very comprehensive work on Western weeds. Order it at www.calweeds.com/shop/agora.cgi.

SA

Information for contributors

Members and others are invited to submit material for publication in *Douglasia*. Articles, book reviews, poetry, photography or illustrations are welcome. All materials submitted should relate to the study of Washington's native plants. Acceptance will be based on space and appropriateness, and materials are subject to copyediting (substantive editing with author's permission). Contributors are reminded that the *Douglasia* audience ranges from professional botanist to the interested enthusiast. For more information about how to contribute, see http://www.wnps.org/douglasia/douglasia_contributors.html.

Email submissions to: gatrellk@msn.com

Deadlines for submission

Deadline	Issue	Members receive approximately
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March 1	Spring	May 1
June 1	Summer	August 1
September 1	Fall	November 1

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