Tours 215 & 216 - Bonhoeffer Botanical Gardens

(Do we see evidence of a massive collapse in NW native plant species in the past and future 20 years?)

Written for discussion during WNPS Study Weekend Tours: 215 & 216 – Sunday, May 19, 2019
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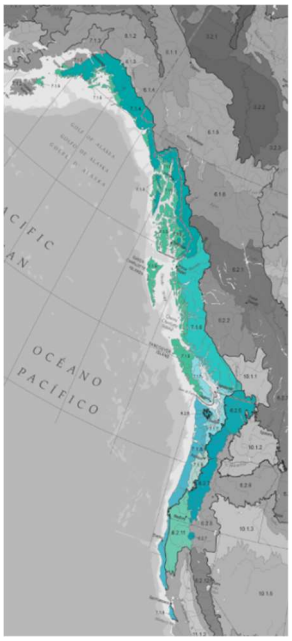

Building Bonhoeffer Gardens (Stanwood) was an attempt to create an outdoor laboratory where students could circumvent a parklike zoo of plants, pausing for 4minutes at 16 teaching stops. It was intended to introduce NW's native plants to students of all ages and it was conceived to address a teaching failure: as a secondary high school teacher, this writer would collect flowers, leaves and branches on a Sunday – lay them out on gymnasium seats that afternoon – and Monday students would file past: seeing/ reading/ touching/ smelling specimens. April & May would often have hot days, the gym's doors would be open; by Noon many exhibits were but bare twigs, stripped of foliage. To afternoon classes, *all twigs looked alike.*

50 years later the Gardens reflect an even greater disappointment. The sorrow is that so few students visit. While building the Gardens, younger (old) teachers would stop to ask this writer when it was that he taught high school biology. After hearing a span of years more than ½ Century ago in Ilwaco and Corvallis, they would say,
"We quit teaching about NW native plants in public schools 40 years ago
… the subject matter is not on the national tests."

Still, there is an even, even GREATER DISAPPOINTMENT!

In populating the Gardens with native plants, we can't find 30% of the targeted plant species.

In planting the Gardens, we held to the rule of not collecting in Nature, but instead utilizing the resources of native nurseries and seed collectors who collect and/or propagate. Our goal is/was to strengthen native plants' presences, not destroy them. (And in our wanderings, we have assisted plants to migrate – planting 100 pairs of Golden Chinquapins here and there in 2017/18.) Plants that this writer remembers from the 1960's are missing; ~450 of the Gardens' targeted 900 native plant species have yet to been seen in a Decade of field and/or buying trips.

Cascadia Plant Species Unique List		
Totals in Gardens / Found / Not Found		
	451	Growing in Gardens
	189	SAM found, not yet in Gardens
	266	Once reported but not yet found
Total:	906	

Bonhoeffer Botanical Gardens
Native Coastal, Cascade Slope and Puget Sound Trough flora for viewing by the next generation

Habitat checks/BBG's List made from the UW's new Hitchcock and Arthur Cronquist's Flora of the Pacific Northwest: An Illustrated Manual (University of Washington Press 201x) plus BBG's favorties: Eugene Kozloff's Plants of Western WA and the Pecks' Manual of Higher Plants (that we've now used for 50+ years) plus the USDA Source URL Links provided by: USDA, NRCS. 2010;he PLANTS Database (http://plants.usda.gov, 24 April 2010). National Plant Data Center, Baton Rouge, LA 70874-4490 USA. Burke UW URL, a University of Washington's www.biology.burke.washington.edu/herbarium website allowing use for educational purposes and crossreferenced to the old Hitchcock and Arthur Cronquist's Flora of the Pacific Northwest: An Illustrated Manual (University of Washington Press, 1976) also Washington Native Plant Society Vascular Plant List, Snohomish County with the addition of names of plants in the UW and WSU herbariums prepared by Don Knoke, 2004. Wikipedia Links provided under: Wikipedia and Creative Commons Attribution Share-Alike; Burke referenced general URLs and others listed below in column headings. 3 or more sources cross referenced were required before inclusion in this list and before planting at BBG's unique location at the end of the Strait of Juan de Fuca.

Early last year (2018), we sought help. The Gardens funded a Western Washington University Summer "**Survey and Monitor**" Project overseen by Dr. Erik DeChaine, Professor of Biology and Curator of the Pacific Northwest Herbarium. **SAM Project** students found 189 of the 455 missing species!

Still, at the end of 2018 …

266 of 906 Targeted Plant Species have not been observed in Nature *(by WWU students or this writer).*

The inspiration for asking WWU to assist came from Dr. DeChaine's presentation at the March 2018 Washington Botanical Symposium, subsequently published in WNPS's Douglasia journal (Summer 2018, Volume 42, No. 2, page 12). An Olympic Mountain research project was described where 5 native plants were surveyed and future habitats were analyzed under climate warming scenarios. Might it be possible to do the same for the 900 native taxa believed likely to grow at Bonhoeffer Gardens? The NW was covered by a glacier 14,000 years ago; it does not have that many native plant species. Might it be possible to survey them all – monitor populations over time - predict a date of extinction (or when plants will be forced to migrate)? Might it be possible to assist NW Native plants migrate, as we add a F° year after year? ⇨

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Add F° ~Estimate Cascadia	
12	Extincts
41%	371
3/9/19 All Plants:	Extinct< 6Yrs? 906

Readers are welcome to download the Gardens' Master File (Excel) and create (tinker with) their own model of known variables @ (see the 2nd sheet: Legend) http://www.plc215.org/wwu-sam-project/ (Cubic spline and nonparametric coefficient weightings await the 2020 SAM 3-year data inputs.)

The Survey & Monitor Project

In the summer of 2018, the Pilchuck Learning Center (Bonhoeffer Gardens' nonprofit corporation) fully funded the SAM Project. As described at https://wp.wwu.edu/botanysam/sample-page/

> The Botanical Survey and Monitor (SAM) Project is an attempt by the Pacific Northwest Herbarium (WWB) at Western Washington University (WWU) to document changes in the distributions of plants native to the Pacific Northwest. Species of plants in the Pacific Northwest vary in their abundances and distributions. Some species are common while others are rare. Some are widespread and their distributions extend well beyond our region while others are narrowly endemic, being restricted to a small area within the northwest. In either case, most of our knowledge about the distributions of the various species stems from historic records in the 1800s and 1900s, and many of those populations have not been revisited since. Can we find the locations? Are the populations still there? Many factors could have impacted plant distributions including urbanization, habitat fragmentation, overzealous collectors, and climatic changes. Have species distributions shifted in response to some of these factors? Have some populations or species gone extinct? If populations are declining, can we estimate when those species may go extinct locally and regionally?

This scientific study started with this writer's Andersen's Emperor's New Clothes like challenge:

"If you say/claim a plant exists, tell me where; let me drive/walk and take its photo."

As designed, SAM is a 3-year effort, potentially extending for another 7, creating a 10 year period of monitoring NW native plants as the climate warms. And if extinction is a potential for some plants with nursery seedlings available, might "we" (WNPS members and other citizen enthusiasts) plant and monitor new populations like BBG has done with Golden Chinquapins?

WWU Survey & Monitor Project with summer students visiting sites indentified from Herbaria Records												
2018 SAM Project Historic Native Plant Sites				2019 SAM Project Historic Native Plant Sites				2020 SAM Project Historic Native Plant Sites				~Estimated Extinction Year
Visited	Found	AddFnd	Photo'd	Visited	Found	AddFnd	Photo'd	Visited	Found	AddFnd	Photo'd	
5	1	0	1	0	0	0	0	0	0	0	0	2440
5	0	0	0	0	0	0	0	0	0	0	0	2066

2018 results proved that the students can't "do it all." They can visit recorded sites, they can identify and take pictures, but they do not have the time to explore and discover many "Added Finds" (unless by accident at a targeted Herbaria recorded site). That's where the Washington Native Plant Society can assist! We have proposed that WNPS tap the combined intellect and memory of its members to:

1) Establish (photo) the existence of native plant species, record their locations, communicate with the SAM Project so that students (over the next 10 years) might
2) Revisit/monitor these native plant populations and track the impact of climate warming.

`A Proposal for WNPS to Join in Assisting the SAM Project

Citizens having the energy, knowledge, and resources to solve the potential of native plant extinction …

2019 SAM Project "Survey & Monitor Project" of the Historically Overlooked Native Plants of Cascadia

Of Cascadia's ~900 native plant species, ~50% are abundant and easily found, ~10% are rare and often monitored. ~300 plant species have been largely overlooked and are relatively unstudied. Last summer's **2018 Sam Project,** funded by **Bonhoeffer Botanical Gardens** ("**BBG**" @Exit 215 on the northbound I-5), focused on revisiting herbaria recorded sites of these plants; 1/2 of the targeted taxa were not found. Those species found, were often not found at historic recorded southerly locations. If these plants have migrated, SAM students did not/do not have the time or resources to find them (nor will they in 2019 - 2020). They need help!

WNPS might increase the appreciation of NW native plants and educate and pass on the knowledge and love of our Land to the next generation by assisting WWU students. May we propose that from mid May to September, the **2019 SAM Project** include WNPS members' efforts? The design might be:

4 teams of 2 students, led by 2 graduate students - walking, camping, driving north from the Siskiyou Mountains to lower BC.

Each team of 2 focuses on 100 plants, the result being ~400 of the NW's "uncommon plant species" will be set for monitoring over the next 10 years.

Target list maintained by Bonhoeffer Gardens funding this research. Project managed by WWU.

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Thursday, September 12, 2019 - 1 PM
SAM students meet with WNPS participating members for a picnic lunch at Bonhoeffer Gardens to discuss experiences and findings.

WNPS Members might:
1) email/text hints re: driving and/or walking directions
2) email/text a photo using "**Subject:**" for data line
   Lonicera ciliosa, 48.2665, 122.2650, 1
   (1 the default, 2=a few, 3=many)
3) tour **BBG** anytime or at WNPS' Study Weekend 5/19
4) log into a proposed SAM URL and enter data
5) think of some (other) ways to assist SAM students
6) attend the related Chapter meeting discussing **SAM**
7) attend the 1st Mentor Picnic …

SAM students will:
1) visit a targeted site (historic herbaria records)
   i) take a picture of the area to report a "null" finding
   ii) or take a picture of the found plant noting the scientific name, location, & abundance in the email "Subject"
   iii) hand enter a log with cubic spline regression data points: a) elevation, b) slope/facing, c) habitat, etc.
2) email the null or found photo with a *smart Subject line* to *bb@plc215.org* and the SAM database and
3) visit WNPS member recommended or photo'd sites to verify findings and permanently record for Herbaria records

Every "student visited" location would have a photo sent. Null findings are as important as "found" plants!

See: *http://www.plc215.org/wwu-sam-project/ and/or https://wp.wwu.edu/botanysam/sample-page/*

March 2018 Posterboard *(updated)* Presented at the Washington Botanical Symposium (March 2018)

Aren't almost all Cascadia plants "rare" or soon to be? It is all about the slope of decline: it is either =>1.0, <1.0, or =0. (extinct). If populations are declining (slope <1.0), it is only a question of when = 0.

This Posterboard was shown at theWashington Botanical Symposium hosted by the UW in March 2018. It and subsequent conversations led to the creation and funding (by BBG) of the WWU SAM Project that put ~12 students in the field, walking north from the Siskiyou's looking for lost plants from southern Oregon to southern BC west of the Cascades "Cascadia".

HAVE WE WITNESSED A MASS EXTINCTION OF NW NATIVE PLANT SPECIES THESE PAST 20 YEARS?

To enrich Bonhoeffer Botanical Gardens' existing Natural Growth

we created a target list of native plants (for zoo-like exhibitions) using well-known references including:

www.USDA, URL Links provided by NRCS. 2010 - the PLANTS Database (http://plants.usda.gov, 24 April 2010) National Plant Data Center; also referenced was University of Washington's www.biology.burke.washington.edu/herbarium website that allows use for educational purposes, all crossreferenced to Hitchcock and Arthur Cronquist's Flora of the Pacific Northwest: An Illustrated Manual (University of Washington Press, 1976). Also referenced were the Washington Flora Checklist, E-Flora BC, CalPhotos, Wikipedia, WTU Herbarium Specimens, and PNW Herbaria Specimens, along with Eugene Kozloff's Plants of Western OR, WA & BC and Pecks' Manual of Higher Plants of Oregon (that we've now used for 50+ years).

3 sources, most 20+ years old, were required to agree that a plant was a NW native. Then we ordered signs!

Of 906 Plant Species Identified, the 2018 SAM survey found 640

451 of these are planted and staked with nameplate signs. They exist as natural growth or from seeds or seedlings; i.e., not transplanted from the wild. 266 signs that flank Peter's Cross (at the left) are unused.

266 Plant Species have not been Found in 10 Years of Searching!

Since 2009 we have toured western WA, OR and BC. One can drive, walk, and be almost anywhere in Western Washington in a few hours' time. If plants exist today, should not one be able to find and photograph them?

"Many native plants did not survive the 2nd cutting."

was a common pioneer lament, now lost in time (and 3rd and 4th cuttings). Old-timers talked of:

- Sprays (logging companies & governments)
- increased # of collectors decreasing the # of seeds (annuals can disappear in a year)
- pollution and climate change (bringing Pecks text's Oregon plants northward)
- loss of habitat caused by invasive plant and animal species (including humans)
- loss of pollinators (insects, bats, etc.); our Gardens are bereft of native birds.

And a 3rd (of 4) Question(s):

Populations increase, are stable, decrease, or cease to exist (multipliers: >=1, <1or 0. Over time <1 = 0). Have the words: *rare, threatened, endangered, sensitive, imperiled, of concern* masked the <1 native plants' demise?

An Invitation to Seed Collectors

We are searching for seeds of NW native plants. Note "seeds;" BBG purchases seedlings only from established native nurseries, see: *http://www.plc215.org/sources.* Visit them; these plant nurseries/people are amazing!

Guerrilla Restoration

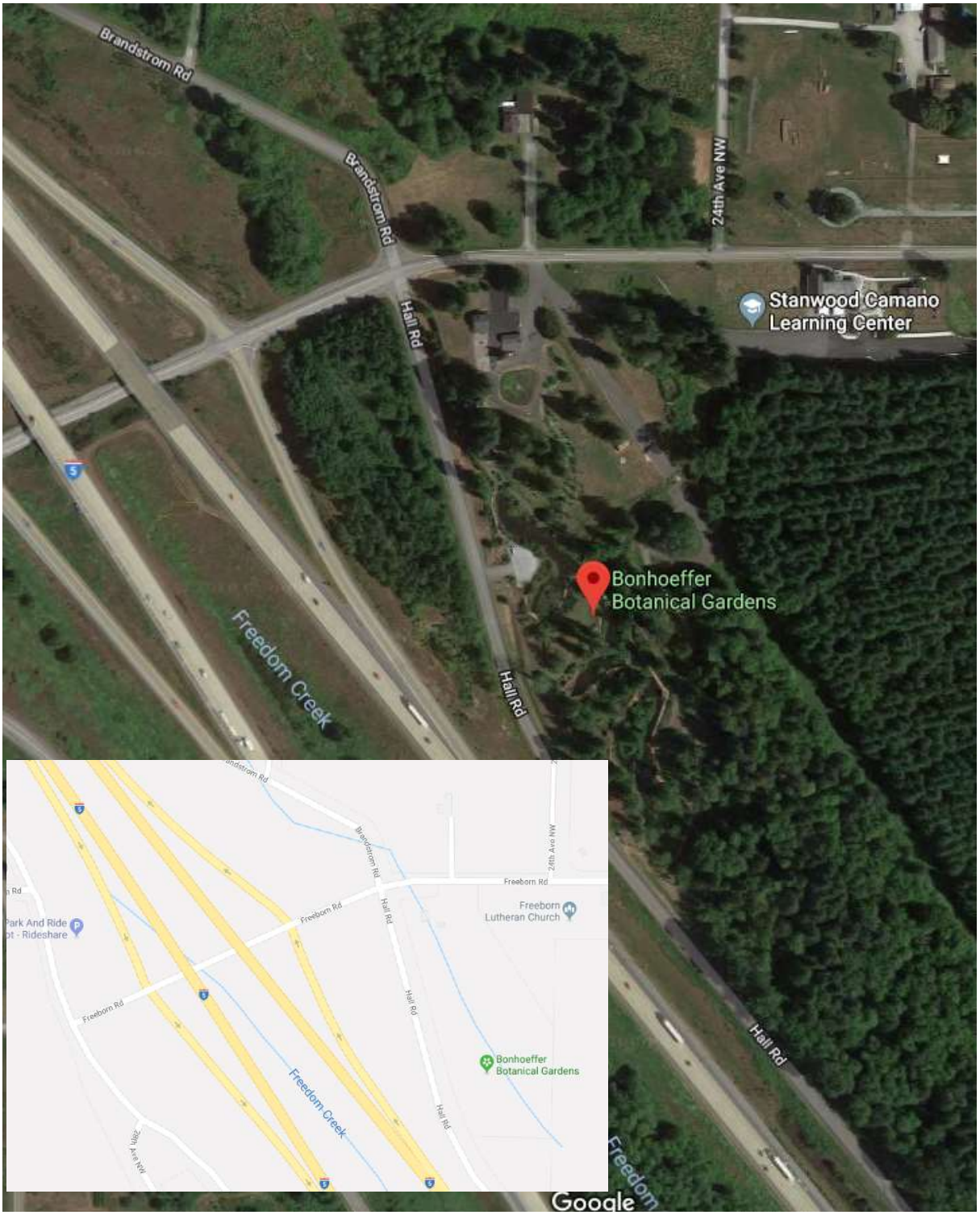
Over 100 of our members planted pairs of Golden Chinquapins here and there in 2018.

BECAUSE IF WE, AS INDIVIDUALS, DON'T ASSIST OUR NW NATIVE PLANTS MIGRATE, WHO WILL?

www.plc215.org … treating Earth as if it were Heaven

Directions

The Gardens are immediately off the I-5 Freeway's northbound lane, Exit 215. From Anacortes, drive east to the I-5 and head south to 300th NW (Exit 215). Tours 215 and 216 will meet in the handicap parking area off the Hall Road (by Google's red mark below)



And if you believe that the Government should be conducting the SAM Project, look at the location of Freedom Creek on the map above. Why would the government lie about a creek's location? Why would they care about Golden Chinquapin any more than they did about the passenger pigeon, once the most abundant bird in America, when there are genetically modified Super Doug seedlings to plant?