

**Washington Rare Plant Care and Conservation  
2010 Rare Plant Seed Collections**

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**Re:** Final Report  
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### **Summary**

Washington Rare Plant Care and Conservation completed eight seed collections of Forest Service Region 6 sensitive plant species for the 2010 University of Washington Botanic Garden - Rare Plant Seed Collection Project. Seeds were collected from four populations of *Delphinium viridescens*, two of *Pyrrocoma hirta* var. *sonchifolia*, and one each of *Microseris borealis* and *Phacelia minutissima*. Four additional collections, one of *D. viridescens*, two of *Iliamna longisepala*, and one of *Corydalis aquae-gelidae*, were either initiated or attempted but not completed due to site access issues and storability questions. Collections occurred in the Gifford-Pinchot and Okanogan-Wenatchee National Forests. All seeds collected under this contract are stored in the Miller Seed Vault at the University of Washington Botanic Gardens.

### **Introduction**

Washington Rare Plant Care and Conservation (Rare Care) was contracted by the U.S. Forest Service to collect seeds of Region 6 sensitive plant species. The collections were made for *ex situ* conservation of germplasm of sensitive species to preserve the genetic diversity of individual populations. Seeds collected under this project were added to Rare Care's seed bank in the Miller Seed Vault. They will be held until the seeds are used or no longer viable.

Seeds collected under this contract are available for use by the Forest Service for reintroductions and augmentation projects at ecologically appropriate sites. In addition, the seeds may be used for research or for reintroductions at other appropriate sites with the permission of the Forest Service. For collections with more than 200 seeds, a small sample of seeds will be used for germination testing to document seed viability and develop propagation protocols for the species. The seeds will not be used for other purposes without the approval of the Forest Service.

## Methods

Rare Care's seed-banking program is conducted in coordination with other Center for Plant Conservation institutions and follows the protocols presented in the Center for Plant Conservation's 2001 Guidelines of *Ex Situ* Conservation Collection Management (Menges 2004). Activities conducted under this project included seed collection, seed storage, and germination testing.

Species targeted for collection were selected by Rare Care and the Forest Service at the start of the contract. For each species, several potential collection sites were identified. Final selection of collection sites was made based on site access requirements, seed availability, and recent information on population size. This year, the list of seed collection sites was modified to take advantage of an apparently excellent year for two species: *Delphinium viridescens* and *Phacelia minutissima*. Initial site visits to several populations in early summer revealed very high numbers of *D. viridescens* plants compared to previous years' population size estimates. Because this species is of high conservation concern, Rare Care decided to increase the number of collection sites of this species to five. In addition, *Phacelia minutissima* was added to the collection list when over 1,000 individuals were discovered at the only known site in the state after many years of unsuccessful searches for it.

Activities conducted to collect and prepare seeds for storage included reconnaissance surveys, seed collecting, accessioning, and cleaning. Reconnaissance surveys were completed by the Rare Care program manager and volunteers trained in seed collection. The primary purpose of reconnaissance surveys was to determine the extent and size of the reproductive populations and to establish a timeline for seed maturation. Reconnaissance surveys were typically conducted when the species was in bloom. Populations were subsequently visited four to six weeks later to check seed maturation rates and to collect seeds.

All collections followed standard protocols conforming to the guidelines established by the Center for Plant Conservation (CPC). These protocols were designed to capture the genetic diversity represented in a population while minimizing the size of the collection in order to mitigate any potential negative impacts to the wild population. For most species, the target size of the collection was 20 to 30 seeds from 50 plants, for a total of 1,000 to 1,500 seeds. In accordance with CPC guidelines, the size of the collections did not exceed 10% of the seed production of the population, and no more 30% of the seeds from a single maternal plant were collected. Therefore, the actual size of the collection was dependent on the size of the population and availability of ripe seeds and in some cases was smaller than the target collection size.

In order to estimate the seed production of the wild populations, fruit from five to ten plants were sampled from each population to determine an average number of seeds per fruit and whether any seeds had been lost to seed herbivores, mold, or other circumstances. Seeds from the sampled fruit were saved for storage and the remainder were scattered on the ground in the vicinity of the maternal plant. The average number of fruit per plant was also estimated in order to determine the total number of ripe seeds available in the population based on the average number of seeds per reproductive plant.

Seed collections occurred between July and September, depending on when ripe seeds were available for each species. Collections were made by Rare Care staff and volunteers. All volunteers assisting in seed collections were required to attend a day of training on rare plant monitoring. All seeds were collected and stored along maternal lines. Paper coin envelopes were used to hold the seeds from one maternal plant. The seeds were placed in the Miller Seed Vault storage room as soon as possible after the collection, usually within 48 hours. Ambient conditions in the storage room were 22% relative humidity and 15° C, which is optimal for drying orthodox seeds (Walters 2004). The seeds were dried for at least one month in order to achieve a moisture content of approximately 6 to 8%. Seeds collected in 2010 are currently being cleaned and counted by trained volunteers. Cleaned seeds will be packaged in aluminum foil packets, heat-sealed, and placed in the freezer where they will be held at -18° C.

### Completed Collections

Table 1 presents a summary of the collections completed by Rare Care in 2010. All seeds have been dried and accessioned, and are currently being cleaned counted and packaged for long term storage. Once cleaned, the seeds will be stored at -18° C and will become a part of the Rare Care ex situ collection. Seed cleaning for collections made in 2009 were completed in 2010 and all collections were placed in the freezer. Copies of the reports for the 2010 seed collections will be sent to Forest Botanists in the respective Forests where the collections were made once the seed cleaning is completed. Copies of the 2009 seed collection reports were sent to Forest Botanists in 2010. Extra copies of all reports are held in Rare Care’s files.

**Table 1. Summary of rare plant species seed collections completed by Rare Care.**

Species	Site Name and Forest	No. Seeds Collected	Accession Numbers <sup>1</sup>
<i>Delphinium viridescens</i>	Allen Creek, Wenatchee NF	1,776	SV10C08.320-358
<i>Delphinium viridescens</i>	Upper Bear Creek (near FS Rd 7201-215), Wenatchee NF	1,098	SV10C09.359-393
<i>Delphinium viridescens</i>	Little Camas Creek, Wenatchee NF	2,918	SV10C10.394-453
<i>Delphinium viridescens</i>	Upper Camas Land, Wenatchee NF	911	SV10C12.464-490
<i>Microseris borealis</i>	Takhlakh Lake South, Gifford-Pinchot NF	1,000 <sup>2</sup>	SV10C16.593-622
<i>Phacelia minutissima</i>	Naneum Creek, Wenatchee NF	300 <sup>2</sup>	SV10C06.219-269
<i>Pyrrocoma hirta</i> var. <i>sonchifolia</i>	Howard Creek Trail, Wenatchee NF	1,000 <sup>2</sup>	SV10C13.491-540
<i>Pyrrocoma hirta</i> var. <i>sonchifolia</i>	Reecer Creek Rd, Wenatchee NF	1,000 <sup>2</sup>	SV10C14.541-591

<sup>1</sup>Each accession number represents one maternal plant.

<sup>2</sup>Number of seeds estimated based on notes by seed collector. An actual count will be available once the seeds are cleaned

### *Delphinium viridescens*

**Status:** USFS Sensitive, USFWS Species of Concern, Heritage G2 S2, State Sensitive

**Element occurrence number:** PDRAN0B200\*038

**Collectors:** Wendy Gibble

**Collection date:** 8-11-2010

**Population notes:** Moderately large population with plants congregated around drainage channels. Shrub and conifer encroachment into the population is minor at this site.

**Collection notes:** Many of the plants on the uppers slope were smaller stature than those seen in wetter areas and had fewer capsules, but seed production was still good.

**Seed quality:** Good.

*Delphinium viridescens*

**Status:** USFS Sensitive, USFWS Species of Concern, Heritage G2 S2, State Sensitive

**Element occurrence number:** PDRAN0B200\*020

**Collectors:** Wendy Gibble and Julie Bresnan

**Collection date:** 8-18-2010

**Population notes:** Very small population of about 100 individuals with patchy distribution along a drainage channel. Shrub and tree encroachment into the habitat is a major threat at this site and the light competition is likely affecting seed production.

**Collection notes:** Seeds were available from only 35 plants. Some had poor seed production, while others had been browsed.

**Seed quality:** Good.

*Delphinium viridescens*

**Status:** USFS Sensitive, USFWS Species of Concern, Heritage G2 S2, State Sensitive

**Element occurrence number:** PDRAN0B200\*013

**Collectors:** Wendy Gibble

**Collection date:** 8-24-2010

**Population notes:** Very large population located in wet meadows along creek. Shrub encroachment into the habitat occupied by *D. viridescens* was observed and will likely become a significant threat over time if not controlled. In addition, conifer encroachment is occurring in the drier areas of the meadow.

**Collection notes:** Very good seed production.

**Seed quality:** Good.

*Delphinium viridescens*

**Status:** USFS Sensitive, USFWS Species of Concern, Heritage G2 S2, State Sensitive

**Element occurrence number:** PDRAN0B200\*023

**Collectors:** Julie Bresnan and Wendy Gibble

**Collection date:** 8-27-2010

**Population notes:** Very small population of about 75 individuals at two locations. Shrub and tree encroachment into the habitat is a major threat at both sites.

**Collection notes:** Seeds were available from only 27 plants. Many stems had been broken or browsed and there was evidence of deer/elk bedding down in the area.

**Seed quality:** Good.

*Microseris borealis*

**Status:** USFS Sensitive, Heritage G4 S2, State Sensitive

**Element occurrence number:** PDSCR1B2L0\*011

**Collectors:** Julie Bresnan

**Collection date:** 9-10-2010

**Population notes:** Small population of about 110 individuals.

**Collection notes:** Collection size limited by the number of seeds available per plant and the number of plants with mature achenes on the day of the collection.

**Seed quality:** Approximately 10% of seeds at site were insect damaged or moldy and 10% were empty.

***Phacelia minutissima***

**Status:** USFS Sensitive, USFWS Species of Concern, Heritage G3 S1, State Endangered

**Element occurrence number:** PDHYD0C300\*001

**Collectors:** Wendy Gibble

**Collection dates:** 7-28-2010 and 8-4-2010

**Population notes:** Large population of about 1,500 individuals. This is the first time this species has been found at this site over several years of searching for it. Ample late spring rainfall may have contributed to the large size of the population this year.

**Collection notes:** Collection size limited by the number of seeds available per plant.

**Seed quality:** Good.

***Pyrrocoma hirta var. sonchifolia***

**Status:** USFS Sensitive, Heritage G4G3T3 S1, State Sensitive

**Element occurrence number:** PDASTDT072\*002

**Collectors:** Wendy Gibble and Julie Bresnan

**Collection date:** 9-16-2010

**Population notes:** Very large population scattered over a half-mile. Plants appear to be in good condition.

**Collection notes:** Good seed production results in a large collection.

**Seed quality:** Approximately 60% of the achenes appeared to be empty.

***Pyrrocoma hirta var. sonchifolia***

**Status:** USFS Sensitive, Heritage G4G3T3 S1, State Sensitive

**Element occurrence number:** PDASTDT072\*NEW

**Collectors:** Julie Bresnan and Wendy Gibble

**Collection date:** 9-16-2010

**Population notes:** Population consists of three sites located along Reecer Creek Road over a stretch of approximately 1.5 miles.

**Collection notes:** Good seed production results in a large collection.

**Seed quality:** Approximately 30% of the seeds were insect damaged, moldy or otherwise malformed. Approximately 30% of the achenes were empty.

**Attempted Collections**

In addition to the completed seed collections listed above, Rare Care initiated work on four other seed collections that were not completed in 2010 for various reasons. On July 20, 2010, a site visit was made with the Leavenworth Ranger District botanist to a *D. viridescens* population near Bear Creek in the Wenatchee National Forest. The population is located in a forest opening along Bear Creek site and is accessed from private property to the north. The Forest Service botanist has an agreement with the property owner to park a vehicle on the property while visiting the

site; however, the agreement did not explicitly include other parties working for the Forest Service. Rare Care attempted to contact the property owner to obtain permission to cross their land, but did not hear back from the property owner. Therefore, the collection was not completed in 2010. This site should be included in next year's collections, and an alternative access point from FS Road 7200 should be investigated.

Site visits were made to two populations of *Iliamna longisepala*. One population on Entiat Ridge (WNHP element occurrence 84) was visited on August 19, 2010 to locate the plants and assess fruit maturation. The population was monitored in 2007 by Rare Care volunteers and the plants occur in scattered patches across approximately 1 mile of very steep terrain. However, during the August visit, the plants could not be relocated from several points along the base of the location. The terrain is extremely steep and contains areas of very dense brush, making the search difficult. Similarly, a site visit was made by a volunteer to a population of *Iliamna longisepala* on Icicle Ridge (EO 66) in August. The volunteer did not have sufficient time to locate the population within the time available, in part because she was also impeded by dense vegetation and steep terrain. In future years, these populations will need to be visited earlier in the season when the plants are in bloom and when more time can be spent locating the plants.

Finally, initial plans included a seed collection from a population of *Corydalis aquae-gelidae* near Crater Creek on the Gifford-Pinchot National Forest (WNHP element occurrence 20). However, information obtained from the Berry Botanic Gardens staff suggested that this species may be partially recalcitrant and may not store well under the conditions of the Miller Seed Vault. Therefore, a very limited collection of approximately 50 seeds was completed on August 18 to allow Rare Care to test a couple different storage parameters to determine whether short or moderate length storage can be achieved for this species in the Miller Seed Vault, or whether alternative storage conditions, such as cryopreservation, are needed for short and long term seed storage.

## **Volunteer Participation**

Volunteer participation included leading or assisting with the collections and cleaning the seeds for storage in the seed vault. To date, volunteers have contributed a total of 143.25 hours of time and 1,674 miles in personal vehicles. Based on a rate of \$19.51/hour of volunteer time and \$0.50/mile, the value of volunteers' contributions to this project equals \$3,632.

## **Conclusion**

Washington Rare Plant Care and Conservation completed eight collections attempted during the 2010 season. Collections ranged in size from 300 seeds to approximately 3,000 seeds, depending on the size of the population and the number of seeds available. Seed collections for all sites except the *P. minutissima* provided adequate seeds for *ex situ* collection. The collection for *P. minutissima* was limited due to the number of seeds available per plant and should be supplemented in future years when there are an adequate number of plants present.

Four other collections were attempted in 2010: one of *Delphinium viridescens*, two of *Iliamna longisepala*, and one of *Corydalis aquae-gelidae*. For 2011, an alternative access point should be investigated from FS Road 7200 to reach the *D. viridescens* site on Bear Creek. No seeds have been collected from this population; therefore, this would be a high priority. For *Iliamna longisepala* seed collections, further reconnaissance work is required earlier in the season when the plants are in bloom to facilitate detection.

## References

Menges, E.S., E.O. Guarrant, and S. Hamzé. 2004. Effects of Seed Collection on the Extinction Risk of Perennial Plants. pp. 305-324 in: Guarrant, E.O., K. Havens, and M. Maunder, eds. *Ex Situ Conservation: Supporting Species Survival in the Wild*. Island Press, Washington.

Walters, C. 2004. Principles for Preserving Germplasm in Gene Banks. pp. 113-138 in: Guarrant, E.O., K. Havens, and M. Maunder, eds. *Ex Situ Conservation: Supporting Species Survival in the Wild*. Island Press, Washington.