# POPULATION SURVEYS AND AUGMENTATION OF THIN-LEAVED PEAVINE: 2013 ANNUAL REPORT

2014

Report to the Bureau of Land Management
Agreement # L09AC16049-0031 and L09AC16049-0045

Report prepared by Ian Silvernail

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Institute for Applied Ecology

## PREFACE

This report is the result of agreement number L09AC16049-0031 and L09AC16049-0045 between the Institute for Applied Ecology (IAE) and the Bureau of Land Management. Projects under both agreements provided funds for the activities describe herein. IAE is a non-profit organization whose mission is the conservation of native ecosystems through restoration, research and education. Our aim is to provide a service to public and private agencies and individuals by developing and communicating information on ecosystems, species, and effective management strategies and by conducting research, monitoring, and experiments. IAE offers educational opportunities through 3-4 month internships.

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**Cover photograph**: *Lathyrus holochlorus* flowers. *Photo by Ian Silvernail.*

## SUGGESTED CITATION

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# POPULATION SURVEYS AND AUGMENTATION OF THIN-LEAVED PEAVINE: 2013 ANNUAL REPORT

REPORT TO THE BUREAU OF LAND MANAGEMENT

## INTRODUCTION

The thin-leaved peavine (*Lathyrus holochlorus)* is a rare member of the Fabaceae. It is a Bureau of Land Management Sensitive Species, a USFWS Species of Concern, and an Oregon Biodiversity Information Center (ORBIC) List 1 species. It is found throughout the Willamette Valley and south toward Roseburg. A few small populations are also found in Lewis County, Washington. The thin-leaved peavine is most commonly found along roadsides, fencerows, or scattered in deciduous woodlands. Most of the remaining populations are along roadsides and unmowed fencerows, where it is commonly associated with Oregon white oak (*Quercus garryana*), common snowberry (*Symphoricarpos albus*), various species of rose (*Rosa* sp.), and poison oak (*Toxicodendron diversilobum*). Many populations are threatened by improper mowing and herbicide use.

The thin-leaved peavine is a rhizomatous perennial, and many populations are likely composed of a single, self-incompatible genetic clone. Most small populations consistently do not produce any viable seed; very few large populations remain.

The intention of this project is to assess historic populations, collect seed, reintroduce nursery-grown plugs, and assess the success of population augmentation efforts. This report includes information about Phase 1 of a four phase project. Phase 1 of the project includes field surveys of historic populations, germination testing, and some plug production.

## 2013 ACTIONS

In 2013, activities included field assessments of known populations, germination testing, and plug growth initiation.

## Field surveys

In 2013, IAE continued work on Phase 1 by engaging in extensive field surveys of known locations. Location data from the Oregon Biodiversity Information Center (ORBIC) and the US Fish and Wildlife Service (USFWS) was used. Both maintain location records for the species, but neither of them is complete. The ORBIC database contains 95 historic location records; 43 of these are not found in the USFWS database. The USFWS database contains 72 historic location records; 20 of these are not found in the ORBIC database. Combining the databases yields 115 total historic location records. Additionally, other botanists and land managers familiar with the species were contacted. This yielded several additional records to investigate.

IAE partnered with the Native Plant Society (NPSO) to complete surveys. One NPSO volunteer, Julie Gibson, visited *L. holochlorus* populations in 2012 and 2013. The data she collected will be combined with the data collected by IAE staff to yield a picture of the current species status across a broader portion of its range.

Between May 8 and June 13, 2013 IAE staff visited 36 populations of *L. holochlorus*. In 2012 and 2013, Julie Gibson visited 26 sites. This equals a total of 62 sites.

### Field methods

Upon arriving at a site, historic records were used to narrow the search area. Areas of potential habitat adjacent to the historic locations were frequently searched as well. The data sheet found in Appendix 1 lists all of the information gathered at each site.

Population size was assessed by censusing the total number of individual stems arising from the ground. Since the plant is a rhizomatous perennial, this is unlikely to represent the actual number of individual, genetically-distinct plants. It is however, the most common monitoring method used for this species. Stems were classified as either vegetative, flowering, or fruiting. Data was taken on the relative abundance of associated species in the area where the *L. holochlorus* occurred. The geographic location of all plant patches at each population was recorded in decimal degrees with a handheld Garmin GPSmap 60Cx unit. Patches of plants were recorded by drawing a polygon; outliers were noted by recording an individual waypoint. At least one photopoint was recorded at each population and the geographic location of the point was noted as a waypoint in decimal degrees. The bearing of each photograph was recorded.

Due to the location sensitivity of the information, individual site reports will be presented in a different document after further location surveys have been completed in 2014.

## Seed collection

A total of 174.2 grams of seed was collected from 12 different populations during July and August. Seed quantities were heavily weighted toward the largest populations, with the two largest populations

yielding 73.5% of the total collected seed by weight. The estimated number of seeds per pound is 14,486 and is based on the mean weight of 5 samples of 100 seeds from the largest known population. Table 1 below shows the quantity of seed collected by county and the number of populations in each. Most of the populations we surveyed set little to no seed.

**Table 1:** Seed collected by county.

| County | number of populations where seed collection occurred | seed collected (grams) |
|---|---|---|
| Benton | 3 | 92.8 |
| Lane | 3 | 51.7 |
| Linn | 1 | 13.4 |
| Polk | 4 | 14.3 |
| Yamhill | 1 | 2.0 |
| Total | 12 | 174.2 |

## Germination and growth protocol

In October 2013, germination testing was initiated. Period of cold-moist stratification of scarified seed was the primary variable tested. Previous information presented by Steven Broich (personal communication, 2013) suggested that scarification is necessary to promote germination. Given limited seed resources, we chose to scarify most of the seed. However, in order to gather anecdotal evidence of the necessity of scarification, one sample for each duration of cold-moist stratification was left unscarified. Table 2 below shows the treatment matrix.

Seeds were placed in a dark walk-in cooler held at 4˚C at the Oregon State University Seed Lab. Seeds were placed in the cooler at different intervals so that all groups were removed from treatment together on January 13, 2014. Upon removal from cold-moist stratification, seeds were placed in an alternating temperature room held at 25˚C during the light day and 15˚C during the dark night. The number of germinants in each sample was recorded upon removal from cold-moist stratification and

**Figure 1.** Developing *Lathyrus holochlorus* fruits found on June 11, 2013.

weekly thereafter for 4 weeks. Results will be presented in the 2014 report after analysis.

**Table 2:** Treatment matrix for germination testing.

| | Weeks of cold-moist stratification | | | | | |
|---|---|---|---|---|---|---|
| | 0 | 2 | 4 | 6 | 8 | 12 |
| Scarified | 5 replicates of 20 seeds in each stratification treatment | | | | | |
| Unscarified | 1 sample of 20 seeds in each stratification treatment | | | | | |

Germinated seeds were planted in the greenhouse to test the impact of different cultivation conditions on the growth and vigor of the plants. Variables tested were the presence or absence of 10% native soil in the planting medium, the inoculation of seeds with symbiotic bacteria, and fertilization with phosphorus. This project is ongoing and the results will be reported in 2014.

## BUDGET

Table 3 is a summary of all costs associated with the 2013 activities described in this report.

**Table 3.** Summary of all expenses.

| **Activity** | |
|---|---|
| Project Coordination | $2,465 |
| Field surveys | $6,051 |
| Seed collection | $2,479 |
| Germination and grow out | $1,761 |
| Equipment | $1,415 |
| Transportation | $1,419 |
| Admin | $3,221 |
| **Total** | $18,811 |

## SUCCESSES AND FAILURES

We were successful in visiting a large number of historic populations and gathering accurate population and plant community data. We prioritized larger sites with the potential for seed production. In 2014, we will be able to expand the geographic range of our surveys.

Based on recommendations from other botanists, we visited all seed collection sites a second time after the initial assessment to place pollination bags over the developing fruits so as to catch the seeds if the pods opened. We visited populations a third time to collect the bags. Upon opening the seed bags, we found that none of the seed pods had dehisced. Seed pods sat in a warm room in open cardboard trays for an additional month before cleaning, and still had not dehisced. From this, we learned that an additional trip to each seed collection site to install pollination bags is unnecessary. In 2014, we will be able to reallocate the resources intended for this part of the process to other activities.

## FUTURE ACTIONS

Many activities are planned for 2014. Data from germination testing will be analyzed. The propagation protocol development is ongoing and will be completed. Further field surveys are planned to assess the status of more historic locations. Further propagation will be initiated in the fall. Partner coordination will occur in anticipation of potential outplantings in 2015.

## APPENDIX 1

Included are datasheets used at all *L. holochlorus* survey sites.

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***Lathyrus holochlorus* – Population Census Data Sheet**

Observation Date: _____

Observers: _____

_____

FID (USFWS): _____ Site Name (USFWS): _____

EO ID (ORBIC): _____ Site Name (ORBIC): _____

ID # (other): _____ Site Name (other): _____

County: _____ Land Ownership: _____

Contact Person: _____ Contact Information: _____

Waypoints and Track Logs (WGS 1984): _____

_____

Directions to site: _____

_____

_____

_____

Photopoints: For each photopoint, list the coordinates or waypoint number, bearing, picture number and description.

_____

_____

_____

_____

_____

Comments (include threats to persistence of population): _____

_____

_____

_____

_____

_____

_____

Target Species Population Data: (count the total number of stems arising from the ground)

| WP/TL | Occupied Area ($m^2$) | # Vegetative | # Flowering | # Fruiting | Total |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| Site Totals | | | | | |

**Plant Community:** For each patch of *Lathyrus holochlorus*, list the three most abundant species (based on percent cover, not number of individuals) in each functional group in order from most abundant to least.

| | | | | | | Ratios | |
|---|---|---|---|---|---|---|---|
| **WP/TL** | **Forbs** | **Grasses** | **Shrubs** | **Trees** | **Other species** | **Shrub:: Forb:Graminoid** | **Native: Non-native** |
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