Introduction of Willamette daisy to E4

2010 Report

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PREFACE

This report is the result of a cooperative project between the Institute for Applied Ecology (IAE) and a federal agency. IAE is a non-profit organization dedicated to natural resource con-servation, 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. Our current activities are concentrated on rare and endangered plants and invasive species.

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INTRODUCTION

Erigeron decumbens (Willamette daisy, Asteraceae), is listed by the USFWS and Oregon Department of Agriculture as an endangered species (ORNHIC 2004) and is considered a Special Status Species by the Bureau of Land Management (BLM). This species is restricted to western Oregon prairies and grassland habitat remnants, and is currently known from approximately 30 sites, all in the Willamette Valley (USFWS 2010). The highest density of existing populations is in the West Eugene area in Lane County, Oregon. Widespread loss of native Willamette Valley prairie habitat to agricultural and urban development is the primary threat to *E. decumben* (USFWS 2010). *Erigeron decumbens* also faces additional threats of encroachment of prairie habitat by trees, shrubs, and invasive weeds, and possibly inbreeding depression arising from small population sizes.

Figure 1. *Erigeron decumbens* at Bald Hill Park, Corvallis, Oregon.

Erigeron decumbens is an herbaceous perennial that primarily reproduces by seed. Plants form clumps of basal leaves and produce one or more flowering stems. The plants also appear to spread vegetatively over very short distances (<10 cm). Although the breeding system of this species has not been studied, *E. decumbens* attracts numerous insect species that are thought to act as pollinators, including *Phycoides campestris* (field crescent, butterfly), halictine bees (sweat bees), and *Toxomerus occidentalis* (a syrphid fly) (Jackson, 1996). Seed dispersal has been estimated at an average distance of 94 cm (Jackson, 1996). It is likely that this species only produces seed when out-crossed. Other members of the Asteraceae exhibit self-incompatibility (Allphin *et al.*, 2002), and an out-crossing breeding system in Willamette daisy is consistent with the failure of very small populations to produce viable seeds.

There have been several reintroduction efforts for *E. decumbens* through-out its range, including introduction of 1000 plants at Finley National Wildlife Refuge, approximately 4.5 miles south of E-4, in 2007 and 2008. The goal of this project was to plant 1000 *E. decumbens* in suitable habitat at E4, a site being restored by USFWS through the Wetland Reserve Program. Here, we summarize grow-out and planting methods and first year survival of these plants.

METHODS

E4 is located on Llewelyn Road, in Benton County, Oregon, approximately 5 miles south of Corvallis (Appendix A). This site was historically been used for agriculture, but has been restored to upland and wetland prairie habitats through the Wetland Reserve Program. The area selected for introduction of *E. decumbens* is an upland near the entrance to the site. Threatened *Sidalcea nelsonii* will be seeded and planted in an adjacent wetland area in 2010-2012. The upland area selected for planting of *E. decumbens* had been prepared by several rounds of application of the herbicide, glyphosate. Although there was good control of graminoids species, we observed many *Hypochaeris radicata* and *Cirsium* spp. seedlings during planting. We also observed some remanant *Rubus armeniacus* and *Rosa* spp.

We used seed that was collected from *E. decumbens* grown at the USDA Natural Resources Conservation Service Plant Materials Center in 2009. These plants were grown from seed collected at Muddy Creek (also known as Allen and Allen) in the Corvallis West Recovery Zone. Three thousand seeds (three seeds per pot) were directly sown into 5.08 cm x 5.08 cm x 10.16 "Anderson" pots EB Stone seedling starter soil. The soil was slightly moistened and the pots were cold stratified at 4^{o}C for four months. Pots were then transferred to the west greenhouse complex at Oregon State University where temperature was maintained at 21^{o}C during the day and 13^{o}C at night with 14 hours a day of artificial light provided by a Sun System 3 - 400 HPS bulb. Plants were bottomed watered regularly and fertilized with Miracle Gro once per week. As needed, plants were thinned so that there were 1000 pots of one plant each.

On April 22 and 23, 2010, we planted *E. decumbens* in five 20m x 10m plots at E4. The long axis of each plot extended slightly north/south at 30^{o}. The short axis extended at 120^{o}. Due to a slightly humped nature to the site, plots were placed so that the area within each plot would be relatively flat. The corners of each plot were marked in t-posts that extend approximately 1.3 m above the soil surface. The southwest corner of each plot was marked with a numbered metal tag (#s 834-838, numbered from the NW to the SE plot). Each plot was divided into a grid of 1m x 1m cells, and *E. decumbens* were planted in the center of each grid cell.

In order to promote plant survival, plants were watered weekly from the end of June to the beginning of August. Watering was terminated when the majority of plants appeared to be initiating dormancy.

On June 15, 2010, we monitored the survival of each individual. Presence/absence and flowering was noted.

A site visit in mid-August revealed that plots had been mown recently.

RESULTS AND DISCUSSION

Two months after planting, 978 (98%) of the *E. decumbens* were still alive. Of these, 77 (8%) flowered. The cover of other forb species increased to greater than 60%.

The majority of this cover was from the exotic forb, *Hypochaeris radicata*. *Hypochaeris radicata* is known to be an aggressive competitor, and may be a particularly strong competitor against *E. decumbens* as they have similar growth habitats and are in the same family. We recommend that aggressive management techniques be used in order to reduced the cover of *H. radicata*. However, as there is little information currently available on effective management techniques that are not detrimental to *E. decumbens*, I recommend that this be done using an experimental approach that includes controls and at least two years of post-treatment monitoring (Thorpe and Kaye, 2007). A new project testing the effectiveness of various control methods in sites occupied by *E. decumbens* has currently received the first phase of funding (funding to IAE by USFWS). This project may serve as a good vehicle through which to test new treatment methods.

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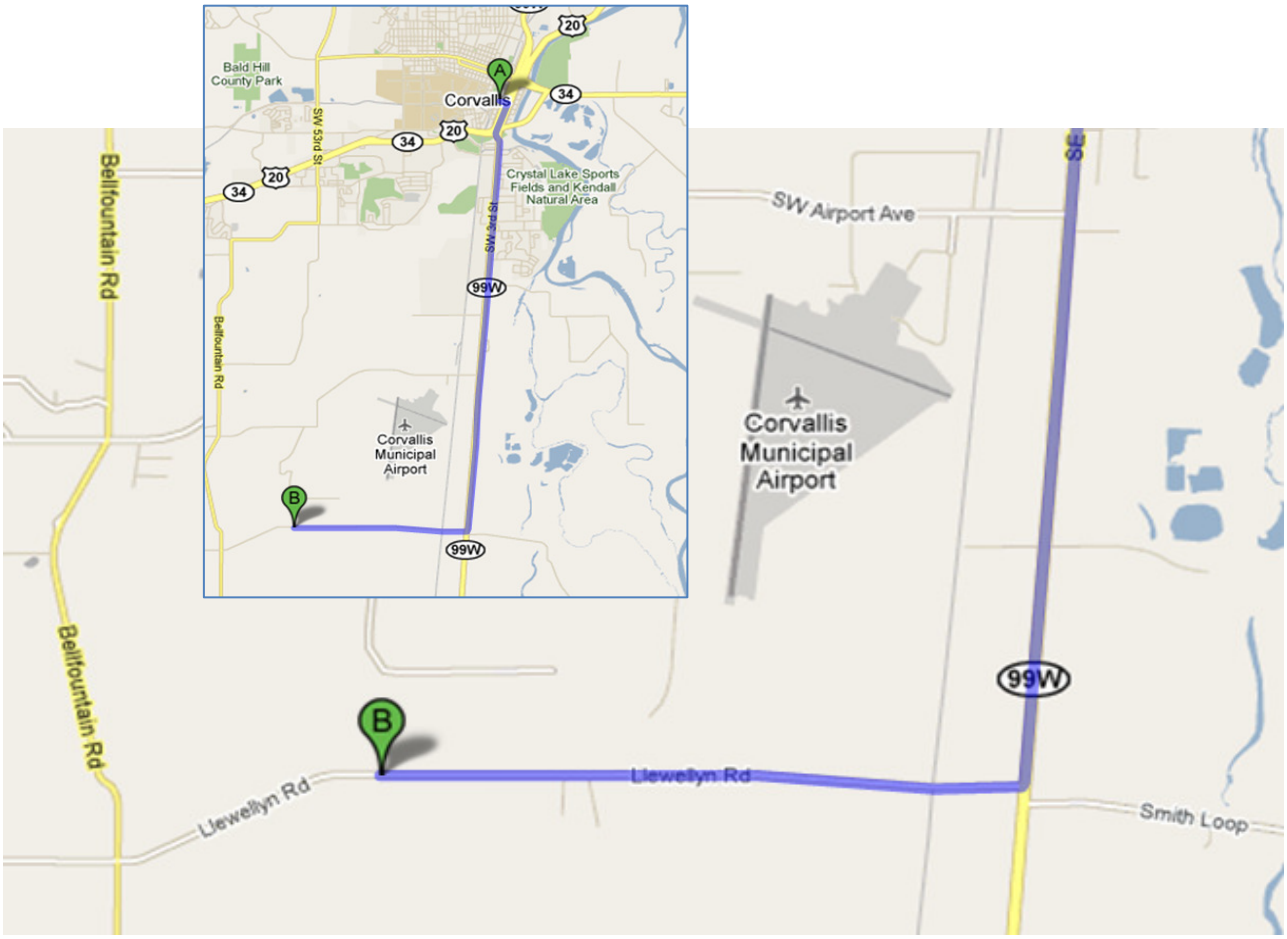
APPENDIX A. LOCATION OF E4.



APPENDIX B. ARIAL PHOTO WITH LOCATION OF *ERIGERON DECUBMENS* (ERDE) AND *SIDALCEA NELSONIAA* (SINE) PLANTING AREAS.