Outplanting Survival of Bartonberry (*Rubus bartonianus*)

2017

Progress Report to the USDI Bureau of Land Management, Vale District

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Institute for Applied Ecology

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PREFACE

This report is the result of an agreement between the Institute for Applied Ecology (IAE) and a federal agency. IAE is a non-profit organization whose mission is 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. Our current activities are concentrated on rare and endangered plants and invasive species.

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Cover photograph: *Rubus bartonianus* seedling planted in Hells Canyon in fall 2016.

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EXECUTIVE SUMMARY

From November 14-17, 2016, we outplanted 2173 individual Bartonberry (*Rubus bartonianus*) seedlings into 3 locations in Hells Canyon. The sites were located near the Baker and Wallowa County boundary, with the Reservoir and Copper Creek sites adjacent to the Snake River and the Hess Road site located in the Ashby Creek drainage southwest of the other sites. We planted 1124 seedlings at the Reservoir site, 866 seedlings at the Hess Road site, and 183 seedlings at the Copper Creek site. From May 23-25, 2017, we monitored survival of outplanted Bartonberry seedlings at the 3 locations.

- Proportion of plants remaining during surveys in 2017 ranged from 20-89%.
- Copper Creek had the highest proportion of plants remaining in 2017.
    - Of the 183 plants originally planted in fall 2016, 131 were still actively growing the following spring.
- The Reservoir site had 492 plants recorded in 2017, from the 1124 planted in fall 2016.
- The Hess Road site had 353 plants counted out of the original 866 planted in fall 2016.

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PROGRESS REPORT TO THE USDI BUREAU OF LAND MANAGEMENT, VALE DISTRICT

INTRODUCTION

Bartonberry (*Rubus bartonianus*; Figure 1) is a narrow endemic that occurs in Oregon and Idaho in the mid sections of Hells Canyon of the Snake River and its tributaries. Historically, Bartonberry occurred over 59.5 river miles in Hells Canyon. Recent field surveys in 2009 and 2010 were unable to relocate the southern and northern most Bartonberry locations, thus, shrinking the global distribution of Bartonberry by 14.5 river miles (24%).

FIGURE 1. BARTONBERRY (*RUBUS BARTONIANUS*) IN FLOWER IN HELLS CANYON.

Bartonberry is a federal species of concern, and a candidate for listing by the state of Oregon (ORBIC 2013). Bartonberry was named by Morton Peck in 1934, honoring Lenora Barton, a rancher who found Bartonberry at Battle Creek in 1931 (USDI BLM 2010). Bartonberry (*Rubus bartonianus)* is classified in the subgenus *Anoplobatus* along with more widespread species including *Rubus parviflorus* (thimbleberry) and *Rubus deliciosus* (delicious raspberry), which occurs primarily in Wyoming, Colorado, New Mexico, and Oklahoma (USDA NRCS 2015). Bartonberry grows in ravines and talus/rocky slopes of Hells Canyon, in the Wallowa-Whitman National Forest in Oregon and the Payette National Forest in Idaho.

Bartonberry is a non-prickly shrub with white showy flowers that produce a deep, red raspberry in May to June (Brooks et al. 1991, Figure 2). Current threats to the species include competition from non-native species, livestock grazing, weed control particularly along roadsides, and climate change (USDI BLM 2010). Competition from the non-native Himalayan blackberry (*Rubus armeniacus*) is a great concern. Himalayan blackberry is a non-native species and can colonize similar habitats to Bartonberry and potentially out-compete this rare species (USDI BLM 2010).

This project will re-establish Bartonberry at the southernmost historic site where Bartonberry appears to have been extirpated, along with other locations that are valuable for contributing to its global distribution. Reintroducing Bartonberry to its historic range will help to maintain the species viability and persistence, and data from this monitoring will aid in future restoration efforts.

METHODS

The Institute for Applied Ecology developed propagation protocols for Bartonberry (Bahm and Gray 2015) and plants from those experiments were grown in the greenhouse for outplanting (Figure 2). In April 2016, seedlings were transplanted into larger containers (Deepot D40L, Stuewe and Sons Inc., Tangent, OR) and moved to an outdoor lath house. This was necessary to ensure proper growth of seedlings and to acclimate seedlings prior to outplanting. Plants were watered daily and received bi-weekly fertilizer until 2 months prior to outplanting, at which time fertilizer addition(s) were halted. All seedlings selected had established roots and ranged from 3-16" in height. The vast majority of outplanted individuals were seedlings, but a small number were from cuttings. We did not differentiate during planting and will combine for any future monitoring.

FIGURE 2. BARTONBERRY (*RUBUS BARTONIANUS*) GROWING OUTSIDE THE GRRENHOUSE TO ACCLIMATE PRIOIR TO OUTPLANTING.

From November 14-17, 2016, we outplanted 2173 individual Bartonberry seedlings into 3 locations in Hells Canyon (Figure 3, Appendix A). The sites are located near the Baker and Wallowa County boundary, with the Reservoir and Copper Creek sites adjacent to the Snake River and the Hess Road site located in the Ashby Creek drainage southwest of the other sites (Figure 3). At the Reservoir site we planted 1124 seedlings, 866 seedlings were planted in the Hess Road site, and 183 seedlings were planted at the Copper Creek location.

At each site, locations with adequate soil(s) were chosen for planting. All soils information was obtained using the USDA Natural Resources Conservation Service Web Soil Survey (http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx). All of the sites were composed of cobbly silt loams. In order to determine appropriate locations/habitat for future restoration efforts, we planted individuals at different elevations, slope, and aspect within each location (Figure 4). GPS coordinates were taken for the general site location, as well as selected points within each planting to allow for relocation of plants for future monitoring. Site Monitoring forms were completed for each location and will be updated during future monitoring efforts.

From May 23-25, 2017, we monitored survival of outplanted Bartonberry seedlings at the 3 locations. We used GPS units to delineate planting boundaries, then a 3-person team surveyed each site. Team members traversed each site roughly equidistant from each other to cover the entire internal boundary of each planting. Members communicated plant locations throughout the search efforts to minimize double counting of individual plants.

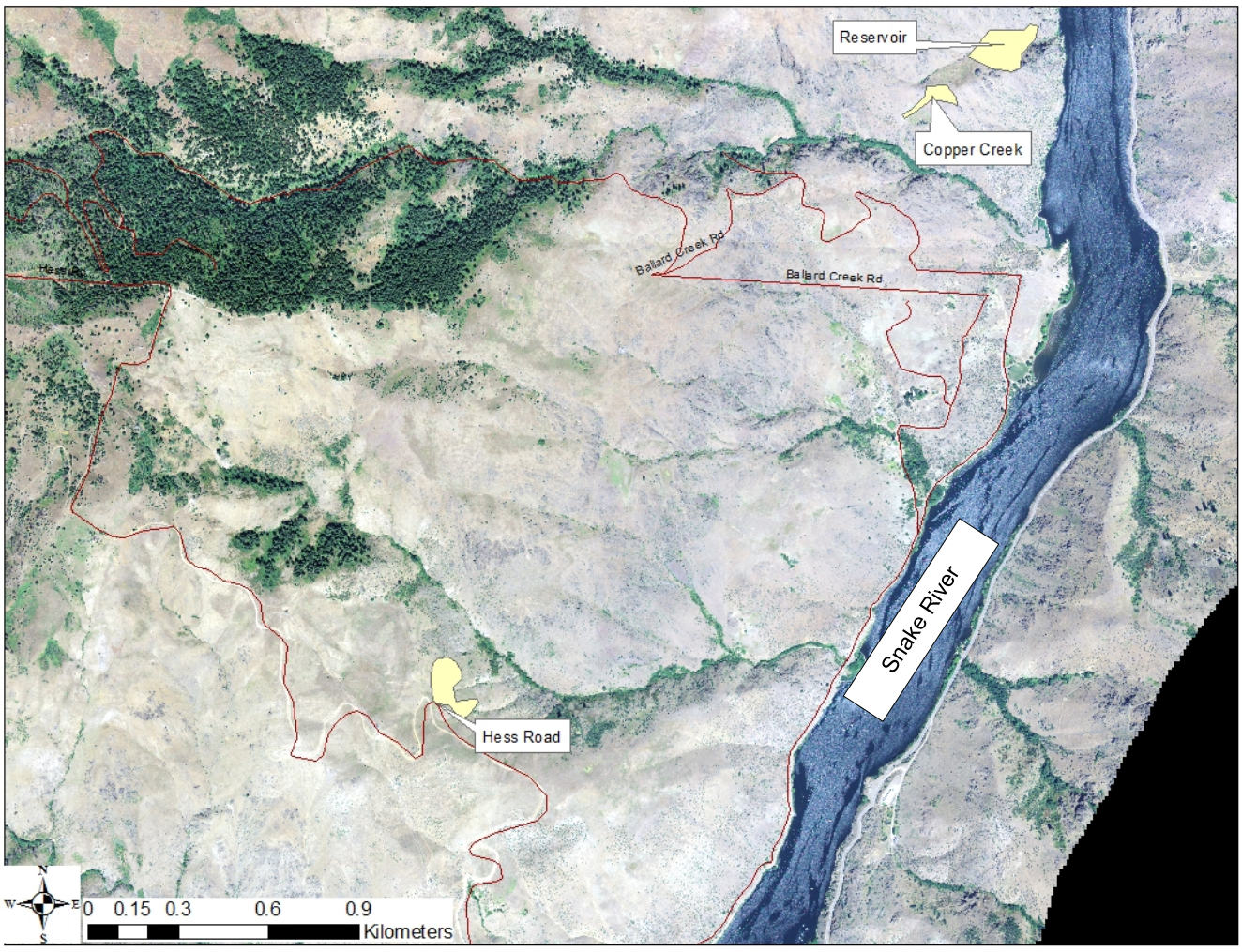

FIGURE 3. OVERVIEW OF BARTONBERRY (*RUBUS BARTONIANUS*) PLANTING SITES AT COPPER CREEK, RESERVOIR, AND HESS ROAD SITES.

FIGURE 4. PLANTING BARTONBERRY (RUBUS BARTONIANUS) AT VARYING LOCATIONS (SLOPE, ASPECT, ELEVATION) TO DETERMINE BEST LOCATION(S) FOR FUTURE RESTORATION EFFORTS.

OUTPLANTING SURVIVAL

The proportion of plants remaining during surveys in 2017 ranged from 20-89% (Table 1). Of the original 2173 plants, 976 remained during monitoring in spring 2017. Copper Creek had the highest proportion of plants remaining in 2017. Of the 183 plants originally planted in fall 2016, 131 were still actively growing the following spring. The Reservoir site had 492 plants recorded in 2017, from the 1124 planted in fall 2016. The Hess Road site had 353 plants counted out of the original 866. While searching for seedlings among surrounding vegetation can be difficult, we are confident that the majority of surviving plants were located by observers (Figure 5).

Several factors could potentially explain the differences in survival we recorded at the sites. Ungulate (native and livestock) and rodent grazing was confirmed at both the Hess Road and Copper Creek sites. At Copper Creek, rodent damage was evident on a single plant at Copper Creek 2, while five plants at the Hess Road site were confirmed to have been grazed (Table 1, Appendix A). Multiple plants at the Reservoir and Hess Road sites could possibly have been missing due to animal damage, but we were unable to confirm because plants were missing.

Another factor that could have impacted survival was the surrounding plant communities at each site. The 2 sites with the highest proportion of surviving plants (Copper Creek 2 & 3), had the lowest vegetative cover of any of the sites, with much more bare ground and exposed rock. At the other sites, herbaceous vegetation cover tended to be much higher. The Copper Creek 1 and Reservoir sites had relatively high cover (Figure 4) of native grass and forb species, while Copper Creek 4 and the Hess Road sites had a combination of native and introduced grass species. Established vegetation could have increased competition for resources, as well as attracted mammalian grazers, potentially limiting survival of Bartonberry seedlings.

FIGURE 5. BARTONBERRY SEEDLING COUNTED DURING SURVIVAL MONITORING IN SPRING 2017.

TABLE 1. LOCATION, NUMBER PLANTED, PLANTS COUNTED IN 2017, AND PROPORTION REMIANING OF BARTONBERRY SEEDLINGS OUTPLANTED IN FALL 2016.

Location Name	Number Planted	Plants 2017	Proportion Remaining	Notes/Comments
Reservoir 1	546	199	0.36	7 holes with soil, but plant missing
Reservoir 2	578	293	0.51	2 plants pulled out of ground; 2 plants desiccated/dead
Copper Creek 1	34	23	0.68	1 hole with soil, but plant missing
Copper Creek 2	47	42	0.89	1 plant missing with evidence of gopher digging through planting hole; 1 hole with soil, but plant missing
Copper Creek 3	34	30	0.88	
Copper Creek 4	68	36	0.53	
Hess Road-Large Poly	726	291	0.40	10 holes with soil, but plant missing; 2 plants pulled out of ground
Hess Road 1	10	2	0.20	
Hess Road 2	98	45	0.46	5 plants browsed by mammalian grazers (ungulate and rodent); minor insect herbivory on 1 plant
Hess Road 3	32	15	0.47	
Totals	**2173**	**976**	**0.45**	
Reservoir	**1124**	**492**	**0.44**	
Copper Creek	**183**	**131**	**0.72**	
Hess Road	**866**	**353**	**0.41**	

FUTURE MONITORING

In spring 2018, we will return to each of the sites to monitor survival of seedlings. Timing will be coordinated with Vale BLM staff so that the Bartonberry will be actively growing. This will allow observers to more readily locate outplanted individuals.

LITERATURE CITED

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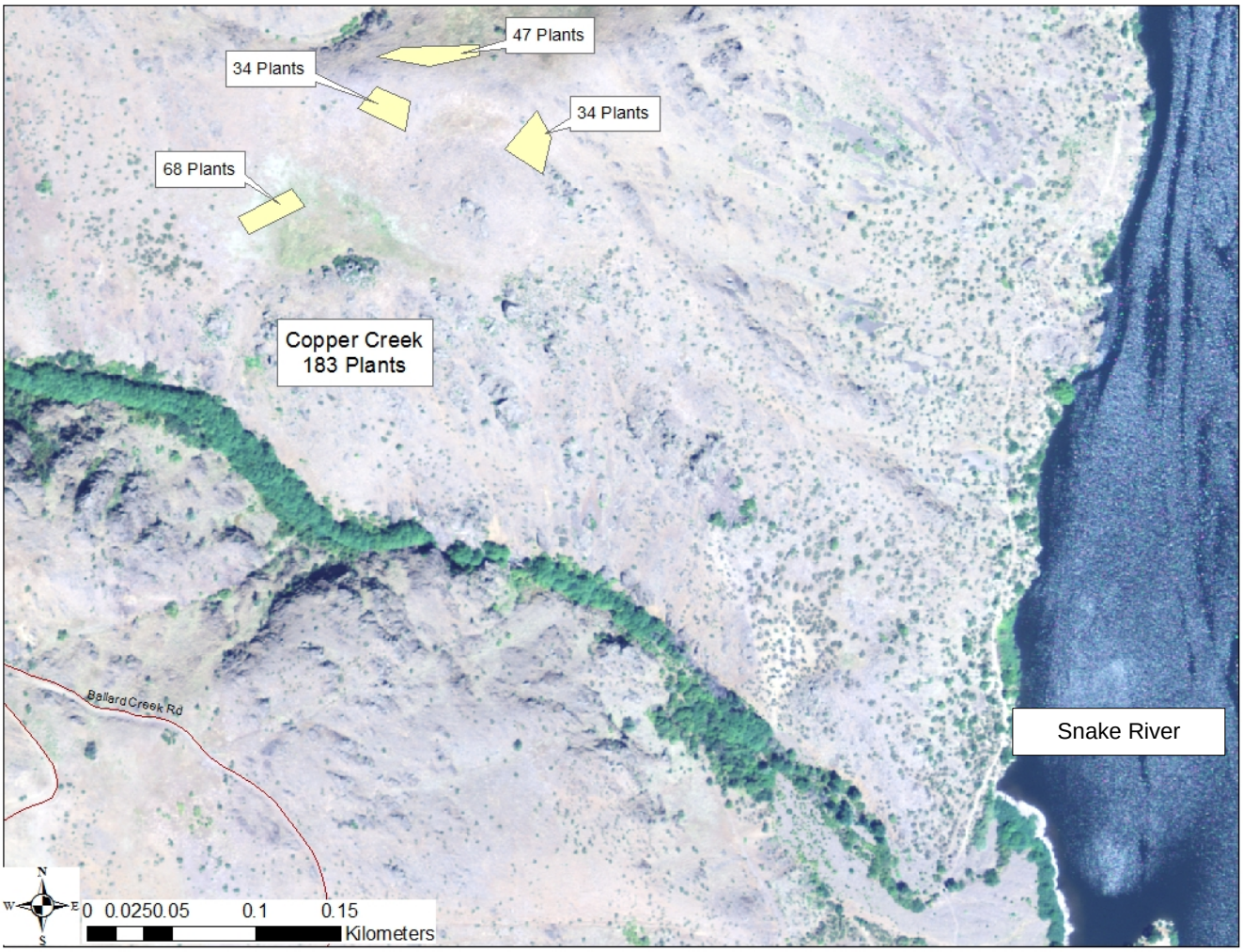
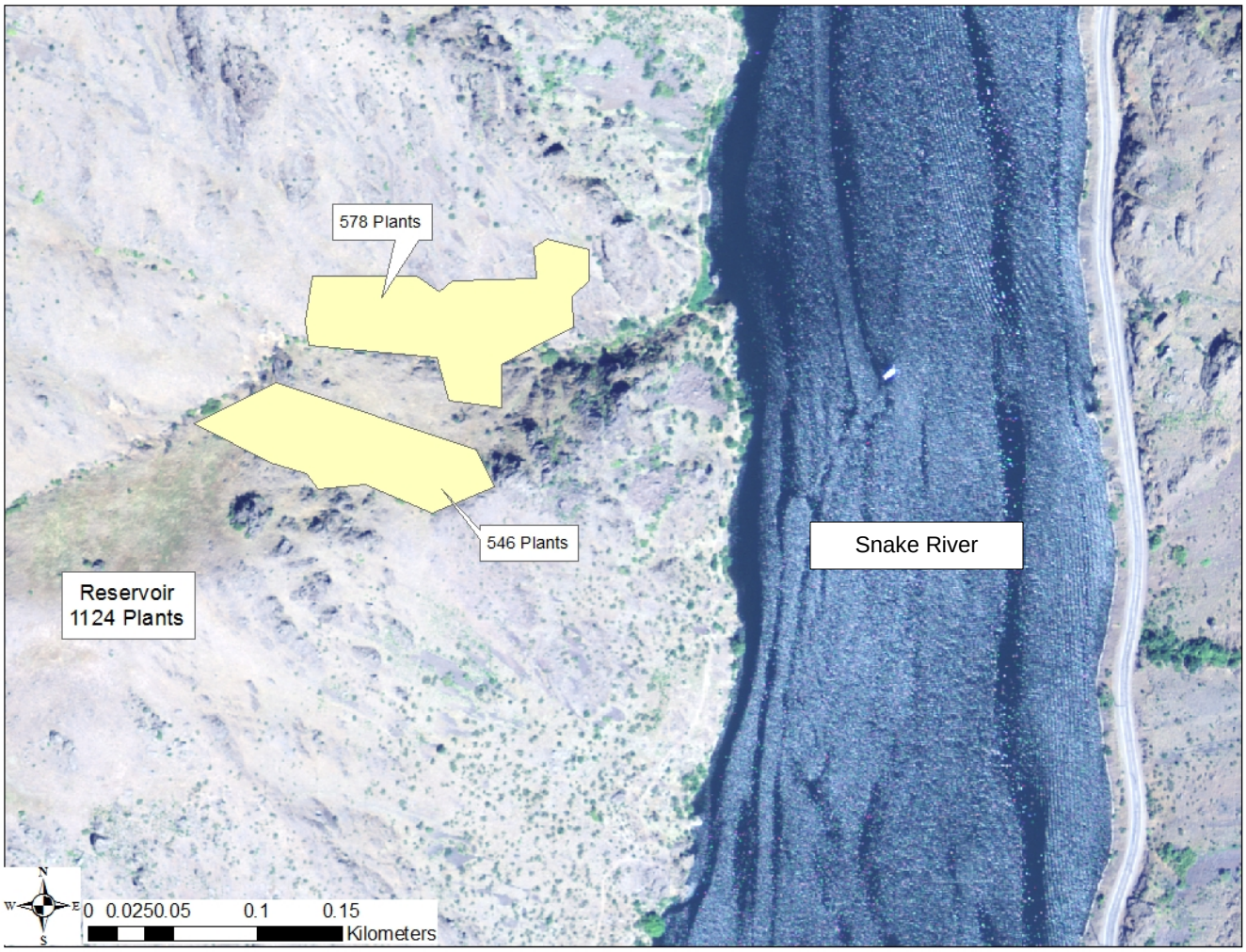
APPENDIX A. MAPS OF *RUBUS BARTONIANUS* OUTPLANTING SITES IN 2016.

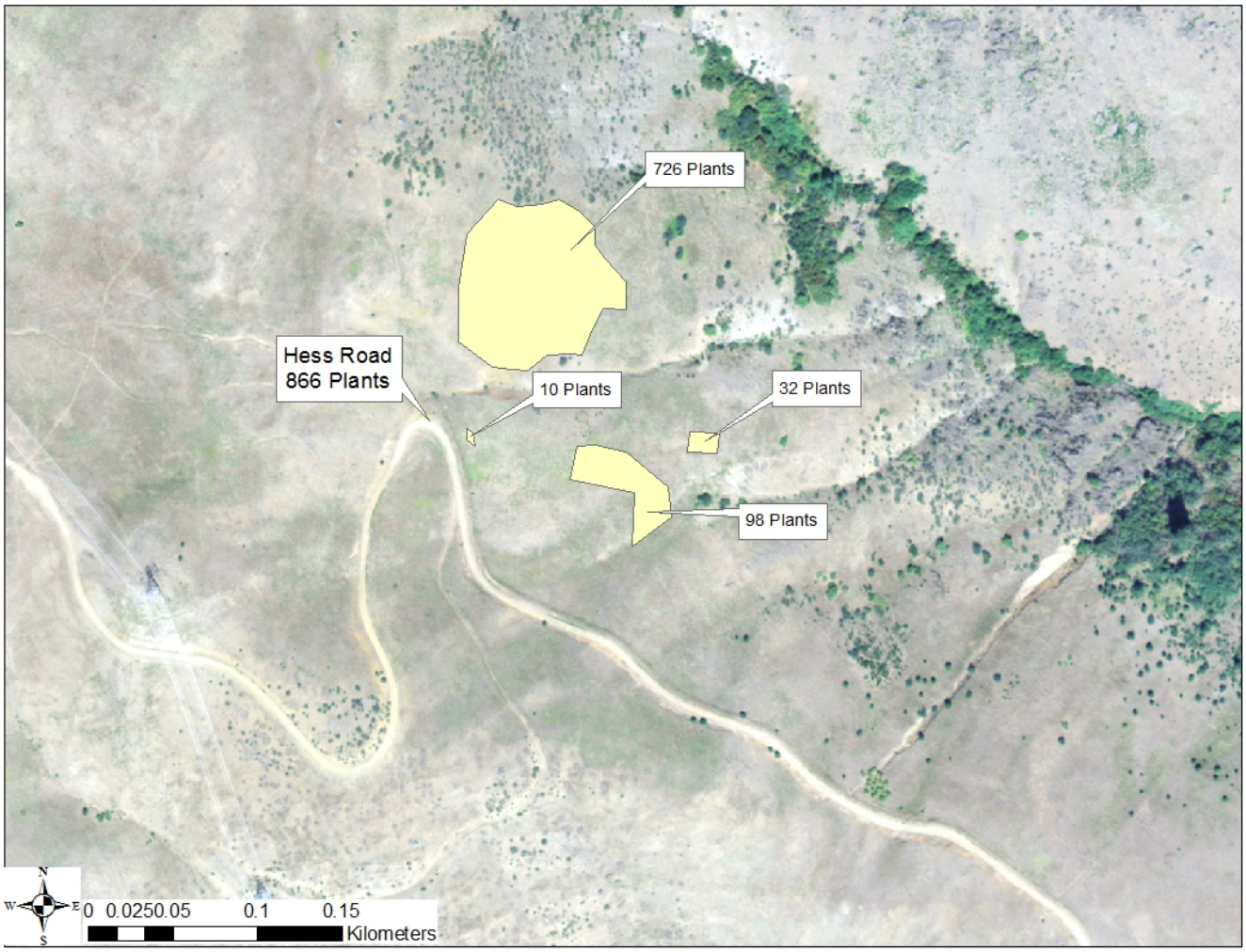
Copper Creek



Reservoir


578 Plants
546 Plants
Snake River
Reservoir
1124 Plants
N
W
E
S
0 0.0250.05 0.1 0.15
Kilometers

Hess Road


726 Plants
Hess Road
866 Plants
10 Plants
32 Plants
98 Plants
N
W
E
S
0 0.0250.05 0.1 0.15
Kilometers