Project completion report to the
Interagency Special Status/Sensitive Species Program (ISSSSP)
Financial Assistance Agreement No. L08AC13768 - Modification 4

Surveys to determine the status of the rare American grass bug (*Acetropis americana* Knight) at historic localities and in suitable habitat on BLM and FS lands in the Willamette Valley of Oregon

Acetropis americana, photo by Celeste Mazzacano, Xerces Society, 2011; specimen courtesy of Oregon State University Arthropod Collection (OSAC)

Deschampsia cespitosa (tufted hairgrass), host plant for the American grass bug; photo from Oregon Floral Project, Bruce Newhouse

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THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION

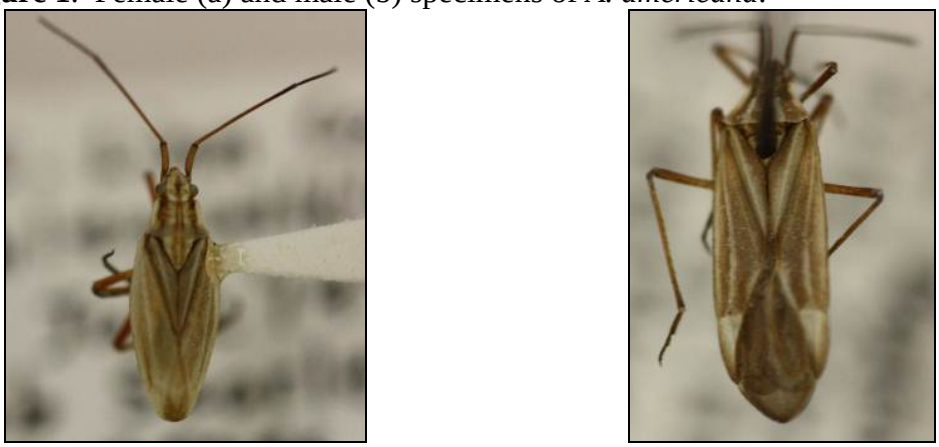
Abstract:
The American grass bug (*Acetropis americana* Knight, 1927) is a rare endemic species known only from a few low-elevation wet native prairie sites in the Willamette Valley of Oregon. The habitat on which this species relies is extremely vulnerable; little undisturbed native grassland persists in the valley, and several of the historic collection localities are destroyed or degraded. The most recent collection record for the species is from a single site in 1985, but thorough targeted surveys for this species did not appear to have been done prior to this effort. In June 2011, Xerces Society staff surveyed historic *A. americana* collection localities as well as additional potential habitat on nearby BLM- and USFS-owned lands, the majority of which is located in the West Eugene Wetlands complex. No *A. americana* were taken at any of the survey sites, raising the possibility that this species has either been extirpated, or is present at such low abundance and/or with such patchy distribution that they are unable to be detected with this level of survey effort.

We achieved all of the major goals of this project:
- determine the criteria for survey areas for the American grass bug by mapping historical collection sites and potential additional habitat
- consult with BLM and USFS botanists and biologists on the appropriate districts and national forests to identify suitable BLM or USFS owned habitat near the historic collection localities
- survey suitable habitat on BLM and USFS land in the Willamette Valley for 7 days (x 2 people) for the American grass bug in June 2011
- revisit historical collection localities for the American grass bug
- record all data including documenting where surveys were conducted
- write a complete report that includes detailed maps of areas surveyed for the American grass bug

Project Background:
The purpose of this project was to determine whether the American grass bug (*Acetropis americana* Knight, 1927) persists in the few historic collection sites from which it was known in Oregon, and to determine whether the species is present in areas of suitable habitat on BLM and USFS lands in Oregon's Willamette Valley. The American grass bug is a rare species that has only been documented from a handful of sites in Benton and Yamhill counties, none of which are on BLM or USFS land. This species is listed as Critically Imperiled by NatureServe and by the Oregon Biodiversity Information Center, and is a Federal Species of Concern. It is thought to be threatened by the displacement of native grass habitat by exotic plants, loss of undisturbed wet prairies, and the damaging effects of fire on tufted hairgrass.

Adults and nymphs of this species have been found only in undisturbed low-elevation native wet prairies dominated by *Deschampsia cespitosa* (tufted hairgrass). Adults are a pale tan to brown color, with black on the antennae and the tips of the legs (Figure 1). Based on collection dates, adults are thought to be active May through June (Knight 1927, Brenner 2005), and by the end of July adults are not abundant (Knight 1927). Specific feeding behavior for this species has not been documented, but other species of mirid plant bugs in the tribe Stenodemini use their piercing-sucking mouthparts to feed on grasses (Schwartz 1987).

Figure 1. Female (a) and male (b) specimens of *A. americana*.



A. *A. americana* female B. *A. americana* male

Photos by Celeste Mazzacano, Xerces Society 2011; specimens courtesy of Oregon State University Arthropod Collection (OSAC)

Only 14 collection records are known for this species since it was first described in 1927, five of which are from the same locality (Finley National Wildlife Refuge near Corvallis, OR). The most recent is from 1985, when a single male specimen was taken by John Lattin from grasslands in the Jackson-Frazier Nature Preserve in Corvallis, OR (OSAC collection). Based on historic collection sites, this species was considered to have a potential distribution in suitable habitat in the Willamette Valley of Oregon and possibly as far north as southwestern Washington (Lattin & Schwartz 1986). However, extensive collections of this species were never made and specific details of its distribution, life history, and positive host plant association remain unknown.

Methods:

Site selection

Historic sites for the American grass bug were revisited (Table 1), with the exception of the 1958 collection site along the Yamhill River around Booth Bend, as conversations with USFS biologists indicated that this area was now farmed under an agricultural use permit. Historic collection sites within the city of Corvallis were visited and walked, but as development had either destroyed or severely degraded the habitat, no transects were surveyed. Historic localities surveyed by Xerces included Jackson-Frazier Wetland in Corvallis and Finley National Wildlife Refuge.

Additional potential habitat to be surveyed on BLM and FS lands was determined first by mapping in ArcView v.10 (ESRI). Land ownership boundaries were overlaid with a USDA GAP land cover layer with the "wet prairie" attribute selected. Individual records for *Deschampsia* were obtained by querying the Oregon Plant Atlas (http://www.oregonflora.org/atlas.php) and added to the map. Potential survey sites were confined to the Willamette Valley; of these, a subset at lower elevations was selected for further investigation, as this species has only been found in low-elevation prairies.

Table 1. Historic collection records for *A. americana*

Site Name	County	Latitude	Longitude	Year
Jackson-Frazier	Benton	44.608581	-123.236904	1985
Booth Bend	Yamhill	45.185086	-123.153992	1958
Finley NWR	Benton	44.411785	-123.324537	1977
Finley NWR	Benton	44.411785	-123.324537	1977
Finley NWR	Benton	44.411785	-123.324537	1977
Finley NWR	Benton	44.411785	-123.324537	1977
Corvallis	Benton	44.570073	-123.297501	1926
Corvallis	Benton	44.570073	-123.297501	pre-1928
Corvallis	Benton	44.558943	-123.299389	1959
Corvallis	Benton	44.570073	-123.297501	1946
Corvallis	Benton	44.570073	-123.297501	1972
Corvallis	Benton	44.570073	-123.297501	1972
Corvallis	Benton	44.570073	-123.297501	1912
Finley NWR	Benton	44.411785	-123.324537	1976

Inquiries about these targeted habitat areas were then made to multiple USFS and BLM staff (Table 2) to obtain more specific site information. There is very little undisturbed, native, *Deschampsia*-dominated wet prairie left in the Willamette Valley, and an even smaller proportion of that is owned by the BLM or USFS. The majority of suitable habitat remaining was found to be concentrated in the areas referred to collectively as the West Eugene Wetlands (WEW).

Table 2. BLM & USFS staff consulted in determining survey sites

Name	Position	Agency
Sally Villegas-Moore	Wetland Natural Resource Specialist	BLM
Chris Langdon	Wildlife biologist	BLM
Cheshire Mayrsohn	Botanist	BLM
Nancy Sawtelle	Plant ecologist	BLM
Scott Hopkins	Wildlife biologist	BLM
Paul Thomas	Wildlife biologist	USFS
Doug Glavich	Botanist	USFS
Joe Doerr	Wildlife biologist	USFS
Molly Juillerat	District botanist	USFS
Dick Davis	District biologist	USFS
Jennifer Lippert	Forest botanist	USFS
Marty Stein	Botanist	USFS
Cindy McCain	Ecologist	USFS
Cheron Ferland	Wildlife biologist	USFS
Jane Kertis	Ecologist	USFS

Survey protocol

Surveys were conducted using a standard sweep net technique, in which the net is swung in a wide arc that sweeps from the bases to the tops of the plants as the surveyor walks slowly

forward through the transect. Sites with abundant *Deschampsia* were more challenging to survey, as the dense, clumped, low crowns of the plants rendered walking difficult. Net contents were examined after every pass through the transect.

Large expanses of wet prairie were surveyed in multiple random polygon transects, concentrating on areas with *Deschampsia* and avoiding areas where the habitat was poor or degraded (i.e. patches of *Phalaris arundinacea* <reed canary grass>) or could not be swept (i.e. clumps of roses, small shrubs). The corners of each polygon were marked visually with flagging and the coordinates were recorded using a Garmin Dakota 10 GPS unit (NAD83). The two-person survey team moved through the entire transect, sweeping an insect net back and forth through and over the tops of the vegetation. Surveys commenced around 8:30-9:30 am each day, and continued until 5-6 pm. The weather during the survey period was warm and sunny, conducive to insect activity. Photographic and specimen vouchers of different Hemiptera netted were taken, although they were obviously not *A. americana*. Specimens were held in screw-cap vials with 80% ethanol until being mounted on paper points.

Results:
Surveys were conducted across three weeks in June, covering the expected period of adult activity: June 13-15, June 21-22, and June 28-29, 2011. Adult *A. americana* are also thought to be active in May, but due to an extremely snowy winter and cold wet spring, conditions were not suitable for surveys in May. Weather conditions on all survey days in June were conducive to grass bug activity--dry, warm, and sunny--except on the morning of June 13 (at Mt. Hebo).

Acetropis americana was not present at any of the sites surveyed; the dominant true bugs found at the sites were Pentatomidae (shield bugs) and meadow plant bugs (Miridae: *Leptoterna*). At many of the historic sites, the habitat was severely degraded. Around Booth Bend, which was not visited, a special farming permit was in use and the area was under agricultural development. The collection site at Finley NWR was invaded by reed canary grass, the historic site at Jackson-Frazier was dominated by shrubs and trees, and the remaining sites in Corvallis were extirpated by development. Multiple *Deschampsia*-rich wet prairie sites in the West Eugene wetlands had what appeared to be suitable habitat, but surveys did not reveal any *A. americana*. It is thus possible that this species has been extirpated.

Site surveys
See Appendix A for a detailed list of survey sites. Multiple polygon transects were surveyed at each site; coordinates represent the approximate midpoint of the overall site. See Appendix B for maps of individual survey polygons within each area.

Mt. Hebo, 06/13/2011, N 45.202874° W 123.711867°:
USFS biologists had informed Xerces staff of the presence of a *Deschampsia*-dominated wet meadow around Mt. Hebo, so it was decided to survey there, although this area is at higher elevation compared to other sites where the grass bug has been collected. Xerces staff surveyed two transects in this area, totaling 778 square meters (sqm). Conditions were not ideal for insect activity, as there were intermittent periods of fog and light mist, although other insects (Hemiptera, Coleoptera, Trichoptera) were taken in the sweep nets. The meadow was very scrubby with many clumps of roses, and showed signs of heavy use by elk. Survey polygons

were confined to the best habitat in the meadow.

Figure 2. Mt. Hebo. Overview of meadow patch

photo by Celeste Mazzacano, Xerces Society, 2011

Finley National Wildlife Refuge, 06/14/2011:
Historic site: N 44.411685° W 123.324676°
Multiple collections of *A. americana* were made at this site in 1976 and 1977. Xerces staff surveyed 619 sqm around the historic collection area, but the habitat did not appear suitable for the species, as the entire region was dominated by reed canary grass, interspersed with patches of rushes in small, wet, low-lying areas.

Finley Prairie: N 44.425939° W 123.306389°
Having done previous wetland sampling work at Finley, Xerces staff were aware of a higher-quality wet prairie in the refuge northeast of the historic *A. americana* collection site. A much higher proportion of native plants, including hairgrass, was scattered throughout this site, and two transects totaling 4420 sqm were surveyed.

Figure 3. Finley NWR

A. Historic site B. Finley Prairie
photos by Celeste Mazzacano, Xerces Society, 2011

Jackson-Frazier, 06/13/2011, N 44.606919° W 123.238343°:
The historic collection site was accessed by wading through the wetland off the boardwalk trail. Proximity to the historic site coordinates was monitored using the GPS unit. The approach to the site was dominated by rushes and cattail, and the habitat around the coordinates was filled in with shrubs and small trees. No sweep netting was done. A large expanse of grassy meadow southwest of the historic site was surveyed as well, but no *A. americana* were found.

Figure 4. Jackson-Frazier

A. Habitat around historic site

B. Meadow south of historic site

photos by Celeste Mazzacano, Xerces Society, 2010

Hansen Prairie, 06/21/2011, N 44.073993° W 123.252686°:
Hansen (See-Sil) is a restored wet prairie on BLM land west of Eugene. The northern portion of this site is oak woodland and scrub/shrub wetland, but the southern/southwestern area is wet meadow with a mixture of sensitive native plants including Bradshaw's lomatium (*Lomatium bradshawii*), Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*), and Hitchcock's blue-eyed grass (*Sisyrinchium hitchcockii*). The site also has scattered patches of weeds such as reed canary grass, common teasel (*Dipsacus sylvestris*) and pennyroyal (*Mentha pulegium)*; these become more pronounced at the southern edge of the parcel, which appears to be more degraded and disturbed, and may possibly follow an old fence line. Six polygons in the southwestern portion of this prairie encompassing 12,870 sqm were surveyed. No *A. americana* were found, and very few Hemiptera were seen apart from shield bugs (Pentatomidae) and meadow plant bugs (*Leptoterna*). Many cinnabar moths (*Tyria jacobaeae),* a species introduced to control invasive tansy ragwort, were also seen.

A single transect comprising 1150 sqm was surveyed adjacent to Hansen Prairie in the Royal Amazon Unit near the Fern Ridge Reservoir, to investigate the habitat in this area. However, this site is not on BLM or FS land and appeared more disturbed, with significant invasion by reed canary grass, so surveys were not continued.

Figure 5. Hansen Prairie

photo by Celeste Mazzacano, Xerces Society, 2011

Oxbow East / Oxbow West / Vinci Prairie:

These three restored wet prairies comprise a contiguous broad swath of BLM-owned land in the West Eugene Wetlands. The sites have abundant tufted hairgrass along with a combination of other native grasses and forbs, including many threatened and endangered (T&E) species. These sites were surveyed across two days because we considered the West Eugene Wetlands to have the largest and highest-quality expanses of low-elevation wet prairie with native plants, including *Deschampsia*, remaining on public land in the Willamette Valley. Because these areas are large, and the presence, distribution, and abundance of the American grass bug is unknown, we decided to maximize our chances of finding the species by surveying a greater number of polygons at each site.

Oxbow East, 06/15/2011 & 06/28/2011, N 44.057192° W 123.187386°

This site had abundant tufted hairgrass and native forbs, as well as patches of reed canary grass, teasel, roses, and pennyroyal. Five polygons comprising 6210 sqm were surveyed. The only Hemiptera found at this site were shield bugs (Pentatomidae).

Oxbow West, 06/15/2011 & 06/29/2011, N 44.056723 W 123.193942°

Habitat in this area had abundant hairgrass as well as many scattered patches of roses and hawthorn. Ten polygons comprising 13,169 sqm were surveyed.

Figure 6. Oxbow East (left) and Oxbow West (right)

photos by Celeste Mazzacano, Xerces Society, 2011

Vinci Prairie, 06/21/2011 & 06/29/2011, N 44.052453° W 123.204172° :
In addition to hairgrass, this site had a variety of forbs plus scattered small trees and patches of rose bushes. Four polygons comprising 9880 sqm were surveyed.

Figure 7. Vinci Prairie

photos by Celeste Mazzacano, Xerces Society, 2011

Speedway, 06/14/2011 & 06/28/2011, N 44.041135° W 123.173527°
Speedway is a restored wet prairie on BLM land in Eugene, southwest of the Vinci/Oxbow complex. This site was surveyed across two days, which allowed us to cover a greater area within a large expanse of what appeared to be very good potential habitat. The BLM site manager informed us that Speedway had not been burned for over 20 years; this was of interest as the effects of the timing of regular burning on inflorescences of tufted hairgrass is thought to be one of the factors contributing to the decline of *A. americana* (Brenner 2005). This site had abundant tufted hairgrass and native forbs as well as a few scattered patches of roses and small trees and some rushes and pennyroyal in low-lying wet areas, but we did not encounter any reed canary grass or teasel in our transects. Seven polygons encompassing a total of 18,107 sqm were surveyed. The only Hemiptera seen were shield bugs (Pentatomidae) and meadow plant bugs (*Leptoterna*).

Willow Creek, 06/14/2011, N 44.037426° W 123.169643°
This site is a restored TNC property with abundant native grasses and forbs, including many T&E species, located immediately south (across the street) of Speedway. Two polygons encompassing 526 sqm were surveyed, but insects taken in the nets did not differ from those seen at Speedway, and the only Hemiptera found were shield bugs.

Figure 8. Speedway (left) and Willow Creek (right)

photos by Celeste Mazzacano, Xerces Society, 2011

Buck Prairie / Lookout Point Lake south, 06/22/2011, N 43.780856° W 122.524987° & N 43.763640° W 122.526142°:
These sites are located on USFS land southeast of Eugene, off Highway 43. Xerces' mapping indicated areas of wet prairie around the Lookout Point Lake reservoir and surrounding river valley. Several of the sites we investigated were not suitable habitat for surveying, however, as many were inundated and more closely resembled scrub/shrub wetland than wet prairie, while those that were not impounded were in a powerline easement area that was mowed, sprayed, and highly degraded. Two polygons in the Buck Prairie area encompassing 4400 sqm were surveyed; this area had been restored in 2001 following removal of scotch broom and had some native forbs but little to no tufted hairgrass. An additional transect comprising 1840 sqm was surveyed in a patch of meadow that had some wetland characteristics, including scattered *Equisetum* (horsetail), but was heavily invaded by scotch broom.

Discussion:
The American grass bug is known as a rare endemic species with historically limited distribution in low wet grasslands of Oregon's Willamette Valley. It is thought to have been taken mostly from *Deschampsia*-dominated wet prairies, although association of *A. americana* nymphs with tufted hairgrass as a definitive host plant has not been described (Lattin & Schwartz 1989). Only a few individuals are associated with each historic record, and this species was never described as being abundant in its known habitats. The Xerces Society targeted surveys at sites where this species was collected in the past, and on BLM and FS lands with potential habitat, but no *A. americana* were taken. Based on surveys done in 2011 of *Deschampsia*-dominated wet prairie on public lands in the Valley, this species may have been extirpated, or else persist at numbers too low to be detected in transect surveys that comprise only a proportion of the total available habitat.

It should be noted that when surveys in targeted habitat areas are unsuccessful, it can be problematic to conclude that the species if definitely absent from the region surveyed. Factors affecting the detectability of a target species include index period, weather conditions, habitat quality, ease of collection, and proportion of available potential habitat surveyed. For Xerces' American grass bug surveys, the best-quality potential habitat available was surveyed using a relatively easy sampling technique, during the proper index period and under nearly ideal weather conditions. However, it was not possible to survey the large expanses of wet prairie completely in the time available, especially in the extensive West Eugene Wetlands. In the absence of exhaustive surveys, the possibility remains that this species may persist at low levels and/or with a patchy distribution.

Recommendations:

Additional surveys:

- Lattin and Schwartz (1986) considered that *A. americana* may be present in suitable habitat in southwestern Washington. To the best of our knowledge, targeted surveys for this species have not been done in Washington, and there are no historic records from this state. Areas of undisturbed wet prairie in southwestern Washington could be mapped and investigated to determine whether this species is present.
- Sweep netting is a straightforward sampling technique that does not require expensive equipment. Additional regions of suitable habitat in the West Eugene Wetlands could be surveyed by staff that manage the sites. Staff could be provided with a pocket guide with photos of *A. americana* and a description of how to discriminate between this species and other commonly encountered Hemiptera. Definitive specimen ID by an expert would still be required, but this may be a venue to allow for more extensive, ongoing surveys.

Habitat management

- If this species persists at any wet prairie sites in the Willamette Valley, it would benefit from habitat protection and restoration that removes or minimizes invasive species and protects native plants in wet grasslands.
- This species is likely most vulnerable to habitat disturbance during the spring and early summer, when nymphs are developing and maturing into adults. Burning as part of an ongoing management plan could have a detrimental effect on the insects during this time.

Acknowledgements:
Funding for *A. americana* surveys was provided by the Interagency Special Status/Sensitive Species Program (ISSSSP). Additional thanks to: Jake Marty, who provided invaluable support and effort as part of the Xerces survey team: Michele Blackburn (Xerces), who generated survey maps; and Sarina Jepsen (Xerces), for reviewing this document.

We greatly appreciate the assistance of Kelli Van Norman (BLM), and the many BLM & USFS staff cited in this report who provided site information and maps. We also thank Chris Marshall (OSAC) for allowing us access to the *A. americana* specimens housed at OSU.

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Appendix A: 2011 Site Survey List

Historic and potential sites surveyed by Xerces for *A. americana* in 2011. Sites are listed roughly in order from north to south

Site name	Historic?	County	Land ownership	Coordinates[1]
Mt. Hebo	No	Yamhill	USFS	N 45.202874° W 123.711867°
Jackson-Frazier	Yes	Benton	Benton Co. Parks	N 44.606919° W 123.238343°
Oregon State University	Yes	Benton	OSU	N 44.570073° W 123.297501°
Finley NWR	Yes	Benton	USFWS	N 44.411685° W 123.324676°
Finley prairie	No	Benton	USFWS	N 44.425939° W 123.306389°
Hanson	No	Lane	BLM	N 44.073993° W 123.252686°
Royal Amazon	No	Lane	US ACOE	N 44.071803° W 123.257992°
Oxbow east	No	Lane	BLM	N 44.057192° W 123.187386°
Oxbow west	No	Lane	BLM	N 44.056723 W 123.193942°
Vinci	No	Lane	BLM	N 44.052453° W 123.204172°
Speedway	No	Lane	BLM	N 44.041135° W 123.173527°
Willow Creek	No	Lane	TNC	N 44.037426° W 123.169643°
Buck Prairie	No	Lane	USFS	N 43.780856° W 122.524987°
Lookout Point Lake	No	Lane	USFS	N 43.763640° W 122.526142°

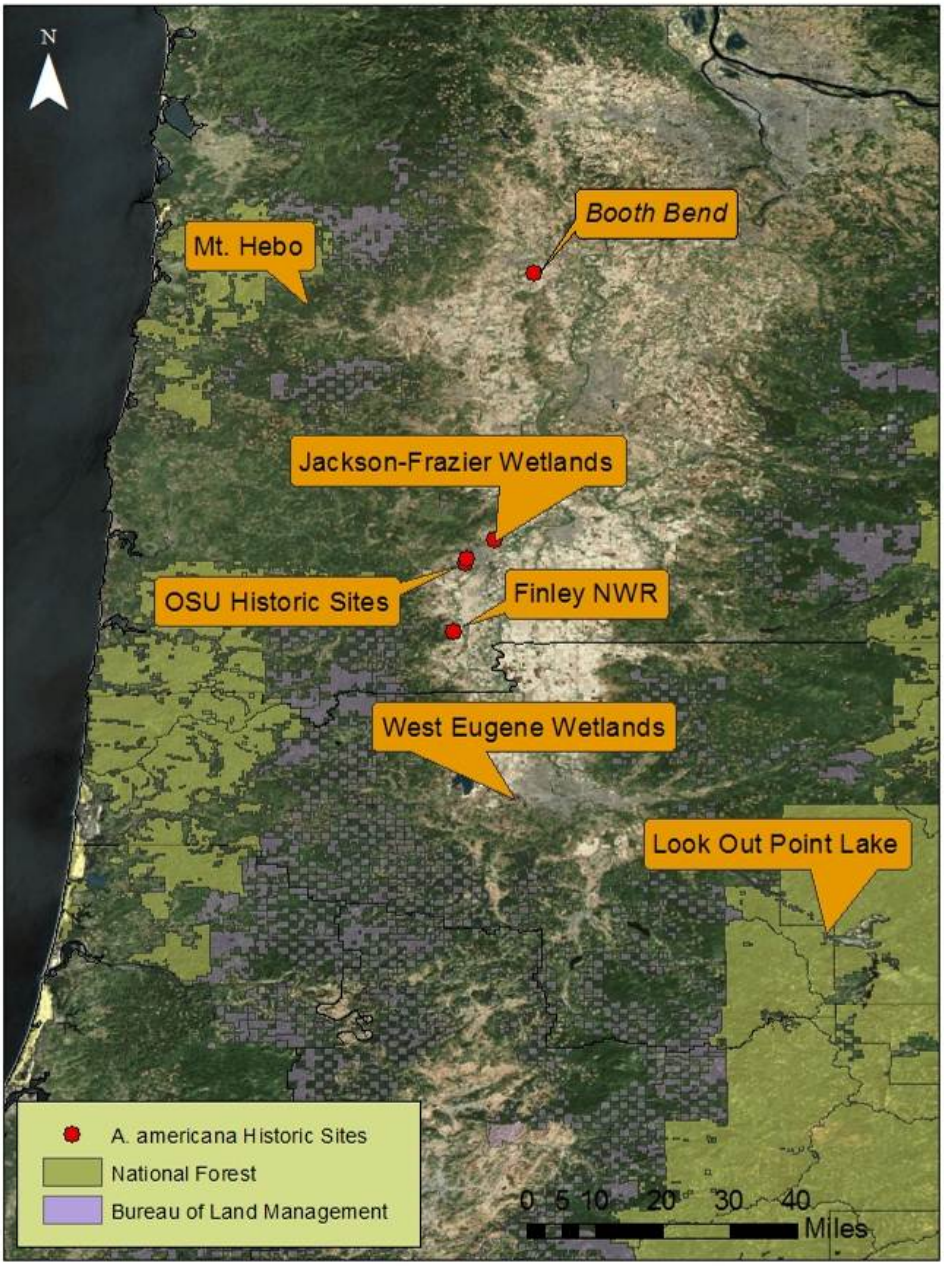
[1]Coordinates represent the approximate midpoint of the overall site surveyed, as multiple polygon transects were surveyed at each site. See Appendix B for maps of individual polygons within each survey area.

Appendix B. Site survey maps

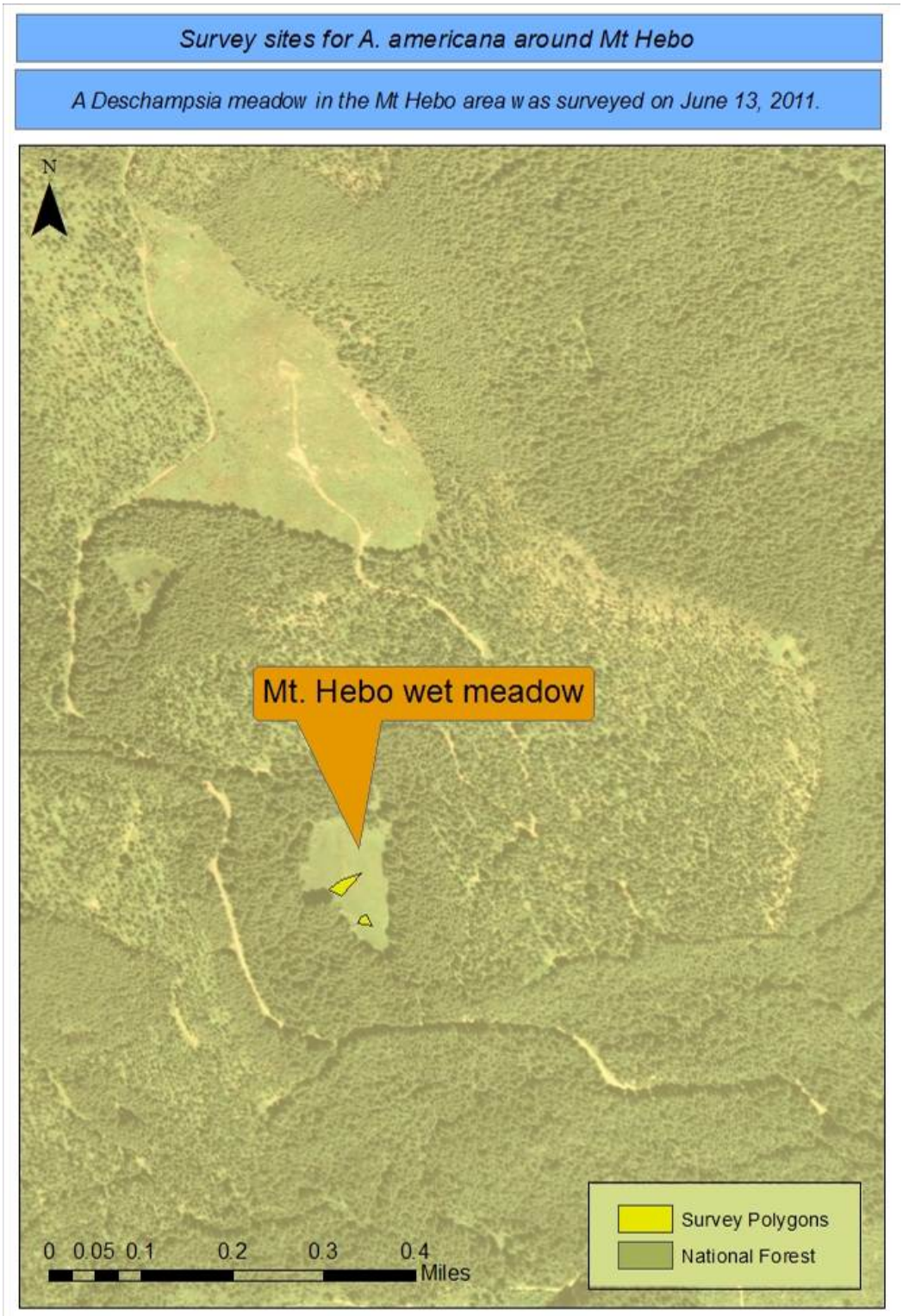
A. Overview of historic and new survey sites for the American grass bug in the Willamette Valley, Oregon. Note: Booth Bend was not visited, as it was indicated to be under a farming permit; OSU historic sites were visited and walked, but the habitat was either severely degraded or destroyed, so no transect surveys were done.

Overview of survey sites for A. americana in the Willamette Valley

Surveys for A. americana were conducted via sweep-netting in June 2011. Labels indicate wet prairie areas surveyed, including historic collection sites (red dots). No A. americana were found at any of the sites surveyed.



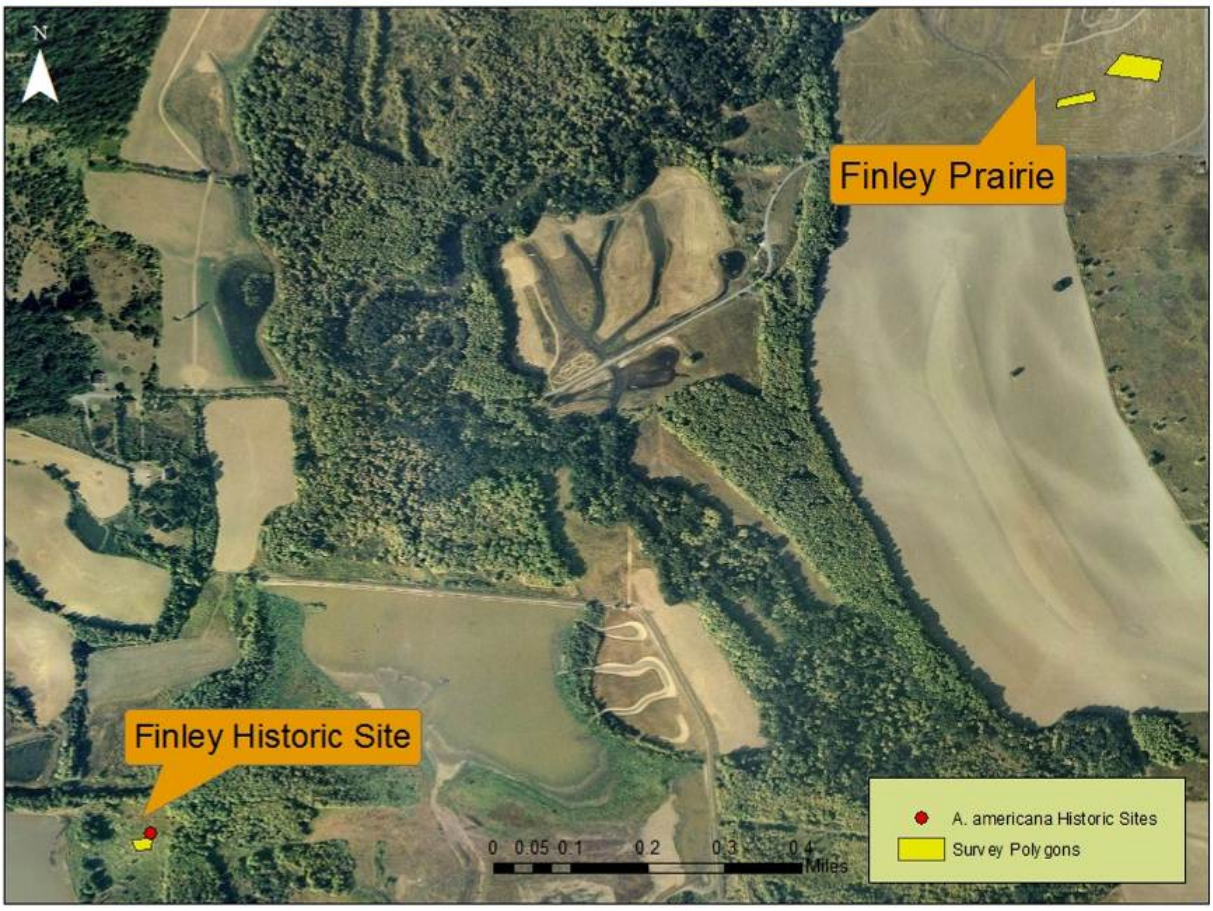
B. Wet prairie site near Mt. Hebo surveyed for American grass bug



C. Wet prairie at Finley National Wildlife Refuge surveyed for American grass bug

Survey sites for A. americana at Finley NWR

Surveys were conducted on June 14, 2011. The historic collection locality surveyed (red dot) was completely invaded by reed canary grass. An additionally area of higher-quality restored wet meadow northeast of the historic site was also surveyed (yellow polygons).



D. Wet prairie at Jackson-Frazier wetlands surveyed for American grass bug

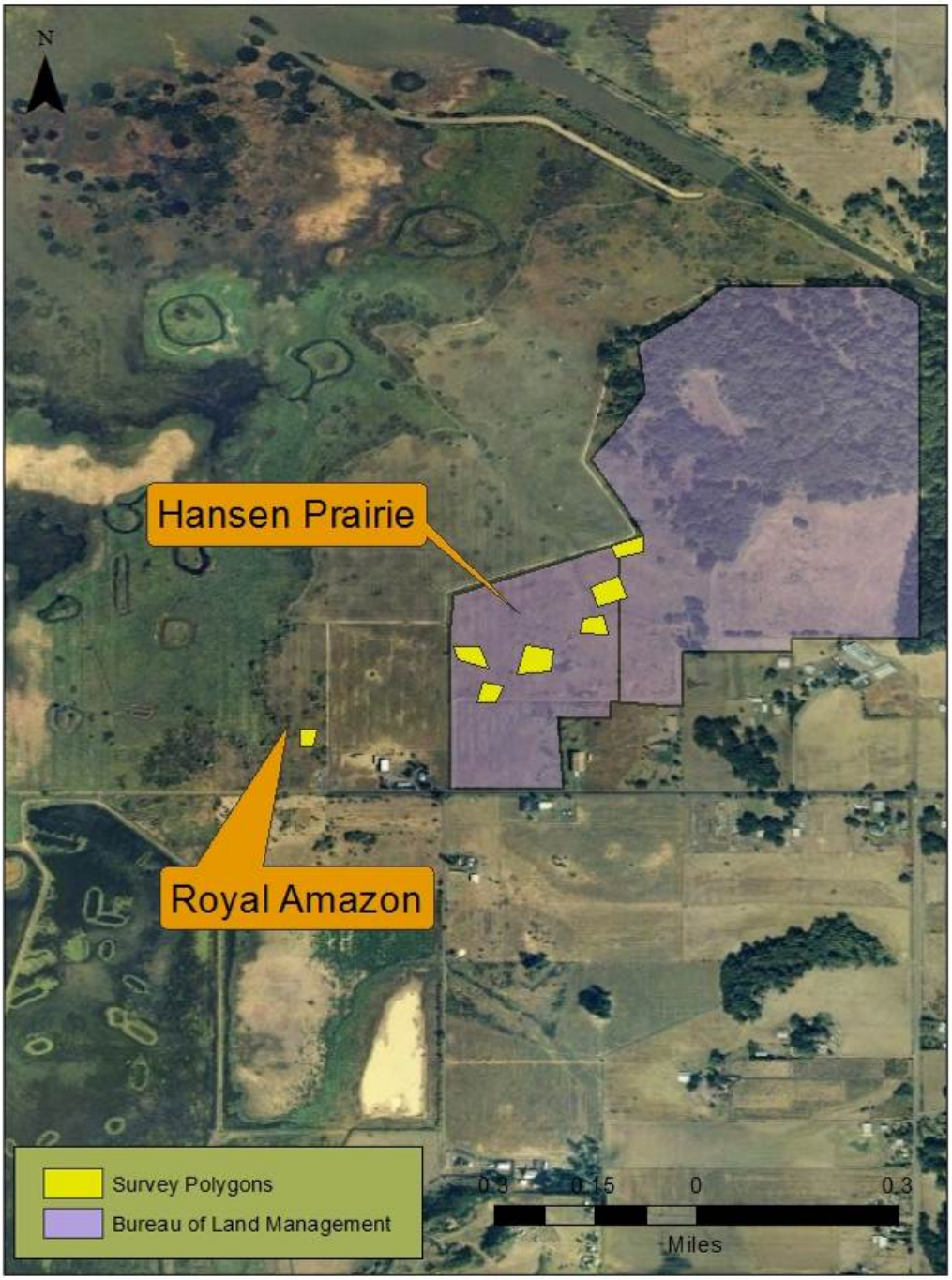
Survey sites for A. americana at Jackson-Frazier wetlands

Surveys were conducted on June 13, 2011. The historic collection site (red dot) was visited but not surveyed, as wet meadow at the site had been replaced by forbs, shrubs, and trees. Additional meadow areas (yellow polygons) south of the historic locality were surveyed.

E. Wet prairie at restored BLM wetland Hansen Prairie surveyed for American grass bug

Survey sites for A. americana at restored West Eugene Wetlands wet prairie sites

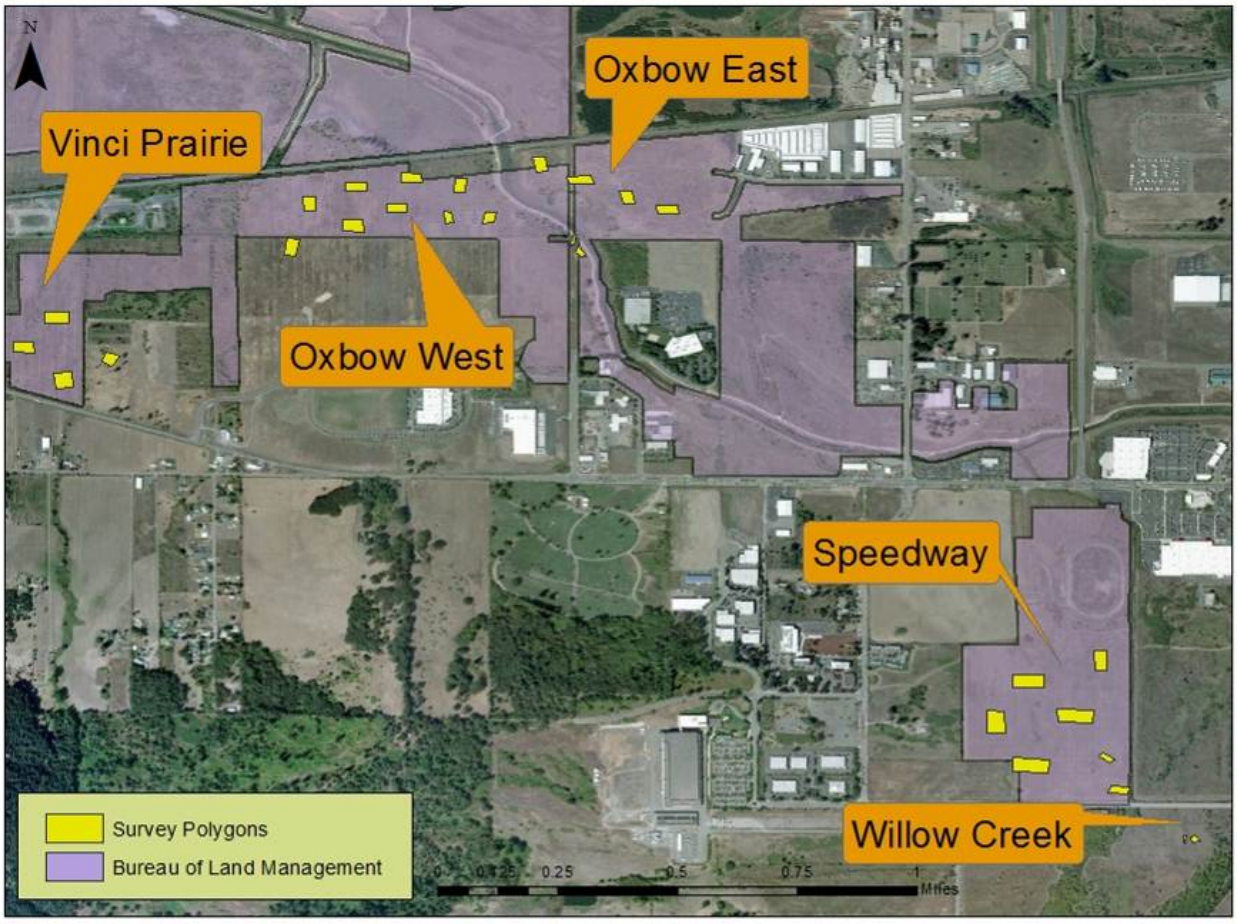
Surveys were conducted on June 21, 2011. The BLM site is restored wet prairie habitat with abundant Deschampsia and other native plants. A small portion of the adjacent Royal Amazon site (U.S. Army Corps of Engineers) was surveyed, but habitat at this site was of poorer quality, with significant reed canary grass invasion.



F. Wet prairie at restored BLM wetland complex in West Eugene Wetlands surveyed for American grass bug

Survey sites for A. americana at restored West Eugene Wetlands wet prairie sites

Surveys were conducted across June 14, 15, 21, 28, and 29, 2011. Sites were restored wet prairie habitat with abundant Deschampsia and other native plants. All wet prairies surveyed were on BLM-owned land except for an adjacent high-quality restored prairie (Willow Creek) owned by The Nature Conservancy.



G. Wetland areas in USFS-owned land south of Lookout Point Lake reservoir surveyed for American grass bug

Survey sites for A. americana in meadows on USFS land along the Lookout Point Lake area.

Surveys were conducted on June 22, 2011. Habitat areas were indicated as restoration areas, but still very disturbed and with abundant non-native species.