

Johnson Prairie Butterfly Mapping

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November 2008

Background

Johnson prairie has historically supported one of the more diverse and abundant butterfly communities on Fort Lewis. Despite weed control efforts, invasive grasses flourish in some areas, and some species of butterflies appear to be declining, especially noteworthy is the state monitor species the valley silverspot (also known as the zerene fritillary). Management activities to control invasive plants and favor native forbs are expected to increase on Johnson prairie in the upcoming years to improve conditions for butterflies. In an effort to inform management planning, and minimize impacts on the butterfly community, we are developing a baseline map of adult butterfly habitat use and *Viola adunca* distribution, the presumed host plant for two resident silverspot butterflies. This approach of mapping adult and larval habitat sites could serve as a model for site-based grassland restoration efforts elsewhere targeting butterflies or other invertebrates with multiple life stages.

Larval Resources

We walked transects in May 2008, noting locations of *Viola adunca* and *V. praemorsa* by patch size and density with the aid of a GPS, in the northeast section of Johnson prairie, an area historically frequented by silverspot fritillaries (Figures 1 and 2).

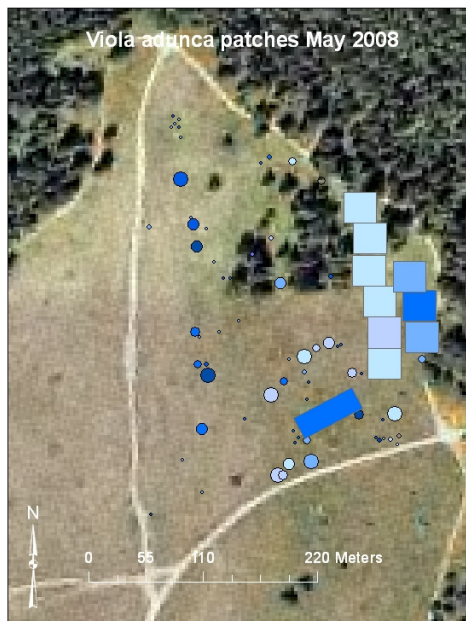


Figure 1. *Viola adunca* patches in NE quadrant of Johnson Prairie, May, 2008. Size of circle indicates approximate size of *V. adunca* patch ($\leq 278\text{m}^2$), and deeper colors represent denser patches (≤ 8 plants/ m^2). Squares (900m^2) or rectangle reflect average data results from transects sampling continuous diffuse distributions.

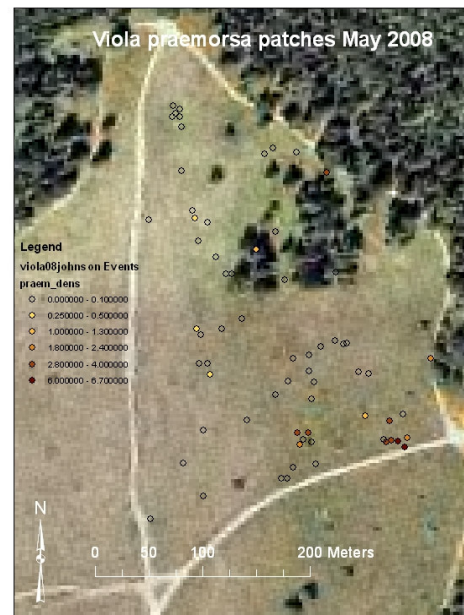


Figure 2. *Viola praemorsa* patches in NE quadrant of Johnson Prairie, May 2008. Deeper colors represent denser patches (≤ 6.7 plants/ m^2). There were additional *V. praemorsa* plants in the swale along the eastern edge, but data were less reliable for that region due to multiple observers.

Adult Butterflies

Bob Hardwick, research chairman for the Washington Butterfly Association (WABA), an association of amateur and professional butterfly enthusiasts, organized volunteers to conduct five monthly (April – August) butterfly mapping exercises on Johnson Prairie during the spring and summer of 2008. The volunteers, led by Bob, surveyed the prairie a section at a time, recording locations and numbers of butterflies observed on a map of Johnson Prairie. They were generally on site from approximately 9:30 am – 3 pm to allow time to cover the entire prairie during a visit.

Four surveys totaling 46.5 survey hours between May and August, 2008 yielded observations of 763 butterflies from fifteen species (Table 1, Figures 3 and 4). A survey conducted in April did not yield any observations of butterflies because the weather conditions did not promote butterfly flight. Common ringlets were the most abundant butterflies, and were observed throughout the prairie. Puget blue butterflies were the second most abundant, occurring at most sites containing lupine plants. Common woodnymphs were the third most abundant butterfly, flying later in the season, and most commonly observed in the southern half of the prairie. Valley silverspots were not observed during any of these surveys, nor by the Fort Lewis RTLA survey team this year, but one individual was observed by Kelly McAllistair on August 3rd on the northeastern edge of Johnson Prairie.

These 2008 results may be compared to observations gathered during a survey effort organized by Maija Morgenweck and Patrick Dunn in 2003 (Table 2). With the exception of common ringlets and hoary elfins, butterfly observations per survey hour were generally lower for most species in 2008 compared with 2003. The number of species observed was also lower in 2008, perhaps due to less survey time in 2008. Butterfly species observed in 2008 but not in 2003 include: 13 spring azures and 1 cabbage white. Butterfly species observed in 2003 but not in 2008 include: 1 silver-spotted skipper (state monitor species), 28 valley silverspots (state candidate species), 6 western tiger swallowtails, 3 pale tiger swallowtails, 1 clouded sulfur, 1 red admiral, 2 Lorquin's admirals, and 3 gray hairstreaks. The distribution pattern of Puget blue butterflies was similar in 2003 and 2008, the species being widely distributed throughout the prairie in both years (Figure 5). The distribution of silverspot fritillary observations in 2008 was concentrated on the east side of the prairie. This is in contrast to the 2003 silverspot observations which included numerous sightings in the 'thumb' and other forest edges on the west side of Johnson prairie (Figure 6).

For another comparison between years, total butterflies counted by the RTLA survey team at Johnson prairie were approximately 15% lower in 2008 compared with 2003 numbers, and number of species observed was also lower. RTLA data show wide vacillations in butterfly numbers on Johnson prairie in intervening years, so the two years, 2003 and 2008, should not be used to quantify a decreasing trend.

Additional hours were spent searching for valley silverspot butterflies outside of Bob Hardwick's survey effort, though none were found other than the single individual by Kelly McAllistair. Valley. Silverspots have become increasingly difficult to locate on Johnson and other Puget

prairies during the last five years. Barry Bidwell's long-term monitoring effort at Glacial Heritage Preserve in Thurston County has also documented a decline in silverspot fritillaries in recent years. The absence of valley silverspots, and the potential decline of Puget sound silverspots is cause to direct habitat improvements for these butterflies. Control of invasive grasses and promotion of violets (*V. adunca*, *V. praemorsa*, and *V. glabella*), the presumed larval food plants for the silverspots, and late season nectar resources, especially showy fleabane (*Erigeron speciosus*), are in progress. Habitat improvements currently target resource islands along the eastern side and western thumb areas of Johnson prairie, with expectations of increasing the number of resource islands and clearing forest 'nooks' along the eastern and western edges in upcoming years.

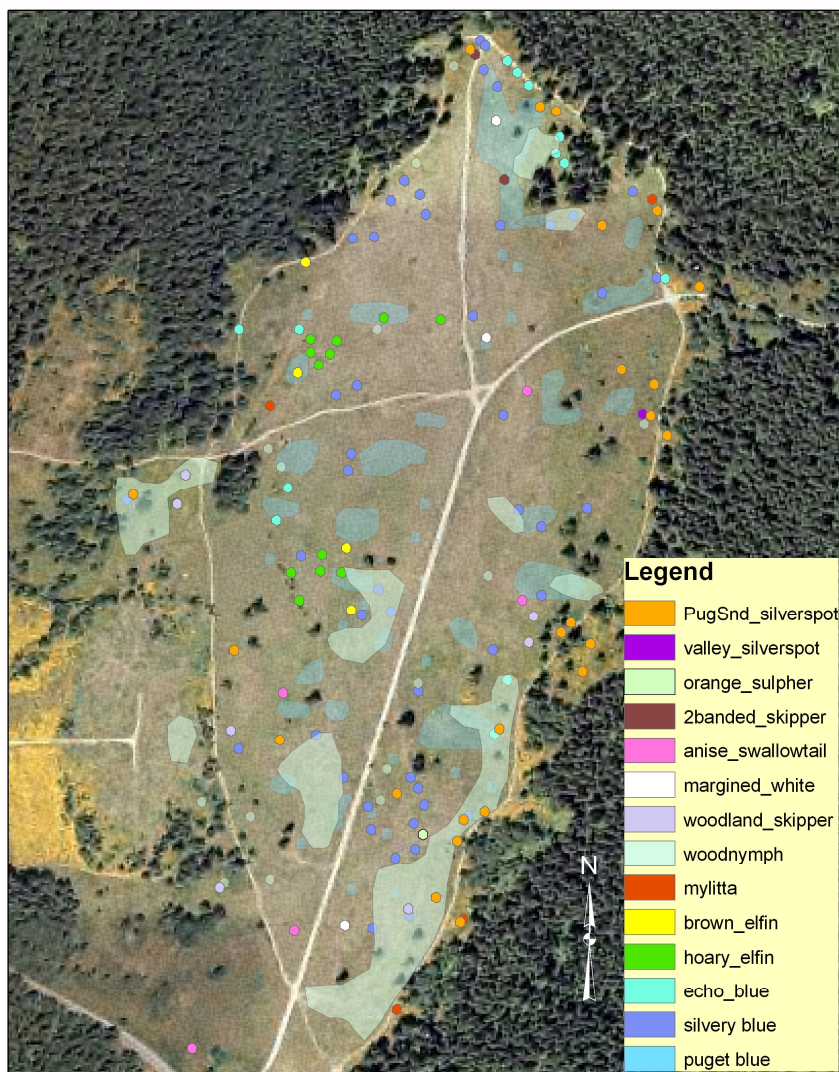


Figure 3. Locations of butterflies, with the exception of ochre

ringlets, observed by Bob Hardwick and volunteers on Johnson Prairie, Thurston County, WA, during the course of 4 survey days, May through August, 2008. The single valley silverspot location was provided by Kelly McAllistair.



Figure 4. Locations of ochre ringlets observed by Bob Hardwick and volunteers on Johnson Prairie, Thurston Co., WA, 2008.

Table1. Summary of butterfly observations during Bob Hardwick's spring and summer 2008 survey effort at Johnson Prairie, Fort Lewis, WA. Species shaded in gray are state candidate or monitor species according to the WA Department of Fish and Wildlife.

Common Name	Scientific Name	May 16	Jun 26	Jul 16	Aug 28	Totals	#butterflies/ survey hrs*
echo blue or spring azure	<i>Celestrina echo echo</i>	13				13	1.4
silvery blue	<i>Glaucopsyche lygdamus columbia</i>	33	13			46	2.2
Puget blue	<i>Plebejus icaroides blackmorei</i>		122	6		128	6.0
common ringlet	<i>Coenonympha tullia eunomia</i>	23	188	127	89	427	9.2
two-banded skipper	<i>Pyrgus ruralis ruralis</i>	2				2	0.2
woodland skipper	<i>Ochlodes sylvanoides sylvanoides</i>				6	6	0.4
marginated white	<i>Pieris marginalis marginalis</i>	3				3	0.3
cabbage white	<i>Pieris rapae</i>	1				1	0.1
hoary elfin	<i>Callophrys polios obscura</i>	12				12	1.3
brown elfin	<i>Callophrys augustinus iroides</i>	3				3	0.3
mylitta crescent	<i>Phyciodes mylitta mylitta</i>	1				1	0.1
anise swallowtail	<i>Papilio zelicaon zelicaon</i>	4		1		5	0.2
common woodnymph	<i>Cercyonis pegala ariane</i>			26	69	95	3.7
orange sulphur	<i>Colias eurytheme</i>			1		1	0.1
Puget sound silverspot (great spangled fritillary)	<i>Argynnis (Speyeria) cybele pugetensis</i>			16	4	20	0.8
Total Butterflies observed		95	323	177	168	763	
# person survey hours		9	12	9.5	16	46.5	
# total butterflies /person survey hour		10.6	26.9	18.6	10.5	16.4	

*These values were calculated as total number of butterflies for that species divided by person survey hours only for surveys during which the butterfly was viewed, considered to be its flight season. The exception was Anise swallowtail, for which total person survey hours included hours from all surveys viewed, along with the survey that occurred between sightings.

Table 2. Comparison between surveys conducted on Johnson Prairie in 2003 (Morgenweck and Dunn 2003) and this survey, 2008.

	2003	2008
Number of butterflies observed	2170	763
Number of species	21	15
Number of survey hours	82.5	46.5
Total butterflies observed / total survey hour	26.3	16.4
Silvery blues / hour	7.19	2.2
Puget blues / hour	8.6	6.0
common ringlets / hour	9.0	9.2
hoary elfins / hour	0.6	1.3
Puget sound silverspots / hr	3.1	0.8
valley silverspots / hr	1.6	0
common woodnymph / hr	16.9	3.7

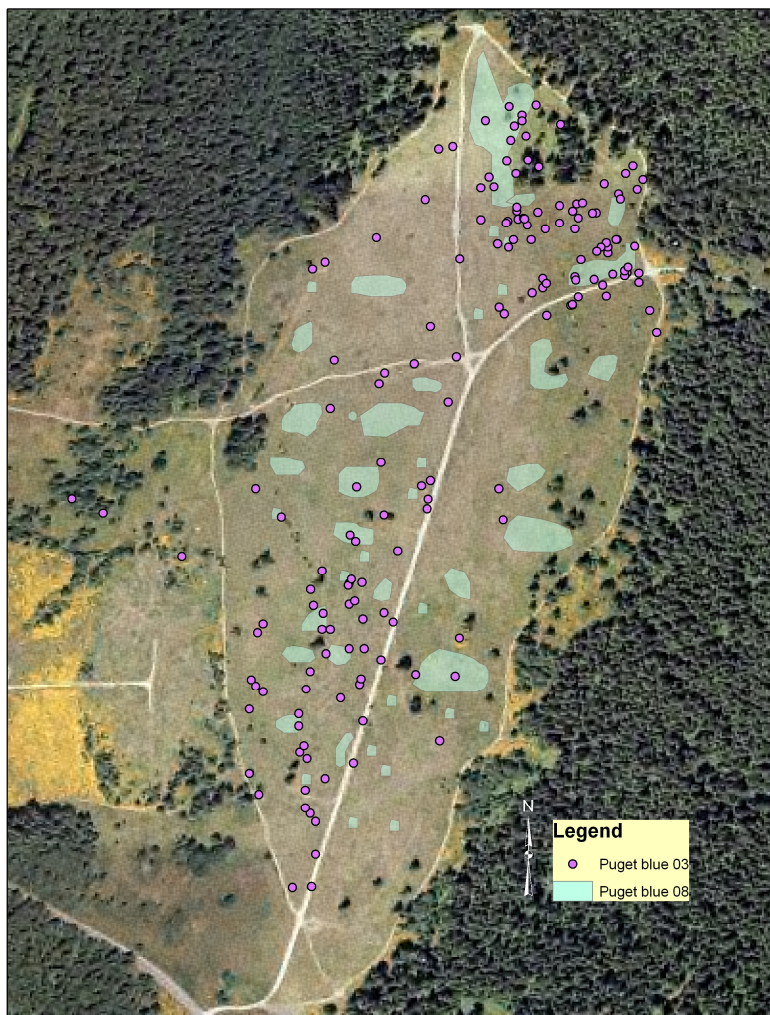


Figure 5. Distribution of Puget blue butterflies in 2003 and 2008, Johnson prairie, Thurston Co., WA.

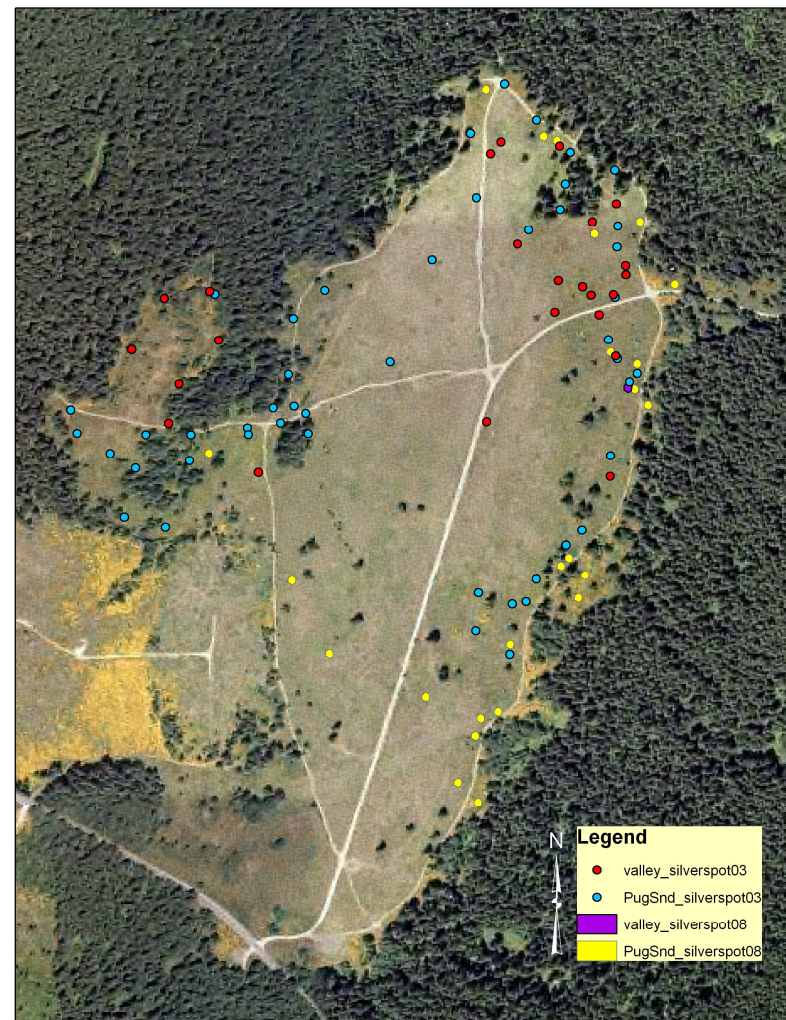


Figure 6. Distribution of valley silverspots and Puget Sound silverspots in 2003 and 2008, Johnson prairie, Thurston Co., WA.