

2011 STATUS OF THE FENDER'S BLUE BUTTERFLY (*Icaricia icarioides fenderi*) IN LANE COUNTY, OREGON: POPULATION ESTIMATES AND SITE EVALUATIONS

Executive Summary

To reduce Fender's blue butterfly census costs and cope with the a lack of trained biologists capable of counting Fender's blue butterfly, it was decided by the Fender's blue butterfly working group in January 2011 to conduct weekly butterfly counts at only a few critical sites and to conduct a more limited count (referred to as a Peak count) at the remaining sites.

Although precipitation during the growing period and crop year was reasonably good, the weather conditions during the Fender's blue butterfly flight period were again some of the worst we have seen. The cooler temperatures and higher than normal number of rainy days and cloudy days in May presented unfavorable weather conditions for butterfly nectaring and egg laying. The low Growing Degree-Day number in May and cool wet conditions in 2011 likely led to a very late emergence and late peak flight period of the Fender's blue butterfly and produced a broad flat curve rather than the normally sharp peak in butterfly numbers that is typically observed.

The Fender's blue butterfly population for the southern Willamette Valley, not including Fern Ridge sites, but including The Nature Conservancy and BLM totaled 573 butterflies in 2011. This was a 62% decline compared to the six year geometric mean of 1507 for 1999-2004, which was a period of years with the highest number of Fender's blue butterflies and prior to the start of a general decline in numbers. The Fender's blue butterfly population in 2011 for all of Willow Creek was estimated to be 392 Fender's blue butterflies which was a 70% decline compared to the six year geometric mean of 1304 for 1999-2004. The Fender's blue butterfly population for all of Coburg Ridge was estimated to be 41 which was a 72 % decline compared the six year geometric mean of 341 for 1993-1998, the years with the highest number of Fender's blue butterflies. The population of Fender's blue butterflies at Fir Butte was estimated to be 136 in 2011 which was a decline of 19% compared to the five year geometric mean of 168 for 2007-2011 (the period with the most consistent data). At Oxbow West in 2011, there was an estimated 2 Fender's blue butterflies compared to 13 in 2010, the lowest since starting counts there.

The main reason for the lower Fender's blue butterfly numbers in 2011 was probably due to unfavorable weather conditions. But the other reason may be because many sites went from having weekly counts to a single peak count. Peak counts occurred at eight out of eleven sites in 2011. Peak count estimates are inherently more conservative than weekly counts because the census may miss the peak flight period and they don't include butterfly counts at the beginning and end of the flight period.

One of the challenges of using the Peak protocol is trying to predict when the peak flight period will be for the Fender's blue butterfly. Two studies were initiated to find a more objective and precise method for estimating the peak Fender's blue butterfly flight period. The first study explored developing a degree-day model and the second investigated whether Kincaid's lupine flower phenology can predict peak Fender's blue butterfly flight period. The results are discussed.

To gain a better understanding of how weather conditions might influence Fender's blue butterfly population counts, weather data and Fender's blue butterfly population estimates were tabulated for all years that butterflies have been counted (1993-2011). Since weather conditions can affect the Fender's blue butterfly differently than field biologists doing the butterfly counts I looked at two different categories of weather data, Growing degree-day units and number of sunny/partly cloudy days and number of cloudy/rainy days for May and June. Weather conditions affecting biologists may have a larger influence on whether butterfly numbers are low, than weather conditions for the butterfly. Weather data analysis indicates that 1996, 1998, 1999, 2010 were all bad weather years for the butterfly yet they did not produce low Fender's blue butterfly numbers. The only exception was 2011. In contrast, 2005 and 2008, which were both bad weather years for biologist, but fair weather conditions for the Fender's blue butterfly, produced very low Fender's blue butterfly numbers for both years.

It is interesting to speculate why the Fender's blue butterfly numbers in recent years continue to be significantly lower than earlier years. One hypothesis for this decline is that unfavorable weather conditions might be more common in the recent past compared to earlier years. Over the span of 19 years of Fender's blue butterfly census work, four out of last seven years (57%) had unfavorable weather conditions (2005-2011) compared to only three out of twelve years (25%) for the period 1993-2004.

It is instructive to look at Fender's blue butterfly numbers at Fern Ridge and Willow Creek

during the period 1999-2011 for important trends that may be occurring. At Fern Ridge, the Fender's blue butterfly numbers have been generally increasing while the numbers at Willow Creek have been generally in a downward trajectory or at the very least, inconsistent with many of ups and downs. Over the thirteen year span there were four years at Fern ridge where there was a decline in Fender's blue butterfly numbers whereas at Willow creek there were seven declines, with the largest decline being 95%. Possible hypotheses are explored to help explain the dissimilar Fender's blue butterfly population trajectories at these two sites, including differences in habitat conditions, vegetation structure, and management strategies.

Based on the positive results at Fern Ridge (in terms of population numbers), the management recommendation for all sites would be to mow entire sites every fall and reduce the abundance of the large stature grasses (using herbicides if possible) and replace them with native short bunch grasses such as California oatgrass and Roemer's fescue.

In 2011 the Degree-day model developed by Len Coop from Oregon State University predicted first flight as much as 2 days early to 11 days later than observed, and it predicted peak flight by as much as 4 days early to 5 days later than observed. These error rates are reasonable, once different degree-day values were determined for Fern Ridge vs. other sites. The online version of the Degree-day model will include links to a more complete spreadsheet of the analysis used to develop the model. It is advised that the model be tested and improved over the next several years. The model was added to the phenology model database online at <http://uspest.org/wea>. The second study investigating whether Kincaid's lupine flower phenology can predict the Fender's blue butterfly flight period revealed that the length of Kincaid's lupine flower stems during June 11-14 (the last time that measurements were taken) averaged 17 cm and the mean number of flower whorls was 8. It is difficult to reach any strong conclusions, after just one season of data collection, about whether Kincaid's lupine at peak flower is a good predictor of peak flight of the Fender's blue butterfly; partly because the 2011 weather conditions were very abnormal. Another year of data collection will provide more certainty whether it can be used to predict peak flight of the Fender's blue butterfly with any accuracy.