

Appendix I. Avian, Botanical and Butterfly Survey Methodology

1.1 Streaked Horned Lark Surveys

Roadside Streaked Horned Lark surveys were conducted between 4 am and 6am by walking stretches of roadside-right-of-way and listening for lark vocalizations. If vocalizations were heard, as soon as light conditions permitted, surveyors visually located the lark, and observed or searched to determine whether nesting was occurring.

1.2 Botanical Surveys

1.2.0 Overall Site Description

Each site was assessed in terms of land use (grazed pasture, ungrazed pasture, relatively undisturbed meadow, tree plantation, etc.), structural layout (completely open, scattered openings, woodland), and site history (when possible: grazed in past, changes in ownership, etc.). Vascular plant species present in target habitats (prairie/savanna/oak woodland) were recorded. Descriptions of the site including the abundance of nectar species, presence of non-native invasive species, and the status of oaks relative to surrounding conifers (overtopped by conifers, losing branches, etc.) were also recorded. Data were recorded on field survey forms.

1.2.1 Covered Species Population or Habitat Description

At sites where covered species were observed, patch perimeters were mapped using a GPS (Global Positioning System) unit and population sizes were estimated. In each patch or population cluster, we estimated plant abundance by counting individuals, or for Kincaid's lupine, by estimating cover occupied by lupine leaves in m² (foliar cover). Lupine foliar cover correlates with lupine abundance, and has been adopted as the standard metric for lupine abundance in the USFWS Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington (USFWS 2010). Kincaid's lupine can have substantial underground clonal growth, making identification of individual plants frequently impossible. Newly discovered Kincaid's lupine populations were assessed for evidence of Fender's blue butterfly presence (i.e. evidence of larvae feeding on young leaves near the plant meristem or eggs on the underside of leaves).

1.2.2 Vegetation Plot Sampling

Vegetation plots (5m x 5m) were sampled in two situations: (1) sites with high quality (high native cover and diversity) target habitats and (2) sites with covered species populations. In both cases we placed multiple plots at a site if there were multiple, distinct, high quality community types, and or multiple covered species population clusters or associated plant community types. In each plot percent cover of vascular plants, bare ground, moss, and rock was recorded. Slope (degrees), aspect (degrees), and elevation (from GIS) were also measured at each plot. Plots were also positioned with a GPS and incorporated into a GIS (Geographic Information System).

1.3 Butterfly Surveys

1.3.0 Fender's blue butterfly

1.3.0.0 Ross Survey Methodology:

Population estimates for Fender's blue butterfly at Fitton Green Natural Area, Beazell Memorial Forest, and on private properties in the Cardwell Hill/Wren area were conducted by counting actual numbers of females and males observed while walking a slow zig-zag meander walk through all Fender's blue butterfly habitat.

Counts were conducted between 10am and 4pm when weather conditions (sunny, warm) stimulated adult activity. Target intervals for population estimates were 5-7 days once adults were present, with subjective adjustments made by the observer as deemed reasonable due to local conditions. Each site is visited a minimum of three times to capture early, peak and late-flying individuals. In a typical year, an adult's lifespan is assumed to be less than 10 days.

1.3.0.1 Hammond Survey Methodology (From Hammond 2007)

Population estimates were made for individual habitat sites by taking the highest count of male butterflies at the peak of the flight season, and doubling that number to account for females (assuming an equal sex ratio). An additional 20% of the combined male-female number was added to this sum to account for butterflies in the tail ends of the flight season that would not have been present on the peak day count. The result is likely a conservative estimate for most populations, particularly for large populations dispersed over large geographic areas where many butterflies are probably missed during the surveys.

1.3.1 Taylor's checkerspot butterfly

1.3.1.0 Population Estimates

Population estimates for Taylor's checkerspot butterfly in the area near Fitton Green Natural Area and Beazell Memorial Forest are made from modified Pollard counts – a

walking tally of all butterflies within a 5-meter radius of the observer along permanent transects. The same transects are used for consistency in the data for year-to-year comparisons. Counts are conducted between 10am and 4pm when weather conditions (sunny, warm) stimulate adult activity. Target intervals for population estimates are 5-7 days once adults are present, with subjective adjustments made by the observer as deemed reasonable due to local conditions. Each site is visited a minimum of three times to capture early, peak and late-flying individuals. In a typical year, an adult's lifespan is assumed to be less than 14 days.

The Taylor's checkerspot population near Fitton Green serves as an indicator for adult checkerspot activity within Benton County as a whole. Visits there to determine the onset of adult activity begin in early April and continue at weekly intervals until checkerspots are observed and formal fieldwork started.

When possible, each population estimate in the Fitton Green area includes a maximum of 3 counts along each of three transects which are then averaged for that site and date. This number is then multiplied by a variable (number) to account for the entire population at that location. Counts at Bezell require visits to five separate areas and needs more time to complete, so only single transect count is made there. This methodology provided a conservative estimate of adults for each site.

1.3.1.1 General Surveys

General surveys for Taylor's checkerspot are conducted throughout the flight period. The surveys include sites visited in past years as well as new sites with potential habitat. Most new sites are on private lands where landowners provide access.

General surveys are conducted, as fair weather permits, around higher priority visits to Fitton Green Natural Area and Bezell Memorial Forest. For each survey, all visible and likely checkerspot habitats are inspected on foot. A visual check for adult checkerspots is always the primary objective. Additional attention is given to the presence and relative abundance of the larval host plant English plantain (*Plantago lanceolata*), and to strawberry (*Fragaria*), cat's-ear lily (*Calochortus*), and sea blush (*Plectritis*) in particular as potential nectar sources for adults.