

RARE BUTTERFLY ASSESSMENT FOR THE COLUMBIA RIVER BASIN IN THE
PACIFIC NORTHWEST

by

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A complete **survey** and **analysis** has been completed of the butterfly **fauna** in the Columbia **River** Basin, extending from the **summit** of the **Cascade Range in Oregon** and Washington east to the Continental Divide **in** western Wyoming and **Montana**. This work **is based** upon the **Atlas of Western USA Butterflies** by **Stanford & Opler** (1993). a county dot distribution atlas of all butterfly species **in** western North America. It is also based upon the Insect collection at Oregon State University (Systematic Entomology **Laboratory**), and upon many years of **collecting** records from amateur **butterfly** collectors that are **currently** being compiled for Oregon and Washington by John **Hinchliff of Portland**, Oregon in cooperation **with** the **Entomology** Department at Oregon State University.

The results of this survey are very surprising and unexpected. There are almost no **rare** butterflies within the Columbia **River** Basin east of the Cascade **Range**. A total of **175** butterfly species **occur** within **this** region. Of these, **137** species (**78%** of the **fauna**) are common and widely distributed. An additional **25** species (**14%**) are at the edge of their ranges **in this** region, and are more common elsewhere. Most of these **are West Coast** species that extend along the east slope of the Cascade Range.

Eight species (5%) are alpine or subalpine species that are **narrowly** endemic to the northern **Rocky Mountains**. However, these species are still widely distributed and are often **abundant within** their restricted habitats. In addition, they are found **in remote**

wilderness areas and national parks that are secure from human disturbances. These species include Pyrgus centaureae, Collas meadii, Lycaena phlaeas, Boloria frigga, Euphydryas gillettii, Coenonympha haydenii, Erebla magdalena, and Erebia theano.

Only 5 species (3%) are truly rare within the Columbia River Basin. Of these, Pyrgus scriptura, Ochlodes yuma, Collas gigantea, and Mitoura Johnsoni are actually common in other parts of North America, and are not candidates for listing under the federal Endangered Species Act as a consequence. Thus, only two butterfly taxa in the Columbia River Basin are potential candidates for federal listing as endangered species, a full species and a geographic subspecies. These include Polltes mardon of the Cascade Range in Oregon and Washington, and Parnassius clodius shepardii in the lower Snake River canyon of eastern Washington. Each of these six taxa are described in greater detail below.

The general absence of rare butterfly species from the Columbia River Basin appears to have an explanation in the historical biogeography of the North American continent. A relatively warm, moist, temperate climate prevailed across much of North America during the late Tertiary some 10-20 million years ago. By 5 million years ago, however, climatic conditions gradually became cooler and dryer, finally culminating in the severe climatic fluctuations of the Pleistocene Ice Ages.

As a consequence, the flora and fauna adapted to the warm, moist conditions of the Miocene period radically contracted their

ranges, surviving only in coastal and southern **refugia** during the Pleistocene period. At the same time, a new flora and **fauna** evolved and adapted to the harsh climatic fluctuations of heat, cold, and drought during the Pleistocene, and became widely distributed across most of North America between the Cascade and Appalachian Ranges. It is this new flora and fauna that prevails in the **Columbia** River Basin today.

By contrast, the old mid-Tertiary flora and **fauna** of the Miocene only survives today in three **refugia** areas of North America. These include (1.) the southern Appalachians and Atlantic Coastal **Plain** extending to northern Florida **and** the Gulf Coast, (2.) the West Coast west of the Cascade and Sierra Nevada Ranges in **California** and western Oregon, and to a **lesser** extent in coastal areas of Washington, British **Columbia**, and southern Alaska, and (3.) in the sub-tropical to tropical areas of **Arizona**, New Mexico, Texas, and most of Mexico.

Examples of **this relictual** flora include the **Taxodiaceae** (redwoods **and** baldcypress), **Juglandaceae** (walnuts and hickories), **Fagaceae** (oaks), **Magnoliaceae** (magnolias), **Lauraceae** (laurels), and **Ericaceae** (rhododendrons and madrones). Examples of invertebrate animals include **many** species of butterflies and moths, including Polltes mardon discussed above and below, many primitive ground beetles, dragonflies, lacewings, **dobsonflies**, caddisflies, and stoneflies. **Examples** of small vertebrates include **many**

amphibians In the families **Ambystomidae**, **Salamandridae**, Plethodontidae, and some frog species of the genera **Ascaphus**, **Rana**, and **Hyla**. Larger vertebrates Include the American **alligator**, **many** kinds of turtles, and some kinds of non-migratory **birds**. Of the latter, the spotted owl (**Strix occidentalis**) of the West Coast, **Southwest**, and Mexico, the red-cockaded woodpecker (**Dendrocopos borealis**) of the Southeast, and the **extinct** ivory-billed woodpecker (**Campephilus principalis**) of the Gulf Coast **are good** examples.

In other words, many of the endangered or potentially endangered species subject to listing under the Endangered Species Act actually belong to this ancient Tertiary flora and **fauna** that **naturally** survive only as relicts In coastal **refugia** along the Atlantic and Pacific **Coasts**, and In Mexico. As an Illustration, the **Animal Candidate Review for Listing as Endangered or Threatened Species** published in the **Federal** Register of November 21, 1991 **lists** over 2000 **taxa**. Aside from migratory **bird** species and those from Hawaii, nearly all of the animal **taxa** on this **list** are found **along** the East Coast Including the southern Appalachians and Gulf Coast: the Southwest including Texas, New Mexico, Arizona, southern **Utah**, and southern Nevada; and the **West** Coast Including California and western Oregon. **Relatively** few candidate species are listed for the Great Plains, the **Rocky** Mountains, the Great Basin, or the **Intermountain** region of the Pacific **Northwest**.

Figure 1 Illustrates this division. The area above the heavy line **may** be described as the Pleistocene Disruption Zone, and the area below the line is the Tertiary **Refugia** Zone. Of approximately **1556** rare **animal taxa** (excluding birds and **Hawai** species), **1290 taxa** (83%) are found In the Tertiary Refugla Zone, while only **266 taxa (17%)** are found within the Pleistocene Disruption Zone. It should be noted that this latter region was often heavily glaciated during the Pleistocene Ice Ages.

Bare Butterfly Species In the Columbia River Basin

1. **Polites mardon** (Mardon skipper)

This butterfly lives **in** wet meadow habitats, and Is a **potential** Candidate for federal listing under the Endangered Species **Act**. The larvae feed on grasses. It appears to be an ancient, **relictual** species of the late Tertiary period that only survives today In four widely disjunct population centers In the Pacific Northwest. It is a rare species because of natural, prehistoric decline **during** the Pleistocene, **rather** than because of **human** disturbance except In western Washington.

One population center **is** located on the **Tenino prairies** near **Olympia**, primarily In **Thurston** Co. Washington. These populations are potentially threatened by human developments and **ecological** s&cession to exotic Scotch broom brush.

A second population center is found in high mountain meadows along the east slope of the **Cascades** near Mt. Adams in **Yakima** and **Klickitat** Counties, Washington. These populations appear to be abundant and **stable at** present, but could be threatened by **land management** practices on the Gifford **Pinchot National** Forest and **Yakima Indian** Reservation.

A third population center **is** found in high mountain-meadows along the summit of the Cascades in Jackson and **Klamath** Counties, Oregon. These populations appear to be abundant and stable at present, but could be threatened by **land management** practices on the **BLM** lands, Rogue River National **Forest**, and **Winema** National Forest.

The fourth population center **is found** in mountain meadows of coastal Del Norte Co. California. These populations also appear to be stable at present, but could be threatened by land **management practices** on the Sir-Rivers National Forest.

2. **Parnassius clodius shepardi** (Shepard's **parnassian**)

This butterfly is completely restricted to the desert canyonlands along the lower **Snake** River in **Whitman**, Garfield, and **Columbia** Counties, Washington. It is a potential candidate for federal **listing** under the **Endangered** Species Act. It **is** potentially threatened by land **management practices** along the Snake River, including future dam construction. The populations require more

detailed surveys to **assess their present** status and threats.

Larvae feed on **Dutchman's** breeches (*Dicentra cucullaria*) that grows in **rocky** areas.

3. *Pyrgus scriptura* (small checkered skipper)

This is a widely distributed species across the Southwest, extending through California, **Nevada**, Utah, Arizona, New **Mexico**, and Colorado. However, there is a widely **disjunct** population reported from western **Montana** in Granite, Deer Lodge, and Powell Counties. The status of this isolated population should be investigated.

4. *Ochlodes yuma* (Yuma skipper)

This is a **widely** distributed species in central **California** and the Great **Basin**, extending across **Nevada** and Utah to western **Colorado**. At **present**, three widely **disjunct** populations are known in the Pacific Northwest. **One** population is found around **Summer Lake and Silver Lake** in Lake Co. Oregon. A second **population** is found near **Zumwalt** in **Wallowa** Co. Oregon. The third population is found in **Grant Co. Washington**.

This butterfly is a Pleistocene relict that lives in **Phragmites** marshes of desert **lowlands**, where the larvae feed on the *Phragmites* reed grass. It was probably widespread **during** the **last glacial**

maxima when lakes and marshes filled the lowlands of the **Great Basin** and Intermountain regions. With the climatic **drying of** more recent times, the butterfly has become a relict in widely **disjunct Phragmites** marshes. Additional populations **will** probably be discovered in the Pacific Northwest with exploration of marshes. and the species is usually abundant within its limited habitat. However, it is potentially threatened by water diversion, livestock disturbance, and other destructive effects upon **its wetlands habitat**

5. Colias gigantea (giant sulphur)

This is a boreal species that is widely distributed across **Canada and Alaska**. In the Pacific Northwest, **it is** restricted to the northern **Rocky Mountain** region in northwestern **Wyoming** and western **Montana**. The larvae feed on **willows (Salix spp.)**, and the butterfly is only found in widely disjunct colonies in natural willow bogs. Because its wetlands habitat is so limited, **it is** potentially threatened by water diversion, livestock **disturbance**, and other destructive effects upon the willow bogs.

6. Mitoura johnsoni (Johnson's hairstreak)

This butterfly **lives in** mature to old-growth conifer forests along the West Coast in California, Oregon, and Washington, where the larvae feed on dwarf mistletoe (Arceuthobium spp.) growing in the tops of conifer trees. It is very similar to the Northern

Spotted **Owl** In Its habitat requirements, and shares almost the same Identical distribution as the owl. However, there are two isolated, **disjunct** populations known from northeast Oregon and eastern **Washington**. One population **is** found In the **mountains** bordering the **Snake** River and Hells **Canyon** In Baker and **Wallowa** Counties, Oregon and adjacent Adams co. Idaho. The second population **is** known from Whitman Co. Washington, possibly extending Into adjacent Spokane Co. and Idaho. These populations are potentially threatened by timber harvest and **particularly** by uncontrolled wild fires. So far, **larvae** have only been found on ponderosa pine (*Pinus ponderosa*) In this area.

REFERENCES

- Stanford, R.E. & P.A. Opler. 1993 . Atlas of Western USA Butterflies Privately **published**, Denver, Colorado. **275 pp.**
- U.S. Fish and **Wildlife Service**. 1991. Endangered and threatened **wildlife** and plants: **animal** candidate review for listing as endangered or threatened species, proposed rule. Federal Register, Thursday, November 21, **1991.**

APPENDIX '1

List of Butterfly Species **Excluded** from Consideration as Rare or Endangered **in** the Columbia River Basin

1. Charlodyas acastus dorothyae

This **taxon** is only found at low elevations along the Snake River In Baker **Co.** Oregon and adjacent Idaho. Recent studies suggest that this is really a hybrid suture zone, an area of **intergradation** between two other subspecies. These are C. acastus acastus to the south and C. acastus sterope to the north. As such, C. acastus dorothyae may not be a valid **taxonomic** entity.

2. Euphilotes rita mattoni

This butterfly Is found In **Elko** Co. Nevada. **It** does not occur in the Pacific Northwest region.

3. Limenitis archippus lahontani

This is not a rare species. It lives In **riparian** habitats along rivers and streams **in desert** lowland areas, where the **larvae** feed on **willows (Salix spp.)**. The butterfly Is widely distributed In southern Idaho, eastern Oregon, and eastern Washington.

4. Polites sabuleti sinemaculata

This butterfly is found in Humboldt Co. **Nevada**. It does not occur in the Pacific Northwest **region**.

5. Speyeria atlantis greyii

This butterfly is restricted to the Ruby Mountains of **Elko Co.** Nevada. It does not occur in the Pacific Northwest region.

6. Polites coras wide distribution
7. Polites mystic wide distribution
8. Polites sonora wide distribution
9. Polites themistocles wide distribution
10. Agriades glandon megalos secure habitat (alpine)
11. Amblyscirtes vialis wide distribution
12. Boloria astarte secure habitat (alpine)
13. Boloria bellona wide distribution
14. Boloria freija secure habitat (alpine)
15. Boloria selene atrocostalis outside Pacific Northwest
16. Boloria selene tollandensis wide distribution
17. Callophrys affinis affinis wide distribution
18. Callophrys dumetorum oregonensis wide distribution
19. Callophrys sheridani neoperplexa wide distribution
20. Carterocephalus palaemon mandan wide distribution

21. Celastrina arcololus echo wide distribution
22. Chlosyne palla palla wide distribution
23. Colias nastes streckeri secure habitat (alpine)
24. Colias occidentalis occidentalis wide distribution
25. Erynnis afranius wide distribution
26. Erynnis l u s wide distribution
27. Erynnis pacuvius lilius wide distribution
28. Erynnis perslus wide distribution
29. Erynnis propertius wide distribution
30. Euphydryas chalcedona wallacensis wide distribution
31. Euphyes vestris vestris wide distribution
32. Euphyes vestris klowa wide distribution
33. Everes comyntas wide distribution
34. Harkenclenus titus immaculosus wide distribution
35. Hesperla juba wide distribution
36. Hesperia nevada wide distribution
37. Inclisalia mossii mossii wide distribution
38. Inclisalia polia obscura wide distribution
39. Lycaena cuprea henryae secure **habitat** (alpine)
40. Lycaena edltha wide distribution
41. Lycaena helloides wide distribution
42. Lycaena rubida perkinsorum wide distribution
43. Mitoura barryi wide distribution
44. Mitoura siva wide distribution
45. Mitoura splnetorum wide distribution

46. Nymphalis vau-album watsoni wide distribution
47. Oarisma parita wide distribution
48. Ochlodes sylvanoides bonnevillia wide distribution
49. Oeneis chryxus chryxus wide distribution
50. Oenels melissa beani secure habitat (alpine)
51. Papilio glaucus canadensis wide distribution
52. Phyciodes pallidus barnesi wide distribution
53. Phyciodes selenis pascoensis wide distribution
54. Pieris protodice wide distribution
55. Polyponla oreas wide distribution
56. Pyrgus centaureae loki wide distribution
57. Satyrium sylvinum putnami wide distribution
58. Satyrium sylvinum sylvinum wide distribution
59. Speyerla egleis mcdunnoughi wide distribution
60. Speyerla egleis oweni wide distribution
61. Thorybes pylades wide distribution
62. Vanessa virginiensis wide distribution

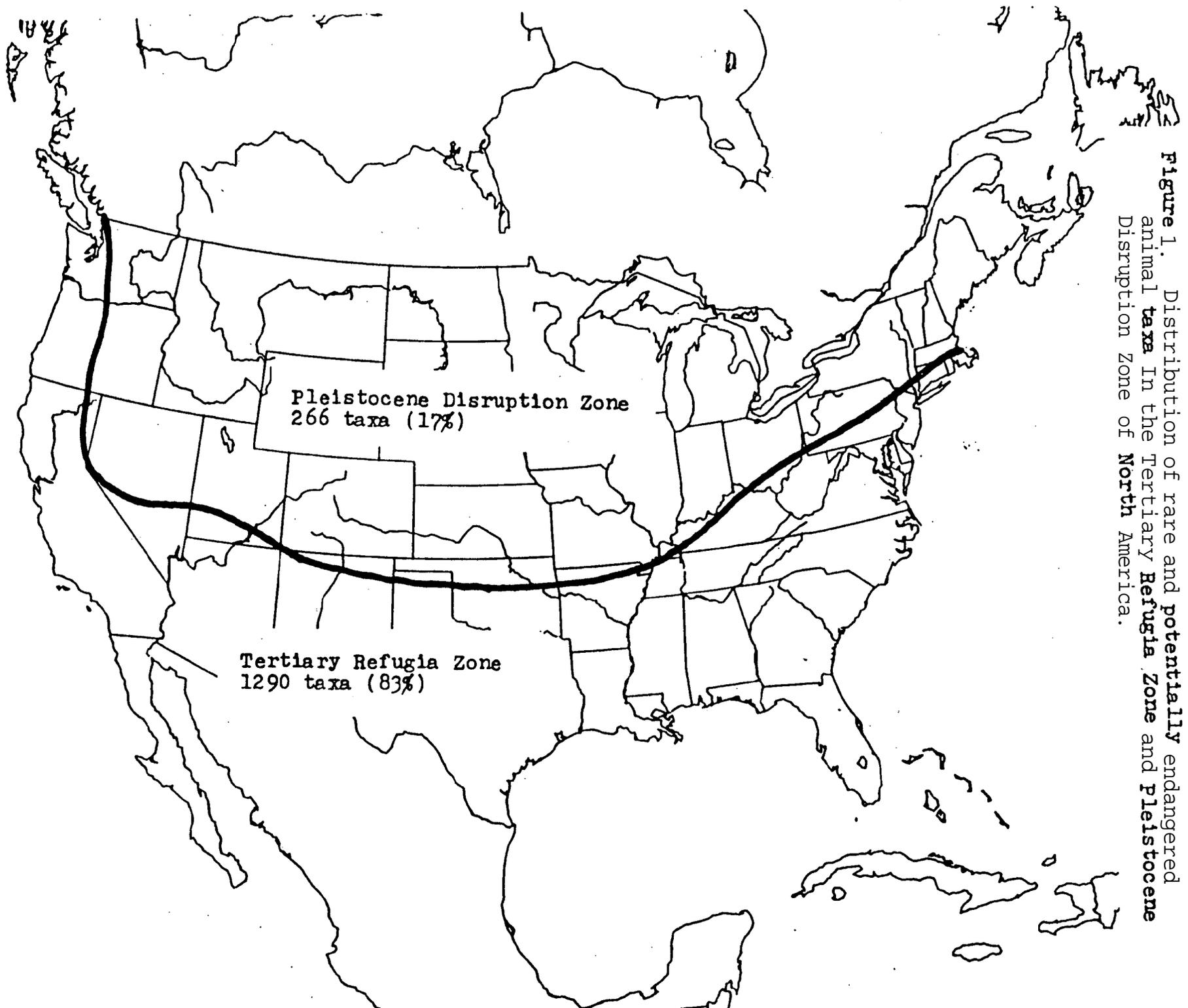


Figure 1. Distribution of rare and potentially endangered animal taxa in the Tertiary Refugia Zone and Pleistocene Disruption Zone of North America.