

Project Proposal

Distribution and Habitat Use of Black Petaltail in the West Cascades of the Umpqua River Basin, Douglas County, Oregon

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Summary: The Black Petaltail (*Tanypteryx hageni*) is perhaps one of the most vulnerable odonates in the Pacific Northwest due to forest management practices and climate change, yet only a relatively few sites are known, particularly in the Umpqua Basin of SW Oregon. As a start to a greater understanding of this species within a large river basin, I propose to sample both expected and unknown or unverified habitats within the basin to better understand their distribution and quantify their use of different habitat types. These findings will serve to allow protection of water sources of a greater number of known sites, elucidate and add to our understanding of habitats used, and provide a basis for further study at multiple scales in the basin.

BACKGROUND/PURPOSE

The Black Petaltail (*Tanypteryx hageni*) is well known by odonatists as a phylogenetically ancient and relatively rare dragonfly that breeds in very specialized habitats. In Oregon, and in much of its range, this species occurs in landscapes that are subject to forest management by both private and federal landowners. The Oregon Conservation Strategy (OCS 2016) identifies Black Petaltail as a “strategy species,” because of its need for specialized habitat such as moist seeps. The OCS recommends to “...assess distribution. Improve understanding of species' habitat requirements, including ability to use a wider range of habitat types than previously observed.” Further, the Oregon Global Warming Commission Subcommittee on Fish, Wildlife, and Habitat Adaptation (2008) expects that effects of rising temperatures and changing precipitation regimes may result in “...decline, extirpation, or extinction of many native fish and wildlife species and populations, especially those dependent on high-elevation, coldwater, or wetland habitats...,” (emphasis added) as well as “...shifts in species' range, especially to northern areas or higher elevations,” and “drying of wetlands and headwater streams.” The habitat of the Black Petaltail is perhaps one of the most vulnerable among western U.S. odonata.

While the Black Petaltail is expected to occur throughout the Western Cascades of Oregon, there are currently only about six locations recorded for the approximately 2000 square miles of the Douglas County Cascades (sources compiled from OdonataCentral.org, iNaturalist, and personal communications with Jim Johnson, Steve Valley, and Chris Beatty).

OBJECTIVES

During the summer of 2019, I wish to survey the Western Cascades of the Umpqua River Basin, eastern Douglas County, Oregon, to find a significant number of new sites and gain new insights into habitat use by the Black Petaltail in the basin. My intent is that an increase in knowledge of distribution and habitat will afford the species greater on-the-ground protection, as well as provide a basis for additional research and monitoring, both within and among habitat patches.

METHODS

I will use a three-pronged approach: 1) random samples of habitats to quantify habitat use, 2) targeted searches in expected habitat, and 3) a volunteer army of searchers (in addition to my searches).

Random Samples. I will randomly select at least 10 sections (1 mi square each) in the western Cascades of Douglas County in which all water habitats will be visited (e.g. streams, ponds, wetlands, seeps). The purpose of this component is to widen the search for Black Petaltails beyond the expected habitat of hillside mountain seeps in order to more objectively quantify habitat use by the species.

Targeted Searches. I will also search for Black Petaltails in at least 25 sites that appear from aerial imagery (e.g. Google Earth) and maps to match our current understanding of habitat preferences of the species. These include open wet meadows that may have associated seeps, mapped “springs,” and relatively open-canopied very small streams. In addition, all known sites in the basin will be visited to see if the populations remain.

Volunteer Dragon Hunters. I have a group of interested biologists and citizen scientists who would like to help me look for new sites. I will give a training session to 20 or more people who will learn how to search for and document the presence of Black Petaltails. These folks will have the option of participating in a one-day Petaltail blitz in the Umpqua Basin, and/or searching on their own time. Note: If it appears my volunteer searchers are successful finding new sites, I will increase my number of random samples and decrease the number of targeted searches I do, in order to strengthen my ability to quantify habitats used in the basin.

I expect most effort will take place in July, but I will begin checking low elevation sites in late May and early June to determine when emergence is beginning. Searches at high elevations will probably continue into early August, depending on the continuation of flight, and some searches may continue for burrows/nymphs/exuviae into September.

At each location visited, I will search not only for flying adults, but also larval burrows and exuviae for the stronger evidence they provide of successful reproduction (Svihla 1959, Raebel et al. 2010). Finds of any of these will be documented with at least one well-photographed individual and an estimate of the total number of each life stage observed and sex of adults recorded. Habitat data will also be recorded, including a description of the habitat, measurement of water temperature, time of day, GPS location, and any additional notes.

All animal and habitat data will be entered in iNaturalist.org to make it available to myself, land managers, and other scientists. Locations will also be entered into Odonata Central. Data analysis will consist of quantifying the rates of occurrence in different habitat types (e.g. streams, ponds/lakes, meadows, seeps) in the 1-section searches. These data may be useful in estimating populations and distribution in the Umpqua Basin Cascades. Means and ranges of habitat parameters will also be reported. Finally, a greater number of precisely located sites will 1) increase our knowledge of the distribution of and habitats used by the species, 2) allow for possible protection of sites, 3) provide data that may be useful for landscape modeling of occurrence within the basin, and 4) provide a baseline for checking populations over time.

LITERATURE CITED

Oregon Conservation Strategy (OCS). 2016. Oregon Department of Fish and Wildlife, Salem, Oregon. <http://www.oregonconservationstrategy.org/overview/>

Oregon Global Warming Commission (OGWC), Subcommittee on Fish, Wildlife, and Habitat Adaptation. 2008. Preparing Oregon’s Fish, Wildlife, and Habitats for Future Climate Change: A Guide for State Adaptation Efforts.

https://www.dfw.state.or.us/conservationstrategy/docs/preparing_oregons_fish_wildllife%20.pdf

Raebel, E., T. Merckx, P. Riordan, D. Macdonald, and D. Thompson. 2010. The dragonfly delusion: why it is essential to sample exuviae to avoid biased surveys. *J. Insect. Conserv.* 14:523-533.

Svihla, A. 1959. The life history of *Tanypteryx hageni* Selys (Odonata). *Trans. Am. Entomol. Soc.* 85:219–232.

BUDGET

Item	***Total	*Currently Secured	**Needed
Field Work (20 da@\$200/day)	\$4000	\$3550	\$450
Data Mgt & Analysis (10 da@\$200/day)	\$2000	\$1000	\$1000
Travel (1900mi@\$0.50/mi)	\$950	\$950	
Supplies (extra SD cards)	\$100	0	\$100
Total	\$7050	\$5550	\$1550

*Contributions from grants, contracts, and six private donors thus far.

**I am continuing to solicit funds. 😊 If I have a shortfall, I am going to complete the project anyway, eating rice and beans.

***Also note that something on the order of \$5000 will be contributed in volunteer time and expense.

RESEARCHER QUALIFICATIONS

*B.S. Wildlife Science 1986

*M.S. Forest Ecology 1998

*30+ years working in western Cascades so familiar with ecosystems and habitats there and getting around in remote forest roads and wilderness.

*As of 2018, I have thus far submitted 2,365 observations of Odonata, documenting 65 species in Douglas County, Oregon, where this study will take place (see iNaturalist.org), including new county records, range expansions, and significant new locations.

*Have developed a routine for photo-documenting odonate observations (each dragonfly photographed from a standard set of 10-12 angles, and damselflies from 4 or 5 angles, see iNaturalist). This affords me a sort of photographic "collection" of the odes I encounter that I and anyone else can study at any time.

*Developed and taught Field Methods for Fish and Wildlife Sampling (NR255) at Umpqua Community College (articulated with FW255 at Oregon State University), since 2017.

*For additional information, see my CV and other info at www.matthewghunter.com/wildlife