

Crowberry Bog (Olympic Peninsula, USA)

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Just north of the Hoh River on the western Olympic Peninsula in Washington State lies a unique wetland called Crowberry Bog (Figure 1). What it lacks in size – approximately 12 hectares – it more than makes up for as the southernmost and only documented raised bog in the western contiguous United States (“Crowberry Bog,” 2021). In recognition of its distinctiveness, the bog was designated as a state Natural Area Preserve by the Washington Department of Natural Resources (DNR) in October of 2019. The 95-hectare preserve protects the bog as well as parts of the surrounding forested area.

When Joe Rocchio first surveyed the bog in August 2011 for the Washington Natural Heritage Program, he could scarcely believe his eyes – or perhaps, his feet? – upon reaching the top of the bog and realizing he had been

walking uphill. Following a multi-year collaborative study, the Washington Department of Natural Resources, Natural Heritage Program (DNR-Natural Heritage Program) and Colorado State University verified that the bog’s topography, hydrologic regime, water chemistry and vegetation were consistent with an ombrotrophic peatland (Rocchio et al. 2021b). The raised nature of the bog results in three ecological zones: plateau (central area of bog), rand (sloping margin of the bog), and lagg (outer transition zone between the bog and adjacent area). The plateau is elevated nearly 3 meters above the surrounding landscape. Peat depth declines moving from the rand to the lagg (Rocchio et al. 2021b). The wetland began to develop following deglaciation of the area 16,000 years ago. The glaciers left a lake basin, which after 16,000 of hydrarch succession, developed into the bog observed today (Heusser 1974).

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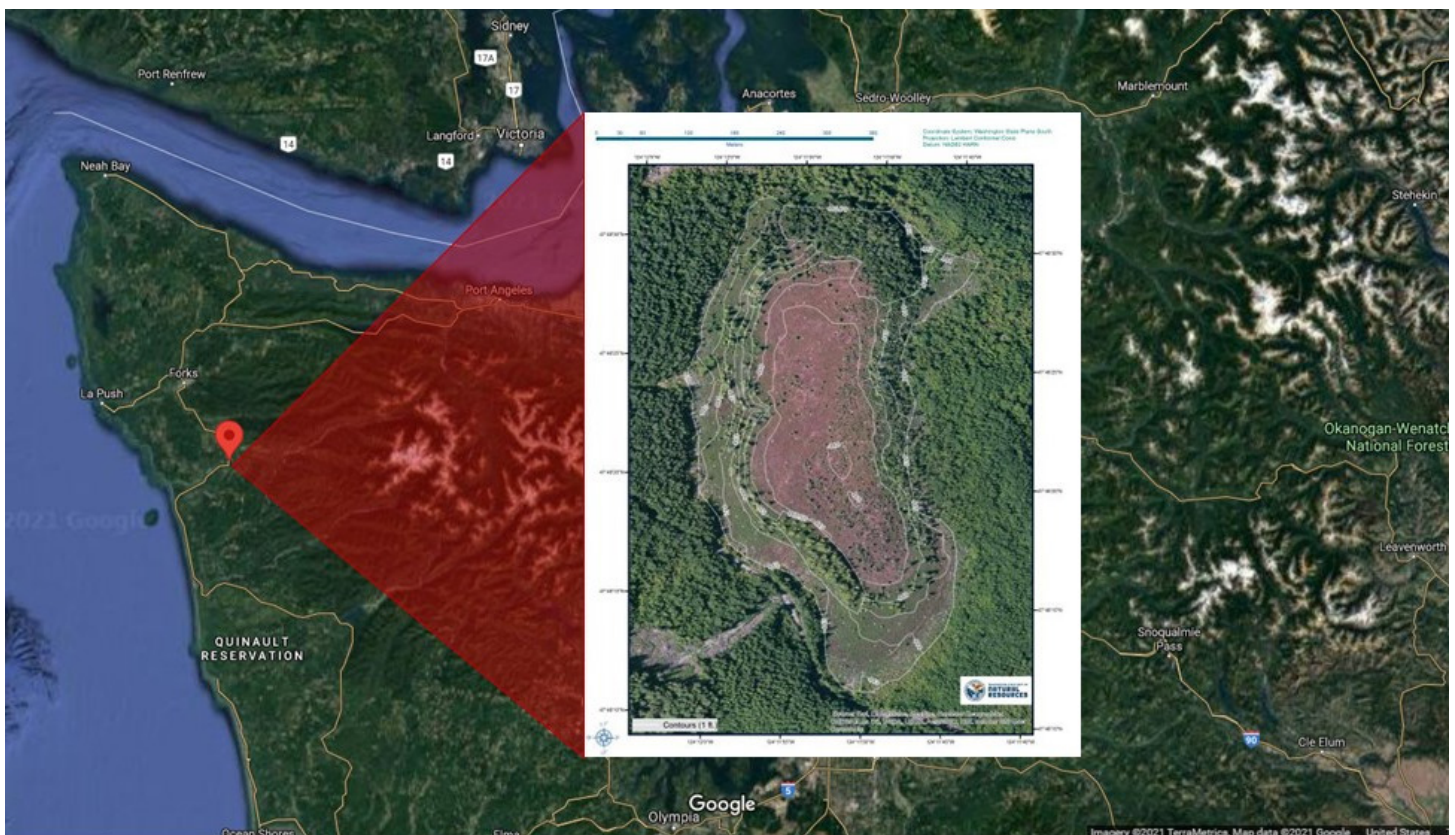


FIGURE 1. Location of Crowberry Bog on Washington State's Olympic Peninsula, with aerial view of the bog (inset). (Courtesy of Joe Rocchio)



FIGURE 2. The plateau dominated by an imperiled plant community of low shrubs of *Kalmia microphylla*, *Rhododendron groenlandicum*, and *Empetrum nigrum*. *Sphagnum rubellum* (seen here in red) and *Sphagnum fuscum* dominate the ground layer. The pink flowers are of *Kalmia microphylla* in bloom. A stunted, bonsai-like western hemlock (*Tsuga heterophylla*) is seen in the right foreground and stunted shore pine (*Pinus contorta* var. *contorta*) are seen in the distance. (Courtesy of Joe Rocchio)

The plateau is dominated by vegetation consistent with rain-dependent peatlands, as well as several globally rare plant communities and two state rare mosses (“Crowberry Bog,” 2021). The bog surface is dominated by red peat moss (*Sphagnum rubellum*), while short-statured western bog laurel (*Kalmia microphylla*), crowberry (*Empetrum nigrum*), and Labrador-tea (*Rhododendron groenlandicum*) are the common shrubs (Figure 2; Rocchio et al. 2021b). Vegetation grows taller towards the boundaries of the bog and gives way to western red cedar (*Thuja plicata*), western crabapple (*Malus fusca*), and coastal rush (*Juncus hesperius*) in the minerotrophic lagg. Given its unique combination of characteristics of a northern peatland at the southernmost extent of its range, and its strong maritime conditions influenced by the proximity to the Pacific Ocean (Rocchio et al. 2021b), Crowberry Bog is a regionally and continentally significant exemplar (Rocchio 2014).

Roosevelt elk (*Cervus elaphus ssp. roosevelti*) and Columbian black-tailed deer (*Odocoileus hemionus spp.*

columbianus) have been observed to frequent the bog, creating trails across the peatland as they forage on skunk cabbage (*Lysichiton americanus*) growing on the plateau (Rocchio et al. 2021b; Rocchio 2014). Black bear (*Ursus americanus*) are also known to frequent the bog.

Perhaps its most notable inhabitant, however, is a butterfly. Two subspecies of the Mariposa copper butterfly (*Lycaena mariposa*; Figure 3) are found in Washington, both of which are restricted to *Sphagnum*-dominated, acidic peatlands on the western Olympic peninsula: Makah copper (*Lycaena mariposa makah*) and June’s copper (*Lycaena mariposa junia*) (Pyle and Hammond 2018). Both are considered globally rare. A population previously believed to be the Makah copper occurs at Crowberry Bog, which was recently shown to be within the transition zone between both subspecies’ ranges. The butterfly uses the native cranberry (*Vaccinium oxycoccos*) as a larval host plant, and is imperiled due to its limited distribution and loss of habitat (Rocchio 2014).

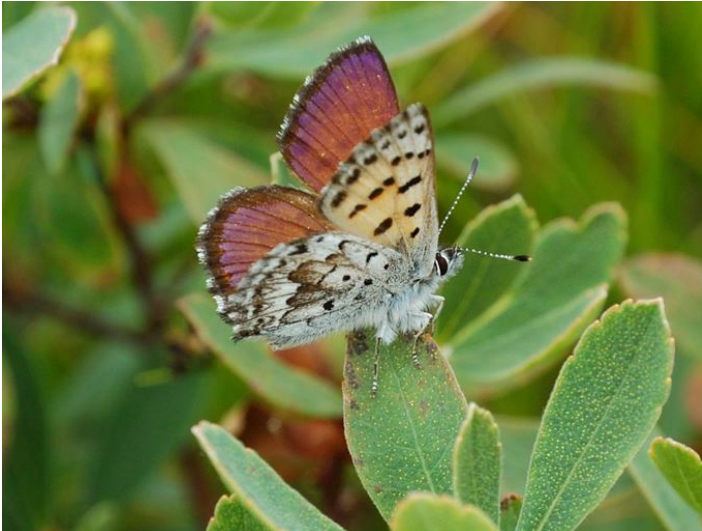


FIGURE 3. The Mariposa copper butterfly (*Lycaena mariposa*) is restricted to *Sphagnum*-dominated, acidic peatlands on the western Olympic peninsula. A population of one of its globally rare subspecies occurs at Crowberry Bog but the specific taxa has yet to be confirmed as it is located within the transition zone between their respective ranges. (Courtesy of Joe Rocchio)

As a precipitation-dependent ecosystem at the southernmost extent of its range, Crowberry Bog is a critical site for understanding the effects of climate change on raised bogs (Rocchio et al. 2021b). Evidence of ongoing peat accumulation in the bog at a rate of 0.64 – 1.1 cm/yr suggests that the bog may also be playing an important role in mitigating climate change by continuing to sequester carbon, though more research is needed to understand the bog’s long-term carbon dynamics (Rocchio et al. 2021b). Five state imperiled plant community types are supported by the bog, all of which are restricted to acidic fens and coastal bogs of the Pacific Northwest region (Rocchio et al. 2021a).

Unfortunately, various factors may be threatening this unique wetland. The predominant land use of the surrounding area is timber harvesting (Rocchio 2014), which may affect the local hydrology, nutrient cycling, and landscape connectivity (Adamus 2014). While the bog itself is under state protection now, past commercial logging occurred in the lagg and left behind cut stumps and fire-scarred snags (Rocchio et al. 2021b). Slash from this harvesting may be blocking water flow in the lagg. Despite this impact, the bog’s hydrology remains intact.

Another potential concern is the effect of trails on exposing the peat surface. Well-worn paths, potentially created by hunters or beargrass and salal pickers for the nursery trade, crisscross the bog and trample vegetation (Rocchio 2014). Especially during the summer months, when vegetation is dry, this can be particularly damaging to mosses and lichens (Rocchio et al. 2021b). User management may mitigate these

impacts and reduce the risk of peat oxidation and subsequent peat erosion that may increase drainage (Rocchio 2014).

Protected as a state Natural Area Preserve, DNR manages the site specifically to maintain the bog’s ecological integrity. Due to the bog’s sensitivity, public access is limited to permitted research and education activities. Currently, there is no established parking or trails, the site is not ADA accessible, and facilities are not available. There are also no formal educational programs available at Crowberry Bog NAP. Public and private universities, other research institutions and individual researchers may contact DNR to propose a research project at the site. If you are interested in pursuing research or educational opportunities at Crowberry Bog NAP, please contact David Wilderman, Natural Areas Ecologist, at david.wilderman@dnr.wa.gov. There is no doubt that this [Wetland of Distinction](#) is truly a one-of-a-kind site and a treasure of the Olympic Peninsula. ■

Note: For a more detailed account of this bog see a presentation “Ecological characteristics of a coastal raised bog, one of the rarest wetland types in the western United States” at: https://botanicgardens.uw.edu/wp-content/uploads/sites/7/2021/03/Rocchio_Crowberry-bog_WABotSymp_03.04.2021.pdf

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