

North Coast and Cascades Network

Climate Change Resource Brief

Pacific West Region
Inventory & Monitoring
National Park Service
U.S. Department of the Interior



High Mountain Lakes

Global climate change is expected to impact mountain lake systems. With over 1,500 mountain lakes in North Cascades, Mount Rainier, and Olympic National Parks, this key and treasured ecological resource is at-risk to rapid and substantial increases in air and water temperature. At-risk are the timing and duration of ice cover and hydrologic regimes (e.g., snowmelt), potentially altering food web interactions, species diversity, and nutrient dynamics. To assess change, North Coast and Cascades Network Inventory and Monitoring Program (NCCN) monitors 20 high-elevation lakes; 6 in Mount Rainier and North Cascades and 8 in Olympic, to identify long-term trends in water quality, biological indicators, and lake physical characteristics.



Staff rafting to water samples locations in a high-elevation mountain lake at North Cascades National Park (NOCA).

Glaciers

Glaciers, sensitive to seasonal variation in temperature and precipitation, are excellent indicators of regional and global climate. Covering a combined area of ~60,000 acres in North Cascades, Mount Rainier, and Olympic National Parks, glaciers have shaped each park's dramatic scenery, topography, and landforms while providing billions of gallons of freshwater for drinking, irrigation, hydroelectricity, fishing, water-based recreation, and wildlife. With small mountain glaciers in rapid retreat in these parks, declining upwards of 50% in the last 100 years, NCCN monitors six 'index' glaciers for yearly mass balance and summer meltwater discharge, and for ten-year glacier area/volume changes.

Old-growth Forests

Tree mortality in old-growth forests of the Pacific Northwest is doubling every 17 years, most likely due to climatic shifts to warmer and drier conditions. Implications are fewer large trees, less carbon storage, forests predisposed to abrupt dieback, and habitat modifications affecting plant and animal composition and distribution. Of the old-growth forests that remain, the most significant—large contiguous blocks—persist in NCCN parks. To track the health of this iconic ecosystem, NCCN monitors trends in tree mortality, recruitment, and growth, and forest structure and composition, as it relates to climate change, in old-growth and mature forests of Olympic, North Cascades, Mount Rainier, and Lewis and Clark National Parks.



National Parks preserve, and NCCN monitors, some of the largest tracts of remaining old-growth in the Pacific Northwest.

Intertidal

National Parks in the North Coast and Cascades Network support the highest diversity of intertidal invertebrates and seaweeds on the west coast of North America (>350 species). While adapted to a harsh wave-swept environment, these marine organisms are especially vulnerable to global climate change through increased water and air temperature, changes in sea level and pH, and increases in the frequency and magnitude of storm events. NCCN monitors water and air temperature at 13 intertidal park sites, and sea level and marine organism abundance and diversity at 11 rocky beach and eight sand beach reference sites.



Staff monitoring plots in rocky intertidal habitat, a hotspot of biological diversity.

Contact Information

Penny Latham, PWR Regional I&M Program Manager, PWRO-Seattle, 909 First Ave., 5th floor, Seattle, WA 98104; Penny.Latham@nps.gov; phone, 206-220-4267.

Mark Huff, North Coast and Cascades I&M Program Manager; Mark.Huff@nps.gov; phone, 253-306-4473.