

Statement of Work
Natural Resource Condition Assessment for
Olympic National Park (OLYM)

Funding Opportunity Announcement: P14AS00048

1. Introduction and Overview

This Statement of Work (SOW) pertains to a Natural Resource Condition Assessment (NRCA) in and adjacent to Olympic National Park in the state of Washington (OLYM; Figure 1). The NRCA will provide an evaluation of current ecological conditions and discernible trends for natural resources and ecosystem processes, identify critical data and knowledge gaps, and highlight existing and potential threats to natural resources and ecosystems within the park. This assessment will rely on existing scientific data from multiple sources, as well as the best professional judgment of an interdisciplinary team of specialists, to evaluate current status and suggest future conditions for natural resources in the park.

The assessment will focus on a subset of terrestrial and aquatic resources and processes selected by the park for particular attention. A list of topics and themes that will be addressed by this NRCA are provided in Table 2.

NRCA Background

Beginning in Fiscal Year 2003, the NPS Water Resources Division received an increase in base funding to assess watershed-scale natural resource conditions within NPS park units. The division's Natural Resource Condition Assessment Program is overseeing these assessments. As a result of input from NPS staff at parks and regional and national level offices, a determination was made to fund a comparable condition assessment for each of the 270-plus parks that have significant natural resources and related values. Each assessment will be generically titled "Assessment of Natural Resource Conditions for [park name]."

The Superintendent and resource managers at the park are the primary audience for the NRCA. It is anticipated that NPS managers will use the NRCA products, findings and conclusions to support:

- near-term strategic planning, such as prioritizing limited staff and budget allocations for natural resource protection and restoration;
- Resource Stewardship Strategy and State of the Park development;
- justifications for natural resources conservation project proposals;
- park efforts to communicate and partner with other stakeholders to address landscape scale resource management issues and educational outreach; and
- public information on park resources for website and social media and for NPS Centennial documents

Olympic National Park

General description of the park and important natural resource topics are provided in Appendix A.

2. Statement of Work

Objectives

The project seeks to interpret and synthesize existing scientific information into a form that park managers can readily apply for use in park decision making and resource planning. By incorporating published research, data from the NPS Inventory and Monitoring Program, additional unpublished NPS data and information and data from other agencies, and relevant professional expertise, the assessment will provide managers and the public with the most current determination of resource and ecosystem conditions available.

The project will result in park specific reports and spatial data that: a) describe park resources in a regional context; b) provide an interdisciplinary evaluation of current resource conditions and discernible trends; c) document critical data gaps and research needs; and d) document high-priority resource management issues.

Overall condition of the Olympic ecosystem will be the focus of the NRCA. Park staff began with the ecological framework in Jenkins et al. 2002 and prioritized a series of questions to be addressed. Some of those will be answered by park staff in a series of resource statements however the current Scope of Work concerns three specific questions described in the next section for which a Principal Investigator and team of experts will be engaged.

Questions to be Addressed

The lands within Olympic National Park have benefitted from more than a century of federal protection. President Grover Cleveland created the Olympic Forest Reserve in 1897. The Reserve was reorganized in 1905 as Olympic National Forest. Theodore Roosevelt turned the Forest into Mount Olympus National Monument in 1909 in order to protect the elk herds, which had already been reduced to fewer than 2000 animals. The present National Park was established by Franklin Roosevelt in 1938.

Throughout this time, our understanding of ecosystems and the impacts of human activities on those ecosystems have greatly expanded. Protections from logging and hunting were once considered “good enough.” Today, we understand that human impacts cross lines drawn on maps and that our parks are impacted by activities on the other side of the world. We’ve also learned that ecosystems can be strongly altered by the addition of non-native alien invaders or by the extinction of native species.

Although widely seen as pristine and protected by its national park status, ecological changes were already in motion before Olympic’s national park designation in 1938: logging efforts were well underway around the park’s boundaries; gray wolves and fisher had been extirpated and mountain goats had been introduced to the park for hunting. The Elwha River had been dammed for hydropower with no provision for fish passage. Human-caused actions set in motion a trajectory of events that has altered the park’s present ecosystem. The park’s ecosystem is evolving and changing in response.

The Natural Resource Condition Assessment (NRCA) for Olympic National Park asks three questions about ecosystem function:

1. What is the current health of the Olympic ecosystem and in what ways does it differ from the way it was before European settlement?
2. What are the ecosystem effects of harvest, poaching, or of declining sensitive species?
3. What species or ecosystem functions are threatened by non-native invaders?

The NRCA will use historical information and available biological clues to characterize past conditions . Thanks to a legacy of careful research and the current Inventory & Monitoring program it should be possible to provide a detailed contrast between past and present conditions. The condition assessment will examine factors that affected the park during that period. A discussion section could provide suggested mitigations or remediations available to park managers to ensure continued protection or to help restore conditions that have been negatively impacted.

Olympic National Park has been the focus of significant amounts of research and holds datasets from past years’ work. These include GIS coverages, vegetation maps, taxa-specific studies (e.g., mountain goats, marmots, elk), an inventory and monitoring program begun in 2002, and work by hundreds of non-NPS scientists whose work is summarized in annual investigator’s reports. Some of the resource topics covered by the three questions are listed in Table 2 along with some suggested data sources.

The three questions listed above require ‘big picture’ analyses of the Olympic ecosystem. The principal investigator and crew will need to thoroughly comb the existing literature housed at the national park and cataloged in the NPS bibliography “DataStore.” It will also be necessary to draw from current knowledge of ecological systems, top-down regulation, reserve design impacts, and other conservation biology topics from the literature.

Addressing the three questions will be conducted through assembling a team of experts whose knowledge extends to a range of topics. The following brief discussions convey the general issues of concern for which there is known data (see Table 2).

1. What is the current health of the Olympic ecosystem and in what ways does it differ from the way it was before European settlement?
 - a. Large animal populations have been greatly impacted through removal of the gray wolf as top predator. Species formerly controlled by wolves include elk and deer which have been studied.
 - b. Meso-predator release caused by wolf removal has had cascading effects through the trophic food web with impacts on other species including coyotes and mustelids. Some meso-predator studies have been done.
 - c. Elk populations have had strong effects on forest vegetation. The park has a history of vegetation mapping, plant inventory, and some forest dynamics plots. Several 1-ha experimental elk exclosures have been in place for decades. Our current "Landscape Dynamics" program based on Landsat imagery may also be useful.
 - d. A lively literature has developed surrounding trophic effects caused by the reintroduction of wolves in Yellowstone. A survey of that literature and a thoughtful analysis of Yellowstone "before" condition could reveal conditions currently in effect at Olympic.
 - e. National parks do not exist in a vacuum. The surrounding social and political milieu are potential limiting factors in how park management views its management options. The park's neighborhood demography and economic setting contribute to our "current condition."

2. What are the ecosystem effects of harvesting, poaching, or of declining sensitive species?
 - a. This question addresses issues of harvest, poaching, and past wildlife management practices.
 - b. Five species of salmonids constituting 70 distinct populations occur in the park. All of the populations are considered sensitive and five are currently listed as 'Threatened' under the Endangered Species Act. Despite significant benefits provided by the current removal of hydropower dams on the Elwha River, sport fishing, tribal co-management, and global issues like climate change are continuing causes of concern.
 - c. The endemic Olympic Marmot seems to be in decline and has been the subject of ten years of recent study. Marmot monitoring is ongoing.
 - d. Northern spotted owls are likewise in decline. Barred owls are increasing in numbers and aggressively displacing spotted owls each year. Study of reproductive success and area occupied by spotted owls has been underway for ten years and is ongoing.
 - e. Marbled murrelets are also in decline and have been monitored in the park.
 - f. Fishers were extirpated from the park in the early 1900's. Ninety animals were released as part of a reintroduction project beginning in 2008. Monitoring is ongoing.
 - g. Amphibians are declining in the park. The park has been a regularly visited "apex" site used in Mike Adams (USGS) "Amphibian Research and Monitoring Initiative" (ARMI).
 - h. Harvesting plants for various purposes has been a continuing issue for park management. These include harvest of salal, moss, and ferns for flower arrangements and horticulture. Illegal timber harvest and mushroom picking are impacts whose true extent are largely unknown.

3. What species or ecosystem functions are threatened by non-native invaders?
 - a. The park has been home to mountain goats introduced for sport hunting purposes in the 1920's before the park was designated. The animals are not native to the Olympic Peninsula. The goats have been controversial since studies conducted in the 1960's and 1970's showed that they were having deleterious effects on mountain vegetation. The goats continue to be an active concern and a detailed history exists on their management.
 - b. Barred owls are non-native invaders displacing Northern spotted owls as noted in (2d) above.
 - c. Noxious weeds... over 200 species of non-native invaders are actively being tracked. An exotic plant management team works in the park each year. But this is an ongoing dilemma.
 - d. Outside impacts from airborne contaminants including persistent organic pesticides, mercury, and nitrogen deposition.
 - e. Wildlife diseases appear to be moving into Olympic animal populations with increasing frequency, possibly related to changing climate.

Guidelines

The standards for NRCA documents are described in detail on the NPS NRCA website (www.nature.nps.gov/water/nrca/guidance.cfm). The core document includes five chapters:

1. NRCA Background Information
2. Introduction and Resource Setting
3. Study Design and Scoping
4. Natural Resource Conditions (see below)
5. Discussion

Chapter 4 - Natural Resource Conditions contains the primary assessment analysis and supporting information for each topic, including:

- a. Description and Assessment Measure
- b. Data and Methods
- c. Reference Conditions/Values
- d. Resource Condition and Trend
- e. Level of Confidence
- f. Data Gaps/Research Needs
- g. Management Recommendations
- h. Sources of Expertise
- i. Literature Cited

Examples of completed reports can be accessed at the NPS NRCA website (<http://www.nature.nps.gov/water/nrca/reports.cfm>).

Other Considerations

Team Expertise - The selected Partner should assemble a team with members that have substantial expertise in the natural resources, processes and ecosystems that are of greatest concern and importance in the park. Specifically, for the OLYM NRCA, the expertise should be particularly relevant to the primary topics described in the three questions. Answering the three questions requires considerable ability in synthesizing data and ecological principles across various disciplines including: predator-prey interaction, top-down regulation, trophic dynamics, fisheries harvest practices and statistics, and ecosystem impacts of invasive species. Expertise should also include experience and background by at least one member of the partner's team for each of the resource topics included in Table 2.

Park-specific focus - All NRCAs will result in a similar set of products as outlined in this SOW. However, each assessment project must consider park-specific variables such as:

- park purpose and significant resources, resource setting, and landscape context (current and historic land-use, adjacent land-use, fragmentation, regional context)
- status of park resource stewardship planning; for example, whether a park has in place a Resource Stewardship Strategy;
- types and amounts of scientific data and information available for use in the assessment;
- other related projects or studies ongoing at the park that may require coordination or data sharing with the NRCA.

Climate Change - The NPS is deeply concerned about the observable and worsening impacts of climate change. A large percentage of current research at Olympic (by both universities and agencies) has centered on the effects of climate change on community ecology, phenology, hydrology, and fire occurrence. These effects may be seen as so over-arching and pressing as to render the above three questions either unanswerable or moot. In light of this reality and in view of the continuing volume of climate-related research, we expect that climate will frequently be mentioned in each of the three questions, but it is our thought to leave the matter of climate change *per se*, out of the current discussions as we need to know and distinguish the non-climate variables that are affecting the condition of the park's natural resources.

Ecological Framework - NPS will collaborate with the Partner to identify the appropriate ecological framework to be used in the NRCA as described in the Guidelines. The framework to be used will be agreed upon between the Partner and the Coordinating Committee (described below) early in the project development process and will be

included in the study plan. There are a number of frameworks that can be considered, including but not limited to an Environmental Protection Agency-Science Advisory Board (EPA-SAB) framework, and the NPS Ecological Monitoring Framework. A partial list of potentially useful assessment frameworks and methodologies is provided on the NRCA program website at nature.nps.gov/water/nrca/frameworks.cfm. A review of completed NRCA projects will also provide additional examples on frameworks previously adopted. Another framework of potential value is the one developed for the OLYM Inventory and Monitoring program in 2002 at http://fresc.usgs.gov/products/papers/onp_framework.pdf.

Reference Conditions - An important part of the project involves the identification or development of appropriate reference conditions against which to assess the current status of identified resources. Reference conditions may be qualitative or quantitative based on existing data and knowledge for a given resource. An additional goal of the effort is to integrate resource condition evaluations across multiple ecosystem components, such as species, communities, and physical processes, to provide syntheses of overall ecosystem condition. Where applicable, ecosystem syntheses will be applied to relevant park areas, such as watersheds, ecosystem/habitat types, or park management zones.

Scientific Integrity - For many resources and processes, sufficient data will not exist to quantitatively assess condition. To maintain scientific credibility, available data and information will be combined with professional expertise to develop valid assessments. Additional credibility will be achieved through transparent, well-documented logic and assumptions, and by communicating a level of confidence associated with all findings and conclusions.

Spatial (GIS) Component - The report will incorporate a strong geospatial component for all topics for which spatial analysis and/or presentation will provide important additional supporting information. (For example, simple presentations of resources in formats that are readily available in existing NPS documents or from other sources may not be necessary unless they are specifically requested by the NPS.) All original spatial data and/or analyses developed by the partner will be delivered as part of the final report, and will include compliant metadata metadata and that meets Federal Geographic Data Committee (FGDC) standards for geospatial content (<http://science.nature.nps.gov/im/units/nccn/datamangement.cfm>).

3. Methods

A project coordinating committee ('Committee') will be assembled by NPS to provide critical project collaboration between the Partner and NPS (Table 1). Additional members will be added to the committee at the discretion of the OLYM staff once the Partner is selected and prior to the first scoping meeting.

Based on this SOW, the selected Partner will:

- draft a Study and Implementation Plan that will be reviewed and approved by the NPS Committee for OLYM;
- in collaboration with NPS, determine the data and information sources most pertinent and useful to the project and compile those materials into the formats needed for project-related analyses;
- provide a multi-disciplinary synthesis of data and information describing current conditions for each topic. The final products will include a written report as well as all relevant spatial and non-spatial data, data analyses and metadata.

During the course of the project, the Partner and the Committee will communicate regularly to assure that NPS has adequate opportunities for input and review of draft products and findings. In addition, the Partner will keep NPS apprised in a timely manner of any potential deviations from the agreed-upon schedule.

Table 1. Preliminary members of the NPS project coordinating committee for the OLYM assessment. Other members may be added or substituted during the course of the project.

Individual	NPS Affiliation	Position Title
Dr. Jerry Freilich	OLYM	Research Coordinator, NRCA POC
Dr. Steve Acker	OLYM	Vegetation Branch Chief
Dr. Patti Happe	OLYM	Wildlife Branch Chief
Sam Brenkman	OLYM	Fisheries Branch Co-Chief
Patrick Crain	OLYM	Fisheries Branch Co-Chief
Dr. Steve Fradkin	OLYM	Marine Ecologist, Limnologist
Roger Hoffman	OLYM	GIS Chief
Louise Johnson	OLYM	Chief of Resource Management
Tonnie Cummings	Pacific West Regional Office	Air Resources Specialist

Project Phases

Phase 1 - The Partner will organize several conference calls with NPS OLYM and NCCN staff to establish specific goals and objectives for the assessment as directed by the priority resources and topics (described below). (Due to the remoteness of the park, site visits will be made if funding allows but are not required.) During and subsequent to these calls/visits, the Partner will work with NPS staff to identify existing sources of scientific data and information useful for the project, and both parties will develop a data-sharing and metadata development strategy for both spatial and non-spatial data.

Phase 2 - Based on the results of the site visits and/or conference calls, the Partner will develop a comprehensive Study and Implementation Plan which will incorporate the goals, objectives, and data management strategy described above. The plan will be reviewed and accepted by the Committee before work proceeds.

Phase 3 - The Partner will produce a draft written report ('NRCA') for the park in accordance with the NPS Requirements and Guidelines for NRCAs described below. (The Partner should be aware that the NRCA national guidelines are subject to change, though it will be the responsibility of the Committee to make the Partner aware of any substantial changes to the guidelines or directives during the project.) The final document will be prepared according to NPS publication directives for the Natural Resource Report series (<http://www.nature.nps.gov/publications/NRPM>). Ongoing communication between the Partner and the Committee will be maintained to assure the quality of the product, and will be the responsibility of both the Partner and NPS.

Phase 4 - Upon delivery of the final draft, NPS will manage its peer review. The Partner and NPS will work together to address and respond to reviewers' suggestions until both NPS and the Partner approve the final document.

Phase 5 - NPS will coordinate the final publication process through the NPS Natural Resource Report Publication program identified above.

4. Focal Themes

A list of priority natural resource elements has been selected by park staff for inclusion in the NRCA (Table 2), and all of these topics should be addressed (i.e. included in Chapter 4). Initial meetings and conversations between the Partner and the Committee will determine the relative amount of effort to be directed to each area and may result in a prioritization of this list.

5. Products

The Partner, in collaboration [or consultation] with the NPS, will produce the following:

1. A Study/Implementation Plan that includes:
 - a. specific objectives and scope of the project based on potential themes, individual park needs, available data, park site visits, and NPS NRCA Guidelines;
 - b. the environmental assessment framework the Partner intends to utilize;
 - c. data management strategy;
 - d. detailed implementation schedule and budget.

2. A final written report for the park in accordance with NPS publication standards (www.nature.nps.gov/publications/NRPM) that includes all of the elements described above under NRCA Guidelines. In addition, the report will include an Executive Summary (5 pages or less), References, and relevant Appendices as determined by the Partner and the Committee. (Suggested appendices include long species lists [e.g. plants], web links, data sources, relevant legislation or management directives, metadata, citations, complex maps or graphics, and expert contact information.)
3. All spatial and non-spatial data and analyses developed for the assessment, with metadata. (Existing data with metadata can be referenced, but metadata must be created in cooperation with park staff for data that are utilized but have no existing metadata.)
4. A final presentation to park staff and their invited associates.

Table 2. Resource topics for which there is known data that would be pertinent in assessing the condition of ecosystem health at OLYM.

Resource Topic	Data Sources (Not Exhaustive)	Comments
Condition of Ecosystem Function		
Missing Species	Victor Scheffer 1995	Excellent historic bibliography
	Peter Dratch 1975	Evergreen College, Wolf Reintroduction to Olympic
Elk-Deer Dynamics	Doug Houston	Several publications
	Chip Leslie	Ph.D., elk and deer, early 1980's
	Schwartz	Exclosure work 1930's
	Coleman Newman	Elk populations and exclosures 1950's
	Olaus & Adolph Murie 1934	Recommended wolf reintroduction
	Kurt Jenkins	M.S. Elk
	Patti Happe	Ph.D. elk and deer
	Jenkins & Fieberg	Modeling of habitat by ungulates 2000's
Mtn Goats	Greg Schorer	Elk on east and west side of park
	Houston, Schreiner, Moorhead 1994	Extensive bibliography
Mesopredators	Kurt Jenkins	Mountain Goat Census results 2011, USGS
	NPS	Forest Carnivore Inventory 2001
	Kim Sager	Black bear movements, Elwha, 2005
	Kurt Jenkins	Bear hair studies 2010's
	Gary Koehler	WDFW 1990's
Marmots	Rob McCoy	Makah Tribe, cougars, bobcat
	Mary Meagher	The Olympic Marmot 1957
	Susan Cox-Griffin	PhD marmots, U of MT 2008
	Julia Witzczuk	M.S. 2007 U of MT. Marmots & coyotes
Prey-Based Studies	Witzczuk, Pagacz, Mills 2013	J. Mammalogy 94(3):702-713
	Andy Carey	PNW Forest Service. Owls and flying squirrels
	Jim Kenagy	UW. Genetic isolation of heather voles
	Corey Welsh	UW Subalpine fossorial mammals
Sociology	Robert Knapp	WWU-Huxley Beavers in the Elwha R
	Ratti et al. 2004	Feasibility of wolf reintroduction: Northwest Science 78, Special Issue, 76 p.
	Calhoun et al. 1999 (Electronic town meeting)	Olympic Natural Resource Center, Battelle, and Elway Research, Seattle

Condition of Ecosystem effected by harvesting, poaching, and decline of sensitive species		
Salmon Harvest	Boldt decision 1974	DOI Solicitors, legal records
	Harvest records	State of WA (DFW) and tribal records
	Lake Ozette Sockeye Listing	NOAA, USFWS,
	Lake Quinault	Weir in operation from 1900, see DFW records
	Elwha	Elwha EIS and FERC proceedings
	Doug Houston	Anadromous Fish in OLYM: Status Report 1983
	Walton 1989	Peninsula College Conference on salmon
	John Meyer NPS	Records on file at OLYM
Landscape Change	NPS records on removing logjams	NPS archives
	DNR HCP for State Timber Harvest	Cooperative Monitoring & Research Committee (CMER)
	NW Forest Plan	http://www.reo.gov/monitoring/reports/15yr-report/
	Thomas et al 2006	Conservation Biology 20 (2)
Marine Derived Nutrients	Cederholm et al 1999	Fate of salmon Fisheries 24 (10): 6-15
	Gende et al. 2002	Fate of salmon BioScience 2002: 52(10):917
Treaty Rights	Boldt decision 1974	and associated proceedings, "The Blue Book"
Marine Survival	NOAA Fisheries	Substantial literature on off-shore effects to fisheries
Effects of invasive species to ecosystem health		
Barred owls	Weins, Anthony, Forsman 2010	J. Wildlife Mngmt. 75(3):531
	Forsman	Many publications
	Anthony et al 2009	Metanalysis of spotted owl barred owl data
Coyotes	Witzczuk, Pagacz, Mills 2013	J. Mammalogy 94(3):702-713
	Halofsky et al. 2011	Adapting to climate change USFS, PNW-GTR-844
Fish	Brenkman NPS	Brook trout, non-natives in Lake Ozette
Plant Invaders	Kohli, Jose, Singh, Batish 2009	Invasive Plants and Forest Ecosystems
	Boersma, Reichert, VanBuren 2006	Invasive Species in the Pacific Northwest
	Chad Jones et al. 2010	Ecological Applications 20:311-326. Predicting invaders
	Lauren Urgenson 2012	J. Ecology. Multiple competitive mechanisms
	Lauren Urgenson et al. 2009	Biological Conservation 142(7): 1536-1541
	Olson and Schreiner 1991	Management of exotic plants in Olympic NP. Unpublished manuscript on paper only. Park records.
	Woodward, Torgerson, Chenoweth, Beirne, Acker 2011	Predicting spread of invasive exotic plants. USGS Open File Report 2011-1048
	Acker in prep	Invasive plants in the Queets watershed
Condition of Air Resources		
Air Resources	NPS Air Quality Division	Will be done by NPS and provided to the partner

6. Roles and Responsibilities

The Partner will:

- collaborate with NPS and other partners in identifying sources of information;
- review park, I&M network, regional, NPS-wide data sources, and other relevant data sources for each resource topic prioritized for the park;
- compile, assess, and summarize existing information to assess the ecological condition of priority resources;
- communicate with NPS to identify watershed, habitat and/or ecological assessment framework(s) to use in the project;
- organize and lead the conference calls or meetings identified in the SOW;
- conduct work and report findings in a manner that meets Department of the Interior policy and guidelines for integrity of scientific and scholarly activities (<http://www.doi.gov/scientificintegrity/index.cfm>);
- meet NPS publication format guidelines and standards;
- ensure all geospatial data products in compliance with NPS Geographic Information System Data Specifications for Resource Mapping, Inventories, and Studies; (adherence to the spatial, tabular, and documentation format/content requirements will be critical); submit geospatial products to the Committee for NPS review when the project is 75% completed;
- provide metadata in compliance with Federal Geographic Data Committee (FGDC) and NPS Profile elements, including the documentation of processing steps involved in creation of final GIS products (if applicable);
- assure the ability of NPS to share or distribute products both internally and with external partners, allowing for confidentiality of T&E species information and for copyrights or permissions;
- create cartographic products in a format that adheres to the National Park Service's Graphic Identity Program standards (<http://imgis.nps.gov/templates.html>).
- provide NPS all supporting data, including GIS-related coverages, metadata, documentation, reports, etc. from the project.
- clearly acknowledge NPS in any published material and presentations.

The NPS will:

- assign a Key Official and NPS Project Manager. The NPS Project Manager is the NPS point of contact for the Partner, will lead the Committee, and will coordinate between the Partner and other NPS park unit staff, the NPS Pacific West Regional Office (PWRO), and the North Coast and Cascades Inventory and Monitoring Network (NCCN I&M). The NPS Project Manager will participate in project management decisions throughout the duration of the project and serve as a liaison with Partner personnel regarding compliance with NPS resource management objectives and policies pertinent to the conduct of this project;
- participate in project development and planning, review interim and final products in a timely manner and participate in meetings as needed;
- assign, as appropriate, other NPS staff including OLYM park staff, NCCN and other I&M staff, PWRO staff, and/or NPS Water Resources Division (WRD) staff to collaborate with the Partner to provide guidance, technical assistance, and logistical coordination as needed;
- coordinate and collaborate with the Partner during information/data collection and status assessment to ensure that the synthesis is consistent with the project goals. Such collaboration may include: access to GIS data layers and information, limited GIS assistance by NPS staff, participation in the development and review of the interim and final reports;
- provide NPS source data and information where available for the subject Parks including data located in Servicewide NPS databases, relevant NPS unpublished documents, and unpublished spatial and non-spatial data located at OLYM and NCCN I&M;
- clearly identify and acknowledge Partner in all published material and presentations;
- coordinate and complete the publication process according to NPS NRR guidelines.

7. Projected Project Schedule

Table 3. Projected Timeline and Responsibilities.

Milestone	Description	Date	Responsible
Project Initiation		September 2014	Partner/NPS
Site Visit/Scoping Meeting	NPS and Partner convene to share NPS data	As soon as possible after funding, no later than Nov. 1 2014	Partner/Committee
Development and Acceptance of Study Plan, including data mgmt., data sharing, and metadata	NPS and Partner discuss and agree on indicators, datasets, methodologies and data management	Feb. 1, 2015	Partner/Committee
Information Collection and Review	Acquire and prepare for analysis (if necessary) all necessary data and information	March 1-June 1, 2015	Partner
Assess Resources	Conduct resource assessments to develop initial findings regarding condition of resources	May 1 - Dec 31, 2015	Partner
First Draft Report	Submit first draft of NRCA with Committee input as needed	Dec. 31, 2015	Partner
Draft Report Review	Committee provides timely response and input	March 1, 2016	Committee
Draft Report Revision	Submit final draft report for NPS peer review	June 1, 2016	Partner
NPS Peer Review	NPS submits final draft report to selected peer reviewers	June 1-Oct. 1 2016	NPS
Prepare Final NRCA	Incorporate peer review and NPS comments and submit Final Report	Nov. 1, 2016	Partner
Present Findings	Present findings and final report to NPS	Nov. 1, 2016	Partner
Final Publication	NPS publication in NRR	Feb. 28, 2017	NPS

8. General References

Jenkins, K., Woodward, A., and Schreiner, E. 2002. A framework for long-term ecological monitoring in Olympic National Park: Prototype for the coniferous forest biome. Forest and Rangeland Ecosystem Science Center, US Department of the Interior and US Geological Survey. Prepared in cooperation with Olympic National Park. 96p.

APPENDIX A. GENERAL INFORMATION FOR OLYM

Olympic National Park is the centerpiece of the Olympic Peninsula, a 13,800 km² landmass in the extreme northwest corner of the conterminous United States. The Peninsula resembles an island because it is surrounded on three sides by water: the Pacific Ocean to the west, the Strait of Juan de Fuca to the north, and Hood Canal to the east. The southern boundary is usually considered to be the Chehalis River Valley. The Olympic Mountains rise from sea level at the coast to culminate on Mt. Olympus at 2430 m. Geologic uplift, heavy precipitation and a dynamic glacial history have created a radial pattern of 11 major river valleys centered in the mountains.

The Olympic Mountains intercept moisture-laden Pacific winds, resulting in a significant rainshadow effect. Olympic National Park is the wettest spot in the conterminous United States; the west slopes of Mount Olympus receive about 200 inches (508 cm) of precipitation per year, whereas less than 34 miles to the east, precipitation is less than 20 inches (50.3 cm) per year. Park ecosystems range from the rich intertidal zone, to rainforests, montane forests, alpine meadows, and glaciers. Temperate rainforests blanket the western slopes of the mountains, while alpine tundra conditions prevail in the dry, northeast section of the park.

Olympic National Park covers 3700 km² in two units: 3530 km² in the central mountainous core, and a narrow 170 km² strip extending 84 km along the coast. Ninety-six percent of the park is designated wilderness; roads, campgrounds, and structures occupy less than 1% of the area and are located around the periphery of the park. The center of the park is accessible only by the 984 km of maintained trails. The park shares 474 km of boundary with land managed primarily for timber by the Washington State Department of Natural Resources (1600 km²), the USDA Forest Service (2800 km²) and private timber companies. However, 350 km² of Olympic National Forest is included in six units of Wilderness Areas, all abutting the park.

Many additional details on the park's vegetation, fauna, geology, and social setting may be found in "A Framework for Long-term Ecological Monitoring in Olympic National Park" at http://fresc.usgs.gov/products/papers/onp_framework.pdf.

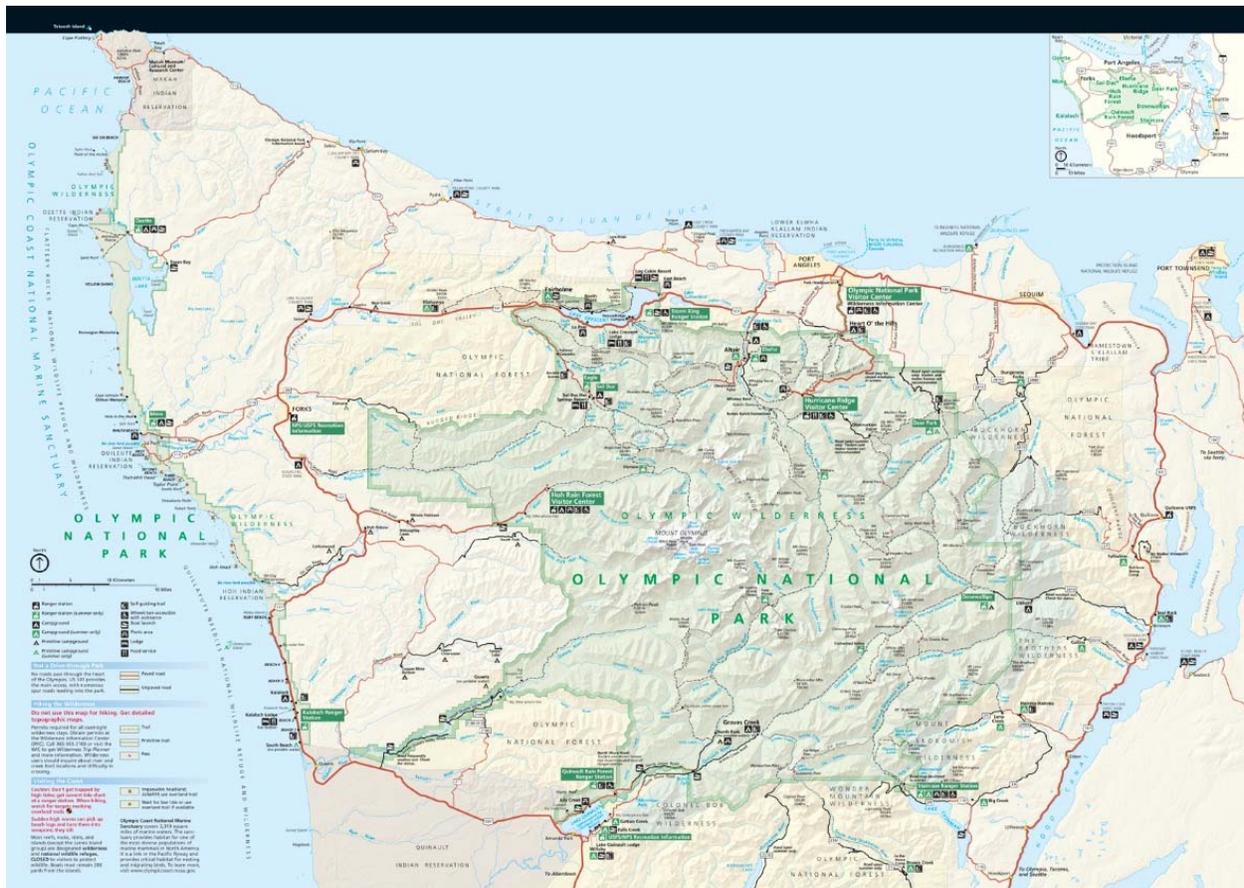


Figure 1. Map of Olympic National Park.