

# RAINFOREST RESERVE MANAGEMENT PLAN

*A Summary with a Climate Lens*



**NORTH COAST  
LAND CONSERVANCY**



## Acknowledgement

*This document summarizes our stewardship plan for the Rainforest Reserve, located within North Coast Land Conservancy's service area on the Oregon Coast. Our service area spans from the Coast Range to Oregon's intertidal zone and extends from the lower Columbia River to the mouth of Siletz Bay. We acknowledge that this land has been inhabited since time immemorial by Indigenous peoples, including the Kathlamet, Clatsop, Chinook, Nehalem, Tillamook, Nestucca, Salmon River, Siletz and Grand Ronde tribes, whose cultures and values deeply respect the land and its resources. The history of colonization, including forced relocation and broken treaties, led to the theft of these ancestral lands, a legacy of injustice that continues to affect tribal communities. North Coast Land Conservancy strives to honor Indigenous values and support healing by fostering connections between the land, water, and people. Through the Oregon Land Justice Project ([www.oregonlandjustice.org](http://www.oregonlandjustice.org)), we are committed to increasing access to ancestral lands and returning land to Indigenous ownership. This document reflects our ongoing efforts to steward the Rainforest Reserve with care, respect, and humility, always learning from the past and from Indigenous communities.*





# Introducing NCLC's Rainforest Reserve

Located adjacent to Oswald West State Park and above Cape Falcon Marine Reserve, the Rainforest Reserve is part of an uninterrupted 32-square-mile conservation corridor that stretches from the summits of 3,000-foot peaks within the Oregon Coast Range to Short Sand Beach and the sandy seabed and rocky reefs of the nearshore ocean. This type of protected land-to-sea corridor is unmatched in the state of Oregon.

North Coast Land Conservancy's Rainforest Reserve was conserved in October 2021, protecting nearly 3,600 acres of coastal rainforest and rocky bald habitat. It represents the continuation of decades of work by Oregon State Parks, The Nature Conservancy, the Oregon Department of Fish and Wildlife, the City of Cannon Beach, the Arch Cape Water and Sanitary District, and NCLC.

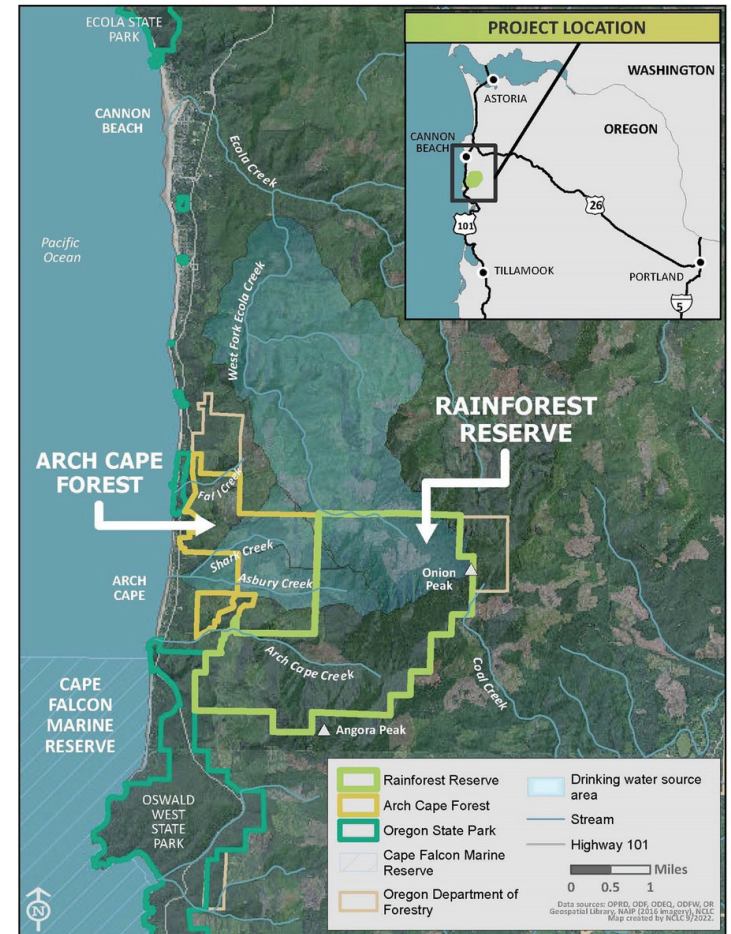
The Rainforest Reserve is part of one of the largest temperate rainforests in the world, stretching from Oregon to Alaska. The reserve's diverse elevation range supports a variety of plant communities, from red cedar in lowlands to Pacific silver fir forests at higher elevations. It receives an average of 93 inches of rain annually and additional moisture through occult precipitation, where ocean water vapor condenses into fog, dew, or mist.

Because of the property's size, species diversity, dramatic elevation gradient, and connectivity with other protected lands, the Rainforest Reserve is expected to be highly resilient to the effects of climate change on plant and animal communities.

Below 2,000 feet of elevation, the reserve's woodlands are characterized by a diverse forest featuring Sitka spruce, western hemlock, western redcedar, and red alder—all

considered productive low-elevation coastal forest communities. At elevations above 2,000 feet—which applies to more than half of the reserve—the overstory of the forest features Pacific silver fir, western hemlock, and western redcedar clinging to steep, exposed rocky slopes.

The direct land-sea interface of the coastal watersheds within the Rainforest Reserve results in a landscape that is home to a rare mix of plants and animals. The two peaks here—Onion Peak and Angora Peak—were once the submarine canyon of the Columbia River. They rose out of the Pacific Ocean tens of millions of years ago in isolation, and life on those peaks experienced island evolution and speciation as more land arose from the



Pacific plate. Because of this, they are home to several endemic plant species that persist in isolation.

Four plant species are federal species of concern: Saddle Mountain bittercress, Queen of the Forest, Saddle Mountain saxifrage, and Chambers paintbrush. An additional 26 plant species are either endemic to the exposed rocky bald areas of the northern Coast Range or exist at the edge of their range, making these plant communities unique and their conservation important.

The property's adjacency to other conserved areas creates an important corridor for wildlife, ranging from invertebrates to large mammals. The streams and seeps of the Rainforest Reserve provide habitat for the federally threatened Oregon coastal coho salmon and cutthroat trout. Additionally, the Columbia torrent salamander and Cope's giant salamander are species considered, respectively, as "vulnerable to" and "at high risk of" extinction by the Oregon Biodiversity Information Center.

The high-elevation seeps on Onion Peak contain the



only documented breeding site in the entire Coast Range for the black petaltail dragonfly. Close to 90 bird species—including willow flycatcher (a state species of concern), Rufous hummingbird, band-tailed pigeon, and peregrine falcon—use the Rainforest Reserve as habitat. Larger mammals—including American black bear, coyote, mountain lion, elk, bobcat, and Columbian black-tailed deer—also inhabit the reserve, as well as a myriad of impressive and iconic northwest fungi.

*Top right: Onion Peak bowl*

*Bottom right: Isolated peaks and rock formations*

*Left: Columbia torrent salamander*

*Top left: Black petaltail dragonfly*

*Bottom left: Chambers paintbrush*



# Conservation Values and Management Strategies

Old-growth forests are crucial habitats for many species. Historically, the forests of the reserve have been managed for commercial timber, resulting in young forest stands that lack the complex structure of old-growth forests. Since its acquisition, we have shifted forest management to favor ecological rather than financial objectives. Old-growth forest attributes will be attained through active management by reducing areas of high tree density, promoting tree growth, and introducing natural disturbances like tree falls and openings. This will improve water filtration, prevent landslides, and provide climate resiliency by storing carbon and creating microhabitats that support plant and animal adaptation. North Coast Land Conservancy's management approach for the reserve comes down to six major goals, outlined below.

## *Management Goals*

### **1. Protecting conservation values into perpetuity**

The reserve's conservation values include its connectivity to other conserved areas, its high climate resiliency, the rare plant communities and animal species it hosts, and the habitat it provides for threatened and priority species. We will monitor and evaluate the integrity and condition of these conservation values on the reserve every year. Public access will be managed to protect the high-elevation rocky bald plant communities. Conservation of this property preserves and enhances ecological flow between its peaks and the marine reserve.

### **2. Stewarding the forest towards late-seral (old-growth) condition**

Our long-term goal is to steward the forest toward a late-seral condition, characterized by large trees, snags, understory vegetation, and down logs. Our management strategies include Ecological Forestry practices to promote old-growth characteristics through density manipulation, species diversification, large deadwood creation, and other management techniques.

## Rainforest Reserve Conservation Values and Management Goals

The Rainforest Reserve Management Plan outlines the primary conservation values and goals of the Rainforest Reserve.

### **Primary Conservation Values**

1. Ecological connectivity to other land conserved and managed to protect watershed resources and functions and a marine reserve dedicated to conservation and scientific research
2. High climate resiliency due to its range of topoclimatic diversity
3. Ecological systems and rare or at-risk plant communities that are state conservation priorities, including Sitka spruce forest and Martindale lomatium rock garden, as well as a rare high-elevation coastal silver fir-western hemlock community
4. High-quality habitat for state conservation priority bird and amphibian species, including willow flycatcher, Rufous hummingbird, peregrine falcon, band-tailed pigeon, northern red-legged frog, and Columbia torrent salamander

### **Management Goals**

1. Protect the conservation values into perpetuity
2. Steward the forest towards late-seral/old-growth condition
3. Manage the drinking watersheds for water quality and quantity
4. Steward the land to be resilient in the face of a changing climate
5. Mitigate unnatural disturbances (roads, stream crossings, invasive species)
6. Promote community benefits (Indigenous access, clean drinking water, recreation)

*Interested in seeing the full Rainforest Reserve Management Plan?  
Email [nclc@nclctrust.org](mailto:nclc@nclctrust.org) to request a copy.*

### 3. Managing the drinking watersheds for water quality and quantity

The Rainforest Reserve contains the headwaters for the drinking watersheds that support the Arch Cape, Cannon Beach, and Cape Falcon communities. Managing the forest towards old-growth conditions will help improve water quality (by decreasing sedimentation) and quantity (by increasing summer low flows). We will decommission unnecessary roads and evaluate and maintain the road network according to best practices, to minimize impact to streams. Herbicide will only be considered as a spot treatment to invasive species that pose a threat to conservation values when other non-chemical treatments are not viable.



### 4. Stewarding the land to be resilient in the face of a changing climate

Converting from clearcuts to old-growth forest has been identified as a critical natural climate solution. Stewarding the Rainforest Reserve toward old-growth forest conditions and to enhance forest health will be our primary goal. Portions of the Rainforest Reserve were replanted following clearcut harvest and are heavily stocked. We plan to thin these dense young stands and to manage the forests for species and structural diversity to increase resiliency to climate change.

### 5. Mitigating unnatural disturbances (*roads, stream crossings, invasive species*)

We worked with experts to conduct an ecological road assessment that identified how roads within the reserve are impacting its conservation values. Roads not necessary for stewardship access will be decommissioned. Those roads that are needed will be managed to minimize their impact to seasonal and perennial streams; rock garden habitat on high-elevation roads; and aquatic species habitat along roadside seeps. Invasive species will be surveyed. When they pose a threat to conservation values, they will be mitigated using methods that have the least negative impact to surrounding habitat.



### 6. Promoting community benefits (*Indigenous access, clean drinking water, recreation*)

NCLC will work with interested Indigenous communities to create access agreements. The forests and streams will be managed to promote clean drinking water. We have previously worked with the National Park Service, Nuveen Natural Capital, Arch Cape Domestic Water Supply District, Oregon State Parks and Recreation District, and other community members to create a Public Access Plan to complement this management plan.

## Climate Considerations

### *The Rainforest Reserve as a Sanctuary from Climate Change*

As we incorporate a climate-adaptive approach into our management of the Rainforest Reserve, we recognize our vital role in supporting the forest's health, as it in turn supports the well-being of human, wildlife, and plant communities. Thoughtful stewardship involves managing the land with a deep understanding of ecological processes, promoting biodiversity, and enhancing habitat connectivity, which allows species to adapt to climate change how and when it occurs. Through careful and conscientious management, we can restore old-growth forest attributes,

improve water quality, and increase carbon sequestration, helping mitigate climate impacts in the years ahead.

This approach emphasizes sustainable practices that respect natural cycles, encouraging regeneration and resilience. By working collaboratively with neighboring landowners and the broader community, we enhance the forest's ability to thrive in the face of changing environmental conditions. The Rainforest Reserve becomes a living example of how intentional, long-term care can heal and strengthen ecosystems. Through this stewardship, we not only protect a vital habitat but also ensure that future generations inherit a healthier, more resilient natural world, offering real hope for combating climate change and preserving biodiversity.





## Climate Context and Projected Changes

Across the Pacific Northwest, we have already been observing a changing climate and its subsequent effects on the area, and we can soundly expect these trends will continue. The mean annual temperature for the Oregon Coast region has increased by 1.2 to 1.5 °C since 1895. By the end of the 21st century, average warming is projected to increase by 2.0 to 3.9 °C, which means temperatures on the Oregon Coast may closely resemble those experienced now in central to northern California. Future droughts are likely to occur more frequently and persist longer. Precipitation is expected to increase in the winter and decrease during the growing season, but variability between years will likely remain high.

When the overall temperature increases in a region, it can cause plant communities to shift, especially those species that are already at the edge of their ecological tolerance. Additionally, higher temperatures and longer drought conditions could increase the frequency and intensity of fire events.

The rare or sensitive species that have evolved over millennia to the conditions of the Oregon Coast will be the most vulnerable to climate changes or disturbance patterns. Additionally, pollinator-plant interactions can be affected by mismatches in phenology or distribution, which would negatively affect the insect populations, as well as plant fecundity.

The lower precipitation levels expected during the summer months would

reduce the extent of seasonal streams. In general, lower seasonal stream levels would affect some terrestrial salamanders like the Cope's giant and Columbia torrent, which have a narrow tolerance for altered temperature and moisture changes while also lacking the ability to migrate over large enough distances to seek refuge from changing conditions.

In some areas of the Coast Range, a decrease in the summer marine cloud layer could shift the distribution of Sitka spruce, western hemlock, and western redcedar, all of which depend on summer moisture and shade. Such conditions would favor the more drought-tolerant and fire-resistant Douglas fir plant communities in areas other tree species formerly occupied, potentially contributing to a decrease in species and habitat diversity.

Because of the Rainforest Reserve's diverse landscape, forest composition, watershed resilience, and underlying geology, the effects of climate change will not be evenly distributed across the area. This variability in site conditions will, in turn, enhance the capacity for species to migrate and adapt over time. We also recognize the uncertainty involved in predicting the effects of climate change on the plants and animals of the Rainforest Reserve and commit to an adaptive management strategy to fulfill our conservation values. We can implement this adaptive strategy by adjusting our management framework according to future observations, best practices, and environmental conditions as they change.



## Prevention

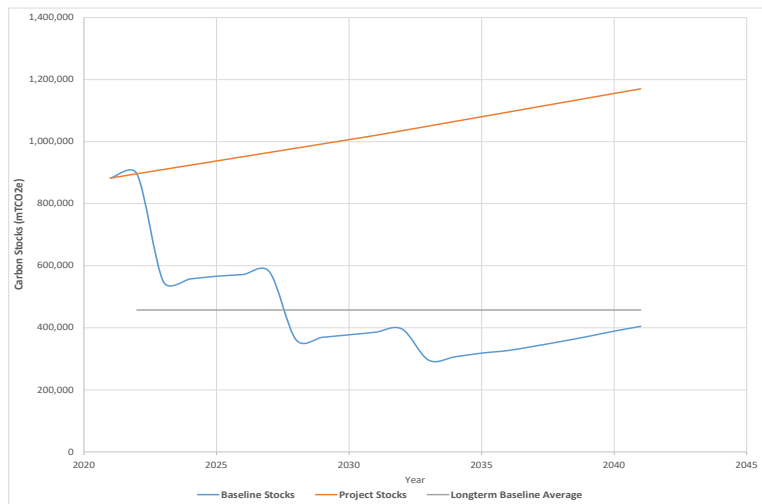
To prevent severe climate change impacts on the North Oregon Coast, we must reduce greenhouse gas emissions and increase carbon sequestration. This will help avoid tipping points that hinder species adaptation. As an organization focused on climate change, we will assess how managing the Rainforest Reserve can reduce emissions and boost carbon storage.

### 1. Greenhouse gas emissions

North Coast Land Conservancy will consider the carbon emitted during forest management operations to limit the organization's impact on climate change. Trucks, heavy equipment, and chainsaws emit significant greenhouse gasses and will be weighed against the need to promote carbon sequestration through tree growth; increased forest structure through variable density thinning; and increased species diversity through tree planting. We will work with contractors to limit the use of polluting equipment through efficient and coordinated operations, as well as utilize new technology that relies less on the burning of fossil fuels.

### 2. Sequestration and carbon storage

Carbon is primarily sequestered from the atmosphere by plants through photosynthesis. Forests on the North Oregon Coast have some of the highest carbon capture rates in the U.S., with old-growth forests



Projected carbon stocks of the reserve compared to commercial timber extraction



storing about 771 metric tons (mt) of CO<sub>2</sub>e (metric tons of carbon dioxide equivalent) per acre. The Rainforest Reserve currently stores about 256 mt CO<sub>2</sub>e/acre above ground in its forests, higher than the 119 mt CO<sub>2</sub>e/acre on private industrial forest lands in Clatsop County. The total above-ground CO<sub>2</sub>e stored in the forests of the Rainforest Reserve is nearly 900,000 mt.

Carbon sequestration rates (the intake of new carbon per year) vary based on site conditions, disturbances, climate, and management. Oregon Coast National Forest land averages 5 mt CO<sub>2</sub>e per acre per year. NCLC's management approach aims to store 6 mtCO<sub>2</sub>e/acre of newly sequestered carbon per year as the Rainforest Reserve matures. Across its 3,500 acres, this would sequester 21,000 mtCO<sub>2</sub>e per year, putting the reserve on track to amass old-growth biomass levels in about 85 years.

Forest soil acts as a carbon reservoir as well, as needle and leaf litter turn into organic matter. While estimating soil carbon distribution is challenging, it is believed to hold about half of the carbon in natural forests. The fall of large trees, which remain on the forest floor for decades, further increases carbon storage. This allows for continued carbon accumulation even after the growth of mature trees slows. This also means that the total amount of carbon the Rainforest Reserve sequesters is more than what is measured by today's standards.

## Mitigation and Adaptation

Industrial carbon emissions have already disrupted global atmosphere and climate patterns. While species and ecosystems can adapt, management strategies can enhance their resilience. In managing the Rainforest Reserve, we will focus on increasing species and genetic diversity; improving habitat connectivity across gradients like elevation and rainfall; providing refugia habitat for native species; and monitoring populations at the margins of their preferred habitats. Here's how our management will promote diversity, adaptation, and connectivity:

### 1. Diversity

Species diversity strengthens the forest's ability to adapt to changes in disturbance patterns and environmental conditions. Genetic variation within a species enhances resilience, and allowing for natural regeneration of site-appropriate genotypes further boosts this. The Rainforest Reserve has a mix of naturally recruited trees (of higher genetic variation) and planted trees (of lower genetic variation). Individual tree selection for thinning can accelerate this diversity



by removing individuals not well adapted to current and future site conditions.

Forests with multiple age classes and structural diversity better withstand challenges like drought and fire. They also lower ground temperatures through shade in the understory. A variety of understory vegetation supports more wildlife species. Only if genetic diversity falls too low in the future would we consider assisted migration of carefully selected tree species as a last resort. In an area that has been subject to rounds of timber harvest, by first promoting and artificially selecting for a diversity of plant species among the current forests, we can better enable the processes of natural selection to occur over time in response to a changing environment.

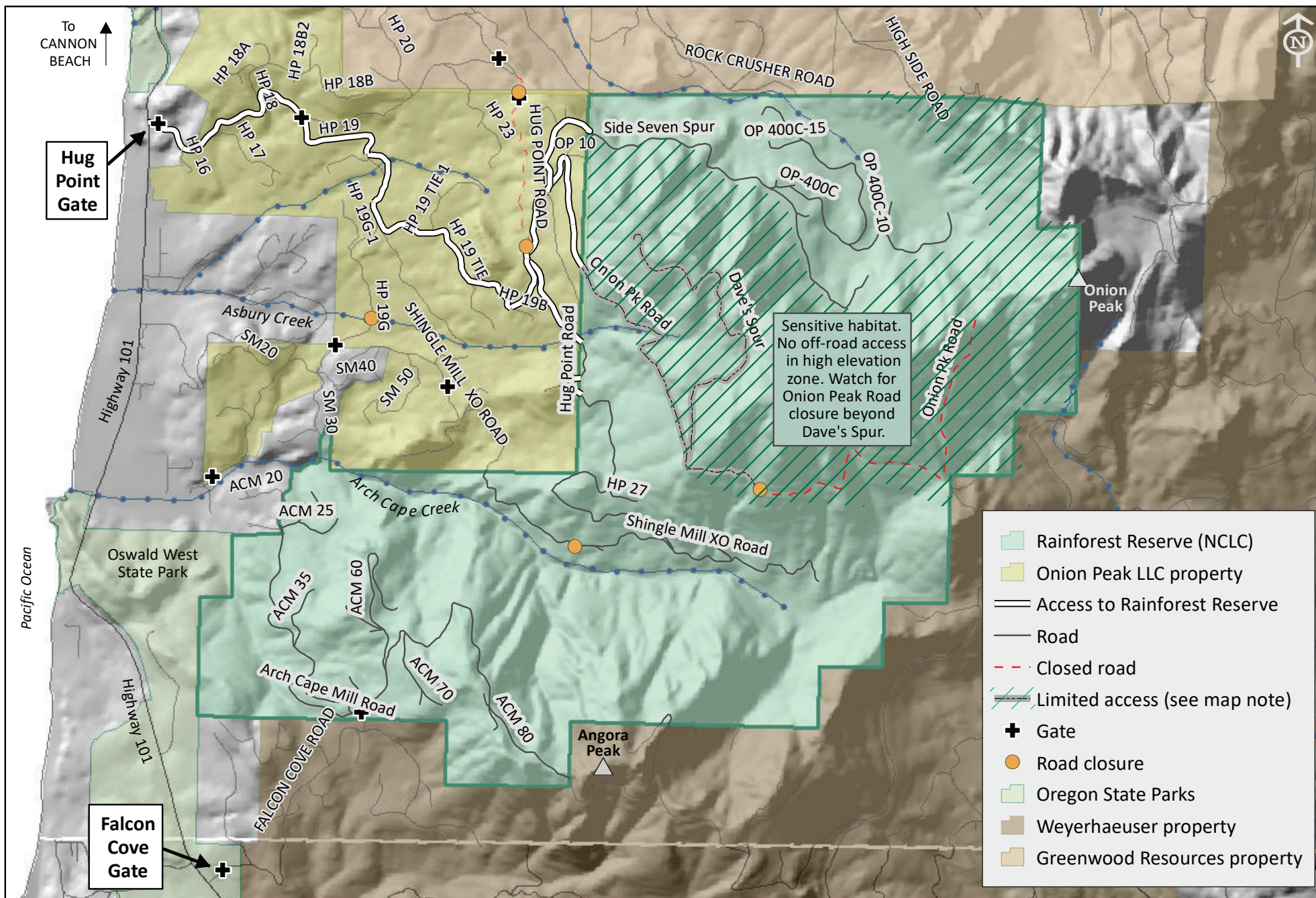
### 2. Connectivity and Transitions

As climate change shifts ecological conditions, plant species will likely move to find more suitable habitats, and animals that depend on them will also need to adjust their distribution, behavior, and abundance. To support these shifts, a connected landscape is essential.

The diverse landscape of the Rainforest Reserve allows species to migrate to areas with suitable environmental conditions to meet their needs. We will work with our neighbors to increase the connectivity of riparian and forest corridors, as well as increase the size of the reserve through land acquisition. This will further increase the resiliency of the region's biotic communities to climate change.

We will also monitor species at the edge of their native range and those unable to migrate through isolated habitats. For example, the Pacific silver fir zone may shrink as western hemlock moves to higher elevations because of warming, and copperbush, found at the southern edge of its range, may shift northward. Some high-elevation rock garden species are rather isolated, making migration for them difficult. While these species face challenges, the diverse landscape of the Rainforest Reserve offers opportunities for adaptation and resilience. We believe careful management can help these communities thrive amid changing conditions, so future generations have the chance to experience and appreciate this unique and awe-inspiring place for years to come.

# RAINFOREST RESERVE Public Access Map



Note to visitors: Please read and respect posted signage on Rainforest Reserve and neighboring properties.





## Public Access and Recreation Policies

We welcome visitors to the Rainforest Reserve—a beautiful place that belongs to us all. To protect this ecologically sensitive land, we must be good stewards. NCLC engaged in a four-year process to work with our community members, our neighboring landowners, and the National Park Service to establish the following public access guidelines for the Rainforest Reserve:

- Public access into the Rainforest Reserve is attainable only through adjacent properties that also provide public access. Hug Point Mainline and Falcon Cove Road are the main access roads. Always follow and respect access regulations of the neighboring landowners.
- Public access is permitted one hour before sunrise to one hour after sunset.
- Expect closures during fire season and when forest management operations are taking place in an area.
- Areas with sensitive natural resources may be marked as no access. There is no access to Onion Peak or sensitive rocky bald habitat.
- “Pack it in—pack it out.” All trash/waste (including human solid waste) must be removed by user. People are encouraged to use “Leave No Trace” principles.
- E-bikes are not allowed. Bicycles (non e-bikes) must stay on maintained, rocked roads. No use off-road. No creating new trails.
- Deer and elk hunting is allowed in the Rainforest Reserve consistent with Oregon Department of Fish and Wildlife (ODFW) regulations. Trapping and predator hunting is not allowed.
- Fishing is allowed and must follow Oregon Department of Fish and Wildlife (ODFW) regulations.
- Recreational foraging, including plant leaves and flowers, mushroom, and berry collection, is allowed for personal, non-commercial use. Removal of wood products is not allowed.
- Horses, dogs, and other domestic animals are not allowed in the Rainforest Reserve
- No camping or fires.

## Gratitude

We want to express our deepest gratitude to all our partners, supporters, stakeholders, and community members. Your dedication, collaboration, and shared vision have been instrumental in shaping this plan. We look forward to continuing this journey with you as we work to preserve and restore the Rainforest Reserve for future generations. Thank you for your ongoing commitment and support.



Thank you for helping protect this special place!