Chapter 2: Habitat Restoration Action Plan

TEP and its partners recognize the importance of natural resources to Tillamook County's economy, culture, and quality of life. Without clean water, productive habitats, and an engaged citizenry, Tillamook County would not be the special place it is today. TEP and its partners strive to ensure the wellbeing of the many species and habitats that are the foundation of Tillamook County's natural economy and cultural identity..

For the purpose of this document, TEP has split our focal watersheds into three different managements zones: the Upper Watershed (Upper), Lower Watershed (Lower), and the Estuary (see example in Figure 2). These management zones are distinguished from each other by physical, biological, and anthropogenic characteristics. These differences result in in unique set of conservation issues and opportunities, providing a convenient way of framing conservation actions to be undertaken in the focus area. Specific ways these areas differ include topography, gradient, vegetation and animal communities, and development and land-use patterns.

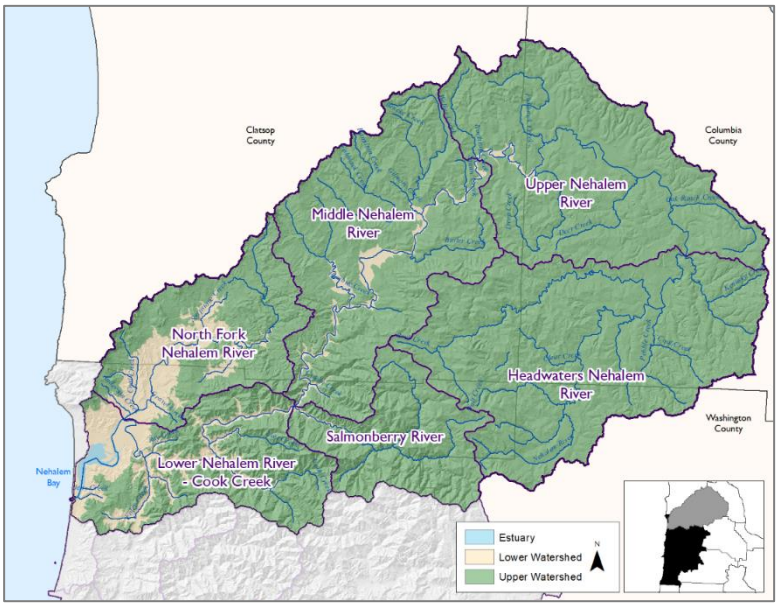


Figure 2. Watershed management zones (Nestucca Watershed).

The upper watershed is dominated by forested, mountainous terrain. Streams in this zone are often small, with high-energy flows and coarse substrates. The predominant land-use in the upper watershed is forestry. Residential and commercial development is limited.

In the lower watershed, gradients are flatter and large alluvial floodplains are present. Portions of this zone are occasionally inundated by high flows in the larger, slower, more sinuous streams found here.. In their unaltered state, lower watersheds support a higher diversity of habitat types than upper watersheds including cottonwood gallery forests, woody and emergent wetlands, and coastal meadows. Due to their relatively flat relief and rich alluvial soils, lower watersheds have been largely altered for agricultural, residential, and commercial development.

The estuarine portion of the watershed is extremely low-gradient and is where the streams that originate in the upper and lower watersheds meet the Pacific Ocean. Tide and the ocean salinity are extremely influential in this zone. This dynamic environment supports a number of rare habitats including woody and emergent tidal wetlands, broad topographically diverse mud and sand flats, and a complex matrix of interwoven tidal channels. Land-uses here are similar to that of the lower watershed, but require levee or dike building coupled with draining to maintain viability. These include agricultural, residential and commercial development; aquaculture (oyster farming); and commercial and recreational fisheries for fish, crabs, and clams.

Within these management zones, a myriad of important habitat types exists. These habitat types are not necessarily exclusive to any one management zone, but often are more or less common in one zone as compared to the other zones. The word "habitat" is defined as a place where an organism or a community of organisms lives, including all living and nonliving factors or conditions of the surrounding environment. However, it is often also used as shorthand terminology to define specific vegetative communities or ecological conditions present in an area. In this document, the term is used in this shorthand fashion. Following are

descriptions of the habitat types TEP works to conserve and restore within its focal area. Depending on the scope of a given project or conservation directive, these habitats may be defined more or less specifically depending on goals. For example, a project may focus on improving environmental conditions estuary wide or may have a specific directive to restore vegetative diversity of low marsh on a specific site in the upper estuary.

Estuaries

As some of the richest and most complex ecosystems on earth, estuaries are important in the life cycle of many fish and wildlife species, some of which form the backbone of Oregon's coastal fishing industry (commercial and recreational). Tidal channels and sloughs, intertidal sand and mudflats, eelgrass beds, and tidal marshes provide structural complexity and abundant food upon which salmon and other species depend. Wetlands within the estuary are tidally influenced and the water can be fresh or saline depending on seasonal variation and their location within the estuary. Over the years, there have been many human impacts to the estuaries of Tillamook County, including dredging, large wood removal, sedimentation, diking, channelization, and other forms of modification. This has resulted in a reduction in ecological services provided by estuaries including flood control and salmon rearing habitat. Since the 1850s, more than 70% of Tillamook's tidal wetlands have been lost or degraded.[1] TEP and its many partners strive to address these challenges by conserving intact wetland tracts, removing or improving tide gates, removing invasive species, and re-establishing native tidal wetland plant communities. While increasingly challenging, these efforts represent the single biggest impact in the goal of restoring the health of estuarine watersheds.

Non-Tidal Freshwater Wetlands

Wetlands are habitats that are greatly influenced by the presence of water at or near the surface of the soil. Due to this frequently saturated condition, the plants and animals that inhabit wetlands are highly specialized, and in many cases do not occur elsewhere. Historically, the important ecological services wetlands provide were unknown or ignored and many Tillamook County wetlands were converted or altered.. As knowledge of ecosystem functions increaseed, the critical services that wetlands provide became apparent. Wetlands act as nature's sponges accepting flood waters, holding them, and redistributing them slowly. Among other things, this helps mitigateflood effects. Wetlands also act as filters - intercepting pollutants, storing them, and breaking them down over time, which protects downstream areas (including drinking water diversions). Wetlands are biological nurseries that provide protection to young salmonids and other aquatic organisms. Realizing the critical role wetlands play, TEP and its many partners are dedicated to their conservation and restoration, not just for the ecological benefits but for social and economic stability as well. Freshwater wetlands occur in all three watershed management zones described above, but are represented more heavily in the lower watershed where the topographical gradient is less. Freshwater wetlands are characterized by their topography, soils, vegetation and water source. Water sources include streams, rainfall and springs, and ponds or lakes. Depending on their specific location, wetlands can be affected by a number of land uses including farming and agriculture, forestry, and residential development. Typical forms of wetland degradation include draining, conversion, and exotic species invasion.

Rivers and Streams

Rivers and streams are the veins of a watershed - supplying water from upslope areas to the lowlands and estuaries. In addition to transporting water, streams move sediment and organic materials, and offer a

[1] Good, James W. Summary and Current Status of Oregon's Estuarine Resources". Oregon State of the Environment Report, Chapter III, Health of Natural Systems and Resources. Change is due to filling and diking between 1870 t0 1970. Restoration of wetlands in recent years has begun to reverse the loss trends. https://www.oregon.gov/DSL/WW/Documents/soer_ch33.pdf.

migratory route for aquatic and terrestrial wildlife. Healthy Pacific Northwest streams are characterized by cold, clean water, varied and abundant gravel, and complex cover from predators and highly-variable flows. Streams also provide a source of clean drinking water to local communities. Stream networks in TEP's focal area have been altered by dredging, large wood removal, stream cleaning, log transport, diking, channelization, and water diversion. Stream habitats are threatened by various factors including elevated pollutant loads entering from adjacent areas and high temperatures in summer due to the removal of healthy riparian forests. These alterations have resulted in degraded water quality, as well as physical and biological simplification of the ecological system. With the goal of protecting important aquatic organisms and ecological processes as well as municipal water supplies, TEP and its partners focus on conservation and restoration efforts that address clean cold water, stream habitat complexity, and organism passage improvements to ensure access is available to as much high-quality stream habitat as possible.

Lower Watershed Floodplains


Roger Ross

The lower watershed includes areas adjacent to the estuary that are within the river's alluvial plain. These areas contain floodplains that tend to be at low elevation and have a very low topographic gradient. Streams within these areas are slower moving, wider, and meandering. Streams within lowland areas overflow onto the floodplain somewhat regularly depositing sediment and organic matter. Severe flooding of lower watershed areas can occur when large winter rain events are combined with high tides in the estuaries. Habitats include cottonwood gallery forests, conifer forests, emergent and woody freshwater wetlands, and coastal prairie. Lower watershed floodplains include most of the urbanized areas, agriculture, and dairy lands within Tillamook County. The largest contiguous area of lower watersheds within the Tillamook County surrounds Tillamook Bay, but there are also extensive areas of lower watershed in the Nehalem and Nestucca River drainages.

Riparian Communities

Riparian communities are vegetation assemblages that occur adjacent to waterways. This close association allows riparian plants to grow larger and lusher than their counterparts farther away from free water. Riparian corridors along Pacific Northwest streams influence in-stream physical and biological processes by providing shade to regulate water temperatures, organic inputs that support the food chain, large woody debris that maintains stream complexity, roots that stabilize banks and reduce erosion, and above ground structure that filters pollutants. Without the nurturing and buffering effects of healthy riparian plant communities, in-stream habitats and aquatic species populations degrade rapidly. As with other habitat types, riparian areas have also been impacted by multiple types of land uses. Banks along many waterways have been cleared of vegetation via residential and agricultural development, and for resource extraction. These changes have impacted the quality of in-stream habitat conditions and the habitat value of the riparian forests themselves. In addition, riparian habitat modification has led to a reduction in water quality, which effects local drinking water resources and negatively effects habitat quality. TEP and its partners are engaging agency and industry representatives as well as private landowners on the importance of riparian ecosystems with the goal of cleaner water, reduced erosion, healthy fisheries, and improved wildlife habitat conditions. This collaborative effort results in innovative win-win solutions that combine healthy and diverse ecosystems and a thriving nature-based economy.

Upland Habitats

Uplands are lands of relatively higher elevation (as compared to stream channel bottoms) that do not flood frequently and, therefore, do not display characteristics associated with great availability of free water. Within TEP's focal area these lands occur predominantly in the upper and lower watershed. They include high marine terraces, alluvial floodplains, and the foothills and mountains of the Coast Range. Habitats include upland

forests, meadows, dunes, and coastal headlands. Within Tillamook County upland habitats are widespread and are used for a number of land uses including forestry, farming and agriculture, and residential development.

Forests

Tillamook County is known for its lush upland rainforests. Forests offer numerous irreplaceable ecological functions crucial for watershed health. Healthy forests stabilize steep slopes, help filter and slow run off, provide inputs of large wood and other organic material, sequester carbon, produce oxygen, and afford habitat for numerous plant and animal species. Upland forests are primarily composed of conifers and various species of hardwoods. Dominant trees include Sitka Spruce, Western Hemlock, Douglas Fir, Big Leaf Maple, and Red Alder. In addition to their habitat value and important ecological services, our forests provide the raw materials to build communities, and have fueled Tillamook County's local economy since the 1880's. Coastal rainforests of the Northern Oregon Coast Range have been altered significantly since first encountered by early European explorers - less than two-percent (2%) of the Coast Range's rainforests remain unaltered or in an "old growth" state. In what is now known as the Tillamook State Forest, from 1933-1951, a series of devastating fires called the "Tillamook Burn" scorched approximately 355,000 acres of forest. Much of the burned old growth timber was salvage logged, a process aided by the construction of miles of forest roads. These devastating burns along with a legacy of logging practices have resulted in higher flood events, decreased summer stream flows, decreased water quality, increased sedimentation rates, fewer organic inputs, amplified carbon levels, and loss of species. While best management practices utilized by industry, governments, and private landowners have vastly improved, these effects continue to be felt today and further progress is needed.

Meadows

Meadows are characterized by non-woody grasses, forbs, sedges, and rushes and therefore have an open low-profile structure vastly different than Tillamook's predominantly forested upland habitats. Given the region's propensity towards dense forests, meadows are relatively rare and require specific environmental conditions to persist without human intervention. Environmental controls that contribute to meadow habitats include physical controls such as geology (substrate) and hydrology, and biological factors such as plant competition and herbivory. Because meadows are dominated by soft grasses and flowering plants and are exposed to direct sunlight, they support a number of important species (including some that cannot persist elsewhere). These include important native pollinators, rodents, and grazers like elk and deer. Included in the diverse array of animals that inhabit Tillamook County's coastal meadows is the endangered Silver Spot Butterfly (*Speyeria zerene hippolyta*). Impacts to meadows include conversion and invasive species. In TEP's focal area, the largest conversion of natural meadows has occurred in the lower watershed and estuarine zones where estuarine and floodplain processes have been altered by activities like levee building and draining. Interestingly, while natural meadows are relatively rare and have been heavily impacted, artificial meadows created by human land-uses, like forestry and agriculture, are widespread. Examples of this include clear-cuts and mowed and/or tilled agricultural fields. These artificial meadows cover thousands of acres and do provide some of the ecological functions of natural meadows, but often lack the native diversity of natural meadows. These artificial meadows are frequently dominated by non-native species, and only persist as long as the human disturbance continues. In keeping with the notion that a healthy watershed is only as healthy as the sum of its parts, TEP looks to accomplish restoration and enhancement of coastal meadows and educate the populace about the ecological, economic, and cultural values of Tillamook County's natural meadows.

Coastal Sand Dunes

Coastal Sand Dunes are large accumulations of drifting sand. Rivers deliver a robust supply of fine sediment to the ocean where it is then redistributed by longshore transport and deposited on nearby beaches by the surf and tides. Once on the beach, prevailing winds take over and push the sand farther up the beach forming large mounds of sand. This mosaic of sand shifts constantly due to the forces of wind. Many specifically adapted species have evolved on the Pacific Northwest's coastal dunes due to the well-drained substrate, salt influence, and disturbance from constantly shifting sand. These dynamic habitats and the host of endemic species that populate them play critical functional roles in the ecosystem and often form a large portion of the habitat directly adjacent to estuaries. Unnatural disturbance to these systems is predominantly caused by residential development, invasive species introduction, stabilization, and recreational use. Probably the most glaring effect on the health and productivity of natural dune systems is the introduction of European Beach Grass. European Beach Grass originated in Europe and North Africa and was introduced to the west coast of the United States in the mid-nineteenth century to stabilize coastal sand dunes. European Beach Grass spread rapidly into dense monocultures choking out precious native vegetation. While introduction of this species succeeded in the goal of stabilizing the dunes, its presence has stifled ecological processes that underpin the community of native plants and animals. When possible, TEP and its partners work to improve and educate the community about coastal dune health especially as it pertains to estuarine processes.

Coastal Headlands


Roger Ross

The wind and ocean pounded rocky outcrops that make up coastal headlands are breathtakingly beautiful. Their resistance to the environmental forces of erosion is due to their geology . Most of the headlands found in TEP's focal area were derived from ancient volcanic eruptions and their subsequent basalt flows that are extremely resistant to the power of wind and wave. Due to the hard composition of the basalt substrate and the exposure to wind, water, and salt, the biology of these sites is unique. These areas support dark wind swept forests, coastal meadows, and bare cliffs and crevices. Tillamook County contains a number of prominent coastal headlands that include Tillamook Head, Neah Kah Nie Mountain, Cape Lookout, Cape Meares, and Cascade Head, all of which harbor unique and precious plants and animals. Three Arch Rocks National Wildlife Refuge off of Cape Meares was established in 1907 by Theodore Rooselvelt and was the first National Wildlife Refuge west of the Mississippi River. The refuge is home to Oregon's largest seabird nesting colony and is an important pupping ground for Steller Sea Lions. Due to their rugged nature, many coastal headlands have avoided wide spread destruction, but habitat modification still remains in the form of residential and commercial forms of development, road building, and invasive species issues. TEP and its partners are always looking for opportunities to improve the health of coastal headlands and recognize their incredible ability to inspire the community to appreciate and protect nature in all of its forms.

The Challenge

Loss and degradation of key habitat features and underlying ecological processes have contributed to declines in salmonids and other aquatic and terrestrial species. Many of these species are important economically or support those that are. When any habitat within the watershed is degraded, whether aquatic or terrestrial, the health of the estuaries, freshwater wetlands, and streams may experience direct and indirect negative

consequences. A watershed must be viewed as a sum of its parts and when parts and, when parts begin to fail, economic viability, environmental health, and quality of life can be negatively affected.

Existing Efforts to Address Habitat

TEP and its partners are dedicated to improving the health and long-term resiliency of the diverse set of habitats, organisms, and the ecological processes that drive them. Beginning in 2001, as required under the Government Performance and Results Act of 1993 (GPRA), TEP has reported CCMP-related projects completed in its focal area to the EPA on an annual basis. Reported projects include those completed by TEP and those of its partners including four watershed councils (Upper Nehalem Watershed Council; Lower Nehalem Watershed Council; Tillamook Bay Watershed Council; and Nestucca, Neskowin, and Sand Lake Watersheds Council), land trusts and other environmental organizations (e.g., North Coast Land Conservancy, Lower Nehalem Community Trust, The Nature Conservancy, Ecotrust, NW Steelheaders, Tillamook Soil & Water Conservation District), several state and federal agencies (e.g., Oregon Department of Forestry, Oregon Department of Fish & Wildlife, Oregon Parks & Recreation Department, Oregon Department of Transportation, US Bureau of Land Management, US Forest Service, US Fish & Wildlife Service, US Natural Resources Conservation Service), Tillamook County, several local municipalities, and a number of private businesses.

A total of 838 projects have been completed between 2001 and 2018. These included 416 projects to enhance riparian vegetation along rivers and streams, 208 fish passage barrier removal projects (e.g., culvert and dam removal), 99 in-stream enhancement projects (e.g. large woody debris placement), 38 projects to limit fine sediments entering streams (e.g., road decommissioning), 30 land acquisition efforts, 20 wetland enhancement projects (e.g., tidal channel construction, wetland plantings), 13 invasive plant removal projects, five efforts to reintroduce native oysters (shellfish seeding), four projects to enhance upland vegetation, two large-scale dike removal efforts, and one each for projects to control flooding, enhance bird habitats and remove contaminants. Figure 3 depicts these reported projects geospatially and by project type.


Roger Ross

To achieve TEP's goals and objectives for habitat conservation and restoration, a framework of 15 actions have been laid out in this CCMP to focus attention on particular issues, streamline decision making, provide adaptability, and ultimately achieve ecological uplift in Tillamook County watersheds.

The first set of actions (HAB 01-08) involve three key organizational steps: assessment, prioritization, and implementation (e.g., conservation and restoration). Assessment involves utilizing existing or new information to understand the most important and pertinent aspects to address in TEP's watershed management zones. It includes evaluation of species, habitats, and ecological processes, but also aims to contextualize these attributes

into a watershed level view that accounts for critical feedbacks between different species and habitats across the watershed. A good example of this is the dependence on salmon-derived nutrients in upland conifer forests and, conversely, the dependence on upland forest-derived organic materials in aquatic ecosystems. Utilizing these contextualized assessments, TEP and its partners can prioritize specific activities to undertake based on ecological need, organizational capacity, cost/benefit, and finances. Armed with a clear understanding of priorities, TEP can implement conservation, restoration, and communication efforts to achieve its goals.

The next set of actions (HAB 09-12) ensure a focus on specific efforts throughout implementation of the CCMP. Included in these are actions dedicated to a species-level approach, rather than a systems-level approach, to ensure the latitude to focus at that level if deemed necessary to protect important ecological, cultural, and economically viable species.

HAB-13 deals with various types of land-use common in Tillamook County, and the best management practices (BMPs) that have been or should be developed to lessen their impact on surrounding natural habitats. Examples of these include streamside riparian buffer strips and constructed wetlands to remove pollutants, improve water temperature, and reduce unnatural erosion. This action was created to distinguish holistic ecological restoration, which is intended to restore natural habitats, from BMPs which are generally designed to minimize impacts of land uses and other human activities. Distinguishing this difference is important to establish clear achievable goals and measure success appropriately.

Finally, actions HAB-14 and 15 are intended to advance and maintain focus on critical areas of policy and strategy important to achieving TEP's overarching goals and objectives. These are largely achieved through concerted efforts to facilitate dialogue and an organizational structure to streamline efforts and create win-win solutions on behalf of all Tillamook County community members.

Roger Ross

TEP and its partners focus on habitat conservation and restoration activities that benefit ecosystems and, in turn, benefit the residents of northwest Oregon. To date, a diverse portfolio of projects has been implemented to improve habitat quality and better sustain wildlife populations that depend on these habitats. Below are some examples of ecosystem attributes and activities that TEP and its partners address to achieve conservation goals.

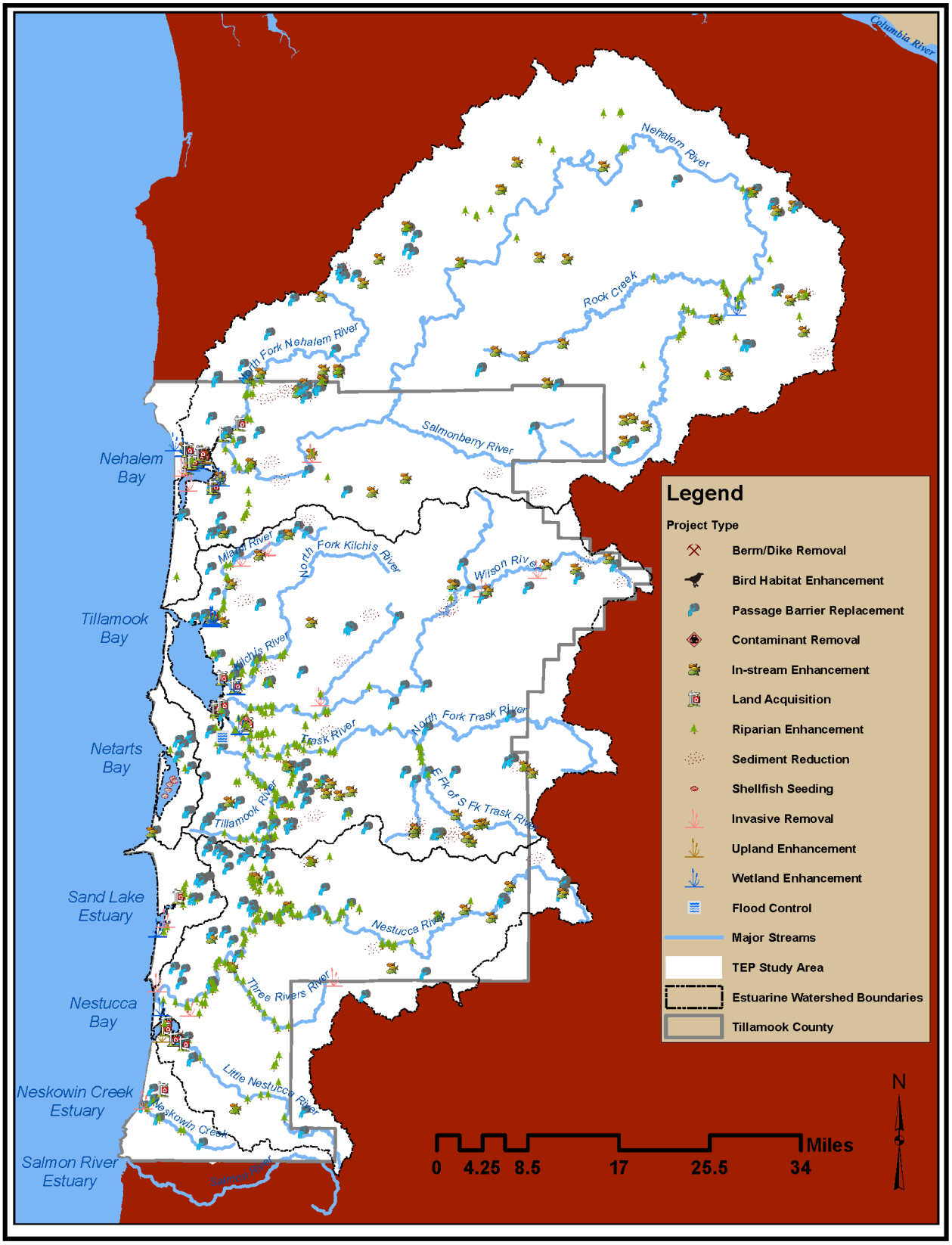


Figure 3. *TEP and partner implemented projects reported to EPA 2001-2018.*

Improve Habitat Connectivity

In order for aquatic and terrestrial organisms to flourish, access to the various environments that support their different life stages must be maintained. Many organisms are not specific to just one form of habitat but, instead, use many organisms use a variety of habitat types for migrating, cover, foraging, breeding, and rearing. If this diverse assemblage of habitats is not available or not adequately interconnected, it can result in species declines and other ecological problems.

Roadways for human transportation can compromise connectivity when passage under or around them are insufficient, often necessitating an improved culvert or bridge for aquatic and terrestrial species to safely pass under the road. In addition, various forms of residential and agricultural development can fragment key habitats and make organism passage between them difficult. Now armed with a better understanding of these inter-habitat requirements and the observed decline of many aquatic and terrestrial organisms, a more strategic approach to removing passage barriers and improving wildlife corridors has begun. TEP and partners are engaged in ongoing watershed scale efforts to identify and prioritize passage barrier culverts and other habitat connectivity issues. While some of these efforts are often cost intensive due to their relationship with civil infrastructure, efforts to address habitat connectivity will pay long-term ecological dividends down the road and, in many cases, improve public safety.

Figure 4. *Fan Creek Culvert Replacement: This project, funded by the BLM and OWEB, replaced two passage barrier culverts on Fan Creek, a tributary in the upper Nestucca River watershed.*

Promote Biological Diversity

Pacific Northwest watersheds are made up of a wide array of habitat types and a web of native plant, animal, fungi, and microbes. Each of these habitats, and the myriad of organisms that inhabit them, play important functional roles within the ecosystem that maintain and ensure community resilience over time. A habitat's ability to recover from natural or human caused disturbance is largely a function of its diversity and connectivity. When habitats are altered, fragmented, or disconnected or species (even inconspicuous ones) are lost, critical ecosystem processes begin to fail. This failure has the potential to harm important culturally and economically viable species and can lead to ecosystem collapse. Diversity also plays an important role in the ability of an ecosystem to adapt to broad-scale changes such as those projected to occur due to global climate change. TEP and its partners are dedicated to promoting diversity through the conservation of existing, highly-diverse habitats and the restoration of degraded habitats using the best science available and a diverse array of high-quality, genetically-adapted plant materials. TEP and its partners also promote ecological diversity through monitoring, education, and outreach programs, which collect, interpret, and disseminate information to stakeholders and the public.

Enhance Habitat Complexity

Habitat complexity refers to the composition and physical structure of an environment. Habitats that are structurally diverse also tend to be biologically diverse. This is because habitats with high structural diversity

provide numerous opportunities or niches and this, in turn, addresses the important biological needs of a wide variety of species. Habitat alterations associated with human land-uses often results in the simplification of habitats (reduced complexity), and this often leads to biologically simple systems. TEP and its partners undertake projects that attempt to restore habitat complexity in Tillamook County's watersheds. Examples include directly adding structural components like large wood or boulders to streams, conserving and restoring habitats that reflect a diversity of species and age-classes, and by conserving or restoring physical processes such as riverine and tidal flooding that add complexity to a system.

Manage Invasive Species

Invasive species are plants and animals that are not indigenous to an area whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Because the species are introduced, they do not have the same biological and environmental pressures in place that keep native communities in relative balance. Therefore, they can rapidly spread and out-compete native species. Their presence can cause severe environmental, economic, and social damage and have dramatic effects on native species through direct competition and altering ecosystem conditions and processes. Exotic species have been introduced onto the landscape through both intentional and accidental mechanism - every species has a unique story. Introductions for food, forage, aesthetic value, and functional value have been many, while other species have simply hitched a ride by ship, plane, or automobile with transporters unaware of their presence until its too late. Others have moved naturally as habitats have changed and shifted as a result of human actions or natural events. Some examples of invasive species in TEP's focal area include reed canary grass, Scotch broom, parrot's feather, Japanese knotweed, nutria, and the New Zealand mud snail. All of these species have caused direct damage to native species and some have been shown to adversely affect native species and/or their habitats. . TEP and its partners' efforts to address the issue include invasive species control as a significant portion of project implementation or as a primary project objective. While in most cases range-wide eradication of an invasive species is infeasible , experience has shown that an understanding of the ecology of an invasive species and a carefully-chosen and focused plan of attack can rid high priority areas of unwanted invaders (or at least greatly reduce their numbers and minimize their negative effects on the environment). Once eradicated (or reduced), if proper care is taken to reestablish native populations, restore natural ecological processes, and prevent reintroduction, success can be long term.

Conservation Acquisition and Easements

Often times the best form of restoration is conservation. Willing landowners who are interested in conserving natural resource values of their land often donate or sell their land to land trusts or other organizations set up to purchase and provide long-termstewardship of conservation lands. Acquisition ensures permanent protection and proper stewardship in accordance with the conservation principles of the receiving organization. Another option available to property owners is a conservation easement which allows the owner to continue to own the land while protecting the habitats of concern for a specified period of time or in perpetuity. By identifying intact, diverse, productive, and resilient community types on the landscape and conserving them, TEP can make a lasting contribution to the future of local ecosystems.

High-value natural areas that are managed for conservation provide a safe haven for numerous species and allow ecosystem processes to occur relatively free of alteration. The benefits of conservation properties often extend beyond their boundaries. Restoration and conservation should not be exclusive of working lands. It is important to consider all of the values of land that is being contemplated for conservation and look for opportunities to combine habitat enhancement activities with existing land uses. Collaborating with diverse stakeholders, TEP and its partners can accomplish the goal of conserving the most critical habitats and species in concert with the community's economic and social needs.

Develop, Promote, and Implement Best Management Practices

Best management practices (BMPs) are structural, vegetative, or managerial practices used to treat, prevent, or reduce water pollution and other forms of habitat degradation. BMPs are recognized as important tool to prevent the impacts of industry and land-use on adjacent natural communities. BMPs can be incorporated voluntarily or as part of regulatory guidelines and are often applied to well-defined point-sources. Agricultural and forestry BMPs utilized in TEP's focal area, including those listed in the Forest Practices Act, involve re-planting practices, vegetative buffers, constructed wetlands, and waste storage, elimination or reprocessing strategies. While BMPs often utilize native species and natural processes to mimic the ecological services key habitats provide in their design, their primary objective is the reduction of human impacts rather than the creation of ecological communities. Over the years, as BMPs for many different types of activities have been developed, case studies have demonstrated not only the success but the flexibility of the BMP approach in controlling or eliminating impacts to receiving water bodies and other key habitats. As part of TEP's effort to conserve and restore key habitats, focus has been placed on implementing and promoting the use of BMPs and facilitating the development of new and innovative BMPs as needed.

Habitat Monitoring and Research

Habitat monitoring and research is necessary to comprehend current conditions in target areas, understand underlying ecological components and processes that sustain them, and determine the effects of land uses and conservation actions. An understanding of historic, current, and probable future conditions allows for prioritization of target communities for conservation and implemention of appropriate restorative actions to achieve desired goals. Monitoring and research focus on biological attributes and the physical attributes that shape the environment (e.g., hydrology, geology).

TEP developed a Project Effectiveness Monitoring Program in 2010. Project-scale effectiveness monitoring measures environmental parameters to determine if habitat enhancement actions are meeting pre-determined objectives. This evaluation process requires both pre- and post-project data collection (and study of control or reference sites, if possible) and allows assessment and comparison of habitat enhancement projects TEP and its partners undertake. TEP uses monitoring protocols that are consistent with other effectiveness monitoring efforts in the region. This decreases the time and effort needed to develop TEP's program and increases its utility beyond the organization by allowing for comparison among projects in a broader regional context.

Special Focus on Salmon Fisheries

Salmonids of the Pacific Northwest are legendary and have sustained humans residing in the area for millennia. Historically, populations of salmon species returning to Tillamook County watersheds were plentiful, and the harvests so robust a sense of inexhaustibility dominated. Things changed in the first half of the 20th-century when salmonid populations began to show a rapid decline due to harvest practices and the loss of stream, estuary, and ocean habitats. Furthermore, as a result of limited understanding of salmon biology and life history strategies, many of the effects of these actions went unrecognized. Today, while salmon populations still face challenges, the scientific understanding of these resilient creatures has improved and efforts to protect and restore their habitats have expanded. Meaningful restoration of salmon populations depends on a comprehensive understanding of many complex physical and biological factors, and a concerted effort by all stakeholders to make it happen. The Oregon Plan for Salmon and Watersheds contains a framework for how stakeholders should assess, monitor, and restore salmonid populations in Oregon. Utilizing the most up to date research and planning tools, TEP and its partners look to prioritize the recovery of salmon while implementing the actions and activities described herein.

Challenges to Addressing Habitat Restoration

Information Gaps

Population Status and Trends: To assess, prioritize, and implement actions that create meaningful progress towards the sustainable health of Tillamook County watersheds, a firm grasp of population status and trends of key species is needed. Ideally, each major estuary and its watershed would have historical population estimates to provide context and current population estimates that are repeatable on an appropriate temporal scale to establish trends through time. In addition to current and historical status, it is also useful to predict future status trends based on known variables that may change (e.g., water or air temperature). These types of data ensure that TEP and its partners have the most up to date understanding of key species upon which to base decisions, allow for greater adaptive management of populations and actions, and provide a measure upon which to base the effectiveness of actions implemented. Species or groups of species chosen for status and trend analysis should provide information that can be used to assess system-wide changes in order to fill any of the data gaps that still exist in TEP's five major watersheds.

Habitat Status and Trends: Similar to population status and trends, information related to key habitat components is also important. Current and historic habitat profiles help to identify temporal trends and to project future conditions. Data that shed light on historic and current habitat conditions will allow TEP and its partners to make more informed decisions about habitat management priorities, as well as monitor the impacts of interventions. A good portion of this status and trend information has already been created and analyzed, but it is important we fill any of the gaps that still exist in TEP's five major watersheds.

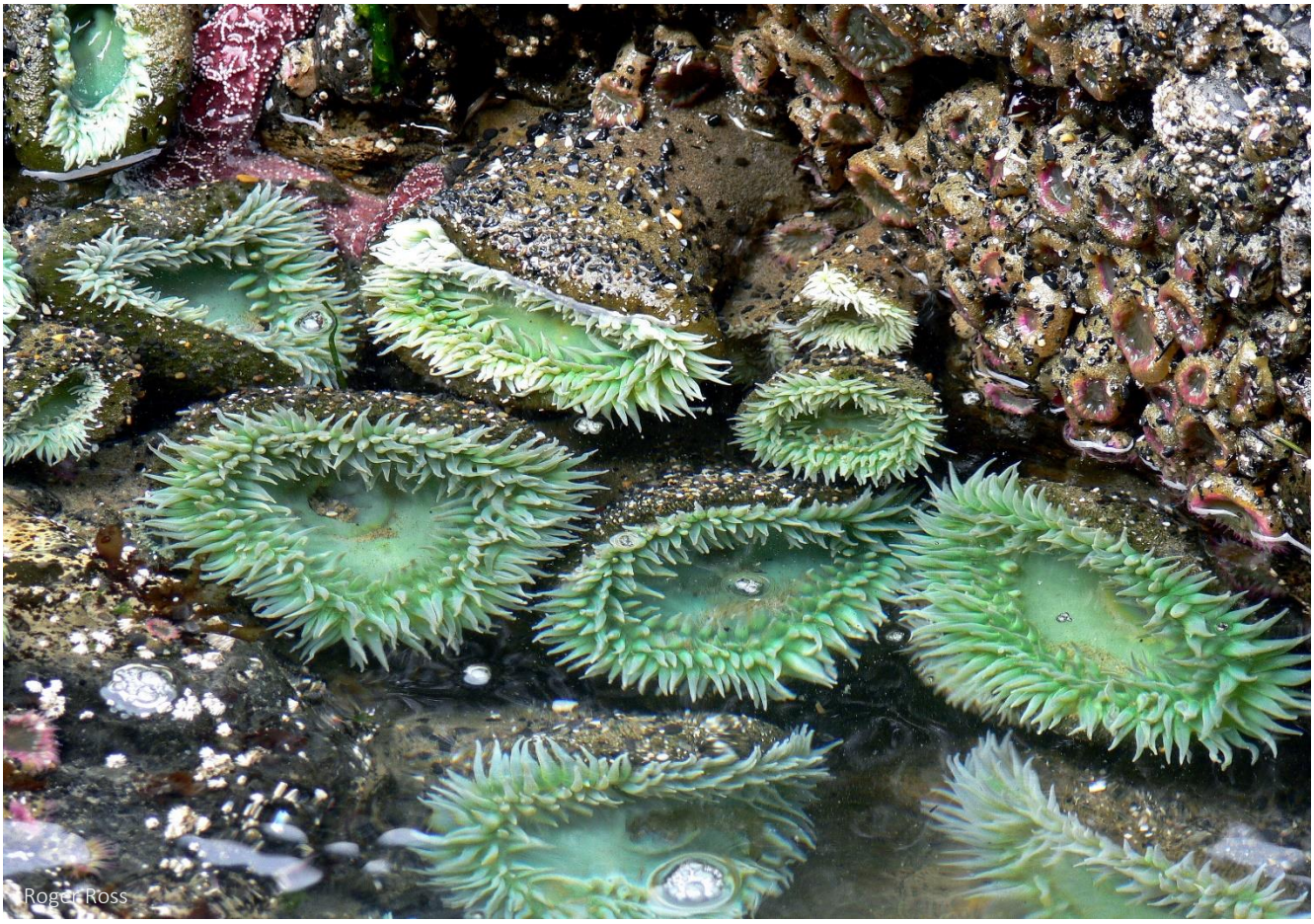
Impact Analysis: It is critical that TEP and its partners understand the specific impacts various land-uses, environmental changes, and other alterations have on key habitats and species, in order to properly prioritize and implement actions to address issues of greatest concern. Many effects of land-uses, such as forestry and agriculture, have already been characterized and have resulted in significant strides to alleviate impacts while continuing to allow these important industries to thrive. However, new threats previously unknown are yet to be investigated. Examples include the impacts of toxic pollutants (e.g., pharmaceuticals and pesticides) anticipated as a result of a warming climate. It is imperative to fill these data gaps to understand any impacts, to determine acceptable thresholds to maintain health, and to prioritize conservation and restoration actions that are most effective at alleviating the impacts.

Barriers

Landowner participation: Many of the programs and projects TEP and partners implement to address habitat issues involve private lands. This requires voluntary landowner cooperation in order to address habitat issues on a watershed scale. A good example of this is noxious weed control. Many noxious weed species spread along watercourses whereby they spread easily from one property to the next. Without full participation of landowners along the length of the watercourse, investments made towards control or eradication would be ineffective and ill-advised. This highlights the importance of developing and maintaining a robust community engagement program and ensuring that all necessary participants are on board prior to investing in some actions.

Community Resources: TEP's focal area encompasses a largely rural landscape; therefore, it is necessary to engage a wide array of partners and funding streams to adequately accomplish the objectives of this CCMP. Given the level of coordination necessary, opportunities can be limited to engage well-funded partners or donors to assist with the environmental actions and organizational infrastructure required to address the scope and scale of the issues faced in the area. In addition, political will and industry goals can be in conflict with restoration and monitoring efforts. Individuals in leadership do not always recognize the value of ecosystem services provided by healthy and properly functioning watersheds.

Regulatory: Federal agencies and the State of Oregon are significant partners in many of the programs identified throughout the CCMP. However, budget and funding limitations have not always allowed Federal and State programs to track project implementation and regulatory compliance. The level of scientific investment, and in a number of cases, political will, have also led to regulations or implementation strategies that have limited effectiveness and ineffective requirements.



Goal

Conserve and restore ecological functions of Tillamook County's estuaries and watersheds to benefit native aquatic and terrestrial species and the communities that depend on them.

Objective Assess, Conserve, and Restore Estuarine Habitats

Large swaths of tidal habitat have been filled, diked, and/or drained for various human uses. These activities have significantly reduced rearing habitat for salmonids, and heavy sediment loads have impacted estuary and floodplain/lower watershed habitats. Protecting and enhancing estuary and slough habitat will help restore viable populations of salmonids and other species.

Objective Assess, Conserve, and Restore Non-Estuarine Wetland Habitats

Non-Estuarine wetlands have been degraded or converted to other uses throughout the upper and lower watershed zones. Wetland conversion to agricultural, urban, infrastructure, and other land uses has reduced off-channel rearing habitat for salmonids and altered stream flows and water quality. Protecting and enhancing non-estuarine wetlands will provide habitat for salmonids and a diverse set of aquatic and terrestrial species, help reduce the effects of flooding and sedimentation, and improve water quality.

Objective Assess, Conserve, and Restore In-stream Habitats

Human activities have severely degraded the quality of in-stream habitats throughout the watersheds in TEP's focal area. Habitats have become structurally less complex, levels of woody debris have declined, flows have been reduced and/or flow regimes altered flow, aquatic organism passage blocked or impeded, and water diverted or impounded. Protection and enhancement of in-stream habitats are needed to restore viable populations of salmonids and other aquatic species.

Objective Assess, Conserve, and Restore Riparian Habitats

Human activities have severely altered or removed riparian vegetation throughout the watersheds in TEP's focal area. This modification has resulted from forestry practices, fires, agricultural activities, road construction, and/or urban development. Protection and enhancement of riparian habitats to more functional conditions along perennial and seasonal streams will improve water quality and salmonid habitat and reduce sediment loading.

Objective Assess, Conserve, and Restore Upland Habitats

Upland habitats within a watershed contribute both biological and physical inputs that are critical to the healthy ecological functioning of aquatic and wetland habitats. These contributions include forage, nutrient input, and habitat connectivity and complexity.

Objective Enhance Health of Salmonid, Shellfish, and Other Aquatic Species Stocks

Degradation of habitats and past and present fishery practices have contributed to the declines of salmonids and other aquatic species. While protecting and enhancing habitats may help stocks recover, fishery practices should also be carefully evaluated and modified as needed to enhance sustainable wild freshwater, estuarine, and marine species populations

Objective Enhance Health of Non-Aquatic Species Stocks

Non-aquatic species within a watershed contribute directly to the ecological health and functionality of aquatic and wetland ecosystems. It is important to protect and restore non-aquatic species stocks with emphasis on those that provide critical contributions to proper ecological functioning at a watershed level.

List of Actions

Assessment and Prioritization

HAB-01	Assess and prioritize estuarine habitats
HAB-02	Assess and prioritize non-estuarine wetland habitats
HAB-03	Assess and prioritize in-stream habitats
HAB-04	Assess and prioritize riparian habitats
HAB-05	Assess and prioritize upland habitats

Conservation and Restoration

HAB-06	Conserve and restore key habitats in the estuary
HAB-07	Conserve and restore key habitats in the lower watershed
HAB-08	Conserve and restore key habitats in the upper watershed
HAB-09	Maximize ecosystem connectivity to ensure a landscape array of ecosystem processes and ease of species movement
HAB-10	Provide genetically appropriate native vegetation and promote its use among habitat restoration and enhancement partners

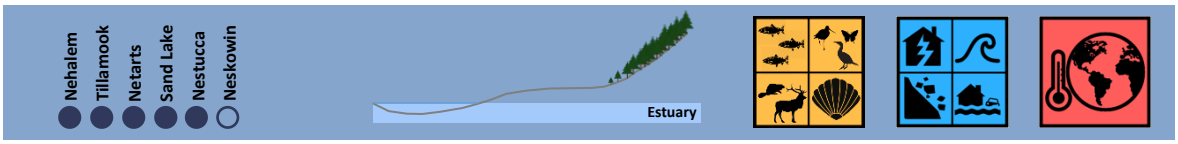
Species Focus

HAB-11	Assess, prioritize, and enhance key native species populations, emphasizing contribution to ecological function
HAB-12	Assess, prioritize, and manage non-native species emphasizing those that have or are likely to have disproportionate negative effects

Land Use & Best Management Practices

HAB-13	Assess and implement best management practices for key habitat conservation.
HAB-14	Encourage the adoption and implementation of policies, ordinances, regulations, and laws that ensure sustainable use and stewardship of natural resources and key habitats
HAB-15	Facilitate the development of pathways, funding sources, and prioritize actions taking place on “working” lands

HAB-01



Assess and prioritize estuarine habitats

What: Assess biological, hydrologic, and geomorphic attributes of key habitats within the estuary to develop a priority list for conservation, restoration, and enhancement actions. Maintain and manage tabular data, GIS layers, and maps produced in a user-friendly format accessible to TEP, conservation partners, educational institutions, and community members to support planning, prioritization, implementation, and monitoring of conservation actions in the estuaries. Assessments will cover biological resources of importance, as well as key physical characteristics including topography, bathymetry, sediment dynamics, and hydrology.

Prioritize key habitats and functions, and specific sites that may be addressed within the estuary for conservation and restoration activities. Prioritizations will utilize the information produced and assimilated in the habitat assessments to evaluate priorities.

Lead(s): TEP

Partners: OSU, UO, USFS, USFWS, NOAA, ODFW, ODA, DEQ, EPA, IAE, CTSI, Watershed Councils, TNC, private landowners

How

Activity 1: Review existing assessments and identify data gaps and outdated information.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 2: Prioritize assessment needs based on critical gaps and relevancy.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 3: Develop a funding strategy and implement priority assessments based on key biological, geomorphic, and hydrologic attributes.

Anticipated Costs: $$

Timing: Short-term

Activity 4: Create a final report summarizing each assessment performed. Report will contextualize the content of all the assessments to ensure they work together in helping achieve CCMP goals and objectives.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 5: Notify all interested parties of assessment availability and make accessing the information easy.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 6: Convene a prioritization committee made up of partners to review assessments and previously completed habitat/ecosystem level prioritizations (anchor habitat, priority watersheds) of estuary habitats conducted for Tillamook County.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 7: Prioritize key habitats and functions, and specific sites that should be addressed with respect to current organizational capacity and opportunities available.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 8: Present estuary priorities to accomplish CCMP goals and objectives at partner and community meetings and in report format made available to all interested parties.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term/Ongoing

Activity 9: Track accomplishment of priority activities and whether the intended outcomes are on trajectory to be achieved.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Why: Habitat conservation and restoration is essential for the recovery of native plant and animal species and the maintenance of critical ecological processes that promote ecosystem health and resiliency. Estuaries are unique environments at the nexus of land and sea and are among the most productive ecosystems in the world. Loss of key estuarine habitats in the Pacific Northwest such as tidal swamp and tidal marsh are key factors in the decline of many species. Humans depend on healthy populations of certain species culturally and economically, and all species represent an indispensable piece of a functional ecosystem. Therefore, it is important that strategies are developed and informed decisions are made to ensure quality habitat and optimum water quality in Tillamook County's estuarine habitats.

Historical descriptions of biologic and geomorphic conditions provide insight on the state of key habitats prior to wide spread alteration, while current assessments provide a critical comparison to evaluate the current state of key habitats. This information helps TEP and its conservation partners identify areas of concern and prioritize species, biologic communities, and habitats sites for conservation and restoration within the estuaries. In addition, the examination of past efforts to improve ecosystem health provide invaluable insight on the practice of restoration and ensures TEP will continually improve its approach moving forward.

Providing a prioritized list of key habitats, ecological processes and functions, and specific sites that should be addressed streamlines project selection, planning, fund acquisition, implementation, and baseline and performance monitoring activities. A well thought out estuary level prioritization also provides a clear path from which to draw conclusions about the cause and effect of conservation and restoration actions across estuarine habitat types and the achievement of TEP's intended objectives.

Performance Measures:

- ✓ Complete or update estuarine assessments for the Nehalem, Tillamook, Netarts, Sand Lake, and Nestucca Estuaries over the next ten years.

Assess and prioritize non-estuarine wetland habitats

What: Inventory current and historic non-estuarine wetlands within TEP's focal area. Assess hydrologic, geomorphic, and biological features of key wetlands to develop a priority list for conservation and enhancement. Non-estuarine wetlands include riverine, palustrine, and lacustrine wetland types. Include evaluation of suitable environmental conditions and specific sites conducive to creating and restoring freshwater wetlands. Maintain and manage all tabular data, GIS layers, and maps produced in a user-friendly format accessible to TEP, conservation partners, educational institutions, and community members to support planning, prioritization, implementation, and monitoring of conservation actions in freshwater wetlands.

Prioritize key habitats, ecological processes and functions, and specific sites that may be addressed in freshwater wetland habitats for conservation and restoration activities. Prioritizations will utilize the information produced and assimilated in the habitat assessments to evaluate priorities.

Lead(s): TEP

Partners: OSU, UO, USFS, USFWS, BLM, ODFW, OPRD, ODF, ODA, DEQ, Tillamook County, Columbia County, Watershed Councils, Municipal Governments, TNC, TCCA, private landowners

How

Activity 1: Update/develop inventories of non-tidal freshwater wetlands within TEP's focal area.

Anticipated Costs: $$/E,F,S,P,O

Timing: Short-term

Activity 2: Use inventories to identify potential freshwater wetlands for further assessment of biological and hydrological features.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 3: Develop list of high priority freshwater wetlands for potential conservation or restoration.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 4: Create a final report summarizing each assessment performed. Report will contextualize the content of all the assessments to ensure they work together in helping achieve CCMP goals and objectives.

Anticipated Costs: $$/E,F,S,P,O

Timing: Following completed assessments

Activity 5: Notify all interested parties of assessment availability and make accessing the information easy

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 6: Convene a prioritization committee made up of partners to review assessments and previously completed habitat/ecosystem level prioritizations (anchor habitat, priority watersheds) of freshwater wetland habitat conducted for Tillamook County.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 7: Prioritize key habitats, ecological processes and functions, and specific sites that should be addressed with respect to current organizational capacity and opportunities available

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 8: Present estuary priorities to accomplish CCMP goals and objectives at partner and community meetings and in report format made available to all interested parties.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term/Ongoing

Activity 9: Track accomplishment of priority activities and whether the intended outcomes are on trajectory to be achieved.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Why: Habitat conservation and restoration is essential for the recovery of significant plant and animal species and the maintenance of critical ecological processes that maintain ecosystem health and resiliency. Freshwater wetlands are unique environments and may represent some of the most impacted forms of wetland in Tillamook County. Impacts are due to the disconnection of streams from their floodplains, the draining of wetland areas for various land uses, and the relative rarity of natural lake systems in Tillamook County. Perennial and ephemeral wetlands are areas that are characterized by extended periods of saturation, which in turn allows the development of hydric soils and establishment of hydrophytic (water-loving) vegetation. They support several rare and ecologically significant species of fish, mammals, invertebrates, and birds. While many species that inhabit freshwater wetlands may be lesser known to the public, these species and their ecological systems support a host of ecological functions and services that support clean water and habitat quality across ecotones.

Historical descriptions of biologic and geomorphic conditions provide insight on the state of freshwater wetlands prior to wide spread alteration, while current assessments provide a critical comparison to evaluate the current state of freshwater wetlands. This information helps TEP and its conservation partners identify issues of concern and prioritize species, biologic communities, and habitats for conservation, creation, and restoration.

Providing a prioritized list of key habitats, ecological processes and functions, and specific sites that should be addressed streamlines project selection, planning, fund acquisition, implementation, and baseline and performance monitoring activities. A well thought out watershed level prioritization also provides a clear path from which to draw conclusions about the cause and effect of conservation and restoration actions across habitat types and the achievement of TEP's intended objectives.

Performance Measures:

- ✓ Assess and prioritize conservation actions in non-estuarine wetlands for all five estuarine watersheds in TEP's focal area over the next ten years.

Assess and prioritize in-stream habitats

What: Review current assessments and metrics collected by partner agencies (e.g., USFS, BLM, ODFW) to determine need for additional in-stream assessments. Address challenges to capacity and funding and facilitate the completion of assessments deemed necessary by partner advisory committee. Schedule follow-up assessments to identify trends and monitor progress of conservation actions consistently into the future. Maintain and manage all tabular data, GIS layers, and maps produced in a user-friendly format accessible to TEP, conservation partners, educational institutions, and community members to support planning, prioritization, implementation, and monitoring of conservation actions.

Prioritize key habitats, ecological processes and functions, and specific sites within in-stream habitats for conservation and restoration activities. Prioritizations will utilize the information produced and assimilated in the habitat assessments to evaluate priorities.

Lead(s): TEP, ODFW, USFS, BLM, ODF, soil and water conservation districts, watershed councils

Partners: OSU, UO, USFS, USFWS, BLM, ODFW, OPRD, ODF, DEQ, Tillamook County, TCCA, private landowners

How

Activity 1: Convene an in-stream advisory group to review the current status of in-stream assessments in Tillamook County, and identify needs and challenges to completing those assessments.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 2: Develop a funding and implementation strategy for creating new and updating out-of-date assessments identified in Activity 1. Strategy shall consider relevance (temporal, content), repeatability, frequency, and cost effectiveness.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 3: Facilitate the completion of assessments according to the strategy identified in Activity 2.

Anticipated Costs: $$/E,F,S,P,O

Timing: Short-term

Activity 4: Create a final report summarizing each assessment performed. Report will contextualize the content of all the assessments to ensure they work together in helping achieve CCMP goals and objectives.

Anticipated Costs: $/E,F,S,P,O

Timing: Following completed assessments

Activity 5: Notify all interested parties of assessment availability and make accessing the information easy.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 6: Convene a prioritization committee made up of partners to review ecosystem assessments and previously completed habitat/ecosystem level prioritizations (anchor habitat, priority watersheds) of in-stream habitat conducted for the focal area.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 7: Prioritize key habitats, ecological processes and functions, and specific sites that should be addressed with respect to current organizational capacity and opportunities available

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 8: Present watershed priorities to accomplish CCMP goals and objectives at partner and community meetings and in report format made available to all interested parties.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term/Ongoing

Activity 9: Track accomplishment of priority activities and whether the intended outcomes are on trajectory to be achieved.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Why: In-stream habitats are complex environments influenced by hydrologic, geologic, chemical, and biological processes. In-stream habitat quality has been degraded by the disconnection of streams from their floodplains, flow diversions, removal of large woody debris, and alteration of surrounding ecosystems (riparian, upland forest, and wetlands) that contribute vital inputs to the system. In-stream habitats support several rare, ecologically significant, and economically important species of fish, mammals, invertebrates, and birds. Among these are a variety of anadromous fish species that depend on high quality in-stream habitat for reproduction and rearing.

Up-to-date in-stream assessments provide a summary of all habitat conditions and highlight problem areas and/or opportunities for protection and enhancement in a complex and dynamic system. This critical information can help plan, prioritize, and implement important in-stream habitat conservation and restoration actions. Using the assessments, in context to the watershed, will result in more cost-effective measures for the recovery of key species.

Providing a prioritized list of key habitats, ecological processes and functions, and specific sites that should be addressed streamlines project selection, planning, fund acquisition, implementation, and baseline and performance monitoring activities. A well thought out estuary level prioritization also provides a clear path from which to draw conclusions about the cause and effect of conservation and restoration actions across habitat types and the achievement of our intended objectives.

Performance Measures:

- ✓ Assess 100 stream miles in priority reaches in the next ten years.


Roger Ross

Assess and prioritize riparian habitats

What: Assess riparian conditions in TEP's focal area to support planning, prioritization, implementation, and monitoring of conservation actions in riparian areas. Assessments will account for high quality, degraded, and restored reaches of streams to provide information on the health of riparian areas in the watersheds. Schedule follow up assessments to track trends and monitor progress of conservation actions consistently into the future. Maintain and manage all tabular data, GIS layers, and maps produced in a user-friendly format accessible to TEP, conservation partners, educational institutions, and community members to support planning, prioritization, implementation, and monitoring of conservation actions of riparian habitats.

Prioritize key habitats, ecological processes and functions, and specific sites within riparian habitats for conservation and restoration activities. Prioritizations will utilize the information produced and assimilated in the habitat assessments to evaluate priorities.

Lead(s): TEP, ODFW, USFS, BLM, ODF, soil and water conservation districts, watershed councils

Partners: OSU, UO, USFS, USFWS, BLM, ODFW, OPRD, ODF, DEQ, Tillamook County, TCCA, private landowners

How

Activity 1: Assess riparian areas in the context of their geomorphic setting to identify areas where restoration and conservation would be beneficial. These assessments should be repeatable, cost efficient, and provide a baseline for performance monitoring in addition to status.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 2: Develop a funding and implementation strategy for completing riparian assessments identified in Activity 1. Strategy shall consider relevance (temporal, content), repeatability, frequency, and cost effectiveness. Ensure proper lead time to coordinate private landowners that have participated in riparian restoration that would be the subject of restoration assessments.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 3: Complete assessments according to the strategy identified in Activity two.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 4: Create a final report summarizing the assessments performed. Report will contextualize the content of all the assessments to ensure they work together in helping achieve CCMP goals and objectives.

Anticipated Costs: $$/E,F,S,P,O

Timing: Following completed assessments

Activity 5: Notify all interested parties of assessment availability and make accessing the information easy.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 6: Convene a prioritization committee made up of partners to review ecosystem assessments and previously completed habitat/ecosystem level prioritizations (anchor habitat, priority watersheds) of riparian habitat conducted for Tillamook County.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 7: Prioritize key habitats, ecological processes and functions, and specific sites that should be addressed with respect to current organizational capacity and opportunities available.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term

Activity 8: Present watershed priorities to accomplish CCMP goals and objectives at partner and community meetings and in report format made available to all interested parties.

Anticipated Costs: $/E,F,S,P,O

Timing: Short-term/Ongoing

Activity 9: Track accomplishment of priority activities and whether the intended outcomes are on trajectory to be achieved.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

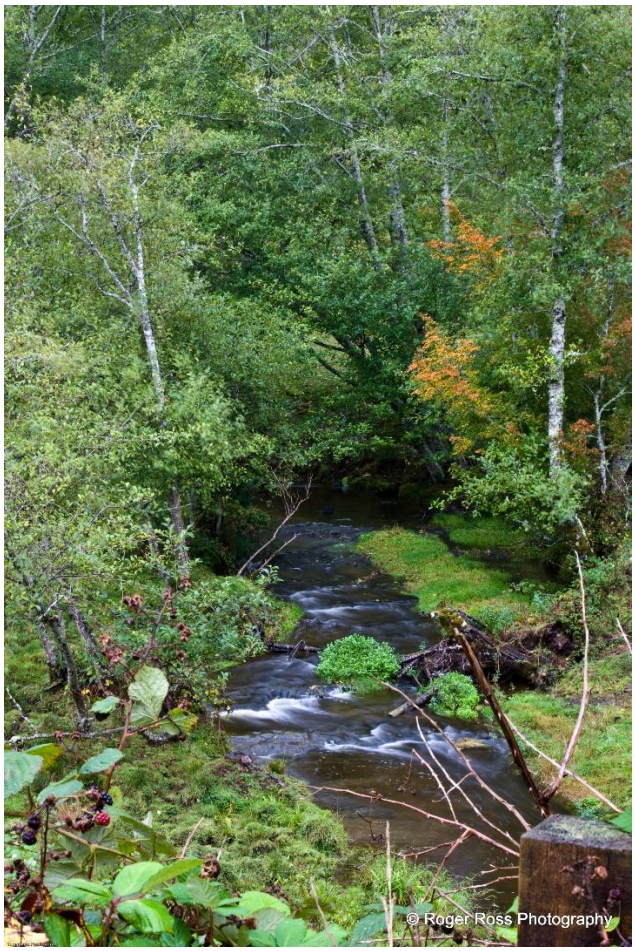
Why: Healthy riparian habitats are biologically diverse. They contribute to the health and functionality of adjacent habitats, including the in-stream habitats they encompass. Riparian habitats have been degraded by the disconnection of streams from their floodplains, flow diversion, outright removal, and the alteration of surrounding ecosystems (streams, upland forest, and wetlands).

Up-to-date riparian assessments provide critical information on the state of habitat conditions and highlight problem areas and/or opportunities for conservation and restoration. This information can help plan, prioritize, and implement important conservation and restoration actions of riparian areas. In addition, an assessment of past restoration actions will provide valuable information on the most successful approaches to take when engaging in conservation and restoration of riparian habitat.

Providing a prioritized list of key habitats, functions, and specific sites that should be addressed streamlines project selection, planning, fund acquisition, implementation, and baseline and performance monitoring activities. A well thought out estuary level prioritization also provides a clear path from which to draw conclusions about the cause and effect of conservation and restoration actions across estuarine habitat types and the achievement of our intended objectives.

Performance Measures:

- ✓ Assess 100 miles of habitat and structural characteristics (e.g., LWD, substrate, pool/riffle ratio) in each of the five focal estuaries in the next ten years.



Assess and prioritize upland habitats

What: Conduct upland habitat assessments to support planning, prioritization, implementation, and monitoring of conservation actions in upland areas. Schedule follow-up assessments to track trends and monitor progress of conservation actions consistently into the future. Maintain and manage all tabular data, GIS layers, and maps produced in a user-friendly format accessible to TEP, conservation partners, educational institutions, and community members to support planning, prioritization, implementation, and monitoring of conservation actions of upland habitats.

Prioritize key habitats, ecological processes and functions, and specific sites within upland habitats for conservation and restoration activities. Prioritizations will utilize the information produced and assimilated in the habitat assessments to evaluate priorities.

Lead(s): TEP, ODFW, USFS, BLM, ODF, soil and water conservation districts, watershed councils

Partners: OSU, UO, USFS, USFWS, BLM, ODFW, OPRD, ODF, ODA, DEQ, Tillamook County, TCCA, private landowners

How

Activity 1: Identify biological and geomorphic aspects of upland habitats and their role in the watershed. These assessments should be repeatable, cost efficient, and provide a baseline for performance monitoring in addition to status.

Anticipated Costs: $/F,S,P,O

Timing: Short-term

Activity 2: Develop a funding and implementation strategy for completing upland habitat assessments identified in Activity 1. Strategy shall consider relevance (temporal, content), repeatability, frequency, and cost effectiveness.

Anticipated Costs: $

Timing: Short-term

Activity 3: Complete assessments according to the strategy identified in Activity 2.

Anticipated Costs: $$/F,S,P,O

Timing: Ongoing

Activity 4: Create a final report summarizing the assessments performed. Report will contextualize the content of all the assessments to ensure they work together in helping achieve CCMP goals and objectives.

Anticipated Costs: $/F,S,P,O

Timing: Following completed assessments

Activity 5: Notify all interested parties of assessment availability and make accessing the information easy.

Anticipated Costs: $/F,S,P,O

Timing: Ongoing

Activity 6: Convene a prioritization committee made up of partners to review ecosystem assessments and previously completed habitat/ecosystem level prioritizations (anchor habitat, priority watersheds) of upland habitat conducted for Tillamook County.

Anticipated Costs: $/F,S,P,O

Timing: Short-term

Activity 7: Prioritize key habitats, ecological processes and functions, and specific sites that should be addressed with respect to current organizational capacity and opportunities available.

Anticipated Costs: $/F,S,P,O

Timing: Short-term

Activity 8: Present watershed priorities to accomplish CCMP goals and objectives at partner and community meetings and in report format made available to all interested parties.

Anticipated Costs: $/F,S,P,O

Timing: Short-term/Ongoing

Activity 9: Track accomplishment of priority activities and whether the intended outcomes are on trajectory to be achieved.

Anticipated Costs: $/F,S,P,O

Timing: Ongoing

Why: Upland habitats are often overlooked when considering conservations actions to improve watershed health. Yet upland habitats make up most of the watershed area. Upland habitats provide numerous inputs that are critical to the functioning of watersheds, some of these include organic debris, sediment, nutrients, food chain support, and water filtration and delivery. Many of the services provided by upland habitats have been degraded due to extensive use for forestry, agriculture, and infrastructure development. These practices and others have altered the structure and biological diversity of the upland system dramatically and these changes have direct negative effects on the function of other habitat types within a watershed. The value of upland systems contributes to a healthy watershed, as such, their restoration is key.

Upland habitat assessments that make clear links between upland habitat health and watershed level function are key to encouraging more conservation and restoration of upland habitats and provide a way to prioritize work to be done. Given the extent and political nature of upland land management, this information can help TEP and its partners make strategic decisions on the conservation and restoration of degraded upland systems. A holistic approach to watershed scale restoration that includes upland habitats is paramount to successfully recovering the most valued species and watershed processes.

Providing a prioritized list of key habitats, ecological processes and functions, and specific sites that should be addressed streamlines project selection, planning, fund acquisition, implementation, and baseline and performance monitoring activities. A well thought out watershed level prioritization also provides a clear path from which to draw conclusions about the cause and effect of conservation and restoration actions across estuarine habitat types and the achievement of our intended objectives.

Performance Measures:

- ✓ Carry out assessments and prioritizations for upland habitat in each of the five focal estuaries over the next ten years.

Roger Ross

HAB-06

Conserve and restore key habitats in the estuary

What: Conserve existing high-quality estuarine habitats and restore historic estuarine habitats by working with landowners on a voluntary basis to secure conservation easements or fee title acquisition. Work with local governments and state government as needed to ensure that regulations intended to protect sensitive lands are working effectively. For high priority restoration areas, work with landowners to undertake restoration actions in tidal marshes, tidal swamps, tidal sloughs/channels, eel grass meadows, mudflats, and estuarine transitional habitats to restore key functions. Restoration actions may include dike breaches, tide gate alteration, hydrologic reconnection, channel creation/modification, habitat structure enhancement, native plant and animal reintroduction, and exotic species control.

Lead(s): TEP, ODFW, USFS, BLM, ODF, soil and water conservation districts, watershed councils

Partners: OSU, UO, USFS, USFWS, NOAA, ODFW, ODA, DEQ, IAE, private landowners

How

Activity 1: Utilize ecological characterizations and prioritizations completed to select logical projects for implementation.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 2: Develop project funding, baseline evaluation, design, implementation, and outreach strategy and timeline.

Anticipated Costs: $$/E,F,S,P,O

Timing: Ongoing

Activity 3: Execute strategy with respect to timeline and the need for adaptive management to effectively conserve and restore key estuarine habitats and processes.

Anticipated Costs: $$$/E,F,S,P,O

Timing: Ongoing

Activity 4: Develop and implement performance monitoring that is consistent with current accepted protocols to evaluate project efficacy, provide similar project comparison, and inform long-term management strategy

Anticipated Costs: $$/E,F,S,P,O

Timing: Ongoing

Activity 5: Disseminate project information (methods and results) to partner organizations, stakeholders, and other interested parties to continually improve conservation and restoration practices in estuarine systems.

Anticipated Costs: $/E,F,S,P,O

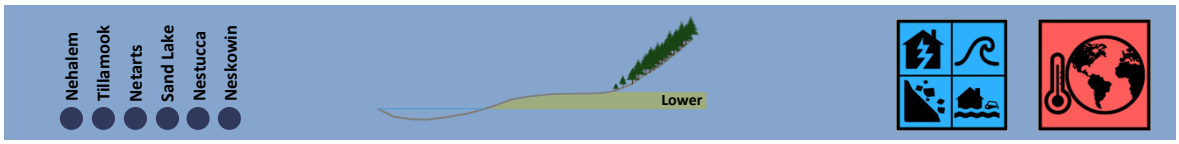
Timing: Ongoing

Why: Estuarine habitats are critical habitats for migrating and overwintering birds; provide spawning, rearing, and cover for anadromous and resident fishes; and are home to an incredible diversity of plants and other wildlife. Estuaries are unique transition zones between salty marine and fresh water riverine systems and their health has been identified as a critical limiting factor in the recovery of several sensitive species including the federally threatened Oregon Coast Coho (an evolutionarily significant unit of coho salmon). Over 80% of Oregon's historical tidal marshes and swamps have been destroyed or severely altered making their conservation and restoration a priority coast wide.

Performance Measures:

- ✓ Conserve 200 acres of healthy estuarine habitat over next ten years.
- ✓ Restore 300 acres of degraded estuarine habitat over the next ten years.

HAB-07



Conserve and restore key habitats in the lower watershed

What: Conserve existing high-quality lower watershed habitats and restore historical lower watershed habitats by working with landowners on a voluntary basis to secure conservation easements or fee title acquisition. Conserve and restore meandering streams; sinuous side channels and sloughs; forested, shrubby, and emergent fresh water wetlands; and mixed riparian gallery forests habitats and functions. Restore the underlying physical processes that maintain key lower watershed habitats over time including floodplain connectivity, freshwater inputs and circulation, sediment regimes, and structural complexity. Restoration actions may include levee breaches, culvert alteration, hydrologic reconnection, channel creation/modification, habitat structure enhancement, native plant and animal reintroduction, and exotic species control. In addition, effective best management practices need to be employed to buffer high-quality habitats from potential degradation associated with the higher rates of development and intensive land use in lower watersheds.

Lead(s): TEP, ODFW, USFS, BLM, ODF, soil and water conservation districts, watershed councils

Partners: OSU, UO, USFS, USFWS, BLM, ODFW, OPRD, ODF, ODA, DEQ, TCCA

How

Activity 1: Utilize ecological characterizations and prioritizations completed to select logical projects for implementation.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 2: Develop project funding, baseline evaluation, design, implementation, and outreach strategies and timelines.

Anticipated Costs: $$/E,F,S,P,O

Timing: Ongoing

Activity 3: Execute strategy with respect to timeline and the need for adaptive management to effectively conserve and restore key lower watershed habitats and processes.

Anticipated Costs: $$$/E,F,S,P,O

Timing: Ongoing

Activity 4: Develop and implement performance monitoring that is consistent with current accepted protocols to evaluate project efficacy, provide similar project comparison, and inform long-term management strategy.

Anticipated Costs: $$/E,F,S,P,O

Timing: Ongoing

Activity 5: Disseminate project information (methods and results) to partner organizations, stakeholders, and other interested parties to continually improve conservation and restoration practices of lower watershed systems.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Why: Habitats and processes in the lower watershed are shaped by low gradient, broad alluvial valley landforms. In these flatter areas the rivers and streams are able to more frequently interact with their floodplains during periods of high water. This dynamic interaction sculpts the alluvial valley floor into a myriad of complex habitat types that include meandering low velocity streams; sinuous side channels and sloughs; forested, shrubby, and emergent fresh water wetlands; and mixed riparian

gallery forests dominated by massive black cottonwoods. Conserving and restoring a highly functioning, healthy array of these habitats to the lower watershed landscape is important to maintain the critical ecosystem services that these habitats provide and upon which the people of Tillamook County depend on for their quality of life. Some of these services include water purification, highly productive agricultural sediment production, and sustainable fish and wildlife populations.

Performance Measures:

- ✓ Conserve and restore 200 acres of lower watershed habitat over the next ten years.

Conserve and restore key habitats in the upper watershed

What: Conserve existing high-quality upper watershed habitats and restore historical upper watershed habitats by working with landowners on a voluntary basis to secure conservation easements or fee title acquisition. Conserve and restore mainstem rivers and tributaries, off-channel aquatic refugia, riverine wetlands, springs, mixed riparian forests, meadows, and diverse upland forest habitats and functions. Restore the underlying physical processes that maintain key upper watershed habitats over time including floodplain connectivity, flow regimes, sediment regimes, and coarse organic debris delivery mechanisms. Restoration actions may include culvert alteration, hydrologic reconnection, channel creation/modification, habitat structure enhancement, native plant and animal reintroduction, and exotic species control. Effective best management practices need to be employed to buffer high-quality habitats from potential degradation associated with resource extraction and rural residential development typical of upper watersheds.

Lead(s): TEP, ODFW, USFS, BLM, ODF, soil and water conservation districts, watershed councils

Partners: OSU, UO, USFS, USFWS, BLM, ODFW, ODF, ODA, DEQ

How

Activity 1: Utilize ecological characterizations and prioritizations completed to select logical projects for implementation.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 2: Develop project funding, baseline evaluation, design, implementation, and outreach strategies and timelines.

Anticipated Costs: $$/E,F,S,P,O

Timing: Ongoing

Activity 3: Execute strategy with respect to timeline and the need for adaptive management to effectively conserve and restore key upper watershed habitats and processes.

Anticipated Costs: $$$/E,F,S,P,O

Timing: Ongoing

Activity 4: Develop and implement performance monitoring that is consistent with current accepted protocols to evaluate project efficacy, provide similar project comparison, and inform long-term management strategy.

Anticipated Costs: $$/E,F,S,P,O

Timing: Ongoing

Activity 5: Disseminate project information (methods and results) to partner organizations, stakeholders, and other interested parties to continually improve conservation and restoration practices of upper watershed systems.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

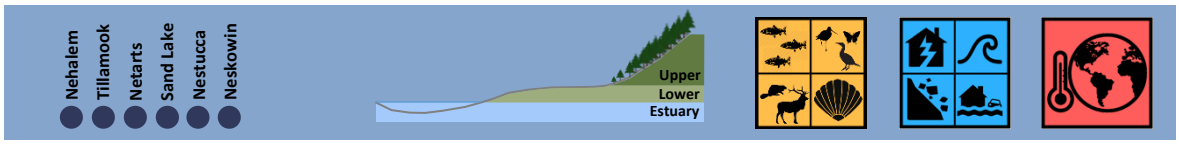
Why: Habitats and processes in the upper watershed are shaped by higher gradient, narrow, coarse sediment dominated landforms. In these steeper areas the rivers and streams are more confined and are characterized by higher velocity, turbulent flow regimes. This high energy environment results in steep rugged valleys prone to landslides. Key habitats include swift mainstem rivers and tributaries, off-channel aquatic refugia, riverine wetlands, springs, mixed riparian forests, meadows, and diverse upland forest. Conserving and restoring

a highly functioning, healthy array of habitats in the upper watershed is important to maintain critical ecosystem services that these habitats provide. Some of these services include clean/cold water production; sediment production and delivery to the lower and estuarine portions of the watershed; spawning gravel for anadromous fish; and sustainable timber, fish, and wildlife populations.

Performance Measures:

- ✓ Restore 200 acres of critical habitat in the upper watershed over the next ten years.

HAB-09



Maximize ecosystem connectivity to ensure a landscape array of ecosystem processes and ease of species movement

What: Conserve and restore lands that provide effective connectivity among and between habitats to allow physical and biological processes to occur that are necessary for healthy ecosystem function. Conservation and restoration shall focus on existing open spaces that encompass viable corridors between habitat types. In addition, it is important to protect areas where high quality habitats transition from one to another. These ecotones are hotbeds of biological diversity and are critical to maintain ecosystem level biological and physical processes. Address manmade barriers like roads, fences, and continuous development to enhance the free flow of organisms and ecological processes through and across them. Develop a watershed-wide characterization that clearly identifies the biological and physical processes that are most critical in and among habitats and where on the landscape they occur and need to be addressed most readily. Based on this characterization, develop priorities for conservation and restoration of the most critical connections.

Lead(s): TEP, ODFW, USFWS, USFS, BLM, ODF, TU, watershed councils

Partners: OSU, UO, USFS, USFWS, NOAA, ODFW, ODA, DEQ, IAE, private landowners

How

Activity 1: Characterize issues that impede the free flow of organisms and ecological processes within and across habitat types and specific areas where they occur.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 2: Develop inventories and prioritizations for connectivity issues that are the most critical to address.

Anticipated Costs: $$

Timing: Ongoing

Activity 3: Carry out conservation and restoration projects that reconnect and enhance organism movement and ecological processes in and between habitat types.

Anticipated Costs: $$$/E,F,S,P,O

Timing: Ongoing

Activity 4: Develop and implement effectiveness monitoring of habitat connectivity projects undertaken.

Anticipated Costs: $$/E,F,S,P,O

Timing: Ongoing

Activity 5: Disseminate project information (methods and results) to partner organizations, stakeholders, and other interested parties to continually improve conservation and restoration practices as they pertain to ecosystem connectivity.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

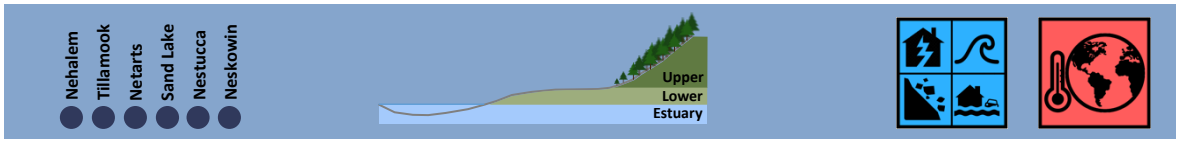
Why: Adequate connectivity in and between habitats is important for the proper functioning of habitats and the survival of the species that depend on them. Connectivity provides long-term resiliency, adaptability to change, and enhances a habitat's ability to recover from manmade and natural disturbances. Important biological processes that occur across ecotones include gene flow and the maintenance of genetic diversity, species movement for colonization and recolonization of habitats, and the flux of valuable organic inputs like leaf litter and

large woody debris. Physical processes that occur across ecotones include the movement of clean water, sediment and nutrient inputs, and environmental influences like temperature moderation. These critical processes, in most cases, are independent of single habitat types in that they only occur effectively when a landscape array of habitats are freely connected; therefore, it is imperative to engage watershed-scale conservation and restoration.

Performance Measures:

- ✓ Implement ten aquatic organism passage projects over the next ten years.
- ✓ Identify 100 acres of critical corridor habitat to be protected over the next ten years.

HAB-10



Provide genetically appropriate native vegetation and promote its use among habitat restoration and enhancement partners

What: Enable the restoration of key habitats and species populations by providing locally sourced, genetically appropriate native plants to partners implementing restoration of key habitats via TEP's Northwest Oregon Habitat Restoration program (NORP) at its native plant nursery. Promote the effective use of native plants through outreach and technical support to partners and the greater community.

Lead(s): TEP

Partners: OSU, UO, USFS, USFWS, NOAA, ODFW, ODA, DEQ, IAE, BLM, ODF, soil and water conservation districts, watershed councils, and private landowners

How

Activity 1: Continue to work towards long-term program sustainability through a variety of funding streams.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 2: Propagate a diversity of locally adapted native plant materials to meet the needs of habitat restoration of all the key habitats found along the north coast of Oregon.

Anticipated Costs: $$$/E,F,S,P,O

Timing: Ongoing

Activity 3: Distribute native plant material to partners and make surplus plant material available to local communities for habitat enhancement and as a mechanism for outreach.

Anticipated Costs: $$/E,F,S,P,O

Timing: Ongoing

Activity 4: Provide technical expertise in native plant propagation, appropriate palette selection, and restoration implementation strategies to partners and interested community members.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 5: Provide opportunities for education, hands-on experience, youth mentorship, and community service in the field of native plants, native plant propagation, and habitat restoration.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

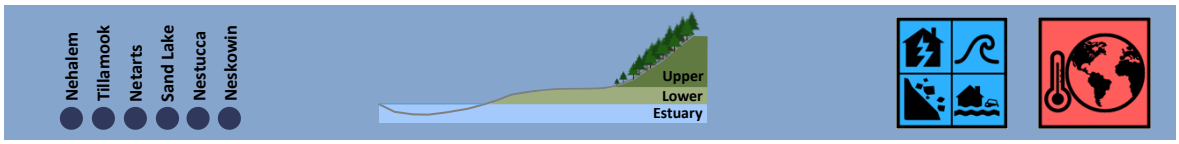
Why: TEP's native plant nursery is the only reliable sources of coastal adapted native plant material for the restoration of estuaries, wetlands, riparian areas, and other key habitat in Northwest Oregon. The nursery propagates plant material and provides it to partners at a low cost which enables the receiving partners to leverage more funding for the implementation of on the ground restoration work. Restoring plant communities with genetically diverse plant populations that are specifically adapted to their environment is a key to successful restoration and ensures the maintenance of genetic integrity in natural plant populations. Genetic diversity and the corresponding unique nature of the plants that make up a given population or sub-population provides species resiliency through disease resistance, increased vigor, adaptability to change, and

resiliency to natural and human caused disturbance. Of special genetic concern are rare plant species or portions of plant populations that are at the periphery of their population distribution. To ensure robust and diverse plant populations into the future and in the face of climate change, it is imperative that TEP and its partners preserve the unique genetic nature of even the most common plant species.

Performance Measures:

- ✓ Supply at least 75,000 native plants to restoration partners annually.
- ✓ Mentor 40 youth annually in the conservation sciences and career field.

HAB-11



Assess, prioritize, and enhance key native species populations, emphasizing contribution to ecological function

What: Assess native plant and animal species within the focal area to identify species populations that need conservation and enhancement utilizing new and established information (i.e., The Oregon Conservation Strategy). Focus on species that are rare, declining, economically significant, and those that exhibit a high relative contribution to the proper functioning of the ecosystem. Common species shall not be overlooked. Using this information, prioritize plant and animal species or specific groups of plant and animal species that are need of conservation and restoration. Develop and implement projects that address the specific needs of target species populations. These projects may include habitat restoration, species reintroduction, exotic species management, outreach, and policy adjustment.

Lead(s): TEP, ODFW, USFWS, USFS, BLM, ODF, TU, watershed councils

Partners: OSU, UO, USFS, USFWS, NOAA, ODFW, ODA, DEQ, IAE, BLM, ODF, soil and water conservation districts, watershed councils, and private landowners

How

Activity 1: Assess the health, status, and functional roles of native plant and animal species in the key habitats. Utilize current information found in conservation and management plans as well as new data and information as needed to paint a comprehensive picture of the focal area's functional ecology.

Anticipated Costs: $$/E,F,S,P,O

Timing: Ongoing

Activity 2: Utilize the comprehensive assessment compiled for Activity 1, prioritize species that are most in need of conservation and enhancement due to their status and/or their relative contribution the ecosystem function.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 3: Develop and implement projects that address the needs of priority species.

Anticipated Costs: $$$

Timing: Ongoing

Activity 4: Disseminate project information (methods and results) to partner organizations, stakeholders, and other interested parties to continually improve conservation and restoration practices of upper watershed systems.

Anticipated Costs: $

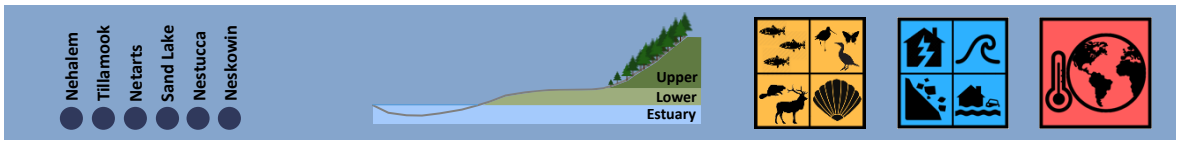
Timing: Ongoing

Why: Ecosystems are made up of a myriad of native plant and animal species that together comprise a functioning ecosystem. Plants and animals play functional roles in a variety of processes including predator/prey relationships, biochemical cycling, and habitat structure modification. While some species may seem insignificant, the functional roles they contribute to the health of the ecosystem may be critical to species with economical or cultural value. Therefore, it is paramount that every species within the ecosystem is treated as a critical piece of the puzzle, and that TEP and its partners strive to understand the significance of their roles even when not clear. The conservation and restoration of species diversity within ecosystems is critical to the maintenance of economically and culturally valuable species and the critical ecosystem services they provide.

Performance Measures:

- ✓ Initiate ten special status species recovery projects over the next ten years.

HAB-12



Assess, prioritize, and manage non-native species emphasizing those that have or are likely to have disproportionate negative effects

What: Assess non-native plant and animal species within Tillamook County to identify species populations that pose potential negative impacts on the ecosystem and native species populations of ecological, cultural, and economic value. Focus on species that exhibit disproportionate negative effects on the proper functioning of the ecosystem currently and those that are likely to do so if allowed to expand. Early detection and rapid response (EDRR) is essential. Using this information, prioritize plant and animal species or specific groups of plant and animal species that need eradication. Develop and implement projects that directly or indirectly reduce the target non-native species populations including the manipulation of habitat conditions suitable for their presence. These projects may include habitat restoration, species reintroduction, exotic species management, outreach, and policy adjustment. Ensure effective collaboration with regional Collaborative Weed Management Areas (CWMA) and Partnership for Regional Invasive Species Management (PRISM) groups.

Lead(s): TEP, ODFW, USFS, BLM, ODF, soil and water conservation districts, watershed councils, private timber

Partners: OSU, UO, USFS, USFWS, NOAA, ODFW, ODA, DEQ, IAE, BLM, ODF, soil and water conservation districts, watershed councils, and private landowners

How

Activity 1: Assess the status and negative effects of non-native plant and animal species on key habitats found in TEP's focal area. Utilize current information found in conservation and management plans as well as new data and information as needed to paint a comprehensive picture of non-native species populations.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 2: Utilize the comprehensive assessment compiled for Activity 1, to prioritize species that are most in need of eradication due to their status and/or their relative negative effects on ecosystem function.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 3: Develop and implement projects that directly or indirectly reduce target non-native species populations.

Anticipated Costs: $$$/E,F,S,P,O

Timing: Ongoing

Activity 4: Disseminate project information (methods and results) to partner organizations, stakeholders, and other interested parties to continually improve efforts to control non-native populations and their corresponding negative effects.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Why: The presence of aggressive, non-native species of plants and animals can have disastrous effects on native species populations, ecosystem function, and local economies. To successfully conserve and restore native populations, ecosystems, ecosystem services, and the natural resources control non-native species present in the ecosystem and prevent the colonization and spread of additional species in the future.

Performance Measures:

- ✓ Develop a strategic plan for invasive species management for each of the five focal estuaries over the next ten years.

Nehalem Bay | Don Best

Assess and implement best management practices for key habitat conservation

What: Assess and implement best management practices used to reduce the impacts of land use on key habitats in the estuarine, lower, and upper portions of the watersheds. Determine the effectiveness and rate of use of current best management practices at reducing impacts on ecosystem processes and function. Through education, outreach, and policy adjustment, encourage the use and further development of best management practices.

Lead(s): TEP, ODFW, USFS, BLM, ODF, soil and water conservation districts, watershed councils, private industry

Partners: OSU, UO, USFS, USFWS, NOAA, ODFW, ODA, DEQ, IAE, BLM, ODF, TCCA, soil and water conservation districts, watershed councils, and private landowners

How

Activity 1: Assess current best management practices used to reduce land use impacts on key habitat.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 2: Utilize information collected to highlight and prioritize opportunities to improve best management practices employed by industry and throughout the landscape.

Anticipated Costs: $$/E,F,S,P,O

Timing: Ongoing

Activity 3: Implement new and established best management practices according to prioritized opportunities.

Anticipated Costs: $$$/E,F,S,P,O

Timing: Ongoing

Activity 4: Encourage the development and use of best management practices through education and outreach.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

Activity 5: Disseminate information on best management practices (methods and results) to partner organizations, stakeholders, and other interested parties to continually improve our understanding of the current state and efficacy of best management practices being employed to mutually benefit ecosystems and industry.

Anticipated Costs: $/E,F,S,P,O

Timing: Ongoing

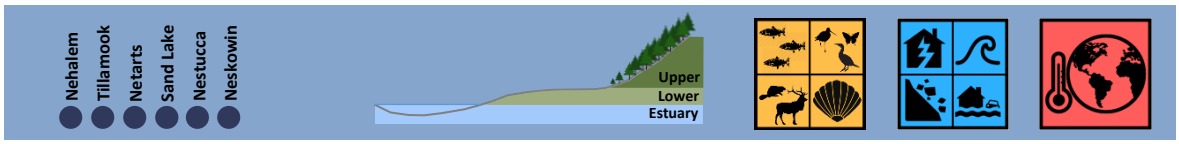
Why: Intensive land and aquatic resource use such as rural development, agriculture, forestry, aquaculture, and fisheries are important to the economic and cultural livelihood of Tillamook County's citizens, but these land uses can also have negative impacts on ecosystem health, water quality, important species, and other natural resources. With expanding populations and a changing climate, the need for natural resources and dependence upon the important ecosystem services that nature provides will increase. To protect important industries while also protecting the natural environment on which they depend, a continuous effort to evaluate, implement, and improve best management practices is necessary. Best management practices are tools, methods, and

strategies that can be incorporated into industries and landscapes that prevent and reduce pollution and other forms of degradation on surrounding natural and human environments.

Performance Measures:

- ✓ Assess the state of BMPs utilized by each major industry in the focal area over the next ten years.
- ✓ Implement at least one BMP associated project annually.

HAB-14



Encourage the adoption and implementation of policies, ordinances, regulations, and laws that ensure sustainable use and stewardship of natural resources and key habitats

What: Through data collection, outreach, and education, encourage the adoption and implementation of policies, ordinances, regulations, and laws that ensure sustainable use and stewardship of natural resources and ecological services provided by key habitats.

Lead(s): State, County, Cities

Partners: OSU, UO, USFS, USFWS, NOAA, ODFW, ODA, DEQ, IAE, BLM, ODF, TCCA, soil and water conservation districts, watershed councils, and private landowners

How

Activity 1: Evaluate the comprehensiveness and effectiveness of policies, ordinances, regulations, and laws that are currently in place to ensure sustainable use of natural resources and key habitats.

Anticipated Costs: $/F,S,P,O

Timing: Ongoing

Activity 2: Develop a list of suggested changes and additions to policies, ordinances, regulations, and laws that may improve management and stewardship of natural resources and key habitats.

Anticipated Costs: $/F,S,P,O

Timing: Ongoing

Activity 3: Evaluate data gaps that, if filled, would lend credence to the adoption or alteration of policies, ordinances, regulations, and laws suggested.

Anticipated Costs: $/F,S,P,O

Timing: Ongoing

Activity 4: Encourage the adoption and implementation of policies, ordinances, regulations, and laws through education and outreach to target audiences.

Anticipated Costs: $/F,S,P,O

Timing: Ongoing

Why: The adoption and implementation of policies, ordinances, regulations, and laws are the most proven mechanisms to ensure the judicious, equitable, and sustainable use and stewardship of natural resources and key habitats. These, combined with conservation and restoration, will lead to improved ecosystem functioning and a robust, sustainable return of natural capital.

Performance Measures:

- ✓ Facilitate one educational workshop on environmental policies and regulations in the next 10 years.
- ✓ Comment on federal, state, and local rulemaking efforts as opportunities arise.

Facilitate the development of pathways, funding sources, and prioritize actions taking place on "working" lands

What: Facilitate the development of pathways, funding sources, and prioritize actions that advance the implementation of conservation and restoration activities in and around working agricultural, ranching, and forestry lands to create a sustainable future for the associated industries and natural ecosystems.

Lead(s): ODFW, USFWS, soil and water conservation districts, watershed councils, TCCA

Partners: OSU, UO, USFS, USFWS, NOAA, ODFW, ODA, DEQ, IAE, BLM, OWEB, ODF, TCCA, soil and water conservation districts, watershed councils, and private landowners

How

Activity 1: Evaluate key habitat and ecological functions in relationship to working lands and develop and prioritize projects that work within this nexus.

Anticipated Costs: $/F,S,P,O

Timing: Ongoing

Activity 2: Develop monitoring and research that illuminates and improves the cost/benefit ratio of implementing working lands conservation and restoration activities.

Anticipated Costs: $$$ /F,S,P,O

Timing: Ongoing

Activity 3: Work with funding streams that help implement conservation and restoration projects on and around working lands.

Anticipated Costs: $/F,S,P,O

Timing: Ongoing

Activity 4: Highlight projects where success has been achieved on behalf of working lands and the natural landscape through education and outreach.

Anticipated Costs: $/F,S,P,O

Timing: Ongoing

Activity 5: Convene and facilitate a working group that focuses specifically on the nexus between working lands and natural ecosystems.

Anticipated Costs: $/F,S,P,O

Timing: Ongoing

Why: Working lands are a critical component to the continued livelihood of Tillamook County residents. Many of these working lands and associated industries directly depend on natural resources or are located adjacent to them. To protect important industries while also protecting the natural environment, improving the nexus between industries and natural ecosystems is critical. Often productive working lands and productive natural ecosystems are considered mutually exclusive, but this is not the case. In fact, several local examples prove otherwise. It is important that these examples are shared. To accomplish this, TEP and its partners need to prioritize activities that utilize working groups, ingenuity, and the latest science and technology to break down barriers and succeed in making working lands and healthy ecosystems mutually beneficial rather than exclusive.

Performance Measures:

- ✓ Convene one workshop for key stakeholders on the state and progress of conservation actions on working lands every other year.
- ✓ Implement five working lands conservation projects over the next ten years.