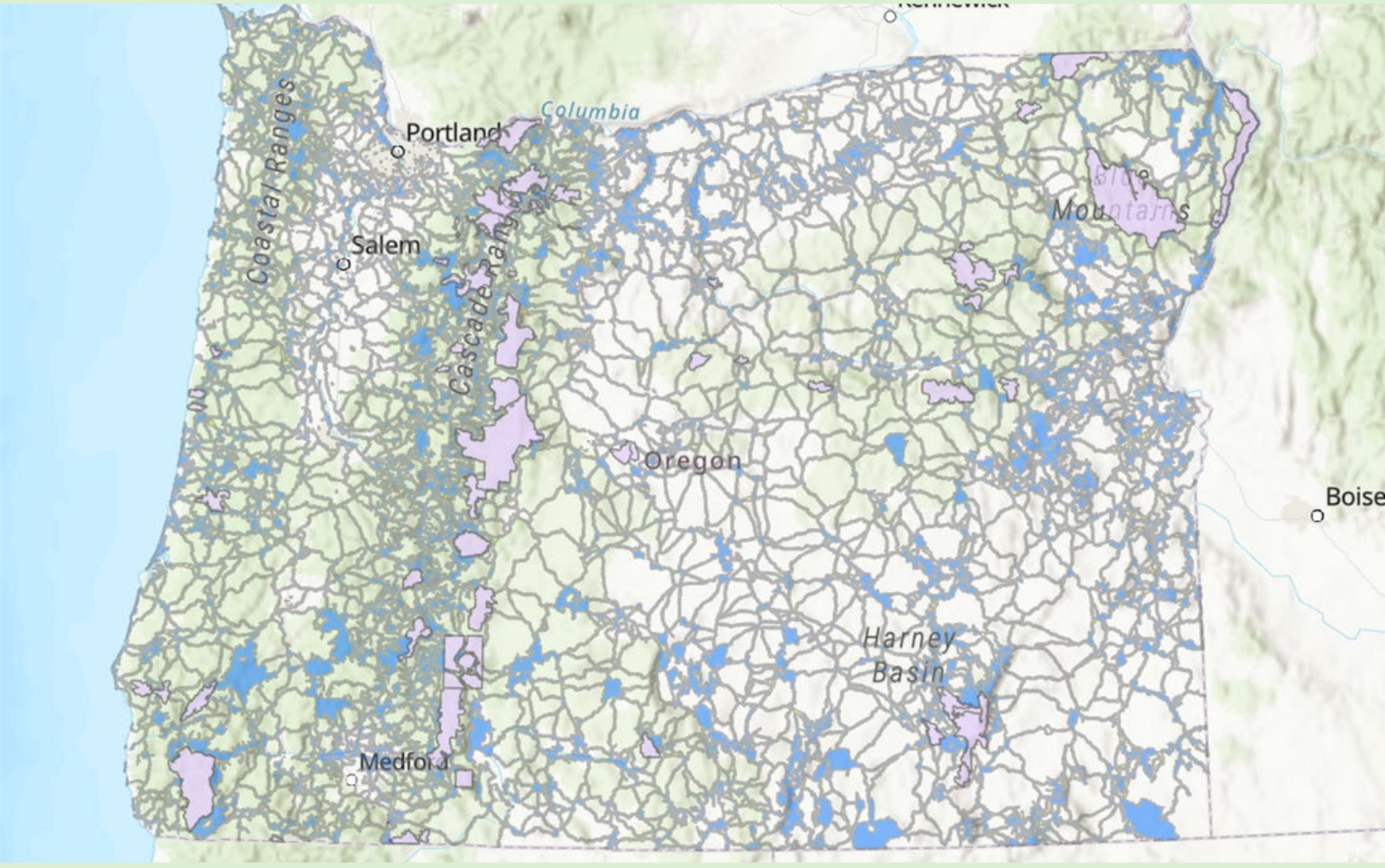
Oregon
Wildlife Corridor Action Plan



OREGON
Fish & Wildlife

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Oregon Wildlife Corridor Action Plan

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EXECUTIVE SUMMARY

Habitat connectivity is a critical component of wildlife conservation. Wildlife must have connected habitat to move across the landscape to fulfill their daily, seasonal, and life cycle needs. In addition, connectivity is recognized as one of the key adaptation strategies for wildlife under changing climates, as connected landscapes are a critical component of climate resiliency. This Wildlife Corridor Action Plan (Plan) was developed pursuant to Oregon Revised Statute 496.272 and presents Priority Wildlife Connectivity Areas (PWCAs) mapped throughout the state to guide the preservation of long-term habitat connectivity for a broad diversity of wildlife species. The purpose of this Plan is to provide state and federal management agencies, conservation groups, transportation planners, and the general public with the information necessary to ensure that wildlife connectivity is being accounted for and incorporated into the planning and implementation of development, resource extraction, habitat management, and other initiatives that may impact wildlife movement in Oregon. The Plan is structured to provide users with background information, resources, and tools to better understand wildlife connectivity and to implement projects to benefit wildlife connectivity in the state.

Areas that promote wildlife connectivity are referred to in scientific literature, the media, and in policy by many terms—connected habitats, habitat mosaics, corridors, steppingstones, pathways, linkages, and landscape networks, among others. The use of one term over another depends on context; for clarity of communicating the types of habitat connectivity critical for wildlife, this Plan focuses on "connectivity areas", a broad term that encompasses all varieties of structural habitat arrangements and species movement patterns. While the term "corridors" is often used in the media and in policy, and is sometimes used synonymously with connectivity, a corridor is a distinct area of the landscape that can provide connectivity. In the ecological literature, "corridors" has a specific connotation, referring to discrete, often narrow, linear areas. In developed areas, habitat corridors, such as riparian corridors or urban greenways, may be the only parts of the landscape suitable to facilitate wildlife movement. Outside of developed regions, however, wildlife may move more opportunistically, and larger areas of intact habitat that permit diffuse movement are just as important to maintaining long-term wildlife connectivity.

There is no one-size-fits-all approach for successful wildlife connectivity efforts. The types of actions needed to improve and/or protect connectivity for wildlife will vary based on geography, habitat, species presence, level of disturbance, land ownership, and local, county, state, and federal policies. The goal of this Plan is to provide users with high-level guidance regarding PWCAs in Oregon. Priority Wildlife Connectivity Areas were developed using the best available science and data regarding the connectivity of wildlife habitat areas. The PWCAs within this Plan serve as an informational tool to guide the work of all entities engaged in land, wildlife, and other natural resource conservation and management that are interested in restoring, enhancing, and protecting habitat important for wildlife connectivity. The Plan outlines general information on wildlife connectivity, the impacts of human changes to the landscape on wildlife movement, and the association between connectivity and climate change, and directs users to an interactive web map to view and obtain more

information on PWCAs throughout the state. Each PWCA is attributed with recommendations to Protect, Restore, pursue Transportation Mitigation for, or Enhance/Maintain habitat. These recommendations highlight the types of conservation actions most needed to benefit wildlife connectivity in a given area. Finally, the Plan provides considerations for how users may further prioritize PWCAs.

1. WHAT IS CONNECTIVITY?

Habitat loss and fragmentation represent the single greatest threat to biodiversity worldwide (Beier and Noss 1998, Heller and Zavaleta 2009, Hilty et al. 2012). Connectivity, the degree to which the landscape facilitates wildlife movement, is key for wildlife to be able to adapt to changing landscapes. The intensification of human development, and associated loss and fragmentation of wildlife habitat, is so severe that planning for connecting species and processes between natural habitats has become a conservation imperative (Worboys 2010).

Wildlife need to move across the landscape to fulfill their daily and seasonal requirements for water, food, shelter, and opportunities to reproduce. Human-driven changes to the landscape like development, resource extraction, the spread of invasive species, and changing climate can restrict the ability of wildlife to move by creating barriers, causing impacts to critical migration stopover sites, and inducing changes in wildlife behavior. Connected habitats aid wildlife in responding to shifting landscape conditions, allowing animals to safely move to seek new habitat following disturbance. Oregon has over 1,000 species of wildlife, including 231 identified as Species of Greatest Conservation Need (i.e., Strategy Species), which have small or declining populations, are at-risk, and/or are of management concern. Maintaining critical areas on the landscape that facilitate wildlife movement will help sustain population connectivity and biodiversity and support the conservation of these at-risk species.

Connectivity encompasses both structural and functional components. Structural connectivity is the physical structure of the landscape— type, assemblage, and continuity of habitat that might facilitate movement. Functional connectivity is the successful movement of wildlife, as well as ecological processes such as gene flow. Connectivity aids species in fulfilling their daily, seasonal, and life history needs (Noss 1991), allows for dispersal (Hanski 1998), helps maintain genetic diversity (Watts et al. 2015), and promotes population viability and persistence in increasingly fragmented landscapes. Providing and conserving habitat connectivity is a key management strategy to preserve species and ecosystem processes under a changing climate (Albright et al. 2021). Warming temperatures are affecting Oregon's fish and wildlife and their habitats. Many species are shifting their ranges northward and higher in elevation and require connected landscapes to find suitable habitat and tolerable temperatures in new areas.

"Barriers to Animal Movement" is one of seven Key Conservation Issues (KCIs) outlined within Oregon's State Wildlife Action Plan, the Oregon Conservation Strategy, which is the overarching state strategy for conserving Oregon's fish and wildlife species. The importance of species and habitat connectivity is identified under Goal 2 of the Barriers to Animal Movement KCI: 'Provide connectivity of habitat for the broad array of wildlife species throughout Oregon.' Improving the connectivity of natural landscapes to better link fish and wildlife populations and allow for range shifts is also an integral component of the Climate Change KCI.

Maintaining connectivity for wildlife necessitates consideration of a variety of movement types and must ensure that wildlife can: 1) fulfill their daily, seasonal, and life history needs, including

movements between foraging areas, movements to and from sites for breeding and/or rearing young, and migratory movements; 2) disperse into new habitats and territories; 3) maintain genetic interchange between populations; 4) respond to stochastic events like wildfires, droughts, and flooding; and 5) adapt to changing climate conditions by moving into new areas to access suitable habitat, sufficient water, and/or tolerable temperatures.

Oregon faces mounting pressure from residential, commercial, and exurban development, agriculture, transportation, energy development, and resource extraction that fragment the landscape and have compromised the integrity and connectivity of wildlife populations and their habitats. This Wildlife Corridor Action Plan (Plan) and the associated Priority Wildlife Connectivity Areas (PWCAs) are intended to provide guidance for land managers, transportation managers, conservation groups, and the general public for where and how conservation action might take place in the state to benefit and promote wildlife connectivity.

KEY RESOURCES:

OREGON CONSERVATION STRATEGY KEY CONSERVATION ISSUE: BARRIERS TO ANIMAL MOVEMENT

OREGON CONSERVATION STRATEGY KEY CONSERVATION ISSUE: CLIMATE CHANGE

2. LANDSCAPE CHANGES AND WILDLIFE MOVEMENT

All wildlife species need to move, to some extent, to fulfill their life cycle requirements. For some species, this movement may be limited to an area of a few square meters, whereas for others their movements may span multiple continents. Species with low mobility are at extreme risk of impacts from habitat fragmentation, as they may lack the ability to move away from disturbance. More mobile species may be better able to adapt to habitat fragmentation by dispersing into suitable habitat elsewhere, but they may also, because of this greater mobility, be more likely to come into conflict with humans and human-caused barriers like development and roadways. Accordingly, all of Oregon's wildlife species are susceptible to impacts to connectivity due to landscape change. Oregon's threatened, endangered, and sensitive species may be particularly vulnerable to fragmentation, compounding the impacts of habitat loss and dwindling populations.

Anthropogenic changes to the landscape may affect connectivity for individual species in a variety of ways, depending on the species' habitat requirements, mobility, and behavior. Connectivity is species-specific: habitat that facilitates the movement of one species may impede the movement of another, and different species react to barriers to movement in different ways. Work intended to enhance wildlife connectivity necessitates consideration of a diversity of species, taxa, life history strategies, and responses to different types of stressors that may act as a barrier to movement.

2.1 HUMAN-CAUSED BARRIERS

Human changes to the landscape can create barriers to animal movement in several different ways, which include 1) creation of physical impediments to movement, 2) removal or alteration of habitat needed for movement, and 3) activities causing behavioral impacts that result in avoidance of areas that would otherwise be suitable for movement.

The most readily apparent human-caused barriers to animal movement are the physical structures that impede or outright prevent connectivity, such as buildings, fences, roadways, solar developments, and dams. The response of wildlife to structures varies by structure type and by species. For example, a fox may be able to make its way around a large industrial complex, whereas for a frog the complex might represent an impassable barrier. While not all physical structures will completely block animal movement, these features are often associated with increased risk of mortality for wildlife due to collisions, entanglement, entrapment, and persecution. Two of the most prevalent physical impediments to wildlife connectivity are roadways and fencing.

The Federal Highway Administration estimates there are nearly 162,000 miles of roads in Oregon, crisscrossing the state and fragmenting wildlife habitat. The barrier effect of any given roadway on wildlife movement varies based on a species' mobility and response to perceived risk (Jacobson et al. 2016), as well as factors such as road width, speed limit, traffic volume, and the proximity of the roadway to high-quality habitat. Smaller roadways with lower traffic volumes may impede or block

the movement of less mobile species but be easily passable for larger, more mobile species. Some roads, such as unpaved Forest Service access roads, may even be used by wildlife to facilitate movement. Nearly all roadways, however, carry some risk of mortality; this risk is typically higher for smaller-bodied species and less mobile species and increases for all species as road size and traffic volumes increase.

Even more ubiquitous in Oregon than roadways, fencing divides the landscape. Fencing is so pervasive that the average distance from any given point in the West to the nearest fence is less than two miles (McInturff et al. 2020) and is likely even shorter, as many fences are undocumented and unmapped (Jakes et al. 2018). Some fences are placed to intentionally benefit wildlife (e.g., wildlife exclusionary fencing to reduce road mortality and funnel wildlife to road crossing structures), but the vast majority of fencing has negative impacts on wildlife.

The permeability of fencing to wildlife depends on the type, height, and condition of the fence. Some types of fencing, such as chain-link or woven wire, are impassable for any species larger than the fence gaps, especially at greater heights. Barbed wire fences are more passable, but wildlife can become entangled in the wires or injured by the barbs. Wildlife attempting to cross fences are at risk of injury or mortality from impalement on fence posts, entanglement in wires, or entrapment between bars, boards, or panels.

Some types of human changes do not involve structural impediments, but rather alterations that make habitat less suitable for wildlife to move across the landscape. These types of alterations could include activities like conversion of native habitat for agricultural uses, resource extraction efforts like logging or mining, flooding of habitat for hydroelectric energy production, or introduction of nonnative vegetation for livestock grazing or ornamental purposes. As with most barriers to movement, the strength of the barrier effect of habitat alteration or removal depends on the species, their mobility, and their behavioral flexibility. Some species may adapt to these habitat changes, making use of disturbed areas. Some species may benefit from habitat alterations. For example, while some logging practices remove habitat for species that rely on closed canopy, forested areas, they may create habitat for species that prefer open areas or forest edges. For other species, habitat alterations remove the structural features necessary to facilitate use, and the disturbed area becomes an impediment to species movement.

In addition to structural barriers and altered habitats, human changes can also induce behavioral impacts in wildlife that reduce habitat connectivity. Sensory stressors associated with human-modified environments, such as lights, sounds, and unusual smells, may deter wildlife from using habitat that would otherwise be suitable for movement. A forested area may provide excellent habitat for movement, foraging, and cover for forest-adapted species, for example, but recreational use of forest trails can cause behavioral disturbances, with wildlife avoiding areas near trails when humans are present (Wisdom et al. 2018). Lights, sounds, and unusual smells may extend for several miles beyond the point of origin, meaning that behavioral avoidance of suitable habitat may occur well beyond the location of any physical infrastructure.

2.2 CLIMATE CHANGE

While habitat loss and fragmentation are the primary drivers of the loss of biodiversity (Fahrig 2003), climate change compounds and intensifies the effects of these issues. Maintaining and restoring landscape connectivity is the most frequently proposed conservation strategy to aid wildlife in adapting to changing climates (Heller and Zavaleta 2009), enhancing resilience for wildlife populations by enabling them to move with shifting climates (Littlefield et al. 2019) and adapt to stochastic events like wildfire, flooding, and droughts (Cross et al. 2013). Connectivity provides several benefits over alternative adaptation approaches, as it allows wildlife to respond to changes when needed and at their own pace. Additionally, providing connectivity for wildlife helps avoid potential issues with the uncertainties around how different species may respond to different climate stressors, such as changes in temperature, moisture, food availability, and water availability (Albright et al. 2021). A landscape-scale network of high quality, interconnected habitats offers an efficient approach, allowing wildlife to move freely to access resources and tolerable temperatures (Krosby et al. 2010).

Climate studies for the Pacific Northwest indicate that, over time: 1) air temperatures will rise, 2) drought will become more common, 3) flooding will increase in frequency, 4) snowpack will decrease, and 5) natural disturbance events, such as tornados, ice storms, windthrow, and wildfire, will increase in frequency and severity (Rupp et al. 2013, Harris et al. 2018).

An increase of 8-10 degrees Fahrenheit in the highest summer temperatures is expected in Oregon by 2050 (Rupp et al. 2013). Reductions in daily freeze-thaw cycles are also expected by mid-century. Climate change projections estimate that the number of daily freeze-thaw cycles will drop by 25% or more in some areas of the state. This trend of hotter summer days and warmer average winter temperatures is expected to contribute to hydrologic changes and related shifts in vegetation type, distribution, and phenology. Together, these conditions are expected to have broad, long-term ecosystem impacts that influence availability, variety, and quality of food sources and water quality and availability. In general, hotter summers are expected to shift habitat and species north and to higher elevations. Well-connected habitats will allow species to follow shifts in resource availability as they occur and seek out suitable temperatures as climate conditions change.

Concurrently with rising temperatures, drought is expected to become increasingly common. Drought can impact wildlife connectivity by reducing the amount of habitat on the landscape as areas become increasingly arid. In desert regions where water sources are already scarce, wildlife may be unable to navigate to suitable habitat elsewhere. As habitat contracts without a way for wildlife to move, populations of species may become isolated. Additionally, drought can also lead to loss of wetland, riparian, and in-stream habitat, removing critical habitat components for some species, reducing water quality, and increasing water temperatures. Planning for connectivity between habitats may allow species to adapt to changes in precipitation through time by shifting to more suitable areas elsewhere.

More severe precipitation events, alongside less precipitation falling as snow, are expected to lead to increases in flooding as the climate warms. Alongside the temporary barrier to movement created by active flooding, floods can have longer-term effects on habitat. Floods may scour waterbeds, removing critical habitat components, or destroy riparian and grassland areas along waterways. Increased runoff from agricultural operations and paved areas carrying pollutants into aquatic systems can create inhospitable conditions for species persistence. Flooding can also result in erosion and sedimentation within aquatic systems, creating new barriers to movement. Further, flooding may introduce nonnative species into formerly unoccupied areas, resulting in increased predation of native fish and amphibians or their eggs or young.

Decreased snowpack may have impacts similar to drought. As temperatures warm and less precipitation falls as snow, significant hydrologic changes are expected. Without snowmelt in spring, stream flows will be reduced or absent. Overall stream depth may decrease, leading to changes in water temperatures and reduced in-stream connectivity for aquatic species. Decreased soil moisture in areas previously reliant on snowpack will result in changes in vegetation, including shifts in spring green-up that may result in phenological mismatch between food availability and timing of migration or parturition (Post and Forchhammer 2008, Gienapp et al. 2014, Doiron et al. 2015).

Alongside increases in air temperature and altered hydrologic regimes, changing climate conditions are expected to lead to more frequent and severe storms and wildfires. Wildfires in particular are a concern for Oregon; the state has already seen numerous large, destructive fires and shortened fire-return intervals in recent years. Analysis of climate data suggests that the number of wildfires in the Pacific Northwest will increase by 20-140 percent over the coming decades (Heidari et al. 2021). While wildfires can be beneficial to some species, severe fires may destroy habitat and force species that are able to escape into new areas. Over longer periods, frequent and more destructive wildfires are likely to damage soil-water infiltration capacity, alter vegetation types, and decrease habitat availability.

As landscape conditions shift due to climate impacts, wildlife will need to move to access suitable temperatures and adequate resources for survival and reproduction. The ability of wildlife to shift their ranges, respond to changes in temperature and precipitation, and escape rising waters, severe storms, and wildfire, will be directly impacted by the extent to which habitats are connected, as well as the number and location of barriers on the landscape, such as buildings, fences, and roadways. The existing protected areas in Oregon may be insufficient to adequately facilitate climate-induced movements. Recent research has indicated that, without work to restore and protect interconnected wildlife habitat, most areas will not adequately support wildlife movement to adapt to changing climate conditions (Parks et al. 2023).

KEY RESOURCES:

ASSOCIATION OF FISH AND WILDLIFE AGENCIES CLIMATE CONNECTIVITY TOOLKIT

CLIMATE ADAPTATION KNOWLEDGE EXCHANGE

3. PRIORITY WILDLIFE CONNECTIVITY AREAS (PWCAS)

Priority Wildlife Connectivity Areas are the foundation of the Wildlife Corridor Action Plan—a map of areas for which designation of wildlife corridors, land acquisition, or other actions are of high priority to protect wildlife movement or habitat connectivity. Priority Wildlife Connectivity Areas include both areas of good quality habitat in intact, relatively undisturbed parts of the landscape, as well as the best remaining marginal habitat to help wildlife navigate through developed or degraded areas.

3.1 METHODS USED TO DEVELOP PWCAS

Beginning in 2019, the Oregon Department of Fish and Wildlife, in partnership with Portland State University and Samara Group, initiated an effort to identify priorities for maintaining landscape connectivity in Oregon using geospatial models to map connectivity areas. This effort was the Oregon Connectivity Assessment and Mapping Project (OCAMP). Completed in 2022, OCAMP analyzed statewide wildlife habitat connectivity at fine resolutions for 54 species representing a variety of taxa, movement types, dispersal capabilities, and sensitivity to anthropogenic threats (Figure 1; Appendix A). Connectivity needs for these species were prioritized, and priorities were compiled to identify the Priority Wildlife Connectivity Areas, an interconnected network representing areas with disproportionately high value for facilitating wildlife movement.

Figure 1: The 54 surrogate species selected for the Oregon Connectivity Assessment and Mapping Project. The full list of species can be viewed on the Oregon Conservation Strategy website, or in Appendix A.

The PWCAs provide a geospatially explicit list of areas for which restoration, protection, or other conservation actions are of high priority to protect wildlife movement or habitat connectivity. The project benefitted from input from experts in other state and federal agencies, as well as universities, Tribes, non-profits, consulting groups, and other NGOs.

Given limited resources and data availability, it is infeasible to model connectivity for all species of concern. For many species, data limitations preclude assessment and the development of connectivity maps. For example, many species lack research on habitat requirements, particularly regarding landscape features that might influence movement. Additionally, availability of occurrence or movement data to use as the primary basis for producing maps is lacking for most species, is geographically and temporally limited, and is strongly biased towards species that are hunted or trapped. To overcome these limitations, OCAMP utilized a modeling approach using a suite of 54 species selected as surrogates to represent the broad diversity of wildlife in Oregon. Traditional approaches to species selection often rely on umbrella species (Lambeck 1997) — typically large-bodied, highly-mobile generalist species with low sensitivity to barriers and habitat types. Research suggests that umbrella species function as poor representatives and do not encompass the connectivity needs of a diversity of species. Instead, surrogate species, selected based on diverse habitat needs, are thought to be most effective (Meurant et al. 2018).

Surrogate species are those that are representative of larger suites of species, habitat characteristics, and/or ecological processes (Beier et al. 2008). Analysis and mapping for these surrogate species is representative of connectivity not just for the species themselves, but also for a suite of other species with similar habitat associations and movement capabilities. For example, American Beaver (*Castor canadensis*) is a riparian-obligate ecological engineer and is a widely studied species with well-known habitat requirements and needs for travel and dispersal pathways. As such, beaver can act as an effective surrogate for other riparian-obligate species, including a variety of other mammals, reptiles, birds, and invertebrates, which have similar habitat requirements but might lack sufficient information for effective connectivity modeling (Stoffyn-Egli and Willison 2011).

As project species were selected to represent a variety of taxa, habitat associations, and structural habitat characteristics, combining priorities across all species provides a comprehensive foundation of connectivity need for the state's wildlife, including threatened, endangered, and sensitive species. Targeted conservation work within PWCAs will provide the greatest benefit to wildlife movement for the widest diversity of species.

Given the importance of connected habitat in aiding wildlife in adapting to changing climate conditions (Albright et al. 2021), PWCAs were also developed to maximize overlap with predicted climate refugia (Michalak et al. 2018), as well as riparian climate corridors/streams with a high predicted probability of persistence (Jaeger et al. 2018). While uncertainties exist around the potential responses of any given species to different climate stressors, this approach ensures that the PWCAs fall within habitats expected to have higher climate resiliency.

KEY RESOURCES:

PRIORITY WILDLIFE CONNECTIVITY AREAS INTERACTIVE WEB MAP

OCAMP EXECUTIVE SUMMARY

OCAMP TECHNICAL REPORT

3.2 RECOMMENDED CONSERVATION ACTIONS

Priority Wildlife Connectivity Areas are made up of individual, 40-acre hexagonal units. Each 40-acre hexagon has been attributed with both a Primary and Secondary Conservation Action Recommendation. These descriptors are intended to assist the user in determining the types of actions that are needed within a given area to most benefit wildlife movement and conservation of wildlife connectivity in Oregon. The four categories of Conservation Action Recommendations are Protect, Restore, Transportation Mitigation, and Enhance/Maintain.

3.2.1 Protect

Permanently protecting habitat through acquisition, easement, or long-term management is the principal action needed to secure structural connectivity for wildlife. The single best conservation measure for maintaining wildlife connectivity in the state would be to protect remaining undeveloped habitat. All hexagons within the PWCA network would benefit from protection measures, but those hexagons specifically attributed with a recommended conservation action of 'Protect' have been targeted for their value for facilitating wildlife movement. These hexagons represent both the highest-quality habitat available to facilitate movement, as well as bottlenecked areas of movement that risk loss of connectivity if land conversion or construction of physical barriers were to occur.

Some hexagons attributed as 'Protect' fall within public or other lands that are already under some level of protection from development. For these areas, efforts to 'Protect' habitat for wildlife connectivity may benefit from specific management actions, such as:

- Road closures, area or seasonal closures, or other forms of recreation management
- Removal or modification of grazing leases
- Avoidance of habitat loss or disturbance from resource extraction activities such as logging, mining, or energy development
- Habitat modifications to reduce wildfire risk and remove invasive vegetation

- Removal of nonnative and/or invasive species, such as feral horses

Protection of habitat for wildlife connectivity does not connote a 'hands-off' approach to land management. Natural and working lands, when managed with wildlife co-benefits in mind, play a critical role in conserving the PWCA network while sustaining economic prosperity on private lands. Voluntary protection measures such as easements allow lands to remain in private ownership while establishing conservation goals to protect structural connectivity for wildlife.

Hexagons attributed as 'Protect' would benefit from targeted measures to protect and preserve habitat, including land acquisition, execution of conservation easements, and/or specific habitat designation within policy.

3.2.2. Restore

In many areas of the state, habitat loss and modification due to development, agriculture, resource extraction, and the spread of invasive species impact connectivity for wildlife. While some species may still use these habitats to move, marginal-quality habitats impact the long-term value of the landscape to help facilitate species movement, may hinder the ability of wildlife to adapt to changing conditions, and may be more susceptible to catastrophic events such as wildfire and the spread of disease. As with the category for 'Protect', nearly all of the hexagons within the PWCA network would benefit from some level of habitat restoration. Those hexagons attributed with a recommended conservation action of 'Restore', however, are those that have significant overlap with development, agriculture, and/or mapped areas of invasive vegetation.

Hexagons attributed as 'Restore' would benefit from measures to rehabilitate habitat damaged by human impacts, including actions to remove and prevent reestablishment of invasive species, remove or modify barriers to wildlife movement, remove overgrowth of vegetation resulting from fire suppression, and promote native ecological communities.

KEY RESOURCES:

SOCIETY FOR ECOLOGICAL RESTORATION: RESTORATION RESOURCE CENTER

RESTORING RARE NATIVE HABITATS IN THE WILLAMETTE VALLEY

OREGON AQUATIC HABITAT RESTORATION AND ENHANCEMENT GUIDE

RESTORING OREGON'S DRY-SIDE FORESTS

A TOOLKIT FOR INVASIVE ANNUAL GRASS MANAGEMENT IN THE WEST

COASTAL RESTORATION TOOLKIT

3.2.3 Transportation Mitigation

Roadways and vehicular traffic are a significant contributor to fragmentation of habitat and impacts to wildlife connectivity. Most species face at least some level of mortality risk associated with roadways, and many species display behavioral avoidance of the activity, noise, lights, vibrations, and smells associated with roads. Any location where the PWCA network intersects with a roadway is a potential site for transportation mitigation. However, some roads pose a greater risk to wildlife connectivity than others, based on factors such as road width, traffic volumes, traffic speed, and proximity to higher-quality habitats. Hexagons attributed with a recommended conservation action of 'Transportation Mitigation' are areas of the PWCA network that are particularly susceptible to fragmentation from roadways. These transportation mitigation priorities were determined by considering 1) the value of the surrounding habitat for facilitating movement, and 2) known areas of high densities of wildlife-vehicle collisions, identified using roadkill data collected by the Oregon Department of Transportation.

These sites will require further prioritization, including evaluation of the myriad factors relevant to successful wildlife passage efforts. Construction of wildlife crossing structures depends not only on the location of high-quality wildlife habitat and probability for wildlife movement across the roadway, but also topography, hydrology, geotechnical suitability, potential impacts to utilities, traffic and freight requirements, climate risk factors, and compatibility of adjacent land use. Additional considerations include funding availability and level of public and/or community support. As such, while numerous locations throughout the PWCA network have been preliminarily identified as sites that may benefit from transportation mitigation, not all sites may be suitable for wildlife crossing structures, and additional work is necessary to assess the feasibility of mitigation at each site.

Areas designated as being in need of Transportation Mitigation may benefit from installation of wildlife crossing structures, autonomous animal detection systems, or other mitigation techniques that would improve wildlife passage across the roadway.

KEY RESOURCES:

OREGON DEPARTMENT OF TRANSPORTATION WILDLIFE CROSSINGS WEB PAGE

FEDERAL HIGHWAYS ADMINISTRATION WILDLIFE CROSSING STRUCTURE HANDBOOK

U.S. FOREST SERVICE WILDLIFE CROSSINGS TOOLKIT

3.2.4 Enhance/Maintain

Some areas within the PWCA network are 1) at a lower risk of habitat loss due to conversion, 2) represent quality, but not necessarily the highest priority of, habitat available for facilitating wildlife movement, and 3) have limited overlap with development, agriculture, or invasive vegetation. These hexagons have been attributed with a Conservation Action Recommendation of 'Enhance/Maintain'. As with the other hexagons in the network, these areas would benefit from protection measures.

Specific actions associated with hexagons attributed as 'Enhance/Maintain' could include maintenance of existing conditions that are already favorable to an assemblage of species, avoidance or minimization of adverse impacts that would fragment habitat, removal, modification, or avoidance of the installation of barriers to wildlife movement, and minor habitat enhancements to ensure continued functionality, including prevention of the establishment of invasive species, wildfire risk minimization, and recreation management.

KEY RESOURCES:

WILDFIRE RISK REDUCTION

MAKE YOUR HOME A HOME FOR WILDLIFE

FENCING WITH WILDLIFE IN MIND

3.3 USE AND APPLICATION OF PWCAS

Priority Wildlife Connectivity Areas are an informational tool to guide the work of all entities engaged in land, wildlife, and other natural resource conservation and management, including state, federal, county, and local governmental organizations, sportsmen's organizations, conservation groups, NGOs, and private landowners interested in restoring, enhancing, and protecting habitat important for wildlife connectivity. Priority Wildlife Connectivity Areas are not regulatory and do not dictate land use for any public or private entity.

The PWCA network occupies approximately 25% of the state's area. A total of 53% of PWCAs fall within lands managed by state or federal agencies. The remaining 47% of PWCAs fall within tribal lands, private lands, and industrial lands, as well as lands managed by cities, counties, universities, and other entities. Priority Wildlife Connectivity Areas represent the parts of the landscape with the highest overall value for facilitating wildlife movement. Focused investments in habitat within PWCAs can increase the likelihood of long-term maintenance of wildlife connectivity in Oregon and can maximize effectiveness over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries to better enhance and protect habitat critical to wildlife movement.

The network of PWCAs serves as a science-based tool that can be used as a resource, in conjunction with other sources of information, to support habitat enhancement, restoration, and protection, transportation mitigation, and conservation planning efforts, as well as future research and monitoring. Priority Wildlife Connectivity Areas indicate areas of the state that are disproportionately important to wildlife connectivity and can serve as a foundation for future analyses that address specific conservation challenges, such as energy development, human population growth, and climate change.

There are many sectors in which information on PWCAs could help inform both planning and on-the-ground conservation action to enhance and maintain wildlife habitat connectivity, including:

- Identification of priorities for land acquisition or conservation easement
- Identification of restoration priorities
- Identification of priorities for transportation mitigation, including siting of new wildlife crossing structures
- Land management plan revisions and decisions for habitat and recreation management for public lands
- Local and county government efforts to protect wildlife connectivity, including incorporation of PWCAs into county planning goals
- Investments through state and federal grant programs for conservation of habitat and working lands
- Informing renewable energy, land use, and waterway planning
- Climate resilience planning
- Informing land use development, including expansion of urban growth boundaries and permitting and mitigation requirements for development of sensitive habitats
- Specific designation and protection within policy

To have the greatest effectiveness for preserving long-term habitat connectivity for wildlife, state and federal agencies should implement Priority Wildlife Connectivity Areas within their individual authorities. The Oregon Department of Fish and Wildlife will provide technical assistance to agencies and other organizations looking to incorporate consideration of PWCAs in their planning and operations. In particular, state agencies should use PWCAs when making recommendations to other state agencies, local governments, and federal and state public land management agencies.

3.3.1 INFORMATION ASSOCIATED WITH PWCAS

There are three different types of PWCAs: **Regions**, **Connectors**, and **Steppingstones** (Figure 2). Each type was identified for a slightly different purpose and plays a distinctive role in wildlife connectivity.

Regions were delineated from the combined top 1% of priorities across 54 surrogate species selected to represent Oregon's diverse wildlife and wildlife-habitat associations. Regions are large,

contiguous areas and represent the highest-value habitat for facilitating species movement throughout the state.

Connectors follow the optimal pathways between Regions. Connectors represent the best available habitat for facilitating movement from Region to Region. Connectors may pass through high-quality habitat in intact, relatively undisturbed parts of the landscape, as well as the best remaining marginal habitat in developed or degraded areas.

Steppingstones are individual or small groups of isolated hexagons within urban growth boundaries. Steppingstones represent remnant areas of intact habitat within otherwise developed landscapes that may help facilitate wildlife movement through urban areas.

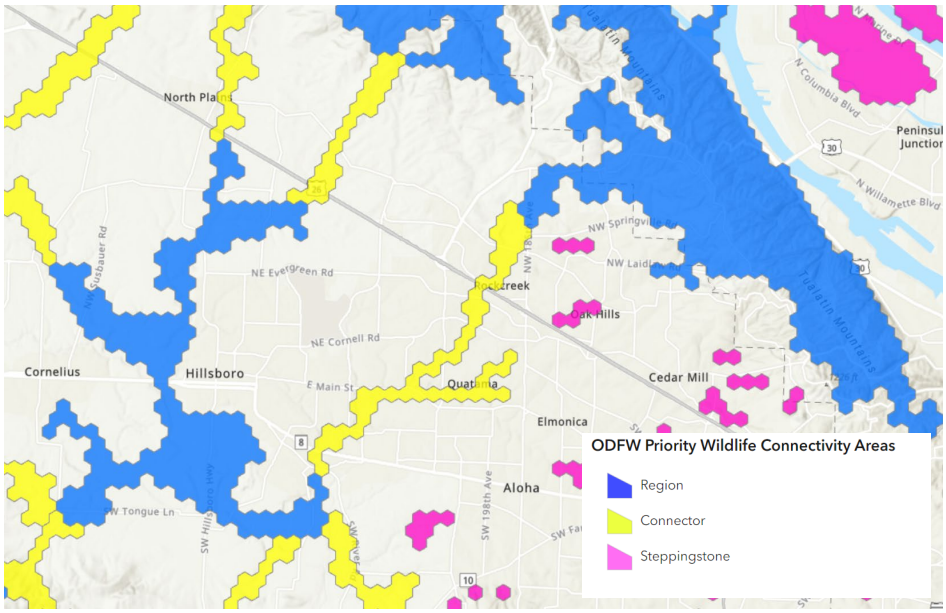

Figure 2: Examples of the three different types of PWCAs: Regions, Connectors, and Steppingstones

Each PWCA has a unique name referencing its general location in the state (by ecoregion), the PWCA type, and a numeric identifier (Figure 3). Ecoregions include the Coast Range (CR), Willamette Valley (WV), Klamath Mountains (KM), West Cascades (WC), East Cascades (EC), Columbia Plateau (CP), Blue Mountains (BM), and Northern Basin and Range (NBR). Priority Wildlife Connectivity Areas that straddle or cross two ecoregions are named based on both (e.g., CR/WV). The three types of PWCAs include Regions (R), Connectors (C), and Steppingstones (S).

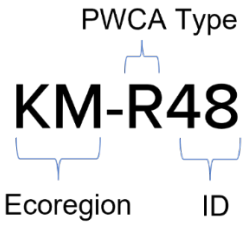

Figure 3: Each PWCA is named by its location within a given ecoregion, PWCA type, and numeric ID, as diagramed here for Klamath Mountains Region 48

In addition to the PWCA name, each hexagon has a unique name, which includes the PWCA name and is followed by a numeric identifier for that hexagon (e.g., KM-R48-H1 refers to hexagon 1 within Klamath Mountains Region 48). In addition to the Conservation Action Recommendations discussed above, hexagons also contain information on the general entity (or entities) responsible for managing the land within the hexagon.

3.3.2 EXAMPLE APPLICATIONS

The following represent just a few examples of how Priority Wildlife Connectivity Areas may be applied in planning for and implementation of wildlife habitat connectivity conservation.

ORGANIZATIONAL PLANNING

Organizations may incorporate consideration of PWCAs into their operations, through inclusion of PWCAs in conservation and management plans or other guidance documents. For example, the Oregon Department of Fish and Wildlife (ODFW) has developed an Oregon Wildlife Connectivity Implementation Plan, a strategic framework for integrating Priority Wildlife Connectivity Areas into ODFW strategies, plans, and projects. The document outlines a variety of actions applicable across all divisions and programs within ODFW, from the administrative level to the on-the-ground work of field-based staff. Specific actions include integration of PWCAs into mitigation programs, guidance and technical assistance provided to partners, and priorities for land protection, acquisition, and restoration.

TRANSPORTATION MITIGATION

Priority Wildlife Connectivity Areas can be used to inform siting of wildlife crossing structures to facilitate wildlife passage across roads. Transportation agencies can use the PWCA tool to identify locations where PWCAs cross roadways; in particular, those PWCAs attributed with a Conservation Action Recommendation of 'Transportation Mitigation' are key targets for wildlife passage efforts. The Oregon Department of Transportation, ODFW, and other stakeholders are looking to reduce

wildlife-vehicle collisions and improve connectivity across US Highway 20 between Suttle Lake and Bend. Along this corridor there are six discrete locations where PWCAs intersect with the highway. An alternatives assessment will further evaluate the suitability of each of these six sites for mitigation, taking into account engineering requirements, compatibility of adjacent land use, geotechnical feasibility, any site-specific information on wildlife movement, such as wildlife telemetry data, and other factors. Locations of PWCAs along the corridor will help support structure placement and the placement and length of associated directional fencing.

LAND PROTECTION

Organizations can use PWCAs as a guide to help identify priorities for land acquisition and conservation easements. For example, a land trust looking to expand its portfolio of conserved areas can use the PWCA tool to explore the parts of the landscape within the trust's focal area that have disproportionately high value for facilitating wildlife movement. The land trust can overlay the boundaries of its existing preserves and conservation easements to see how PWCAs might facilitate movement among them, and target properties for acquisition or execution of new conservation easements within these PWCAs.

HABITAT RESTORATION

The PWCA tool can be used to identify sites important for wildlife connectivity that currently pass through marginal habitat and would benefit from habitat restoration. Consider a Soil and Watershed Conservation District (SWCD) looking to do floodplain restoration to improve flood control and benefit native salmonids. The SWCD has a handful of potential sites identified in their district but for final site selection want to ensure the project will have mutual benefits for wildlife connectivity. They use the PWCA tool to assess overlap of their potential sites with PWCAs, as well as the recommended conservation actions within PWCAs for the sites they are considering. The SWCD then prioritizes site selection based on overlap with PWCAs with Conservation Action Recommendations to Restore habitat.

HABITAT ENHANCEMENT

Priority Wildlife Connectivity Areas can provide value to a wide diversity of entities. Land managers, including private landowners, may use the tool to assess whether the property they manage falls within any PWCAs. For example, consider a livestock producer that finds that their property falls within a PWCA Connector. Conservation Action Recommendations within this Connector are to Protect and Enhance/Maintain habitat. The livestock producer is interested in engaging in work to benefit wildlife connectivity on their property, particularly for migrating ungulates. The livestock producer works with biologists from ODFW, as well as their local chapter of the Oregon Hunter's Association, to identify grants and cost-share programs for habitat enhancements that benefit both livestock production and wildlife connectivity. The livestock producer is able to make several improvements within the PWCA Connector on their land, including replacement of old pasture

fencing with wildlife-friendly fencing and installation of gravity-fed catchment systems, also called guzzlers, to provide additional water sources for wildlife.

SITING FOR DEVELOPMENT

Another key use of the PWCA tool is for avoidance—ensuring that development occurs in a way to limit negative effects on wildlife connectivity. Siting development in areas outside of essential wildlife habitat, including PWCAs, can help reduce impacts. For example, an energy developer may be looking for suitable land to develop a new utility-scale solar installation. The developer could use PWCAs to ensure that the parcels they are considering fall outside of critical habitat for facilitating wildlife movement, either through the PWCA tool, or through the Oregon Renewable Energy Siting and Assessment (ORESA) mapping tool, which includes PWCAs as a layer under Natural Resource Considerations/Species and Habitats. The developer can use the PWCA and/or ORESA tool to get a sense of potential impacts to wildlife habitat connectivity prior to consultation with ODFW and other departments for permitting and mitigation requirements.

The PWCA tool can also be helpful in mitigation planning. The Oregon Department of Fish and Wildlife will integrate PWCAs into its implementation of the Fish and Wildlife Habitat Mitigation Policy, through which ODFW works with regulatory and planning agencies, developers, operators, public interest groups, and the public to require or recommend mitigation for losses of fish and wildlife habitat resulting from development actions. Priority Wildlife Connectivity Areas will inform the categorization of habitats potentially impacted by proposed development actions, and ODFW will then make its mitigation recommendations consistent with the goals and standards set forth in the mitigation policy.

These examples represent only a handful of potential use cases for applying Priority Wildlife Connectivity Areas to planning for and implementation of wildlife habitat connectivity conservation. Any organization or individual interested in restoring, enhancing, protecting, or otherwise promoting wildlife movement and wildlife habitat connectivity may find value in utilizing PWCAs and the associated tools and resources.

3.4 PRIORITIZING PWCAS

The network of PWCAs within Oregon is extensive, and there may be a desire to further prioritize to identify parts of the network most in need of conservation action. Many entities can incorporate PWCAs into their respective planning and prioritization processes by combining overlap of PWCAs within their area of interest with other sources of information specific to their organizational

mission, needs, and goals. Prioritization may also be influenced by landowner willingness and funding availability. In general, however, action within PWCAs may be particularly beneficial when:

- A PWCA supports priority wildlife species, such as Federally- or State- threatened or endangered species, at-risk species, or Conservation Strategy Species/Species of Greatest Conservation Need
- A PWCA is small and/or isolated (such as a Steppingstone) or narrow/bottlenecked and may be at risk of disconnection if any land use change occurs
- A PWCA contains unique features, such as rare or uncommon habitats
- A PWCA intersects with other conservation planning tools or habitat priorities (e.g., Oregon Conservation Strategy Conservation Opportunity Areas, aquatic habitat priorities, ungulate migration pathways, climate refugia, etc.)
- A PWCA is adjacent to permanently protected lands, such as USFWS National Wildlife Refuges, Designated Wilderness Areas, or Crater Lake National Park
- Land within a PWCA is unprotected

KEY RESOURCES:

OREGON CONSERVATION STRATEGY

CONSERVATION OPPORTUNITY AREAS

THREATENED, ENDANGERED, AND CANDIDATE SPECIES IN OREGON

The Priority Wildlife Connectivity Areas within this Plan represent a landscape-scale tool to target conservation action in areas that will have the greatest overall value for facilitating wildlife movement. Accordingly, these areas capture only a fraction of the landscape representing the highest-priority areas across a diverse assemblage of species. This does not indicate that habitat falling outside of the Priority Wildlife Connectivity Area network is unimportant to facilitating wildlife movement or maintaining wildlife habitat connectivity. Areas falling outside of PWCAs may still have value for wildlife connectivity, may be important for local populations of wildlife species, and may still benefit from targeted conservation action to restore, enhance, or protect habitat.

While Priority Wildlife Connectivity Areas are a valuable tool for identifying areas most in need of conservation investment to benefit wildlife movement, users should leverage this information in conjunction with other relevant spatial data, conservation guidelines, and consideration of local/site-specific/project-specific needs. Other relevant factors may include land ownership, protected status, proximity to other habitats of interest, presence of species of concern, or inclusion in other landscape-scale conservation planning tools.

The connectivity modeling used to develop PWCAs represents a snapshot of current landscape conditions, with analyses based on the best available information and spatial data at the time of the

project. Priority Wildlife Connectivity Areas do not consider future scenarios, including fluctuations in demographics or land management or anticipated shifts in connectivity due to changing climate conditions. Future changes, including rural, commercial, residential, energy, and agricultural development, spread of invasive species, wildfire, drought, and shifting communities due to climate change could affect species connectivity and the potential function of any given PWCA. As such, this analysis will need to be revised to incorporate new and better spatial data, to incorporate improved information on species habitat needs and drivers of movement, and to reflect changes to landscape conditions. This Plan and the associated PWCAs are not permanent and will undergo periodic review and updating in accordance with ORS 496.272.

Prior to final adoption of this Wildlife Corridor Action Plan, a 30-day comment period was provided for public input on the draft. The public was notified about the opportunity to comment via a press release, as well as an email bulletin distributed to the 7,641 subscribers of ODFW's wildlife habitat connectivity listserv. A total of 24 public comment letters were received and considered while preparing the final Plan. Appendix B lists and categorizes public comments and responses, including any changes made to the Plan. Only actionable comments have been included. Many comments expressed support for the Plan, as well as for construction of more wildlife crossing structures; these general comments are not listed in Appendix B. The full suite of public comments received can be made available upon request.

While this Plan and the associated Priority Wildlife Connectivity Areas provide guidance on the locations and actions that are of high priority to protect wildlife habitat connectivity, preservation of long-term habitat connectivity in Oregon will rely on individual agencies, as well as other organizations and private landowners, acting to implement these recommendations within their respective authorities. To ensure PWCAs adequately preserve long-term habitat connectivity for wildlife, additional resources may be required for successful implementation within various state agencies and to support participation of private landowners and NGOs.

3.5 PWCA TOOLS AND SUPPORTING INFORMATION

PWCA WEB MAP: An interactive web map to view PWCAs and associated Conservation Action Recommendations.

PWCA WEB MAP USER'S GUIDE: A guide detailing the tools and features of the PWCA web map.

PWCA WEB MAP VIDEO TUTORIAL: A brief video tutorial demonstrating use of the PWCA web map.

OREGON CONSERVATION STRATEGY SUCCESS STORY: PRIORITY WILDLIFE CONNECTIVITY AREAS: A web page detailing information on the background, development, and use of PWCAs in Oregon, with links to additional resources.

OREGON CONNECTIVITY ASSESSMENT AND MAPPING PROJECT TECHNICAL REPORT: A detailed report providing information on the development and interpretation of OCAMP products, including

the rationale behind the selected methodologies, the statistical approaches used in validating model output, and project limitations.

OREGON CONNECTIVITY ASSESSMENT AND MAPPING PROJECT EXECUTIVE SUMMARY: A lay-friendly summary of project methods and guidance for applying Priority Wildlife Connectivity Areas to conservation planning and on-the-ground enhancement, restoration, and protection of wildlife habitat.

PWCA LAYER ON COMPASS: A version of the PWCA layer on the Centralized Oregon Mapping Products and Analysis Support System (Compass). Compass contains a variety of additional spatial data layers, including information on Oregon Conservation Strategy Species, Strategy Habitats, and Conservation Opportunity Areas.

PWCA INFORMATIONAL HANDOUT: A one-page handout that provides basic information on what PWCAs are and how they might be used. This simple product overview is intended for distribution to help with education and outreach efforts for PWCAs.

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APPENDIX A: SURROGATE SPECIES AND HABITAT REPRESENTATIONS

Ecoregion	Species common name	Selected to represent
Blue Mountains	Bighorn Sheep	Dwarf Shrub-steppe: Alpine meadows and rocky slopes
	Black-tailed Jackrabbit	Shrub-steppe: sagebrush, shadscale, greasewood, chaparral thickets and forest edges
	Lewis's Woodpecker	Westside Oak and Dry Douglas-fir Forest and Woodlands: High density of snags
	Long-toed Salamander	Herbaceous Wetlands: Dense cover such as leaf litter/down wood
	Mountain Goat	Alpine Grasslands and Shrublands/Subalpine Parkland
	Cougar	Habitat Generalist: Focal species
	Red-naped Sapsucker	Upland Aspen Forest
	Rocky Mountain Elk	Habitat Generalist: Focal species
	Western Rattlesnake	Westside Lowlands Conifer-Hardwood Forest: South-facing rocky outcroppings
Cascades	American Pika	Alpine Grasslands and Shrublands/Subalpine Parkland: Associated with talus slopes
	Cascades Frog	Alpine Grasslands and Shrublands/Subalpine Parkland: Permanent lentic waterbodies
	Coastal Tailed Frog	Conifer hardwood forests: Headwater streams
	Great Gray Owl	Eastside (Interior) Mixed Conifer Forest/Ponderosa Pine Forest and Woodlands: Montane meadows
	Hoary Bat	Westside Lowlands Conifer-Hardwood Forest: Mature stands

	Pacific Marten	Montane Mixed Conifer Forest: Mid/late seral, multi-layered canopy
	Mule Deer	Habitat Generalist: Focal species
	Oregon Slender Salamander	Westside Riparian Wetlands, Late Seral Stage Douglas-fir Forests
	Pileated Woodpecker	Mixed Conifer Woodlands: Snags in valley bottoms
	Sierra Nevada Red Fox	Alpine Grasslands and Shrublands/Subalpine Parkland
	Western Bumble Bee	Mixed Conifer Woodlands: Floral resources
	Western Toad	Montane Coniferous Wetlands
Coast Range	American Beaver	Open Water/Riparian & Herbaceous Wetlands
	Northern Flying Squirrel	Conifer Hardwood Forests: Mid/late seral, interconnected conifer canopies
	Northern Red-legged Frog	Conifer Hardwood Forests: Mid/late seral, aquatic-terrestrial linkage/pond associated
	Pacific-slope Flycatcher	Conifer Hardwood Forests: Old growth/mature stands, multiple canopy layers
	Snowy Plover	Coastal Dunes & Desert Playa and Salt Scrub Shrublands: associated with dry salt flats and salt-evaporated waterbodies
	Townsend's Chipmunk	Conifer Hardwood Forests: Early seral stage and clearings
	Wrentit	Dense shrub layers, also associated with oak woodlands
Columbia Plateau	Burrowing Owl	Shrub-Steppe: Open, treeless areas with low sparse vegetation
	Ord's Kangaroo Rat	Shrub-steppe: Associated with open areas and sandy substrates
	Vesper Sparrow	Shrub-steppe: Associated with open areas and short, sparse grass and scattered shrubs

Klamath Mountains	Black-tailed Deer	Habitat Generalist: Focal species
	Pacific Fisher	Montane Mixed Conifer Forest, Eastside (Interior) Mixed Conifer Forest, Westside Riparian-Wetlands, and Westside Lowlands Conifer-Hardwood Forest
	Foothill Yellow-legged Frog	Southwest Oregon Mixed Conifer-Hardwood Forest: Streams, riparian edges, & gravel bars
	Hermit Thrush	Southwest Oregon Mixed Conifer-Hardwood Forest: Dense shrub layers
	Little Brown Myotis	Ponderosa Pine Forest and Woodlands: Forest areas associated with pond, lakes or streams
	Northern Alligator Lizard	Conifer hardwood forests: Meadow edges and riparian zones
	Roosevelt Elk	Habitat Generalist
	Western Pond Turtle	Open Water: Lakes, rivers and streams
Northern Basin and Range	Columbia Spotted Frog	Open Water/Riparian & Herbaceous Wetlands
	Ferruginous Hawk	Shrub-Steppe/Dwarf Shrub-Steppe: Cliffs, outcrops and tree groves
	Lazuli Bunting	Eastside Riparian Wetlands: Open woodlands with dense shrub cover
	Long-nosed Leopard Lizard	Desert Playa and Salt Scrub Shrublands: Scattered low plants with sandy/gravel substrates
	Morrison's Bumble Bee	Shrub-steppe: flowering plants
	Porcupine	Upland Aspen Forest
	Pronghorn	Shrub-Steppe: Open, expansive terrain
	Pygmy Rabbit	Shrub-Steppe: Areas with tall, dense shrub cover
	Greater Sage-grouse	Shrub-Steppe: Focal species

	Western Meadowlark	Eastside Grasslands: Associated with open grasslands, prairies, and meadows
Willamette Valley	Bushy-tailed Woodrat	Montane Mixed Conifer Forest: Early/mid seral, open and/or rocky habitats
	Fender's Blue Butterfly	Grasslands/Prairie: Early seral, flowering resources
	Purple Martin	Westside Lowlands Conifer-Hardwood Forest: Early seral, associated with snags
	Western Gray Squirrel	Westside Lowlands Conifer-Hardwood/ Dry Doug Fir-Oak: Mid/late seral
	White-breasted Nuthatch	Oak woodlands: Mid/late seral

Name/Organization	Comment	Response
Wildlands Network	…we believe that the formal WCAP should include more of these details on how the agency plans to engage in on-the-ground implementation… Specifically, we support formally adopting ODFW's priority actions 3 through 8 outlined in [the Oregon Wildlife Connectivity Implementation Plan]	The WCAP is intended to "provide guidance for all state agencies". It is not specific to ODFW. ODFW's plans to integrate PWCAs into agency work are currently provided as an example for implementation, under Section 3.3.2, Example Applications: Organizational Planning. The Oregon Wildlife Connectivity Implementation Plan is linked to in this section and briefly summarized.
Wildlands Network	We believe that ODOT should have contributed to this draft WCAP either (1) explaining how it has started working toward prioritizing this list of PWCAs requiring transportation mitigation or (2) explaining how it plans to prioritize this list.	ODOT is coordinating closely with ODFW in creating a prioritized list of PWCAs that require transportation mitigation. The modeling and work to identify the PWCAs across the state is of great importance to ODOT and will be a very useful tool in aiding ODOT and ODFW in identifying and prioritizing key connectivity locations that cross public roads. For ODOT specifically, the safety of the traveling public is of high importance to the mission of the organization. Therefore, ODOT is currently undergoing a prioritization process in ODOT Research using the PWCAs to identify and prioritize transportation mitigation priorities around the state for ungulate species. This effort is to focus and identify those connectivity locations for these species that can cause damage to vehicles and to the safety and health of the traveling public. An estimated completion date for this focused effort is late spring 2024. The primary implementation issue for ODOT will be to acquire long-term, consistent funding to plan, design, construct, monitor and maintain these wildlife passage features.
Wildlands Network	Without clear transportation mitigation priorities, let alone clear plans to develop them, it may be difficult to measure implementation successes in five years within the next installment of the WCAP.	ODOT and ODFW are developing a process using the PWCAs to identify transportation mitigation priorities around the state. Coordination between the two agencies will continue. For ODOT specifically, the safety of the traveling public is of high importance to the mission of the organization. Therefore, ODOT is currently undergoing a prioritization process in ODOT Research using the PWCAs to identify and prioritize transportation mitigation priorities around the state for ungulate species. This effort is to focus and identify those connectivity locations for these species that can cause damage to vehicles and to the safety and health of the traveling public. An estimated completion date for this focused effort is late spring 2024.

		Wildlands Network may be correct in their assumption that it may be difficult to measure implementation success in the first five years of the WCAP. This will primarily be due to two factors: 1) the lack of available funding and/or the time and success to acquire grant funding to construct wildlife passage features and 2) the time it takes to plan and design a project to get it to construction may exceed five years. ODOT and ODFW are committed to finding ways to successfully implement PWCAs in the first five years of the WCAP.
Pew Charitable Trusts	ODOT has collected decades of wildlife-vehicle collisions (WVCs) data, which has informed the identification of several WVC 'hot spots' throughout the state. This data has led to the construction and design of several wildlife crossing structures in Oregon. The WCAP would benefit from increased collaboration between ODOT and ODFW and inclusion of ODOTs data.	We have already cross-referenced ODOT's WVC data in the attribution of PWCAs with the Conservation Action Recommendation of 'Transportation Mitigation'. This is referenced in the WCAP under Section 3.2.2, Transportation Mitigation. Given the uncertainty from several commentors on whether or not the WVC data had been considered, we have updated the text to read, "These transportation mitigation priorities were determined by considering both 1) the value of the surrounding habitat for facilitating movement, and 2) known areas of high densities of wildlife-vehicle collisions, identified using roadkill data collected by the Oregon Department of Transportation." to improve clarity.
Pew Charitable Trusts, Oregon Action Team on Ungulate Migration (OAT)	ORS §496.272(1) also requires the WCAP to "provide guidance for all state agencies to develop benchmarks for the designation and protection of wildlife corridors in Oregon." In the final plan, we recommend that ODFW expand on how benchmarks will be set, and who will set them.	Guidance for all state agencies is provided via the Conservation Action Recommendations associated with each 40-acre hexagon in the PWCA network. The PWCAs are non-regulatory and do not dictate land use for any public or private entity. We have updated Section 3.3, Use and Application of PWCAs, to include the text, "In order to have the greatest effectiveness for preserving long-term habitat connectivity for wildlife, state and federal agencies should implement Priority Wildlife Connectivity Areas within their individual authorities. The Oregon Department of Fish and Wildlife will provide technical assistance to agencies and other organizations looking to incorporate consideration of PWCAs in their planning and operations." Any specific designation in policy for protection of these areas is beyond the regulatory authority of the Department and would require legislative action.
Pew Charitable Trusts, Oregon Action Team on Ungulate Migration (OAT)	ODFW should also incorporate separate, analytical information such as GPS collared data for individual species to identify known migration routes for these species.	The state has limited GPS data to leverage, and data availability is heavily biased towards ungulates. Among GPS datasets, only a fraction of any given species' range in the state has been assessed. PWCAs were delineated using methods to avoid this type of species-specific and spatial bias, and to protect sensitive data, including specific travel pathways of individual animals, such as migration routes.
Pew Charitable Trusts, Oregon Action Team on	We recommend that the current plan be modified to incorporate future climate related scenarios, including at a minimum	Any specific analytical work to predict future wildlife movement under changing climate conditions would be a massive undertaking requiring consideration of multiple representative climate pathways and downscaled climate data, an

Ungulate Migration (OAT)	wildlife movement across the landscape and to higher elevations.	understanding of how climate conditions may shift available habitat, and an understanding of how different species may respond to climate changes, information that is not currently available for most of Oregon's wildlife species. This type of analysis was outside the scope, funding availability, and timeline of the Oregon Connectivity Assessment and Mapping Project but may be a consideration for future research efforts. The PWCAs do incorporate consideration of climate change by prioritizing predicted climate refugia as well as prioritizing Connectors along riparian climate corridors/streams with a 70% or greater predicted probability of permanence. This is reflected in the documentation for OCAMP, which is linked to as a Key Resource. Additionally, the text of Section 3.1, Methods used to Develop PWCAs, has been updated to reference inclusion of climate-resilient habitats: "Given the importance of connected habitat in aiding wildlife in adapting to changing climate conditions (Albright et al. 2021), PWCAs were also developed to maximize overlap with predicted climate refugia (Michalak et al. 2018), as well as riparian climate corridors/streams with a high predicted probability of persistence (Jaeger et al. 2018). While uncertainties exist around the potential responses of any given species to different climate stressors, this approach ensures that the PWCAs fall within habitats expected to have higher climate resiliency." The Plan also discusses predicted effects of climate change and the importance of connectivity in helping species to adapt to changing climate conditions under Section 2.2, Climate Change.
Pew Charitable Trusts	Pew asks that the priority areas be expanded to include areas that are known habitat of federally (i.e., critical habitat) and state listed species, sites of so-called "rare or uncommon habitats," and "narrow/bottlenecked" PWCAs.	There is already significant overlap between known habitat of Threatened, Endangered, and Sensitive species. Expanding PWCAs to encompass all areas that are known habitat of federally- or state-listed species would a) significantly increase the amount of coverage of PWCAs in the state and b) shift the focus in those areas away from connectivity and more towards core habitat generally, which is not the function of PWCAs as connectivity priorities. Listed species in many cases already have critical habitat designations. The PWCA web map/data can be used to identify overlap with or connections between designated critical habitat areas. PWCAs were delineated based on species connectivity needs, rather than specific (i.e., 'rare or uncommon') habitat types. 'Narrow/bottlenecked' PWCAs are included in the network and are thus already priorities.
Pew Charitable Trusts	To facilitate development of ODOT's program and identify sites for potential	We have already cross-referenced ODOT's WVC data in the attribution of PWCAs with the Conservation Action Recommendation of 'Transportation Mitigation'.

	mitigation, ODFW should include data related to wildlife vehicle collision intersections in the plan.	This is referenced in the WCAP under Section 3.2.2, Transportation Mitigation. Interested users can choose to overlay ODOT's WVC data layer with the PWCAs by using the 'Add Data' tool in the web map or by downloading the PWCA data layer for use in desktop GIS software. The PWCA data have been made available to ODOT staff through TransGIS to assist with project planning and scoping.
Pew Charitable Trusts	The WCAP should include some of the eight priority actions outlined in the recently completed Oregon Wildlife Connectivity Implementation Plan.	The WCAP is intended to "provide guidance for all state agencies". It is not specific to ODFW. ODFW's plans to integrate PWCAs into agency work are currently provided as an example for implementation, under Section 3.3.2, Example Applications: Organizational Planning. The Oregon Wildlife Connectivity Implementation Plan is linked to in this section and briefly summarized.
Pew Charitable Trusts, Oregon Action Team on Ungulate Migration (OAT)	For the WCAP to work as an "action plan" we recommend that ODFW make both general and specific recommendations to state agencies and federal land management agencies to best apply this information into their land management practices.	Guidance for all state agencies, federal agencies, and other users is provided via the Conservation Action Recommendations associated with each 40-acre hexagon in the PWCA network. The PWCAs are non-regulatory and do not dictate land use for any public or private entity. We have updated Section 3.3, Use and Application of PWCAs, to include the text, "In order to have the greatest effectiveness for preserving long-term habitat connectivity for wildlife, state and federal agencies should implement Priority Wildlife Connectivity Areas within their individual authorities. The Oregon Department of Fish and Wildlife will provide technical assistance to agencies and other organizations looking to incorporate consideration of PWCAs in their planning and operations." A number of recommendations are included under Section 3.3, Use and Application of PWCAs, including "Land management plan revisions and decisions for habitat and recreation management for public lands."
Pew Charitable Trusts, Oregon Action Team on Ungulate Migration (OAT)	The agency should share with WCAP advocates information about what continued research, collaring, and monitoring is needed to improve the WCAP for the next revision and the funding requirements to satisfy this effort.	Specific needs are already outlined by ODFW within the Oregon Wildlife Connectivity Implementation Plan, which is summarized and linked to in Section 3.3.2, Example Applications, as well as in the 'Future Work' section in the OCAMP Technical Report. The need for updates is captured in the last paragraph of Section 3.4 of the WCAP, "As such, this analysis will need to be revised to incorporate new and better spatial data, to incorporate improved information on species habitat needs and drivers of movement, and to reflect changes to landscape conditions. This Plan and the associated PWCAs are not permanent and will undergo periodic review and updating in accordance with ORS 496.272."
Oregon Action Team on Ungulate Migration (OAT)	Cross-referencing or overlaying ODOT's WVC data with ODFW's Priority Wildlife Connectivity Areas (PWCAs) could serve	We have already cross-referenced ODOT's WVC data in the attribution of PWCAs with the Conservation Action Recommendation of 'Transportation Mitigation'. This is referenced in the WCAP under Section 3.2.2, Transportation Mitigation. Given the uncertainty from several commentors on whether or not the WVC data

	to develop a much-needed priority highway list of future crossing projects.	had been considered, we have updated the text to read, "These transportation mitigation priorities were determined by considering 1) the value of the surrounding habitat for facilitating movement, and 2) known areas of high densities of wildlife-vehicle collisions, identified using roadkill data collected by the Oregon Department of Transportation." to improve clarity.
Oregon Action Team on Ungulate Migration (OAT)	The WCAP would also benefit from a discussion on how ODOT will use the WCAP to establish a "program to reduce wildlife-vehicle collisions in areas where wildlife corridors identified in the [WCAP] intersect with proposed or existing public roads," as required by ORS§366.161(1), and how ODOT and ODFW will coordinate efforts to reduce WVCs based on data gathered by the WCAP, as required by ORS § 366.162.	In the past, ODOT relied on its WVC data and some limited ODFW telemetry data to identify locations to prioritize and construct wildlife passage features. However, with PWCAs identifying wildlife passage corridors, ODOT and ODFW can coordinate on identifying crossing locations, prioritize locations, determine what features may be reasonable and feasible at those locations, and provide clarity on where to focus agency attention, resources, and limited funding opportunities. ODOT and ODFW have already begun to coordinate our efforts to reduce WVCs and provide wildlife passage. The agencies have been meeting regularly and have begun to identify locations and priorities. The agencies will continue to closely coordinate as we move forward.
Oregon Action Team on Ungulate Migration (OAT)	Volume 2 of this USGS publication [Ungulate migrations of the western United States] includes collaring data for a variety of ungulates that identify additional areas/migration-related habitats. We recommend the inclusion of these known migration routes.	Among ungulate GPS collar datasets, only a fraction of any given species' range in the state has been assessed. Priority Wildlife Connectivity Areas were delineated using methods to avoid this type of spatial bias, encompassing each surrogate species' full range within Oregon. The habitat connectivity priorities for Mule Deer, Black-tailed Deer, Rocky Mountain Elk, Roosevelt Elk, Mountain Goat, Pronghorn, and Bighorn Sheep were used when delineating PWCAs. Interested users may choose to further prioritize by overlapping available ungulate collar data with the PWCAs using the 'Add Data' tool in the web map or by downloading the PWCA data layer for use in desktop GIS software.
Oregon Action Team on Ungulate Migration (OAT)	To further prioritize conservation efforts, we recommend the identification of a list of high-priority areas to include areas of known habitat of federally (i.e., critical habitat) and state-listed species.	There is already significant overlap between known habitat of Threatened, Endangered, and Sensitive species. Expanding PWCAs to encompass all areas that are known habitat of federally- or state-listed species would a) significantly increase the amount of coverage of PWCAs in the state and b) shift the focus in those areas away from connectivity and more towards core habitat generally, which is not the function of PWCAs as connectivity priorities. Listed species in many cases already have critical habitat designations. The PWCA web map/data can be used to identify overlap with or connections between designated critical habitat areas.

Oregon Action Team on Ungulate Migration (OAT)	In addition, we also recommend the inclusion of other areas… such as sites of "rare or uncommon habitats," "narrow/bottlenecked" PWCAs, and a list of prioritized wildlife crossing projects…	PWCAs were delineated based on species connectivity needs, rather than specific (i.e., 'rare or uncommon') habitat types. 'Narrow/bottlenecked' PWCAs are included in the network and are thus already priorities.
Oregon Action Team on Ungulate Migration (OAT)	The WCAP explains that ODFW has recommended "transportation mitigation" in areas where ODFW's PWCAs overlap with "known areas of high densities of wildlife-vehicle collisions." However, it is unclear whether ODOT's WVC data was used to determine these high-density areas.	ODOT's WVC data was cross-referenced in the attribution of PWCAs with the Conservation Action Recommendation of 'Transportation Mitigation'. This is referenced in the WCAP under Section 3.2.2, Transportation Mitigation. Given the uncertainty from several commentors on whether or not the WVC data had been considered, we have updated the text to read, "These transportation mitigation priorities were determined both by 1) the value of the surrounding habitat for facilitating movement, and 2) known areas of high densities of wildlife-vehicle collisions, identified using roadkill data collected by the Oregon Department of Transportation." to improve clarity.
Oregon Action Team on Ungulate Migration (OAT)	…the WCAP could be improved with more information from ODOT regarding the benefits of mitigating WVCs at these identified areas, whether there are any ranked priorities among these areas, or what variables they might be using to determine any ranked priorities.	The overall modeling and work to identify the PWCAs across the state is of great importance to ODOT and will be a very useful tool in aiding ODOT and ODFW in identifying and prioritizing key wildlife connectivity locations that cross public roads. For ODOT specifically, the safety of the traveling public is of high importance to the mission of the organization. Therefore, ODOT is currently undergoing a prioritization process in ODOT Research using the PWCAs to identify and prioritize transportation mitigation priorities around the state for ungulate species. This effort is to focus and identify those connectivity locations for these species that can cause damage to vehicles and to the safety and health of the traveling public. An estimated completion date for this focused effort is late spring 2024. ODOT is also working with the TransGIS program staff to ensure that project planning and scoping personnel can have access to PWCA data early in project development. This will be key in identifying and including wildlife connectivity priorities into project planning, scoping, design, and budget preparation. The benefits of mitigating WVCs, ranking priorities, and the variables used to determine the ranking of priorities has been occurring in a coordinated effort between the two agencies. Some of these items have been identified and discussed and others will be determined as we move forward and learn from our experiences in implementing the WCAP and in determining the feasibility of constructing wildlife connectivity features in identified priority locations. The primary implementation roadblock for ODOT and ODFW will not be in creating criteria or identifying the variables used to determine the ranking of priorities, but

		rather in securing long-term, reliable funding to plan, design, construct, monitor and maintain wildlife passage features.
Oregon Action Team on Ungulate Migration (OAT)	…the state has additional migration corridor priorities listed in its Oregon Action Plan to advance the directives in Secretarial Order 3362, but it is not clear in the WCAP whether those priorities, or any additional data sets gained from GPS-collared animals, will be factored into ranking priorities among the areas identified for transportation mitigation.	Numerous factors must be considered when determining sites for transportation mitigation, including topography, geotechnical feasibility, compatibility of adjacent land use, and funding availability. Funding availability via programs associated with Secretarial Order 3362 may be considered when selecting sites for mitigation. Priority Wildlife Connectivity Areas that have been attributed with a Conservation Action Recommendation of 'Transportation Mitigation', if selected for mitigation, will take into account a variety of other data sources when determining structure type, design, and placement, including data sets from GPS-collared animals, where available.
Oregon Action Team on Ungulate Migration (OAT)	…we recommend that the WCAP additionally identify a set of Corridor Priority Areas, generally, in relation to Secretarial Order 3362.	Secretarial Order 3326 (SO 3362) is specific to Mule Deer, Rocky Mountain Elk, and Pronghorn. The PWCAs were identified based on the needs of a wide diversity of wildlife and are intended to benefit Oregon's wildlife broadly, rather than any specific species or taxa. Interested users can overlap SO 3362 priorities with PWCAs to identify potential opportunities for mutual benefit. Oregon intends to update its State Action Plan for the implementation of SO 3362 in 2024; this update will take into account PWCAs when determining focal areas for inclusion in the State Action Plan.
Oregon Action Team on Ungulate Migration (OAT)	We recommend incorporating many of these priority actions identified in the Oregon Wildlife Connectivity Implementation Plan into the final WCAP.	The WCAP is intended to "provide guidance for all state agencies". It is not specific to ODFW. ODFW's plans to integrate PWCAs into agency work are currently provided as an example for implementation, under Section 3.3.2, Example Applications: Organizational Planning. The Oregon Wildlife Connectivity Implementation Plan is linked to in this section and briefly summarized.
Oregon Wildlife Coalition	…more "habitat generalists" species would have made the mapping more robust since they tend to have wide habitat ranges, act as umbrella species for many others, and therefore would have [been] good surrogate species.	A significant number of habitat generalist species were included among the 54 surrogates selected for the effort, including Mule Deer, Black-tailed Deer, Rocky Mountain Elk, Roosevelt Elk, and Cougar. Additionally, research indicates that, despite having wide habitat ranges, umbrella species function as poor surrogates and do not adequately encompass the connectivity needs of a diversity of species. Instead, a suite of species selected based on diverse habitat needs, as we have done with the selection of our 54 species, are thought to be most effective as surrogates. See Meurant et al. 2018, Selecting Surrogate Species for Connectivity Conservation, *Biological Conservation* 227:326–334
Oregon Wildlife Coalition	Another management action talks about the removal of non-native species – we	Both the terms 'nonnative' and 'invasive' are used in the Plan, 'invasive' more extensively than 'nonnative'. Nevertheless, we have changed the wording of

	recommend using the term "invasive" instead of non-native.	"Removal of nonnative species, such as feral horses" to "Removal of nonnative and/or invasive species, such as feral horses"
Oregon Wildlife Coalition	The plan includes "restore" as a recommendation category, and recognizes restoration is a part of rebuilding connectivity beyond infrastructure. However, most hexagons in this category have significant overlap with development, agriculture, and/or mapped areas of invasive vegetation, and it is unclear how ODFW plans to achieve restorations in these areas given these potential hurdles.	The Wildlife Corridor Action Plan is intended to provide guidance to all entities engaged in land management, conservation, and development; it is not specific to ODFW. ODFW does not have regulatory authority to manage, designate, or conserve habitat beyond actions taken within ODFW's Wildlife Areas. As a result, the agency relies on the work of its partners, including federal land management agencies, private landowners, land trusts, conservation organizations, and other NGOs, to assist with on-the-ground implementation of the recommendations outlined in the Wildlife Corridor Action Plan and other guidance documents. ODFW will provide technical guidance to entities looking to engage in work within PWCAs, including those looking to restore habitat in developed or agricultural areas and/or those with invasive vegetation.
Oregon Wildlife Coalition	… the Plan should recommend incorporation of connectivity goals in state and local land use and zoning regulations and planning	Section 3.3, Use and Application of PWCAs, has been updated to include, "… state agencies should use PWCAs when making recommendations to other state agencies, local governments, and federal and state public land management agencies."
Oregon Wildlife Coalition	… it would be helpful to see concrete steps ODFW plans to take to work collaboratively with various entities, agencies (like ODOT), and NGOs to ensure these recommendations are implemented.	ODFW's plans to integrate PWCAs into the agency's programs and operations, including work done with other entities, are outlined within the Oregon Wildlife Connectivity Implementation Plan, which is highlighted, summarized, and linked to in Section 3.3.2, Example Applications: Organizational Planning.
Oregon Wildlife Coalition	Implementation of OCAMP should pay equal focus on invertebrates and herpetofauna. Wildlife connectivity discussions often get limited to connectivity infrastructure such as wildlife crossings for large game species and other mammals. While the importance of such structures should not be underestimated, we also want to ensure that the ODFW pays equal attention to herpetofauna, and urges its partners to do the same.	ODFW agrees with the need to provide connectivity for all wildlife species. For this reason, PWCAs are species agnostic and were developed using surrogate species selected to represent a broad diversity of species in the state, including birds, mammals, reptiles, amphibians, and invertebrates. The priorities and Conservation Actions Recommendations provided by the PWCAs are not limited to wildlife crossings, nor are the Recommendations in any way specific to or limited to large game species or other mammals. ODFW does, and will continue to, encourage ODOT to consider wildlife crossing structures to benefit all wildlife, not solely in areas where ungulates are the primary species of concern.

Oregon Wildlife Coalition	The Plan says that 54 species were assessed in the connectivity mapping project. It would be helpful if those species were listed and if it was also made clear for which species they served as a surrogate.	A table of all of the surrogate species, what they were selected to represent, and their status as Oregon Conservation Strategy Species/Species of Greatest Conservation Need is linked to in the caption of Figure 1, illustrating the 54 surrogate species, under Section 3.1, Methods Used to Develop PWCAs. A simplified table of the 54 surrogate species has been added as Appendix A.
Oregon Wildlife Coalition	The Plan states that "outside of developed regions, however, wildlife may move more opportunistically, and larger areas of intact habitat that permit diffuse movement are just as important to maintaining long-term wildlife connectivity." Given the importance of these larger areas in supporting movement for a diverse range of species, it would be helpful if the map would capture where those areas are across Oregon, and by extension, the critical role public lands play in supporting wildlife corridors.	The map captures larger areas supporting diffuse species movement; these areas are included as PWCAs. The methodological processes used to identify these diffuse areas is detailed in the OCAMP documentation. The Wildlife Corridor Action Plan notes that a total of 53% of PWCAs fall within lands managed by state or federal agencies. There are critical roles for both public and private lands in supporting wildlife movement.
Oregon Wildlife Coalition	The Plan acknowledges that "availability of occurrence or movement data to use in producing maps is limited for most species and is strongly biased towards species that are hunted or trapped." It would be helpful if the Plan explained more clearly, in the same passage, how it corrected for that bias and emphasized that the connectivity mapping is intended to benefit all species.	The text has been updated to read, "Additionally, availability of occurrence or movement data to use as the primary basis for producing maps is lacking for most species, is geographically and temporally limited, and is strongly biased towards species that are hunted or trapped. To overcome these limitations, OCAMP utilized a modeling approach using a suite of 54 species selected as surrogates to represent the broad diversity of wildlife in Oregon." Section 3.1, Methods Used to Develop PWCAs, describes how species were selected for the effort to represent all of Oregon's wildlife, across all taxa: "As project species were selected to represent a variety of taxa, habitat associations, and structural habitat characteristics, combining priorities across all species provides a comprehensive foundation of connectivity need for the state's wildlife, including threatened, endangered, and sensitive species. Targeted conservation work within PWCAs will provide the greatest benefit to wildlife movement for the widest diversity of species."
Rocky Mountain Elk Foundation	ODOT has collected decades of data related to wildlife-vehicle collisions	ODOT's WVC data were cross-referenced in the attribution of PWCAs with the Conservation Action Recommendation of 'Transportation Mitigation'. This is

	(WVCs) which has informed several WVC hot spots and the construction of wildlife crossing structures. RMEF recommends connecting WVC data with ODFW's Priority Wildlife Connectivity Areas (PWCAs) to further prioritize future crossing projects.	referenced in the WCAP under Section 3.2.2, Transportation Mitigation. Given the uncertainty from several commentors on whether or not the WVC data had been considered, we have updated the text to read, "These transportation mitigation priorities were determined both by 1) the value of the surrounding habitat for facilitating movement, and 2) known areas of high densities of wildlife-vehicle collisions, identified using roadkill data collected by the Oregon Department of Transportation." to improve clarity.
Rocky Mountain Elk Foundation	RMEF recommends further prioritization of the different types of PWCAs identified in the network. For example, including layers for broad species distribution maps would help hone on where an organization might find PWCAs for elk or other wildlife.	Interested users may choose to further prioritize by overlapping species distribution maps with the PWCAs using the 'Add Data' tool in the web map or by downloading the PWCA data layer for use in desktop GIS software.
Rocky Mountain Elk Foundation	Including additional spatial information for ODFW's priority big game migration corridor areas (e.g., SO3362 State Action Plan) would create more discrete opportunities for RMEF to partner with ODFW on future projects.	Secretarial Order 3326 (SO 3362) is specific to Mule Deer, Rocky Mountain Elk, and Pronghorn. The PWCAs were identified based on the needs of a wide diversity of wildlife and are intended to benefit Oregon's wildlife broadly, rather than any specific species or taxa. Interested users can overlap SO 3362 priorities with PWCAs to identify potential opportunities for mutual benefit.
Tualatin Hills Park and Recreation District	Adding a section at the end that describes next steps and actions… would strengthen the document.	A concluding paragraph has been added at the end of Section 3.4, Prioritizing PWCAs, stating, "While this Plan and the associated Priority Wildlife Connectivity Areas provide guidance on the locations and actions that are of high priority to protect wildlife habitat connectivity, preservation of long-term habitat connectivity in Oregon will rely on individual agencies, as well as other organizations and private landowners, acting to implement these recommendations within their respective authorities. To ensure PWCAs adequately preserve long-term habitat connectivity for wildlife, additional resources may be required for successful implementation within various state agencies and to support participation of private landowners and NGOs."
Clackamas River Basin Council	I was a little surprised not to see more discussion of human needs in the landscape and the importance of doing corridor conservation in ways that help support and uplift the communities where the work is occurring.	The primary intent of the WCAP is to "to preserve long-term habitat connectivity for wildlife as defined in ORS 496.004" by providing "a list of areas for which designation of wildlife corridors, land acquisition or other agency actions are of high priority to protect wildlife movement or habitat connectivity." Interested users may choose to further prioritize by overlapping spatial information related to social justice and environmental equity with PWCAs using the 'Add Data' tool in

		the web map or by downloading the PWCA data layer for use in desktop GIS software.
Department of Horticulture, Oregon State University	In the Wildlife Corridor Action Plan, please consider floral resources for migratory wildlife such as hummingbirds, Monarch butterflies and other birds and insects.	Floral resources were considered when identifying PWCAs. Three surrogate species, Fender's Blue Butterfly, Western Bumble Bee, and Morrison's Bumble Bee, were selected to represent floral resources on the landscape.