Assessment of the Benefits of Beaver Managed Floodplains to Oregon Conservation Strategy Species: A Literature Review

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One half of a pair of beavers now occupying restored habitat on Hay Creek, Cottonwood Canyon State Park, Oregon
Photo: ONDA Staff

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Executive Summary

State Wildlife Action Plans (SWAP) are federally prescribed, federally approved, and federally funded strategies and prioritization tools developed by states and territories to conserve and recover "Species of Greatest Conservation Need" (SGCN) before they become too rare or costly to restore. Federal law requires SWAPs to identify "Key Habitats" that support SGCN (Oregon Conservation Strategy 2016). Oregon calls its SWAP the "Oregon Conservation Strategy" (OCS), refers to SGCN as "Strategy Species", and refers to Key Habitats as "Strategy Habitats." Oregon has identified 294 SGCN and 11 Strategy Habitats. Beaver Managed Floodplains (BMF) are not currently listed as an OCS Strategy Habitat. Mounting evidence shows that BMFs are unique habitats that have an outsized importance to achieving the purpose and goals of the OCS by supporting a disproportionately large percentage of SGCN.

Because of the uniqueness of BMFs and the large number of SGCN which depend on them, Oregon has both an opportunity and a responsibility to identify BMFs as a Strategy Habitat in the current revision process of its SWAP. Failure to do so would undercut the purpose of the SWAP, needlessly imperiling SGCN and squandering limited federal and state resources available for species conservation and recovery.

The intention of this literature review is to inform policymaker and stakeholder discussions regarding the value of including BMFs as an OCS Strategy Habitat to more effectively achieve the goals and objectives of the OCS. Prioritizing BMFs inherently requires working to facilitate the unique suite of conditions that allow beavers to better fulfill their ecological role on the landscape as ecological engineers and keystone species. The OCS habitat-based strategy mirrors an "umbrella species" approach, in which the focused management of one species conveys direct and tangible benefits to a host of other species and habitat needs.

Specifically, our aim was to inform four topics of discussion surrounding the benefits of BMFs to SGCN and the value of identifying BMFs as a Strategy Habitat. Based on the review of 330 resources, the conclusions we reached regarding these four topics are:

- The best available science is abundant and sufficient to inform a discussion regarding the benefits of BMFs to SGCN and therefore the value of BMFs as a Strategy Habitat. Published science on the topic of beavers and their role as ecosystem engineers may have been rare during the initial writing of the OCS, and may have been unfamiliar to the revision team in 2016. However, relevant resources and knowledge are now abundant (as evidenced by the bibliography of this report) and are clearly sufficient to inform an analysis of the inclusion of BMFs as Strategy Habitat.

- Conservatively, 146 SGCN (50%) likely benefit from BMFs based on clear statements and relationships described in published literature. However, an additional 72 SGCN (24.5% of total SGCN) could benefit from beaver management of floodplains based on our analysis of habitat needs of individual SGCN and the conditions that beavers create. Combined, nearly 75% of Oregon's SGCN could benefit from more BMFs on the landscape. Key findings of our analysis of

these potential benefits and the supporting literature we consulted are listed for each species in the appendices of this report.

- BMFs have the potential to benefit SGCN statewide; The reach of these potential habitat benefits encompasses all nine ecoregions, and is not restricted to taxa commonly considered as aquatic. This broad influence indicates the relevance of BMF conservation to a comprehensive statewide strategy such as the OCS.

- There are 43 SGCN listed as Federally Threatened or Endangered. 44% of these Federally listed SGCN could benefit from BMFs. 159 SGCN are also on the state and federal collaborative Interagency Special Status/Sensitive Species Program (ISSSSP) list used by federal land managers for conservation planning and prioritization of species and their habitats. As many as 111 of the 159 (70%) SGCN included in the ISSSSP list could benefit from beaver's ecosystem management. Additionally, 14 of the 16 Species Recovery Plans reviewed directly mentioned beavers or beaver activity as positive contributors to a species' habitat needs or as an action item for the conservation of the Plan's species. This clear overlap between state and federal priorities and mandates provides multilateral incentives for prioritizing beaver conservation in consultations between state wildlife and federal land management agencies (Federal Land Policy Management Act 1976).

The first section of this report describes the role that beavers play on the landscape and the need for management that supports conditions which enable beaver's functional role in their ecosystems rather than simply their presence. It also provides introductory background information on beaver managed floodplains, as well as the ecological and economic benefits of beaver managed floodplains in order to provide broader context for the assessment.

The report's second section presents and discusses the results of the literature review's assessment of benefits provided by BMFs, including the number of OCS species with the potential to benefit from beavers' functional presence on the landscape, and the degree to which those species are likely to benefit from BMFs. The assessment tables containing the information and citations used to assess the potential benefits of BMFs for each SGCN are included as appendices.

In the final section of this report, the potential benefits BMFs provide to each SGCN are cross-referenced in regards to each species' federal and state designations, as well as taxonomic and ecoregional distributions.

1. Ecological Significance and Benefits of Beaver Managed Floodplains

North American beavers (*Castor canadensis*) are ecosystem engineers, known for their construction of dams that result in the creation and maintenance of unique instream and riparian habitat conditions that include ponds, side channels, and heightened stream complexity (Raphael and Molina, 2013). As a result of their engineering, they have a disproportionately large effect on the rest of their ecosystem, making them a keystone species on which other species depend (Castro *et al*., 2017). Supporting keystone species and ecosystem engineers like beavers is suggested as a way to conserve many species, including rare and little-known species (Bartel *et al*. 2010, Raphael and Molina 2013).

While Oregon's beaver populations are not currently at risk of going extinct, beaver managed floodplains are; Across much of Oregon, beavers persist in substandard habitat conditions that do not allow them to effectively fulfill their ecological function as ecosystem engineers. The loss of beaver managed floodplains from every part of the state over the past two centuries has had deleterious effects on numerous species that depend on this critical habitat, and has coincided with the decline of many of the species that stand to benefit from the prioritization of BMFs as Strategy Habitat in the OCS.

Beaver Managed Floodplains

For the purposes of this report, beaver managed floodplains (BMFs) are defined as riparian areas where beavers are the driving force managing the hydrology and vegetation of a stream to a sufficient degree to establish and maintain suitable conditions for healthy multigenerational beaver residence.

Managing for BMFs Requires Prioritizing the Needs of Beavers

BMFs are, by definition, managed, established and actively maintained by beavers, and are therefore unique and different from other forms of riparian or aquatic habitat. The existence, resilience and maintenance of BMFs is impossible without beavers, due to a positive feedback loop whereby beaver activities create a habitat conducive to continued flourishing populations of beaver. BMFs therefore cannot be conserved without prioritizing the needs and activities of beavers themselves.

Habitats where beaver are surviving, but are not managing their ecosystem, do not provide the same benefits as BMFs. The mere *presence* of beavers will not result in the many benefits outlined in this assessment to OCS Strategy Species. It is critical to combine habitat management with species management to ensure that beavers possess the conditions and materials they need to fulfill their ecological function by actively managing their habitat for their own benefit and the concurrent benefit of all the species which depend on them.

Many beavers regularly cling to survival in substandard conditions where human uses and impacts have resulted in conditions preventing the healthy management of floodplains by beavers. These limiting factors need to be addressed through improved management at both the state and federal levels. Anthropogenic impacts that impair beavers' ability to establish and maintain BMFs include trapping, water withdrawals, and livestock browse and trampling of den sites, as well as the resulting insufficient or inappropriate vegetation or disrupted hydrological regimes.

Benefits of Beaver Managed Floodplains

Direct Ecological Benefits

There are many direct ecological benefits associated with beavers, their dams, and the ponds that form behind them, as well as adjacent and downstream conditions. Beaver ponds are critical habitat for several species. Many species of amphibians, especially frogs, rely on slow-moving water like ponds for both habitat and breeding grounds (Brazier *et al*. 2020, Goldfarb and Flores 2018, Hembree 2018, Stevens *et al*. 2007). Ponds are ideal habitats for other species that thrive in slow-moving water, like lentic invertebrates and certain aquatic turtles (Collen and Gibson 2000, and Castro *et al*. 2017). Beaver dams themselves and resulting side-channels are also critical habitats: several species of filter-feeders and lotic invertebrates thrive on dams (Collen and Gibson, 2000, and Brazier *et al*. 2020) and amphibians overwinter in dams (Brazier *et al*. 2020). Several species also make use of beaver lodges, both when they are in use, and when beavers abandon them. Trumpeter swans nest on beaver dams and lodges, whether active or not (McKelvey *et al*., 1983, Goldfarb and Flores, 2018, Idaho Department of Fish and Game). Badgers, pine martens, wolves, and foxes use abandoned lodges for winter dens (Rosell *et al*. 2005, Gauvin *et al*. 2020 and Windels 2017). Various species of small mammals, including mink, voles, and shrews also use beaver dams and structures as overwintering habitats and food storage (Samas 2015). Channels and ditches transformed by beaver activity can also serve as habitats for mammals (Samas 2015). The combination of dams, side-channels, and ponds increases channel complexity in the stream, which can provide important habitat for several species of fish, including salmonids (Hood 2012, Castro *et al*. 2012 and Bouwes *et al*. 2016).

Hydrological Benefits

Outside of the direct ecological benefits that they provide as a habitat, BMFs have several other benefits. Beaver dams are associated with improved water quality, especially in areas with waterborne pollutants and excess levels of nutrients like nitrogen and phosphorus. Concentrations of suspended solids, phosphorus, and nitrogen are lower in streams that contain beaver dams compared to streams lacking beaver complexes (Lazar *et al*. 2015, Rosell *et al*. 2005, Brazier *et al*. 2020, Błędzki *et al*. 2010 and Windels 2016). Beaver dams also decrease the concentration of pollutants in water (Puttock *et al*. 2017). Although the direct effects of beavers on water pH are unclear, research consistently shows that acid-neutralizing capacity is higher in beaver-impounded streams, which can also protect against degraded water quality (Puttock *et al*. 2017, Little *et al*. 2020, Rosell *et al*. 2005, Cirmo and Driscoll 1993, Margolis *et al*. 2001 and Windels 2016). While dissolved oxygen levels are often lower directly upstream of beaver dams, oxygen levels return to normal stream levels a short distance downstream of the dams (Windels 2016 and Rosell *et al*. 2005). Beaver presence can affect the hydrology of an entire watershed (Windels 2016). The introduction of beavers to the Chesapeake Bay water system is expected to improve the water quality in the estuary (Blankenship, 2022).

Beaver dams also impound sediment, causing deposition upstream (Collen and Gibson, 2000, Brazier *et al*. 2020 and Rosell *et al*. 2005). This can provide important spawning habitat for some fish species, including salmonids (Collen and Gibson 2000). As a result of the sediment deposition upstream of dams, there are reduced silt loads downstream of beaver dams (Rosell *et al*. 2005, Puttock *et al*. 2017, Grudzinski *et al*. 2022 and Castro *et al*. 2017). This can improve water quality for species sensitive to high sediment loads (Castro *et al*. 2017).

By impounding water, beaver dams slow the flow of water and elevate the water table. This can improve growing conditions for plants over a larger geography, including riparian plants and wildflowers (Castro *et al*. 2017 and "Northwest Pollinators and Climate Change | USDA Climate Hubs"). As a result of ponding, beaver complexes are often the last places to dry up in arid areas, and there is anecdotal evidence of beaver complexes turning intermittent streams into ones with year-round flow (Müller-Schwarze 2011 and Castro *et al*. 2017). Beavers are also critical for maintaining the hydrology of wetlands; they have historically been found in alkaline wetlands, and their loss is associated with draining of wetlands (Sivinski and Tonne 2011 and Wolkis 2016).

Beaver dams are also known to promote the recovery of incised streams, which have lowered streambeds and are disconnected from their floodplains. Stream incision is an environmental issue that is associated with loss of wetlands, decreases in base flow volume, increases in water temperatures, and loss of important habitats. By slowing the flow of water, beaver dams reduce streambed erosion and promote sediment aggradation, which ultimately helps incised streams recover and reconnect to their floodplains. While this process can occur as a result of riparian vegetation regaining health, or by other means, beaver dams are associated with faster stream recovery times (Pollock *et al*. 2014 and Fitch 2016). For example, in Washington, beaver presence is predicted to reduce recovery times in incised streams by 17–33% (Teske 2012).

There are several reports that characterize the temperature dynamics in beaver-impounded streams. The lack of consensus between their findings indicates that multiple variables beyond just beaver activity need to be considered to determine causality (McCaffrey 2009, Bouwes *et al*. 2016, Brazier *et al*. 2020, Rosell *et al*. 2005, Weber *et al*. 2017 and Talabere 2002). Contributing factors influencing stream water temperature include shade, pond depth, pond surface area, water flow speed, but also inherent characteristics such as underlying geology and groundwater connectivity. Decreased shade, flow speed and depth, and increased surface area are associated with an increase in temperature. Deeper pools and increased shade are associated with decreased temperatures (Philip 2022 and Rosell *et al*. 2005). Increased connectivity and exchange with groundwater is associated with cooling downstream of dams, as well as the buffering of diel temperature fluctuations (Rosell *et al*. 2005 Weber *et al*. 2017 and Bouwes *et al*. 2016). This cooling effect is a result of the fact that groundwater is colder than the measured surface water, so when downstream upwelling brings hyporheic flows to the surface, it results in cooler stream temperatures. The interaction between groundwater and stream flows is promoted in streams with greater hydraulic gradients, which can occur both as a result of a steeper streambed gradient and having sufficient water to stabilize groundwater tables and maintain pond levels (Dittbrenner *et al*. 2022).

Climate and Landscape Resiliency

Beaver complexes can increase resilience against natural disasters and climatic changes. They are listed as factors that can improve climate resiliency for various areas, including both inland and coastal habitats (Brophy 2019 and Idaho Department of Fish and Game 2017). This is largely a result of their expansion of wetlands, which can decrease temperatures locally by supporting plants that cool down regions by evapotranspiration. The shading that fog and water vapor provide also cools down areas, and can help moderate extremes in daily temperatures (Vymazal *et al*. 2011). Furthermore, beavers can help increase carbon sequestration by increasing floodplain connectivity (Jordan and Fairfax 2022). In areas prone to

flooding or flash flooding, beaver dams can mitigate the effects of high flows by slowing water (Otto 2021 and Jordan and Fairfax 2022). In areas prone to wildfires, beaver dams can increase landscape resilience and enhance recovery. Beavers improve wildfire resilience by increasing buffer zones of well-hydrated and green vegetation (Fairfax and Whittle 2020). Following wildfires, beaver dams impound the sediment that flows downstream, which is important given the increased erosion in burned areas. The increase in sediment storage following fires enhances watershed recovery and resilience (Dunn 2023).

Landscape Effects

Although best known for their ponds, beavers are key players in the formation of several other habitat types. Beavers support a diverse array of micro-habitats within BMFs, which means that they can help support a diverse array of species and species' needs. For example, riparian habitat conditions along the banks of a stream are supported by beaver presence through the elevation of the water table, which helps sustain riparian vegetation (Wyoming Fish and Game Department 2019). These habitats are critical for biodiversity; an estimated 80% of wildlife in Wyoming and 85% of wildlife in Washington relies on riparian habitats for some portion of their life (Teske 2012 and Emme and Jellison 2004). Beavers also support meadow habitats. When beaver ponds drain, they become meadows that can provide forage for ungulates (Müller-Schwarze 2011). Outside of this, beavers can support other habitat types as well, including the scrub-shrub habitat that certain bird species live in (Chandler *et al*. 2009). The flooding associated with beaver ponds produces deadwood by inundating and killing trees (Thompson *et al*. 2016, Orazi *et al*., 2020 and Rosell *et al*. 2005). Deadwood can also be an important habitat for several bird species, including woodpeckers and raptors (Rosell *et al*. 2005). Woodpeckers benefit from the dead trees in beaver-flooded areas (Windels 2017, Rosell *et al*. 2005 and Pietrasz *et al*. 2019). Woodpecker-created holes in trees killed by beavers can provide habitat for small mammals that nest in tree cavities (Rosell *et al*. 2005). As such, several species of small mammals also benefit from the presence of deadwood. On a larger scale, the clearing of trees, the presence of ponds, and the formation of beaver meadows create habitat heterogeneity that benefits species that depend upon open spaces like meadows, and water adjacent to forested areas (Bartel *et al*. 2010, Marshall *et al*. 2006, Castro *et al*. 2017 and Orazi *et al*. 2022).

Trophic Benefits

By providing habitat and resources for such a wide array of species, the presence of beavers has effects that span across trophic levels. Different studies have observed increased invertebrate diversity, productivity, and biomass in various beaver complexes (Orazi *et al*. 2022, Rosell *et al*. 2005, Brazier *et al*. 2020, Bush and Wissinger 2016, Schloemer *et al*. 2023 and Janiszewski *et al*. 2014). Increased water, forage, and prey availability also attract bird species. Waterfowl are attracted to the open water associated with beaver presence, which can be an important overwintering habitat (Windels 2017). Studies assessing bird species richness and density at beaver ponds observed that both were higher in beaver ponds (Medin and Clary 1999). In Wyoming, bird density in some BMFs was three times that of riparian habitats lacking beavers (Wyoming Fish and Game Department 2019). Outside of this, the increased density of some amphibians, like frogs, as well as some reptiles, such as aquatic turtles and lizards, has been observed at beaver ponds (Stevens *et al*. 2007, Castro *et al*. 2017, Anderson *et al*. 2014, Russell *et al*. 1999). By increasing habitat quality and diversity, beaver ponds also increase the densities of some fish species, especially juvenile salmonids (Hood 2012, Casto *et al*. 2017 and Bouwes *et al*. 2016). Small mammals and ungulates are thought to benefit from increased forage availability (Gauvin *et al*. 2020). As

a result of this, species that predate on invertebrates, amphibians, reptiles, birds, fish, ungulates and small mammals benefit from beaver complexes due to an increase in their prey items. Beaver complexes are associated with increased bat populations, due to the higher invertebrate densities (Orazi *et al*. 2022 and Nummi *et al*. 2011). Furthermore, there is higher mammal species richness and activity in areas with beaver activity, and there has been increased predatory mammal activity observed in beaver maintained habitat compared to those without beavers (Fedyń *et al*. 2022). This is thought to be due to the increased density of their prey items, including small mammals (Nummi *et al*. 2019). Beavers themselves can also be prey items to several large carnivores, like wolves and wolverines, and occasionally bobcats and foxes (Gable *et al*. 2017, Dietland Müller-Schwarze 2011, and U.S. Fish and Wildlife 2011). Estuarine beavers may help support marine species like orcas that eat salmonids by providing juvenile fish habitat for their prey (Goldfarb and Bascomb 2019).

Economic Benefits

The benefits that beavers provide extend beyond the ecological effects that they have. The attenuation of high and low flows benefits public utilities that manage reservoirs, those working on the land, and larger settlements (Niemi *et al*. 2020). The improvement in water quality also benefits towns and cities, as well as mitigates the downstream effects of farms and ranches that apply large amounts of fertilizer to their crops or whose activities otherwise generate substantial nitrogen inputs to streams (Niemi *et al*. 2020 and Puttock *et al*. 2017). Ranchers and farmers further benefit from the elevation of water tables, which improves the drought-resistance of pastures and results in an increase in forage that feeds livestock (Fitch 2016). The improved riparian, aquatic, and meadow habitat quality and quantity also supports species that otherwise would have required funding to conserve, as well as by supporting recreation that is centered on biodiversity (Niemi *et al*. 2020 and Bird *et al*. 2011). Examples of such recreation include hunting, fishing and bird-watching. Additionally, beaver wetlands provide economic benefit by improving climate resiliency and carbon storage (Niemi *et al*. 2020 and Vymazal *et al*. 2011). One study characterized the value of water quality improvement as "$100,000 per year per percent improvement" (Niemi *et al*. 2020). Another quantified improved water quality as $30-150 per household; and improved groundwater quality as $240-2,000 per household (Bird *et al*. 2011). While many of the other benefits are difficult to quantify in terms of economic value, it is evident that the benefits of beavers extend outside of their direct benefit to other species in their ecosystems to human societies as well.

2. Benefits of Beaver Managed Floodplains to SGCNs

This report summarizes how the ecological effects of beaver may affect the 294 SGCNs on the Oregon Conservation Strategy list. To accomplish this, an extensive literature review was performed. The key topics of investigation included the ecological needs and conservation status of each of the 294 species on the list, research linking beavers to each species of interest, the ecological effects of beaver activities (especially in the Western States and areas similar in climate to Oregon) and other general research pertaining to beavers and their effects. A total of 330 sources were used for this literature review. Sources included peer reviewed academic papers, published books and field guides, and government conservation and species recovery documents.

Much existing beaver research is conducted far from Oregon. The location of sources was considered when assessing the applicability of their findings. When informing decisions as to the potential benefits of

beavers to a given species, sources referring to areas far from, or climatically different, from Oregon were not weighed as heavily as those addressing similar areas. Sources with research conducted within the state of Oregon were weighted most heavily. Furthermore, several sources refer to *Castor fiber*, the Eurasian beaver, a distinct species from the North American beaver. Despite the Eurasian species exhibiting significant behavioral and ecological similarities to North American beavers (Rosell *et al*. 2005), findings regarding European beavers were also not weighted as heavily as those looking at the North American beaver.

From the findings in the literature review, 35 of the 294 SGCN had sources directly and explicitly connecting their well-being specifically to beaver activities. To assess the degree of benefit of beaver activities to the remaining 259 SGCN, published descriptions of each SGCN's ecological needs was compared with the known ecological outcomes of beaver presence. From this comparison, the expected effect of beaver activities on the species was derived. Given the complexities of how beavers can affect landscapes across ecotones, the expected effect of beavers in these assessments was considered specifically in the ecological background of the habitats present in Oregon.

The assessment categories distinguishing the various potential levels of likelihood of beaver benefits on a given species are summarized in Table 1. The corresponding evidence from the literature justifying the assessment that each species is given is contained in Appendix A.

It should be noted that in cases where species were given an assessment category of "Unclear," this assessment reflects a lack of information about the particular SGCN, not a lack of information about beavers and their ecological benefits. Many species are listed as SGCN based on how little is known about them. Several species or subspecies that lack information specific to them also were assessed partially based on the existing literature surrounding highly related species. Some of the SGCN are specific subspecies that are distinguished from other related subspecies due to distinct home ranges, but are physiologically and ecologically very similar. Where applicable, findings related to the ecological needs of the broader species were applied to the assessment of the subspecies on the OCS list.

The assessment results show that up to 218 of the total 294 SGCN (74%) could benefit from beaver managed floodplains (categories of Neutral/possible benefit" or higher). Of these, 35 of the 294 SGCN (12%) have direct evidence of beaver benefits ("Beaver benefits" category). 111 of the 294 SGCN (38%) have indirect linkages of beaver benefits ("Beaver probably benefits") supported by robust evidence comparing SGCN needs and conditions related to BMFs. And 72 of the 294 SGCN (24%) are likely to either have a neutral relationship to beavers or a positive relationship ("Neutral or possible benefit"). Of the remaining SGCN, 30 of the SGCN (10%) are unlikely to be affected by beavers either positively or negatively. 19 SGCN (6%) are unlikely to benefit from beavers, and 27 of the 294 SGCN (9%) do not have an easily predictable outcome from coexistence with beavers because of data gaps in regards to the SGCN species in question.

Assessment Category	What Does it Mean
Beaver benefits	Direct evidence in the literature of beavers benefitting this species
Beaver probably benefits	Robust indirect evidence from known ecological needs of species and ecological effects of beavers indicating that beavers should provide a benefit
Neutral/possible benefit	Weak indirect evidence from known ecological needs of species and ecological effects of beavers indicating that beavers should provide a benefit
Neutral	No clear indications that beavers would benefit or harm a species; beavers unlikely to overlap with this species
Beaver probably does not benefit	Direct or indirect evidence that beaver activities do not benefit this species
Unclear	There is insufficient information available to assess the relationship between beaver activities and this species

Table 1: The assessment categories and definitions used in this report to classify the likelihood that beaver activities will benefit a given OCS SGCN.

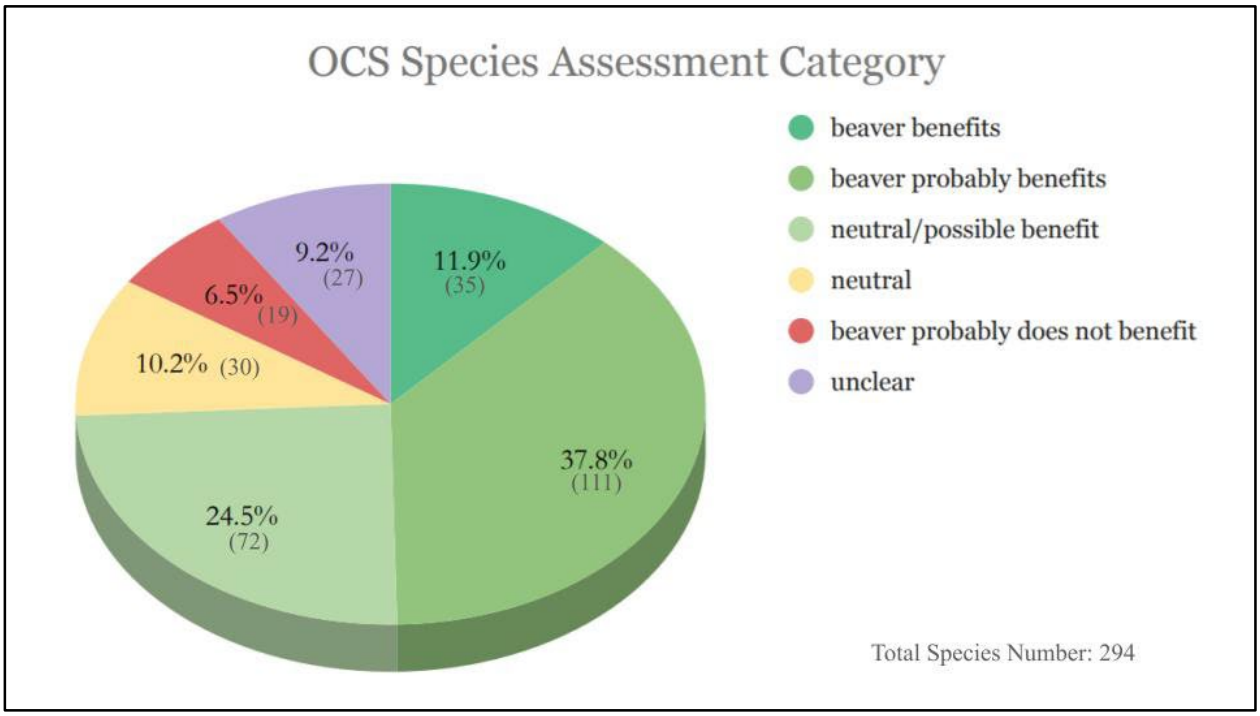

Figure 1: Assessment of 294 SGCN results by category. The colors of each section of the pie chart correspond to specific assessment categories listed in table 1. The percent reported is the percent of SGCN that are in that assessment category, and the number is the raw number of SGCN in each assessment category.

3. Overlap with State and Federal Designations and Recovery Plans

Endangered Species Act-Listed Species

The OCS list of SGCN has 25 federally Threatened and 18 federally Endangered Species for a total of 43 SGCNs which are also Threatened or Endangered species. Of these, 10 of the 43 (23%) are known to benefit from BMFs (highest "Beaver benefits" category), and an additional 9 of the 43 (21%) are predicted to benefit from BMFs ("Beaver probably benefits"). Therefore, nearly half of the SGCN which are federally listed as Threatened or Endangered species have a high likelihood of benefiting from beaver management of floodplains (Table 2). Additionally, 189 of the SGCN have their own State Protected Status outside of being SGCN. Of these, 29 of the 113 (26%) state-listed Sensitive Species, 4 of the 39 (10%) state-listed Threatened Species, and 1 of the 37 (3%) state-listed Endangered Species are known to benefit from beaver managed floodplains (Table 2). The OCS list of SGCN contains 86 species with neither state nor federal protected designations. The species assessment category, federal listing status, and state listing status for all 294 species on the OCS list can be found in Appendix B.

Interagency Special Status/Sensitive Species Program

The Oregon and Washington Bureau of Land Management (BLM), and Region 6 of the US Forest Service (USFS) maintain an Interagency Special Status/Sensitive Species Program (ISSSSP) list of species with the objective of working to conserve sensitive species and their habitats to prevent taking actions which may result in downward population trends resulting in federal ESA listings. (https://www.fs.usda.gov/r6/issssp/policy/). Both the BLM and the USFS rely on consultations with federal, state and other agencies to coordinate and inform land management decisions and planning processes (https://www.fs.usda.gov/r6/issssp/policy/). 159 SGCN are on these collaborative ISSSSP lists (Appendix C). According to our assessment, as many as 111 of the 159 (70%) SGCN/ISSSSP species could benefit from beaver activities (Table 2).

Species Conservation Assessments and Recovery Plans

Fourteen U.S. Fish and Wildlife, Oregon Department of Fish and Wildlife, and Interagency Special Status/Sensitive Species Program "Species Conservation Assessments" and "Recovery Plans" were reviewed for this project. These fourteen assessments and plans define state and federal strategies and priorities for the conservation and protection of some of the highest priority species present in the region and represent the collaborative input of leading researchers, scientists and policy makers using the best available science. All fourteen documents directly mentioned beavers or beaver activity as contributors to existing habitat or as an action item for the conservation of 16 of the SGCN addressed in the reports (Table 3).

Assessment Category	State Sensitive Species # (%)	State Threatened Species # (%)	State Endangered Species # (%)	Federally Threatened or Endangered Species # (%)	ISSSSP Species # (%)
Beaver benefits	29 (26%)	4 (10%)	1 (3%)	10 (23%)	24 (15%)
Beaver probably benefits	62 (55%)	6 (15%)	6 (16%)	9 (21%)	66 (42%)
Neutral/possible benefit	18 (16%)	5 (13%)	4 (11%)	9 (21%)	21 (13%)
Neutral	1 (1%)	4 (10%)	7 (19%)	3 (7%)	9 (6%)
Beaver probably does not benefit	2 (2%)	9 (23%)	7 (19%)	1 (2%)	15 (9%)
Unclear	1 (1%)	11 (28%)	12 (32%)	11 (26%)	24 (15%)
Total	113 (100%)	39 (100%)	37 (100%)	43 (100%)	159 (100%)

Table 2: Number (and percent) of SGCN which are State Sensitive, State Threatened, State Endangered, and Federally Threatened/Endangered or ISSSSP listed species and where they correspond to each assessment category described in Table 1. The percent reported is the percent of all SGCN of the given assessment category in that threat status or listing. The number is the raw number of species in the assessment category for each threat status.

Report Name and Agency	Key Quote(s) Discussing Beaver
Recovery Plan for the Native Fishes Of The Warner Basin and Alkali Subbasin	"...in general, adult suckers used stretches of stream where the gradient was sufficiently low to allow the formation of long...pools...About 45 percent of these pools were beaver ponds"
Recovery Plan for the Oregon Chub (Oregonichthys crameri)	"Oregon chub are found in slack water off-channel habitats such as beaver ponds..."
Final Recovery Plan Southwestern Willow Flycatcher (Empidonax traillii extimus)	"Occupied sites are typically located along slow-moving stream reaches...and at the margins of impounded water (e.g., beaver ponds..."; "(manage) keystone species such as beaver...to restore desired processes, increase habitat quality and quantity, reduce fire potential, and favor native over exotic plants. Beaver activity creates still waters by impoundment and aids sediment storage."
2005 Oregon Native Fish Status Report Volume II Assessment Methods & Population Results	"During dry years and summer months [cutthroat trout] distribution shrinks to just a few beaver ponds"; "Oregon chub prefer off-channel habitats with minimal or no flow, an abundance of vegetation, and depositional substrate including… stable beaver ponds…"
Oregon Coast Coho Conservation Plan For the State of Oregon	"High quality over-wintering habitat for juvenile coho is usually recognizable by one or more of the following features: large wood, a lot of wood, pools, connected off-channel alcoves, beaver ponds, lakes, connected floodplains and wetlands, and other conditions"
Conservation Assessment for the Western Painted Turtle in Oregon (Chrysemys Picta Bellii)	"In...drought, painted turtles...traveled overland to more permanent water that included...ponded areas behind beaver dams "
Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead	"Develop education and outreach on the benefits of beaver dams to ecosystems and fishes; provide landowner assistance with regards to property damage from beavers; provide incentives to landowners managing their land to achieve the habitat benefits that beavers provide"
Upper Willamette River Conservation And Recovery Plan For Chinook Salmon And Steelhead	" Include education and outreach materials on the benefit of beaver dams to ecosystem function in general and specifically to juvenile rearing habitat."
Coastal Multispecies Conservation and Management Plan (Chinook Salmon, Chum Salmon, steelhead, Cutthroat Trout)	Habitat tactics include encouraging "the restorative role of beavers in smaller stream reaches"
Conservation Assessment for Harlequin Duck (Histrionicus histrionicus)	"downy ducklings are not strong swimmers...Montana females moved broods to small beaver ponds or oxbow ponds"
Conservation Assessment For Purple Martin (Progne subis)	"They nest opportunistically in cavities in open habitats created by disturbance like...flooding from beaver ponds"
FINAL Coastal, Columbia, and Snake Conservation Plan for Lampreys in Oregon	"...encourage use of beavers to restore habitats...also should improve conditions for all life stages of lampreys"
Rogue–South Coast Multi-Species Conservation and Management Plan	"Promote beavers and beaver-related pond habitat to increase water quantity and stream complexity, (via) riparian restoration and helping landowners learn to live with beaver impacts."
Draft Recovery Plan for Oregon Spotted Frog (Rana pretiosa)	Threats to species include "Changes in hydrology - dams, human related modifications to seasonal flooding, water diversions, dams and manipulation, draining for development, drought, loss of beaver"

Table 3. Federal and State Species Management, Assessment and Recovery Plans featuring SGCN, and each reports specific references to the benefits of beavers towards the conservation of the priority species.

The extensive cross-listing of so many species which would benefit from BMFs (state priority species, federal priority species and federal and state management goals and recovery plans targeting specific species) highlights substantial motivation for collaboration towards common goals when state and federal agencies are engaged in required and customary consultations regarding federal land management plans, policies and Environmental Assessment and Impact Statements. (Federal Land Policy Management Act 1976). This co-management relationship is well established and clearly summarized in the 2015 BLM John Day Basin Record of Decision and Resource Management Plan, where the BLM states: "The BLM's major role in the management of fish and other aquatic species is to provide habitat that supports desired aquatic plants and animals. In concert, Oregon Department of Fish and Wildlife (ODFW) protects and enhances Oregon's fish and wildlife and their habitats. The RMP was developed in coordination with ODFW, draws on state comprehensive wildlife conservation strategies, and contains direction that is consistent with state rules and regulations for fish and wildlife management."

SGCN Geographic and Taxonomic Distributions

The geographic extent of potential beaver benefits to SGCN is statewide, encompassing all nine ecoregions (Table 4 and Appendix D), and is not restricted only to taxa commonly considered as aquatic (Table 5). This comprehensive extent demonstrates the appropriateness and broad potential impact of formally prioritizing beaver and their habitat in a statewide strategy such as the OCS.

A conservative assessment of the benefits of BMFs across ecoregions using only the highest categories of "Beaver benefits" and "Beaver probably benefits" results in an average of 76% of SGCN benefitting from beaver activities across terrestrial ecoregions with BMFs providing clear benefits to 90% of SGCN in the East Cascades Ecoregion. When the assessment includes the category of "Neutral/possible benefits" an average of 85% of species in terrestrial ecoregions could benefit from more management of floodplains by beavers, with the highest percentage of SGCN benefitting from beavers being 96% in the East Cascades Ecoregion.

The non-terrestrial "Near-Shore" ecoregion has a lower percentage of SGCN which the authors were able to draw clear documented links to benefits from beaver activities. Only 15% of SGCN in the "Nearshore Ecoregion" showed strong and likely benefits from beaver activities (such as Orcas feeding on salmon that spawn in beaver maintained habitat). However, an additional 61% of the Near-shore SGCN had a degree of likelihood of benefits from beavers, but these connections were slightly less well-documented, such as a petrel species which may be foraging for fish in estuaries where beaver activities have been shown to increase the numbers of some fish (Hood 2012).

Assessment Category	Blue Mountain Species # (%)	Coastal Range Species # (%)	Columbia Plateau Species # (%)	East Cascades Species # (%)	Klamath Mountains Species # (%)	North Basin and Range Species # (%)	West Cascades Species # (%)	Willamette Valley Species # (%)	Near Shore Species # (%)
Beaver benefits	15 (26%)	17 (27%)	8 (23%)	16 (23%)	10 (15%)	12 (18%)	20 (33%)	17 (27%)	6 (8%)
Beaver probably benefits	31 (53%)	29 (46%)	20 (57%)	46 (67%)	35 (52%)	26 (39%)	31 (52%)	32 (51%)	5 (7%)
Neutral/possible benefit	2 (3%)	7 (11%)	4 (11%)	4 (6%)	6 (9%)	10 (15%)	3 (5%)	9 (14%)	45 (61%)
Neutral	1 (2%)	4 (6%)	0 (0%)	1 (1%)	3 (4%)	5 (8%)	1 (2%)	1 (2%)	17 (23%)
Beaver probably does not benefit	4 (7%)	4 (6%)	2 (6%)	0 (0%)	4 (6%)	7 (11%)	3 (5%)	1 (2%)	0 (0%)
Unclear	5 (9%)	2 (3%)	1 (3%)	2 (3%)	9 (13%)	6 (9%)	2 (3%)	3 (5%)	1 (1%)
Total species	58 (100%)	63 (100%)	35 (100%)	69 (100%)	67 (100%)	66 (100%)	60 (100%)	63 (100%)	74 (100%)

Table 4: Number and percent of total SGCN in each assessment category, per ecoregion (as described by the OCS). The percent reported is the percent of all SGCN in that ecoregion that are in that assessment category. The number is the raw number of SGCN in the assessment category for each ecoregion.

Assessment Category	Amphibian Species # (%)	Bird Species # (%)	Fish Species # (%)	Invertebrate Species # (%)	Mammal Species # (%)	Plant Species # (%)	Reptile Species # (%)
Beaver benefits	5 (29%)	9 (16%)	15 (25%)	0 (0%)	4 (14%)	0 (0%)	2 (40%)
Beaver probably benefits	8 (47%)	36 (62%)	6 (10%)	34 (55%)	15 (52%)	9 (14%)	3 (60%)
Neutral /Possible benefit	2 (12%)	12 (21%)	31 (52%)	15 (24%)	5 (17%)	7 (11%)	0 (0%)
Neutral	1 (6%)	0 (0%)	8 (13%)	9 (15%)	1 (3%)	11 (17%)	0 (0%)
Beaver probably does not benefit	0 (0%)	0 (0%)	0 (0%)	1 (2%)	3 (10%)	15 (24%)	0 (0%)
Unclear	1 (6%)	1 (2%)	0 (0%)	3 (5%)	1 (3%)	21 (33%)	0 (0%)
Total # in taxa	17 (100%)	58 (100%)	60 (100%)	62 (100%)	29 (100%)	63 (100%)	5 (100%)

Table 5: Number and percent of total SGCN in each assessment category, per taxonomic class. The percent reported is the percent of all SGCN in that taxa that are in that assessment category. The number is the raw number of SGCN in the assessment category for each taxonomic class.

Conclusion

There is ample and definitive evidence to show that beavers managing healthy floodplains directly benefit the majority of SGCN, across all Oregon Ecoregions, and across all taxa. The benefits provided by BMFs directly support many overlapping and inter-reliant federal and state species management mandates which are best achieved through collaborative planning. Formal designation of beaver managed floodplains as an OCS Strategy Habitat is critical to improving collaborative conservation of Oregon's Species of Greatest Conservation Concern.

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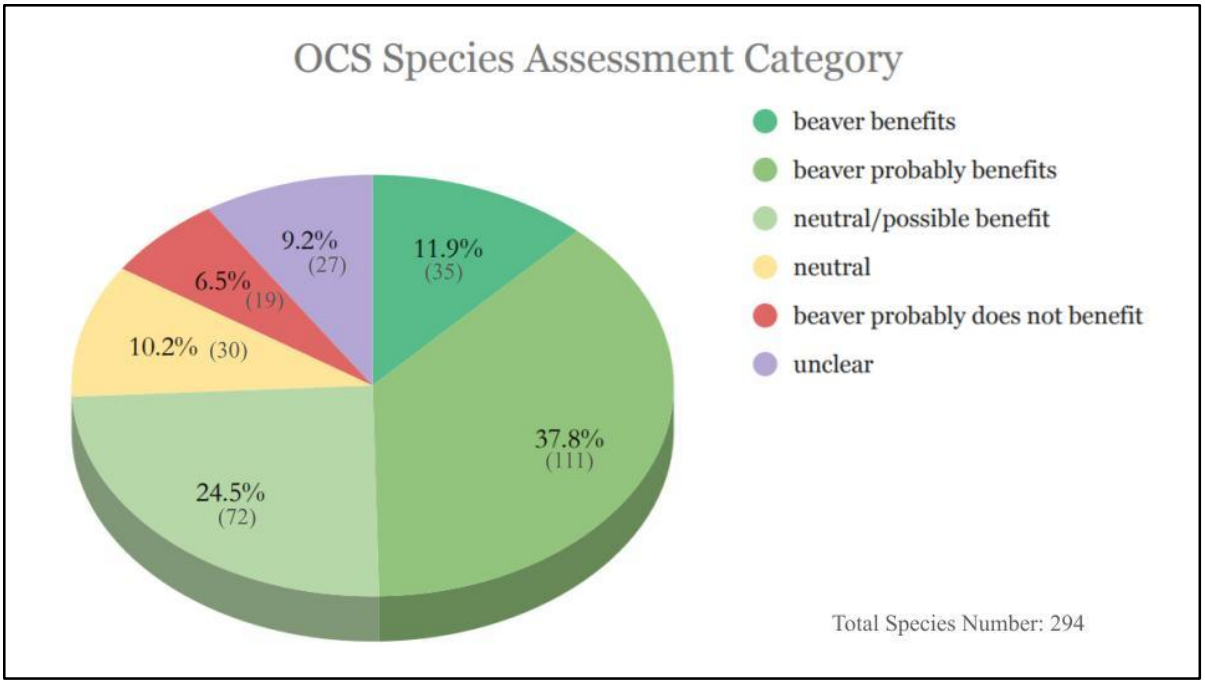
Appendix A: Complete Assessment Table

The following appendix contains the complete assessment table for the 294 species on the Oregon Conservation Strategy Species of Greatest Conservation Need. Each species is arranged alphabetically within a taxonomic group, and has been placed into one of six assessment categories. The justification for the categorization of each species, with citations, is also included below the summary tables

Assessment Legend:

Assessment Category	What Does it Mean
Beaver benefits	direct evidence in the literature of beavers benefitting this species
Beaver probably benefits	robust indirect evidence from known ecological needs of species and ecological effects of beavers that beavers should benefit
Neutral/possible benefit	weak indirect evidence from known ecological needs of species and ecological effects of beavers that beavers should benefit
Neutral	doesn't seem like beavers would benefit or harm; beavers unlikely to overlap with this species
Beaver probably does not benefit	direct or indirect evidence that beaver presence would disrupt this species
Unclear	unclear direct or indirect evidence; insufficient information is known to assess

Assessment Results Summary Figure:



Assessment of 294 SGCN results by category. The colors of each section of the pie chart correspond to specific assessment categories listed in table 1. The percent reported is the percent of SGCN that are in that assessment category, and the number is the raw number of SGCN in each assessment category.

OCS Species Common Name	Assessment	Reasoning (With Citation)
Cascades Frog	benefits	Beaver ponds provide breeding habitats for this species, which include slow-moving water, as in ponds, or in low vegetation near ponds (Castro et al, 2017)(Schwantes, 2021)(Idaho Department of Fish and Game, 2017). The presence of beaver dams is known to promote the colonization of this species in streams (Crisafulli et al., 2005) (Müller-Schwarze, 2011).
Columbia Spotted Frog	benefits	This species is known to live in beaver-modified streams. In one study, Columbia spotted frog populations were observed to increase following the reintroduction of beaver (Lingo, 2013). Furthermore, beaver-mimicking ponds are dug in Idaho to increase habitat for this species (Hembree, 2018)(Goldfarb and Flores, 2018). In Idaho, beaver reintroduction is a strategy for meeting multiple ecological needs that this species has, including restoring river and riparian habitat to functioning conditions, restoring and maintaining priority wetlands and riparian zones, and restoring and maintaining priority aquatic habitat to benefit soil and water conservation (Idaho Department of Fish and Game, 2017)(Idaho Department of Fish and Game, 2023). Beaver restoration has been listed as an action item for the benefit of this species' habitat in both Washington in Wyoming. In Washington, this species lives in Columbia Basin foothill riparian woodland and shrubland habitats, where the restoration of beavers to their historical range is an action item. This species also lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change. It lives in temperate Pacific freshwater emergent marshes as well, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015). In Wyoming, this species is known to occur in aspen/deciduous forest habitats, where the loss of beaver has been associated with droughts, and beaver reintroduction is an action item for habitat restoration (Wyoming Game and Fish Department, 2017). This species is also known to occur in Wyoming wetlands, which include beaver ponds and several other habitat features that beavers promote and maintain (Wyoming Game and Fish Department, 2017). This species is also known to occur in Wyoming riparian areas, where beaver dam construction and success are considered positive factors contributing to habitat quality and size (Wyoming Game and Fish Department, 2017).
Northern Red-legged Frog	benefits	Beaver ponds provide breeding habitats for this species, which include forested sites with still-water habitats (Castro et al., 2017)(Schwantes, 2021). This species is found in mixed coniferous and deciduous forests. For mixed coniferous and deciduous forests, allowing natural beaver activity has been suggested as an ideal step to protect amphibian and reptile habitats (Pilliod & Wind, 2008). This species lives in freshwater marshes in the North Coast and Klamath provinces in California, where integration of beaver ecology and increasing beaver population are conservation strategies for this habitat type (California Department of Fish and Wildlife, 2015). This species also lives in American Southwest riparian forest and woodland habitats in the Bay Delta and Central Coast provinces in California, where beaver occur (California Department of Fish and Wildlife, 2015).
Oregon Spotted Frog	benefits	This species uses ponds, marshes, and streams in meadows for breeding and foraging. They need sites with low, continuous water flow for overwintering (Oregon Conservation Strategy). Beaver-modified streams have conditions that would be favorable for egg-laying for this species, and are listed as habitat in several pieces of literature (Castro et al, 2017)(Schwantes, 2021)(Environment Canada, 2015). Loss of beaver and loss of water are listed as threats to this species (U.S. Fish and Wildlife Service, 2023). In Washington, this species lives in temperate Pacific freshwater emergent marshes, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015).
Western Toad	benefits	This species is known to use beaver ponds as breeding sites in Idaho, and are important breeding habitats for subspecies of this species (Idaho Department of Fish and Game, 2017) (Goldfarb & Flores, 2018). In Washington, this species lives in Columbia Basin foothill riparian woodland and shrubland habitats, where the restoration of beavers to their historical range is an action item. This species also lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change. It lives in temperate Pacific freshwater emergent marshes as well, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015). In Idaho, beaver reintroduction is listed as an action item for multiple ecological benefits that support this species. This includes the restoration and maintenance of priority wetlands and riparian zones, and the restoration and maintenance of priority aquatic habitats for soil and water conservation (Idaho Department of Fish and Game, 2023). In Wyoming, this species lives in aspen/deciduous forest habitats, where the loss of beaver has been associated with drought-like effects, and beaver reintroduction is an action item for habitat restoration (Wyoming Game and Fish Department, 2017). This species also lives in wetlands in Wyoming, which include beaver ponds and other habitat features that beavers maintain (Wyoming Game and Fish Department, 2017).
American Three-toed Woodpecker	benefits	This species nests in dead trees with heartrot, and its presence is strongly associated with the presence of deadwood (Marshall et al., 2006)(Csuti et al., 2001) (Oregon Conservation Strategy). Many researchers think that beaver presence is favorable for this species (Pietrasz et al., 2019). Beaver dams are associated with an increase in deadwood due to flooding (Thompson et al, 2016).
Bobolink	benefits	In Canada, beaver-created meadows are listed as one of the types of native grasslands that have biophysical attributes associated with critical habitat for this species (Environment and Climate Change Canada, 2022). In Idaho, beaver restoration is listed as a strategy to improve wetland resilience to climate change for the benefit of this species (Idaho Department of Fish and Game, 2017). In general, this species nests on moist meadows, and uses willows for perches (Marshall et al., 2006)(Csuti et al., 2001). Beavers are associated with an increase in moisture, and with an increase in riparian species like willows (Brazier et al., 2020).

OCS Species Common Name	Assessment	Reasoning (With Citation)
Greater Sandhill Crane	benefits	In Idaho, beaver restoration is listed as an action item for several ecological benefits that support this species. These include maintaining and protecting riverine and aquatic habitats; improving the resiliency of wetland habitats to changing hydrology and precipitation; stabilizing head cuts and raising water tables in springs, seeps, fens, and meadows; restoring stream geomorphology, water quality, and riparian habitat; increasing water storage to combat climate change; improving wetland resilience to climate change; restoring and maintaining priority wetlands and riparian zones; restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In the Bay Delta and Central Coast provinces in California, sandhill cranes live in freshwater marshes, where the integration of beaver ecology and increasing beaver population are listed as conservation strategies for this habitat type (California Department of Fish and Wildlife, 2015). This species lives in wetlands in the Willamette Valley (Grossman, 2002). Beavers are associated with an increase in wetlands (Rosell et al., 2005)(Castro et al., 2017). Sandhill cranes have been observed living at active beaver complexes, and are observed more frequently at active beaver sites compared to inactive sites or sites lacking beaver (Noson & Hutto, 2005)(Goldfarb & Flores, 2018). In Washington, this species lives in temperate Pacific freshwater emergent marshes, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015).
Harlequin Duck	benefits	In Washington, this species lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change. They are also found in temperate Pacific freshwater emergent marshes, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015) In Idaho, beaver restoration is listed as an action item for several ecological benefits that support this species. These include maintaining and protecting riverine and aquatic habitat; restoring stream geomorphology, water quality, and riparian habitat; increasing water storage to combat the effects of climate change; and restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2017)(Idaho Department of Fish and Game, 2023). In Wyoming, this species lives in riparian areas, where beaver dam construction and success positively contribute to habitat size and quality (Wyoming Game and Fish Department, 2017). In Montana, others of this species have been reported to move broods to small beaver ponds, as ducklings are not strong swimmers (Rockwell, 2018).
Olive-sided Flycatcher	benefits	This species lives in beaver ponds and beaver meadows (Cadman et al.,1987). It is also found along the wooded shores of streams, lakes, rivers, beaver ponds, marshes, and bogs. It is often found where standing dead trees are present (Marshall et al., 2006). Beaver dams are associated with an increase in snags and deadwood, due to the flooding these cause (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005) In Idaho, beavers are listed as an action item for several ecological benefits known to support this species. These include managing forests for a diversity of structure and composition, restoring and maintaining priority wetlands and riparian zones, and restoring and maintaining priority aquatic habitats to benefit soil and water conservation (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In New Mexico, this species lives in Rocky Mountain montane riparian forest habitats, where beavers also occur. As such, they are known to co-exist with beaver (New Mexico Department of Game and Fish, 2016). This species lives in riparian habitats in the Willamette Valley (Grossman, 2002). Beavers are associated with an increase in riparian habitat (Rosell et al., 2005)(Castro et al., 2017).
Pileated Woodpecker	benefits	This species uses trees that are already hollow due to being dead, and reductions in snags are listed as a limiting factor for this species (Marshall et al., 2006)(Oregon Conservation Strategy). Beaver dams are associated with an increase in snags and deadwood, due to the flooding these cause. Many species of woodpecker benefit from an increase in these snags (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005). This species lives in riparian habitats in the Willamette Valley (Grossman, 2002). Beavers are associated with an increase in riparian habitat (Rosell et al., 2005)(Castro et al., 2017). In other states, this species has been observed living at beaver ponds and was observed more frequently closer to beaver ponds than the control site (Lochmiller, 1979).
Purple Martin (Western)	benefits	This species is known to nest in cavities in open habitats created by disturbance, like flooding from beaver ponds. Their habitat includes areas near beaver ponds, and they are known to prefer wooded ponds, like those created by beaver (Rockwell, 2019)(Faulkner, 2010, as cited in Walker et al.). This species forages for flying insects diurnally over open areas like rivers, lakes, marshes, fields, and high above the canopy of forests. It nests in snags, among other things (Marshall et al., 2006). Beavers are associated with an increase in wetlands, and with snags (Batzer and Baldwin, 2012)(Bush and Wissinger, 2016)(Castro et al., 2017). They are also associated with an increase in invertebrate populations (Rosell et al., 2005). In Wyoming, this species lives in aspen/deciduous forest habitats, where the loss of beaver in this habitat has been associated with drought-like effects, and beaver reintroduction is considered an action item or habitat restoration (Wyoming Game and Fish Department, 2017). This species is found in several habitat types in California. In the North Coast and Klamath provinces, it lives in freshwater marshes, where the integration of beaver ecology and increasing beaver population are listed as conservation strategies for this habitat type (California Department of Fish and Wildlife, 2015). This species also lives in north coastal and montane riparian forest and woodland habitats in the North Coast and Klamath provinces, where allowing beavers to persist for riparian habitat is an objective (California Department of Fish and Wildlife, 2015). This species also lives in American Southwest riparian forest and woodland habitats in the Bay Delta and Central Coast provinces, where beaver also occur (California Department of Fish and Wildlife, 2015). This species also lives in freshwater marshes in the Bay Delta and Central Coast provinces, where increasing the beaver population is a goal (California Department of Fish and Wildlife, 2015). In Washington, this species lives in temperate Pacific freshwater emergent marshes, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015).

OCS Species Common Name	Assessment	Reasoning (With Citation)
Trumpeter Swan	benefits	Beavers help create more open water habitat that is suitable for waterfowl, including this species (Goldfarb & Flores, 2018)(Windels, 2017)(McKelvey et al., 1983). Trumpeter swans are also known to nest on beaver houses (Idaho Department of Fish and Game, 2017). In Idaho, beaver restoration and reintroduction are listed as action items for multiple ecological benefits that support this species. These include improving the resiliency of riverine, riparian, and wetland ecosystem climate change resilience; restoring and maintaining priority riparian forests, wetlands, and riparian zones; and restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In Wyoming, this species lives in wetlands, which include beaver ponds and other habitat features that beavers maintain (Wyoming Game and Fish Department, 2017). This species also lives in riparian areas in Wyoming, where beaver dam construction and success positively contribute to habitat size and quality (Wyoming Game and Fish Department, 2017).
Willow Flycatcher	benefits	This species has been observed in habitats where beavers live and are important for ecosystem health in multiple western states. In Wyoming, this species is listed as living in riparian areas, where beaver dam construction and success improve habitat size and quality (Wyoming Game and Fish Department, 2017). In New Mexico, this species lives in Rocky Mountain montane riparian forest habitats, where it coexists with beaver (New Mexico Department of Game and Fish, 2016). In the North Coast and Klamath provinces in California, this species lives in freshwater marshes, where the integration of beaver ecology and increasing beaver population are conservation strategies for this habitat type (California Department of Fish and Wildlife, 2015). In Colorado, this species lives in riparian woodlands and shrublands, where beavers are important for the maintenance of the health of the ecosystem (Colorado Parks and Wildlife, 2015). More generally, beavers have been observed to create suitable willow flycatcher habitats. Willow flycatchers live at beaver ponds, and an increase in willow flycatcher populations has been observed following increases in beaver population (Noson & Hutto, 2005)(Albert & Trimble, 2000)(Medin & Clary, 1999)(Csuti et al., 2001)(Marshall et al., 2006)(Southwestern Willow Flycatcher Recovery Team Technical Subgroup, 2002).
Alvord Chub	benefits	This species has been observed living in beaver ponds (Scheerer et al., 2015). As such, beavers create viable habitat for this species.
Bull Trout	benefits	Bull trout have been observed to overwinter in beaver ponds (Collen & Gibson, 2000). As such, beaver would increase habitat for this species. Decreased water quality, water quantity, and riparian habitat are all threats to this species (U.S. Fish and Wildlife Service, 2015). Beavers are associated with increased late-season flows, improved water quality, and riparian vegetation (Rosell et al., 2005)(Castro et al., 2017). In Idaho, beaver reintroduction is listed as an action item to restore and maintain priority aquatic habitat to benefit soil and water conservation for the benefit of this species (Idaho Department of Fish and Game, 2023).
Chinook Salmon	benefits	Poor water quality is a threat to this species (Oregon Conservation Strategy). Beaver dams are associated with improved water quality (Brazier et al., 2020). Beaver dams and ponds are associated with increased juvenile Chinook salmon populations, indicating that they are valuable habitats for this species (Hood, 2012). In Idaho, beaver restoration is listed as an action item for several ecological benefits that are known to support this species. These include maintaining and protecting riverine and aquatic habitat; restoring stream geomorphology, water quality, and riparian habitat; increasing water storage to combat climate change; and restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In Oregon, stream restoration; riparian function protection; increasing connectivity with wetlands, floodplains, side channels, and estuaries; improved water quality; and increased beaver activity are listed as action items for the restoration of this species (Oregon Department of Fish and Wildlife, 2014). Education on beaver dams as juvenile rearing habitat is also listed as an action item for this species in Oregon (Oregon Department of Fish and Wildlife, 2010)(Oregon Department of Fish and Wildlife, 2011).
Chum Salmon	benefits	In Washington, the degradation of riparian and estuary habitats is listed as a threat to this species, and the restoration of riparian vegetation and natural instream habitat is listed as an action item (Washington Department of Fish and Wildlife, 2015). In Oregon, stream restoration; riparian function protection; increasing connectivity with wetlands, floodplains, side channels, and estuaries; improved water quality; and increased beaver activity are all listed as action items for the restoration of this species (Oregon Department of Fish and Wildlife, 2014). Juvenile chum salmon populations were observed to decrease following the removal of beaver dams (Schaffer et al., 2023).
Coastal Cutthroat Trout	benefits	Cutthroat trout have higher survival rates in beaver-influenced streams (McCaffrey, 2009). Cutthroat trout have also been observed to overwinter in beaver ponds (Collen & Gibson, 2000)(Jakober et al., 2000). In Oregon, stream restoration; riparian function protection; increasing connectivity with wetlands, floodplains, side channels, and estuaries; improved water quality; and increased beaver activity are all listed as action items for the restoration of this species (Oregon Department of Fish and Wildlife, 2014). Promoting beaver-related pond habitats to increase water availability and stream complexity is also suggested for this species in Oregon (Oregon Department of Fish and Wildlife, 2021b).
Coho Salmon	benefits	Beaver dams and pools are valuable habitats for juvenile Coho salmon (Hood, 2012)(Castro et al, 2017)(Oregon Department of Fish and Wildlife, 2007). In Oregon, education on beaver dams as juvenile rearing habitat is listed as an action item for this species (Oregon Department of Wildlife, 2010). Increasing beaver dams where they are limited is also suggested to create high-quality rearing habitat for this species in Oregon (Oregon Department of Fish and Wildlife, 2007). Promoting beaver-related pond habitats to increase water availability and stream complexity is also suggested for this species in Oregon (Oregon Department of Fish and Wildlife, 2021b). Intertidal beaver ponds are also observed to be important for juveniles of this species along the Oregon coast, and their re-establishment is listed as a factor anticipated to increase estuary productivity for this species (Miller & Sadro, 2003)(Brophy & van de Wetering, 2012). In the Bay Delta and Central Coast provinces in California, this species lives in American Southwest riparian forest and woodland habitats, where beavers also occur (California Department of Fish and Wildlife, 2015). This species lives in wetlands in the Willamette Valley (Grossman, 2002). Beavers are associated with an increase in wetlands (Rosell et al., 2005)(Castro et al., 2017).

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Lahontan Cutthroat Trout	benefits	Cutthroat trout were observed to have higher survival rates in beaver-influenced streams. Beaver ponds may provide a survival advantage to this species where they are limited by temperature. The total number of Lahontan cutthroat trout was higher in beaver ponds than in free-flowing sections of a beaver-inhabited stream (McCaffrey, 2009)(Talabere, 2002). Cutthroat trout have been observed to overwinter in beaver ponds (Collen & Gibson, 2000)(Jakober et al., 2000).
Miller Lake Lamprey	benefits	High juvenile lamprey densities were observed in tidal beaver pool complexes, suggesting that beaver can provide valuable habitat for juvenile lampreys (Hood, 2012). Restoration plans for Coho salmon, chinook salmon, chum salmon, steelhead, and cutthroat trout that recommend beaver restoration also suggest a benefit for all life stages of this species. The removal of substrates associated with complexity, like woody debris and beaver dams, from streams is listed as a threat to this species. Other threats to this species include compromised water quality and reduced instream flows (Oregon Department Of Fish And Wildlife, 2020). Beavers have been associated with improved water quality and increased late-season flows (Rosell et al., 2005)(Castro et al., 2017)(Brazier et al., 2020).
Oregon Chub	benefits	Habitat alteration is listed as a threat to this species. This species prefers habitats such as beaver ponds, oxbows, side channels, backwater sloughs, low-gradient tributaries, and flooded marshes (U.S. Fish and Wildlife, 1998b)(Oregon Department of Fish and Wildlife, 2005). Beavers would produce an increase in viable habitat for this species.
Pacific Lamprey	benefits	High juvenile lamprey densities were observed in tidal beaver pool complexes, suggesting that beaver can provide valuable habitat for juvenile lampreys (Hood, 2012). The removal of in-stream substrates associated with complexity, like woody debris and beaver dams, is a threat to this species. Other threats to this species include compromised water quality and reduced instream flows. Restoration plans for species like Coho salmon, chinook salmon, chum salmon, steelhead, and cutthroat trout that include beaver or beaver dams state that all life stages of these species are also likely to benefit from beaver presence (Oregon Department of Fish and Wildlife, 2020). Beavers have been associated with improved water quality and increased late-season flows (Rosell et al., 2005)(Castro et al., 2017)(Brazier et al., 2020). In Idaho, beaver restoration is an action item for several ecological benefits known to support this species. These include maintaining and protecting riverine and aquatic habitat; restoring stream geomorphology, water quality, and riparian habitat; increasing water storage to combat climate change; and restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In the Bay Delta and Central Coast provinces in California, this species lives in American Southwest riparian forest and woodland habitats, where beaver also occur (California Department of Fish and Wildlife, 2015).
Steelhead / Rainbow / Redband Trout	benefits	This species has been observed using beaver ponds, and juvenile populations are higher in beaver-influenced streams (Castro et al, 2017)(Bouwes et al., 2016). In Oregon, education on beaver dams as juvenile rearing habitat is listed as an action item for this species (Oregon Department of Wildlife, 2010)(Oregon Department of Fish and Wildlife, 2011). Promoting beaver-related pond habitats to increase water availability and stream complexity is also suggested for this species in Oregon (Oregon Department of Fish and Wildlife, 2021). In Idaho, beaver restoration is listed as an action item for several ecological benefits that are known to support this species. These include maintaining and protecting riverine and aquatic habitat; restoring stream geomorphology, water quality, and riparian habitat; increasing water storage to combat the effects of climate change; restoring and maintaining priority aquatic habitat to benefit soil and water conservation (Idaho Department of Fish and Game, 2017)(Idaho Department of Fish and Game, 2023). In the Bay Delta and Central Coast provinces in California, this species lives in American Southwest riparian forest and woodland habitats, where beaver also occur (California Department of Fish and Wildlife, 2015).
Warner Sucker	benefits	Warner suckers are often found in pools, or in sections of streams with gentle enough gradients to form pools. In one study, 45% of the ponds where Warner suckers were found were beaver ponds (U.S. Fish and Wildlife Service, 1998c). As such, beavers create suitable habitat for this species.
Western Brook Lamprey	benefits	High juvenile lamprey densities were observed in tidal beaver pool complexes, suggesting that beaver can provide valuable habitat for juvenile lampreys (Hood, 2012). Restoration plans for Coho salmon, chinook salmon, chum salmon, steelhead, and cutthroat trout that recommend beaver restoration also suggest a benefit for all life stages of this species. The removal of substrates associated with complexity, like woody debris and beaver dams, from streams is listed as a threat to this species. Other threats to this species include compromised water quality and reduced instream flows (Oregon Department Of Fish And Wildlife, 2020). Beavers have been associated with improved water quality and increased late-season flows (Rosell et al., 2005)(Castro et al., 2017)(Brazier et al., 2020).
Western River Lamprey	benefits	High juvenile lamprey densities were observed in tidal beaver pool complexes, suggesting that beaver can provide valuable habitat for juvenile lampreys (Hood, 2012). Restoration plans for Coho salmon, chinook salmon, chum salmon, steelhead, and cutthroat trout that recommend beaver restoration also suggest a benefit for all life stages of this species. The removal of substrates associated with complexity, like woody debris and beaver dams, from streams is listed as a threat to this species. Other threats to this species include compromised water quality and reduced instream flows (Oregon Department Of Fish And Wildlife, 2020). Beavers have been associated with improved water quality and increased late-season flows (Rosell et al., 2005)(Castro et al., 2017)(Brazier et al., 2020).
Westslope Cutthroat Trout	benefits	Cutthroat trout were observed to have higher survival rates in beaver-influenced streams (McCaffrey, 2009). Cutthroat trout have also been observed to overwinter in beaver ponds (Collen & Gibson, 2000)(Jakober et al., 2000).
Columbian White-tailed Deer	benefits	Beavers are known to create riparian habitat with adequate forage that is suitable for this species (Gauvin et al., 2020)(Washington Department of Fish and Wildlife, 2015). In Washington, this species lives in temperate Pacific freshwater emergent marshes, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015).

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Fisher	benefits	This species has been observed at beaver ponds (Philip, 2022). They use cavities in both live or dead trees for denning (Oregon Conservation Strategy). Beavers are shown to be associated with an increase in deadwood and snags as a result of the flooding that their damming causes (Thompson et al., 2016)(Rosell et al., 2005). Riparian buffers are suggested to provide habitat for this species, and habitat components important to fishers, like snags and downed wood, are associated with beaver (U.S. Fish and Wildlife Service, 2011c)(Thompson et al., 2016)(Rosell et al., 2005). Many small mammals, which fishers predate on, thrive in beaver pond complexes (Fedyń et al., 2022)(Nummi et al., 2019). Fishers may also predate upon beavers and/or scavenge them, as beavers have been used as bait for fisher inventory reports (Ferland et al., 2015). In Idaho, beaver dams and beaver restoration are listed as a strategy for several ecological benefits that are known to support this species. These include restoring stream geomorphology, water quality, and riparian habitat; and restoring and maintaining priority riparian forests (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). This species coexists with beavers in north coastal and montane riparian forest and woodland habitats in the North Coast and Klamath provinces in California, where allowing beavers to persist for riparian habitat is an objective (California Department of Fish and Wildlife, 2015). In Washington, this species lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats in Washington, where beaver activity is an important driver of hydrological change (Washington Department of Fish and Wildlife, 2015).
Gray Wolf	benefits	Beaver-created habitats can help support populations of ungulates that wolves can predate upon (Gauvin et al., 2020). Wolves may also predate upon beavers themselves (Gable et al., 2017)(Oregon Department of Fish and Wildlife, 2019). In Washington, this species lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change (Washington Department of Fish and Wildlife, 2015).
Wolverine	benefits	In Idaho, beaver reintroduction is an action item to manage forest composition and structure for the benefit of this species (Idaho Department of Fish and Game, 2017). Wolverines also benefit directly from beaver presence, as they have been known to predate on beavers (U.S. Fish and Wildlife Service, 2011b).
Western Painted Turtle	benefits	Beavers can help create a more suitable habitat for this species (Russell et al., 1999)(Castro et al., 2017)(Metts et al., 2001). Turtle abundance and beaver activity are positively correlated, and beaver activity creates several key habitat features that this species benefits from (Oregon Department of Fish and Wildlife, 2015). In the Northwest, this species lives in grassland habitats. Allowing natural beaver activity is suggested as an ideal option when protecting amphibian and reptile habitats (Pilliod & Wind, 2008). This species lives in several habitat types in Wyoming. It is found in wetlands, which include beaver ponds and other habitat features that beavers maintain (Wyoming Game and Fish Department, 2017). This species also lives in riparian areas, where beaver dam construction and success increase habitat size and quality (Wyoming Game and Fish Department, 2017). This species inhabits a river basin in Wyoming where beaver reintroduction is an action item for improving aquatic habitat (Wyoming Game and Fish Department, 2017).
Western Pond Turtle	benefits	Beavers can help create a more suitable habitat for this species (Castro et al., 2017). Turtle abundance and beaver activity are positively correlated in Oregon, and beaver activity creates several key habitat features that this species benefits from (Oregon Department of Fish and Wildlife, 2015). In California, this species lives in several habitats. This species lives in freshwater marshes in the North Coast, Klamath, Bay Delta, and Central Coast provinces, where integration of beaver ecology and increasing beaver population are conservation strategies (California Department of Fish and Wildlife, 2015). This species also lives in American Southwest riparian forest and woodland habitats in the Bay Delta and Central Coast provinces, where beaver also occur (California Department of Fish and Wildlife, 2015). This species also lives in freshwater marshes in the Bay Delta and Central Coast provinces, where increasing the beaver population is a goal (California Department of Fish and Wildlife, 2015). In Washington, this species lives in temperate Pacific freshwater emergent marshes, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015). This species lives in wetlands in the Willamette Valley (Grossman, 2002). Beavers are associated with an increase in wetlands (Rosell et al., 2005)(Castro et al., 2017).
Clouded Salamander	beaver probably benefits	This species lives in the forest and is found in moist areas and clearings under downed logs (Oregon Conservation Strategy)(Csuti et al., 2001). The availability of large logs is listed as a limiting factor for this species (Oregon Conservation Strategy). Beavers are associated with an increase in deadwood and snags as a result of the flooding that their damming causes (Thompson et al., 2016)(Rosell et al., 2005).
Coastal Tailed Frog	beaver probably benefits	This species can use pools for oviposition in fast headwater streams (Karraker 2006). This species is also sensitive to sedimentation (Oregon Conservation Strategy). Beaver dams form ponds with slow-moving water, and trap sediment behind them, leading to a reduced sediment load downstream of the dam (Rosell et al., 2005)(Brazier et al., 2020). This species has been reported in a variety of habitats. It is found in dry coniferous forests, where natural beaver activity has been suggested as a management-friendly option to help protect amphibian and reptile habitats (Pilliod & Wind, 2008). This species is also found in north coastal and montane riparian forest and woodland habitats in the North Coast and Klamath provinces in California, where beavers also occur. Allowing beavers to persist in riparian habitat is listed as an objective for the improvement of this habitat type (California Department of Fish and Wildlife, 2015).
Columbia Torrent Salamander	beaver probably benefits	This species is vulnerable to dessication and is found in streams in mature forests in Washington (Washington Department of Fish and Wildlife, 2015). Beavers are associated with moisture and wetlands (Rosell et al, 2005).

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Cope's Giant Salamander	beaver probably benefits	This species has been found in riparian areas close to surface waters, and riparian buffers are thought to benefit this species. There has been a positive correlation observed between this species and riparian vegetation and woody debris substrate. A positive association exists between this species and pools near down wood accumulations in riparian areas, although large debris that traps sediment does not benefit this species (Foster & Olson, 2014). In Washington, elevated stream temperature from riparian vegetation loss, erosion, and increased sedimentation are listed as threats to this species, and the protection of riparian areas is listed as an action item (Washington Department of Fish and Wildlife, 2015). Beaver dams introduce woody debris to streams, can reduce downstream sedimentation, and increase riparian vegetation (Rosell et al., 2005)(Brazier et al., 2020).
Del Norte Salamander	beaver probably benefits	This species is sometimes found in decaying logs in moist, rocky areas in forests, and eats invertebrates (Csuti et al., 2001). Beavers are associated with an increase in deadwood and snags as a result of the flooding that their damming causes (Thompson et al., 2016)(Rosell et al., 2005). This species lives in north coastal and montane riparian forest and woodland habitats in the North Coast and Klamath provinces in California, where beavers occur, and allowing beavers to persist is listed as an objective for riparian habitat improvement (California Department of Fish and Wildlife, 2015).
Foothill Yellow-legged Frog	beaver probably benefits	In the North Coast and Klamath provinces in California, this species lives in north coastal and montane riparian forest and woodland habitats, where beavers occur, and allowing beavers to persist is listed as an objective for riparian habitat improvement (California Department of Fish and Wildlife, 2015). This species also lives in American Southwest riparian forest and woodland habitats in the Bay Delta and Central Coast provinces in California, where beaver also occur (California Department of Fish and Wildlife, 2015). In general, this species is found in permanent slow-moving streams in a variety of environments (Csuti et al., 2001). Beaver dams slow the flow of water (Rosell et al, 2005).
Oregon Slender Salamander	beaver probably benefits	This species is observed in and around rocks and logs in mature forests, and has a positive association with deadwood and snags, and is found in vegetation buffers adjacent to perennial and intermittent streams (Clayton & Olson, 2009)(Guderyahn et al., 2010). Beaver dams are associated with an increase in snags and deadwood, due to the flooding they cause (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005). This species eats invertebrates (Csuti et al., 2001). Beavers are associated with increased invertebrate populations, although there is no data as to whether the distribution of this species and that of beavers overlaps (Rosell et al., 2005).
Rocky Mountain Tailed Frog	beaver probably benefits	This species is found in dry coniferous forests in the Northwest, where natural beaver activity has been suggested as a management-friendly option to help protect amphibian and reptile habitats (Pilliod & Wind, 2008). In Washington, this species lives in Columbia Basin foothill riparian woodland and shrubland habitats, where the restoration of beavers to their historical range is an action item. This species also lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change (Washington Department of Fish and Wildlife, 2015). In Idaho, beaver reintroduction is listed as an action item to restore and maintain priority aquatic habitat to benefit soil and water conservation for the benefit of this species (Idaho Department of Fish and Game, 2023). This species is vulnerable to the alteration of riparian zones, especially increases in sediment loads and reductions in woody debris (Washington Department of Fish and Wildlife, 2015). Beaver dams slow the flow of water and trap sediment, resulting in slower flows and more sediment in their ponds, and therefore less sediment downstream of dams (Rosell et al., 2005)(Brazier et al., 2020). Beaver dams are inherently woody debris.
Acorn Woodpecker	beaver probably benefits	This species is known to prefer oak woodlands, although it relies more generally on trees with dead limbs or snags for storing their food, and has been observed in riparian cottonwood habitats (Marshall et al., 2006)(Oregon Conservation Strategy). Beaver dams are associated with an increase in snags and deadwood, due to the flooding they cause. Many species of woodpecker benefit from this increase in snags (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005). Beavers are also associated with an increase in riparian vegetation (Rosell et al., 2005).
American White Pelican	beaver probably benefits	In Idaho, beaver reintroduction and restoration is listed as an action item for ecological benefits that support this species. These include improving riverine and riparian ecosystem climate change resiliency and restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2017) (Idaho Department of Fish and Game, 2023). In Wyoming, this species is listed as living in wetlands, which inherently include beaver ponds and other habitat features that beavers are known to maintain (Wyoming Game and Fish Department, 2017). In the Bay Delta and Central Coast provinces in California, this species lives in freshwater marshes, where beavers live, and increasing the beaver population is listed as a goal (California Department of Fish and Wildlife, 2015). More generally, this species breeds on lakes and freshwater marshes and feeds on fish in these habitats (Marshall et al., 2006)(Csuti et al., 2001). Beavers are associated with an increase in wetland habitats, and with supporting fish populations (Rosell et al., 2005)(Castro et al., 2017).
Black Swift	beaver probably benefits	This species lives in crevices and ledges and is often found near waterfalls (Oregon Conservation Strategy). In Idaho, beaver reintroduction is listed as an action item to restore and maintain priority aquatic habitat to benefit soil and water conservation for the benefit of this species (Idaho Department of Fish and Game, 2023). In New Mexico, this species is listed as occurring in Rocky Mountain montane riparian forest habitats, where beavers also occur. As such, they are known to co-exist with beaver (New Mexico Department of Game and Fish, 2016).
Black-backed Woodpecker	beaver probably benefits	This species is often associated with snags resulting from burned trees, but research shows that vital rates for this species do not differ between green and burned forests (Kerstens & Rivers, 2023)(Marshall et al., 2006). This species has been observed in riparian areas adjacent to rivers where there are sufficient dead or dying trees for their sustenance (Bonham, 2013). Snag availability is listed as a limiting factor for this species (Oregon Conservation Strategy). Beaver dams are associated with an increase in snags and deadwood, due to the flooding these cause. Many species of woodpecker benefit from an increase in these snags (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005). Beavers are also associated with an increase in riparian areas (Rosell et al., 2005)(Castro et al., 2017).

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Black-necked Stilt	beaver probably benefits	This species lives in alkali wetlands and freshwater ponds and lakes. It is vulnerable to both drought and flooding (Oregon Conservation Strategy). Beaver presence is associated both with increased availability of water throughout the year, as well as reduced flooding risk (Brazier et al., 2020)(Kanazawa, 2022). Although the effects of beavers on the pH is of water variable and contested, there is evidence of beavers being present at and maintaining historically alkaline wetlands (Sivinski & Tonne, 2011) (Wolkis, 2016).
Brown Pelican (California)	beaver probably benefits	Forage fish availability is listed as a limiting factor for this coastal species (Oregon Conservation Strategy). Brown pelicans are listed as eating schooling fish, as well as being opportunistic feeders (Marshall et al., 2006)(Lamb et al., 2017). Beaver presence in estuaries in the Skagit River, WA, is associated with increased pool habitat for several estuarine fish species, including three-spine stickleback, which is a schooling fish (Hood, 2012)(Greenwood et al., 2016).
Burrowing Owl (Western)	beaver probably benefits	In Idaho, beaver restoration is listed as a strategy to improve landscape resilience for the benefit of this species (Idaho Department of Fish and Game, 2017). In general, this species eats a wide variety of prey items including rodents, insects, bats, small birds, crayfish, reptiles, and amphibians (Csuti et al., 2006). Beavers are associated with an increase in all of these, except for crayfish (Fedyń et al., 2022)(Nummi et al., 2019)(Nummi et al, 2011)(Russell et al., 1999)(Medin & Clary, 1999).
Caspian Tern	beaver probably benefits	In Idaho, beaver reintroduction is listed as an action item for several ecological benefits that support this species. These include the restoration and maintenance of priority wetlands, riparian zones, and aquatic habitats, as well as soil and water conservation (Idaho Department of Fish and Game, 2023). In Wyoming, this species is listed as living in wetlands, which inherently includes features that include beaver ponds, as well as other habitat features that beavers are known to maintain (Wyoming Game and Fish Department, 2017). In general, this species is usually found near bodies of water in marine, brackish, and freshwater environments. It eats a variety of fish, including salmonids, anchovy, herring, sardines, surfperch, sand lance, sculpins, smelt, flatfish, bass, yellow perch, and sucker (Marshall et al., 2006). Beavers are found in freshwater and in coastal environments and are associated with an increase in population for several species of fish, including salmonids (Hood, 2012)(Castro et al, 2017) (Bouwes et al., 2016).
Columbian Sharp-tailed Grouse	beaver probably benefits	In Idaho, beaver restoration is listed as a strategy for multiple ecosystem benefits that support this species. These benefits include improving landscape resilience; improving the resiliency of riverine, wetland, and riparian ecosystems to climate change; and restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2017)(Idaho Department of Fish and Game, 2023). In Washington, this species lives in Columbia Basin foothill riparian woodland and shrubland habitats, where the restoration of beavers to their historical range is an action item. This species also lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change (Washington Department of Fish and Wildlife, 2015). In Wyoming, this species lives in aspen/deciduous forest habitats, where the loss of beaver has been associated with drought-like effects, and beaver reintroduction is an action item for habitat restoration (Wyoming Game and Fish Department, 2017). In Colorado, this species lives in riparian woodlands and shrublands habitats, where beavers are important for the maintenance of the health of the ecosystem (Colorado Parks and Wildlife, 2015).
Common Nighthawk	beaver probably benefits	In Idaho, beaver restoration and reintroduction is listed as a strategy or action item for several ecological benefits that support this species. These strategies include maintaining and protecting riverine and aquatic habitat, increasing water storage to combat climate change, improving landscape resilience, and restoring and maintaining priority wetlands and riparian zones (Idaho Department of Fish and Game, 2017)(Idaho Department of Fish and Game, 2023). In Utah, this species has been observed living in riparian and depressional wetland areas (Noson & Hutto, 2005). Beavers are associated with an increase in riparian areas and wetlands (Rosell et al., 2005)(Castro et al., 2017). In general, this species forages on insects, and forages in a wide variety of habitats (Csuti et al., 2001)(Marshall et al., 2006). Beavers are associated with an increase in insects (Rosell et al., 2005).
Dusky Canada Goose	beaver probably benefits	The loss of wintering habitat is listed as a threat to this species. This species has been observed wintering at Nestucca Bay in Oregon, in habitats where beavers live (U.S. Fish and Wildlife Service, 2012a). It has also been observed in wetlands in the Willamette Valley (Grossman, 2002). Beavers are associated with an increase in wetlands, and their ponds are good roosting habitats for wintering waterfowl during fall and winter (Rosell et al., 2005)(Castro et al., 2017). In Washington, this species lives in temperate Pacific freshwater emergent marshes, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015). In the Copper River Delta in Alaska, the loss of this species to mammalian predators has declined, which may be a result of flooding from beaver colonization (Bromley and Rothe, 2003). Canada geese, which this species is a subspecies of, have been observed nesting on beaver lodges (Collins et al., 2019).
Ferruginous Hawk	beaver probably benefits	In Washington, beaver restoration is listed as an action description for the ecological system this species is associated with (Washington Department of Fish and Wildlife, 2015). In Wyoming, this species is listed as living in riparian areas, where beaver dam construction and success are listed as improving habitat size and quality (Wyoming Game and Fish Department, 2017). In general, this species has been observed nesting in riparian woodland vegetation, and preys on small mammals (Csuti et al., 2001). Beavers are associated with increases in riparian vegetation, as well as with increased populations of small mammals (Rosell et al., 2005)(Fedyń et al., 2022)(Nummi et al., 2019).

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Flammulated Owl	beaver probably benefits	This species is found in drier forests, often adjacent to open areas. It nests in snags and eats aerial invertebrates (Marshall et al., 2006). Beaver complexes create habitat heterogeneity by felling and flooding trees, creating ponds and meadows that form clearings in forests (Castro et al., 2017). Beaver pond complexes are also associated with increased invertebrate populations (Rosell et al., 2005). In Wyoming, this species lives in aspen/deciduous forest habitats, where the loss of beaver has been associated with drought-like effects, and beaver reintroduction is an action item for habitat restoration (Wyoming Game and Fish Department, 2017). In New Mexico, this species is listed as occurring in Rocky Mountain montane riparian forest and montane-subalpine wet shrubland and wet meadow habitats, where beavers also occur. As such, they are known to co-exist with beaver (New Mexico Department of Game and Fish, 2016). In Washington, this species lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change (Washington Department of Fish and Wildlife, 2015).
Franklin's Gull	beaver probably benefits	This species nests in marshes (Marshall et al., 2006). Beavers are associated with an increase in wetlands (Batzer and Baldwin, 2012)(Bush and Wissinger, 2016)(Castro et al., 2017). In Idaho, beavers are listed as an action item for many ecological benefits that support this species. These include maintaining wetland function, restoring and maintaining priority wetlands and riparian zones, and restoring and maintaining priority aquatic habitats for soil and water conservation (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In Wyoming, this species is listed as living in wetlands, which inherently include beaver ponds, as well as other habitat features that beavers maintain (Wyoming Game and Fish Department, 2017).
Grasshopper Sparrow	beaver probably benefits	This species is found in relatively dry grasslands and grainfields, and eats seeds and insects (Marshall et al., 2006). Beavers are associated with an increase in invertebrate populations (Rosell et al., 2005). In Idaho, beaver is listed as a climate adaptation strategy to increase the water-holding capacity of landscapes for the benefit of this species (Idaho Department of Fish and Game, 2017). In Utah, this species has been observed living in riparian areas (Noson and Hutto, 2005). Beavers are associated with an increase in riparian area (Rosell et al., 2005)(Castro et al., 2017).
Great Gray Owl	beaver probably benefits	This species requires large forested areas with grassland clearings (Oregon Conservation Strategy). Beaver complexes create habitat heterogeneity by felling and flooding trees, creating ponds and meadows that form clearings in forests (Castro et al., 2017). In Idaho, beaver activity and reintroduction is listed as action item for multiple ecological benefits that support this species. These include managing forests for structural and composition diversity, and restoring and maintaining both priority riparian areas and wetlands (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In Wyoming, this species lives in aspen/deciduous forest habitats, where the loss of beaver has been associated with drought-like effects, and beaver reintroduction is an action item for restoration (Wyoming Game and Fish Department, 2017).
Greater Sage-Grouse	beaver probably benefits	This species forages in wet meadows after forbs desiccate in the uplands, and rears broods in wetlands (Goldfarb & Flores, 2018)(Maestas & Wheaton, 2017)(Csuti et al., 2001)(Hagen, 2011). Beavers are associated with meadows and wetlands (Rosell et al., 2005). In Idaho, beaver restoration is listed as a strategy for several ecological benefits that support this species. These include improving landscape resilience, improving wetland resilience to climate change, restoring and maintaining priority wetlands and riparian zones, and restoring and maintaining priority aquatic habitats for soil and water conservation (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017).
Lewis's Woodpecker	beaver probably benefits	This species is known to reside in riparian forests (Csuti et al., 2001)(Marshall et al., 2006)(Washington Department of Fish and Game, 2015). It feeds on aerial insects, nests in large snags for nesting, well-decayed snags, and forages in areas with open canopies (Oregon Conservation Strategy). Beaver dams are associated with an increase in snags and deadwood, due to the flooding they cause. Many species of woodpecker benefit from an increase in these snags (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005). Beavers are also associated with an increase in insect biomass, and with habitat heterogeneity (Rosell et al., 2005). In Idaho, beaver restoration is listed as an action item for several ecological benefits known to support this species. These include maintaining and protecting riverine and aquatic habitat; restoring stream geomorphology, water quality, and riparian habitat; increasing water storage to combat the effects of climate change; and restoring and maintaining priority riparian forests (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In Washington, this species lives in Columbia Basin foothill riparian woodland and shrubland habitats, where the restoration of beavers to their historical range is an action item. This species also lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change (Washington Department of Fish and Wildlife, 2015). In Wyoming, this species lives in aspen/deciduous forest habitats, where the loss of beaver has been associated with drought-like effects, and beaver reintroduction is an action item (Wyoming Game and Fish Department, 2017). This species also lives in riparian areas in Wyoming, where beaver dam construction and success improve habitat size and quality (Wyoming Game and Fish Department, 2017). In New Mexico, this species lives in Rocky Mountain montane riparian forest and montane-subalpine wet shrubland and wet meadow habitats, where beaver also occurs. As such, they are known to co-exist with beaver (New Mexico Department of Game and Fish, 2016). In Colorado, this species lives in riparian woodlands and shrublands habitats, where beavers are important for the maintenance of ecosystem health (Colorado Parks and Wildlife, 2015).

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Loggerhead Shrike	beaver probably benefits	This species is associated with big sagebrush, low sagebrush with scattered juniper, black greasewood, and cold desert shrub communities as breeding habitat. They are found in habitats with larger plants that are suitable for nesting and perching as well, as long as the habitat is adjacent to open areas for foraging. They consume mostly insects (Marshall et al., 2006). Beavers are associated with increased invertebrate abundance and are predicted to benefit some scrub-shrub birds (Chandler et al, 2008)(Rosell et al., 2005)(Taylor, 1992). In Washington, the restoration of beavers to their historical range is an action description item for the ecological system this species is associated with (Washington Department of Fish and Wildlife, 2015). In Wyoming, this species' habitat includes riparian areas (Yosef, 1996, as cited in Bjornlie et al.). Beavers are associated with an increase in riparian areas (Rosell et al., 2005)(Castro et al., 2017). In New Mexico, this species is listed as occurring in Rocky Mountain montane riparian forest habitats, where beavers also occur. As such, they are known to co-exist with beaver (New Mexico Department of Game and Fish, 2016).
Long-billed Curlew	beaver probably benefits	This species often nests in meadows near water, or in wet meadows (Csuti et al., 2001). In Utah, this species has been observed living in riparian areas (Noson & Hutto, 2005). Beavers are associated with an increase in water, meadows, and riparian areas (Rosell et al., 2005)(Castro et al., 2017). In Idaho, beaver restoration and reintroduction is listed as a strategy or action item for various ecological benefits that support this species. This includes improving landscape resilience, improving wetland resilience to climate change, and restoring and maintaining priority aquatic habitat to benefit soil and water conservation (Idaho Department of Fish and Game, 2017)(Idaho Department of Fish and Game, 2023). In New Mexico, this species is listed as occurring in montane-subalpine wet shrubland and wet meadow habitats, where they co-exist with beaver (New Mexico Department of Game and Fish, 2016).
Mountain Quail	beaver probably benefits	This species requires riparian cover in dry habitats (Marshall et al., 2006)(Csuti et al., 2001). Beavers are associated with an increase in riparian areas and vegetation (Rosell et al., 2005). In Idaho, beaver restoration and restoration is listed as an action item for several ecological benefits that support this species. These benefits include maintaining and protecting riverine and aquatic habitat, improving wetland habitat resiliency to changing hydrology and precipitation, stabilizing head cuts and raising water tables, and restoring and maintaining priority wetlands and riparian zones (Idaho Department of Fish and Game, 2017)(Idaho Department of Fish and Game, 2023). In Washington, this species lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change (Washington Department of Fish and Wildlife, 2015).
Northern Goshawk	beaver probably benefits	This species forages in forest mosaics with large trees, snags, and downed logs (Marshall et al., 2006). Beaver complexes create habitat heterogeneity by felling and flooding trees, creating ponds and meadows that form clearings in forests (Castro et al., 2017). In Wyoming, this species lives in aspen/deciduous forest habitats, where the loss of beaver has resulted in drought-like effects, and beaver reintroduction is an action item for restoration (Wyoming Game and Fish Department, 2017).
Northern Spotted Owl	beaver probably benefits	This species is typically found in old-growth forests, although it is also found in forests that have characteristics of old-growth forests. Loss of habitat is a major threat to this species. Current recovery plants for this species discuss the importance of things like wildfire that disrupt habitat because they improve habitat resilience; beavers are implicated in an increase in habitat heterogeneity and in forest disturbance via the flooding that they can cause (U.S. Fish and Wildlife Service, 2011a)(Castro et al., 2017). This species predates on small mammals and is often found nesting near streams (Csuti et al., 2001). Beavers are associated with an increase in small mammal populations (Fedyń et al., 2022)(Nummi et al., 2019). Beavers are also associated with increased water availability (Rosell et al., 2005). In the North Coast and Klamath provinces in California, this subspecies of spotted owls lives in north coastal and montane riparian forest and woodland habitats, where allowing beavers to persist for riparian habitat is a habitat objective (California Department of Fish and Wildlife, 2015). More generally, spotted owls live in American Southwest riparian forest and woodland habitats in the Bay Delta and Central Coast provinces in California, where beavers also occur (California Department of Fish and Wildlife, 2015).
Peregrine Falcon (American)	beaver probably benefits	Reduction in prey is listed as a threat to this species (Oregon Conservation Strategy). Peregrine falcons eat small birds, and beaver ponds are correlated with higher densities of waterfowl and other birds (Bradley & Oliphant, 1991)(Medin & Clary, 1999)(Rosell et al., 2005). In New Mexico, this species is listed as occurring in Rocky Mountain montane riparian forest habitats, where beavers also occur. New Mexico Department of Game and Fish, 2016). This species lives in upland prairies in the Willamette Valley, where beaver once thrived and are now making a comeback (Grossman, 2002). In the Bay Delta and Central Coast provinces in California, this species lives in the American Southwest riparian forest and woodland habitats, where beavers also occur (California Department of Fish and Wildlife, 2015). In the Bay Delta and Central Coast provinces in California, this species also lives in freshwater marshes, where beaver occur, and increasing the beaver population is a goal for this habitat type (California Department of Fish and Wildlife, 2015). In Washington, this species lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change. It is also found in temperate Pacific freshwater emergent marshes, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015).
Red-necked Grebe	beaver probably benefits	This species lives in lakes and ponds (Oregon Conservation Strategy). It is limited by water quality and eats fish and invertebrates (Marshall et al., 2006). Beaver dams are associated with improved water quality (Brazier et al., 2020). Beaver dams and pools are also associated with increased invertebrate density, and with supporting various species of fish (Rosell et al., 2005)(Hood, 2012).
Sagebrush Sparrow	beaver probably benefits	In Idaho, beaver restoration is listed as a strategy to improve landscape resilience for the benefit of this species (Idaho Department of Fish and Game, 2017). In New Mexico, this species is listed as occurring in Rocky Mountain montane riparian forest and montane-subalpine wet shrubland and wet meadow habitats, where beaver also occur. As such, they are known to co-exist with beaver (New Mexico Department of Game and Fish, 2016).

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Short-eared Owl	beaver probably benefits	Marshes are important habitats for this species (Csuti et al., 2001)(Marshall et al., 2006). Beavers are associated with an increase in wetlands (Batzer & Baldwin, 2012) (Bush & Wissinger, 2016)(Castro et al., 2017). In Idaho, beaver restoration is listed as a strategy for multiple ecological benefits that support this species. These include improving landscape resilience, improving wetland resilience to climate change, and restoring and maintaining priority wetlands and riparian zones (Idaho Department of Fish and Game, 2017)(Idaho Department of Fish and Game, 2023). In the North Coast, Klamath, South Coast, Bay Delta, and Central Coast provinces in California, this species lives in freshwater marshes, where integration of beaver ecology and increasing beaver population conservation strategies (California Department of Fish and Wildlife, 2015). This species also lives in American Southwest riparian forest and woodland habitats in the Bay Delta and Central Coast provinces in California, where beaver also occur (California Department of Fish and Wildlife, 2015). In Washington, this species lives in temperate Pacific freshwater emergent marshes, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015).
Snowy Egret	beaver probably benefits	This species nests in riparian areas and marshes, and forages in lakes, meadows, and marshes (Marshall et al., 2006). In Wyoming, this species is found in wetlands. Wyoming wetlands include beaver ponds, as well as other habitat features that beavers are known to maintain (Wyoming Game and Fish Department, 2017). Outside of Wyoming, beavers are associated with an increase in wetlands as well (Batzer & Baldwin, 2012)(Bush & Wissinger, 2016)(Castro et al., 2017).
Swainson's Hawk	beaver probably benefits	This species is listed as living in riparian areas in Wyoming, where beaver dam construction and success are positive factors contributing to habitat quality and size (Wyoming Game and Fish Department, 2017). Elsewhere, this species has been observed nesting in willows and using meadows. It preys on small mammals (Csuti et al., 2001). Beavers are associated with increases in riparian vegetation and meadows, as well as with increased populations of small mammals (Rosell et al., 2005)(Fedyń et al., 2022)(Nummi et al., 2019).
Upland Sandpiper	beaver probably benefits	This species nests in partly flooded meadows and grasslands, often with a small intermittent creek nearby. It eats insects and some plant material (Marshall et al., 2006) (Csuti et al., 2001). Beavers are associated with increases in riparian vegetation and meadows, as well as with increased populations of invertebrates (Rosell et al., 2005).
Western Bluebird	beaver probably benefits	This species is known to live in riparian forests, and nests in cavities made by species like woodpeckers (Marshall et al., 2006)(Washington Department of Fish and Wildlife, 2015)(Csuti et al., 2001). Beaver dams are associated with an increase in snags and deadwood, due to the flooding they cause, and many species of woodpecker benefit from this increase (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005). In New Mexico, this species is listed as occurring in Rocky Mountain montane riparian forest and montane-subalpine wet shrubland and wet meadow habitats, where beaver also occur (New Mexico Department of Game and Fish, 2016). In Oregon, this species lives in upland prairies in the Willamette Valley, where beaver once thrived and are now making a comeback. As such, this species can coexist with beaver (Grossman, 2002).
Western Meadowlark	beaver probably benefits	This species lives in upland prairies in the Willamette Valley, where beaver once thrived and are now making a comeback (Grossman, 2002). In Utah, this species has been observed living in riparian and depression wetland habitats, and areas without and with active beaver complexes (Noson & Hutto, 2005). As such, this species can coexist with beaver. This bird is described as living in a scrub-shrub habitat, in particular a habitat with high vegetative ground coverage, and eats insects (Marshall et al., 2006). Beavers are predicted to benefit some scrub-shrub birds (Chandler et al, 2008). They are also associated with an increase in vegetation, and with higher invertebrate populations (Rosell et al., 2005).
White-breasted Nuthatch (Slender-billed)	beaver probably benefits	This species is associated with cavities made by woodpeckers, or formed by decay in live or dead trees, which they use for nesting and roosting (Marshall et al., 2006). Beaver dams are associated with an increase in snags and deadwood, due to the flooding these cause. Many species of woodpecker benefit from this increase in snags, which could result in more habitat for this species (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005).
White-headed Woodpecker	beaver probably benefits	This species favors mature ponderosa pine woodlands (Oregon Conservation Strategy). Large and decaying snags are important habitat features, needed for nesting and foraging, for this species (Marshall et al., 2006)(Purcell & McGregor, 2021). Beaver dams are associated with an increase in snags and deadwood, due to the flooding these cause. Many other species of woodpecker benefit from this increase in snags (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005).
Yellow Rail	beaver probably benefits	Lives in freshwater marshes and wet meadows that often have sedges, willows, and often standing water up to a foot deep. Eats small invertebrates, like insects and mollusks, seeds, and some leafy green vegetation (Csuti et al., 2001). Beavers are associated with an increase in wetlands, where willow and sedges are often found (Batzer & Baldwin, 2012)(Bush & Wissinger, 2016)(Castro et al., 2017).
Yellow-breasted Chat	beaver probably benefits	This species occupies valley riparian areas and floodplain areas and eats terrestrial and aerial invertebrates (Marshall et al., 2006)(Grossman, 2002). Beavers are associated with an increase in wetlands, and an increase in invertebrate biomass (Batzer & Baldwin, 2012)(Bush & Wissinger, 2016)(Castro et al., 2017)(Rosell et al., 2005).
Great Basin Redband Trout	beaver probably benefits	In vegetated montane streams, the presence of this species has been positively related to the abundance of pools. In lowland desert streams, this species is associated with shaded reaches of streams with contain cooler stream temperatures. Water diversion and loss of riparian vegetation are listed as threats to this species. Beaver population enhancement is an action item to maintain healthy ecosystems and watersheds, specifically to preserve functional links between floodplains, side channels, riparian zones, and alluvial fans, for the benefit of this species. Beaver reintroduction is an action item to protect and restore the habitat for this species (Interior Redband Conservation Team, 2016). Beavers are associated with increased pools, late-season flows, and riparian vegetation (Rosell et al., 2005)(Castro et al., 2017).

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Lost River Sucker	beaver probably benefits	This species is threatened by poor water quality and lack of habitat connectivity, and the conservation of riparian areas and restoration of wetlands are listed as action items for the restoration of this species (Oregon Conservation Strategy)(U.S. Fish and Wildlife Services, 2013). Beavers are associated with an increase in riparian vegetation and wetlands, improved water quality, and better aquatic habitat connectivity (Rosell et al., 2005)(Castro et al., 2017)(Brazier et al., 2020). Beaver dam or beaver dam analog construction has been suggested as an important restoration feature in wildfire-affected stream regions where this species lives (Whitcomb, 2022).
Modoc Sucker	beaver probably benefits	Habitat for this species has been characterized as being in streams with low flow, large shallow pools with cover, soft sediments, and clear water (Williams, 1985). This species is threatened by habitat degradation through channelization, water diversions, and livestock grazing. Grazing activities lead to a reduction in riparian vegetation and increased erosion (U.S. Fish and Wildlife, 1984). The restoration plan for this species includes the goal of a habitat with excellent water quality, complex physical attributes, clean spawning substrates, foraging habitats, and hiding and thermal cover (Heck et al., 2008). Beavers are associated with increased water availability, water quality, stream complexity, sediment impoundment, and riparian vegetation (Rosell et al., 2005)(Castro et al., 2017).
Shortnose Sucker	beaver probably benefits	Conservation of riparian areas and restoration of wetlands are listed as action items for the restoration of this species (U.S. Fish and Wildlife Services, 2013). Beavers are associated with an increase in riparian vegetation and wetlands (Rosell et al., 2005). Beaver dam or beaver dam analog construction has been suggested as an important restoration feature in wildfire-affected stream regions where this species lives (Whitcomb, 2022).
Umpqua Chub	beaver probably benefits	This species needs an off-channel habitat that includes low flow, silty organic substrate, and abundant vegetation. It is threatened by wetland drainage and pollution (Oregon Department of Fish and Wildlife, 2021a). Beavers are associated with increased channel complexity, as well as low flow, sediment accumulation, and increased vegetation around and upstream of the dam. They are also associated with an increase in wetlands and improved water quality (Castro et al., 2017)(Rosell et al., 2005).
White Sturgeon	beaver probably benefits	This species lives in coastal, brackish, and even freshwater habitats. It eats lampreys (Bond et al., 1984). High fish densities of juvenile lamprey have been observed in low-tide estuarine beaver ponds (Hood, 2012). Riparian habitat and vegetation may be important for the spawning of this species, and their eggs and larvae are found in island complexes and side channels. This species prefers free-flowing stream stretches but has been known to inhabit stiller habitats. Pollution is detrimental to this species (Jones et al., 2011). Beavers are associated with increased channel complexity, increased formation of pools increased riparian vegetation, and improved water quality (Rosell et al., 2005)(Castro et al., 2017)(Brazier et al., 2020). In Idaho, beaver reintroduction is listed as an action item to restore and maintain priority aquatic habitat to benefit soil and water conservation, for the benefit of this species (Idaho Department of Fish and Game, 2023). In the Bay Delta and Central Coast provinces in California, this species lives in American Southwest riparian forest and woodland habitats, where beaver also occur (California Department of Fish and Wildlife, 2015).
Archimedes Springsnail	beaver probably benefits	Sedimentation and water quality are listed as threats to this species (Oregon Conservation Strategy)(Stone, 2009). Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020)(Błędzki et al., 2010). Reductions in water flow are also listed as a threat to this species. Lowering the water table and reduction of groundwater could threaten this species (Stone, 2009). Beaver dams are associated with increased water availability and late-season flows (Castro et al., 2017)(Rosell et al., 2005).
Beller's Ground Beetle	beaver probably benefits	This species lives in sphagnum bogs (Oregon Conservation Strategy). Along the Oregon coast, beavers maintain the early seral conditions required for Sphagnum vegetation, and in communities with pre-existing Sphagnum communities, beaver ponds result in little vegetation change (Christy, 2005)(Little et al., 2020).
Black Petaltail	beaver probably benefits	Black petaltails live in wet, boggy areas (Eaton & Kaufman, 2007). Beavers are associated with an increase in wet areas (Rosell et al., 2005)(Castro et al., 2017).
California Floater Freshwater Mussel	beaver probably benefits	Freshwater mussels have life cycles that are intricately tied to fish like salmonids. This particular genera of mussel is known to be tolerant of stiller waters, lower dissolved oxygen, and higher nutrient concentrations than other freshwater mussels (Mazzacano & Blackburn, 2015). Beaver pond complexes are known to support salmonid populations (Rosell et al., 2005)(Hood, 2012). Beaver dams are also associated with slower water flows and lower dissolved oxygen upstream of the dam due to water impoundment (Rosell et al., 2005).
Columbia Clubtail	beaver probably benefits	Wetland drainage is listed as a threat to this species (Oregon Conservation Strategy). Beavers help increase the water retained on the landscape; beaver ponds also often favor lentic macroinvertebrate communities, which include odonates like the Columbia Clubtail (Bush & Wissinger, 2016). In Washington, this species lives by slower-moving and muddy rivers and riparian woodland habitats, and the restoration of beavers to their historical range is an action item for the ecological system this species is associated with (Washington Department of Fish and Wildlife, 2015). Beaver dams slow the flow of water and trap sediment, resulting in slower flows and more sediment in their ponds (Rosell et al., 2005)(Brazier et al., 2020).
Columbia Gorge Caddisfly	beaver probably benefits	Adults of this species are found near the stream on understory vegetation and logs protruding from the stream or its margin; these could include beaver dams. Beaver dams are known to create habitat for some lotic aquatic invertebrates, including some caddisflies. This species is adversely affected by decreased water quality and water pollution (Hietala-Henschell et al., 2020)(Bush & Wissinger, 2016). Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020)(Błędzki et al., 2010). In Washington, the protection of riparian habitats is listed as an action item for this species (Washington Department of Fish and Wildlife, 2015). Beavers are associated with an increase in riparian habitat (Rosell et al., 2005)(Castro et al., 2017).
Columbia Gorge Hesperian	beaver probably benefits	This is a native terrestrial snail species, which means that water is essential for both their survival and reproduction (Burke, 2013). Beavers are associated with an increase in water (Rosell et al., 2005).

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Crater Lake Tightcoil	beaver probably benefits	This is a native terrestrial snail species, which means that water is essential for both their survival and reproduction. This species is also often found in riparian habitats (Burke, 2013)(Blackburn, 2017a)(Gowan et al., 2004). Beavers are associated with an increase in water and riparian habitats (Rosell et al., 2005).
Dall's Ramshorn	beaver probably benefits	Sedimentation and water quality are listed as threats to this species (Oregon Conservation Strategy)(Blackburn, 2017b). Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020)(Błędzki et al., 2010). Reductions in water flow are also listed as a threat for this species (Oregon Conservation Strategy)(Blackburn, 2017b). Beaver dams are associated with increased water availability and late-season flows (Castro et al., 2017)(Rosell et al., 2005).
Franklin's Bumble Bee	beaver probably benefits	This species is a pollinator. Beavers are associated with an increase in wetlands and meadows; restoration of riparian areas via beaver dams or mimicry is listed as a way to help Northwest pollinators (Mitchell et al., 2021)(Collins et al., 2019).
Great Basin Ramshorn	beaver probably benefits	Sedimentation and water quality are listed as threats to this species. Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020)(Błędzki et al., 2010). Reductions in water flow are also listed as a threat to this species. Beaver dams are associated with increased water availability and late-season flows (Castro et al., 2017)(Rosell et al., 2005).
Great Spangled Fritillary	beaver probably benefits	Violets, which are critical for this species, are listed as growing in streambanks and moist forests (Turner & Gustafson, 2006). Beavers are associated with moisture and stream health (Rosell et al., 2005)(Castro et al., 2017).
Highcap Lanx	beaver probably benefits	Sedimentation and water quality are listed as threats to this species (Oregon Conservation Strategy)(McMullen & Duncan, 2017). Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020)(Błędzki et al., 2010). Reductions in water flow are also listed as a threat to this species (Oregon Conservation Strategy)(McMullen & Duncan, 2017). Beaver dams are associated with increased water availability and late-season flows (Castro et al., 2017)(Rosell et al., 2005).
Insular Blue Butterfly	beaver probably benefits	This species is a pollinator and relies on clovers (Oregon Conservation Strategy). Clovers are listed as occurring in most ecosystems, according to the Forest Service. Some species are found commonly by riparian species like aspen (Coladonato, 1993). Beavers are associated with an increase in riparian areas, wetlands, and meadows; restoration of riparian areas via beaver dams or mimicry is listed as a way to help Northwest pollinators (Mitchell et al., 2021)(Collins et al., 2019)(Rosell et al., 2005) (Castro et al., 2017).
Klamath Ramshorn	beaver probably benefits	Sedimentation and water quality are listed as threats to this species (Oregon Conservation Strategy)(Blackburn & Duncan, 2019). Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020)(Błędzki et al., 2010). Reductions in water flow are also listed as a threat to this species. Beaver dams are associated with increased water availability and late-season flows (Castro et al., 2017)(Rosell et al., 2005).
Lined Ramshorn	beaver probably benefits	Sedimentation and water quality are listed as threats for this species (Oregon Conservation Strategy)(Blackburn, 2017c). Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020)(Błędzki et al., 2010). Reductions in water flow are also listed as a threat to this species. Beaver dams are associated with increased water availability and late-season flows (Castro et al., 2017)(Rosell et al., 2005).
Mardon Skipper Butterfly	beaver probably benefits	This species is a pollinator that lives in meadows, and meadow drying is listed as one of its limiting factors (Oregon Conservation Strategy). Beavers are associated with an increase in wetlands and meadows and restoration of riparian areas via beaver dams or mimicry is listed as a way to help Northwest pollinators (Mitchell et al., 2021) (Collins et al., 2019)(Rosell et al., 2005)(Castro et al., 2017).
Monarch Butterfly	beaver probably benefits	This species relies on milkweeds. Both milkweeds and monarch butterflies are described as being found near wetlands and riparian areas in Washington (Washington Department of Fish and Wildlife, 2015). In Idaho, beavers are listed as an action item to restore natural disturbance regimes, improve riverine and riparian habitat climate change resiliency, increase water storage capacity, improve stream water quality, increase riparian habitat, and restore and maintain priority wetlands and riparian zones for the benefit of this species (Idaho Department of Fish and Wildlife, 2017)(Idaho Department of Fish and Game, 2023).
Oregon Shoulderband	beaver probably benefits	This is a native terrestrial snail species, so water is essential for both the survival and reproduction of this species (Burke, 2013). Beavers are associated with an increase in water (Rosell et al., 2005).
Oregon Silverspot Butterfly	beaver probably benefits	This species relies on the early blue violet and western blue violet (Oregon Conservation Strategy). The early blue violet and western blue violet are described as growing in damp streambeds and meadows near trees, and at all elevations (Turner & Gustafson, 2006)(Bartow, 2014). Beavers are associated with meadows and moisture (Rosell et al., 2005)(Castro et al., 2017).
Pacific Walker	beaver probably benefits	This species lives in riparian areas, and is sensitive to polluted water, as well as reductions in groundwater (Oregon Conservation Strategy)(Blackburn et al., 2021a). Beavers are associated with an increase in riparian areas, improved water quality, and higher water tables (Brazier et al., 2020)(Błędzki et al., 2010)(Rosell et al., 2005).

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Purple-lipped Juga	beaver probably benefits	This species requires gravel-boulder riffles in cold, highly-oxygenated water (Oregon Conservation Strategy). In ecosystems where water is limited, beavers would benefit this species insofar as beavers increase late-stream flows. The water behind beaver dams sometimes has reduced oxygen levels, but the water downstream of dams has oxygen levels comparable to those in the rest of the stream. Beaver dams impound sediment upstream of the dam, which reduces sediment transport downstream of the dam (Błędzki et al., 2010)(Rosell et al., 2005). This species is vulnerable to nutrient enrichment in the water, and it is more tolerant of siltation and slack water than other species of Juga (Blevins et al., 2015). Beavers are associated with decreases in excess water-borne nutrients (Brazier et al., 2020)(Błędzki et al., 2010)(Rosell et al., 2005). Beaver dams do cause sedimentation and slow the flow of water behind dams, so this species' tolerance of those conditions could indicate that its habitat may not be disrupted by beaver presence (Castro et al., 2017)(Rosell et al., 2005). This species also sometimes affixes egg masses to sunken logs, which means that beaver dams could provide substrate for its egg-laying (Blevins & Jordan, 2015).
Robust Walker	beaver probably benefits	Water diversion and ditching of springs and seeps are listed as threats to this species, which are found in perennial seeps, rivulets, mud banks, and marsh seepages leading into shallow streams (Stone & Huff, 2010). Beaver dams are associated with increased water availability (Castro et al., 2017)(Rosell et al., 2005). This species is described as a 'riparian associate' (Hietala-Henschell, Foltz Jordan, et al., 2019). Beavers are associated with an increase in riparian habitat (Castro et al., 2017).
Rotund Lanx	beaver probably benefits	Poor water quality is listed as a threat to this species (Oregon Conservation Strategy). Beaver dams are associated with improved water quality (Brazier et al., 2020)(Błędzki et al., 2010)(Rosell et al., 2005).
Scale Lanx	beaver probably benefits	Sedimentation and water quality are listed as threats to this species (Oregon Conservation Strategy). Beaver dams are associated with improved water quality, with reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020)(Błędzki et al., 2010)(Rosell et al., 2005). Reductions in water flow are also listed as a threat to this species. Beaver dams are associated with increased water availability and late-season flows (Castro et al., 2017)(Rosell et al., 2005).
Scalloped Juga	beaver probably benefits	This species requires clean, cold, highly-oxygenated water. Sedimentation and water quality are listed as threats to this species (Oregon Conservation Strategy). Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load. Although oxygen levels upstream of dams sometimes have lower oxygen levels, oxygen levels downstream of dams are usually reflective of conditions elsewhere in un-impounded reaches of the stream (Brazier et al., 2020)(Błędzki et al., 2010)(Rosell et al., 2005). The effects of beaver dams on water temperature are complex. However, beaver dams are associated with increased connectivity with groundwater, which can result in upwellings of cool water downstream of complexes (Rosell et al., 2005)(Weber et al., 2017)(Bouwes et al., 2016). Reductions in water flow are also listed as a threat to this species. Beaver dams are associated with increased water availability and late-season flows (Castro et al., 2017)(Rosell et al., 2005).
Shortface Lanx	beaver probably benefits	This species requires clean, cold, highly-oxygenated water and stable, boulder-gravel substrates. Sedimentation and water quality are listed as threats to this species (Oregon Conservation Strategy)(Blackburn et al., 2020). Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load. Although oxygen levels upstream of dams sometimes have lower oxygen levels, oxygen levels downstream of dams are usually reflective of conditions elsewhere in un-impounded reaches of the stream (Brazier et al., 2020)(Błędzki et al., 2010)(Rosell et al., 2005). The effects of beaver dams on water temperature are complex. However, beaver dams are associated with increased connectivity with groundwater, which can result in upwellings of cool water downstream of complexes (Rosell et al., 2005)(Weber et al., 2017)(Bouwes et al., 2016). In Idaho, beaver reintroduction is listed as an action item to restore and maintain priority aquatic habitat for soil and water conservation, for the benefit of this species (Idaho Department of Fish and Game, 2023).
Sinitsin Ramshorn	beaver probably benefits	Sedimentation and water quality are listed as threats to this species (Oregon Conservation Strategy)(Blackburn, 2017d). Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020)(Błędzki et al., 2010). Reductions in water flow are also listed as a threat to this species. Beaver dams are associated with increased water availability and late-season flows (Castro et al., 2017)(Rosell et al., 2005).
Siskiyou Hesperian	beaver probably benefits	This species is found in marshy environments under woody debris, has been described as a 'riparian associate', and is found in areas with riparian vegetation like willows (Burke, 2013)(Blackburn et al., 2021b). Beaver dams are associated with an increase in water and wetland environments, snags and deadwood, and riparian vegetation (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005). Water quality and sedimentation are listed as threats to this species. Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020)(Błędzki et al., 2010).
A Stonefly (no common name)	beaver probably benefits	Beaver dams can create lotic habitat for aquatic invertebrates like stoneflies (Bush & Wissinger, 2016). This species is narrowly endemic to a small stretch of Willow Creek, near Eugene, which could make an overlap in distribution with beavers unlikely (Oregon Conservation Strategy). This Willow Creek runs through a native wet prairie in the Willamette Valley (Titus et al., 1996). Historically, beavers have been found in the wet prairies of the Willamette, and they are making a comeback in these habitats (Grossman, 2002). As such, beavers could be found living near where this species lives.

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Turban Pebblesnail	beaver probably benefits	Sedimentation and water quality are listed as threats to this species (Oregon Conservation Strategy)(Hietala-Henschell, Weisbaum, et al., 2019). Beaver dams are associated with improved water quality, reductions in dissolved nutrients like nitrogen and phosphorus, and reductions in downstream sediment load (Brazier et al., 2020) (Błędzki et al., 2010). Reductions in water flow are also listed as a threat to this species. Beaver dams are associated with increased water availability and late-season flows (Castro et al., 2017)(Rosell et al., 2005). This species seems to prefer habitats with particular vegetation, including aspen and willow (Hietala-Henschell, Weisbaum, et al., 2019). Beavers are associated with an increase in riparian vegetation species, including willow and aspen (Castro et al., 2017).
Western Bumble Bee	beaver probably benefits	In Idaho, beaver restoration and reintroduction is listed as an action item or a strategy to meet several ecological needs for this species, including increasing water storage to combat climate change, managing structure and composition diversity in forests, improving wetland resilience to climate change, maintaining priority riparian forest, and restoring and maintaining priority wetlands and riparian zones (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In Colorado, this species lives in riparian woodlands and shrublands habitats, where beavers are known to live and are important for the maintenance of the health of the ecosystem (Colorado Parks and Wildlife, 2015). This species is a northwest pollinator, so the restoration of riparian areas via beaver dams or mimicry could support it (Mitchell et al., 2021)(Collins et al., 2019).
Western Ridged Mussel	beaver probably benefits	Poor water quality is a threat for this species (Oregon Conservation Strategy). Beaver dams are associated with improved water quality and reductions in dissolved nutrients like nitrogen and phosphorus (Brazier et al., 2020), (Błędzki et al., 2010). In Idaho, beaver reintroduction is listed as an action item to restore and maintain priority aquatic habitat to benefit soil and water conservation, for the benefit of this species (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017).
Winged Floater Freshwater Mussel	beaver probably benefits	Freshwater mussels have life cycles that are intricately tied to fish like salmonids. This particular genera of mussel is known to be tolerant of stiller waters, lower dissolved oxygen, and higher nutrient concentrations than other freshwater mussels (Mazzacano & Blackburn, 2015). Beaver pond complexes are known to support salmonid populations (Rosell et al., 2005)(Hood, 2012). Beaver dams are also associated with slower water flows and lower dissolved oxygen upstream of the dam due to water impoundment (Rosell et al., 2005).
American Marten	beaver probably benefits	This species of marten is typically associated with mature forests with closed canopies but will use openings in forests if there are sufficient downed logs to provide cover (Csuti et al., 2001). Beaver complexes create habitat heterogeneity by felling and flooding trees, creating ponds and meadows that form clearings in forests (Castro et al., 2017). In Idaho, beaver reintroduction is listed as an action item for the restoration and maintenance of priority riparian forests for the benefit of this species (Idaho Department of Fish and Game, 2023). Some marten species also use snags, deadwood, and abandoned beaver lodges in beaver-altered habitats (Rosell et al., 2005). Martens have also been recorded as having higher activity levels in beaver-impacted areas, possibly as a result of higher small mammal prey abundance (Nummi et al., 2019).
California Myotis	beaver probably benefits	This species forages by clumps of trees and by open water (Csuti et al., 2001). High densities of bats are often observed at beaver pond complexes, as a result of the increased abundance of insects and easy access to water (Orazi et al., 2022)(Nummi et al, 2011).
Fringed Myotis	beaver probably benefits	This species uses large snags for roosts (Oregon Conservation Strategy). Beavers are shown to be associated with an increase in deadwood and snags as a result of the flooding their damming causes (Thompson et al., 2016)(Rosell et al., 2005). High densities of bats are often observed at beaver pond complexes, as a result of the increased abundance of insects, and easy access to water (Orazi et al., 2022)(Nummi et al, 2011). This species forages in riparian areas (Csuti et al., 2001)(Gervais, 2017a). Beavers are associated with an increase in riparian areas (Thompson et al., 2016)(Rosell et al., 2005). In Idaho, beaver reintroduction is an action item for several ecological benefits that support this species. These include restoring and maintaining priority riparian forests, wetlands, and riparian zones; and restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2023). In Wyoming, this species lives in several habitats. It lives in aspen/deciduous forest habitats, where the loss of beaver has been associated with drought-like effects, and beaver reintroduction is an action item for habitat restoration (Wyoming Game and Fish Department, 2017). This species also lives in wetlands in Wyoming, which include beaver ponds, and other habitat features that beavers maintain (Wyoming Game and Fish Department, 2017). This species also lives in riparian areas in Wyoming, where beaver dam construction and success increase habitat size and quality (Wyoming Game and Fish Department, 2017). In the North Coast and Klamath provinces in California, this species lives in north coastal and montane riparian forest and woodland habitats, where allowing beavers to persist in riparian habitat is an objective for habitat (California Department of Fish and Wildlife, 2015).

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Hoary Bat	beaver probably benefits	This species forages in riparian areas and eats aerial insects (Csuti et al., 2001). Beavers are associated with an increase in riparian areas (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005). High densities of bats are often observed at beaver pond complexes, as a result of the increased abundance of insects, and easy access to water (Orazi et al., 2022)(Nummi et al, 2011). In Idaho, beaver restoration is listed as an action item for several ecological benefits known to support this species. These include maintaining and protecting riverine and aquatic habitats; improving the resiliency of wetland habitats to changing hydrology and precipitation; stabilizing head cuts and raising water tables in springs, seeps, fens, and meadows; restoring stream geomorphology, water quality, and riparian habitat; increasing water storage to combat climate change; improve landscape resilience; managing forests for a diversity of structure and composition; improving the resiliency of riverine, riparian, and wetland ecosystem resilience to climate change; restoring and maintaining priority riparian forests, wetlands, and riparian zones; and restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In Washington, this species lives in Columbia Basin foothill riparian woodland and shrubland habitats, where the restoration of beavers to their historical range is an action item. This species also lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change. It lives in temperate Pacific freshwater emergent marshes as well, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015). In Colorado, this species lives in riparian woodlands and shrublands habitats, where beavers are known to live and are important for the maintenance of the health of the ecosystem (Colorado Parks and Wildlife, 2015).
Killer Whale	beaver probably benefits	This species lives in the ocean, where beavers are not found. As such, it is not expected to overlap in distribution with beavers. However, beaver presence has been associated with supporting fish populations in estuaries and coastal regions, which could provide food for orcas. Limited prey has been a limiting factor for this species in the Pacific Northwest (Goldfarb & Bascomb, 2019).
Long-legged Myotis	beaver probably benefits	This species requires large snags and hollow trees for roosting (Oregon Conservation Strategy). Beavers are associated with an increase in deadwood and snags as a result of the flooding their damming causes (Thompson et al., 2016)(Rosell et al., 2005). High densities of bats are often observed at beaver pond complexes, as a result of the increased abundance of insects, and easy access to water (Orazi et al., 2022)(Nummi et al, 2011). This species has been observed in riparian forests and eats aerial insects (Csuti et al., 2001). Beavers are associated with an increase in riparian vegetation (Rosell et al., 2005)(Casto et al., 2017). In Idaho, beaver reintroduction is an action item for several ecological benefits known to support this species. These include restoring and maintaining priority riparian forests, wetlands, and riparian zones; and restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2023). This species lives in several habitats in Wyoming. It lives in aspen/deciduous forest habitats, where the loss of beaver has been associated with drought-like effects, and beaver reintroduction is an action item for habitat restoration (Wyoming Game and Fish Department, 2017). This species also lives in wetlands in Wyoming, which include beaver ponds, and other habitat features that beavers maintain (Wyoming Game and Fish Department, 2017). This species also lives in riparian areas in Wyoming, where beaver dam construction and success increase habitat size and quality (Wyoming Game and Fish Department, 2017). In the North Coast and Klamath provinces in California, this species lives in north coastal and montane riparian forest and woodland habitats, where allowing beavers to persist is listed as an objective for this habitat (California Department of Fish and Wildlife, 2015).
Pallid Bat	beaver probably benefits	This species uses snags as day roosts eat insects, and associates with open-water sites within the landscape (Csuti et al., 2001)(Oregon Conservation Strategy). Beavers are shown to be associated with an increase in deadwood and snags as a result of the flooding that their damming causes (Thompson et al., 2016)(Rosell et al., 2005). High densities of bats are often observed at beaver pond complexes, as a result of the increased abundance of insects, and easy access to water (Orazi et al., 2022)(Nummi et al, 2011). This species forages in riparian areas (Gervais, 2016a). Beavers are associated with an increase in riparian areas (Thompson et al., 2016)(Rosell et al., 2005). In Idaho, beaver reintroduction is an action item for several ecological benefits that support this species. These include restoring and maintaining priority riparian forests, wetlands, and riparian zones; and restoring and maintaining priority aquatic habitat to benefit soil and water conservation (Idaho Department of Fish and Game, 2023). This species lives in several habitat types in Wyoming. It lives in aspen/deciduous forest habitats, where the loss of beaver has been associated with drought-like effects, and beaver reintroduction is an action item for habitat restoration (Wyoming Game and Fish Department, 2017). This species also lives in wetlands in Wyoming, which include beaver ponds, and other habitat features that beavers maintain (Wyoming Game and Fish Department, 2017). This species also lives in riparian areas, where beaver dam construction and success improve habitat size and quality (Wyoming Game and Fish Department, 2017).
Ringtail	beaver probably benefits	This species lives in American Southwest riparian forest and woodland habitats in the Bay Delta and Central Coast provinces in California, where beavers also occur (California Department of Fish and Wildlife, 2015). In other areas, this species is known to forage in riparian areas (Poglayen-Neuwall & Toweill, 1988; and Harrison, 2012; as cited in Beauvais et al.). Beavers are associated with an increase in riparian areas (Rosell et al., 2005)(Castro et al., 2017). Ringtails have a varied diet that is predominantly composed of plants, small mammals, and insects (Alexander et al., 1994). Beavers and beaver pond complexes are associated with increased densities of insects, as well as with supporting several plants and small mammal species (Rosell et al., 2005)(Fedyń et al., 2022)(Nummi et al., 2019).
Rocky Mountain Bighorn Sheep	beaver probably benefits	Bighorn sheep are limited by water supply and don't stray far from water (Lowery, 2013). In Idaho, beaver reintroduction is a climate adaptation strategy for increasing the water-holding capacity of landscapes for the benefit of this species (Idaho Department of Fish and Game, 2017). Beavers are associated with an increase in water availability (Castro et al., 2017)(Rosell et al., 2005).

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Sierra Nevada Red Fox	beaver probably benefits	This subspecies of the red fox is recorded as consuming rodents and other small rodents and with denning habitats comparable to their lower-elevation counterparts (Sierra Nevada Red Fox Conservation Advisory Team, 2022). Studies comparing fox abundance between beaver-modified areas versus areas lacking beaver found more red foxes at beaver sites, and red foxes are known to use beaver lodges as shelter in the winter (Rosell et al, 2005)(Gauvin et al, 2020). Beavers have been associated with an increase in small mammal populations (Fedyń et al., 2022)(Nummi et al., 2019).
Silver-haired Bat	beaver probably benefits	This species uses large snags and hollow trees to roost, forages over ponds and streams in the woods, and eats aerial insects (Oregon Conservation Strategy)(Csuti et al., 2001). Beavers are associated with an increase in ponds, deadwood, and snags as a result of the flooding that their damming causes (Castro et al., 2017)(Rosell et al., 2005)(Brazier et al., 2020)(Thompson et al., 2016). High densities of bats are often observed at beaver pond complexes, as a result of the increased abundance of insects, and easy access to water (Orazi et al., 2022)(Nummi et al, 2011). In Idaho, beaver restoration is listed as an action item for several ecological benefits known to support this species. These include maintaining and protecting riverine and aquatic habitats; improving the resiliency of wetland habitats to changing hydrology and precipitation; stabilizing head cuts and raising water tables in springs, seeps, fens, and meadows; restoring stream geomorphology, water quality, and riparian habitat; increasing water storage to combat the effects of climate change; improving landscape resilience; managing forests for a diversity of structure and composition; improving the resiliency of riverine, riparian, and wetland ecosystem resilience to climate change; restoring and maintaining priority riparian forests; restoring and maintaining priority wetlands and riparian zones; and restoring and maintaining priority aquatic habitat to benefit soil and water conservation (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). In Washington, this species lives in Columbia Basin foothill riparian woodland and shrubland habitats, where the restoration of beavers to their historical range is an action item. This species also lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change. It lives in temperate Pacific freshwater emergent marshes as well, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015)(Washington Department of Fish and Wildlife, 2015).
Spotted Bat	beaver probably benefits	This species roosts in trees adjacent to meadows at night, and forages on aerial insects in riparian areas (Oregon Conservation Strategy)(Csuti et al., 2001)(Gervais, 2016c). High densities of bats are often observed at beaver pond complexes, as a result of the increased abundance of insects, and easy access to water (Orazi et al., 2022) (Nummi et al, 2011). Beavers are associated with an increase in riparian areas (Thompson et al., 2016)(Rosell et al., 2005). In Idaho, beaver reintroduction is listed as an action item for several ecological benefits that support this species. These include restoring and maintaining priority riparian forests, wetlands, and riparian zones; and restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2023). This species lives in several habitat types in Wyoming. It lives in aspen/deciduous forest habitats, where the loss of beaver has been associated with drought-like effects, and beaver reintroduction is an action item for habitat restoration (Wyoming Game and Fish Department, 2017). This species also lives in wetlands in Wyoming, which include beaver ponds, and other habitat features that beavers maintain (Wyoming Game and Fish Department, 2017). This species also lives in riparian areas in Wyoming, where beaver dam construction and success increase habitat size and quality (Wyoming Game and Fish Department, 2017). In New Mexico, this species lives in Rocky Mountain montane riparian forest habitats and montane-subalpine wet shrubland and wet meadow habitats, where beavers also occur. As such, they are known to co-exist with beaver (New Mexico Department of Game and Fish, 2016).
Townsend's Big-eared Bat	beaver probably benefits	This species uses hollow trees for roosting (Oregon Conservation Strategy). Beavers are shown to be associated with an increase in deadwood and snags as a result of the flooding their damming causes (Thompson et al., 2016)(Rosell et al., 2005). This species eats aerial insects (Csuti et al., 2001). High densities of bats are often observed at beaver pond complexes, as a result of the increased abundance of insects, and easy access to water (Orazi et al., 2022)(Nummi et al, 2011). In Idaho, beaver restoration is listed as an action item for several ecological benefits that support this species. These include improving the resiliency of wetland habitats to changing hydrology and precipitation; stabilizing head cuts and raising water tables in springs, seeps, fens, and meadows; restoring stream geomorphology, water quality, and riparian habitat; increasing water storage to combat climate change; improving landscape resilience; restoring and maintaining priority riparian forests, wetlands, and riparian zones; restoring and maintaining priority aquatic habitat for soil and water conservation (Idaho Department of Fish and Game, 2023)(Idaho Department of Fish and Game, 2017). This species forages in riparian areas in Washington and Oregon (Gervais, 2017b)(Washington Department of Fish and Wildlife, 2015). In Washington, this species lives in Columbia Basin foothill riparian woodland and shrubland habitats, where the restoration of beavers to their historical range is an action item. This species also lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change. It lives in temperate Pacific freshwater emergent marshes as well, which beavers historically had a positive role in maintaining and creating (Washington Department of Fish and Wildlife, 2015). This species lives in multiple habitats in Wyoming. It lives in aspen/deciduous forest habitats, where the loss of beaver has been associated with drought-like effects, and beaver reintroduction is an action item for habitat restoration (Wyoming Game and Fish Department, 2017). This species also lives in wetlands in Wyoming, which include beaver ponds and other habitat features that beavers maintain (Wyoming Game and Fish Department, 2017). This species also lives in riparian areas in Wyoming, where beaver dam construction and success benefit habitat size and quality (Wyoming Game and Fish Department, 2017). In New Mexico, this species is listed as occurring in Rocky Mountain montane riparian forest and montane-subalpine wet shrubland and wet meadow habitats, where beavers also occur. As such, they are known to co-exist with beaver (New Mexico Department of Game and Fish, 2016). In the North Coast and Klamath provinces in California, this species lives in north coastal and montane riparian forest and woodland habitats, where allowing beavers to persist for riparian habitat is an objective (California Department of Fish and Wildlife, 2015). Beavers are associated with an increase in riparian areas (Thompson et al., 2016)(Rosell et al., 2005).

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Western Gray Squirrel	beaver probably benefits	This species is described as being present in riparian habitats and eating tree matter, fruit, berries, green vegetation, and insects (Csuti et al., 2001). Beavers are associated with an increase in riparian habitat, vegetation, and insects (Rosell et al., 2005). In Washington, this species lives in Northern Rocky Mountain lower montane riparian woodland and shrubland habitats, where beaver activity is an important driver of hydrological change (Washington Department of Fish and Wildlife, 2015).
White-tailed Jackrabbit	beaver probably benefits	This species is found in open regions like sagebrush deserts and grasslands, as well as open areas in coniferous forests and alpine meadows. It feeds on grasses and forbs in spring and summer, and on leaves and stems of woody plants in winter (Csuti et al., 2001). In Montana, this species is commonly associated with several types of riparian habitat (Foresman, 2012; Hart et al., 1998; as cited by Webmaster). Beavers are associated with an increase in riparian habitat, habitat heterogeneity, meadow habitat, and vegetation (Rosell et al., 2005).
Boggs Lake Hedge Hyssop	beaver probably benefits	This species grows in vernal pools, marshy regions on the margins of reservoirs and lakes, and seasonal wetlands (Meinke, 1982). Beavers are associated with an increase in wetlands (Rosell et al., 2005).
Bradshaw's Desert Parsley	beaver probably benefits	This species lives in wetlands in the Willamette Valley, and is restricted to wet prairies elsewhere (Grossman, 2002)(U.S. Fish and Wildlife Service, 2010). Beavers are associated with an increase in wetlands (Rosell et al., 2005)(Castro et al., 2017). This species is found in the West Eugene Wetlands, where beavers are also found. As such, it is known to coexist with beavers (Esterson, 2018)(Andrus & Walsh, 2002).
Howellia	beaver probably benefits	This species is typically found at the shaded edges of vernal pools (Oregon Conservation Strategy). In Idaho, beaver reintroduction is an action item for the restoration and maintenance of priority wetlands and riparian zones for the benefit of this species (Idaho Department of Fish and Game, 2023).
Large-flowered Rush Lily	beaver probably benefits	This species lives in bogs, moist, open meadows, seeps, and wetland areas (Oregon Conservation Strategy). The presence of beavers is associated with increased water tables, more water availability, more wetland habitat, and more meadow habitat (Rosell et al., 2005)(Brazier et al., 2020).
Native Eelgrass	beaver probably benefits	Excess nutrient load and eutrophication are some of the leading causes of habitat loss for this species (Beheshti and Ward, 2021). Beaver complexes are associated with decreased nutrient load and better water quality downstream of where dams are, and have been implicated in improving estuarine water quality in other estuaries (Blankenship, 2022)(Brazier et al., 2020).
Nelson's Checkermallow	beaver probably benefits	This species is found in wetlands and upland prairies in the Willamette Valley. Elsewhere, this species is found in wet prairies and along streams (U.S. Fish and Wildlife Service, 2010). Beavers are associated with an increase in wetlands and meadows (Rosell et al., 2005). They also once thrived in the upland prairies of the Willamette and are now making a comeback, indicating that this species can coexist with beaver (Grossman, 2002).
Oregon Semaphore Grass	beaver probably benefits	This species is found in moist meadows and marshland (Oregon Conservation Strategy). Beavers are associated with increased wetlands and water availability (Rosell et al., 2005).
Peacock Larkspur	beaver probably benefits	This species is found in wet prairies (U.S. Fish and Wildlife Service, 2010). Beavers are associated with increased water availability (Rosell et al., 2005).
Western Lily	beaver probably benefits	This species is found in bogs and is threatened by the draining and filling of bogs (Oregon Conservation Strategy). The presence of beavers is associated with an increase in wetland and meadow habitat (Brazier et al., 2020)(Rosell et al., 2005).
California Mountain Kingsnake	beaver probably benefits	This species is found in dry coniferous forests, where allowing natural beaver activity has been suggested as a management-friendly option to help protect amphibian and reptile habitats (Pilliod & Wind, 2008). In California, this species lives in Rocky Mountain montane riparian forest habitats, where they co-exist with beaver (New Mexico Department of Game and Fish, 2016). Elsewhere, this species is known to live in moist, riparian areas (Stewart et al., 2005). Beavers are associated with an increase in riparian areas (Rosell et al., 2005)(Brazier et al., 2020).
Northern Sagebrush Lizard	beaver probably benefits	This species is found in sagebrush habitats, chaparral, juniper woodlands, river bottoms, and coniferous forests. They need open ground near ground cover. They eat a variety of small invertebrates, including crickets, beetles, flies, ants, wasps, bees, mites, ticks, and spiders (Csuti et al., 2001). Beavers are associated with an increase in insect populations (Rosell et al., 2005)(Brazier et al., 2020). In the Northwest, this species lives in grasslands, sagebrush steppe/desert shrublands, and dry coniferous forests. For dry coniferous forests and sagebrush steppe/desert shrublands, allowing natural beaver activity has been suggested as a management-friendly option to protect amphibian and reptile habitats. For grasslands, allowing natural beaver activity is suggested as an ideal option when protecting amphibian and reptile habitats (Pilliod & Wind, 2008).
Western Rattlesnake	beaver probably benefits	This species is associated with dry, open habitats, and a diet that includes small mammals, birds, amphibians, and reptiles (St. John, 2021). Beavers are associated with an increase in small mammal, bird, and amphibian populations (Fedyń et al., 2022)(Nummi et al., 2019)(Albert & Trimble, 2000)(Medin & Clary, 1999)(Vehkaoja & Nummi, 2015). In the Northwest, this species lives in dry coniferous forests, mixed coniferous and deciduous forests, sagebrush steppe/desert shrublands, and grasslands. For dry coniferous forests and sagebrush steppe/desert shrublands, allowing natural beaver activity has been suggested as a management-friendly option to protect amphibian and reptile habitats. For mixed coniferous and deciduous forests and grasslands, allowing natural beaver activity is suggested as an ideal option for protecting amphibian and reptile habitats (Pilliod & Wind, 2008). This species lives in upland prairies in the Willamette Valley, where beavers once thrived and are now making a comeback. As such, this species can coexist with beaver (Grossman, 2002).

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Larch Mountain Salamander	data deficient	This species is rarely found in wet areas and does not require standing water or streams for any of its life history (Csuti et al., 2001)(Crisafulli et al., 2008). This species inhabits a diverse array of terrestrial habitats, including snags and down logs, but requires cool and moist microhabitats wherever it is (Crisafulli et al., 2008). Beaver dams are associated with moisture, wetlands, and an increase in snags and deadwood (Orazi et al., 2022)(Windels, 2017)(Rosell et al., 2005). While this species may benefit from the snags beaver dams create, it may not benefit from the increase in water on the landscape.
Western Snowy Plover	data deficient	This species lives on the coast. Driftwood is an important part of their habitat, and a reduction in driftwood may pose a threat to this species, although too much driftwood may make nesting difficult. The impoundment of creeks and rivers may negatively affect habitat by reducing sand delivery to beaches. Ponds with shallow water are important foraging habitat for this species. Nesting birds can be attracted to an area when ponds are drained during the breeding season, but flooding can destroy them when the ponds are refilled (U.S. Fish and Wildlife Service, 2007b). Estuarine beavers could introduce more woody substrate to coastal areas via dam construction. These dams may also impound sand and reduce its delivery to coastal areas (Hood, 2012). Beavers are associated with the formation of ponds, which could provide foraging habitats for this species (Rosell et al., 2005). However, the formation of more permanent ponds may also lead to the flooding of nesting areas. As such, more data is needed to characterize how beavers would affect this species.
Sisters Hesperian	data deficient	Very little is understood about this species. It is limited in distribution (Oregon Conservation Strategy). The lack of description of habitat and diet makes it difficult to ascertain whether or not it would overlap with or benefit from beavers.
Taylor’s Checkerspot Butterfly	data deficient	This species is found in prairies, meadows, coastal bluffs, estuaries, coastal beach deposits in the lowlands, as well as high-elevation montane meadows and forest clearings (Jordan, 2012). The larvae need relatively dry, warm sites (U.S. Fish and Wildlife Service, 2022). The habitat requirements for this species generally include sufficient plants and nectar for food (U.S. Fish and Wildlife Service, 2010). This species has been observed nectaring on a wide array of plant species, including both those that grow and thrive in moist locations and those that grow and thrive in dry locations (Stevens et al., 2000)(Schalau, 2016)(Voss, 1985, as cited in Jaunzems)(Larsen, 2020)(Jordan, 2012). They are dependent on Plantago lanceolata, a plant species that can grow in a diverse array of conditions, including wet conditions (Stewart, 1996). Drought and subsequent loss of food for larvae have been implicated as a threat to this species. Adult nectar sources are also critical for their survival (Jordan, 2012). Beavers are associated with an increase in wetlands and meadows; restoration of riparian areas via beaver dams or mimicry is listed as a way to help Northwest pollinators (Mitchell et al., 2021)(Collins et al., 2019). However, if dry sites are important for larvae, the presence of wetlands, which are associated with beaver populations, may disrupt this species (Rosell et al., 2005).
Vernal Pool Fairy Shrimp	data deficient	Although this species requires water, the introduction of too much water can be detrimental. The timing, length, and frequency of inundation are critical to the survival of individuals of this species; the presence of too much water may introduce predators into their environment and pose a risk to their survival (U.S. Fish and Wildlife Service, 2012b)(U.S. Fish and Wildlife Service, 2005). As such, there is limited data regarding how increasing water availability may affect this species.
Washington Ground Squirrel	data deficient	This species is found in arid deserts and grasslands. It is most frequently found in sagebrush or grasslands associated with riverbanks, hillsides, or ravines. It eats forbs, grasses, flowers, bulbs, roots, seeds, seed pods, and insects (Csuti et al., 2001). While this species feeds on vegetation and animals that would be present in beaver-influenced areas, it is found in dry areas, where a beaver may disrupt the plant species composition (Rosell et al., 2005).
Arrow-leaf Thelypody	data deficient	This species is often found with western junipers along streambanks, seasonally moist areas, seeps, and under isolated juniper trees away from obvious moisture (Oregon Conservation Strategy). Beavers are associated with increases in late-season flows and water availability (Rosell et al., 2005). Some junipers don't do well in moist soils, which indicates that this species is likely to grow in soils that are not moist (Dirr, 1990; and Whitcomb, 1984; as cited in Westerfield, 2022). However, some of the highest-quality populations observed in east-central Oregon in 2009 are by springs and wetlands (Meinke et al., 2011). As such, there is limited data concerning how beaver presence would affect this species.
Big-flowered Wooly Meadowfoam	data deficient	This species is typically associated with vernal pools, and it generally occurs near the wetter, inner edges of pools, and not the drier outer fringes (U.S. Fish and Wildlife Service, 2005). Beavers are associated with an increase in water (Rosell et al., 2005). It is possible that increased access to water could be detrimental to its survival, as seasonality is an important feature of vernal pools. There is limited data regarding to what extent that applies to this species, given that it grows in the wettest regions of vernal pools.
Cook's Desert Parsley	data deficient	This species grows in vernal pools. While water availability is important to this species, it is also possible that increased access to water could be detrimental to its survival, as seasonality is an important feature of vernal pools (U.S. Fish and Wildlife Service, 2005).
Cronquist's Stickseed	data deficient	This species is found growing in habitats with a variety of moisture regimes, primarily on sandy sagebrush slopes and moist slopes of ravines (Oregon Conservation Strategy). As such, there is limited data regarding how increased water availability or exposure to moisture would affect its distribution.
Crosby's Buckwheat	data deficient	This species grows on light-colored, tuffaceous sandstone on valley bottoms, foothills, and mountaintops (Meinke, 1982). Its habitat description does not indicate moisture requirements, and, as such, there is limited data regarding how beavers would affect this species.
Davis' Peppergrass	data deficient	This species grows in playas that are frequently inundated in the early season by standing water, and then dry to a concrete-like substrate by early summer. This species undergoes extreme temperature and moisture fluctuations (Meinke, 1982). Given that fluctuation in moisture is important, there is limited data regarding how the presence of beaver, which could lead to more sustained access to water, would affect this species.

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Dwarf Meadowfoam	data deficient	This species grows in vernal pools. While water availability is important to this species, it is also possible that increased access to water could be detrimental to its survival, as seasonality is an important feature of vernal pools (U.S. Fish and Wildlife Service, 2012b).
Gentner's Fritillary	data deficient	This species is often found in grassland and chaparral habitats; although found in areas like the edges of dry woodlands, it is not found in extremely dry sites. It is listed as occurring in meadows and riparian habitats, although these habitats only account for 17% of where it was found (U.S. Fish and Wildlife Service, 2003a). The presence of beaver is associated with an increase in riparian, wetland, and meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). While this plant is found in some of these habitats, it seems to favor other habitats, and therefore there is limited data regarding how beaver presence would affect this species.
Golden Paintbrush	data deficient	This species is found in meadows (Turner & Gustafson, 2006). Although some recent planting projects indicate that this species grows poorly in wetlands, historical evidence indicates that this species once thrived in both moist and well-drained sites. Soils in areas with high water tables generally are not considered as having well-drained soils, as water pools and does not percolate through, and the presence of beavers is associated with increased water tables (Schulte et al., 2005)(Rosell et al., 2005)(Brazier et al., 2020). As such, there is limited data regarding what the growing conditions for this species are, and how increased water availability would affect this species (Kaye et al., 2012)(Lawrence & Kaye, 2006).
Greenman's Desert Parsley	data deficient	This species is limited in its distribution (Oregon Conservation Strategy). As such, there is limited data regarding whether beavers would overlap in distribution with this species. It is found on moist subalpine ridges and rock summits (Meinke, 1982). If moisture is important for this species, then beavers could support this species. However, there is limited data regarding the moisture requirements for this species.
Howell's Mariposa Lily	data deficient	This species is found in the Siskiyou Mountains in dry open forests on rocky serpentine soils (Turner & Gustafson, 2006). This species has also been observed in seasonally wet sites, and the drying of soils may be associated with the mortality of this species (Brown et al., 2012). The presence of beavers is associated with increased water tables, more water availability, more wetland habitat, and more meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives in dry forests, but also seasonally wet areas, and soil drying may create adverse conditions for this species, there is limited data regarding how beaver presence may affect this species.
Howell's Microseris	data deficient	This species grows in vernal pools. While water availability is important to this species, it is also possible that increased access to water could be detrimental to its survival, as seasonality is an important feature of vernal pools (U.S. Fish and Wildlife Service, 2012b).
Howell's Spectacular Thelypody	data deficient	This species is found in low-elevation river valleys and moist, alkaline plains (Oregon Conservation Strategy). Beaver presence is associated with increased availability of water and the elevation of the water table (Brazier et al., 2020). Although the effects of beavers on the pH is of water variable and contested, there is evidence of beavers being present at and maintaining historically alkaline wetlands (Sivinski & Tonne, 2011)(Wolkis, 2016). The presence of beaver is associated with an increase in riparian, wetland, and meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). However, if moisture is high year-round, this plant may be outcompeted by sedges, rushes, and other vegetation (U.S. Fish and Wildlife Service, 2002). As such, there is limited data regarding how beaver presence would affect this species.
McDonald's Rockcress	data deficient	This species grows only on soils derived from ultramafic parent material, containing high levels of heavy metals and low levels of nutrients (U.S. Fish and Wildlife Service, 2019d). Given that beavers are not known to change the soil composition of terrestrial habitats, and other limiting factors for this species were not described, there is limited data regarding whether beavers would affect the distribution of this species.
Mulford's Milkvetch	data deficient	This species grows in shrub-steppe and desert shrub communities on sandy areas along rivers, old river deposits, sandy bluffs, and dune-like talus (Oregon Conservation Strategy). There is limited data regarding how increased moisture would affect this species, given that they grow in the desert yet also close to water. Beavers do not seem to address any of the other limiting factors for this species.
Owyhee Clover	data deficient	This species grows on barren slopes (Oregon Conservation Strategy). There is limited data regrading what the moisture requirements for this species are, and therefore limited data regarding how beaver would affect this species.
Peck's Milkvetch	data deficient	This species grows in open habitats and may be associated with pine, juniper, or bitterbrush communities (Oregon Conservation Strategy). There is limited data regarding what the moisture requirements for this species are.
Pumice Grape-fern	data deficient	This species grows in areas of alpine scree, lodgepole pine, or antelope bitterbrush frost pockets (Oregon Conservation Strategy). It is found on open, flat, high-elevation ridgetops and gently rolling slopes, and it emerges in years when conditions are sufficiently moist. If moisture is a limiting factor for this species, then beavers could improve growing conditions for this species. However, there is limited data regarding whether moisture is a limiting factor.
Rough Popcornflower	data deficient	This species is found in vernal pools and requires water from fall until spring. There is limited data regarding how year-round water would affect this species (U.S. Fish and Wildlife Service, 2003b).
Spalding's Campion	data deficient	This species is found in open, moist bunchgrass grassland communities, as well as other habitat types. It is found on north-facing slopes where soil moisture is higher (U.S. Fish and Wildlife Service, 2007a). The presence of beavers is associated with increased water tables, more water availability, more wetland habitat, and more meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). If this species does well in areas with increased soil moisture, it may benefit from the presence of beaver. However, there is limited data regarding whether extensively increased moisture may have detrimental effects on this species.

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White Rock Larkspur	data deficient	This species grows in well-drained soils in a variety of habitats, including along rivers (Oregon Conservation Strategy). Soils in areas with high water tables generally are not considered as having well-drained soils, as water pools and does not percolate through, and the presence of beavers is associated with increased water tables (Schulte et al., 2005)(Brazier et al., 2020). As such, there is limited data regarding how increased water availability or exposure to moisture would affect its distribution.
Southern Torrent Salamander	neutral	This species inhabits cold mountain streams, spring heads, and seeps. They prefer loose gravel stream beds and are often associated with high-gradient streams.e (Oregon Conservation Strategy).
Blue Rockfish	neutral	This species normally occurs in water between 3 to 92 m deep in the ocean (Bond et al., 1984). Beavers are not found in this habitat.
Borax Lake Chub	neutral	Borax Lake is a unique ecosystem; there does not seem to be documentation of beavers living in proximity to geothermal springs (Furnish et al., 2002).
Canary Rockfish	neutral	This species normally occurs deep in the ocean (Somerton & Murray, 1976). Beavers are not found in this habitat.
China Rockfish	neutral	This species normally occurs deep in the ocean (Somerton & Murray, 1976). Beavers are not found in this habitat.
Deacon Rockfish	neutral	This species is found in coastal waters over rocky bottoms (Rasmuson et al., 2021). Beavers are not known to be found in this habitat.
Tiger Rockfish	neutral	This species normally occurs deep in the ocean (Somerton & Murray, 1976). Beavers are not found in this habitat.
Wolf-eel	neutral	This species is associated with rocky habitats in the ocean (Oregon Conservation Strategy). Beavers are not found in this habitat.
Yelloweye Rockfish	neutral	This species normally occurs deep in the ocean (Somerton & Murray, 1976). Beavers are not found in this habitat.
Borax Lake Ramshorn	neutral	This species only lives in Borax Lake (Hietala-Henschell & Blevins, 2017). Borax Lake is a unique ecosystem; there does not seem to be documentation of beavers living in proximity to geothermal springs (Furnish et al., 2002).
California Mussel	neutral	This species is found only in rocky intertidal and shallow subtidal habitat (Oregon Conservation Strategy). Beavers are not known to inhabit these areas. As such, their distribution is not expected to overlap.
Flat Abalone	neutral	This species lives in rocky intertidal areas; although beavers are found in estuaries, they are not typically found closer to the ocean, much less in rocky tidal zones (Oregon Conservation Strategy).
Leona's Little Blue Butterfly	neutral	This species occurs in only one known location globally, which is six square miles of ash-pumice habitat with spurry buckwheat southeast of Crater Lake (Oregon Conservation Strategy). Given its limited distribution, it is unlikely that beavers would overlap with it.
Purple Sea Urchin	neutral	This species lives in rocky intertidal areas; although beavers are found in estuaries, they are not typically found closer to the ocean, much less in rocky tidal zones (Oregon Conservation Strategy).
Razor Clam	neutral	This species lives on sandy beaches and in shallow, sandy subtidal areas. Beavers are not known to be found in this habitat (Oregon Conservation Strategy).
Red Abalone	neutral	This species lives in rocky intertidal areas; although beavers are found in estuaries, they are not typically found closer to the ocean, much less in rocky tidal zones (Oregon Conservation Strategy).
Red Sea Urchin	neutral	This species lives in rocky intertidal areas; although beavers are found in estuaries, they are not typically found closer to the ocean, much less in rocky tidal zones (Oregon Conservation Strategy).
Rock Scallop	neutral	This coastal species requires rocky substrates (Oregon Conservation Strategy). Beavers are not known to be found in this habitat.
Gray Whale	neutral	This species lives in the open ocean and eats invertebrates living on and above the sea floor, such as amphipods (Pauly, 1998). Their distribution is unlikely to overlap with that of beaver, and there are no sources linking beaver to any of their prey items.
Coast Range Fawn Lily	neutral	This species grows in a wide variety of habitats including open meadows, brushland, rocky cliffs, open to closed coniferous forests, and the edges of sphagnum bogs (Oregon Conservation Strategy). Beavers are associated with an increase in meadows, maintain early seral conditions required for Sphagnum vegetation, and do not seem to affect pre-existing Sphagnum communities, but are not associated with the other habitat types this species is found in (Rosell et al., 2005)(Christy, 2005)(Little et al., 2020). Given this, it seems as though they can tolerate a wide array of hydrological conditions, and therefore beaver presence may not be expected to greatly enhance or worsen growing conditions for this species.
Cusick's Lupine	neutral	This species is found on eroding hillsides of volcanic ash. It is extremely limited in its distribution, being found at only 5 locations in the Blue Mountain foothills (Oregon Conservation Strategy). Given this, it is unlikely that the distribution of this species would overlap with that of beavers.

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Malheur Valley Fiddleneck	neutral	This species is only found in a range of 30 square km, or 16 square miles (Oregon Conservation Strategy)(Meinke, 2011). Given this limited distribution, there is limited data regarding whether its distribution would overlap with that of beavers. This species grows on tufaceous hillsides, often near exposed rock summits (Meinke, 1982). The sites where this species grows are described as lacking water and forage and being on unstable steep slopes (Meinke, 2011). It is unlikely that beavers would overlap with the distribution of this species.
Malheur Wire-lettuce	neutral	This species grows in only one known location in Oregon, which is restricted to a single hilltop, and is dominated by big sagebrush and cheatgrass (Parenti, 1991). It is unlikely that beavers would overlap with the distribution of this species.
Packard's Mentzelia	neutral	This species is found only in five locations, all occurring along one gulch, Leslie Gulch, and its side canyons. Leslie Gulch is in east-central Malheur County, Oregon, near the Idaho border (Flora of North America Editorial Committee, 2016, as cited in Greene & Joyal, 2021). Given this, it is unlikely that beavers and this species would overlap.
Pink Sandverbena	neutral	This species grows along the coast, in regions of active sand movement (EcoWest Consulting, Inc., 2008). Beavers are not expected to overlap with the distribution of this species.
Sea Palm	neutral	This species grows on highly exposed, rocky intertidal shores (Oregon Conservation Strategy). Beavers are not found in this habitat, and therefore their distributions are not expected to overlap.
Sexton Mountain Mariposa Lily	neutral	This species is found only at Sexton Mountain (Meinke, 1982). Given this, it is unlikely that beaver and this species would overlap in distribution.
Shiny-fruited Allocarya	neutral	The species is found in one location (Meinke, 1982). Given this, it is unlikely that beaver and this species would overlap in distribution.
Silvery Phacelia	neutral	This species grows on sand dunes, bluffs, and the bases of coastal headlands (Oregon Conservation Strategy). Beavers are not found in this habitat, and therefore their distributions are not expected to overlap.
Surf Grass	neutral	This species grows on rocky intertidal shores (Oregon Conservation Strategy). Beavers are not found in this habitat, and therefore their distributions are not expected to overlap.
Cascade Torrent Salamander	neutral/possible	This species requires continuous access to cold water, is sensitive to sedimentation, and eats aquatic and semi-aquatic invertebrates (Csuti et al., 2001). Beaver dam complexes are associated with elevated water tables and higher late-season flows in areas where streams decrease in flow or dry up (Dietland Müller-Schwarze, 2011) (Castro et al., 2017). The effects of beaver dams on water temperature are complex. However, beaver dams are associated with increased connectivity with groundwater, which can result in upwellings of cool water downstream of complexes (Rosell et al., 2005)(Weber et al., 2017)(Bouwes et al., 2016). Beaver dams trap sediment behind them, leading to a reduced sediment load downstream of the dam (Rosell et al., 2005)(Puttock et al., 2017)(Grudzinski et al., 2022)(Castro et al., 2017). Beavers are associated with increased populations of both aquatic and terrestrial invertebrates (Rosell et al., 2005)(Brazier et al., 2020). Some of the management considerations for this species include retaining riparian buffers for stream shading, and large wood recruitment (Howell and Maggiulli, 2011). Beavers are associated with an increase in riparian areas and vegetation, as well as with an increase in large woody substrates in and around their complexes (Rosell et al., 2005)(Castro et al., 2017).
Siskiyou Mountains Salamander	neutral/possible	This species is observed in and around rocks and logs in densely wooded areas and eats invertebrates (Csuti et al., 2001). Beavers are associated with increased invertebrate populations, although there is no data as to whether the distribution of this species and that of beavers overlaps (Rosell et al., 2005).
Black Brant	neutral/possible	This species is observed as living in bays and along the coast (Oregon Conservation Strategy). Its diet is composed of eelgrass and sea lettuce, and is highly specialized (Marshall et al., 2006). It is unlikely that its distribution overlaps with that of beavers. However, it is possible that beavers could improve growing conditions for their food sources, as they have been associated with improving estuarine water quality (Blankenship, 2022).
Black Oystercatcher	neutral/possible	This species nests above the high-water mark on the coast, and eats intertidal invertebrates (Marshall et al., 2006). Beavers are unlikely to overlap in species distribution. The effect of beavers on intertidal invertebrates is not well-characterized, and there is limited data as to whether the positive effects on estuarine invertebrates and fish would positively affect intertidal ecosystems by providing more food resources or not.
Brewer's Sparrow	neutral/possible	This species utilizes a variety of shrub habitats, principally sagebrush, over a wide elevation range. It eats insects and seeds (Marshall et al., 2006). Beavers are associated with an increase in invertebrate populations, and are predicted to benefit some scrub-shrub birds (Rosell et al., 2005)(Chandler et al, 2008). In Utah, this species has been observed living in riparian areas (Noson and Hutto, 2005). Beavers are associated with an increase in riparian area (Rosell et al., 2005)(Castro et al., 2017). This species has been observed living in areas without, areas with inactive, and areas with active beaver complexes in Utah, although it is observed more frequently in wetland areas without beaver compared to those with beaver (Noson and Hutto, 2005). As such, it can coexist with beaver.

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Chipping Sparrow	neutral/possible	This species prefers forests with open spaces and clearings during the breeding season and eats insects (Marshall et al., 2006)(Csuti et al., 2001). Beavers are associated with increased habitat heterogeneity, as well as with increased invertebrate populations (Castro et al., 2017)(Rosell et al., 2005). This species has been observed living in areas without, areas with inactive, and areas with active beaver complexes, although it is observed more frequently in wetland areas without beaver compared to those with beaver (Noson & Hutto, 2005).
Fork-tailed Storm-Petrel	neutral/possible	This species forages over the ocean and nests on offshore islands (Csuti et al., 2001). While this species does not overlap in habitat with beavers, given that estuarine beavers are associated with increased populations of some estuarine fish, it is possible that this could support the diet of this species (Hood, 2012).
Juniper Titmouse	neutral/possible	This species is highly reliant on junipers for habitat and food (Marshall et al., 2006). Specifically, this species is a juniper and piñon-juniper woodland obligate across much of its distribution (Cicero, 2000; and Gillihan, 2006; as cited in Hubbard et al.). Juniper and piñon forests are found in the cooler, wetter regions of semiarid areas, but are also typically found on drier soils (Muldavin & Triepke, 2019). In Nevada, this species is often found in riparian areas adjacent to juniper and piñon woodlands, and sometimes nests in riparian vegetation (Bureau of Land Management). Beavers are associated with an increase in riparian vegetation (Rosell et al., 2005). In New Mexico, this species is listed as occurring in Rocky Mountain montane riparian forest habitats, where beavers also occur. As such, they are known to co-exist with beaver (New Mexico Department of Game and Fish, 2016).
Leach's Storm-Petrel	neutral/possible	This species forages over the ocean and nests on offshore islands (Csuti et al., 2001). While this species does not overlap in habitat with beavers, given that estuarine beavers are associated with increased populations of some estuarine fish, it is possible that this could support the diet of this species (Hood, 2012).
Marbled Murrelet	neutral/possible	This species lives along the coast and forages for fish; while they have some preferences, they are known to be opportunistic and to forage what is available (U.S. Fish and Wildlife Service, 1997). Estuarine beavers are associated with increased populations of various types of fish, including those that ultimately disperse into the sea, which means that they could help support populations of murrelets through increased food availability (Hood, 2012).
Oregon Vesper Sparrow	neutral/possible	This species is associated with open habitats of mixed-conifer forests, grassland, sagebrush, fallow fields, mountain meadows, juniper-steppe, agricultural cropland, and dry, open woodlands. It eats seeds and insects (Marshall et al., 2006). Beavers are associated with an increase in invertebrate populations, as well as with increased moisture (Rosell et al., 2005). Beavers are predicted to benefit some scrub-shrub birds (Chandler et al., 2008). The draining of wetlands may have historically increased habitat for this species. This species is also described as being rare on valley floors, where riparian forests, wetlands, and wet prairies occur, and as having low habitat overlap with Song Sparrows, which occur in wetter habitats (Altman, 2017). However, this species is also known to live in riparian areas and to coexist with beavers (Noson and Hutto, 2005). In New Mexico, this species lives in Rocky Mountain montane riparian forest habitats, where beavers also occur. (New Mexico Department of Game and Fish, 2016). This species lives in upland prairies in the Willamette Valley, where beaver once thrived and are now making a comeback (Grossman, 2002). In Utah, this species has been observed living in areas without, areas with inactive, and areas with active beaver complexes, although it is observed more frequently in wetland areas without beaver compared to those with beaver (Noson and Hutto, 2005).
Rock Sandpiper	neutral/possible	This species lives on jetties, rocky headlands, offshore rocks, rocky estuaries, and tide pools, and eats intertidal invertebrates (Marshall et al., 2006). The effects of beavers on intertidal invertebrates are not well-characterized, and as such there is limited data as to whether the positive effects on estuarine invertebrates would positively affect intertidal ecosystems by providing more food resources or not.
Streaked Horned Lark	neutral/possible	This species lives in upland prairies in the Willamette Valley, where beavers once thrived and are now making a comeback. As such, this species can coexist with beaver (Grossman, 2002). More generally, this species is found in open areas with sparse or low vegetation coverage and is associated with early succession (Pearson and Altman, 2005)(U.S. Fish and Wildlife Service, 2019b). The disruption that beaver dam flooding causes creates habitat heterogeneity that produces open patches and areas of early success (Castro et al., 2017).
Tufted Puffin	neutral/possible	This species forages over the ocean and nests on offshore islands and headlands (Marshall et al., 2006). While this species does not overlap in habitat with beavers, given that estuarine beavers are associated with increased populations of some estuarine fish, it is possible that this could support the diet of this species (Hood, 2012).
Big Skate	neutral/possible	This species lives in estuaries, bays, and over the continental shelf. It eats shrimp, worms, and clams as well as on fishes (Bester, 2017). Beavers have been associated with an increase in population with some species of estuarine and marine fish (Hood, 2012). Outside of this, beavers are unlikely to overlap in distribution with this species.
Black Rockfish	neutral/possible	Juveniles of this species have been observed in estuarine eelgrass habitats, and it has been suggested that such habitats are important for this species (Schwartzkopf, 2020). It is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Brown Rockfish	neutral/possible	Eelgrass is listed as a habitat for this species (Johnson et al., 2015). It is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Cabezon	neutral/possible	Juveniles of this species have been observed in estuarine eelgrass habitats, although it is not their favored estuarine environment (Schwartzkopf, 2020). It is possible that beavers could improve growing conditions for somewhat biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.

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Copper Rockfish	neutral/possible	Juveniles of this species have been observed in estuarine eelgrass habitats, and it has been suggested that such habitats are important for this species (Schwartzkopf, 2020). It is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Eulachon	neutral/possible	This species is observed in estuaries. In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
Foskett Spring Speckled Dace	neutral/possible	This species lives in specific springs. Threats to these springs include a reduction in riparian vegetation and increased sedimentation (U.S. Fish and Wildlife Service, 1998c). Beaver dams trap sediment, and beaver complexes are associated with an increase in riparian vegetation (Brazier et al., 2020)(Castro et al., 2017). However, given how localized this species is, beavers would need to colonize the area adjacent to the spring to have an effect (U.S. Fish and Wildlife Service, 1998c).
Goose Lake Sucker	neutral/possible	The restoration plan for this species includes the goal of a habitat with excellent water quality, complex physical attributes, clean spawning substrates, foraging habitats, and hiding and thermal cover (Heck et al., 2008). Beavers are associated with increased water quality, stream complexity, sediment impoundment, and vegetation (Rosell et al., 2005)(Castro et al., 2017).
Grass Rockfish	neutral/possible	This species is observed in estuaries (Schwartzkopf, 2020). In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017) (Rosell et al., 2005).
Green Sturgeon	neutral/possible	This species lives in several Oregon estuaries and eats lampreys (Bond et al., 1984). High fish densities of juvenile lamprey have been observed in low-tide estuarine beaver ponds, so beavers could help increase prey for this species (Hood, 2012). Pollution and sediment impoundment are both listed as threats to this species (National Marine Fisheries Service, 2018). Beavers are associated with improved water quality (Rosell et al., 2005)(Castro et al., 2017)(Brazier et al., 2020). This species lives in American Southwest riparian forest and woodland habitats in the Bay Delta and Central Coast provinces in California, where beavers also occur (California Department of Fish and Wildlife, 2015). As such, this species can coexist with beaver.
Hutton Spring Tui Chub	neutral/possible	This species lives in a specific spring. Threats to the spring include a reduction in riparian vegetation increased sedimentation, and the nearby toxic plume that could compromise water quality (U.S. Fish and Wildlife Service, 1998c)(U.S. Fish and Wildlife Service, 2019a). Beaver dams trap sediment and pollutants, and beaver complexes are associated with an increase in riparian vegetation (Brazier et al., 2020)(Castro et al., 2017). However, given how localized this species is, beavers would need to colonize the area adjacent to the spring to have an effect (U.S. Fish and Wildlife Service, 1998c).
Kelp Greenling	neutral/possible	Juveniles of this species have been observed in estuarine eelgrass habitats, although it is not their favored estuarine environment (Schwartzkopf, 2020). It is possible that beavers could improve growing conditions for somewhat biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Lingcod	neutral/possible	Juveniles of this species have been observed in estuarine eelgrass habitats, although it is not their favored estuarine environment (Schwartzkopf, 2020)(Johnson et al., 2015). It is possible that beavers could improve growing conditions for somewhat biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Longfin Smelt	neutral/possible	This species has a life cycle that requires estuaries. In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
Millicoma Dace	neutral/possible	This species is strongly cover-oriented and is associated with swiftwater habitats and complex substrates. The lack of complex stream habitats with large wood and coarse substrate is listed as a reason why they may be rare today (Scheerer et al., 2014). Beavers are associated with the formation of dams, which introduce stream complexity and woody substrates to streams (Rosell et al., 2005)(Castro et al., 2017)(Brazier et al., 2020).
Northern Anchovy	neutral/possible	Juveniles of this species have been observed in estuarine eelgrass habitats, although it is not their favored estuarine environment (Schwartzkopf, 2020). It is possible that beavers could improve growing conditions for somewhat biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Pacific Herring	neutral/possible	Eelgrass is an important breeding ground for this species (Short et al., 2002)(Short & Burdick, 1996)(Johnson et al., 2015). It is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Pacific Sand Lance	neutral/possible	Eelgrass is listed as a habitat for this species (Johnson et al., 2015). It is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.

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Pile Perch	neutral/possible	Estuaries may be important spawning habitat for this species. In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
Pit Sculpin	neutral/possible	The restoration plan for this species includes the goal of a habitat with excellent water quality, complex physical attributes, clean spawning substrates, foraging habitats, and hiding and thermal cover (Heck et al., 2008). Beavers are associated with increased water quality, stream complexity, sediment impoundment, and vegetation (Rosell et al., 2005)(Castro et al., 2017).
Quillback Rockfish	neutral/possible	Juveniles of this species have been observed in estuarine eelgrass habitats, and it has been suggested that such habitats are important for this species (Schwartzkopf, 2020). It is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Redtail Surfperch	neutral/possible	Estuaries are listed as a need for this species. In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
Rock Greenling	neutral/possible	Eelgrass is listed as a habitat for this species (Johnson et al., 2015). It is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Shiner Perch	neutral/possible	Juveniles of this species have been observed in estuarine eelgrass habitats, and are more abundant in these estuarine habitats than dock ones (Schwartzkopf, 2020)(Johnson et al., 2015). It is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Spiny Dogfish	neutral/possible	The juveniles of this species can be found in estuaries. The diet of this species includes small schooling fish and marine invertebrates (Brodeur et al., 2009). In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005). Beavers are also associated with an increase in the populations of some coastal fish species (Hood, 2012).
Starry Flounder	neutral/possible	Eelgrass is listed as a habitat for this species (Johnson et al., 2015). It is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Striped Perch	neutral/possible	This species lives in estuaries (Springer et al., 2010)(Garwood et al., 2013). In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
Surf Smelt	neutral/possible	Eelgrass is listed as a habitat for this species (Johnson et al., 2015). It is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022). Otherwise, it is unlikely that the distribution of this species and that of beavers would overlap.
Topsmelt	neutral/possible	This species uses estuaries. In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).\
Vermilion Rockfish	neutral/possible	This species is typically associated with rocky habitats. It co-occurs with other species of rockfish, like copper rockfish. It eats small fish, crustaceans, and macroplankton (Dick et al., 2021). There is limited data as to whether juveniles of this species also use eelgrass habitat, like copper rockfish (Schwartzkopf, 2020). If so, beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022).
Yellowtail Rockfish	neutral/possible	This species is observed in estuaries (Schwartzkopf, 2020). In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
Blue Mud Shrimp	neutral/possible	This species is found in estuaries, usually on mudflats (Rudy & Rudy, 1983). In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
Bulb Juga	neutral/possible	This species requires gravel-boulder riffles in cold, highly-oxygenated water (Oregon Conservation Strategy). In ecosystems where water is limited, beavers would benefit this species insofar as beavers increase late-stream flows (Rosell et al., 2005). The water behind beaver dams sometimes has reduced oxygen levels, but the water downstream of dams has oxygen levels comparable to those in the rest of the stream (Błędzki et al., 2010)(Rosell et al., 2005). The effects of beaver dams on water temperature are complex. However, beaver dams are associated with increased connectivity with groundwater, which can result in upwellings of cool water downstream of complexes (Rosell et al., 2005)(Weber et al., 2017)(Bouwes et al., 2016).

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Dalles Mountainsnail	neutral/possible	This species is limited in its distribution and lives in rocky areas with minimal vegetation (Oregon Conservation Strategy)(Blevins et al., 2019). It is a terrestrial gastropod, which means that water is critical for its survival (Burke, 2013). However, there is limited data on whether it lives near bodies of water, and therefore whether or not its distribution would overlap with that of beavers.
Dungeness Crab	neutral/possible	This species lives in rocky intertidal areas, and uses eelgrass as breeding grounds; although beavers are found in estuaries, they are not typically found closer to the ocean, much less in rocky tidal zones (Oregon Conservation Strategy)(Short et al., 2002)(Short & Burdick, 1996). However, it is possible that beavers could improve growing conditions for biologically relevant species like eelgrass, as they have been associated with improving estuarine water quality (Blankenship, 2022).
Fender's Blue Butterfly	neutral/possible	This species is a pollinator (Oregon Conservation Strategy). Critical habitat elements for this species include both early seral upland prairie, wet prairie, and oak savanna habitat with a mosaic of grasses and forbs, an absence of dense canopy vegetation; and larval host plants, which include various lupines (U.S. Fish and Wildlife Service, 2010). Beavers are associated with an increase in wetlands and meadows; restoration of riparian areas via beaver dams or mimicry is listed as a way to help Northwest pollinators (Mitchell et al., 2021)(Collins et al., 2019). However, all of the host lupines grow in dry or seasonally moist areas (Turner & Gustafson, 2006). This species lives in upland prairies in the Willamette Valley, where beavers once thrived and are now making a comeback (Grossman, 2002). This species is found in the West Eugene Wetlands, where beavers are also found. As such, it is known to coexist with beavers (Esterson, 2018)(Andrus & Walsh, 2002).
Malheur Cave Amphipod	neutral/possible	The water source of Malheur Cave is unknown; if it is groundwater, beaver could help elevate the water level in the lake, but otherwise, beaver would be unlikely to affect the species inside the cave (Palmer, 1975)(Oregon Conservation Strategy).
Malheur Cave Flatworm	neutral/possible	The water source of Malheur Cave is unknown; if it is groundwater, beaver could help elevate the water level in the lake, but otherwise, beaver would be unlikely to affect the species inside the cave (Palmer, 1975)(Oregon Conservation Strategy). Pollution of aquatic systems is listed as a threat to this species (Hyman, 1937). Beaver dams are associated with improved water quality (Brazier et al., 2020)(Błędzki et al., 2010)(Rosell et al., 2005).
Malheur Cave Springtail	neutral/possible	The water source of Malheur Cave is unknown; if it is groundwater, beaver could help elevate the water level in the lake, but otherwise, beaver would be unlikely to affect the species inside the cave (Palmer, 1975)(Oregon Conservation Strategy). Pollution of aquatic systems is listed as a threat to this species (Christiansen & Bellinger, 1996). Beaver dams are associated with improved water quality (Brazier et al., 2020)(Błędzki et al., 2010)(Rosell et al., 2005).
Malheur Isopod	neutral/possible	The water source of Malheur Cave is unknown; if it is groundwater, beaver could help elevate the water level in the lake, but otherwise, beaver would be unlikely to affect the species inside the cave (Palmer, 1975)(Oregon Conservation Strategy).
Malheur Pseudoscorpion	neutral/possible	The water source of Malheur Cave is unknown; if it is groundwater, beaver could help elevate the water level in the lake, but otherwise, beaver would be unlikely to affect the species inside the cave (Palmer, 1975)(Oregon Conservation Strategy). Pollution of aquatic systems is listed as a threat to this species, as well as the drawdown of groundwater (Benedict & Malcolm, 1973). Beaver dams are associated with improved water quality and an elevated water table (Brazier et al., 2020)(Błędzki et al., 2010) (Rosell et al., 2005).
Native Littleneck Clam	neutral/possible	This species is found in estuaries. In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
Ochre Sea Star	neutral/possible	This species is found in estuaries. In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
Olympia Oyster	neutral/possible	Populations of this species are found in estuaries (Baker, 1995). In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
Pacific Giant Octopus	neutral/possible	This species den in rocky areas, and eats a wide array of marine animals that include crustaceans, fish, and soft-bodied organisms (Tunley-Daymude, 2021). Beavers are associated with an increase in the population of several fish species that live in the ocean, which may serve as prey for this species (Hood, 2012). Beavers are not expected to overlap in distribution with this species.
Sunflower Star	neutral/possible	This species is found in tidal areas, on a variety of substrates (Shivji et al., 1983). It feeds on clams, snails, chitons, urchins, sand dollars, asteroids, crabs, and other invertebrates. While it is unlikely that beavers would overlap in distribution with this species, it is possible that estuarine beavers could support some invertebrate species, including those that this species may predate on.
American Pika	neutral/possible	This animal lives by rocky talus slopes, often by meadows, and is also found in rocky areas within forests or near lakes. They eat grasses, forbs, leaves, ferns, moss, and conifer needles (Yandow et al., 2015). Beavers are associated with an increase in herbaceous vegetation (Rosell et al., 2005). Given that this species is restricted to rocky, high-elevation areas, it is likely that the distribution of this species and that of beavers does not overlap very much.
Harbor Porpoise	neutral/possible	This species lives in the ocean, where beavers are not found. As such, it is not expected to overlap in distribution with beavers. This species eats schooling fish (Booth, 2019). Beaver presence in estuaries in the Skagit River, WA, is associated with increased pool habitat for estuarine species, including salmon and three-spine stickleback, which are schooling fish (Hood, 2012)(Goldfarb & Bascomb, 2019)(Greenwood et al., 2016).

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Northern Elephant Seal	neutral/possible	This species lives in the ocean, where beavers are not found. As such, it is not expected to overlap in distribution with beavers. This species eats fish (Antonelis et al., 1987). Beaver presence has been associated with supporting fish populations in estuaries and coastal regions, which could provide food for seals (Goldfarb & Bascomb, 2019).
Pacific Harbor Seal	neutral/possible	This species lives in the ocean, where beavers are not found. As such, it is not expected to overlap in distribution with beavers. This species eats fish (Orr et al., 2003). Beaver presence has been associated with supporting fish populations in estuaries and coastal regions, which could provide food for seals (Goldfarb & Bascomb, 2019).
Steller Sea Lion	neutral/possible	This species lives in the ocean, where beavers are not found. As such, it is not expected to overlap in distribution with beavers. This species eats fish, including salmon (Sigler et al., 2009). Beaver presence has been associated with supporting fish populations in estuaries and coastal regions, which could provide food for Sea Lions (Goldfarb & Bascomb, 2019)(Hood, 2012).
Applegate's Milkvetch	neutral/possible	This species grows in seasonally moist, strongly alkaline soils (Oregon Conservation Strategy). The regions that they grow in experience periodic, seasonal flooding, and are moist in the winter and spring, which may be attributed to the clay hardpans that underly them. These hardpans stop water percolation and provide seasonal soil moisture saturation as well as retention. The soil moisture where this species grows may exclude plants that require dry conditions (U.S. Fish and Wildlife Service, 1998a). Beavers are associated with an increase in water and wetlands (Rosell et al., 2005)(Castro et al., 2017). Although the effects of beavers on the pH is of water variable and contested, there is evidence of beavers being present at and maintaining historically alkaline wetlands (Sivinski & Tonne, 2011)(Wolkis, 2016). This species has a very narrow range, and there is limited data as to whether the distribution of beaver and this species would overlap.
Bull Kelp	neutral/possible	This species is associated with rocky substrates in intertidal habitats (Oregon Conservation Strategy). As such, it is not expected to overlap in distribution with beavers. However, pollution and sedimentation may negatively affect the growth of this species (Springer et al., 2010). It is possible that beavers could improve growing conditions for this species, as they have been associated with improving estuarine water quality (Blankenship, 2022).
Kincaid's Lupine	neutral/possible	This species grows in seasonally wet meadows and prefers well-drained soils (U.S. Fish and Wildlife Service, 2010). Soils in areas with high water tables generally are not considered as having well-drained soils, as water pools do not percolate through, and the presence of beavers is associated with increased water tables. However, beavers are also associated with more meadow habitats, which could expand the range of this species (Rosell et al., 2005)(Brazier et al., 2020)(Schulte et al., 2005). Furthermore, this species is found in the West Eugene Wetlands, where beavers are also found. As such, it is known to coexist with beavers (Esterson, 2018)(Andrus & Walsh, 2002). Given its preference for well-drained soils, there is limited data from coexistence whether this species prefers a beaver-modified habitat to an unmodified habitat.
Northern Wormwood	neutral/possible	This species is found in a variety of habitats, including both arid ones and streamside locations with occasional flooding (Brickner, 2013)(Rosell et al., 2005). Given this, it seems as though they can tolerate a wide array of hydrological conditions. Disruption of riparian habitat, or riparian development, is listed as a threat to this species. Beavers are associated with an increase in riparian habitat (Rosell et al., 2005).
Point Reyes Bird's-beak	neutral/possible	This species grows in salt marshes, which are sometimes found in estuaries (Due, 2022). In Oregon, improving water quality and loss of habitat complexity are listed as limiting factors for estuarine habitats (Oregon Conservation Strategy). Beavers are associated with increased habitat complexity and improved water quality (Brazier et al., 2020)(Castro et al., 2017)(Rosell et al., 2005).
White-topped Aster	neutral/possible	This species is found in the West Eugene Wetlands, where beavers are also found. As such, it is known to coexist with beavers (Esterson, 2018)(Andrus & Walsh, 2002). More generally, this species is found in both wet and dry meadows (U.S. Fish and Wildlife Service, 2010). There is limited data from from coexistence whether this species prefers a beaver-modified habitat or wetlands to a drier habitat, as it occurs in both.
Willamette Daisy	neutral/possible	This species lives in upland prairies in the Willamette Valley, where beavers once thrived and are now making a comeback (Grossman, 2002). This species is found in the West Eugene Wetlands, where beavers are also found. As such, it is known to coexist with beavers (Esterson, 2018)(Andrus & Walsh, 2002). More generally, this species is found in both wet and dry meadows (U.S. Fish and Wildlife Service, 2010). There is limited data from coexistence whether this species prefers a beaver-modified habitat or wetlands to a drier habitat, as it occurs in both.
Hoary Elfin Butterfly	unlikely	This species relies on the host plant Arctostaphylos uva-usrsi, which grows in dry, rocky soils (Turner & Gustafson, 2006). Beavers are associated with an increase in water availability and moisture, and as such the host plant would not be expected to thrive where beavers are present (Rosell et al., 2005).
Kit Fox	unlikely	This species eats rodents (kangaroo rats, pocket mice, etc.), insects, reptiles, and ground-nesting birds. It often hunts in arid and sparsely vegetated areas (Lowery, 2013). Beavers are associated with an increase in small mammal populations, although not necessarily the small mammals that are the primary components of this species' diet (Fedyń et al., 2022)(Nummi et al., 2019). This species hunts in areas where beaver would not be expected. Furthermore, an increase in open water, which is associated with beaver, may attract competitors and predatory species, like coyotes, which may have a negative effect on this species (Vesely, 2015)(Rosell et al., 2005)(Castro et al., 2017).
Pygmy Rabbit	unlikely	This species lives in semiarid shrub steppe habitats and is often found both living and eating in sagebrush stands. It has historically been associated with vegetation along permanent and intermittent stream channels, as well as alluvial fans (U.S. Fish and Wildlife Service, 2012c). Burrow utilization and intensity were negatively associated with riparian areas for this species, and an increase in open water on this landscape may attract predators, which may have a negative effect on this species (Gervais, 2016b)(Wilson et al., 2010). Beavers are associated with an increase in water and riparian areas (Rosell et al., 2005)(Castro et al., 2017)

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Red Tree Vole	unlikely	Riparian protection buffers and other wetland protections are suggested to provide habitat and connectivity for this species. However, this species would probably not use these areas for movement between patches of coniferous habitat due to a lack of interior habitat, and studies have shown a negative influence of forest edge with modeled habitat for this species (U.S. Fish and Wildlife Service, 2019c).
Cascade Head Catchfly	unlikely	This species grows on dry slopes (Turner & Gustafson, 2006). Given that this species lives in dry habitats, wetland environments and increased water would probably not benefit this species.
Crinite Mariposa Lily	unlikely	This species grows in dry sites (Bureau of Land Management and U.S. Fish and Wildlife Service, 2004)(Whitman et al., 2020). The presence of beaver is associated with an increase in riparian, wetland, and meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives in dry habitats, wetland environments and increased water would probably not benefit this species.
Golden Buckwheat	unlikely	This species grows on barren slopes and outcrops, in open desert shrub communities. This plant is endemic to a small area in Malheur County (Oregon Conservation Strategy)(Meinke, 1982). As such, there is limited data regarding whether or not its distribution would overlap with that of beavers. However, given that this species lives in dry habitats, wetland environments and increased water would probably not benefit this species.
Grimy Ivesia	unlikely	This species grows in a habitat that is very dry and relatively barren (Petix & Bahm, 2016). The presence of beavers is associated with increased water tables, more water availability, more wetland habitat, and more meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives in dry habitats, wetland environments and increased water would probably not benefit this species.
Lawrence's Milkvetch	unlikely	This species grows on sandy or rocky soils overlying basalt on dry slopes (Meinke, 1982). The presence of beavers is associated with increased water tables, more water availability, more wetland habitat, and more meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives on dry soils, wetland environments, and increased water would probably not benefit this species.
Macfarlane's Four o'Clock	unlikely	This species occurs in warm and dry habitats (U.S. Fish and Wildlife Service, 2000). The presence of beavers is associated with increased water tables, more water availability, more wetland habitat, and more meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives in dry environments, wetland environments and increased water would probably not benefit this species.
Red-fruited Lomatium	unlikely	This species grows on dry, gravelly, and rocky soils (Kagan & Vrilakas, 1993). The presence of beavers is associated with increased water tables and more water availability (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives on dry soils, wetland environments, and increased water would probably not benefit this species.
Smooth Mentzelia	unlikely	This species is found on dry, open, green, or grey montmorillonite-derived soils (Oregon Conservation Strategy). The presence of beavers is associated with increased water tables and more water availability (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives on dry soils, wetland environments, and increased water would probably not benefit this species.
Snake River Goldenweed	unlikely	This species inhabits dry, rocky, open soil with little other perennial vegetation (Meinke, 1982). The presence of beavers is associated with increased water tables and more water availability (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives on dry soils, wetland environments, and increased water would probably not benefit this species.
South Fork John Day Milkvetch	unlikely	This species usually occurs on dry, barren slopes in gravelly, shallow soils overlying basalt (Croft et al., 1997). The presence of beavers is associated with increased water tables and more water availability (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives on dry soils, wetland environments, and increased water would probably not benefit this species.
Sterile Milkvetch	unlikely	This species is typically found in dry, barren ashy areas on gravelly and sandy clay bluffs and knolls (Meinke, 1982). The presence of beavers is associated with increased water tables, more water availability, more wetland habitat, and more meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives in dry forests, wetland environments and increased water would probably not benefit this species.
Tygh Valley Milkvetch	unlikely	This species is found on dry, rocky soils (Oregon Conservation Strategy). The presence of beavers is associated with increased water tables and more water availability (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives on dry soils, wetland environments, and increased water would probably not benefit this species.
Umpqua Mariposa Lily	unlikely	This species is found in the Siskiyou Mountains in dry open forests on rocky serpentine soils (Turner & Gustafson, 2006). The presence of beavers is associated with increased water tables, more water availability, more wetland habitat, and more meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives in dry forests, wetland environments and increased water would probably not benefit this species.
Wayside Aster	unlikely	This species is typically found in dry, upland sites in coniferous forests (Wogen, 1998). The presence of beavers is associated with increased water tables, more water availability, more wetland habitat, and more meadow habitat (Rosell et al., 2005)(Brazier et al., 2020). Given that this species lives in dry forests, wetland environments and increased water would probably not benefit this species.

OCS Species Common Name	Assessment	Reasoning (With Citation)
Wolf's Evening Primrose	unlikely	This coastal species requires adequate moisture, especially before its taproot has grown, as well as well-drained soils (Oregon Conservation Strategy)(Currin, 2011). Soils in areas with high water tables generally are not considered as having well-drained soils, as water pools and does not percolate through, and the presence of beavers is associated with increased water tables (Schulte et al., 2005)(Rosell et al., 2005)(Brazier et al., 2020). Moisture is not listed as a limiting factor for this species given its habitat, and as such an elevated water table is unlikely to produce better habitat for it.

Appendix B: Species Assessment, Federal Listing Status, and State Listing Status

The following appendix contains the species assessment category, federal listing status, and state listing status for all 294 species on the Oregon Conservation Strategy. Species that are federally listed as threatened or endangered are protected under the ESA, whereas those that are species of concern or candidates for listing are not. In terms of threat level, the federal listings in order of least to most concern are: species of concern, candidates for listing, threatened, and endangered. For state listings, the order of least to most concern is: sensitive, threatened, and endangered. The summary table for this appendix is in the main report.

Threat Level Legends:

Federal Threat Level	# Species
SOC (Species of Concern)	95
C (Candidate for Listing)	1
T (Threatened)	25
E (Endangered)	16
Total	*137*

State Threat Level	# Species
S (Sensitive)	113
T (Threatened)	39
E (Endangered)	37
Total	*189*

Assessment Category Legend:

Assessment Category	What Does it Mean
beaver benefits	direct evidence in the literature of beavers benefitting this species
beaver probably benefits	robust indirect evidence from known ecological needs of species and ecological effects of beavers that beavers should benefit
neutral/possible benefit	weak indirect evidence from known ecological needs of species and ecological effects of beavers that beavers should benefit
neutral	doesn't seem like beavers would benefit or harm; beavers unlikely to overlap with this species
beaver probably does not benefit	direct or indirect evidence that beaver presence would disrupt this species
unclear	unclear direct or indirect evidence; insufficient information is known to assess

Summary Table:

Species Assessment	State Sensitive Species # (%)	State Threatened Species # (%)	State Endangered Species # (%)	Federally Threatened/Endangered Species # (%)
beaver benefits	29 (26%)	4 (10%)	1 (3%)	10 (23%)
beaver probably benefits	62 (55%)	6 (15%)	6 (16%)	9 (21%)
neutral/possible benefit	18 (16%)	5 (13%)	4 (11%)	9 (21%)
neutral	1 (1%)	4 (10%)	7 (19%)	3 (7%)
beaver probably does not benefit	2 (2%)	9 (23%)	7 (19%)	1 (2%)
unclear	1 (1%)	11 (28%)	12 (32%)	11 (26%)
total	113 (100%)	39 (100%)	37 (100%)	43 (100%)

OCS Species Common Name	Assessment	Federal Listing Status (OCS)	State Listing Status (OCS)
Cascade Torrent Salamander	neutral/possible benefit		S
Cascades Frog	beaver benefits	SOC	S
Clouded Salamander	beaver probably benefits		S
Coastal Tailed Frog	beaver probably benefits	SOC	S
Columbia Spotted Frog	beaver benefits	SOC	S
Columbia Torrent Salamander	beaver probably benefits		S
Cope's Giant Salamander	beaver probably benefits		S
Del Norte Salamander	beaver probably benefits	SOC	S
Foothill Yellow-legged Frog	beaver probably benefits	SOC	S
Larch Mountain Salamander	unclear	SOC	S
Northern Red-legged Frog	beaver benefits	SOC	S
Oregon Slender Salamander	beaver probably benefits	SOC	S
Oregon Spotted Frog	beaver benefits	T	S
Rocky Mountain Tailed Frog	beaver probably benefits	SOC	S
Siskiyou Mountains Salamander	neutral/possible benefit	SOC	S
Southern Torrent Salamander	neutral	SOC	S
Western Toad	beaver benefits		S
Acorn Woodpecker	beaver probably benefits	SOC	S
American Three-toed Woodpecker	beaver benefits		S
American White Pelican	beaver probably benefits		S
Black Brant	neutral/possible benefit		S
Black Oystercatcher	neutral/possible benefit	SOC	S
Black Swift	beaver probably benefits		S
Black-backed Woodpecker	beaver probably benefits		S
Black-necked Stilt	beaver probably benefits		S
Bobolink	beaver benefits		S
Brewer's Sparrow	neutral/possible benefit		S
Brown Pelican (California)	beaver probably benefits		E
Burrowing Owl (Western)	beaver probably benefits	SOC	S
Caspian Tern	beaver probably benefits		S
Chipping Sparrow	neutral/possible benefit		S

OCS Species Common Name	Assessment	Federal Listing Status (OCS)	State Listing Status (OCS)
Columbian Sharp-tailed Grouse	beaver probably benefits	SOC	S
Common Nighthawk	beaver probably benefits		S
Dusky Canada Goose	beaver probably benefits		S
Ferruginous Hawk	beaver probably benefits	SOC	S
Flammulated Owl	beaver probably benefits		S
Fork-tailed Storm-Petrel	neutral/possible benefit		S
Franklin's Gull	beaver probably benefits		S
Grasshopper Sparrow	beaver probably benefits		S
Great Gray Owl	beaver probably benefits		S
Greater Sage-Grouse	beaver probably benefits	SOC	S
Greater Sandhill Crane	beaver benefits		S
Harlequin Duck	beaver benefits	SOC	S
Juniper Titmouse	neutral/possible benefit		S
Leach's Storm-Petrel	neutral/possible benefit		S
Lewis’s Woodpecker	beaver probably benefits	SOC	S
Loggerhead Shrike	beaver probably benefits		S
Long-billed Curlew	beaver probably benefits		S
Marbled Murrelet	neutral/possible benefit	T	T
Mountain Quail	beaver probably benefits	SOC	S
Northern Goshawk	beaver probably benefits	SOC	S
Northern Spotted Owl	beaver probably benefits	T	T
Olive-sided Flycatcher	beaver benefits	SOC	S
Oregon Vesper Sparrow	neutral/possible benefit	SOC	S
Peregrine Falcon (American)	beaver probably benefits		S
Pileated Woodpecker	beaver benefits		S
Purple Martin (Western)	beaver benefits	SOC	S
Red-necked Grebe	beaver probably benefits		S
Rock Sandpiper	neutral/possible benefit		S
Sagebrush Sparrow	beaver probably benefits		S
Short-eared Owl	beaver probably benefits		S

OCS Species Common Name	Assessment	Federal Listing Status (OCS)	State Listing Status (OCS)
Snowy Egret	beaver probably benefits		S
Streaked Horned Lark	neutral/possible benefit	T	S
Swainson's Hawk	beaver probably benefits		S
Trumpeter Swan	beaver benefits		S
Tufted Puffin	neutral/possible benefit		S
Upland Sandpiper	beaver probably benefits	SOC	S
Western Bluebird	beaver probably benefits		S
Western Meadowlark	beaver probably benefits		S
Western Snowy Plover	unclear	T	T
White-breasted Nuthatch (Slender-billed)	beaver probably benefits		S
White-headed Woodpecker	beaver probably benefits	SOC	S
Willow Flycatcher	beaver benefits	SOC	S
Yellow Rail	beaver probably benefits	SOC	S
Yellow-breasted Chat	beaver probably benefits	SOC	S
Alvord Chub	beaver benefits	SOC	S
Big Skate	neutral/possible benefit		
Black Rockfish	neutral/possible benefit		
Blue Rockfish	neutral		
Borax Lake Chub	neutral	E	E
Brown Rockfish	neutral/possible benefit		
Bull Trout	beaver benefits	T	S
Cabezon	neutral/possible benefit		
Canary Rockfish	neutral		
China Rockfish	neutral		
Chinook Salmon	beaver benefits	T	T
Chum Salmon	beaver benefits	T	S
Coastal Cutthroat Trout	beaver benefits	SOC	S
Coho Salmon	beaver benefits	T	E
Copper Rockfish	neutral/possible benefit		
Deacon Rockfish	neutral	T	

OCS Species Common Name	Assessment	Federal Listing Status (OCS)	State Listing Status (OCS)
Eulachon	neutral/possible benefit	T	
Foskett Spring Speckled Dace	neutral/possible benefit	SOC	T
Goose Lake Sucker	neutral/possible benefit		S
Grass Rockfish	neutral/possible benefit	SOC	
Great Basin Redband Trout	beaver probably benefits	SOC	S
Green Sturgeon	neutral/possible benefit	T	S
Hutton Spring Tui Chub	neutral/possible benefit		T
Kelp Greenling	neutral/possible benefit	T	
Lahontan Cutthroat Trout	beaver benefits	T	T
Lingcod	neutral/possible benefit		
Longfin Smelt	neutral/possible benefit		
Lost River Sucker	beaver probably benefits	E	E
Miller Lake Lamprey	beaver benefits		S
Millicoma Dace	neutral/possible benefit	SOC	S
Modoc Sucker	beaver probably benefits		S
Northern Anchovy	neutral/possible benefit		
Oregon Chub	beaver benefits		S
Pacific Herring	neutral/possible benefit		
Pacific Lamprey	beaver benefits	SOC	S
Pacific Sand Lance	neutral/possible benefit		
Pile Perch	neutral/possible benefit		
Pit Sculpin	neutral/possible benefit		S
Quillback Rockfish	neutral/possible benefit		
Redtail Surfperch	neutral/possible benefit		
Rock Greenling	neutral/possible benefit		
Shiner Perch	neutral/possible benefit		
Shortnose Sucker	beaver probably benefits	E	E
Spiny Dogfish	neutral/possible benefit		
Starry Flounder	neutral/possible benefit		
Steelhead / Rainbow / Redband Trout	beaver benefits	T	S

OCS Species Common Name	Assessment	Federal Listing Status (OCS)	State Listing Status (OCS)
Striped Perch	neutral/possible benefit		
Surf Smelt	neutral/possible benefit		
Tiger Rockfish	neutral		
Topsmelt	neutral/possible benefit		
Umpqua Chub	beaver probably benefits	SOC	S
Vermilion Rockfish	neutral/possible benefit		
Warner Sucker	beaver benefits	T	T
Western Brook Lamprey	beaver benefits		S
Western River Lamprey	beaver benefits	SOC	S
Westslope Cutthroat Trout	beaver benefits	SOC	S
White Sturgeon	beaver probably benefits		
Wolf-eel	neutral		
Yelloweye Rockfish	neutral		
Yellowtail Rockfish	neutral/possible benefit		
Archimedes Springsnail	beaver probably benefits		
Beller's Ground Beetle	beaver probably benefits	SOC	
Black Petaltail	beaver probably benefits		
Blue Mud Shrimp	neutral/possible benefit		
Borax Lake Ramshorn	neutral		
Bulb Juga	neutral/possible benefit		
California Floater Freshwater Mussel	beaver probably benefits	SOC	
California Mussel	neutral		
Columbia Clubtail	beaver probably benefits	SOC	
Columbia Gorge Caddisfly	beaver probably benefits	SOC	
Columbia Gorge Hesperian	beaver probably benefits		
Crater Lake Tightcoil	beaver probably benefits		
Dall's Ramshorn	beaver probably benefits		
Dalles Mountainsnail	neutral/possible benefit		
Dungeness Crab	neutral/possible benefit		
Fender’s Blue Butterfly	neutral/possible benefit	E	

OCS Species Common Name	Assessment	Federal Listing Status (OCS)	State Listing Status (OCS)
Flat Abalone	neutral		
Franklin's Bumble Bee	beaver probably benefits	SOC	
Great Basin Ramshorn	beaver probably benefits		
Great Spangled Fritillary	beaver probably benefits		
Highcap Lanx	beaver probably benefits		
Hoary Elfin Butterfly	beaver probably does not benefit		
Insular Blue Butterfly	beaver probably benefits	SOC	
Klamath Ramshorn	beaver probably benefits		
Leona's Little Blue Butterfly	neutral		
Lined Ramshorn	beaver probably benefits		
Malheur Cave Amphipod	neutral/possible benefit	SOC	
Malheur Cave Flatworm	neutral/possible benefit	SOC	
Malheur Cave Springtail	neutral/possible benefit		
Malheur Isopod	neutral/possible benefit		
Malheur Pseudoscorpion	neutral/possible benefit	SOC	
Mardon Skipper Butterfly	beaver probably benefits		
Monarch Butterfly	beaver probably benefits		
Native Littleneck Clam	neutral/possible benefit		
Ochre Sea Star	neutral/possible benefit		
Olympia Oyster	neutral/possible benefit		
Oregon Shoulderband	beaver probably benefits		
Oregon Silverspot Butterfly	beaver probably benefits	T	
Pacific Giant Octopus	neutral/possible benefit		
Pacific Walker	beaver probably benefits		
Purple Sea Urchin	neutral		
Purple-lipped Juga	beaver probably benefits		
Razor Clam	neutral		
Red Abalone	neutral		
Red Sea Urchin	neutral		
Robust Walker	beaver probably benefits		

OCS Species Common Name	Assessment	Federal Listing Status (OCS)	State Listing Status (OCS)
Rock Scallop	neutral		
Rotund Lanx	beaver probably benefits		
Scale Lanx	beaver probably benefits		
Scalloped Juga	beaver probably benefits		
Shortface Lanx	beaver probably benefits		
Sinitsin Ramshorn	beaver probably benefits		
Siskiyou Hesperian	beaver probably benefits		
Sisters Hesperian	unclear		
A Stonefly (no common name)	beaver probably benefits		
Sunflower Star	neutral/possible benefit		
Taylor's Checkerspot Butterfly	unclear	E	
Turban Pebblesnail	beaver probably benefits		
Vernal Pool Fairy Shrimp	unclear	T	
Western Bumble Bee	beaver probably benefits		
Western Ridged Mussel	beaver probably benefits		
Winged Floater Freshwater Mussel	beaver probably benefits		
American Marten	beaver probably benefits		S
American Pika	neutral/possible benefit		S
California Myotis	beaver probably benefits		S
Columbian White-tailed Deer	beaver benefits	E	S
Fisher	beaver benefits	SOC	S
Fringed Myotis	beaver probably benefits	SOC	S
Gray Whale	neutral		E
Gray Wolf	beaver benefits	E	
Harbor Porpoise	neutral/possible benefit		
Hoary Bat	beaver probably benefits	SOC	S
Killer Whale	beaver probably benefits	E	
Kit Fox	beaver probably does not benefit		T
Long-legged Myotis	beaver probably benefits	SOC	S
Northern Elephant Seal	neutral/possible benefit		

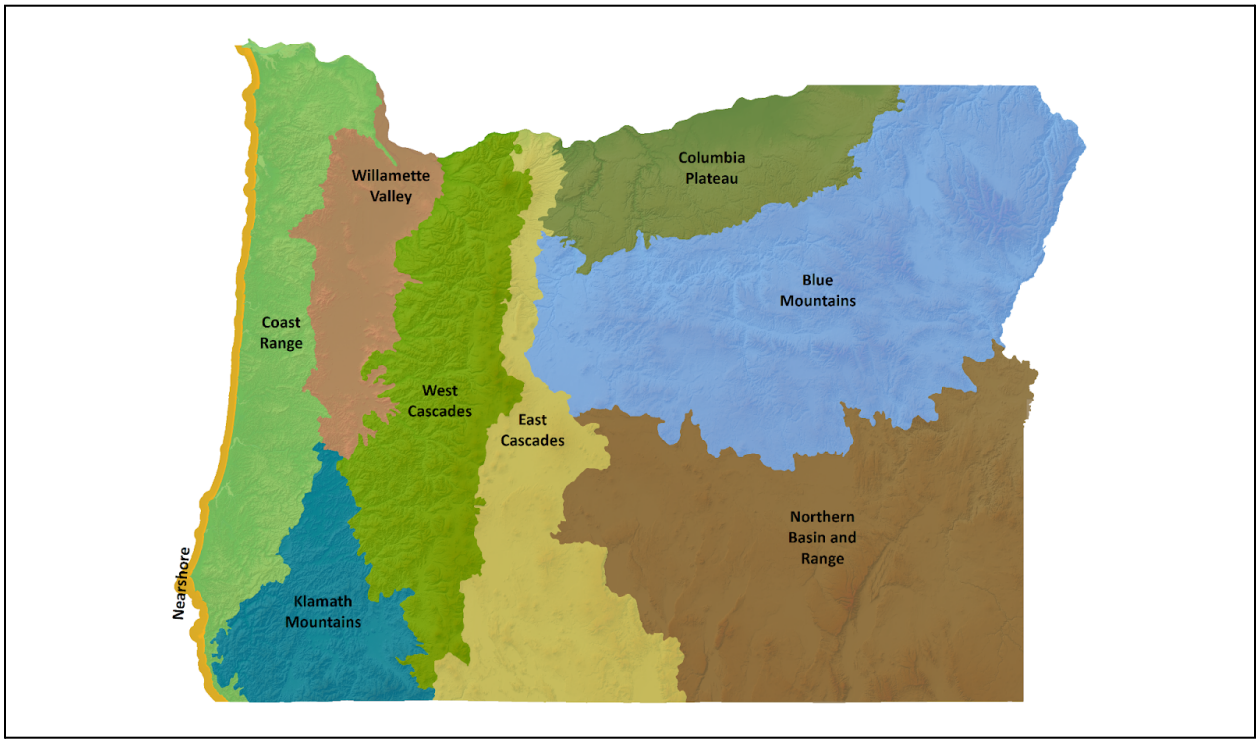
OCS Species Common Name	Assessment	Federal Listing Status (OCS)	State Listing Status (OCS)
Pacific Harbor Seal	neutral/possible benefit		
Pallid Bat	beaver probably benefits	SOC	S
Pygmy Rabbit	beaver probably does not benefit	SOC	S
Red Tree Vole	beaver probably does not benefit	C	S
Ringtail	beaver probably benefits		S
Rocky Mountain Bighorn Sheep	beaver probably benefits		S
Sierra Nevada Red Fox	beaver probably benefits		S
Silver-haired Bat	beaver probably benefits	SOC	S
Spotted Bat	beaver probably benefits	SOC	S
Steller Sea Lion	neutral/possible benefit		
Townsend's Big-eared Bat	beaver probably benefits	SOC	S
Washington Ground Squirrel	unclear	SOC	E
Western Gray Squirrel	beaver probably benefits		S
White-tailed Jackrabbit	beaver probably benefits		S
Wolverine	beaver benefits		T
Applegate's Milkvetch	neutral/possible benefit	E	E
Arrow-leaf Thelypody	unclear	SOC	T
Big-flowered Wooly Meadowfoam	unclear	E	E
Boggs Lake Hedge Hyssop	beaver probably benefits	SOC	T
Bradshaw's Desert Parsley	beaver probably benefits	E	E
Bull Kelp	neutral/possible benefit		
Cascade Head Catchfly	beaver probably does not benefit	SOC	T
Coast Range Fawn Lily	neutral	SOC	T
Cook's Desert Parsley	unclear	E	E
Crinite Mariposa Lily	beaver probably does not benefit	SOC	E
Cronquist's Stickseed	unclear	SOC	T
Crosby's Buckwheat	unclear	SOC	T
Cusick's Lupine	neutral	SOC	E
Davis' Peppergrass	unclear	SOC	T
Dwarf Meadowfoam	unclear	SOC	T

OCS Species Common Name	Assessment	Federal Listing Status (OCS)	State Listing Status (OCS)
Gentner's Fritillary	unclear	E	E
Golden Buckwheat	beaver probably does not benefit	SOC	T
Golden Paintbrush	unclear	T	E
Greenman's Desert Parsley	unclear	SOC	T
Grimy Ivesia	beaver probably does not benefit	SOC	E
Howell's Mariposa Lily	unclear	SOC	T
Howell's Microseris	unclear		T
Howell's Spectacular Thelypody	unclear	T	E
Howellia	beaver probably benefits	T	T
Kincaid's Lupine	neutral/possible benefit	T	T
Large-flowered Rush Lily	beaver probably benefits	SOC	T
Lawrence's Milkvetch	beaver probably does not benefit	SOC	T
Macfarlane's Four o'Clock	beaver probably does not benefit	T	E
Malheur Valley Fiddleneck	neutral	SOC	T
Malheur Wire-lettuce	neutral	E	E
McDonald's Rockcress	unclear	E	E
Mulford's Milkvetch	unclear	SOC	E
Native Eelgrass	beaver probably benefits		
Nelson's Checkermallow	beaver probably benefits	T	T
Northern Wormwood	neutral/possible benefit	SOC	E
Oregon Semaphore Grass	beaver probably benefits	SOC	T
Owyhee Clover	unclear	SOC	E
Packard's Mentzelia	neutral	SOC	T
Peacock Larkspur	beaver probably benefits	SOC	E
Peck's Milkvetch	unclear		T
Pink Sandverbena	neutral	SOC	E
Point Reyes Bird's-beak	neutral/possible benefit	SOC	E
Pumice Grape-fern	unclear		T
Red-fruited Lomatium	beaver probably does not benefit	SOC	E
Rough Popcornflower	unclear	E	E

OCS Species Common Name	Assessment	Federal Listing Status (OCS)	State Listing Status (OCS)
Sea Palm	neutral		
Sexton Mountain Mariposa Lily	neutral		E
Shiny-fruited Allocarya	neutral		E
Silvery Phacelia	neutral	SOC	T
Smooth Mentzelia	beaver probably does not benefit	SOC	E
Snake River Goldenweed	beaver probably does not benefit	SOC	E
South Fork John Day Milkvetch	beaver probably does not benefit		T
Spalding's Campion	unclear	T	E
Sterile Milkvetch	beaver probably does not benefit		T
Surf Grass	neutral		
Tygh Valley Milkvetch	beaver probably does not benefit		T
Umpqua Mariposa Lily	beaver probably does not benefit	SOC	E
Wayside Aster	beaver probably does not benefit	SOC	T
Western Lily	beaver probably benefits	E	E
White Rock Larkspur	unclear	SOC	E
White-topped Aster	neutral/possible benefit	SOC	T
Willamette Daisy	neutral/possible benefit	E	E
Wolf's Evening Primrose	beaver probably does not benefit	SOC	T
California Mountain Kingsnake	beaver probably benefits	SOC	S
Northern Sagebrush Lizard	beaver probably benefits	SOC	S
Western Painted Turtle	beaver benefits		S
Western Pond Turtle	beaver benefits	SOC	S
Western Rattlesnake	beaver probably benefits		S
TOTAL LISTED SPECIES		139	189

Appendix C: Species Assessment and Ecoregion

The following appendix contains the species assessment category and ecoregion for all 294 species on the Oregon Conservation Strategy. The ecoregions and their locations are shown on the map below:



Map showing the nine ecoregions in Oregon
Image source: Oregon Conservation Strategy

Assessment Category Legend:

Assessment Category	What Does it Mean
beaver benefits	direct evidence in the literature of beavers benefitting this species
beaver probably benefits	robust indirect evidence from known ecological needs of species and ecological effects of beavers that beavers should benefit
neutral/possible benefit	weak indirect evidence from known ecological needs of species and ecological effects of beavers that beavers should benefit
neutral	doesn't seem like beavers would benefit or harm; beavers unlikely to overlap with this species
beaver probably does not benefit	direct or indirect evidence that beaver presence would disrupt this species
unclear	unclear direct or indirect evidence; insufficient information is known to assess

Summary Table:

Assessment Category	Blue Mountain Species # (%)	Coastal Range Species # (%)	Columbia Plateau Species # (%)	East Cascades Species # (%)	Klamath Mountains Species # (%)	North Basin and Range Species # (%)	West Cascades Species # (%)	Willamette Valley Species # (%)	Near Shore Species # (%)
beaver benefits	15 (26%)	17 (27%)	8 (23%)	16 (23%)	10 (15%)	12 (18%)	20 (33%)	17 (27%)	6 (8%)
beaver probably benefits	31 (53%)	29 (46%)	20 (57%)	46 (67%)	35 (52%)	26 (39%)	31 (52%)	32 (51%)	5 (7%)
neutral/possible benefit	2 (3%)	7 (11%)	4 (11%)	4 (6%)	6 (9%)	10 (15%)	3 (5%)	9 (14%)	45 (61%)
neutral	1 (2%)	4 (6%)	0 (0%)	1 (1%)	3 (4%)	5 (8%)	1 (2%)	1 (2%)	17 (23%)
beaver probably does not benefit	4 (7%)	4 (6%)	2 (6%)	0 (0%)	4 (6%)	7 (11%)	3 (5%)	1 (2%)	0 (0%)
unclear	5 (9%)	2 (3%)	1 (3%)	2 (3%)	9 (13%)	6 (9%)	2 (3%)	3 (5%)	1 (1%)
total species	58 (100%)	63 (100%)	35 (100%)	69 (100%)	67 (100%)	66 (100%)	60 (100%)	63 (100%)	74 (100%)

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Cascade Torrent Salamander	neutral/possible benefit							WC	WV	
Cascades Frog	beaver benefits				EC			WC		
Clouded Salamander	beaver probably benefits		CR			KM		WC	WV	
Coastal Tailed Frog	beaver probably benefits		CR			KM		WC		
Columbia Spotted Frog	beaver benefits	BM					NBR			
Columbia Torrent Salamander	beaver probably benefits		CR						WV	
Cope's Giant Salamander	beaver probably benefits		CR		EC			WC		
Del Norte Salamander	beaver probably benefits		CR			KM				
Foothill Yellow-legged Frog	beaver probably benefits		CR			KM		WC	WV	
Larch Mountain Salamander	unclear							WC		
Northern Red-legged Frog	beaver benefits		CR			KM		WC	WV	
Oregon Slender Salamander	beaver probably benefits							WC	WV	
Oregon Spotted Frog	beaver benefits				EC			WC		
Rocky Mountain Tailed Frog	beaver probably benefits	BM								
Siskiyou Mountains Salamander	neutral/possible benefit					KM				
Southern Torrent Salamander	neutral		CR			KM			WV	
Western Toad	beaver benefits	BM	CR		EC	KM	NBR	WC		
Acorn Woodpecker	beaver probably benefits					KM			WV	
American Three-toed Woodpecker	beaver benefits	BM			EC					
American White Pelican	beaver probably benefits				EC		NBR			
Black Brant	neutral/possible benefit		CR							NS
Black Oystercatcher	neutral/possible benefit									NS

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Black Swift	beaver probably benefits							WC		
Black-backed Woodpecker	beaver probably benefits	BM			EC					
Black-necked Stilt	beaver probably benefits						NBR			
Bobolink	beaver benefits	BM					NBR			
Brewer's Sparrow	neutral/possible benefit			CP						
Brown Pelican (California)	beaver probably benefits									NS
Burrowing Owl (Western)	beaver probably benefits	BM		CP			NBR			
Caspian Tern	beaver probably benefits		CR		EC		NBR			NS
Chipping Sparrow	neutral/possible benefit								WV	
Columbian Sharp-tailed Grouse	beaver probably benefits	BM								
Common Nighthawk	beaver probably benefits			CP		KM			WV	
Dusky Canada Goose	beaver probably benefits								WV	
Ferruginous Hawk	beaver probably benefits	BM		CP			NBR			
Flammulated Owl	beaver probably benefits	BM			EC	KM		WC		
Fork-tailed Storm-Petrel	neutral/possible benefit									NS
Franklin's Gull	beaver probably benefits						NBR			
Grasshopper Sparrow	beaver probably benefits			CP		KM			WV	
Great Gray Owl	beaver probably benefits	BM			EC	KM		WC		
Greater Sage-Grouse	beaver probably benefits	BM					NBR			
Greater Sandhill Crane	beaver benefits				EC		NBR	WC		
Harlequin Duck	beaver benefits		CR					WC		
Juniper Titmouse	neutral/possible benefit						NBR			

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Leach's Storm-Petrel	neutral/possible benefit									NS
Lewis's Woodpecker	beaver probably benefits	BM		CP	EC	KM		WC		
Loggerhead Shrike	beaver probably benefits	BM		CP						
Long-billed Curlew	beaver probably benefits	BM		CP	EC		NBR			
Marbled Murrelet	neutral/possible benefit		CR			KM				NS
Mountain Quail	beaver probably benefits						NBR			
Northern Goshawk	beaver probably benefits				EC			WC		
Northern Spotted Owl	beaver probably benefits		CR		EC	KM		WC	WV	
Olive-sided Flycatcher	beaver benefits	BM	CR		EC			WC	WV	
Oregon Vesper Sparrow	neutral/possible benefit					KM			WV	
Peregrine Falcon (American)	beaver probably benefits		CR				NBR			
Pileated Woodpecker	beaver benefits	BM								
Purple Martin (Western)	beaver benefits		CR			KM		WC	WV	
Red-necked Grebe	beaver probably benefits				EC					
Rock Sandpiper	neutral/possible benefit									NS
Sagebrush Sparrow	beaver probably benefits			CP						
Short-eared Owl	beaver probably benefits								WV	
Snowy Egret	beaver probably benefits						NBR			
Streaked Horned Lark	neutral/possible benefit								WV	
Swainson's Hawk	beaver probably benefits	BM		CP	EC		NBR			
Trumpeter Swan	beaver benefits	BM			EC		NBR			
Tufted Puffin	neutral/possible benefit		CR							NS

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Upland Sandpiper	beaver probably benefits	BM								
Western Bluebird	beaver probably benefits								WV	
Western Meadowlark	beaver probably benefits								WV	
Western Snowy Plover	unclear		CR				NBR			NS
White-breasted Nuthatch (Slender-billed)	beaver probably benefits								WV	
White-headed Woodpecker	beaver probably benefits	BM			EC	KM				
Willow Flycatcher	beaver benefits						NBR		WV	
Yellow Rail	beaver probably benefits				EC					
Yellow-breasted Chat	beaver probably benefits					KM			WV	
Alvord Chub	beaver benefits						NBR			
Big Skate	neutral/possible benefit									NS
Black Rockfish	neutral/possible benefit									NS
Blue Rockfish	neutral									NS
Borax Lake Chub	neutral						NBR			
Brown Rockfish	neutral/possible benefit									NS
Bull Trout	beaver benefits	BM		CP	EC		NBR	WC	WV	
Cabezon	neutral/possible benefit									NS
Canary Rockfish	neutral									NS
China Rockfish	neutral									NS
Chinook Salmon	beaver benefits	BM	CR	CP	EC	KM	NBR	WC	WV	NS
Chum Salmon	beaver benefits		CR						WV	NS
Coastal Cutthroat Trout	beaver benefits		CR					WC	WV	NS
Coho Salmon	beaver benefits		CR		EC	KM		WC	WV	NS
Copper Rockfish	neutral/possible benefit									NS
Deacon Rockfish	neutral									NS

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Eulachon	neutral/possible benefit		CR			KM			WV	NS
Foskett Spring Speckled Dace	neutral/possible benefit						NBR			
Goose Lake Sucker	neutral/possible benefit				EC					
Grass Rockfish	neutral/possible benefit									NS
Great Basin Redband Trout	beaver probably benefits	BM			EC		NBR			
Green Sturgeon	neutral/possible benefit		CR			KM				NS
Hutton Spring Tui Chub	neutral/possible benefit						NBR			
Kelp Greenling	neutral/possible benefit									NS
Lahontan Cutthroat Trout	beaver benefits						NBR			
Lingcod	neutral/possible benefit									NS
Longfin Smelt	neutral/possible benefit									NS
Lost River Sucker	beaver probably benefits				EC					
Miller Lake Lamprey	beaver benefits				EC					
Millicoma Dace	neutral/possible benefit		CR							
Modoc Sucker	beaver probably benefits				EC					
Northern Anchovy	neutral/possible benefit									NS
Oregon Chub	beaver benefits							WC	WV	
Pacific Herring	neutral/possible benefit									NS
Pacific Lamprey	beaver benefits		CR	CP	EC	KM		WC	WV	NS
Pacific Sand Lance	neutral/possible benefit									NS
Pile Perch	neutral/possible benefit									NS
Pit Sculpin	neutral/possible benefit				EC		NBR			

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Quillback Rockfish	neutral/possible benefit									NS
Redtail Surfperch	neutral/possible benefit									NS
Rock Greenling	neutral/possible benefit									NS
Shiner Perch	neutral/possible benefit									NS
Shortnose Sucker	beaver probably benefits				EC					
Spiny Dogfish	neutral/possible benefit									NS
Starry Flounder	neutral/possible benefit									NS
Steelhead / Rainbow / Redband Trout	beaver benefits	BM	CR	CP	EC	KM		WC	WV	
Striped Perch	neutral/possible benefit									NS
Surf Smelt	neutral/possible benefit									NS
Tiger Rockfish	neutral									NS
Topsmelt	neutral/possible benefit									NS
Umpqua Chub	beaver probably benefits		CR			KM		WC		
Vermilion Rockfish	neutral/possible benefit									NS
Warner Sucker	beaver benefits						NBR			
Western Brook Lamprey	beaver benefits	BM	CR	CP				WC	WV	
Western River Lamprey	beaver benefits		CR	CP					WV	NS
Westslope Cutthroat Trout	beaver benefits	BM		CP						
White Sturgeon	beaver probably benefits									NS
Wolf-eel	neutral									NS
Yelloweye Rockfish	neutral									NS
Yellowtail Rockfish	neutral/possible benefit									NS

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Archimedes Springsnail	beaver probably benefits				EC					
Beller's Ground Beetle	beaver probably benefits				EC			WC		
Black Petaltail	beaver probably benefits		CR		EC			WC		
Blue Mud Shrimp	neutral/possible benefit									NS
Borax Lake Ramshorn	neutral						NBR			
Bulb Juga	neutral/possible benefit	BM		CP						
California Floater Freshwater Mussel	beaver probably benefits								WV	
California Mussel	neutral									NS
Columbia Clubtail	beaver probably benefits	BM					NBR			
Columbia Gorge Caddisfly	beaver probably benefits							WC		
Columbia Gorge Hesperian	beaver probably benefits							WC		
Crater Lake Tightcoil	beaver probably benefits				EC					
Dall's Ramshorn	beaver probably benefits				EC					
Dalles Mountainsnail	neutral/possible benefit			CP						
Dungeness Crab	neutral/possible benefit									NS
Fender's Blue Butterfly	neutral/possible benefit								WV	
Flat Abalone	neutral									NS
Franklin's Bumble Bee	beaver probably benefits					KM		WC		
Great Basin Ramshorn	beaver probably benefits				EC					
Great Spangled Fritillary	beaver probably benefits							WC	WV	
Highcap Lanx	beaver probably benefits				EC					
Hoary Elfin Butterfly	beaver probably does not benefit		CR							

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Insular Blue Butterfly	beaver probably benefits		CR							
Klamath Ramshorn	beaver probably benefits				EC					
Leona's Little Blue Butterfly	neutral				EC			WC		
Lined Ramshorn	beaver probably benefits				EC					
Malheur Cave Amphipod	neutral/possible benefit						NBR			
Malheur Cave Flatworm	neutral/possible benefit						NBR			
Malheur Cave Springtail	neutral/possible benefit						NBR			
Malheur Isopod	neutral/possible benefit						NBR			
Malheur Pseudoscorpion	neutral/possible benefit						NBR			
Mardon Skipper Butterfly	beaver probably benefits					KM				
Monarch Butterfly	beaver probably benefits	BM	CR	CP	EC	KM	NBR	WC	WV	
Native Littleneck Clam	neutral/possible benefit									NS
Ochre Sea Star	neutral/possible benefit									NS
Olympia Oyster	neutral/possible benefit									NS
Oregon Shoulderband	beaver probably benefits					KM		WC		
Oregon Silverspot Butterfly	beaver probably benefits		CR							
Pacific Giant Octopus	neutral/possible benefit									NS
Pacific Walker	beaver probably benefits		CR							
Purple Sea Urchin	neutral									NS
Purple-lipped Juga	beaver probably benefits	BM		CP						
Razor Clam	neutral									NS
Red Abalone	neutral									NS

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Red Sea Urchin	neutral									NS
Robust Walker	beaver probably benefits		CR							
Rock Scallop	neutral									NS
Rotund Lanx	beaver probably benefits					KM				
Scale Lanx	beaver probably benefits				EC					
Scalloped Juga	beaver probably benefits				EC					
Shortface Lanx	beaver probably benefits			CP						
Sinitsin Ramshorn	beaver probably benefits				EC					
Siskiyou Hesperian	beaver probably benefits				EC	KM				
Sisters Hesperian	unclear		CR							
A Stonefly (no common name)	beaver probably benefits								WV	
Sunflower Star	neutral/possible benefit									NS
Taylor's Checkerspot Butterfly	unclear								WV	
Turban Pebblesnail	beaver probably benefits				EC					
Vernal Pool Fairy Shrimp	unclear					KM				
Western Bumble Bee	beaver probably benefits	BM	CR	CP	EC	KM	NBR	WC	WV	
Western Ridged Mussel	beaver probably benefits	BM	CR			KM			WV	
Winged Floater Freshwater Mussel	beaver probably benefits								WV	
American Marten	beaver probably benefits	BM	CR		EC	KM		WC		
American Pika	neutral/possible benefit	BM			EC		NBR	WC		
California Myotis	beaver probably benefits	BM	CR		EC	KM	NBR	WC	WV	

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Columbian White-tailed Deer	beaver benefits		CR						WV	
Fisher	beaver benefits		CR			KM		WC		
Fringed Myotis	beaver probably benefits	BM	CR		EC	KM	NBR	WC	WV	
Gray Whale	neutral									NS
Gray Wolf	beaver benefits	BM			EC	KM	NBR	WC		
Harbor Porpoise	neutral/possible benefit									NS
Hoary Bat	beaver probably benefits	BM	CR	CP	EC	KM	NBR	WC	WV	
Killer Whale	beaver probably benefits									NS
Kit Fox	beaver probably does not benefit						NBR			
Long-legged Myotis	beaver probably benefits	BM	CR		EC	KM	NBR	WC		
Northern Elephant Seal	neutral/possible benefit									NS
Pacific Harbor Seal	neutral/possible benefit									NS
Pallid Bat	beaver probably benefits	BM		CP	EC	KM	NBR			
Pygmy Rabbit	beaver probably does not benefit						NBR			
Red Tree Vole	beaver probably does not benefit		CR			KM		WC		
Ringtail	beaver probably benefits		CR			KM		WC		
Rocky Mountain Bighorn Sheep	beaver probably benefits	BM								
Sierra Nevada Red Fox	beaver probably benefits				EC	KM		WC		
Silver-haired Bat	beaver probably benefits	BM	CR	CP	EC	KM	NBR	WC	WV	
Spotted Bat	beaver probably benefits	BM		CP	EC	KM	NBR			
Steller Sea Lion	neutral/possible benefit									NS
Townsend's Big-eared Bat	beaver probably benefits	BM	CR	CP	EC	KM	NBR	WC	WV	

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Washington Ground Squirrel	unclear			CP						
Western Gray Squirrel	beaver probably benefits								WV	
White-tailed Jackrabbit	beaver probably benefits						NBR			
Wolverine	beaver benefits	BM								
Applegate's Milkvetch	neutral/possible benefit				EC					
Arrow-leaf Thelypody	unclear	BM								
Big-flowered Wooly Meadowfoam	unclear					KM				
Boggs Lake Hedge Hyssop	beaver probably benefits						NBR			
Bradshaw's Desert Parsley	beaver probably benefits								WV	
Bull Kelp	neutral/possible benefit									NS
Cascade Head Catchfly	beaver probably does not benefit		CR							
Coast Range Fawn Lily	neutral		CR							
Cook's Desert Parsley	unclear					KM				
Crinite Mariposa Lily	beaver probably does not benefit					KM				
Cronquist's Stickseed	unclear						NBR			
Crosby's Buckwheat	unclear						NBR			
Cusick's Lupine	neutral	BM								
Davis' Peppergrass	unclear						NBR			
Dwarf Meadowfoam	unclear					KM				
Gentner's Fritillary	unclear					KM				
Golden Buckwheat	beaver probably does not benefit						NBR			
Golden Paintbrush	unclear								WV	

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Greenman's Desert Parsley	unclear	BM								
Grimy Ivesia	beaver probably does not benefit						NBR			
Howell's Mariposa Lily	unclear					KM				
Howell's Microseris	unclear					KM				
Howell's Spectacular Thelypody	unclear	BM								
Howellia	beaver probably benefits								WV	
Kincaid's Lupine	neutral/possible benefit					KM			WV	
Large-flowered Rush Lily	beaver probably benefits					KM				
Lawrence's Milkvetch	beaver probably does not benefit			CP						
Macfarlane's Four o'Clock	beaver probably does not benefit	BM								
Malheur Valley Fiddleneck	neutral						NBR			
Malheur Wire-lettuce	neutral						NBR			
McDonald's Rockcress	unclear					KM				
Mulford's Milkvetch	unclear						NBR			
Native Eelgrass	beaver probably benefits									NS
Nelson's Checkermallow	beaver probably benefits		CR						WV	
Northern Wormwood	neutral/possible benefit			CP				WC		
Oregon Semaphore Grass	beaver probably benefits	BM			EC					
Owyhee Clover	unclear						NBR			
Packard's Mentzelia	neutral						NBR			
Peacock Larkspur	beaver probably benefits								WV	
Peck's Milkvetch	unclear	BM			EC					

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
Pink Sandverbena	neutral		CR							
Point Reyes Bird's-beak	neutral/possible benefit		CR							
Pumice Grape-fern	unclear				EC					
Red-fruited Lomatium	beaver probably does not benefit	BM								
Rough Popcornflower	unclear					KM				
Sea Palm	neutral									NS
Sexton Mountain Mariposa Lily	neutral					KM				
Shiny-fruited Allocarya	neutral					KM				
Silvery Phacelia	neutral		CR							
Smooth Mentzelia	beaver probably does not benefit						NBR			
Snake River Goldenweed	beaver probably does not benefit	BM					NBR			
South Fork John Day Milkvetch	beaver probably does not benefit	BM								
Spalding's Campion	unclear	BM								
Sterile Milkvetch	beaver probably does not benefit						NBR			
Surf Grass	neutral									NS
Tygh Valley Milkvetch	beaver probably does not benefit			CP						
Umpqua Mariposa Lily	beaver probably does not benefit					KM		WC		
Wayside Aster	beaver probably does not benefit					KM		WC	WV	
Western Lily	beaver probably benefits		CR							
White Rock Larkspur	unclear							WC	WV	
White-topped Aster	neutral/possible benefit								WV	
Willamette Daisy	neutral/possible benefit								WV	
Wolf's Evening Primrose	beaver probably does not benefit		CR							

OCS Species Common Name	Assessment	Blue Mountains	Coastal Range	Columbia Plateau	East Cascades	Klamath Mountains	North Basin and Range	West Cascades	Willamette Valley	Near Shore
California Mountain Kingsnake	beaver probably benefits		CR	CP	EC	KM		WC		
Northern Sagebrush Lizard	beaver probably benefits			CP						
Western Painted Turtle	beaver benefits	BM	CR	CP	EC			WC	WV	
Western Pond Turtle	beaver benefits		CR		EC	KM		WC	WV	
Western Rattlesnake	beaver probably benefits								WV	
Total Species		58	63	35	69	67	66	60	63	74
Total Species %		19.73%	21.43%	11.90%	23.47%	22.79%	22.45%	20.41%	21.43%	25.17%

Appendix D: State Wildlife Action Plan, Conservation Assessment, and Recovery Plans Discussing Beavers

The following appendix shows which of the 294 species on the Oregon Conservation Strategy list are described in other western states' State Wildlife Action Plans as living in habitats influenced by beavers. The states whose action plans are referenced are California, Idaho, Washington, and Wyoming.

This appendix also contains the list of U.S. Fish and Wildlife (FWS), Oregon Department of Fish and Wildlife (ODFW), and Interagency Special Status/Sensitive Species Program (ISSSSP) species conservation assessment and recovery plans for OCS species that directly mention beavers or beaver activity as contributors to existing habitat or as an action item for the conservation of the species.

SWAP Species Categorization Legend:

Categorization	Meaning
beaver benefits	The SWAP document lists this species either as benefitting from the ecological services of beaver or as living in a habitat that is supported by beaver presence
coexists	The SWAP document lists this species as living in a habitat where beavers are also found, but that is not confirmed to be supported by beaver presence

The SWAP documents describe the ecological benefits and importance of beavers in many ways. They describe the benefits observed when beavers are present, the ecosystem degradation observed as a result of beaver absence, how beaver presence can be an action item to support restoration efforts, as well as how beaver ponds and other beaver-constructed features are integral parts of several types of habitat. The table below contains quotes reflecting the language used surrounding beavers in these documents:

Type of Beaver-Related Description	Quotes
Ecosystem health in the presence of beavers	• "Beavers have historically been important in slowing and storing surface water runoff, raising groundwater tables, expanding wetland habitat, and improving soil moisture for wetland vegetation. Restoration of American Beaver populations may play an important role in mitigating the effects of climate change in watersheds" (Idaho Department of Fish and Game, 2017, p. 146)
Ecosystem degradation in the absence of beavers	• "American Beaver populations currently exist at lower than historic levels across the western US, including northern Idaho. This results in a host of ecological consequences such as stream incision, lowered water table, and reduced extent and wetness of riparian habitat. Beaver restoration efforts have been shown to be an effective tool for restoring habitat and ecological function to riverine systems" (Idaho Department of Fish and Game, 2017, p. 100)

	● "While the widespread removal of American Beaver has harmed riparian ecosystem processes, American Beaver recolonization in the interior Columbia River Basin has led to the rapid improvement in riparian processes, structures, and quality of instream salmon habitat along incised streams." (Washington Department of Fish and Wildlife, 2015, p. 4-36) ● "Aspen woodlands in riparian situations may be suffering drought-like effects from the historic reductions in beaver numbers and distribution." (Wyoming Game and Fish Department, 2017, p. 1-10)
Action items related to beaver restoration	● "Educate landowners and the public on the benefits of beavers for mitigating climate change impacts" (Idaho Department of Fish and Game, 2017, p. 494) ● "Encourage acceptance and tolerance of beavers through education and outreach" (Idaho Idaho Department of Fish and Game, 2017, p. 606) ● "Action: Use boulders, anchored large wood, beaver, or other methods to stabilize head cuts and raise the water table of incised channels in seep-fed meadows; scatter small logs (e.g., juniper) to disperse overland flow" (Idaho Idaho Department of Fish and Game, 2017, p. 739)
Beavers as integral components of habitat types	● "For the purposes of this document, wetlands include wet meadows, potholes, playas, oxbows, beaver ponds, marshes, bogs, seeps, the vegetated shorelines of lakes and ponds, and other types of open water." (Wyoming Game and Fish Department, 2017, p. 10-2) ● "Montane marshes that are created as a function of beaver dams and along shorelines can be quite common" (New Mexico Department of Game and Fish, 2015, p. 134)

SWAP Species Benefiting From Beaver by State and Report Year:

State	SWAP Report Year	# OCS Species (%) Benefitting From Beaver
California	2015	15 (5%)
Idaho	2015	33 (11%)
Idaho	2023	38 (13%)
Washington	2015	21 (7%)
Wyoming	2017	24 (8%)

Total Unique SWAP Species Benefiting From Beaver

Species Categorization	# Of OCS Species	% of Total OCS Species
Benefit (and Coexist)	65	22%
Coexist	9	3%
Benefit and/or Coexist	74	25%

OCS Species Common Name	Idaho SWAP (2015)	Idaho SWAP (2023)	Washington SWAP (2015)	Wyoming SWAP (2017)	California SWAP (2015)	New Mexico SWAP (2016)	Colorado SWAP (2015)
Cascade Torrent Salamander	No	no	no	no	no	no	no
Cascades Frog	beaver benefits	no	no	no	no	no	no
Clouded Salamander	No	no	no	no	no	no	no
Coastal Tailed Frog	No	no	no	no	beaver benefits	no	no
Columbia Spotted Frog	beaver benefits	beaver benefits	beaver benefits	beaver benefits	no	no	no
Columbia Torrent Salamander	No	no	no	no	no	no	no
Cope's Giant Salamander	No	no	no	no	no	no	no
Del Norte Salamander	No	no	no	no	beaver benefits	no	no
Foothill Yellow-legged Frog	No	no	no	no	beaver benefits	no	no
Larch Mountain Salamander	No	no	no	no	no	no	no
Northern Red-legged Frog	No	no	no	no	beaver benefits	no	no
Oregon Slender Salamander	No	no	no	no	no	no	no
Oregon Spotted Frog	No	no	beaver benefits	no	no	no	no
Rocky Mountain Tailed Frog	No	beaver benefits	beaver benefits	no	no	no	no
Siskiyou Mountains Salamander	No	no	no	no	no	no	no
Southern Torrent Salamander	No	no	no	no	no	no	no
Western Toad	beaver benefits	beaver benefits	beaver benefits	beaver benefits	no	no	no
Acorn Woodpecker	No	no	no	no	no	no	no
American Three-toed Woodpecker	No	no	no	no	no	no	no
American White Pelican	beaver benefits	beaver benefits	no	beaver benefits	beaver benefits	no	no
Black Brant	No	no	no	no	no	no	no
Black Oystercatcher	No	no	no	no	no	no	no
Black Swift	No	beaver benefits	no	no	no	coexists with	no
Black-backed Woodpecker	No	no	no	no	no	no	no
Black-necked Stilt	No	no	no	no	no	no	no
Bobolink	beaver benefits	no	no	no	no	no	no
Brewer's Sparrow	No	no	no	no	no	no	no
Brown Pelican (California)	No	no	no	no	no	no	no
Burrowing Owl (Western)	beaver benefits	no	no	no	no	no	no
Caspian Tern	No	beaver benefits	no	beaver benefits	no	no	no

OCS Species Common Name	Idaho SWAP (2015)	Idaho SWAP (2023)	Washington SWAP (2015)	Wyoming SWAP (2017)	California SWAP (2015)	New Mexico SWAP (2016)	Colorado SWAP (2015)
Chipping Sparrow	No	no	no	no	no	no	no
Columbian Sharp-tailed Grouse	beaver benefits	beaver benefits	beaver benefits	beaver benefits	no	no	coexists with
Common Nighthawk	beaver benefits	beaver benefits	no	no	no	no	no
Dusky Canada Goose	No	no	beaver benefits	no	no	no	no
Ferruginous Hawk	No	no	beaver benefits	beaver benefits	no	no	no
Flammulated Owl	No	no	coexists with	beaver benefits	no	coexists with	no
Fork-tailed Storm-Petrel	No	no	no	no	no	no	no
Franklin's Gull	beaver benefits	beaver benefits	no	beaver benefits	no	no	no
Grasshopper Sparrow	beaver benefits	no	no	no	no	no	no
Great Gray Owl	beaver benefits	beaver benefits	no	beaver benefits	no	no	no
Greater Sage-Grouse	beaver benefits	beaver benefits	no	beaver benefits	no	no	no
Greater Sandhill Crane	beaver benefits	beaver benefits	beaver benefits	no	beaver benefits	no	no
Harlequin Duck	beaver benefits	beaver benefits	beaver benefits	beaver benefits	no	no	no
Juniper Titmouse	No	no	no	no	no	coexists with	no
Leach's Storm-Petrel	No	no	no	no	no	no	no
Lewis’s Woodpecker	beaver benefits	beaver benefits	beaver benefits	beaver benefits	no	coexists with	coexists with
Loggerhead Shrike	No	no	beaver benefits	no	no	coexists with	no
Long-billed Curlew	beaver benefits	beaver benefits	no	no	no	coexists with	no
Marbled Murrelet	No	no	no	no	no	no	no
Mountain Quail	beaver benefits	beaver benefits	coexists with	no	no	no	no
Northern Goshawk	No	no	no	beaver benefits	no	no	no
Northern Spotted Owl	No	no	no	no	beaver benefits	no	no
Olive-sided Flycatcher	beaver benefits	beaver benefits	no	no	no	coexists with	no
Oregon Vesper Sparrow	No	no	no	no	no	coexists with	no
Peregrine Falcon (American)	No	no	beaver benefits	no	beaver benefits	coexists with	no
Pileated Woodpecker	No	no	no	no	no	no	no
Purple Martin (Western)	No	no	beaver benefits	beaver benefits	beaver benefits	no	no
Red-necked Grebe	No	no	no	no	no	no	no
Rock Sandpiper	No	no	no	no	no	no	no
Sagebrush Sparrow	beaver benefits	no	no	no	no	coexists with	no

OCS Species Common Name	Idaho SWAP (2015)	Idaho SWAP (2023)	Washington SWAP (2015)	Wyoming SWAP (2017)	California SWAP (2015)	New Mexico SWAP (2016)	Colorado SWAP (2015)
Short-eared Owl	beaver benefits	beaver benefits	beaver benefits	no	beaver benefits	no	no
Snowy Egret	No	no	no	beaver benefits	no	no	no
Streaked Horned Lark	No	no	no	no	no	no	no
Swainson's Hawk	No	no	no	beaver benefits	no	no	no
Trumpeter Swan	beaver benefits	beaver benefits	no	beaver benefits	no	no	no
Tufted Puffin	No	no	no	no	no	no	no
Upland Sandpiper	No	no	no	no	no	no	no
Western Bluebird	No	no	no	no	no	coexists with	no
Western Meadowlark	No	no	no	no	no	no	no
Western Snowy Plover	No	no	no	no	no	no	no
White-breasted Nuthatch (Slender-billed)	No	no	no	no	no	no	no
White-headed Woodpecker	No	no	no	no	no	no	no
Willow Flycatcher	No	no	no	beaver benefits	beaver benefits	coexists with	coexists with
Yellow Rail	No	no	no	no	no	no	no
Yellow-breasted Chat	No	no	no	no	no	no	no
Alvord Chub	No	no	no	no	no	no	no
Big Skate	No	no	no	no	no	no	no
Black Rockfish	No	no	no	no	no	no	no
Blue Rockfish	No	no	no	no	no	no	no
Borax Lake Chub	No	no	no	no	no	no	no
Brown Rockfish	No	no	no	no	no	no	no
Bull Trout	No	beaver benefits	no	no	no	no	no
Cabezon	No	no	no	no	no	no	no
Canary Rockfish	No	no	no	no	no	no	no
China Rockfish	No	no	no	no	no	no	no
Chinook Salmon	beaver benefits	beaver benefits	no	no	no	no	no
Chum Salmon	No	no	no	no	no	no	no
Coastal Cutthroat Trout	No	no	no	no	no	no	no
Coho Salmon	No	no	no	no	coexists with	no	no

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Copper Rockfish	No	no	no	no	no	no	no
Deacon Rockfish	No	no	no	no	no	no	no
Eulachon	No	no	no	no	no	no	no
Foskett Spring Speckled Dace	No	no	no	no	no	no	no
Goose Lake Sucker	No	no	no	no	no	no	no
Grass Rockfish	No	no	no	no	no	no	no
Great Basin Redband Trout	No	no	no	no	no	no	no
Green Sturgeon	No	no	no	no	coexists with	no	no
Hutton Spring Tui Chub	No	no	no	no	no	no	no
Kelp Greenling	No	no	no	no	no	no	no
Lahontan Cutthroat Trout	No	no	no	no	no	no	no
Lingcod	No	no	no	no	no	no	no
Longfin Smelt	No	no	no	no	no	no	no
Lost River Sucker	No	no	no	no	no	no	no
Miller Lake Lamprey	No	no	no	no	no	no	no
Millicoma Dace	No	no	no	no	no	no	no
Modoc Sucker	No	no	no	no	no	no	no
Northern Anchovy	No	no	no	no	no	no	no
Oregon Chub	No	no	no	no	no	no	no
Pacific Herring	No	no	no	no	no	no	no
Pacific Lamprey	beaver benefits	beaver benefits	no	no	coexists with	no	no
Pacific Sand Lance	No	no	no	no	no	no	no
Pile Perch	No	no	no	no	no	no	no
Pit Sculpin	No	no	no	no	no	no	no
Quillback Rockfish	No	no	no	no	no	no	no
Redtail Surfperch	No	no	no	no	no	no	no
Rock Greenling	No	no	no	no	no	no	no
Shiner Perch	No	no	no	no	no	no	no
Shortnose Sucker	No	no	no	no	no	no	no
Spiny Dogfish	No	no	no	no	no	no	no

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Starry Flounder	No	no	no	no	no	no	no
Steelhead / Rainbow / Redband Trout	beaver benefits	beaver benefits	no	no	coexists with	no	no
Striped Perch	No	no	no	no	no	no	no
Surf Smelt	No	no	no	no	no	no	no
Tiger Rockfish	No	no	no	no	no	no	no
Topsmelt	No	no	no	no	no	no	no
Umpqua Chub	No	no	no	no	no	no	no
Vermilion Rockfish	No	no	no	no	no	no	no
Warner Sucker	No	no	no	no	no	no	no
Western Brook Lamprey	No	no	no	no	no	no	no
Western River Lamprey	No	no	no	no	no	no	no
Westslope Cutthroat Trout	No	no	no	no	no	no	no
White Sturgeon	No	beaver benefits	no	no	coexists with	no	no
Wolf-eel	No	no	no	no	no	no	no
Yelloweye Rockfish	No	no	no	no	no	no	no
Yellowtail Rockfish	No	no	no	no	no	no	no
Archimedes Springsnail	No	no	no	no	no	no	no
Beller's Ground Beetle	No	no	no	no	no	no	no
Black Petaltail	No	no	no	no	no	no	no
Blue Mud Shrimp	No	no	no	no	no	no	no
Borax Lake Ramshorn	No	no	no	no	no	no	no
Bulb Juga	No	no	no	no	no	no	no
California Floater Freshwater Mussel	No	no	no	no	no	no	no
California Mussel	No	no	no	no	no	no	no
Columbia Clubtail	No	no	beaver benefits	no	no	no	no
Columbia Gorge Caddisfly	No	no	no	no	no	no	no
Columbia Gorge Hesperian	No	no	no	no	no	no	no
Crater Lake Tightcoil	No	no	no	no	no	no	no

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Dall's Ramshorn	No	no	no	no	no	no	no
Dalles Mountainsnail	No	no	no	no	no	no	no
Dungeness Crab	No	no	no	no	no	no	no
Fender’s Blue Butterfly	No	no	no	no	no	no	no
Flat Abalone	No	no	no	no	no	no	no
Franklin's Bumble Bee	No	no	no	no	no	no	no
Great Basin Ramshorn	No	no	no	no	no	no	no
Great Spangled Fritillary	No	no	no	no	no	no	no
Highcap Lanx	No	no	no	no	no	no	no
Hoary Elfin Butterfly	No	no	no	no	no	no	no
Insular Blue Butterfly	No	no	no	no	no	no	no
Klamath Ramshorn	No	no	no	no	no	no	no
Leona's Little Blue Butterfly	No	no	no	no	no	no	no
Lined Ramshorn	No	no	no	no	no	no	no
Malheur Cave Amphipod	No	no	no	no	no	no	no
Malheur Cave Flatworm	No	no	no	no	no	no	no
Malheur Cave Springtail	No	no	no	no	no	no	no
Malheur Isopod	No	no	no	no	no	no	no
Malheur Pseudoscorpion	No	no	no	no	no	no	no
Mardon Skipper Butterfly	No	no	no	no	no	no	no
Monarch Butterfly	beaver benefits	beaver benefits	no	no	no	no	no
Native Littleneck Clam	No	no	no	no	no	no	no
Ochre Sea Star	No	no	no	no	no	no	no
Olympia Oyster	No	no	no	no	no	no	no
Oregon Shoulderband	No	no	no	no	no	no	no
Oregon Silverspot Butterfly	No	no	no	no	no	no	no
Pacific Giant Octopus	No	no	no	no	no	no	no
Pacific Walker	No	no	no	no	no	no	no
Purple Sea Urchin	No	no	no	no	no	no	no
Purple-lipped Juga	No	no	no	no	no	no	no

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Razor Clam	No	no	no	no	no	no	no
Red Abalone	No	no	no	no	no	no	no
Red Sea Urchin	No	no	no	no	no	no	no
Robust Walker	No	no	no	no	no	no	no
Rock Scallop	No	no	no	no	no	no	no
Rotund Lanx	No	no	no	no	no	no	no
Scale Lanx	No	no	no	no	no	no	no
Scalloped Juga	No	no	no	no	no	no	no
Shortface Lanx	No	beaver benefits	no	no	no	no	no
Sinitsin Ramshorn	No	no	no	no	no	no	no
Siskiyou Hesperian	No	no	no	no	no	no	no
Sisters Hesperian	No	no	no	no	no	no	no
A Stonefly (no common name)	No	no	no	no	no	no	no
Sunflower Star	no	no	no	no	no	no	no
Taylor's Checkerspot Butterfly	no	no	no	no	no	no	no
Turban Pebblesnail	no	no	no	no	no	no	no
Vernal Pool Fairy Shrimp	no	no	no	no	no	no	no
Western Bumble Bee	beaver benefits	beaver benefits	no	no	no	no	coexists with
Western Ridged Mussel	beaver benefits	beaver benefits	no	no	no	no	no
Winged Floater Freshwater Mussel	no	no	no	no	no	no	no
American Marten	no	beaver benefits	no	no	no	no	no
American Pika	no	no	no	no	no	no	no
California Myotis	no	no	no	no	no	no	no
Columbian White-tailed Deer	no	no	beaver benefits	no	no	no	no
Fisher	beaver benefits	beaver benefits	coexists with	no	beaver benefits	no	no
Fringed Myotis	no	beaver benefits	no	beaver benefits	beaver benefits	no	no
Gray Whale	no	no	no	no	no	no	no
Gray Wolf	no	no	coexists with	no	no	no	no
Harbor Porpoise	no	no	no	no	no	no	no
Hoary Bat	beaver benefits	beaver benefits	beaver benefits	no	no	no	coexists with

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Killer Whale	no	no	no	no	no	no	no
Kit Fox	no	no	no	no	no	no	no
Long-legged Myotis	no	beaver benefits	no	beaver benefits	beaver benefits	no	no
Northern Elephant Seal	no	no	no	no	no	no	no
Pacific Harbor Seal	no	no	no	no	no	no	no
Pallid Bat	no	beaver benefits	no	beaver benefits	no	no	no
Pygmy Rabbit	no	no	no	no	no	no	no
Red Tree Vole	no	no	no	no	no	no	no
Ringtail	no	no	no	no	coexists with	no	no
Rocky Mountain Bighorn Sheep	beaver benefits	no	no	no	no	no	no
Sierra Nevada Red Fox	no	no	no	no	no	no	no
Silver-haired Bat	beaver benefits	beaver benefits	beaver benefits	no	no	no	no
Spotted Bat	no	beaver benefits	beaver benefits	beaver benefits	no	coexists with	no
Steller Sea Lion	no	no	no	no	no	no	no
Townsend's Big-eared Bat	beaver benefits	beaver benefits	beaver benefits	beaver benefits	no	coexists with	no
Washington Ground Squirrel	no	no	no	no	no	no	no
Western Gray Squirrel	no	no	coexists with	no	no	no	no
White-tailed Jackrabbit	no	no	no	no	no	no	no
Wolverine	beaver benefits	no	no	no	no	no	no
Applegate's Milkvetch	no	no	no	no	no	no	no
Arrow-leaf Thelypody	no	no	no	no	no	no	no
Big-flowered Wooly Meadowfoam	no	no	no	no	no	no	no
Boggs Lake Hedge Hyssop	no	no	no	no	no	no	no
Bradshaw's Desert Parsley	no	no	no	no	no	no	no
Bull Kelp	no	no	no	no	no	no	no
Cascade Head Catchfly	no	no	no	no	no	no	no
Coast Range Fawn Lily	no	no	no	no	no	no	no
Cook's Desert Parsley	no	no	no	no	no	no	no
Crinite Mariposa Lily	no	no	no	no	no	no	no
Cronquist's Stickseed	no	no	no	no	no	no	no

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Crosby's Buckwheat	no	no	no	no	no	no	no
Cusick's Lupine	no	no	no	no	no	no	no
Davis' Peppergrass	no	no	no	no	no	no	no
Dwarf Meadowfoam	no	no	no	no	no	no	no
Gentner's Fritillary	no	no	no	no	no	no	no
Golden Buckwheat	no	no	no	no	no	no	no
Golden Paintbrush	no	no	no	no	no	no	no
Greenman's Desert Parsley	no	no	no	no	no	no	no
Grimy Ivesia	no	no	no	no	no	no	no
Howell's Mariposa Lily	no	no	no	no	no	no	no
Howell's Microseris	no	no	no	no	no	no	no
Howell's Spectacular Thelypody	no	no	no	no	no	no	no
Howellia	no	beaver benefits	no	no	no	no	no
Kincaid's Lupine	no	no	no	no	no	no	no
Large-flowered Rush Lily	no	no	no	no	no	no	no
Lawrence's Milkvetch	no	no	no	no	no	no	no
Macfarlane's Four o'Clock	no	no	no	no	no	no	no
Malheur Valley Fiddleneck	no	no	no	no	no	no	no
Malheur Wire-lettuce	no	no	no	no	no	no	no
McDonald's Rockcress	no	no	no	no	no	no	no
Mulford's Milkvetch	no	no	no	no	no	no	no
Native Eelgrass	no	no	no	no	no	no	no
Nelson's Checkermallow	no	no	no	no	no	no	no
Northern Wormwood	no	no	no	no	no	no	no
Oregon Semaphore Grass	no	no	no	no	no	no	no
Owyhee Clover	no	no	no	no	no	no	no
Packard's Mentzelia	no	no	no	no	no	no	no
Peacock Larkspur	no	no	no	no	no	no	no
Peck's Milkvetch	no	no	no	no	no	no	no
Pink Sandverbena	no	no	no	no	no	no	no

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Point Reyes Bird's-beak	no	no	no	no	no	no	no
Pumice Grape-fern	no	no	no	no	no	no	no
Red-fruited Lomatium	no	no	no	no	no	no	no
Rough Popcornflower	no	no	no	no	no	no	no
Sea Palm	no	no	no	no	no	no	no
Sexton Mountain Mariposa Lily	no	no	no	no	no	no	no
Shiny-fruited Allocarya	no	no	no	no	no	no	no
Silvery Phacelia	no	no	no	no	no	no	no
Smooth Mentzelia	no	no	no	no	no	no	no
Snake River Goldenweed	no	no	no	no	no	no	no
South Fork John Day Milkvetch	no	no	no	no	no	no	no
Spalding's Campion	no	no	no	no	no	no	no
Sterile Milkvetch	no	no	no	no	no	no	no
Surf Grass	no	no	no	no	no	no	no
Tygh Valley Milkvetch	no	no	no	no	no	no	no
Umpqua Mariposa Lily	no	no	no	no	no	no	no
Wayside Aster	no	no	no	no	no	no	no
Western Lily	no	no	no	no	no	no	no
White Rock Larkspur	no	no	no	no	no	no	no
White-topped Aster	no	no	no	no	no	no	no
Willamette Daisy	no	no	no	no	no	no	no
Wolf's Evening Primrose	no	no	no	no	no	no	no
California Mountain Kingsnake	no	no	no	no	no	coexists with	no
Northern Sagebrush Lizard	no	no	no	no	no	no	no
Western Painted Turtle	no	no	no	beaver benefits	no	no	no
Western Pond Turtle	no	no	beaver benefits	no	beaver benefits	no	no
Western Rattlesnake	no	no	no	no	no	no	no
Species that Beavers are Expected to Benefit	33	38	21	24	15	0	0
Species Coexisting With Beavers	0	0	5	0	6	15	5

USFW, ODFW, and ISSSSP species Conservation Assessment and Recovery Plans Mentioning Beavers

Report Name	Publisher	Publication Year	OCS Species	Key Quote(s) Discussing Beaver
RECOVERY PLAN FOR THE NATIVE FISHES OF THE WARNER BASIN AND ALKALI SUBBASIN: Warner sucker (Threatened) Catostomus warnerensis Hutton tui chub (Threatened) Gila bicolor ssp. Foskett speckled dace (Threatened) Rhinichthys osculus ssp.	FWS	1998	Warner Sucker	“...in general, adult suckers used stretches of stream where the gradient was sufficiently low to allow the formation of long...pools...About 45 percent of these pools were beaver ponds”
Recovery Plan for the Oregon Chub (Oregonichthys crameri)	FWS	1998	Oregon Chub	“Oregon chub are found in slack water off-channel habitats such as beaver ponds...”
Final Recovery Plan Southwestern Willow Flycatcher (Empidonax traillii extimus)	FWS	2002	Willow Flycatcher	"Occupied sites are typically located along slow-moving stream reaches...and at the margins of impounded water (e.g., beaver ponds...).”; a restoration action item for this species includes managing “keystone species such as beaver...to restore desired processes, increase habitat quality and quantity, reduce fire potential, and favor native over exotic plants. Beaver activity creates still waters by impoundment and aids sediment storage.”
2005 Oregon Native Fish Status Report Volume II Assessment Methods & Population Results	ODFW	2005	Cutthroat Trout, Oregon Chub	"during dry years and summer months [cutthroat trout] distribution shrinks to just a few beaver ponds"; "Oregon chub prefer off-channel habitats with minimal or no flow, an abundance of vegetation, and depositional substrate including sloughs, backwater pools, stable beaver ponds, oxbows, and low gradient tributaries"
Oregon Coast Coho Conservation Plan For the State of Oregon	ODFW	2007	Coho Salmon	"High quality over-wintering habitat for juvenile coho is usually recognizable by one or more of the following features: large wood, a lot of wood, pools, connected off-channel alcoves, beaver ponds, lakes, connected floodplains and wetlands, and other conditions"
Conservation Assessment for the Western Painted Turtle in Oregon (Chrysemys Picta Bellii)	ISSSSP	2009	Painted Turtle	“In...drought, painted turtles...traveled overland to more permanent water that included... ponded areas behind beaver dams ”
Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead	ODFW	2010	Coho Salmon, Chinook Salmon, Chum Salmon, Steelhead	“Develop education and outreach on the benefits of beaver dams to ecosystems and fishes; provide landowner assistance with regards to property damage from beavers; provide incentives to landowners managing their land to achieve the habitat benefits that beavers provide”
UPPER WILLAMETTE RIVER CONSERVATION AND RECOVERY PLAN FOR CHINOOK SALMON AND STEELHEAD	ODFW	2011	Steelhead, Chinook Salmon	" Include education and outreach materials on the benefit of beaver dams to ecosystem function in general and specifically to juvenile rearing habitat."
Coastal Multispecies Conservation and Management Plan (Chinook Salmon, Chum Salmon, steelhead, Cutthroat Trout)	ODFW	2014	Chinook Salmon, Chum Salmon, Steelhead, Cutthroat Trout	Habitat tactics include encouraging "the restorative role of beavers in smaller stream reaches"
Conservation Assessment for Harlequin Duck (Histrionicus histrionicus)	ISSSSP	2018	Harlequin Duck	“downy ducklings are not strong swimmers...Montana females moved broods to small beaver ponds or oxbow ponds”
Conservation Assessment For Purple Martin (Progne subis)	ISSSSP	2019	Purple Martin	“They nest opportunistically in cavities in open habitats created by disturbance like...flooding from beaver ponds”
FINAL Coastal, Columbia, and Snake Conservation Plan for Lampreys in Oregon	ODFW	2020	Pacific Lamprey, Miller Lake Lamprey, Western Brook Lamprey, Western River Lamprey	“...encourage use of beavers to restore habitats...also should improve conditions for all life stages of lampreys”
Rogue–South Coast Multi-Species Conservation and Management Plan	ODFW	2021	Steelhead, Coho Salmon, Cutthroat Trout	"Promote beavers and beaver-related pond habitat to increase water quantity and stream complexity, primarily through riparian restoration and helping landowners learn to live with beaver impacts."
Draft Recovery Plan for Oregon Spotted Frog (Rana pretiosa)	FWS	2023	Oregon Spotted Frog	Threats to species include “Changes in hydrology - dams, human related modifications to seasonal flooding, water diversions, dams and manipulation, draining for development, drought, loss of beaver”