

EXECUTIVE SUMMARY

We conducted an extensive assessment of Puget Sound biodiversity by identifying all species present in the Puget Basin and determining which of these species are classified as imperiled. For imperiled species, we identified the primary threats that led to their decline and the key habitats they depend on.

Based on an exhaustive search of regional taxa guides, databases, and other sources, we identified 7,013 species in the Puget Sound Basin, including 4,248 animals, 1,504 plants, 851 fungi, and 392 algae. This is more species than are found in 31 individual states, indicating the Puget Sound is a significant hotspot for biological diversity in the United States.

Of the 7,013 species found in Puget Sound, we determined that 957 (14%) are imperiled, including 519 plants, 296 animals, 129 fungi and 13 marine algae (seaweed). Of imperiled animals, 119 are invertebrates, 80 are birds, 44 are mammals, 38 are fish, 11 are amphibians, and four are reptiles (Figure 1). Of the 957 imperiled species, 285 are critically imperiled, 272 are imperiled, and 400 are vulnerable.

According to our research, at least 14 species are believed to be extirpated from the Puget Sound, including such well known species as the Gray Wolf and Grizzly Bear, as well as the Pacific Fisher, Yellow-billed Cuckoo, eight invertebrates, and two subspecies of Mazama Pocket Gopher.

A total of 17 species are listed as threatened or endangered under the Endangered Species Act and another 13 species are candidates for

listing. Given our finding that there are at least 956 imperiled species in the Puget Basin, including 557 critically imperiled and imperiled species, clearly more species require the greater protection provided by the Act.

Puget Sound species are threatened by a multitude of factors, of which habitat destruction primarily from urban and agricultural sprawl and logging, is the most severe. Other causes of species imperilment include exotic species, pollution, global climate change, and overfishing. Although there is an increasing focus on protecting wildlife and the habitats they depend on, these threats are—if anything—growing.

Imperiled species occur in all of the Puget Sound habitats. A number of habitats are of particular importance, including old-growth forests, Puget Prairies, rivers and wetlands, coasts and estuaries, marine environments, and alpine meadows. Although some of these habitats, such as old-growth forests, have received significant attention and a modicum of protection, others have severely declined with little notice. Pristine Puget Prairies, for example, now occupy as little as three percent of their former extent, but little action has been taken to protect or restore this precious ecosystem. Likewise, 32 fish species are imperiled in estuarine and marine environments, yet efforts to create meaningful marine reserves or provide other stringent protections have, to date, not come to fruition. The sheer number of imperiled species indicates swift action must be taken to avoid further loss of the Puget Sound's incredible natural heritage.

on the cover: Puget Prairie in the Yellow Island Preserve
photo by Keith Lazelle

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Marbled Murrelets are denizens of both marine waters, where they feed, and old-growth forests, where they nest.

photo by Tom Holt

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INTRODUCTION

The Puget Sound Basin supports a rich diversity of habitats ranging from Eel Grass beds to old-growth forests and alpine meadows. In the past century, these habitats have been degraded by a myriad of factors including logging, mining, livestock grazing, water pollution, overfishing, fire suppression, spread of exotic species, and urban and agricultural sprawl. Many native species that thrived in the basin for tens of thousands of years have declined, some to the point of becoming endangered species, others becoming entirely extinct.

In the absence of a complete biodiversity assessment, it is impossible to gauge the level of

impact to native species or adequately prioritize conservation efforts at national, regional, or local levels. Some species and habitat types such as the Northern Spotted Owl and old-growth forests receive significant attention while others, such as the Streaked Horned Lark and prairies have gone relatively unnoticed despite dramatic declines. In conducting the first study to catalog and assess the conservation status of all known species in the Puget Sound Basin, we hope to alleviate this situation by calling attention to the full-range of imperiled species and habitats in the Puget Sound Basin and providing a scientific basis for prioritization of habitat protection plans.



An adult Bald Eagle.
photo courtesy USFWS



The endangered Mazama Pocket Gopher is found only in shrinking Puget Prairies.
photo by William Leonard



Rosy Owl's-clover (*Orthocarpus bracteosus*) may be extinct.
photo by Tom Kaye

STUDY AREA

The Puget Sound Basin includes the Sound itself and all surrounding lands, west from the crest of the Cascades to the crest of the Olympics and north from Lewis County to southern British Columbia and Vancouver Island. It encompasses a broad range of landforms and elevations from marine and coastal areas at sea

level to alpine meadows and sharp peaks above 6,000 ft. in both mountain ranges. The climate is maritime with mild, wet winters and dry summers. Precipitation is heavy, ranging from 24 inches annually in northern portions of the Sound to 120 inches annually in high elevation areas (Franklin and Dyrness 1988).



Map of the Puget and Georgia Basins with the study area highlighted in red.
map by Curtis Bradley

METHODS

We compiled a list of all species present in the Puget Sound Basin from regional and national taxa guides, state and provincial databases, published literature, and other sources. We excluded species that only occasionally occur, or are unusual or introduced to the Puget Sound. We obtained information on the distribution, habitat preferences, known threats, and status of each species from various sources. Distributional information was derived from taxa guides and data from the Washington State GAP program. Qualitative information on habitat preference and known threats was obtained from taxa guides and published literature. Status information was obtained from Natureserve, World Conservation

Congress (IUCN), Washington State Department of Fish and Wildlife, British Columbia Conservation Data Centre, U.S. Fish and Wildlife Service, Washington Audubon, and American Fisheries Society. Species were broadly classified as imperiled if they were recognized as being of concern, vulnerable, or worse by one of the above sources (Table 1).

Species were classified as critically imperiled, imperiled, or vulnerable based on the corresponding classifications of the various organizations that rated the species status (Table 2). A species was considered to be critically imperiled, imperiled, or vulnerable if this was the case in either its Washington or British Columbia range.

Table 1. Classifications Used To Identify Imperiled Species.

Source	Imperiled classifications
Natureserve	G1-3, S1-3 in either WA or BC
IUCN	Vulnerable, endangered, critically endangered
Federal ESA	Candidate, threatened, endangered
Washington State	Species of Concern, Candidate, threatened, endangered
British Columbia	Blue list and red list
WA Audubon	SIC, SHC, EWS*
American Fisheries Society	Vulnerable, threatened, endangered

*Species of immediate concern, species of high concern, and early warning species.

Table 2. Classification of Puget Sound Imperiled Species.

Source	Critically Imperiled	Imperiled	Vulnerable
Natureserve	Critically Imperiled (G1)	Imperiled (G2)	Vulnerable (G3)
IUCN	Critically endangered	Endangered	Vulnerable
Federal ESA	Endangered	Threatened	Species of concern
Washington	Endangered	Threatened	Species of concern
British Columbia	Red List	Blue List	
WA Audubon	SIC	SHC	EWS
AFS	Endangered	Threatened	Vulnerable

RESULTS

We identified 7,013 species with all or a portion of their range within the Puget Sound Basin, including 4,248 animals, 1,504 plants, 851 fungi, and 392 algae. We identified a total of 599 vertebrate animals, including 28 amphibians and reptiles, 232 birds, 234 fish and 105 mammals. Vertebrate and plant estimates are likely fairly complete as these groups have been relatively well-studied by the scientific community. Invertebrates, fungi and algae have been studied less, and thus many species have likely not been discovered yet and the status of

many more is unknown. We identified a total of 3,647 invertebrates, including 886 beetles, 301 butterflies, 105 shrimp and crabs, and a large diversity of other marine and terrestrial species.

Based on a list of the number of species by state compiled by Stein et al. (2000) and containing vertebrates, plants and select mollusks and crustaceans, we determined that the Puget Sound Basin has more species than 31 individual states including Idaho, Montana, Wyoming, Alaska, and Hawaii, making the region a substantial hotspot for biological diversity.



Mardon Skippers.
photo by William Leonard



A Green Sturgeon swims deep in the Puget Sound.
photo credit unknown



A Western Screech Owl.
photo courtesy USFWS

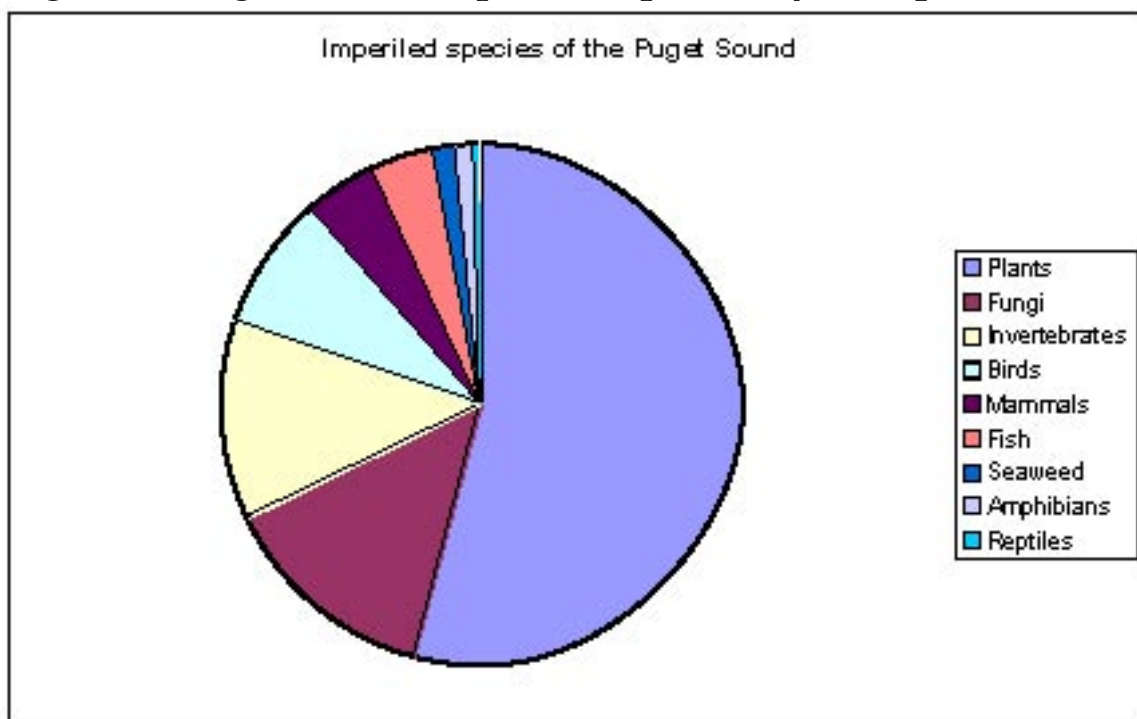
IMPERILED SPECIES OF PUGET SOUND

Of the 7,013 species documented in the Puget Sound, we determined 957 (14%) are imperiled—including 519 plants, 296 animals, 129 fungi, and 13 marine algae (seaweed) (Appendices A-I). Of imperiled animals, 119 are invertebrates, 80 are birds, 44 are mammals, 38 are fish, 11 are amphibians, and four are reptiles (Figure 1). Of the 957 imperiled species, 285 are critically imperiled, 272 are imperiled, and 400 are vulnerable.

Given the diversity of species and habitats in the Puget Sound Basin and the degree of threats to this diversity, it is not surprising that the basin is home to 17 federally recognized threatened and endangered species and 13 candidates for listing. These species are found in nearly all of the Puget Sound's key habitats (Figure 1). In marine habitats, threatened, endangered, and candidate species include the Walleye Pollack, Copper Rockfish, Orca, Sei Whale, Fin Whale, and the Stellar Sea Lion. Marine species are threatened by a combination of entrapment in nets, pollution, historic hunting, overfishing, and habitat destruction. In coastal

habitats, threatened and endangered species include the Brown Pelican, Bald Eagle, and Marbled Murrelet with threats varying from historic DDT poisoning (Bald Eagle and Pelican), to urban development (all species) and logging (Murrelet). In stream habitats, Chum and Chinook Salmon and Bull Trout are all listed as threatened species and are imperiled by pollution of streams from logging, agriculture, livestock grazing, urban development, and stream blockage by dams. A total of 11 species are threatened, endangered, or candidates because of loss of prairie habitats to urban and agricultural development—including Golden Paintbrush, Kincaid's Lupine, seven subspecies of Mazama Pocket Gopher, Taylor's Checkerspot Butterfly, and Streaked Horned Lark. In wetland habitats, the Water Howellia is listed as threatened and the Marsh Sandwort is listed as endangered with urban and agricultural developments as primary threats. Finally, the Canada Lynx, Northern Spotted Owl, Pacific Fisher, and Marbled Murrelet are listed because of logging of old-growth forests.

Figure 1. Puget Sound Imperiled Species By Group.



Sadly, our research uncovered 14 species that are potentially extirpated from the Puget Sound, including nine species that may be globally extinct. These species include one bird, eight invertebrates, four mammals, one fungi, and five plants. The single extirpated bird is the Yellow-billed Cuckoo, which was formerly a common species in the Puget Sound Basin. Of the eight invertebrates, all but a beetle (*Canthon simplex*), which is extirpated, are believed globally extinct. Mammals lost to the Puget Sound Basin include the Gray Wolf, Grizzly Bear, and Pacific Fisher, all three of which were eliminated

by hunting, persecution, and habitat loss, and the Tacoma and Tenino Pocket Gophers, both of which are believed globally extinct. The five extirpated plants include White Western Groundsel, Marsh Sandwort, Pygmy-water Lily, Coast Microseris, and Rose-purple Sand Verbena. Many other species are imperiled in the Puget Sound Basin, but still hang on. Habitat protection, reduction of pollution and regulation of Puget Sound fisheries are all needed to ensure that the list of extirpated and extinct species' does not grow.

YELLOW-BILLED CUCKOO

The Yellow-billed Cuckoo, often referred to as the raincrow because its unique song heralds the coming of rain, was once a common breeder in the Puget Sound Basin. By 1934, however, it was all but absent from its breeding range in the Puget Sound. One Yellow-billed Cuckoo was seen in western Washington in 1996, the first since 1979.

The cause of the Cuckoo's demise is the same threat facing most endangered species—habitat loss. In the West, Cuckoos are closely associated with streamside forests. Unfortunately, logging, cattle grazing, dams, water diversions, water pumping and pollution have decimated the West's rivers and riparian forests. The Cuckoo may in part be absent from the Puget Basin because of a lack of stop-over habitat to support its northward migration.

To save the Cuckoo and its habitat, the Center for Biological Diversity prepared a comprehensive status review of the species' habitat needs, population trends, taxonomy, and management status in 1997. In 1998, the Center authored a petition signed by 22 environmental groups to protect the Cuckoo under the federal Endangered Species Act. The petition resulted in a finding by the U.S. Fish & Wildlife Service that the Yellow-billed Cuckoo warrants protection under the Endangered Species Act as a "threatened" species, but that such protection is

precluded by listing of other species. The warranted but precluded designation allows for an indefinite delay of federal protection. Meanwhile, western rivers continue to be dammed, diverted, polluted, paved, and grazed. Neither they nor the Cuckoo can sustain the current rate of exploitation much longer.



The Yellow-billed Cuckoo.
photo by Ron Austing

THREATS TO PUGET SOUND BIODIVERSITY

The number and diversity of imperiled species discussed above reflects the severity of threats to Puget Sound ecosystems. We identified threats to 330 of the 957 species. Habitat destruction was the most commonly identified threat to imperiled species, impacting 272 (82%) of the 330 species. Other threats included pollution (139, 42%), exploitation (62, 19%), exotic species (51, 16%), and human disturbance (24, 7%). Because these numbers are not based on a complete or systematic survey of threats to Puget Sound species, they can not be considered a definitive description of the relative importance of the various threats. That said, our finding that habitat destruction is the leading cause of species imperilment echoes the findings of other studies (e.g. Wilcove et al. 1998).

Habitat destruction has impacted all key habitats in the Puget Sound Basin with the major causes being logging and urban and agricultural sprawl. In forested ecosystems, logging has had the largest impact on biodiversity, resulting in the loss of at least 90% of old-growth forests in the Basin (Morrison et al. 1991, FEMAT 1993). Given the roughly 1,000 species known to be associated with Pacific Northwest old-growth forests (Thomas et al. 1993), this loss has been devastating to wildlife populations with species such as the Pacific Fisher being totally lost from the Basin.

Urban and agricultural development impacts nearly all Puget Sound ecosystems. The human population doubled between 1960 and 2000 with nearly four million people now living in the Basin (PSWQAT 2002). In forests, urban and agricultural sprawl has resulted in extensive loss of tree cover. American Forests (1999) estimated that between 1972 and 1996 areas of dense forest cover (>50% tree cover) in low elevation areas of the eastern Puget Sound declined by 37% primarily because of forest conversion to other uses. In the last 100 years, dredging and filling to support urban and agricultural sprawl has resulted in the loss of more than 70% of tidal marsh and wetlands (Bortleson et al. 1980, Thom and Hallum 1991). Sprawl is also a major factor in the loss of nearly 97% of intact Puget Prairies.

Pollution is an ongoing and serious concern in the Puget Sound. Oil spills, the regions many pulp mills, and other industry all contribute to the Puget Sound being one of the more polluted bodies of water in the U.S. Between 1993 and 2001, there were 191 serious oil spills (25-10,000 gallons) in the Puget Sound resulting in at least 73,400 gallons of oil entering the Sound (PSWQAT 2002). At least 8,700 acres of soft sediment are known to be seriously contaminated in the Sound and an additional 87,000 acres are believed to be less seriously contaminated (PSWQAT 2002). Many chemicals that are known to be persistent in the environment and highly toxic, such as PCBs, continue to enter the Sound. The concentration of PCBs in shellfish declined sharply after use of these chemicals was banned in the 1970s, but in the late 1990s again began to increase (PSWQAT 2002). Pollution impacts many species of concern in the Puget Sound, but is particularly detrimental to organisms high on the food chain. Pollution, for example, is believed to be a serious threat to Puget Sound Orcas, which have declined sharply in the last decade.

Exploitation of wildlife both historically and presently has had severe impacts on species in marine, terrestrial, and aquatic habitats. Commercial fishing is a threat to at least 24 species of Puget Sound fish, including a number of species of rockfish, Pacific cod, and Pacific Herring. A number of other species are not directly exploited by the fishing industry, but are severely impacted as bycatch when they are entangled in nets or hooked by longliners, including Short-tailed Albatross and Marbled Murrelets. Although less prevalent today, trapping of fur-bearing mammals led to declines in a number of species and contributed to the extirpation of the Pacific Fisher and Gray Wolf from the region. Similarly, uncontrolled hunting at the turn of the century led to declines in many species, in particular shorebirds such as the Marbled Godwit, some of which have never reached historical levels.

A growing concern in the Puget Sound and in the nation as a whole is the introduction and spread of exotic species, which out-compete or prey on native species. A recent study of exotic species in

marine habitats of the Puget Sound found 10 new species that had previously not been reported, increasing the total known exotic species in salt

and brackish waters of the Sound to 52 (DNR 2000). Exotic species occur and are likely increasing in all of Puget Sound's key habitats.

PUGET SOUND'S ORCAS

The Puget Sound has its own resident population of Orcas, known to scientists as the "Southern Resident Killer Whales." The Southern Residents exhibit different behaviors than either Orcas traveling up and down the coast or residents in Canada. The Southern Residents, for example, have their own distinct dialect: a unique variety of clicks, whistles, and burst-pulsed signals that are not shared with any other population of Orcas.

Unfortunately, this unique population of Orcas is heading for extinction. A combination of PCB poisoning, declines in salmon (a favorite Southern Resident prey), general ecosystem deterioration, growing whale watching pressure, and the lingering effects of many whales being captured for display in the 1960s and 1970s, has caused the population to plummet almost 20% since 1996. Add in the constant threat of oil spills, boat collisions, fishing net entanglement, strandings, and disease, and you have a recipe for the extinction of one of North America's most magnificent and charismatic species.

The Center for Biological Diversity conducted a population viability analysis (PVA) for the Puget Sound Orca. The PVA, a complex computer model, showed that if current population trends continue, the population will go extinct within 100 years, possibly as soon as 30 years. Even if birth and death rates are averaged out over the past several decades, the orca's risk of extinction is greater than 50% in the next 100 years and 99% in the next 200 years. Just one or two oil spills, strandings, or disease outbreaks per century dramatically increases the risk of extinction.

Considering the high probability of extinction, the Center's science and legal team developed a comprehensive petition to list the Puget Sound whales as "endangered" under the U.S. Endangered Species Act (ESA), which was filed with the National Marine Fisheries Service by the Center on May 1, 2001, on behalf of a coalition including the Center for Whale Research, the Whale Museum, Ocean Advocates, Washington Toxics Coalition, Orca Conservancy, American Cetacean Society, Friends of the San Juans, People for Puget Sound, Cascade Chapter of the Sierra Club, Project Sea Wolf, and former Washington Secretary of State, Ralph Munro. In response to this petition, the Southern Resident Population of Orcas has now been proposed for listing as a threatened species, bringing much needed protection.



Orcas surface in the Puget Sound.
photo courtesy of NOAA

KEY HABITATS OF THE PUGET SOUND BASIN

Puget Sound's Old-Growth Forests.

The abundant moisture and mild temperatures of the Puget Sound Basin and Pacific Northwest allows trees to grow larger than anywhere else on earth. These giants of the plant kingdom, including Sitka Spruce, Western Red Cedar, and Coastal Douglas-fir, have captured our imagination for centuries and form the keystone of this ecosystem. The unique features of large, old-growth trees provide an essential structural component to the habitat of many irreplaceable species.

The large cavities, broken tops, and platforms that form in large, old-growth trees provide nesting, roosting, and denning areas for the Northern Spotted owl, Northern Goshawk, Pileated Woodpecker, Vaux's Swift, Marbled Murrelet, Pacific Fisher, and numerous other species. A number of species only occur high in the canopy of old-growth trees, depending on the unique combination of light,

temperature, and humidity that can be found elevated in the canopy, including many species of lichen, such as the Cryptic Paw Lichen or Tickertape Bone Lichen. Still other species depend on the wide-open spaces found in the understory of large old-growth trees, including the Northern Goshawk and Northern Spotted Owl, which hunt from tree to tree in old-growth forests.

Old-growth trees provide habitat for species not only when they're alive, but also long after. Standing dead trees, called snags, are a source of insects for woodpeckers and other animals. Many wildlife species nest or den on the inside of hollowed out snags. Snags are also used for perching by Vaux's Swifts, Olive-sided Flycatchers, and others. Dead trees on the forest floor provide cover for many species, such as Larch Mountain and Van Dyke's Salamanders, and create rich organic moisture holding soils. Such moist soils are favored by many

LARCH MOUNTAIN SALAMANDER

This rare salamander was originally believed to only inhabit the Columbia River Gorge, but was later found as far north as Snoqualmie Pass, in the eastern portion of the Puget Sound Basin. It makes its home in mossy areas of moist talus slopes, caves, and old-growth forests. Interestingly, the Larch Mountain Salamander mimics the behavior of poisonous millipedes, which coil up when they are uncovered from forest debris, by similarly coiling up in the hope of fooling predators.

Larch Mountain Salamanders are the smallest of the woodland salamanders. They are lungless, breathing through their skin, and have a tan, reddish, or yellowish backstripe with a body that is pink, red, or red-orange below.

Larch Mountain Salamanders are highly sensitive to alteration of their moist habitats from logging, which raises temperatures and decreases humidity. Already a rare salamander that occurs in a

highly patchy and fragmented distribution, the Larch Mountain Salamander is growing more imperiled due to further logging of its habitat on both Federal and private lands. The Center for Biological Diversity is considering the Larch Mountain Salamander for petitioning as an endangered species.



The Larch Mountain salamander.
photo by Joshua L Puhn



The threatened Water Howellia is dependent on wetlands.

photo by Kristi Dubois

unique invertebrate species, such as the Pacific Giant Earthworm, Folding Trapdoor Spider, Antlike Stone Beetle, and Whitebase Sideband Snail. Finally, large, dead trees that fall into streams and shape the stream's environment, slowing flow and forming pools critical to many aquatic species, such as Chinook Salmon. In sum, the large trees found in old-growth forests of the Puget Sound Basin and greater Pacific Northwest support a diverse and unique assemblage of species found nowhere else on earth.

Numerous studies have documented the decline of old-growth forests (e.g. Morrison et al. 1991, FEMAT 1993). We identified 39 imperiled species that are, to differing degrees, dependant on old-growth forests—including two salamanders, five birds, nine invertebrates, three mammals, 16 fungi and lichens, and four plants. These species include the familiar Northern Spotted owl and Marbled Murrelet, but also the Phantom Orchid, Cryptic Paw Lichen, and Larch Mountain Salamander. At least one species, the Pacific Fisher, has been extirpated from the Puget Sound Basin in part because of loss of old-growth forests.

A Forgotten Ecosystem: Puget Sound's Prairies.

In the shadow of Puget Sound's grand conifer forests, few people realize that the Puget Sound is also home to extensive prairies, grasslands and Garry Oak woodlands. Puget Sound's prairies support a wealth of rare and beautiful species, many of which are declining in the face of rapid habitat loss. More typically found in dry areas, grasslands are found in the Puget Sound as a result of three factors:

the rainshadow of the Olympic Mountains, which keeps precipitation relatively low, well-drained gravel soils deposited by retreating Pleistocene Ice, and historic burning by Native Americans to cultivate food plants, such as camas root (Franklin and Dyrness 1988). Prairie and grassland habitats resulting from the rain-shadow include portions of the San Juan Islands and the northeastern Olympic Peninsula. Those derived from glacially-deposited gravels cover large areas south of Olympia in southern Thurston County. Puget prairies are characterized by large open grassy areas with familiar grassland species, such as Idaho fescue and Common Camas, interspersed with Garry Oak, Lodgepole Pine, and Douglas-fir.

In the past 150 years, over 90% of Puget Sound's prairies have been destroyed. Just 3% are relatively healthy. Those that remain are being devoured by sprawl from Mount Vernon, Seattle, Tacoma, Olympia, Centralia and other growing areas. In the face of such dramatic habitat loss, many Puget Prairie species have declined, some to the point of extinction.

We identified 27 imperiled species that are dependent on, or occur in, prairie habitats—including three birds, three butterflies, seven mammals, and 14 plants. At least two species dependent on Puget Prairies are thought to be extinct—the Tacoma and Tenino Pocket Gophers.

Key Habitats continued on next page



The threatened Chinook Salmon is imperiled by a multitude of factors, including logging, pollution, and urban and agricultural development.

photo by Tom Holt

Key Habitat from previous page

In December, 2002, a coalition of environmental and scientific organizations petitioned the U.S. Fish and Wildlife Service to put 10 Puget Prairie species on the federal endangered species list. Among the species are the Streaked Horned Lark, a strikingly colorful, ground nesting bird that once was so common that it plagued turn-of-the-century golfers; the Island Marble butterfly which was thought extinct until rediscovered on San Juan Island in 1998; and seven pocket gophers, two of which may already be extinct.

Rivers and Streams. Lifeblood of the region, the rivers of the Puget Sound Basin support a wealth of species diversity. We identified 129 imperiled species dependent on aquatic and riparian habitats, including nine amphibians, eight birds, 11 fish, 39 invertebrates, five mammals, seven lichens, and 48 plants. Six species are threatened, endangered, or candidates under the ESA, including the Oregon Spotted Frog, Chum and Chinook salmon, Bull Trout, Bald Eagle, and Water Howelia. Threats to aquatic and riparian habitats are numerous, including logging, urban and agricultural development, livestock grazing, pollution, and invasive species.

Freshwater Wetlands. Wetlands and lakes provide important habitat for a wealth of species. Over 76% of all wetlands have been lost in the

Puget Sound Basin and more are being lost every year, primarily to urban and agricultural development. Canning (1989) estimates that development results in the loss of 900-2,000 acres of freshwater wetlands each year in Washington. We identified 155 imperiled species dependent on freshwater wetlands, including 16 birds, one fish, 13 invertebrates, two mammals, two reptiles, and 118 plants. Two wetland plants, the Marsh Sandwort and Water Howelia, and the Bull Trout are wetland and lake species that are listed as threatened or endangered under the ESA.

Coasts and Estuaries. Coastal environments support a diversity of habitats, including salt marshes, tidal mudflats, rocky intertidal zones, meadows, beaches, dunes, and unique forest types dominated by shore pine. Coastal areas, however, are also highly desirable for humans and are likely experiencing the greatest development pressure in the Puget Sound Basin. Such development leads to catastrophic losses of habitat. Bortleson et al. (1980), for example, documented that over 73% of tidal wetlands have been lost to development and Morrison et al. (1994) found that from 1977-1993 the amount of shoreline that was armored, either with seawalls or bulkheads in Thurston County, doubled to about a third of the total shoreline. We identified 64 imperiled species that occur in coastal environments, including 22 birds, one fish,



Beautiful Puget Prairie.
photo by Kurt Wieland

seven invertebrates, seven lichens, and 27 plants. Of these, the Bald Eagle and Brown Pelican are listed as threatened and endangered under the ESA, respectively.

Marine Environments. Unlike most other habitats, habitat loss is not the most prevalent threat to marine species and their habitats, rather pollution, overharvest, and entrapment in nets are the predominant threats. We identified 75 imperiled species dependent on marine environments, including 13 seaweeds, 21 birds, 31 fish, three invertebrates, five whales, northern fur seal, Stellar's

sea lion, and the sea otter. The Steller's Sea Lion, and Fin and Sei Whales are listed as endangered under the Endangered Species Act.

Alpine Meadows. Because of their climate and relative isolation, alpine meadows contain many unique species, many of which are relicts of the Pleistocene. Our review of Puget Sound Basin species identified eight imperiled species dependent on alpine meadows, including two mammals, and six plants. Threats include climate change, which could force tree-line upwards, and livestock grazing.

THE ISLAND MARBLE

The Island Marble is a beautiful white and greenish butterfly with a marbled texture under the hind wing. It was believed extinct since the 1920s until rediscovered on San Juan Island in 1998. Historically it occurred in grasslands and Garry oak woodlands on southern Vancouver Island, the Gulf Islands, and the San Juan Islands. It is now extirpated from Vancouver Island and the Gulf Islands. Surveys conducted in 2002 on San Juan Island found only 10-20 butterflies, indicating the Island Marble is on the verge of extinction.

The primary cause of the Island Marble's decline is the loss of its habitat: grasslands, prairies, and Garry oak woodlands. Ninety-five percent of the Garry oak woodlands on Vancouver Island have been lost to cattle grazing, agriculture, urban and suburban sprawl, fire suppression, and invasion of exotic species. Pesticides spraying is also a threat.

On December 10, 2002, the Center For Biological Diversity, Xerces Society, Friends of the San Juans, and Northwest Ecosystem Alliance filed a petition with the U.S. Fish and Wildlife Service to protect the Island Marble under the Endangered Species Act. Listing under the ESA will require protection of specific grasslands, prairies, and woodlands as "critical habitat" for the

butterfly and the development of a federal recovery plan. It will ensure that federal agencies act to save the Island Marble while encouraging state and private interests to participate as well.



The Island Marble butterfly.
photo by Bill Yake

Ramaria maculatipes, Ramaria lorithamnus, Ramaria rainierensis, Pilophorus nigricaulis, Kaernefeltia californica, Usnea longissima, Bryoria pikei, Cladonia imbricaria, Umbilicaria angulata, Cavernularia lophyrea, Cladina portentosa, Alecortia nigricans, Cornicularia normoerica, Platismatia stenophylla, Platismatia lacunose, Leptogium gelatinosum, Ophioparma rubricosa, Adeleocia

CONCLUSIONS AND SUMMARY

We identified 7,013 species native to the streams, wetlands, and alpine meadows. Threats Puget Sound Basin, of which at least to species and their habitats, such as urban and 14% (957) are imperiled. At least 14 species are agricultural development, logging, pollution, known or suspected to be extinct or extirpated invasive species, and global climate change, from the Puget Sound Basin. Imperiled species are—if anything—increasing, highlighting the occur in all of the primary habitats in the Puget need for greater protection for key habitats and Sound Basin, including old-growth forests, Puget the species that depend on them. Prairie, coasts, marine environments, rivers and

century, Clubmoss Bell-heather, Dwarf Contorted Suncup, Hairy Owl's-clover, Pacific Lance-leaf Spring-beauty, Phantom Orchid, Green-fruited Sedge, Erect pygmy-weed, Oregon Ash, Beaked Spikerush, Salish Daisy, Rough-leaf Aster, Long-stalk Whitlow-grass, Howell's Quillwort, Western Strawberry-bush, Nuttall's Quillwort, Dense Sedge, Great Polemonium, Mountain Desert-parsley, Rhizomnium punctatum, Southwestern Waterwort, Blunt Sedge, Smith Melic Grass, Different Nerve Sedge, Purple-leaved willow-herb, Lace Lipfern, Booth Willow, Shining flatsedge, Nuttall's waterweed, Water Lobelia, Oakes Pondweed, Northern Water-starwort, Pussy paws, Orthotrichum affine, Northern yellow locoweed, Seabeach Groundsel, Few-flowered Sedge, A moss, A moss, Tortula subulata, Spinulose Shield Fern, Bog Clubmoss, A moss, Glaucous Gentian, Epipterygium tozeri, Common Alaska Harebell, Rice Cutgrass, Fox Sedge, Least Grape-fern, A moss, Mild Water-pepper, Alisia californica, Sweetflag, Spleenwort-leaved Goldthread, Field Dodder, Clustered Lady's-slipper, Needle-leaf Navarretia, Northern Bladderwort, Bryum violaceum, Orthotrichum cupulatum, Sharp-pod Peppergrass, Common Blue-cup, Ross' Avens, Thin-leaved Peavine, Prostrate Hymenolobus, Prairie Lupine, Kellogg's Rush, Dwarf Stitchwort, Mountain monardella, Scapose Scalepod, Bear's-foot Sanicle, Purple Black-snakeroot, California Buttercup, Geyer's Onion, Boreal Aster, Diffuse Montia, Seaside Trefoil, White Meconella, Beardless Lyme Grass, Riverbank Lupine, Coast Microseris, Small-head Tarweed, Kincaid's lupine, Tooth-leaf Monkey-flower, Choriso Bog-orchid, Rough Popcorn-flower, Lindley's Silver-puffs, Rosy Owl's-clover, Mountain Owl's-clover, Water-plantain buttercup, Pine Broomrape, Sticky Crazyweed, Shasta Fern, Seashore Bentgrass, A hornwort, Aleutian wormwood, Paper Onion, Bugloss Fiddle-neck, Seaside Fiddleneck, A liverwort, Magenta paintbrush, Olympic Harebell, Brewer's bittercress, Bristly Manzanita, Mountain Moonwort, Buxbaumia viridis, Common Sandweed, Elmer Indian-paintbrush, One-and-a-half-flower, Small-reedgrass, Western Bitter-cress, Indian paintbrush, Olympic wallflower, Common Spring Gold, Annual Hairgrass, Western Lilaeopsis, Glaucous willow-herb, Glandular Willow-herb, Cliff Douglasia, Slender Cat's-eye, Olympic Mountains Fleabane, Sphagnum moss, Irregular Polypody, Dune Bluegrass, Howell Gooseberry, Mountain Mare's-tail, Cladopodium crispifolium, Lyall Lupine, Golden corydalis, Heterocladium macounii, Bolander's Rush, Pacific Popcorn-flower, Hooker's Bluegrass, Tisch's saxifrage, Lobb Water-buttercup, Small-fruit smelowskia, Tall woolly-heads, Gracefull arrowgrass, Bristly-stemmed Sidalcea, Curtus's Aster, Toothcup, Bowl Clover, Menzies' Burnet, Howell's Triteleia, Bearded owl-clover, Sierra Nevada Marsh Fern, Felwort, Howell Violet, Giant Chain-fern, Scurvy-grass, California Hedge-parsley, Slender woolly-heads, Western Bluegrass, Upland Yellow Violet, Several-flowered Sedge, Ptychomitrium gardneri, Yellow-flowered Sedge, Beaked Sedge, Hoary Draba, Long-styled Sedge, California Sword-fern, Pull-up Muhly, Geyer Onion, white western groundsel, Rose Checker-mallow, Alpine Azalea, Bryum canariense, Adder's Tongue, Much-branch Groundsmoke, Western Yellow Oxalis, Seashore Lupine, A liverwort, Gray Beach Peavine, Western Pearl-flower, Beach Knotweed, Mountain Fescue, Curve-beak Lousewort, Yellow Willowherb, Rock brake, Northern Beech Fern, American Alpine Lady Fern, Vancouver Groundcone, Water Bulrush, Douglas' neckera, Spring Forget-me-not, Regel Rush, Rocky Mountain Juniper, Chickweed Monkey-flower, Dwarf Miner's-lettuce, Meadow Baby-blue-eyes, Mountain Tarweed, Grassy Tarweed, Broad-leaf Beardtongue, Harford's Melic Grass, Western Sweet-cicely, Western Water-milfoil, Henderson's Rockmat, Shade phacelia, Howell's Bluegrass, Narrow-leaved sword fern, Wiry knotweed, Fowler Knotweed, Mountain fern, Golden Blue-eyed-grass, Douglas' silene, Mexican Hedge-nettle, Fringepod, Geyer's Willow, Pterogonium gracile, Dense flowered lupine, Curved Woodrush, Lemmon's Willow, Canyon Bog-orchid, Floating Bur-reed, Torrey's Peavine, Alaska Large Awn Sedge, Muttongrass, Cooley's Buttercup, Loesel's Twayblade, Columbian Watermeal, Scouler's Catchfly, Hairy Water-fern, Gray's bluegrass, Tortula bolanderi,

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APPENDIX A: Imperiled Species of the Puget Sound

Mammals. The 43 imperiled mammals include 19 small mammals, 10 carnivores, five whales, five bats, one seal, one sea lion, and two ungulates (Appendix A). Eight are dependent on marine environments (five whales, Northern Fur Seal, Steller’s Sea Lion, and Sea Otter), 13 are dependent on forests, including four that are associated with old-growth forest, including the Pacific Fisher, Marten, and three bats, 14 (mainly the small mammals) are dependent on meadows, and eight are dependent on riparian habitats.

Most declining or imperiled mammals are threatened by habitat loss. In addition, pollution, entrapment in nets, and historic persecution are threats to many of

the marine mammals. Fur trapping and hunting are threats to a number of the fur-bearing mammals, such as beaver, fisher, and marten. Seven Puget Sound Basin mammals are listed as threatened or endangered or are candidates under the ESA, including the Lynx, Grizzly Bear, Sea Otter, Gray Wolf, Steller’s Sea Lion, Sei Whole, Fin Whale, Orca, and Pacific fisher. The Gray Wolf, Grizzly Bear, and Pacific Fisher are extirpated from the Puget Sound Basin. The Tacoma and Tenino Pocket Gophers are likely extinct (Table 2).

Amphibians. The Pacific Northwest contains one of the richest assemblages of amphibians in North America, including 11 imperiled species (table 2).

Table 1. Imperiled Mammals of the Puget Sound Basin.

Common	Status	Common	Status
Gray Wolf	Critically imperiled	Bighorn Sheep	Imperiled
Grizzly Bear	Critically imperiled	Vancouver Island Ermine	Imperiled
Steller Sea-lion	Critically imperiled	Pacific Fisher	Imperiled
Canada Lynx	Critically imperiled	Orca (southern resident)	Imperiled
Long-tailed Weasel	Critically imperiled	Townsend’s Western Big-eared Bat	Imperiled
Sea Otter	Critically imperiled	Townsend’s Big-eared Bat	Imperiled
Keen’s Myotis	Critically imperiled	Fringed Myotis	Imperiled
Pallid Bat	Critically imperiled	Trowbridge’s Shrew	Imperiled
Washington Snowshoe Hare	Critically imperiled	Western Gray Squirrel	Imperiled
Townsend’s Mole	Critically imperiled	Northern Fur Seal	Vulnerable
Vancouver Island Water Shrew	Critically imperiled	North American Wolverine	Vulnerable
Marsh Shrew	Critically imperiled	Vancouver Island Wolverine	Vulnerable
Coastal Mountain Beaver	Critically imperiled	Harbor Porpoise	Vulnerable
Olympic Pocket Gopher	Critically imperiled	Western Pocket Gopher	Vulnerable
Tacoma Pocket Gopher	Critically imperiled	Yelm pocket gopher	Vulnerable
Washington Southern Red-backed Vole	Critically imperiled	Olympia pocket gopher	Vulnerable
Western Pocket Gopher	Critically imperiled	Olympic Marmot	Vulnerable
Shaw Island Vole	Critically imperiled	Cascades Mountain Beaver	Vulnerable
Western Pocket Gopher	Critically imperiled	Cascade Golden-mantled Ground Squirrel	Vulnerable
Fin Whale	Critically imperiled	Mountain Lion	Vulnerable
Sei Whale	Critically imperiled	Gray Whale	Vulnerable
Roosevelt Elk	Imperiled		

The Oregon Spotted Frog is a candidate for listing under the Endangered Species Act.

All Puget Sound Basin amphibians are dependent to some degree on aquatic ecosystems, most are also dependent on forest environments, at least two (Van Dyke's and Larch Mountain Salamander) are dependent on old-growth forests.

Pollution, livestock grazing, logging, development, exotic species, and disease are the primary threats to amphibians in the Puget Sound Basin.

Reptiles. There are four imperiled reptiles in the Puget Sound Basin, including the Sharptail Snake, Western Pond Turtle, Western Painted Turtle, and Rubber Boa. All four are dependent to some degree on streamside or wetland habitats,

where threats include habitat loss to urban and agricultural development and exotic species. The Sharptail Snake and Western Pond Turtle are both critically imperiled with the latter extirpated from British Columbia. The Painted Turtle and Boa are both imperiled.

Birds. We identified 80 imperiled birds in the Puget Sound. Of these, 28 are dependent on coastal and marine habitats and 23 are dependent on freshwater habitats, such as riparian areas and wetlands, highlighting the importance of aquatic and semi-aquatic habitats for birds. Given the rampant destruction of these habitats, it is not surprising that habitat loss is a primary factor in the decline of many species.

Appendix continued on next page

Table 2. Imperiled Amphibians of the Puget Sound Basin.

Common	Status	Common	Status
Oregon Spotted Frog	Critically imperiled	Van Dyke's Salamander	Vulnerable
Coastal Tailed Frog	Imperiled	Larch Mountain Salamander	Vulnerable
Pacific Giant Salamander	Imperiled	Cascade Torrent Salamander	Vulnerable
Cope's Giant Salamander	Vulnerable	Northern Red-legged Frog	Vulnerable
Olympic Torrent Salamander	Vulnerable	Western Toad	Vulnerable
Cascades Frog	Vulnerable		

Table 3. Imperiled Birds of the Puget Sound.

Common	Status	Common	Status
Black Swift	Critically imperiled	Heerman's Gull	Vulnerable
Red Knot	Critically imperiled	Western Gull	Vulnerable
Brown Pelican	Critically imperiled	Black Turnstone	Vulnerable
Horned Puffin	Critically imperiled	Ruddy Turnstone	Vulnerable
Purple Martin	Critically imperiled	Wilson's Phalarope	Vulnerable
Western Grebe	Critically imperiled	Sanderling	Vulnerable
Oregon Vesper Sparrow	Critically imperiled	Arctic Tern	Vulnerable
Slender-billed, white-breasted nuthatch	Critically imperiled	Harlequin Duck	Vulnerable
Common Murre	Critically imperiled	Hammond's Flycatcher	Vulnerable
Brandt's Cormorant	Critically imperiled	Pacific-slope Flycatcher	Vulnerable
Thick-billed Murre	Critically imperiled	Hermit Warbler	Vulnerable
Marbled murrelet	Critically imperiled	Cassin's vireo	Vulnerable
Streaked Horned Lark	Critically imperiled	Lazuli Bunting	Vulnerable
Olive-sided Flycatcher	Critically imperiled	Red-breasted Sapsucker	Vulnerable

Table 3 continued on next page

Other habitats supporting declining or imperiled birds include forest (22), and meadows and prairie (nine). Of the forest-dependent species, five are found in old-growth, including two federally listed bird species: the northern spotted owl and marbled murrelet. Both are threatened by logging. At least three bird species are extirpated from the Puget Sound Basin, including the Yellow-billed Cuckoo, Short-tailed Albatross, and Trumpeter Swan (Table 3).

Fish. We identified 38 imperiled fish in the Puget Sound Basin, including 27 that live in marine environments, six that live in freshwater, and five

that are anadromous. Marine fish in the Puget Sound face a multitude of threats, including overfishing, dredging, and pollution. Imperiled freshwater and anadromous fish are threatened by pollution, logging, dams and diversions, and exotic species. The Bull Trout, Hood Canal population of the Chum Salmon, and Chinook Salmon are listed as threatened or endangered under the ESA.

Invertebrates. Because so little is known about invertebrates, it is likely far more are imperiled than the 119 species we identified. Eighty-nine of the imperiled invertebrates are insects, including 37 butterflies, seven beetles, and seven dragonflies. Also imperiled are 17 snails and slugs (several of

Table 3 continued on from previous page

Northern Spotted Owl	Critically imperiled	Blue Grouse	Vulnerable
Queen Charlotte Goshawk	Critically imperiled	Rufous Hummingbird	Vulnerable
Yellow-billed Cuckoo	Critically imperiled	MacGillivray's Warbler	Vulnerable
Black-throated Gray Warbler	Vulnerable		
American Peregrine Falcon	Critically imperiled	Canvasback	Vulnerable
Sandhill Crane	Critically imperiled	Hooded Merganser	Vulnerable
Golden Eagle	Imperiled	Barrow's Goldeneye	Vulnerable
Hutton's Vireo	Imperiled	Brant	Vulnerable
Barn Owl	Imperiled	Pelagic Cormorant	Vulnerable
Bald Eagle	Imperiled	Fork-tailed Storm-petrel	Vulnerable
Snow Goose	Imperiled	Tufted Puffin	Vulnerable
Lewis's Woodpecker	Imperiled	Common Loon	Vulnerable
Hairy Woodpecker	Imperiled	Pileated Woodpecker	Vulnerable
Band-tailed Pigeon	Imperiled	Chipping Sparrow	Vulnerable
Western Screech-Owl	Imperiled	Merlin	Vulnerable
Vancouver Island Pygmy Owl	Imperiled	Vaux's Swift	Vulnerable
Double-crested Cormorant	Imperiled	Sage Sparrow	Vulnerable
Ancient Murrelet	Imperiled	Willow Flycatcher	Vulnerable
Cassin's Auklet	Imperiled	Yellow Warbler	Vulnerable
Caspian Tern	Imperiled	Yellow-breasted Chat	Vulnerable
Trumpeter Swan	Imperiled	Rock Sandpiper	Vulnerable
Short-eared Owl	Imperiled	Surfbird	Vulnerable
Short-billed Dowitcher	Imperiled	Black Oystercatcher	Vulnerable
Peale's Peregrine Falcon	Imperiled	Whimbrel	Vulnerable
American Bittern	Imperiled	Clark's Grebe	Vulnerable
Green Heron	Imperiled	Marbled Godwit	Vulnerable
Great Blue Heron	Imperiled		

which are dependent on old-growth forests), one millipede, one centipede, two earthworms, and nine marine invertebrates—including five oysters and mussels and a crab. Imperiled invertebrates occur in a broad range of habitats and are faced with multiple threats, including habitat loss, pollution, and invasive species. None are currently listed under the ESA. At least two species may be extinct and one is extirpated, including two beetles and a freshwater snail.

Fungi and Lichens. We identified 126 imperiled fungi and lichen species. Imperiled fungi and lichen species are predominantly found in forest

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A close-up of the threatened Golden Paintbrush (*Castilleja leviseta*) bloom.
photo by Tom Kaye

Table 4. Imperiled Fish of the Puget Sound Basin.

Common	Status	Common	Status
Green Sturgeon	Critically imperiled	Basking Shark	Vulnerable
Nooksack Dace	Critically imperiled	White Shark	Vulnerable
Salish Sucker	Critically imperiled	Chiselmouth	Vulnerable
Bocaccio	Critically imperiled	Canary Rockfish	Vulnerable
Shortspine Thornyhead	Critically imperiled	Quillback Rockfish	Vulnerable
Walleye Pollock	Critically imperiled	Widow Rockfish	Vulnerable
Speckled Dace	Imperiled	Yelloweye Rockfish	Vulnerable
Chum Salmon	Imperiled	Tiger Rockfish	Vulnerable
Chinook Salmon	Imperiled	Black Rockfish	Vulnerable
Shorthead Sculpin	Imperiled	Pacific Hake	Vulnerable
White Sturgeon	Imperiled	Lingcod	Vulnerable
Leopard Dace	Vulnerable	Darkblotched Rockfish	Vulnerable
River Lamprey	Vulnerable	Copper Rockfish	Vulnerable
Bull Trout	Vulnerable	Brown Rockfish	Vulnerable
Eulachon	Vulnerable	Pacific Ocean Perch	Vulnerable
Longfin Smelt	Vulnerable	Pacific Cod	Vulnerable
China Rockfish	Vulnerable	Redstripe Rockfish	Vulnerable
Greenstriped Rockfish	Vulnerable	Yellow-tailed Rockfish	Vulnerable
Pacific Herring	Vulnerable	Big Skate	Vulnerable

ecosystems with many dependent on old-growth forests. Other habitats supporting rare fungi and lichens include rock outcrops, talus slopes, dunes, and riparian areas. Threats include air pollution, to which lichen are highly sensitive, logging, and urban development. No Puget Sound Basin fungi or lichens are listed under the ESA. At least one species may already be extirpated from the Puget Sound Basin.

Seaweed. We identified 13 imperiled marine algae (seaweed) species, including several types of kelp (Table 7). Marine algae are an important source of food and shelter for hundreds of marine animals. They also influence fundamental ecological processes. Kelp, for example, provides essential habitat for snails, crabs, shrimp, starfish, sea anemones, sea cucumbers, brittle stars, sea squirts, and many other creatures. It also reduces beach erosion. Primary threats include water pollution from urban

Table 5. Imperiled Invertebrates of the Puget Sound.

Common	Status	Common	Status
Fossaria vancouverensis (Freshwater Snail)	Critically imperiled	Vancouver Ringlet	Imperiled
Grain Physa	Critically imperiled	Moss' Elfin	Imperiled
Canthon simplex (Beetle)	Critically imperiled	Coastal Green Hairstreak	Imperiled
Omus audouini (Tiger Beetle)	Critically imperiled	Hoary Elfin	Imperiled
Hatch's Click Beetle	Critically imperiled	Behr's Hairstreak	Imperiled
Phymatodes rainieri (Beetle)	Critically imperiled	Rosner's Hairstreak	Imperiled
Rough plated pentamera sea cucumber	Critically imperiled	Olympia Pebblesnail	Imperiled
Chionea macnabeana	Critically imperiled	Olive Clubtail	Imperiled
Scleropogon bradleyi (Robberfly)	Critically imperiled	Grappletail	Imperiled
Nicocles rufus (Robberfly)	Critically imperiled	Cascades Needlefly	Imperiled
Nicocles rufus (Mayfly)	Critically imperiled	Yosemite Springfly	Imperiled
Paraleptophlebia rufivenosa (Mayfly)	Critically imperiled	Rainier Stripetail	Imperiled
Arctogeophilus insularis (Centipede)	Critically imperiled	Blue-gray Taildropper	Imperiled
Pacific Giant Earthworm	Critically imperiled	Puget Oregonian	Imperiled
Ceratopsus downesi	Critically imperiled	Oregon Megomphix	Imperiled
Nysius paludicolus	Critically imperiled	Dromedary Jumping-slug	Imperiled
Anderson's Water Boatman	Critically imperiled	Warty Jumping-slug	Imperiled
Camirus porosus	Critically imperiled	Oregon Floater	Imperiled
Harmostes dorsalis	Critically imperiled	Pinto Abalone	Vulnerable
Scolopostethus tropicus	Critically imperiled	Bog Idol Leaf Beetle	Vulnerable
Phytocoris occidentalis	Critically imperiled	Cicindela tranquebarica vibex (Tiger Beetle)	Vulnerable
Dun Skipper	Critically imperiled	Beller's Ground Beetle	Vulnerable
Grammia complicata (Moth)	Critically imperiled	Ameletus majusculus (Mayfly)	Vulnerable
Lupine Blue	Critically imperiled	Caudatella jacobi (Mayfly)	Vulnerable

Table 5 continued on next page

and agricultural activities, oil spills, sedimentation related primarily to logging throughout the Puget Basin, and near shore development.

Plants. We identified 519 imperiled plants, including 132 critically imperiled, 165 imperiled, and 222 vulnerable species (Table 8). Imperiled plants are found in all Puget Sound key habitats. Threats to plant species include invasive species and habitat loss from development, logging, and other

factors. Four plant species are listed as threatened or endangered under the ESA, including the Marsh Sandwort, Golden Paintbrush, Kincaid's Lupine, and Water Howelia. At least eight species are likely extirpated from the Puget Sound Basin, including the White Western Groundsel, Marsh Sandwort, Rosy Owl Clover, Pygmy Water Lily, Kidney-leaved Violet, Coast Microseris, Rose Checkered Mallow, and Rose-purple Sand Verbena.

Table 5 continued from previous page

Large marble	Critically imperiled	Pacific Giant Earthworm	Vulnerable
Bremner's Silverspot	Critically imperiled	Greater Arctic	Vulnerable
Taylor's Checkerspot	Critically imperiled	Ringlet	Vulnerable
Sand-verbena Moth	Critically imperiled	Blackmore's Blue	Vulnerable
A Noctuid moth	Critically imperiled	Western Sulphur	Vulnerable
Mardon Skipper	Critically imperiled	Lilac-bordered Copper	Vulnerable
Vancouver Island Blue	Critically imperiled	Sheridan's Green Hairstreak	Vulnerable
Johnson's Hairstreak	Critically imperiled	Nelson's Hairstreak	Vulnerable
Lophocampa roseata (Moth)	Critically imperiled	Monarch	Vulnerable
Okenia vancouverensis (Nudibranch)	Critically imperiled	Thicket Hairstreak	Vulnerable
Vivid Dancer	Critically imperiled	Queen Charlotte's Copper	Vulnerable
Olympic Grasshopper	Critically imperiled	Western Green Hairstreak	Vulnerable
Fender's Soliperlan Stonefly	Critically imperiled	Dog Star Skipper	Vulnerable
Sword Snowfly	Critically imperiled	Spot-winged Glider	Vulnerable
Meltwater Lednian Stonefly	Critically imperiled	Western River Cruiser	Vulnerable
Pink Millipede	Critically imperiled	Black Petaltail	Vulnerable
Hexura picea (Spider)	Critically imperiled	Western Pondhawk	Vulnerable
Keeled Jumping-slug	Critically imperiled	Olympia Oyster	Vulnerable
Evening Fieldslug	Critically imperiled	Cascades Stripetail	Vulnerable
Malone Jumping-slug	Critically imperiled	Alberta Springfly	Vulnerable
Hoko vertigo	Critically imperiled	Palestripe Springfly	Vulnerable
Oregon Forestsnail	Critically imperiled	Osobenus yakimae (Stonefly)	Vulnerable
Goose Barnacle	Critically imperiled	A Stonefly	Vulnerable
Western Ridged Mussel	Critically imperiled	Painted Springfly	Vulnerable
Greenland Cockle	Critically imperiled	Black Needlefly	Vulnerable
Abbreviate Pondsail	Imperiled	Agassiz Snowfly	Vulnerable
Pacific Sand Crab	Imperiled	Olympia Stripetail	Vulnerable

Table 5 continued on next page



Sandhill Cranes.
photo by Robin Silver



An OR Spotted Frog.
photo by Joshua Puhn



A Rough Popcorn flower.
photo by Dr. Ivo Tosevski

Table 5 continued from previous page

Lasiopogon willametti (Robberfly)	Imperiled	Oregon Stripetail	Vulnerable
Rams-horn Valvata	Imperiled	Pacific Needlefly	Vulnerable
Oregon skipper	Imperiled	Notched Stripetail	Vulnerable
Pacuvius Duskywing	Imperiled	Yellow-bordered Taildropper	Vulnerable
Island Checkerspot	Imperiled	Cascades Apatanian Caddisfly	Vulnerable
Olympic Arctic	Imperiled	Mt Hood Primitive Brachycentrid Caddisfly	Vulnerable
Hoffmann's Checkerspot	Imperiled	Winged Floater	Vulnerable
Propertius Duskywing	Imperiled	Puget Blue	Vulnerable
Indra Swallowtail	Imperiled		

Table 6. Imperiled Lichens and Fungi of the Puget Sound.

Scientific	Status	Scientific	Status
<i>Hygrophorus vernalis</i>	Critically Imperiled	<i>Alectoria lata</i>	Imperiled
<i>Macowanites mollis</i>	Critically Imperiled	<i>Cladonia norvegica</i>	Imperiled
<i>Tricholomopsis fulvescens</i>	Critically Imperiled	<i>Leptogium rivale</i>	Imperiled
<i>Clitocybe senilis</i>	Critically Imperiled	<i>Cetrelia cetrarioides</i>	Imperiled
<i>Alpova alexsmithii</i>	Critically Imperiled	<i>Phylliscum demangeonii</i>	Imperiled
<i>Calicium adaequatum</i>	Critically Imperiled	<i>Hydrothyria venosa</i>	Imperiled
<i>Microcalicium arenarium</i>	Critically Imperiled	<i>Pseudaleuria quinaultiana</i>	Imperiled
<i>Calicium adpersum</i>	Critically Imperiled	<i>Albatrellus caeruleoporus</i>	Imperiled
<i>Cortinarius cyanites</i>	Critically Imperiled	<i>Albatrellus avellaneus</i>	Imperiled
<i>Endogone acrogena</i>	Critically Imperiled	<i>Oxyporus nobilissimus</i>	Imperiled
<i>Ramaria verlotensis</i>	Critically Imperiled	<i>Arcangeliella camphorata</i>	Imperiled
<i>Cystocoleus ebeneus</i>	Critically Imperiled	<i>Dermatocarpon luridum</i>	Imperiled
<i>Niebla cephalota</i>	Critically Imperiled	<i>Mycena quinaultensis</i>	Vulnerable
<i>Ramalina thrausta</i>	Critically Imperiled	<i>Mycena hudsoniana</i>	Vulnerable
<i>Leioderma solediatum</i>	Critically Imperiled	<i>Mythicomyces corneipes</i>	Vulnerable
<i>Sulcaria badia</i>	Critically Imperiled	<i>Collybia bakerensis</i>	Vulnerable
<i>Hypogymnia oceanica</i>	Critically Imperiled	<i>Hemimycena tortuosa</i>	Vulnerable
<i>Pyrrhospora quernea</i>	Critically Imperiled	<i>Phellodon atratus</i>	Vulnerable
<i>Erioderma solediatum</i>	Critically Imperiled	<i>Rhizopogon evadens</i> var. <i>subalpinus</i>	Vulnerable
<i>Hypogymnia heterophylla</i>	Critically Imperiled	<i>Gastroboletus ruber</i>	Vulnerable
<i>Umbilicaria havaasii</i>	Critically Imperiled	<i>Chaenotheca furfuracea</i>	Vulnerable
<i>Umbilicaria lambii</i>	Critically Imperiled	<i>Mycocalicium subtile</i>	Vulnerable
<i>Bryoria friabilis</i>	Critically Imperiled	<i>Cortinarius variipes</i>	Vulnerable
<i>Rinodina griseosoralifera</i>	Critically Imperiled	<i>Phaeocollybia piceae</i>	Vulnerable
<i>Arctoparmelia incurva</i>	Critically Imperiled	<i>Ramaria rubella</i> var. <i>blanda</i>	Vulnerable
<i>Halecania viridescens</i>	Critically Imperiled	<i>Ramaria araiospora</i>	Vulnerable
<i>Pannaria rubiginosa</i>	Critically Imperiled	<i>Ramaria gracilis</i>	Vulnerable
<i>Alectoria ochroleuca</i>	Critically Imperiled	<i>Ramaria rubribrunnescens</i>	Vulnerable
<i>Hypotrachyna revoluta</i>	Critically Imperiled	<i>Ramaria gelatiniaaurantia</i>	Vulnerable
<i>Collema nigrescens</i>	Critically Imperiled	<i>Ramaria largentii</i>	Vulnerable
<i>Umbilicaria proboscidea</i>	Critically Imperiled	<i>Ramaria cyaneigranosa</i>	Vulnerable
<i>Vulpicida tilesii</i>	Critically Imperiled	<i>Ramaria stuntzii</i>	Vulnerable
<i>Umbilicaria rigida</i>	Critically Imperiled	<i>Cordyceps ophioglossoides</i>	Vulnerable
<i>Opegrapha solediiifera</i>	Critically Imperiled	<i>Phlyctis argena</i>	Vulnerable
<i>Nephroma occultum</i>	Critically Imperiled	<i>Loxosporopsis corallifera</i>	Vulnerable
<i>Nephroma silvae-veteris</i>	Critically Imperiled	<i>Hypogymnia inactiva</i>	Vulnerable
<i>Vestergrenopsis isidiata</i>	Critically Imperiled	<i>Phaeophyscia hirsuta</i>	Vulnerable

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<i>Coccotrema pocillarium</i>	Critically Imperiled	<i>Platismatia stenophylla</i>	Vulnerable
<i>Choiromyces alveolatus</i>	Critically Imperiled	<i>Platismatia lacunosa</i>	Vulnerable
<i>Otidea smithii</i>	Critically Imperiled	<i>Leptogium gelatinosum</i>	Vulnerable
<i>Gautieria otthii</i>	Critically Imperiled	<i>Ophioparma rubricosa</i>	Vulnerable
<i>Rhodocybe speciosa</i>	Imperiled	<i>Adelolecia pilati</i>	Vulnerable
<i>Clitocybe subditopoda</i>	Imperiled	<i>Buellia badia</i>	Vulnerable
<i>Rhizopogon exiguus</i>	Imperiled	<i>Cavernularia hultenii</i>	Vulnerable
<i>Boletus pulcherrimus</i>	Imperiled	<i>Lecanora cadubriae</i>	Vulnerable
<i>Chamonixia caespitosa</i>	Imperiled	<i>Hypogymnia rugosa</i>	Vulnerable
<i>Tholurna dissimilis</i>	Imperiled	<i>Parmelia omphalodes</i>	Vulnerable
<i>Hebeloma olympianum</i>	Imperiled	<i>Alectoria vancouverensis</i>	Vulnerable
<i>Phaeocollybia californica</i>	Imperiled	<i>Ramalina menziesii</i>	Vulnerable
<i>Ramaria aurantiisiccescens</i>	Imperiled	<i>Pilophorus clavatus</i>	Vulnerable
<i>Ramaria maculatipes</i>	Imperiled	<i>Hypogymnia duplicata</i>	Vulnerable
<i>Ramaria lorithamnus</i>	Imperiled	<i>Euopsis granatina</i>	Vulnerable
<i>Ramaria rainierensis</i>	Imperiled	<i>Koerberia sonomensis</i>	Vulnerable
<i>Pilophorus nigricaulis</i>	Imperiled	<i>Pseudocyphellaria rainierensis</i>	Vulnerable
<i>Kaernefeltia californica</i>	Imperiled	<i>Sticta limbata</i>	Vulnerable
<i>Usnea longissima</i>	Imperiled	<i>Pseudocyphellaria anomala</i>	Vulnerable
<i>Bryoria pikei</i>	Imperiled	<i>Pseudocyphellaria crocata</i>	Vulnerable
<i>Cladonia imbricarica</i>	Imperiled	<i>Peltigera pacifica</i>	Vulnerable
<i>Umbilicaria angulata</i>	Imperiled	<i>Peltigera collina</i>	Vulnerable
<i>Cavernularia lophyrea</i>	Imperiled	<i>Lobaria linita</i>	Vulnerable
<i>Cladina portentosa</i>	Imperiled	<i>Sticta arctica</i>	Vulnerable
<i>Alectoria nigricans</i>	Imperiled	<i>Helvella elastica</i>	Vulnerable
<i>Cornicularia normoerica</i>	Imperiled	<i>Helvella crassitunicata</i>	Vulnerable



A Peregrine Falcon
photo by Sidney Maddock

Table 7. Imperiled Marine Algae of the Puget Sound.

Scientific	Status	Scientific	Status
<i>Cylindrocarpus rugosus</i>	Critically imperiled	<i>Laminaria farlowii</i>	Critically imperiled
<i>Erythroglossum intermedium</i>	Critically imperiled	<i>Percursaria dawsonii</i>	Critically imperiled
<i>Hollenbergia nigricans</i>	Critically imperiled	<i>Dictyoneurum californicum</i>	Critically imperiled
<i>Endophyton ramosum</i>	Critically imperiled	<i>Laminaria sinclairii</i>	Critically imperiled
<i>Gracilariophila oryzoides</i>	Critically imperiled	<i>Stictyosiphon tortilis</i>	Critically imperiled
<i>Laminaria longipes</i>	Critically imperiled	<i>Antithamnionella spirographidis</i>	Critically imperiled
<i>Dictyoneuropsis reticulata</i>	Critically imperiled		



A Grizzly Bear cools itself.
photo by Robin Silver



A Black Oystercatcher.
photo courtesy USFWS



A Taylor's Checkerspot.
photo credit unknown



A Gray Wolf.
photo courtesy USFWS

Table 8. Imperiled Plants of the Puget Sound.

Common	Status	Common	Status
Rose-purple sand-verbena	Critically Imperiled	Rhizomnium punctatum	Imperiled
Brook Spike-primrose	Critically Imperiled	Southwestern Waterwort	Imperiled
Dense-flower Spike-primrose	Critically Imperiled	Blunt Sedge	Imperiled
Olympic Onion	Critically Imperiled	Smith Melic Grass	Imperiled
Tufted Foxtail	Critically Imperiled	Different Nerve Sedge	Imperiled
Marsh sandwort	Critically Imperiled	Purple-leaved willow-herb	Imperiled
Mexican mosquito-fern	Critically Imperiled	Lace Lipfern	Imperiled
Tall Bugbane	Critically Imperiled	Booth Willow	Imperiled
Rockslide Larkspur	Critically Imperiled	Shining flatsedge	Imperiled
Roll's golden log moss	Critically Imperiled	Nuttall's waterweed	Imperiled
Deltoid Balsam-root	Critically Imperiled	Water Lobelia	Imperiled
Least Bladdery Milk-vetch	Critically Imperiled	Oakes Pondweed	Imperiled
Apple Moss	Critically Imperiled	Northern Water-starwort	Imperiled
Paint Brush Owlclover	Critically Imperiled	Pussy paws	Imperiled
Winged Water-starwort	Critically Imperiled	Orthotrichum affine	Imperiled
Coiled Sedge	Critically Imperiled	Northern yellow locoweed	Imperiled
Thurber's Reed Grass	Critically Imperiled	Seabeach Groundsel	Imperiled
Golden paintbrush	Critically Imperiled	Few-flowered Sedge	Imperiled
Muehenberg's centuary	Critically Imperiled	A moss	Imperiled
Clubmoss Bell-heather	Critically Imperiled	A moss	Imperiled
Dwarf Contorted Suncup	Critically Imperiled	Tortula subulata	Imperiled
Hairy Owl's-clover	Critically Imperiled	Spinulose Shield Fern	Imperiled
Pacific Lance-leaf Spring-beauty	Critically Imperiled	Bog Clubmoss	Imperiled
Phantom Orchid	Critically Imperiled	A moss	Imperiled
Green-fruited Sedge	Critically Imperiled	Glaucous Gentian	Imperiled
Erect pygmy-weed	Critically Imperiled	Epipterygium tozeri	Imperiled
Oregon Ash	Critically Imperiled	Common Alaska Harebell	Imperiled
Beaked Spikerush	Critically Imperiled	Rice Cutgrass	Imperiled
Salish Daisy	Critically Imperiled	Fox Sedge	Imperiled
Rough-leaf Aster	Critically Imperiled	Least Grape-fern	Imperiled
Long-stalk Whitlow-grass	Critically Imperiled	A moss	Imperiled
Howell's Quillwort	Critically Imperiled	Mild Water-pepper	Imperiled
Western Strawberry-bush	Critically Imperiled	Alsia californica	Imperiled
Nuttall's Quillwort	Critically Imperiled	Sweetflag	Imperiled
Dense Sedge	Critically Imperiled	Spleenwort-leaved Goldthread	Imperiled
Great Polemonium	Critically Imperiled	Field Dodder	Imperiled
Mountain Desert-parsley	Critically Imperiled	Clustered Lady's-slipper	Imperiled

Needle-leaf Navarretia	Critically Imperiled	Seashore Bentgrass	Vulnerable
Northern Bladderwort	Critically Imperiled	A hornwort	Vulnerable
Bryum violaceum	Critically Imperiled	Aleutian wormwood	Vulnerable
Orthotrichum cupulatum	Critically Imperiled	Paper Onion	Vulnerable
Sharp-pod Pepper-grass	Critically Imperiled	Bugloss Fiddle-neck	Vulnerable
Common Blue-cup	Critically Imperiled	Seaside Fiddleneck	Vulnerable
Ross' Avens	Critically Imperiled	A liverwort	Vulnerable
Thin-leaved Peavine	Critically Imperiled	Magenta paintbrush	Vulnerable
Prostrate Hymenolobus	Critically Imperiled	Olympic Harebell	Vulnerable
Prairie Lupine	Critically Imperiled	Brewer's bittercress	Vulnerable
Kellogg's Rush	Critically Imperiled	Bristly Manzanita	Vulnerable
Dwarf Stitchwort	Critically Imperiled	Mountain Moonwort	Vulnerable
Mountain monardella	Critically Imperiled	Buxbaumia viridis	Vulnerable
Scapose Scalepod	Critically Imperiled	Common Sandweed	Vulnerable
Bear's-foot Sanicle	Critically Imperiled	Elmer Indian-paintbrush	Vulnerable
Purple Black-snakeroot	Critically Imperiled	One-and-a-half-flower Small-reedgrass	Vulnerable
California Buttercup	Critically Imperiled	Western Bitter-cress	Vulnerable
Geyer's Onion	Critically Imperiled	Indian paintbrush	Vulnerable
Boreal Aster	Critically Imperiled	Olympic wallflower	Vulnerable
Diffuse Montia	Critically Imperiled	Common Spring Gold	Vulnerable
Seaside Trefoil	Critically Imperiled	Annual Hairgrass	Vulnerable
White Meconella	Critically Imperiled	Western Lilaeopsis	Vulnerable
Beardless Lyme Grass	Critically Imperiled	Glaucous Willow-herb	Vulnerable
Riverbank Lupine	Critically Imperiled	Glandular Willow-herb	Vulnerable
Coast Microseris	Critically Imperiled	Cliff Douglasia	Vulnerable
Small-head Tarweed	Critically Imperiled	Slender Cat's-eye	Vulnerable
Kincaid's lupine	Critically Imperiled	Olympic Mountains Fleabane	Vulnerable
Tooth-leaf Monkey-flower	Critically Imperiled	Sphagnum moss	Vulnerable
Choriso Bog-orchid	Critically Imperiled	Irregular Polypody	Vulnerable
Rough Popcorn-flower	Critically Imperiled	Dune Bluegrass	Vulnerable
Lindley's Silver-puffs	Critically Imperiled	Howell Gooseberry	Vulnerable
Rosy Owl's-clover	Critically Imperiled	Mountain Mare's-tail	Vulnerable
Mountain Owl's-clover	Critically Imperiled	Claopodium crispifolium	Vulnerable
Water-plantain buttercup	Critically Imperiled	Lyall Lupine	Vulnerable
Pine Broomrape	Critically Imperiled	Golden corydalis	Vulnerable
Sticky Crazyweed	Critically Imperiled	Heterocladium macounii	Vulnerable
Shasta Fern	Critically Imperiled	Bolander's Rush	Vulnerable

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Pacific Popcorn-flower	Critically Imperiled	Seashore Lupine	Vulnerable
Hooker's Bluegrass	Critically Imperiled	A liverwort	Vulnerable
Tisch's saxifrage	Critically Imperiled	Gray Beach Peavine	Vulnerable
Lobb Water-buttercup	Critically Imperiled	Western Pearl-flower	Vulnerable
Small-fruit smelowskia	Critically Imperiled	Beach Knotweed	Vulnerable
Tall woolly-heads	Critically Imperiled	Mountain Fescue	Vulnerable
Gracefull arrowgrass	Critically Imperiled	Curve-beak Lousewort	Vulnerable
Bristly-stemmed Sidalcea	Critically Imperiled	Yellow Willowherb	Vulnerable
Curtus's Aster	Critically Imperiled	Rock brake	Vulnerable
Toothcup	Critically Imperiled	Northern Beech Fern	Vulnerable
Bowl Clover	Critically Imperiled	American Alpine Lady Fern	Vulnerable
Menzies' Burnet	Critically Imperiled	Vancouver Groundcone	Vulnerable
Howell's Triteleia	Critically Imperiled	Water Bulrush	Vulnerable
Bearded owl-clover	Critically Imperiled	Douglas' neckera	Vulnerable
Sierra Nevada Marsh Fern	Critically Imperiled	Spring Forget-me-not	Vulnerable
Felwort	Critically Imperiled	Regel Rush	Vulnerable
Howell Violet	Critically Imperiled	Rocky Mountain Juniper	Vulnerable
Giant Chain-fern	Critically Imperiled	Chickweed Monkey-flower	Vulnerable
Scurvy-grass	Critically Imperiled	Dwarf Miner's-lettuce	Vulnerable
California Hedge-parsley	Critically Imperiled	Meadow Baby-blue-eyes	Vulnerable
Slender woolly-heads	Critically Imperiled	Mountain Tarweed	Vulnerable
Western Bluegrass	Critically Imperiled	Grassy Tarweed	Vulnerable
Upland Yellow Violet	Critically Imperiled	Broad-leaf Beardtongue	Vulnerable
Several-flowered Sedge	Critically Imperiled	Harford's Melic Grass	Vulnerable
Ptychomitrium gardneri	Critically Imperiled	Western Sweet-cicely	Vulnerable
Yellow-flowered Sedge	Critically Imperiled	Western Water-milfoil	Vulnerable
Beaked Sedge	Critically Imperiled	Henderson's Rockmat	Vulnerable
Hoary Draba	Critically Imperiled	Shade phacelia	Vulnerable
Long-styled Sedge	Critically Imperiled	Howell's Bluegrass	Vulnerable
California Sword-fern	Critically Imperiled	Narrow-leaved sword fern	Vulnerable
Pull-up Muhly	Critically Imperiled	Wiry knotweed	Vulnerable
Geyer Onion	Critically Imperiled	Fowler Knotweed	Vulnerable
white western groundsel	Critically Imperiled	Mountain fern	Vulnerable
Rose Checker-mallow	Critically Imperiled	Golden Blue-eyed-grass	Vulnerable
Alpine Azalea	Critically Imperiled	Douglas' silene	Vulnerable
Bryum canariense	Critically Imperiled	Mexican Hedge-nettle	Vulnerable
Adder's Tongue	Critically Imperiled	Fringepod	Vulnerable
Much-branch Groundsmoke	Critically Imperiled	Geyer's Willow	Vulnerable
Western Yellow Oxalis	Critically Imperiled	Pterogonium gracile	Vulnerable

Dense flowered lupine	Critically Imperiled	Jointed Glasswort	Vulnerable
Curved Woodrush	Critically Imperiled	Henderson Mallow	Vulnerable
Lemmon's Willow	Critically Imperiled	Sphagnum moss	Vulnerable
Canyon Bog-orchid	Critically Imperiled	Bent-kneed four-tooth moss	Vulnerable
Floating Bur-reed	Critically Imperiled	Flett's Violet	Vulnerable
Torrey's Peavine	Critically Imperiled	Cusick Speedwell	Vulnerable
Alaska Large Awn Sedge	Critically Imperiled	Menzies' Wintergreen	Vulnerable
Muttongrass	Critically Imperiled	Western St. John's-wort	Vulnerable
Cooley's Buttercup	Critically Imperiled	Green-flower Alum-root	Vulnerable
Loesel's Twayblade	Critically Imperiled	Green Spleenwort	Vulnerable
Columbian Watermeal	Critically Imperiled	One-sided Sedge	Vulnerable
Scouler's Catchfly	Critically Imperiled	Torrey's Surf-grass	Vulnerable
Hairy Water-fern	Critically Imperiled	Bug-on-a-stick	Vulnerable
Gray's bluegrass	Critically Imperiled	A moss	Vulnerable
Tortula bolanderi	Critically Imperiled	Northern Moonwort	Vulnerable
Goldthread	Critically Imperiled	Northern Starflower	Vulnerable
Spanish-clover	Critically Imperiled	Little Mountain Thimble-weed	Vulnerable
Pygmy Water-lily	Critically Imperiled	Goldenback fern	Vulnerable
Bryum capillare var. torquescens	Critically Imperiled	Sphagnum moss	Vulnerable
Vancouver Island Beggar-ticks	Imperiled	Large Roundleaf Orchid	Vulnerable
Geyer's Sedge	Imperiled	Luminous Moss	Vulnerable
Tall Swamp Onion	Imperiled	Philonotis capillaris	Vulnerable
Brachydontium olympicum	Imperiled	Hookeria lucens	Vulnerable
Yellow Sand-verbena	Imperiled	California Willow-herb	Vulnerable
Chaffweed	Imperiled	Plagiomnium venustum	Vulnerable
Sand-dune sedge	Imperiled	American Dragonhead	Vulnerable
Seaside Bitter-cress	Imperiled	Illinois Pondweed	Vulnerable
Stalked Moonwort	Imperiled	Alaska Alkaligrass	Vulnerable
Olympic nuttall's rockcress	Imperiled	Dicranella heteromalla	Vulnerable
Canadian Single-spike Sedge	Imperiled	Red Peatmoss	Vulnerable
Magenta paintbrush	Imperiled	Fringed Grass-of-Parnassus	Vulnerable
Cotton's Milk-vetch	Imperiled	A moss	Vulnerable
Washington Springbeauty	Imperiled	Sea pine	Vulnerable
Upward-lobed Moonwort	Imperiled	Gairdner Yampah	Vulnerable
Long-leaf Arnica	Imperiled	Blue wild-rye	Vulnerable
Payson's Sedge	Imperiled	Vetchling Peavine	Vulnerable
Clubmoss Cassiope	Imperiled	Slender Whitlow-grass	Vulnerable
Obscure Indian-paintbrush	Imperiled	Electric Eels	Vulnerable
Cliff Indian-paintbrush	Imperiled	Oregon Woodsia	Vulnerable

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One-flowered Bleeding-hearts	Imperiled	Sugar Stick	Vulnerable
Bigleaf Sedge	Imperiled	Sierra Sanicle	Vulnerable
Thompson's Pincushion	Imperiled	Few-flowered Oatgrass	Vulnerable
Shooting star	Imperiled	American Pinesap	Vulnerable
Cascade Rockbrake	Imperiled	Leafy Dwarf Knotweed	Vulnerable
Coastal Woodfern	Imperiled	Fan-leaf Cinquefoil	Vulnerable
Scouler's Corydalis	Imperiled	Plagiothecium laetum	Vulnerable
Rainier Whitlow-grass	Imperiled	Plagiomnium cuspidatum	Vulnerable
Crumia latifolia	Imperiled	Buttercup-leaf Suksdorfia	Vulnerable
Maritime Goldfields	Imperiled	Few-seeded Whitlow-grass	Vulnerable
Western Sweet-vetch	Imperiled	Small-leaf Cat's-foot	Vulnerable
Smith's Fairy-bells	Imperiled	Western Polypody	Vulnerable
Glacier Fawnlily	Imperiled	Alpine rush	Vulnerable
Lance-fruited draba	Imperiled	Pacific Brome	Vulnerable
Thompson's Wandering Daisy	Imperiled	Coast Range Lomatium	Vulnerable
Slim-head Manna Grass	Imperiled	Smooth Cliff-brake	Vulnerable
Boreal Bedstraw	Imperiled	Grassleaf Mud-plantain	Vulnerable
Small Northern Bog-orchid	Imperiled	Beach silver top	Vulnerable
Yellow Mountain-avens	Imperiled	Clammy Hedge-hyssop	Vulnerable
Smoky Mountain Sedge	Imperiled	Alpine Spicy Wintergreen	Vulnerable
Larger Canadian St. John's Wort	Imperiled	Marsh-speedwell	Vulnerable
Giant Helleborine	Imperiled	Brewer's Rush	Vulnerable
Oregon Willow-herb	Imperiled	Thread Rush	Vulnerable
Pointed Rush	Imperiled	Large-flower False-dandelion	Vulnerable
Olympic Aster	Imperiled	Presl Sedge	Vulnerable
Water howellia	Imperiled	Broad-leaved Twayblade	Vulnerable
Explorer's Gentian	Imperiled	Common Screw Moss	Vulnerable
Pacific Waterleaf	Imperiled	Tall Agoseris	Vulnerable
Fleshy Jaumea	Imperiled	Lance-leaved Moonwort	Vulnerable
Mountain Foxtail	Imperiled	Blue-joint Reedgrass	Vulnerable
Lesser Bladderwort	Imperiled	Torrey's Cat's-eye	Vulnerable
Funaria muhlenbergii	Imperiled	White Plectritis	Vulnerable
Three-leaf Bitterroot	Imperiled	Racomitrium heterostichum	Vulnerable
Pale-yellow Jewel-weed	Imperiled	Shining Clubmoss	Vulnerable
Northern Microseris	Imperiled	Spiny-spore Quillwort	Vulnerable
Creeping Bishop's-cap	Imperiled	Zygodon moss	Vulnerable
Coast Man-root	Imperiled	Northern Stitchwort	Vulnerable
Tall bluebells	Imperiled	Northern Twayblade	Vulnerable
Macoun's Meadow-foam	Imperiled	Isothecium cristatum	Vulnerable

Nuttall's sandwort	Imperiled	Fringed Pinesap	Vulnerable
Brewer's Monkey-flower	Imperiled	Gnome-plant	Vulnerable
Howell's Miner's-lettuce	Imperiled	Mingan's Moonwort	Vulnerable
California Bayberry	Imperiled	Giant Fountain Moss	Vulnerable
Tongue-leaf False Luina	Imperiled	Fissidens limbatus	Vulnerable
Philonotis yezoana	Imperiled	Fendler's waterleaf	Vulnerable
Woodland Beardtongue	Imperiled	Magellan's Peatmoss	Vulnerable
Nodding False Semaphore Grass	Imperiled	A moss	Vulnerable
Oregon Wood-sorrel	Imperiled	A moss	Vulnerable
Polytrichum sphaerothecium	Imperiled	Shag Carpet Moss	Vulnerable
Kruckeberg's Sword-fern	Imperiled	Delicate Peatmoss	Vulnerable
Mount Rainier Lousewort	Imperiled	Water Awlwort	Vulnerable
Hairy-fruit Smooth Dewberry	Imperiled	Western Rattlesnake-root	Vulnerable
Pleuroziopsis ruthenica	Imperiled	Arctic Harebell	Vulnerable
Snow Dwarf Bramble	Imperiled	Haleakala Fir-clubmoss	Vulnerable
Oregon Spike-moss	Imperiled	Cliff Campylopus	Vulnerable
Tracy Mistmaid	Imperiled	Letterman's Bluegrass	Vulnerable
Siskiyou Mountains Butterweed	Imperiled	Creeping Sandwort	Vulnerable
Small-flowered Trillium	Imperiled	Low Fleabane	Vulnerable
Western pearlwort	Imperiled	Ulota megalospora	Vulnerable
Del Norte Coast Willow	Imperiled	Raynolds Sedge	Vulnerable
Olympic Mountain Groundsel	Imperiled	Western Twayblade	Vulnerable
California Scurf-pea	Imperiled	Clustered cancer root	Vulnerable
Narrow-leaf Skullcap	Imperiled	Mountain Bladder Fern	Vulnerable
Beach Sandspurry	Imperiled	Mountain tansy-mustard	Vulnerable
Tortula amplexa	Imperiled	Nuttall Knotweed	Vulnerable
Cut-leaf Synthyris	Imperiled	Two-spike Larkspur	Vulnerable
Rocky Mountain Stitchwort	Imperiled	Badge Moss	Vulnerable
Small-flower Tonella	Imperiled	Alaska Blue-eye-grass	Vulnerable
Macraei's clover	Imperiled	Scouler's Valerian	Vulnerable
Umbellate Stitchwort	Imperiled	A Hair Cap Moss	Vulnerable
Western Poison-oak	Imperiled	Rose Meadowsweet	Vulnerable
Mountain Buttercup	Imperiled	Marsh Horsetail	Vulnerable
Haircap	Imperiled	Alpine Brook Saxifrage	Vulnerable
Fissidens ventricosus	Imperiled	Dicranoweisia cirrata	Vulnerable
Chamisso's Miner's-lettuce	Imperiled	Sand-Dune Blue Grass	Vulnerable
Blunt-leaf Pondweed	Imperiled	Buxbaum's Sedge	Vulnerable
Alice's fleabane	Imperiled	Large headed sedge	Vulnerable

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Taper-tip Onion	Imperiled	Orthotrichum pulchellum	Vulnerable
Southern Mudwort	Imperiled	Dusky Willow	Vulnerable
Poor sedge	Imperiled	Yellow Water-crowfoot	Vulnerable
Swamp Gentian	Imperiled	Mountain Lady's-slipper	Vulnerable
Common Sneezeweed	Imperiled	Alpine Smelowskia	Vulnerable
Entosthodon fascicularis	Imperiled	Rocky Mountain Spike-moss	Vulnerable
Green-sheath Sedge	Imperiled	Seashore Bindweed	Vulnerable
Elegant Polemonium	Imperiled	Nodding wild rye	Vulnerable
Flatleaf Bladderwort	Imperiled	Orthotrichum lyellii	Vulnerable
Bristly Sedge	Imperiled	Mad-dog Skullcap	Vulnerable
Desmatodon obtusifolius	Imperiled	Pennsylvania Sedge	Vulnerable
Kidney-leaf White Violet	Imperiled	Blue toadflax	Vulnerable
Indian Rice	Imperiled	Pleuridium acuminatum	Vulnerable
Bulb-bearing Water-hemlock	Imperiled	American Bistort	Vulnerable
Alaska Plantain	Imperiled	Marsh Seedbox	Vulnerable
Shinleaf	Imperiled	Russet Sedge	Vulnerable
Northwestern Manna Grass	Imperiled	Rhizomnium glabrescens	Vulnerable
Nuttall's Pussytoes	Imperiled	A moss	Vulnerable
Water Pygmyweed	Imperiled	Ulota phyllantha	Vulnerable
Golden Chinquapin	Imperiled	Weak Bluegrass	Vulnerable
Golden Draba	Imperiled	Cascades Willow	Vulnerable
Brewer's Cliff-brake	Imperiled	Moonwort Grape-fern	Vulnerable
Dicranella schreberiana var. robusta	Imperiled	Porotrichum vancouveriense	Vulnerable
Boreal Grass-of-parnassus	Imperiled	Narrow-leaf Water-plantain	Vulnerable
Drummond's anemone	Imperiled	Pink Fawn-lily	Vulnerable
Floating Pennywort	Imperiled	Arctic Aster	Vulnerable
Treelike Clubmoss	Imperiled	Northern Yellow Point-vetch	Vulnerable
Lime-seep Eucladium	Imperiled	White-bark Pine	Vulnerable
Cascade Wallflower	Imperiled	California Pinefoot	Vulnerable
Porcupine Sedge	Imperiled	Velvetleaf Blueberry	Vulnerable
Grimmia elatior	Imperiled		



A Pacific Fisher.
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A young Spotted Owl.
photo by Robin Silver



A Green Heron.
photo courtesy USFWS



A Sea Otter.
photo by GettyPhoto.com



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