

OCS Chapter 6. Strategy Species Methods

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Strategy Species Overview

The U.S. Fish and Wildlife Service (USFWS) requires all State Wildlife Action Plans to designate Species of Greatest Conservation Need based on (i) “low and declining species” and (ii) “species that are indicative of the diversity and health of wildlife of the state.” Strategy Species [\[Insert OCS weblink\]](#) lists were developed to meet this requirement for Oregon, recognizing that more specific efforts could then be developed throughout the implementation of conservation efforts.

The USFWS also requires states to provide specific information about problems that may affect these species, information needed to improve conservation, and recommended Conservation Actions [[Link to USFWS requirements in Strategy Introduction: Elements 1, 3, 4](#)].

The Oregon Conservation Strategy (Strategy) uses the term “Strategy Species” for Species of Greatest Conservation Need. The Strategy identifies fish, wildlife, invertebrate, and plant Strategy Species and vulnerable animal concentrations.

Methods for Determining Strategy Species

The Oregon Conservation Strategy (Strategy) list of Strategy Species was developed by regional biologists and species experts for publication in 2006, first by creating a list of all declining species in Oregon. Then, spatial models of Oregon’s vegetation types were used to produce species – habitat associations that estimated the extent of habitat loss experienced by each species. The 2006 Strategy identified “data gap” species, defined as species that may be of conservation concern but insufficient information is available to fully assess whether they meet the conservation criteria. The data gap species list was used as a starting point to consider new Strategy Species for the 2015 update.

The Oregon Department of Fish and Wildlife (ODFW) Wildlife Division updated the Wildlife Strategy Species. ODFW Fish Conservation and Recovery updated the Fish Strategy Species. Experts from the Oregon Department of Agriculture (ODA), the Oregon Biodiversity Information Center (ORBIC), the Xerces Society for Invertebrate Conservation, and independent species experts were consulted to update the Invertebrate Strategy Species. ODA Plant Conservation Program reviewed the Plant Strategy Species, and additional experts from the Institute for Applied Ecology provided additional information. Although efforts were made to standardize criteria, available information and the conservation criteria for Strategy Species varied depending on taxa.

Methods for Determining Updates to Wildlife Strategy Species List

ODFW's Wildlife Conservation Program staff led a comprehensive review process for the Wildlife Strategy Species – the amphibians, birds, reptiles and mammals. Conservation Criteria based on the criteria used in 2006 Strategy were used. Agency files and scientific literature were reviewed to consider new information or major changes in the past 10 years, and to decide whether to keep a species on the list, or to remove it if the species no longer meets the criteria. The list of Data Gap species from 2006, and also considered whether species with elevated conservation status (federal ESA status; NatureServe Global or State rank) should be added to the Strategy Species list. Information from agency files and literature searches was also used to update the information associated with each species, as published in the species table (special needs; limiting factors; data gaps; conservation actions). ODFW consulted with species experts throughout Oregon to review the Strategy Wildlife Species lists and information associated with each species.

ODFW reached out to an extensive list of species experts to review their preliminary recommendations. Some of the species technical experts who contributed to the 2006 Strategy, as well as many new experts and ODFW biologists were included in the review. ODFW considered their recommendations and incorporated them into the updated Strategy.

Oregon's Wildlife Strategy species Conservation Criteria:

- Strategy species are designated by ecoregion, based on local conservation need and opportunities. Consult these criteria if needed for suggested Strategy species list additions or removals by ecoregion
- Consider: Has there been a notable change to this species in this ecoregion documented within the past 10 years?

If three or more of these criteria apply to a species within an ecoregion, the species may be considered a "Wildlife Strategy Species":

1. Life history traits render the species vulnerable to potential threats, such as low reproductive rates, low dispersal ability, dependence on multiple at-risk habitats, dependence on uncommon or at-risk habitats, or at-risk structures. Or, the species gathers in concentrations for some part of its life cycle including nesting, roosting or feeding sites.
2. Population size is small and at risk, or greatly reduced from its historic population size OR Population size is small and at risk OR greatly restricted from historic population size, suggesting the species could become extirpated in much or all of the ecoregion.
3. Restricted distribution occurs when one of three criteria is met:
 - a. This species is considered an ecoregion endemic or near-endemic: a notable proportion of the species' range occurs in this ecoregion; or,
 - b. There is significant retraction from historic geographic range; or,
 - c. It is a disjunct (isolated) population that is important to conservation of species throughout its range.
4. Either (a) declining population in the ecoregion OR (b) declining population statewide and the ecoregion is especially important for conservation

5. Populations of this species in this ecoregion are known (or strongly suspected) to be impacted by a Key Conservation Issue or major threat:
 - Climate Change - Information from the [University of Washington Climate Change Vulnerability Assessment](#) was consulted for Strategy Species covered by the Assessment
 - Land Use Changes (including renewable energy) - Results in habitat loss to the population
 - Changes in Water Quality and Quantity
 - Barriers to Animal Movement
 - Disruption to Disturbance Regimes (fire, flooding) or ecological processes (stream hydrology or nutrient flows)
 - Invasive Species - Plants or animals, competitors or predators
 - Other known threats to populations including: disease, predation, pollutants, hybridization, parasitism, nest predation

Methods for Determining Updates to Fish Strategy Species

ODFW Fish Conservation and Recovery Program staff led the review for the Fish Strategy Species. The comprehensive review was based on a number of criteria, which closely match the Wildlife Strategy Species criteria described above. If a fish species or Species Management Unit (SMU) is listed under the Endangered Species Act as threatened or endangered either at the state or federal level, it was automatically designated as a Strategy Species. Additionally, ODFW updated the Sensitive Species List to inform the Conservation Strategy Species update and any fish species that was designated as an ODFW Sensitive Species was also designated as a Strategy Species.

A variety of resources were used to update the Sensitive Species list. Status assessments in recently approved conservation and recovery plans were used. All ODFW conservation and recovery plans are [available online](#). For species and SMU's with no recent written assessment or plan, ODFW staff used information from recent research or monitoring efforts (e.g., fish distribution and abundance surveys), prior listing on the Sensitive Species list or in the 2005 [Oregon Native Fish Status Report](#), or professional knowledge and judgment to determine the status. When applicable, ODFW staff also consulted with partner scientists and agencies to help inform decisions.

To account for the lack of data and multiple sources of uncertainty (taxonomic, range, abundance) surrounding many of the non-game species, the conservation risk was assessed based on a rarity model that assesses species vulnerability to drought, wildfire, climate change or nonnative fishes. The model data were sourced from the Oregon State University Fish Collection and expert opinion (ODFW District Fish Biologists and researchers). Two metrics were developed to assess distribution or range. For the first metric fish distribution was defined as narrow (limited) when a species is found in four or fewer districts and broad (widespread) when a species is found in 5-16 districts. For the second metric fish distribution was defined as narrow if only "limited distribution" or "rare" status responses were received for a species and broad if a species was "widespread" or "common" in any district. An abundance metric was developed, where a "low" abundance score was assigned if the minimum district score for a species was 4-6 (limited, not locally abundant; rare; or unknown) and a "high" abundance score was

assigned if the minimum district score for a species was 1-3 (widespread; common; or limited, but locally abundant).

A metric for habitat specificity was also developed, where fish were assigned to the “narrow” category if a species inhabits fewer than 3 of the 5 habitat types (large river, small river, creek, spring, lacustrine) and did not occupy both lowland and upland habitats, and to the “broad” category if the species inhabits 3 or more habitat types or occupies both lowland and upland habitats. The data for habitat types and elevation (upland, lowland, or both) were obtained from the online [FishTraits](#).

The range/distribution, abundance, habitat specificity, and endemism (y/n) data for each species were then compiled and each fish was assigned to one of 8 rarity categories (Figure X), according to Yu and Dobson (2000), based on distribution/range (high or low; assigned once for each of the two metrics), population abundance (high or low), and habitat specificity (broad or narrow).

		Distribution (range)			
		Large		Small	
Population abundance		high	low	high	low
Habitat Specificity	broad	A (4)	C (3)	E (3)	G (2)
	narrow	B (3)	D (2)	F (2)	H (1)

Categories	Description
A	Generalist
B	Locally abundant over a large range and in specific habitat
C	Low abundance over a broad range in several habitats
D	Low abundance over a large range and in specific habitat
E	Locally abundant in several habitats but narrow geographic range
F	Locally abundant in specific habitat but narrow geographic range
G	Low abundance, narrow geographic range, in several habitats
H	Low abundance, narrow geographic range, in specific habitat

Figure X. Rarity categories, descriptions, and scores (in parentheses) from: Yu, J., and F. S. Dobson. 2000. Seven forms of rarity in mammals. *Journal of Biogeography* 27:131-139.

Methods for Determining Updates to Invertebrate Strategy Species

ODFW consulted with experts from ODA, ORBIC, the Xerces Society for Invertebrate Conservation, and independent species experts to update the Invertebrate Strategy Species and the information associated with each species. There are numerous data gaps for Invertebrates and few surveys are conducted to look for invertebrates. To the extent possible, the Wildlife Conservation Criteria were considered for Invertebrates. Over the past 10 years, more information has been gathered to indicate a lack of knowledge for many species, resulting in several species moved to “Data Gap Species” status.

[Link Box]: Pollinators in the Strategy. The updated Strategy includes several new pollinator species, including Franklin’s Bumblebee. For more information on how states are incorporating pollinators into State Wildlife Action Plans, see [www.teaming.com/state-wildlife-action-plans-publication]

Methods for Determining Updates to Plant Strategy Species

ODFW consulted with ODA's Plant Conservation Program and with the Institute for Applied Ecology to consider new information and references for plant species. Numerous data gaps exist for plant species of conservation concern, and few surveys are conducted regularly. The list of Strategy Plants remains the same as the 2006 list, incorporating updates on taxonomy, and updated information on species profiles and links to additional information.

Methods for Determining Updates to Nearshore Strategy Species

The ODFW Marine Program led the update process for Nearshore Strategy Species. Nearshore Strategy Species are determined to be in greatest need of management attention. Identification as a Nearshore Strategy Species does not necessarily mean the species is in trouble. Rather, those identified as Nearshore Strategy Species have some significant nearshore management and/or conservation issue connected to that species that is of interest to resource managers.

Development of the 2015 Nearshore Strategy Species list began with a review of the original list of Strategy Species developed a decade ago, including species that utilize the nearshore but that had only been included in the Oregon Conservation Strategy. The species that were still recognized as species of concern, at risk, important, or a priority by federal or state agencies, stakeholders, experts, non-government organizations, scientific researchers, tribes or other conservation processes were included on the revised list. In addition, a comprehensive list of species that occur in the nearshore was evaluated for potential new additions to the Nearshore Strategy Species list. To maintain a nearshore ecosystem focus, attention was focused on both harvested and non-harvested species that predominantly occur, or are common, within Oregon's nearshore environment.

To assist with the identification of Nearshore Strategy Species, the following information was compiled from published literature, available online data, scientific databases, and personal communication from experts, for each species on the list:

- taxonomic information
- distribution, including species geographic range and depth
- harvest/collection information, including sector(s) (commercial, sport, aquarium trade, and/or scientific/medical research) and whether targeted or incidental catch
- life history information, including mode of reproduction, fecundity, timing of reproduction, timing of egg/larval/juvenile stages, longevity, age at maturity, and migratory behavior or seasonal distribution
- habitat use for each life history stage
- trophic interactions, including prey, predators, and competition
- population status information, including whether a population assessment has been conducted, listed as overharvested, listed as a threatened or endangered species, whether species has experienced a population decline, whether the species is rare, has small range or is endemic, if species has specialized habitat requirements, and if the species has low productivity.

This information was used to help examine the conservation needs of each species with regards to four separate criteria (each weighted equally). Each species was evaluated for each of these four criteria to identify those species in greatest need of management attention:

1. *Species status* - examples of species status include overharvested, rare, declining population throughout its range or in Oregon.
2. *Ecological importance* - examples of ecological importance include habitat forming, habitat engineer, keystone species, prey species.
3. *Vulnerability to human or natural factors* - examples of vulnerability include susceptible to oil spills or water pollution, life history traits render it particularly vulnerable (low productivity, specialized habitat requirements, climate change or ocean acidification effects, etc.), or there are significant data gaps or research needs on vulnerability for that species.
4. *Economic/social/cultural importance* - examples of importance to humans include commercially important, recreationally important, culturally important to Oregon tribes, flagship or sentinel species.

Those species whose conservation needs were determined to best be met through existing management affecting habitats or communities of organisms were separated from the list. Through extensive examination, deliberation, and consultation with subject matter experts, 73 species were identified as Nearshore Strategy Species. These species, or distinct populations, were determined to have conservation needs in greatest need of management attention *and* to have the greatest potential for benefit from management actions.

The table presents the list of Nearshore Strategy Species, including notes on special needs, limiting factors, data gaps and conservation actions for each species. This information is provided for use by managers, research and monitoring projects or programs, those producing education and outreach materials, planners, and the general public. Readers should note that management jurisdiction varies for each species. For instance, some Nearshore Strategy Species are managed by ODFW, others by NOAA Fisheries or USFWS, and many species are under shared management authority by multiple resource agencies and institutions.

Strategy Species Conservation Summaries: Guide to Strategy Species Tables (OCS Chapter 7)

Strategy Species [\[Insert OCS weblink\]](#) were designated by ecoregion, based on conservation need and opportunities, rather than on a statewide basis. The ecoregions listed in the table below represent the highest priorities for implementing conservation actions for individual species. However, some species also occur in ecoregions other than the ones listed in the table. Appropriate conservation actions implemented outside the listed ecoregion(s) will also contribute to the overall conservation for that species.

Key to ecoregion abbreviations:

- BM = Blue Mountains
- CP = Columbia Plateau
- CR = Coast Range
- EC = East Cascades
- KM = Klamath Mountains
- NBR = Northern Basin and Range

WC = West Cascades
WV = Willamette Valley
NS = Nearshore

Special Needs:

These are the types of habitat or habitat elements that are important to the species sometime during its lifecycle. Needs may include requirements for foraging, raising young, daily movement needs, migrating or wintering. For plants, they may also include soil, elevation or other factors that determine where a species occurs.

Limiting Factors:

These describe some of the issues that affect species and may limit or otherwise impact their populations. Limiting factors are often associated with changes in habitat quality or quantity, but also include disease, competition or other impacts from non-native species, disturbance during sensitive times, barriers to movement and other factors. For the Strategy, limiting factors also includes those that make a species more vulnerable to change or slow to recover from population declines. For example, some species occur at naturally low densities, have very specific habitat requirements, have naturally low reproductive rates, occur in a small geographic area (endemic), or move across very large areas.

Data Gaps:

These are research or monitoring questions that need to be answered to better inform species conservation efforts. They may include basic life history requirements, habitat associations, or impacts from potential limiting factors. Data gaps that apply to all species or broad groups of species are presented on page __. For example, data on baseline conservation status, estimated population size and population trends are needed for most Strategy Species.

Key Conservation Actions:

These are priority actions recommended to conserve the species. Management actions should ideally address a species special needs and limiting factors. For some species, actions have already been implemented and should be continued. For other species, new conservation actions are identified. Conservation actions need to be compatible with local priorities, local comprehensive plans and land use ordinances, as well as other local, state, or federal laws. Actions on federal lands must undergo federal planning processes prior to implementation to ensure consistency with existing plans and management objectives for the area.

Additional Strategy Species Background References:

The Society for the Study of Amphibians and Reptiles (SSAR)
Mexico. http://www.ssarherps.org/pages/comm_names/Index.php

The American Ornithologists' Union *Check-list of North American Birds*
<http://www.aou.org/checklist/north/>

Wilson and Reeder's (2005) *Mammal Species of the World: a taxonomic and geographic reference*. Available as an online database at <http://www.vertebrates.si.edu/msw/mswcfapp/msw/index.cfm>

NatureServe Explorer: <http://www.natureserve.org/explorer/>

Applegarth, J. S. 1995. Invertebrates of Special Status or Special Concern in the Eugene District. U.S. Bureau of Land Management, Eugene, Oregon.

Frest, T. and E. Johannes. 1995. Interior Columbia Basin Mollusk Species of Special Concern. Unpublished report prepared for the Interior Columbia Basin Ecosystem Management Project.

Christine G. Niwa, Roger E. Sandquist, Rod Crawford, Terrence J. Frest, Terry Griswold, Paul Hammond, Elaine Ingham, Sam James, Edward J. Johannes, James Johnson, W.P. Kemp, James LaBonte, John D. Lattin, James McIver, Joel McMillin, Andy Moldenke, John Moser, Darrell Ross, Tim Schowalter, Vince Tepedino, and Michael R. Wagner. 2001. Invertebrates of the Columbia River Basin Assessment Area. United States Department of Agriculture Forest Service Pacific Northwest Research Station General Technical Report PNW-GTR-512.

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