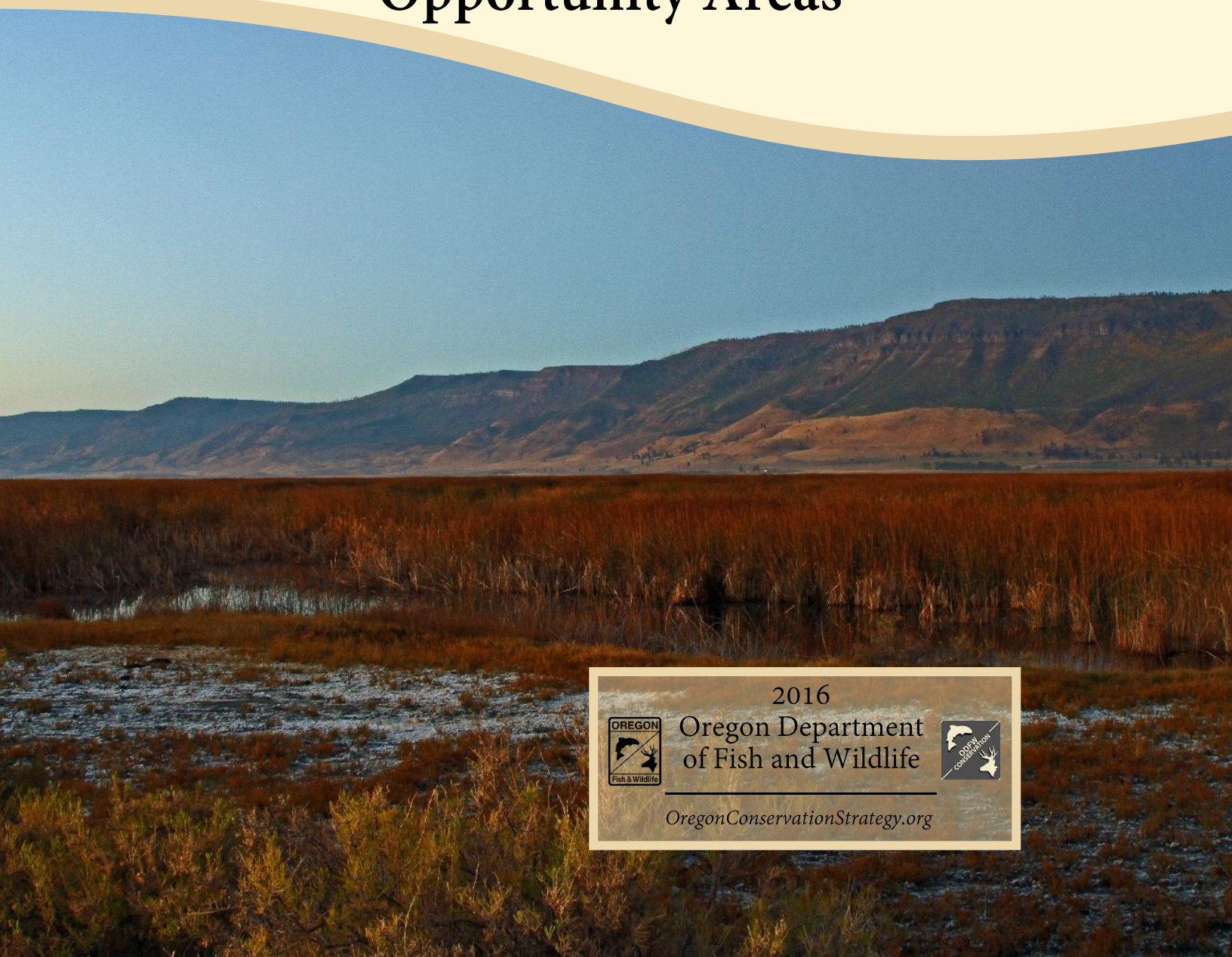




the OREGON CONSERVATION STRATEGY



Chapter 4: Conservation Opportunity Areas



2016
Oregon Department
of Fish and Wildlife



OregonConservationStrategy.org

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PDF Content Last Updated December 30, 2016

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Contact ODFW

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Recommended Citation

Oregon Conservation Strategy. 2016. Oregon Department of Fish and Wildlife, Salem, Oregon.

Cover Photos

Banner: American marten, USFWS; monarch butterfly, Derek Ramsey, Wikipedia; Greater Sage-Grouse, Jeannie Stafford, USFWS; coho salmon, BLM; western lily, ODA; western pond turtle, Keith Kohl, ODFW

Featured image: Conservation Opportunity Area 189, which includes Summer Lake and the surrounding high desert wetlands subregion, Keith Kohl, ODFW



Photo Credit: Keith Kohl, ODFW

CONSERVATION OPPORTUNITY AREAS

Conservation Opportunity Areas (COAs) are places where broad fish and wildlife conservation goals would best be met. Focusing investments in these prioritized areas can increase the likelihood of long-term success, maximize effectiveness over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries.

All 206 COAs include supporting information in an associated COA profile, including details about the area's Conservation Strategy priorities, recommended actions consistent with local priorities, and ongoing conservation efforts.

COAs were developed to guide voluntary conservation actions in Oregon. Land use or other activities within these areas will not be subject to any new regulations. The Oregon Department of Fish and Wildlife (ODFW) COA map, dataset, and underlying profile information should only be used in ways consistent with these intentions.



Above: Map of ODFW Conservation Opportunity Areas (red-hatching). Photo credit: ODFW, ESRI, USGS. View an [interactive map](#) online.



Photo Credit: ODFW

COA OVERVIEW

BACKGROUND

Landowners and land managers throughout Oregon can contribute to conserving fish and wildlife by maintaining, restoring, and improving habitats. These conservation actions benefit Strategy Species and Strategy Habitats, and are important regardless of location. However, focusing investments in prioritized areas, or COAs, can increase the likelihood of long-term success, maximize effectiveness over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries. Site-level information is listed for each of the COAs on [profile pages](#) of the [OregonConservationStrategy.org](#) website.

COAs are places where broad fish and wildlife conservation goals would best be met, and they have been designated for all ecoregions within the Conservation Strategy, except the Nearshore ecoregion. COAs were delineated through a spatial modeling analysis and expert biologist review ([COA Methodology](#)). Continuing the voluntary approach to Strategy implementation, conservation actions will likely be implemented within COAs by a variety of partners (e.g., landowners, land managers, agencies, watershed councils, local land trusts, Soil and Water Conservation Districts, etc.), and will encompass all types of land ownership and management approaches.

COAs were developed to guide voluntary conservation actions in Oregon. Land use or other activities within these areas will not be subject to any new regulations. The ODFW COA map, dataset, and underlying profile information should only be used in ways consistent with these intentions.

COA SUMMARY

The total size of COAs covers 33,349 square miles, which is roughly 34 percent of the state of Oregon.

COA Profiles

Each COA has an associated COA profile with supporting information on Conservation Strategy priorities. This information includes a list of: [Strategy Species](#), [Strategy Habitats](#), special features, recommended conservation actions, local conservation plans, and potential conservation partners. Web links are provided when possible to assist users in locating more detailed information and guidance on the local conservation priorities. COA profiles can be accessed through the [Conservation Opportunity Areas](#) page, either by selecting areas within the COA map or by selecting specific COAs in the [list or grid view](#).

COA profile information is available for download in an [Excel table](#) format.

Wilderness Areas

During the Oregon Conservation Strategy revision process, efforts were made to improve how COAs work alongside Oregon's existing protected areas. For example, federal Wilderness Areas may be restricted from undergoing restoration or enhancement projects, but they provide an important protection of areas that contain high concentrations of Strategy Species and Strategy Habitats. All Wilderness Areas have been removed from ODFW COAs, with an effort instead placed on including areas directly adjacent to Wilderness Areas. The intention was to maximize the area within COAs where conservation actions can take place, while also building upon existing protected areas in an effort to enhance connectivity and contiguous blocks of Strategy Habitats.

Public Lands

Sixty-three percent of the land encompassing COAs is owned and managed by government agencies. The majority are federal lands (92 percent), with state lands accounting for 5 percent and the remaining 3 percent split among local government agencies. COA profiles include a Special Features section, which highlights protected areas within each COA and links users to local conservation plans.

Urban Areas

Another focal area of the COA revision process was to improve how urban, or developed, areas were incorporated into the analysis. The initial COA modeling process, undergone in 2006, incorporated raw landscape development data, such as roads, census population areas, and Urban Growth Boundaries (UGBs) to avoid areas highly impacted by development. An improvement within the revised COA modeling process, completed in 2016, is the availability of [species movement models](#) developed by [The Nature Conservancy \(TNC\)](#). These models were generated using updated UGBs as well as transportation, transmission lines, and other development-related datasets, and they predict the impact of developed areas on the ability for a species to move across the landscape. This allowed the COA revision analysis to focus on the impact of development to Strategy Species, rather than simply avoiding populated or developed lands. Nearly half of the revised COAs (93 out of 206) include at least some land

within an UGB, totaling over 300 square miles of urban areas included statewide, and providing ample opportunity to undergo [Conservation in Urban Areas](#).

Other organizations develop and maintain prioritized conservation areas across the state of Oregon. Some examples of this work include:

- [TNC Willamette Valley Synthesis Conservation Opportunity Areas](#): “The primary goals of the Synthesis Project are to delineate priority terrestrial and freshwater sites [in the Willamette Valley] where investment in conservation or restoration would best contribute to (1) the health of historically significant and functional habitats, (2) the survival or recovery of imperiled plants and wildlife dependent on those habitats, (3) improved floodplain connectedness to benefit water quality for aquatic biodiversity, and (4) overall watershed health.”
- [TNC Ecoregional Assessments](#): “A portfolio of sites that if managed for conservation could conserve all the biodiversity (species and communities) within the ecoregion.”



Photo Credit: Rick McEwan

COA METHODOLOGY

ODFW COAs were originally developed for the 2006 Conservation Strategy with the best available information at the time and an intention for them to be updated as new information became available. Agencies, conservation organizations, and stakeholder groups have since indicated that COAs were one of the most heavily utilized components of the Strategy ([10-Year Report](#)), helping to prioritize on-the-ground conservation actions statewide. In response to staff and partner requests, the ODFW re-analyzed COA boundaries for the 2016 Conservation Strategy, using new and updated science, data, and resources.

To continue the success of the 2006 COAs, the same definition, concept, and general datasets were used in the 2016 analysis. Improvements focused on:

- Incorporating new and updated data within the modeling analysis
- Conducting a more precise and better documented analysis
- Working with internal and external technical experts statewide
- Standardizing COA profiles to provide clearer connections between COAs and Strategy Species, Strategy Habitats, and Key Conservation Issues

This section presents a description of each step in the COA revision process: Spatial Modeling Analysis, Spatial Modeling Analysis Review, COA Boundary Delineation, and COA Profile Development.

SPATIAL MODELING ANALYSIS

The process to update the 2016 COA boundaries began with a rigorous spatial analysis, using a conservation prioritization and spatial modeling program called [Marxan](#). Marxan provided decision support with the design of conservation areas, using best available data to focus on concentrations of Strategy Species, Strategy Habitats, and additional datasets related to selected Key Conservation Issues.

The Marxan spatial modeling analysis involved the following steps:

- Compiling data into assessment units
- Setting Marxan goals for all Strategy Species, Strategy Habitats, and additional datasets
- Establishing a suitability index
- Variable calibration
- Marxan analysis

Compiling Data Into Assessment Units

The first step in the planning process was to select conservation targets, based on best available datasets. The conservation targets are elements of biodiversity (i.e., plants, animals, and habitats) and were limited to those elements included in the list of Strategy Species and Habitats, or related to Strategy Key Conservation Issues. In November 2014, ODFW Conservation Strategy development staff convened a Technical Advisory Team, including representatives from the Institute for Applied Ecology, Klamath Bird Observatory, Natural Resources Conservation Service, ODFW Fish Division, Oregon Biodiversity Information Center (ORBIC), TNC, The Wetlands Conservancy, and U.S. Fish and Wildlife Service (USFWS). The Technical Advisory Team discussed available conservation targets and associated datasets to emphasize within the 2016 COA analysis.

The following datasets were determined to provide the best available information on each associated Conservation Strategy component:

Strategy Species: Wildlife (Amphibians, Birds, Mammals, Reptiles)

- [ORBIC](#) Element Occurrences
- [ORBIC](#) Point Observation Dataset
- [ODFW Observation Data](#)
- [eBird](#)
- [ORBIC](#) Species Models

Strategy Species: Fish

- ODFW Crucial Habitat Assessment: [Aquatic Species of Concern](#)

Strategy Habitats

- [2016 Conservation Strategy Habitat Map developed by ORBIC and ODFW](#)
- [2010 ORBIC Ecological Systems](#)

- [2011 National Land Cover Dataset](#)
- [Wetland Restoration Planning Tool Dataset](#)
- [SageCON](#)
- [Confluences](#)

Key Conservation Issue: Climate Change

- TNC Topo-Climate Diversity Model
- [Willamette River Cold Water Sources](#)

Key Conservation Issue: Disruption of Disturbance Regimes

- Floodplains ([FEMA 100 year flood zones](#))

Key Conservation Issue: Barriers to Animal Movement

- [TNC Resistance Model](#)
- [TNC Species Permeability Model](#)

Key Conservation Issue: Land Use Changes

- [U.S. Geological Survey \(USGS\) Protected Areas Database](#)

All available data for the established conservation targets were then attributed to assessment units, wall-to-wall polygonal features from which the conservation portfolio was constructed. The 2006 COA analysis used hydrologic unit code (HUC) level 6 watersheds, which are relatively coarse and vary greatly in size and shape across the landscape. The 2016 COA analysis used a finer resolution (1 square mile hexagon grid of assessment units) for a more statistically sound analysis, which is the same base data used in the Western Association of Fish and Wildlife Agencies Crucial Habitat Assessment Tool ([WAFWA CHAT](#)), the ODFW Crucial Habitat Assessment work presented in the [ODFW Compass](#), and the decision support system currently under development within the Oregon Sage-Grouse Conservation Partnership.

Setting Marxan Goals for all Strategy Species, Strategy Habitats, and Additional Datasets

After selecting targets and compiling all available data, the next step of the spatial modeling process involved setting goals for the number of occurrences and geographic distribution of each target. These goals are based on the amount and distribution of each target across the geography, factoring in target rarity and degree of endangerment to ensure that each target is treated equally. Targets should be represented in multiple COAs (where possible) as a hedge against stochastic events (e.g., disease, fire) and to buffer against the anticipated impacts of climate change, with an overarching intention to provide for long-term viability of Strategy Species and Habitats.

Strategy Species and Habitat goals were generated using an overall range of 30 percent (recommended minimum amount of habitat needed to sustain imperiled populations) to 60 percent (recommended maximum amount of habitat to be included while still prioritizing distinct areas). The goal range was further adjusted to account for additional data characteristics if needed, with more reliable data assigned higher goal percentages. Specific goals were then established based on the following matrices, with an emphasis on assigning higher percentages to Strategy Species and Habitats declared in fewer ecoregions. The overall objective was to normalize Strategy Species and Habitats throughout the COA analysis, providing higher goals for Strategy Species and Habitats that were represented in only one ecoregion, and lower goals for Strategy Species and Habitats represented in all ecoregions.

Strategy Species: Wildlife Goals

The total number of ecoregions where each species was designated a Strategy Species compared to the species' conservation status (see table on next page). NatureServe State Rank ("S-rank") was used as a consistent measure for conservation status ([NatureServe](#)). Goals were established for both species observations (higher percentage) and species habitat distribution modeling (lower percentage). 'XX' indicates that no Strategy Species occurred within a particular combination.

TOTAL NUMBER OF ECOREGIONS WHERE EACH SPECIES WAS DESIGNATED AS A STRATEGY SPECIES COMPARED TO THE SPECIES' CONSERVATION STATUS (S-RANK)

S-rank	Number of Ecoregions							
	1	2	3	4	5	6	7	8
S1	60%/30%	XX	XX	XX	XX	50%/25%	XX	XX
S2	60%/30%	50%/25%	50%/25%	50%/25%	50%/25%	40%/20%	40%/20%	40%/20%
S3	60%/30%	50%/25%	50%/25%	50%/25%	40%/20%	40%/20%	40%/20%	40%/20%
S4	50%/25%	50%/25%	XX	XX	40%/20%	XX	XX	XX
S5	50%/25%	XX	40%/20%	XX	XX	XX	XX	XX

Strategy Species: Fish Goals

The total number of ecoregions where each species was designated a Strategy Species compared to the species' conservation status. The priority rank established within the [Aquatic Species of Concern Crucial Habitat Assessment](#) was used as a consistent measure for conservation status.

Aquatic SOC (CHAT) Priority	Number of Ecoregions						
	1	2	3	4	5	6	7
1	50%	40%	40%	40%	30%	30%	30%
2	50%	40%	40%	30%	30%	30%	30%
3	40%	40%	40%	30%	30%	30%	30%

Strategy Habitat Goals

Habitat goals were established for each Strategy Habitat based on qualitative assessments of conservation status, impairment, data quality, and the number of ecoregions containing each habitat. Additional data related to sagebrush and wetland habitats were incorporated to further prioritize especially high value habitat locations.

Habitat	Ecoregion							
	BM	CR	CP	EC	KM	NBR	WC	WV
Aspen Woodlands	60%			60%		60%		
Coastal Dunes		50%						
Estuaries		40%						
Natural Lakes	40%	40%	40%	40%	40%	40%	40%	40%
Grasslands	50%	50%	50%		40%		40%	40%
Late Successional Mixed Conifer Forests	40%	40%		40%	40%		40%	

Habitat	Ecoregion							
	BM	CR	CP	EC	KM	NBR	WC	WV
Oak Woodlands		60%		60%	60%		60%	60%
Ponderosa Pine Woodlands	40%			40%	50%			
Riparian and Flowing Water Habitats	40%	40%	40%	40%	40%	40%	40%	40%
Sagebrush Habitats	50%		40%	50%		50%		
Sagebrush Habitats – Impacted by Fire, Invasives, or Landscape Integrity	30%		NA	30%		30%		
Wetlands	40%	30%	40%	40%	30%	40%	30%	30%
Wetlands – High Conservation Significance	60%	50%	60%	60%	50%	60%	50%	50%

Remaining dataset goals were established primarily based on data quality: confluences (30 percent), floodplains (20 percent), and topo-climate diversity (40 percent).

Establishing a Suitability Index

Suitability values denote the “cost” of conservation, or the impediments to conservation, and allow the analysis to emphasize areas most suitable to conservation. Suitability was estimated for each assessment unit, using a consistent formula factoring in values based on barriers to animal movement and land conversion/use (i.e., TNC Resistance and Species Permeability Models) and land protection status (i.e., USGS GAP Protected Areas Database) within each assessment unit. Suitability ranges were scaled among ecoregions to provide a standardized minimum, maximum, and range of suitability values within all ecoregions across Oregon.

Variable Calibration

Marxan spatial modeling software requires variables to customize the modeling analysis. Two of the most important variables are the: 1) Number of Iterations, which defines the number of times that

Marxan will duplicate a random seeding and analysis and 2) Boundary Length Modifier, which is used to determine the relationship of the size of conservation areas versus number of distinct conservation areas (e.g., few large areas, or many smaller areas). Scripts were utilized to find the optimal calibration settings for these variables within each ecoregion.

Calibration results:

Ecoregion	Number of Iterations	Boundary Length Modifier
Blue Mountains	2,000,000,000	0.16
Coast Range	600,000,000	0.11
Columbia Plateau	1,000,000,000	0.11
East Cascades	650,000,000	0.14
Klamath Mountains	900,000,000	0.14
Northern Basin & Range	2,000,000,000	0.16
West Cascades	500,000,000	0.19
Willamette Valley	600,000,000	0.11
Statewide	2,000,000,000	0.14

Marxan Analysis

Separate Marxan runs were first performed within each ecoregion. These results were then used as a seed to run a final statewide Marxan model.

ODFW would like to acknowledge:

TNC, Portland, OR: provided guidance, data processing, and general assistance with the data, modeling analysis, and documentation. Some of the text within the COA Methodology page has been taken verbatim, with permission, from the TNC report [“Conserving Nature’s Stage: Identifying Resilient Terrestrial Landscapes in the Pacific Northwest”](#).

USFWS, Portland, OR: provided software training, automated scripts and tools, data processing, and general assistance with the data, modeling analysis, and documentation

SPATIAL MODELING ANALYSIS REVIEW

The results of the spatial modeling analysis were reviewed by ODFW Fish and Wildlife Biologists as well as the Stakeholder Advisory Committee convened by the ODFW for the Conservation Strategy update. Numerous review sessions were held across the state with detailed presentations and in-depth discussions. An online mapping application and PDF map of model results were provided to ODFW field staff and the Stakeholder Advisory Committee, along with multiple formats to provide review and input. All comments for specific areas were converted into a spatial format and assigned to specific assessment units within the COA analysis.

COA BOUNDARY DELINEATION

The final step in producing the revised COA boundaries was to compile all available information into a single boundary dataset. Layers utilized during this process included:

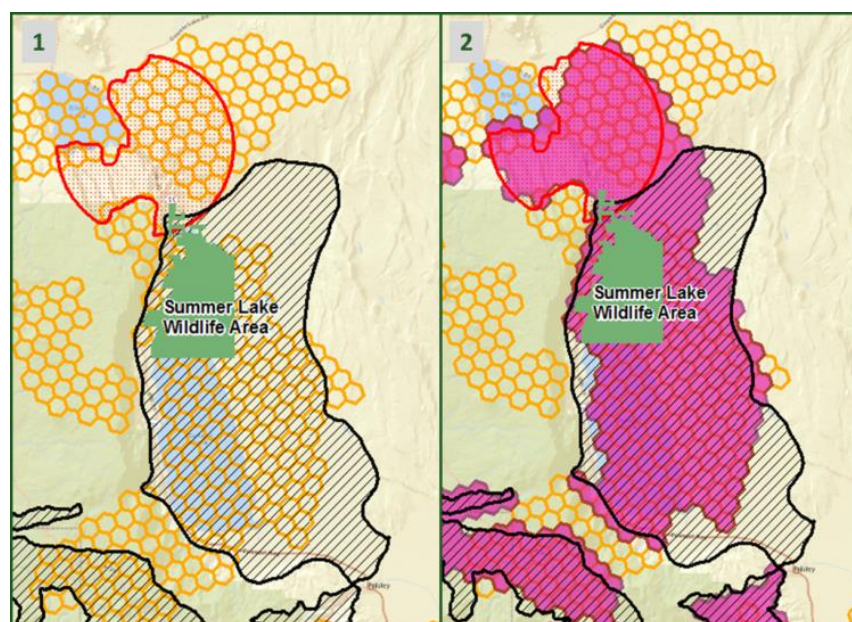
- Results of the statewide ODFW 2016 COA Spatial Modeling (Marxan) Analysis
- Results of the ecoregion-specific ODFW 2016 COA Spatial Modeling (Marxan) Analysis
- Feedback provided during the 2016 COA review process
- ODFW COAs produced in 2006
- TNC Ecoregional Assessment Portfolios
- [TNC Willamette Synthesis Conservation Opportunity Areas](#)
- [ODFW Sage-Grouse Core Areas](#)
- [WAFWA CHAT](#)

The ODFW Conservation Opportunity Area Revision Team examined the Oregon landscape and selected the final square-mile assessment units to include in the 2016 COA boundaries using the following criteria:

- Maintain any assessment units that were highlighted within the solution of the ODFW 2016 COA Spatial Modeling Analysis and were included as a 2006 ODFW COA.
- Include assessment units that were highlighted within the solution of the ODFW 2016 COA Spatial Modeling Analysis and were approved during the review process by ODFW field staff and/or Conservation Strategy stakeholders.
- Maintain any assessment units that were highlighted within the solution of the ODFW 2016 COA Spatial Modeling Analysis and are included as an ODFW Sage-Grouse Core Area.

- Include 2006 ODFW COAs that were requested to be maintained by ODFW field staff and/or Conservation Strategy stakeholders.
- Include assessment units that included at least three of the layers listed in the paragraph above.
- **Remove all Wilderness Areas from COAs.**
- Connect COAs as much as possible, often following streams or similar Strategy Habitat corridors.
- Do not exceed more than 35 percent of the Oregon landscape.
- The 2006 ODFW COAs encompassed approximately 26 percent of the Oregon landscape. Because of recent data improvements, a higher percentage was deemed acceptable for the 2016 analysis. Through discussions with agency partners and the Technical Advisory Team, it was determined that anything exceeding 35 percent of the landscape would negate the purpose of COAs and reduce their chance for success.
- Do not exceed more than 40 percent within an individual ecoregion, to ensure that focusing on specific areas was not minimized within a given ecoregion.
- Maintain a mix of public and private land (include at least 30 percent private land, statewide).
- The final COA boundaries should meet at least 75 percent of the Marxan goals set during the spatial modeling analysis.

After selecting hexagons to include in the final solution, boundary lines were then drawn to divide areas into distinct COAs, following similar habitats and/or watersheds where possible. Each COA was given a unique name and COA ID. Some 2016 COAs follow the same boundaries as the 2006 COA, or **TNC Willamette Synthesis COAs**, instead of having a hexagonal boundary. All 2016 COA boundaries were clipped to the Oregon state boundary.



COA PROFILE DEVELOPMENT

Initial profiles for each COA were developed using the data from the COA analysis, providing detailed lists of Strategy Species and Habitats that have been documented within each COA. ODFW staff manually recorded remaining profile information. COA profiles will continue to be refined with new and updated information.