



Site-specific Management

How to Avoid and Minimize Impacts of
Development to Shrub-steppe



*Washington
Department of
Fish and Wildlife*

IMPORTANT NOTE TO READERS: The following is a condensed version of the site-specific management section found in WDFW's Management Recommendations for Washington's Priority Habitats: Shrub-Steppe. To find the site-specific management section in its entirety, please go to <https://wdfw.wa.gov/sites/default/files/publications/01333/wdfw01333.pdf>

This publication should be cited as:

Azerrad, J. M., K. A. Divens, M. F. Livingston, M. S. Teske, H. L. Ferguson, and J. L. Davis. 2011. Site-specific management: how to avoid and minimize impacts of development to shrub-steppe. Washington Department of Fish and Wildlife, Olympia, Washington. ^a

Cover photo by Joe Rocchio.

^a *This publication received a minor update in 2020 to ensure consistency with an update made to the PHS shrubsteppe definition to address the role of fire in shrubsteppe ecosystems. The substantive new content related to fire is shown in italics in the body of this pamphlet.*

The first step in managing for development impacts in shrub-steppe is recognizing when shrub-steppe exists near the proposal. While this may seem obvious, many do not recognize shrub-steppe. To avoid this situation, communities can develop systems to flag project proposals at the earliest stages.

If impacts are likely, here we offer useful guidance to avoid or minimize these impacts by identifying:

- when to write a habitat management plan.
- how to consider the surrounding landscape.
- the type of features to measure and assess.
- a protocol for mapping and ranking shrub-steppe quality on a parcel or a proposed subdivision.
- recommendations and techniques to incorporate into a development proposal.
- ways of approaching mitigation.

WHEN TO REQUEST A HABITAT MANAGEMENT PLAN

A habitat management plan (HMP) is one of the most useful tools for addressing a project's impacts to habitat. An HMP is a detailed plan to document where important habitat areas occur, potential incursions or impacts to habitat, and ways to avoid or minimize habitat loss. Using our management recommendations as a guide, an HMP should describe the:

- impacts to habitat by a proposed land use action.
- resources on the property and habitat connectivity on adjacent properties.
- past, present, and future land uses.
- mitigation measures, including quantitative goals, objectives, and performance standards.
- implementation plan using maps, as-built drawings, and operation/maintenance plans.
- monitoring, evaluation, and a contingency plan with corrective actions if conservation or mitigation actions do not lead to the desired outcome.

To assess the need for an HMP, begin by gathering critical information (Table 1) such as the location of nearby shrub-steppe and the amount and quality of shrub-steppe on the parcel.

Table 1. Information to obtain and review to guide the development of a HMP.

Information Source	Purpose	How to obtain
Landscape scale shrub-steppe maps	To determine where shrub-steppe is likely to occur onsite or nearby.	Available if jurisdiction or large land-owner developed maps at this scale.
Most current high-resolution aerial photos	To get a general sense of important features.	Statewide Imagery
WDFW's PHS data ¹	To determine if WDFW has identified locations of priority species or habitats.	https://wdfw.wa.gov/species-habitats/at-risk/phs/maps
DNR's Rare Plants and High Quality Ecosystem data ¹	To determine if DNR's Natural Heritage Program (NHP) has identified rare plants or high quality ecosystems ² .	NHP Data Products and Requests
PHS Management Recommendations	Recommendations for priority species or habitats occurring on or near site.	https://wdfw.wa.gov/species-habitats/at-risk/phs/recommendations
Parcel (ownership) maps	To see if nearby lands are owned by a resource agency or conservation organization.	http://depts.washington.edu/wagis/projects/parcels/producers

¹ The absence of data locations for any given site does not necessarily mean that shrub-steppe habitat is not present on the site

² NHP's [database manager](#) should be contacted since some data is deemed as sensitive. Sensitive data is not available online.

You should have someone with a strong background in shrub-steppe wildlife ecology develop your HMP. This individual must be proficient with identifying common shrub-steppe plants. They also must know how to key less common shrub-steppe plants out in the field.

We recommend an HMP for any project having all factors identified in Table 2. A site does not necessarily need to fulfill all these factors for an HMP to be necessary. In fact, HMPs can be important even when only a single factor is identified. We recommend you contact a WDFW biologist or other natural resource professionals to help evaluate the need for an HMP and to review your HMP.

Table 2. Summary of important factors in determining the need for an HMP.

Determinant factors	Rationale
Shrub-steppe associated or obligate species present	If these species occur on or near the project site, typically that indicates the habitat is important for conservation.
Important landscape features present	Large, connected, or less isolated patches of shrub-steppe are important for many wildlife species. Also, the landscape context of a patch is an important consideration. For instance, a small patch of lower-quality habitat could still be of high value if it functions as a wildlife corridor between larger shrub-steppe patches.
Shrub-steppe has been identified on or near a site	If a conservation organization or resource agency mapped shrub-steppe on or near the site, high quality habitat is likely present.
Other on-site priority habitats occur	The presence of multiple priority habitats (e.g., shrub-steppe and riparian) means the site is of even greater importance as habitat.

CONSIDERING THE SURROUNDINGS

Knowing what key habitat is immediately surround a proposed development is important given the impact rarely is confined to the project area. While it is not always possible to identify all key features on adjacent properties, any relevant information will help assess a project’s true impacts. By using aerial photos, landscape scale shrub-steppe maps (see *PHS Shrub-steppe Management Recommendations*, Appendix 7), and PHS data, developers and planners can identify important features like the presence of shrub-steppe or a priority species on adjacent parcels.

To ensure consistent planning across properties, we recommend jurisdictions keep a retrievable record of all previously developed HMPs. That way, new projects near a site with an HMP can be flagged. Planners can then proactively work to make sure any new project will not compromise conservation measures that were enacted as part of an earlier-developed HMP.

MAPPING AND ASSESSING SHRUB-STEPPE

The Department developed a protocol for mapping shrub-steppe within a project area for a subdivision or single home (see *PHS Shrub-steppe Management Recommendations*, Appendix 9). We recommend using this protocol in the early stage of developing an HMP.

Information generated from this protocol can help you apply the general recommendations outlined below. Resulting maps can help determine where the best quality habitat occurs and can aid in deciding where to develop and what to protect. Although these habitat maps will sometimes lead you to a clear decision, appropriate conservation strategies will not always be obvious. For instance, a small parcel fully covered in shrub-steppe of consistent quality may be hard to manage; while a large parcel may be easier to manage given more options and fewer constraints.

GENERAL RECOMMENDATIONS

The application of shrub-steppe conservation measures at a finer scale is not always simple. However, some techniques, when properly applied, can reduce impacts to shrub-steppe wildlife.

Development Densities. - Development densities in shrub-steppe should generally be no greater than what the most shrub-steppe species will tolerate (see *PHS Shrub-steppe Management Recommendations*, Figure 12). Though most of these species can tolerate low density development, certain provisions are needed to further ensure functional habitat is not impacted. These include the use of cluster development (with provisions to set aside open space), as well as terms to minimize impacts of roads and utilities, auxiliary structures (e.g., outbuildings), yard maintenance, fences, and domestic animals.

Siting of Homes and Lots. - Given the mapping protocol in Appendix 9 of the *PHS Shrub-steppe Management Recommendations* helps identify where shrub-steppe occurs and can measure habitat quality, the output of the protocol should guide the siting of new homes. For example, where a parcel consists entirely of shrub-steppe, knowing where lower quality habitat occurs can help with finding options about where development is appropriate. Specifically, homes should be built on the lowest quality habitat available on a parcel. And when there are multiple options, home building should occur as far as possible from important features such as high-quality shrub-steppe, large habitat patches, important areas of connectivity, or wildlife burrows or nests.

Roads and Utilities. - Roads and utility corridors are a primary source of habitat fragmentation, especially when bisecting large patches of shrub-steppe. You should minimize the use of overhead utility lines or bury them when possible. Route larger transmission lines to avoid important habitats. We also recommend placing any type of linear structure along an existing road or utility rights-of-way.

Along roads vehicles spread invasive plant seed and road-side soil disturbance aid in establishing these plants. To reduce the spread of undesirable plants, take appropriate measures to minimize soil depths at roadside verges; use coarse, infertile soils as fill; build roads through more resistant plant communities; and reestablish native vegetation along roads after construction (unless actively maintaining it as a fire-break). You should also time roadside maintenance such as mowing and herbicide use to maximize detrimental effects on exotics and to minimize impacts to native plants and wildlife. To reduce mortality from road-kills, minimize the length of roads and reduce speed limits to the greatest extent possible. Using the protocol in Appendix 9 of the *PHS Shrub-steppe Management Recommendations*, planners and developers should locate new roads using factors mentioned earlier to guide the siting of homes.

Landscaping and Yard Maintenance. - Landscaping and yard maintenance can greatly impact shrub-steppe. Although low density development can minimize impacts to shrub-steppe, this approach is undermined when a developer or homeowner disturbs or clears the remaining shrub-steppe on a lot. To keep this from happening, planners and developers should designate only a small portion of each lot for activities like clearing vegetation, grading, landscaping, or yard maintenance. Designated areas should occur in areas of non-habitat, disturbed habitat, or lower quality habitat. Restricting these activities to small a portion of a lot should be a condition of a legally binding site plan or agreement that “runs with the land” to ensure it is carried over to future landowners. Although your dwelling should always have a fire-resistant buffer for safety, we encourage landscaping with native plants adapted to the shrub-steppe zone (see Washington Native Plant Society’s [Native Plant and Seed Source](#) link). We recommend a fire-resistant buffer width no greater than what is necessary to protect the dwelling.

Domestic Animals. - Outdoor pets and other animals including livestock on hobby farms can impact shrub-steppe wildlife. Dogs and especially cats harass and kill countless numbers of birds, mammals,

reptiles, and amphibians each year. The [Cats Indoor Campaign](#) developed materials on reducing these impacts. Large livestock like cattle and horses can also impact habitat, especially when they overgraze and disturb fragile soils. We recommend outdoor pets have a limited presence in developments near important shrub-steppe. Given the known impacts of livestock on shrub-steppe habitat and wildlife, we recommend a limited presence of livestock on lands with shrub-steppe not primarily intended for commercial ranching. You should also use Best Management Practices to address other factors like fencing, buffers, and seasonal rotations.

Fences. - Fences affect wildlife by restricting their access to critical habitat and provide perches for predators that harm sensitive species. Because of their impacts to wildlife, construct your fence only where absolutely necessary. We recommend a tailored design to minimize impacts to wildlife as well as careful fence placement. New and existing fences—especially in Greater Sage-grouse habitat—require clear markings to prevent collision (see NRCS’s [Fence Considerations in Sage-Grouse Habitat](#) fact sheet). Because wildlife can damage fences, wildlife-friendly designs reduce the frequency of costly and time-consuming repairs. [Fencing with Wildlife in Mind](#) has guidelines for building wildlife-friendly fences.

Developing Wetlands and Riparian Areas. - Given the limited water in arid lands, development proposals should carefully consider potential impacts to wetlands, seeps, springs, and riparian areas. The availability of these habitats is important to shrub-steppe wildlife. We recommend avoiding development and other disturbances near springs, seeps, wetlands, and riparian areas. You should also leave soils with cryptobiotic crust undisturbed given the importance of these crusts in retaining soil moisture.

Water Use and Development. – Water development for irrigation and supplying water can also impact shrub-steppe if not carefully planned. For instance, canals and ditches can fragment habitat just like roads and other rights-of-way. To the greatest extent possible, place water conveyance structures along existing rights-of-way and not through large patches of shrub-steppe. Also avoid diverting from or disturbing natural springs and seeps, especially in sage grouse summer range.

Fire Management and Defenses. – *Shrubsteppe disturbed by fire alters habitat condition but does not eliminate the shrubsteppe habitat. Thus, planners and developers should consider fire-disturbed shrubsteppe as a priority under WDFW’s PHS Program. This should consequently be factored into any decisions about developing in and around fire-disturbed shrubsteppe. Considerations that inform development should include fire size and intensity, adjacent shrubsteppe condition and connectivity, and the likely trajectory of habitat recovery, both with and without active restoration. Strategies to assess habitat recovery post-fire can include surveys to verify occupancy/presence of obligate shrubsteppe plants and wildlife as well as key structural components (e.g., biological soil crusts).*

Building in dry shrubsteppe landscapes comes with inherent wildfire risks. The risk increases with exacerbated drought seasons and increased fuel loads due to fire suppression. Planners have tools to reduce this risk, such as requiring that homes and yards meet wildfire-resistant standards. This includes non-combustible building materials as well as properly screened vents.

These and other techniques should be used along with the creation of defensible space measured around the actual dwelling structure. Though defensible space is a critical tool to mitigate risk, removing vegetation can harm and eliminate habitat function when sites managed for defensible space overlap with shrubsteppe. To limit habitat loss, defensible space should be considered part of the development footprint and should prioritize protecting the residential dwelling unit rather than other structures (e.g. out-buildings).

Residents and jurisdictions can also invest in restoring shrubsteppe health in and around residential areas to build resilience to catastrophic wildfires. This is particularly useful for shrubsteppe near residential areas disturbed by features commonly associated with large wildfire (e.g., broad expanses of dense cheatgrass).

Wildfire prevention education efforts, such as brochures, social media campaigns, and public service announcements, are successful and cost-effective ways to decrease human-caused wildfires. The “[Wildfire Risk to Communities](#)” website is a comprehensive resource to consult when approving new homes and subdivisions. It also has useful information that can guide local building codes as well as a [Risk Explorer Tool](#) that allows planners to identify site-specific development risks. The tool can be particularly useful to long-range planners who can use it to inform and add risk-prevention strategies into their local long-range plans (e.g., siting UGAs in low fire risk areas and in reasonable proximity to fire responders).

Conservation Development Techniques

Techniques such as cluster development, flexible densities, lot sizes and configurations, as well as set-asides can help conserve any type of habitat, not just shrub-steppe. Given this fact, WDFW's [Landscape Planning for Washington's Wildlife: Managing for Biodiversity in Developing Landscapes](#) (see Chapter 7) describes in detail some techniques presented below.



Figure 1. In the top image are eight homes dispersed throughout an 80-acre parcel. The green area is shrub-steppe. Below is the same site, except with the homes clustered and the shrub-steppe placed in an area protected as open space.

Deed Restrictions & Conservation Easements

When placing a deed restriction on a designated area being set-aside for habitat conservation, the restriction should run with the land and not with the grantee. That way the land is given adequate protection by conserving it in perpetuity.

Conservation easements should have language to permanently restrict any land use incompatible with habitat protection (e.g., ATVs, waste disposal, shooting wildlife, etc).

Clustering all development into the least sensitive portion of a site is useful, since that can reserve a large portion of a parcel for shrub-steppe protection using a deed restriction, conservation easement, or another legally-binding approach (see inset above). When jurisdictions allow for flexible densities, lot sizes and configuration, developers and planners can use this flexibility to also balance the needs of wildlife and development. On the top of Figure 1 is a parcel developed using conventional practices. Under this scenario, all shrub-steppe is likely to be replaced by residential lots.

But by using the techniques described above, shrub-steppe can be better protected and set aside as a reserve within a parcel (Bottom of Figure 1).

Incentives

Incentives can help when parcels have constraints that make development difficult or impossible without compromising important habitat. When development and habitat protection are incompatible, programs like Transfer of Development Rights (TDRs), Open Space Tax incentives, and Conservation Futures all are useful options. Many incentive-based programs give tax-breaks, while others lead to the outright purchase of land for permanent conservation when there is a willing landowner. Some lands are eligible for purchased with [Section 6](#) funds when there is habitat for a state or federally listed species. [Landscape Planning for Washington’s Wildlife: Managing for Biodiversity in Developing Landscapes](#) gives a detailed description of these and other incentives.

Parcels with Sensitive Species

We strongly advise landowners with habitat for a sensitive species consider pursuing a land use with less of an impact given development at even exceedingly low densities seem to harm these species. For many of the most sensitive species, WDFW has published species-specific [Management Recommendations](#). These publications should be referenced and their recommendations incorporated into HMPs.

Given sage-grouse is arguably the most sensitive shrub-steppe species, much is published on this species. Construction of roads, power lines, and all types of development can wipe out sage-grouse habitat. The PHS Management Recommendations for Greater Sage-grouse is one useful source of guidance. Table 3 lists other sources to guide management of known or potential habitat in designated sage-grouse management units (see [Washington’s Sage-Grouse Recovery Plan](#) for management unit locations).

Table 3. Publications to help guide activities that can impact Greater Sage-grouse habitat.

Title	Land Use Activities Addressed
Management Recommendations for Washington’s Priority Species: Birds	Guidelines for sagebrush alteration, fire management, grazing, use of herbicides/pesticides, restoration.
Washington State Recovery Plan for the Greater Sage-Grouse	Guidelines for the implementation of species recovery objectives to meet population goals.
Guideline to Manage Sage Grouse Populations and Their Habitats	Guidelines for fencing; power lines; water development; breeding, brood-rearing, and winter habitat management; and habitat restoration.
Sage-Grouse Habitat in Idaho: A Practical Guide for Landowners and Managers	Helps land managers recognize characteristics of productive and unfavorable sage-grouse habitat throughout different species life stages. Guidelines focus mainly on grazing.
SAGEMAP	Sage-grouse and sagebrush mapping and research efforts clearinghouse from around the Western U.S.
Washington Department of Fish and Wildlife Wind Power Guidelines	Guidance for developing land-based wind energy projects to avoid, minimize and mitigate impacts to fish and wildlife habitats.

Mitigation

Once you locate shrub-steppe in a project area, WDFW recommends a consistent application of the following mitigation sequence in the following order going from the most to the least preferred option:

1. avoid impact by not taking a certain action;
2. minimize impacts by limiting the action;
3. remedy the impact by restoring the affected area;
4. reduce the impact over time by preservation or maintenance;
5. compensate for the impact by replacing or substituting resources.

You should enforce lasting mitigation using a binding site plan with restrictive covenants recorded on the plat and an HMP or equivalent that “runs with the land” to ensure it is carried to future landowners.

The prior recommendations are meant to avoid and minimize any impact. Methods of compensatory “off-site” mitigation usually do not prove as effective as protecting habitat on-site, because created or mitigated sites rarely replace lost function. However, by using an established shrub-steppe mitigation bank, off-site mitigation may be acceptable. Specifically, through using a mitigation bank, the loss of small, isolated patches of shrub-steppe can be acceptable when offset by protecting large, intact, well-connected areas of shrub-steppe. However, in most instances we recommend off-site mitigation only as a last resort and after all other options have received serious consideration. When using off-site mitigation, we recommend only using it to develop parcels of lesser quality shrub-steppe (e.g., small, isolated, and/or disturbed vegetation) in return for protecting high quality shrub-steppe. We also recommend ~~off-site~~¹ mitigation ratios of no less than two acres of protected shrub-steppe for every acre of lost habitat. Mitigation sites should be as geographically close as possible to the affected habitat.

¹ Please see the [erratum](#) for the explanation for why this word is struck out of the text.

Erratum

For a correction to Management Recommendations for Washington's Priority Habitats: Shrubsteppe

May 16, 2022

In this publication WDFW cites the agency's [Wind Power Guidelines](#) as the supporting source for recommending a 2:1 shrubsteppe mitigation ratio. The intent was for the mitigation ratio in PHS Shrubsteppe to mirror the mitigation ratio in the Wind Power Guidelines. The authors of PHS Shrubsteppe unintentionally prefaced mitigation with the word "off-site" to mean that for every 1 unit (e.g., acre) of habitat lost, 2 units of habitat are to be conserved "elsewhere". The word "off-site" is not used in the Wind Power Guidelines. From the author's perspective, "off-site" included any undisturbed site on or off the disturbed parcel. This differs from the common meaning of "off-site", which equates "off-site" to parcels different from the ones being developed or disturbed.

This mismatch of author intent and the common usage of the word as well as the unintended difference between the mitigation ratio presented in PHS Shrubsteppe and the Wind Power Guidelines creates confusion in how to correctly implement the mitigation ratio in PHS Shrubsteppe. To correct this, we have struck the word "off-site" from the misstated sentence.