

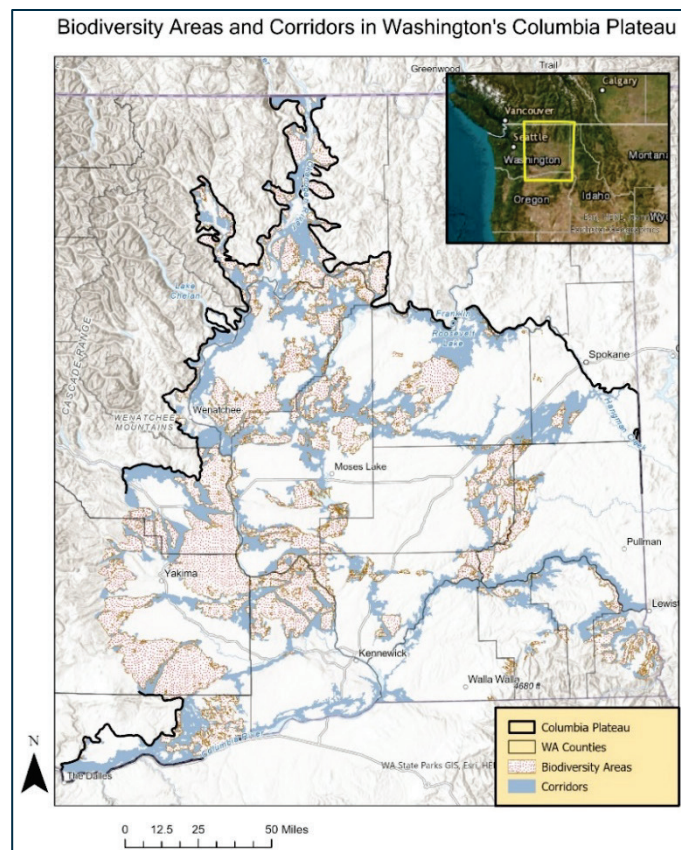
# Priority Habitats and Species Local Government User Guide



## Biodiversity Areas and Corridors Map

PHS Guidance for Local Governments

PHS Mission: To effectively communicate WDFW's conservation priorities via data driven maps, guidance, and technical assistance to influence terrestrial and aquatic land use decisions such that Priority Habitats and Species are protected and perpetuated.



Washington  
Department of  
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May 12, 2023

# Acknowledgements

**Acknowledging the Indigenous People, Land, and Culture of the Pacific Northwest:** Since time immemorial, Indigenous People have graced the Pacific Northwest with rich traditions of many diverse cultures, languages, traditional knowledge expressed artistically and practically with intricate principles passed down throughout generations. As the first stewards of this land, Indigenous People from this part of the world are ancestrally engrained in the very fabric of this region that is known today as Washington State.

Washington Department of Fish and Wildlife (WDFW) acknowledges the American Indian Tribes as the original occupants of this land enjoyed today by all Washingtonians. Their historic reliance to hunt, fish, and gather traditional foods defines their inherent responsibilities to protect and steward the precious resources on the waters and landscape shared today by all Washington residents.

The very survival of the Pacific Northwest Tribes is a testament of resiliency of what they have endured and continue to endure throughout generations on this very landscape. Through scarred valor, many historical encounters of massacre, renunciation of religious freedom, systemic racism, cultural assimilation of native children through institutional residential schools, and the fight for their inherent rights and liberties, they have prevailed. Throughout this tormented history brought by colonization, abrogated treaties, infringement of civil rights, and the salmon protests of the 1960s, the Northwest Tribes and WDFW have founded a commitment of respect, unity, and alliance taught by the realities of the past.

Today tribal governments and WDFW work collaboratively to conserve and manage aquatic and terrestrial resources across the State and practice sound science to ensure successful resource management decisions. The Tribes and WDFW work together to ensure the sustainability of fish, wildlife, ecosystems, and culture for the next seven generations and beyond.

**Reviewer acknowledgment:** Many people were involved with mapping the Priority Habitats and Species Biodiversity Areas and Corridors Priority Habitats. The project authors extend our sincere appreciation to the following individuals that played important roles during the development and review of the Biodiversity Areas and Corridors dataset:

- **WDFW Habitat Program:** Carmen Andonaegui, Amanda Barg, Scott Downes, Keith Folkerts, Perry Harvester, Terry Johnson, Julia Michalak, Mike Ritter, and Elizabeth Torrey.
- **WDFW Wildlife Program:** Mike Atamian, Jason Fidorra, Janet Gorrell, and Mark Teske.
- **Natural Resources Conservation Service:** Tom Miewald.

While we acknowledge and appreciate all the review and comments provided by these advisors, this report's authors bear responsibility for this document and any errors contained herein.

**User acknowledgment:** The Washington Department of Fish and Wildlife recognizes and appreciates the significant role that local governments, tribes, conservation organizations, and others play in accomplishing our agency's mission. Indeed, we are certain that without their concerted efforts to designate and protect Biodiversity Areas and Corridors that are essential for many of the state's at-risk wildlife species, WDFW would be unable to fulfill its mandate on behalf of Washingtonians.

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## Acronyms

BAC	Biodiversity Areas and Corridors
BAS	Best Available Science
CAO	Critical Areas Ordinance
FWHCA	Fish and Wildlife Habitat Conservation Area
GMA	Growth Management Act
PHS	Priority Habitats and Species
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SMA	Shoreline Management Act
VSP	Voluntary Stewardship Program
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WHCWG	Washington Habitat Connectivity Working Group

## About PHS Local Government User Guides

The Washington Department of Fish and Wildlife (WDFW) recognizes local governments' authority and responsibility to manage land use – including for purposes beyond protecting fish and wildlife habitat. WDFW appreciates the complexity local governments face when designating and protecting habitats and species; the agency takes seriously its responsibility to provide supportive technical assistance.

*The Priority Habitats and Species (PHS) Local Government User Guides* are intended to augment the technical assistance WDFW Habitat Biologists provide to local governments in support of their land use responsibilities under the Growth Management Act (GMA, [RCW 36.70A](#)), Shoreline Management Act ([RCW 90.58](#)), Voluntary Stewardship Program ([VSP](#)), and State Environmental Policy Act (SEPA, [RCW 43.21C](#)).

The details of Critical Area Ordinances (CAOs), Shoreline Master Programs, and other development regulations varies from jurisdiction to jurisdiction. For purposes of this *PHS Local Government User Guide*, we assume that a jurisdiction's CAO contains the following common provisions:

- (a) PHS Priority Habitats and Priority Species are designated and protected as Fish and Wildlife Habitat Conservation Areas (FWHCAs),
- (b) PHS maps are adopted and incorporated by reference,
- (c) for projects that potentially disturb FWHCAs, applicants are required to complete a critical area report (i.e., habitat management plan) to delineate and evaluate the FWHCA, and
- (d) the planning department has the discretion to require a screening level critical area report (in lieu of a more extensive report) when warranted.

This *PHS Local Government User Guide* describes how the PHS Biodiversity Areas and Corridors map for the Columbia Plateau can help inform land use decisions and describes key features and limitations of the map. In our assessment, the map and associated *PHS Technical Report: PHS Biodiversity Areas and Corridors Map* meet the definition of Best Available Science (BAS). This User Guide is a guidance document that incorporates WDFW's assessment of BAS from the map and technical report, but it is not BAS itself. Appendix A contains several Frequently Asked Questions for local government planners, policy makers, and citizens. Appendix B lists experts who reviewed the mapping process and results. Appendix C provides links to additional resources. For case-specific applications of this User Guide, users are encouraged to contact a local [WDFW Habitat Biologist](#).

## Background

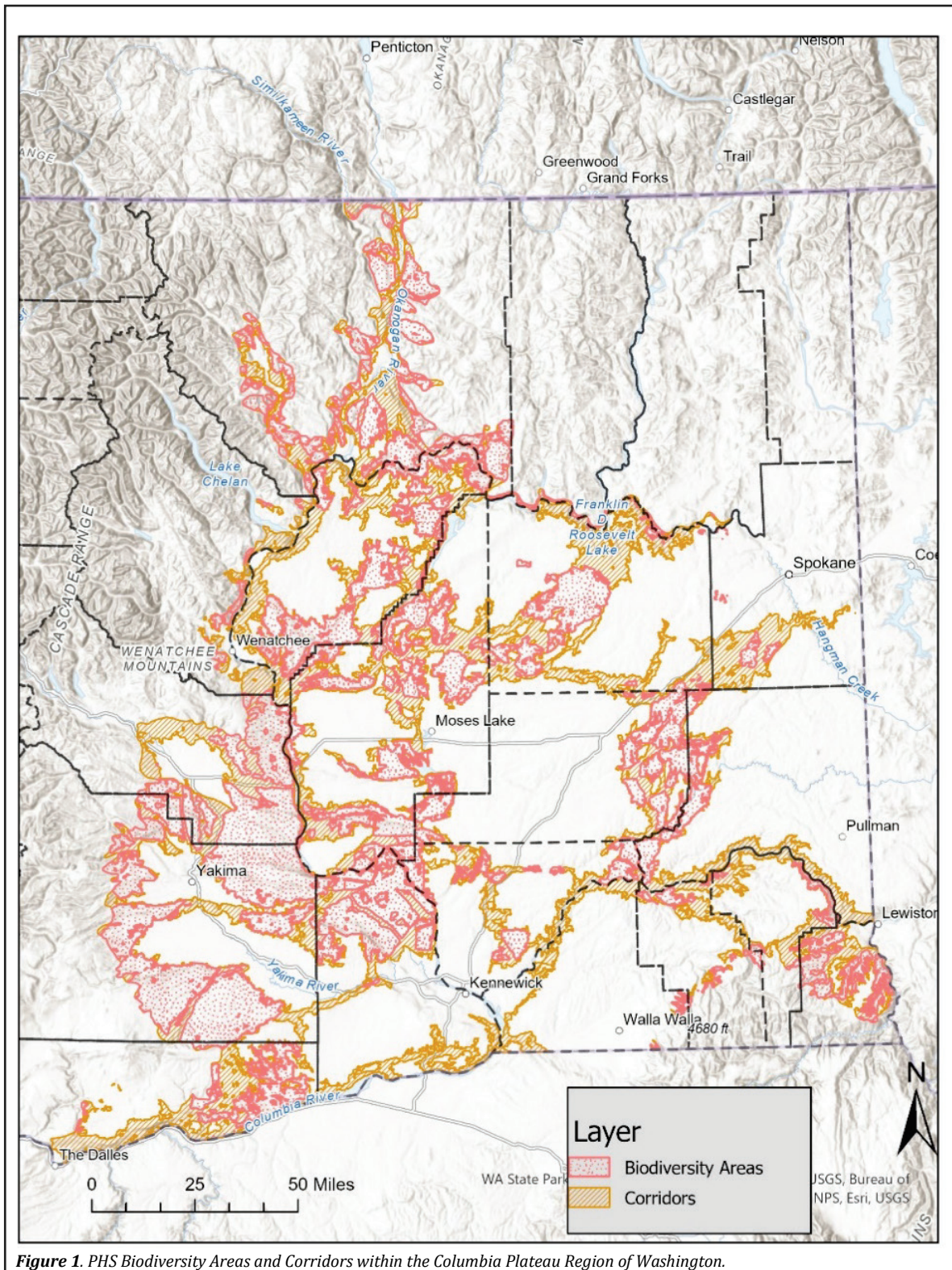
Large intact blocks of habitat are critical for biodiversity because they can support sensitive species, species that require large areas, and more resilient wildlife populations compared to smaller or more fragmented habitat areas (MacArthur and Wilson 1967, Watson et al. 2018). Corridors provide pathways for wildlife to move between biodiversity areas. This movement supports critical ecosystem functions including plant and animal movement to access food, water, shelter, and breeding habitat; adaptation to climate change; and gene flow. Together, these biodiversity areas and corridors create a connected network of intact habitat critical to the long-term health of wildlife populations. Human land use and development has led to the dramatic loss and fragmentation of wildlife habitat and is a leading cause of biodiversity loss and decline globally (IPBES 2019). On the Columbia Plateau, over half of the native Shrubsteppe vegetation has been converted to agriculture and what remains is highly fragmented (WHCWG 2012). The Columbia Plateau is home to several Federally listed species and many Washington Species of Greatest Conservation Need. Maintaining a connected network of intact habitat is essential for the long-term survival and health of these species.

### Biodiversity Area and Corridor Conservation at WDFW

WDFW recognizes large, connected, landscapes as an agencywide conservation priority and refers to these areas as Biodiversity Areas and Corridors. Biodiversity Areas and Corridors are lands with comparatively rich and abundant wildlife that are connected to allow wildlife to move freely and safely between core habitat areas. PHS Biodiversity Areas outside of urban growth areas must be identified using “a scientifically based assessment conducted over a landscape scale,” as defined in the [PHS List](#) (see WDFW 2008). PHS Corridors are defined as “areas of relatively undisturbed and unbroken tracts of vegetation that connect fish and wildlife habitat conservation areas, priority habitats, or areas identified as biologically diverse” (i.e., Biodiversity Areas).

### PHS Mapping of Biodiversity Areas and Corridors

The PHS program used modeled core habitat and connectivity data produced by the Washington Wildlife Connectivity Working Group (WHCWG) to develop the PHS Biodiversity Areas and Corridors map shown in Figure 1 (WHCWG 2012). PHS Biodiversity Areas include any location identified by the WHCWG as a landscape integrity core (i.e., areas  $\geq 10,000$  acres of contiguous habitat with relatively low human land use modification) and additional locations identified as Habitat Concentration Areas (i.e., modeled core habitat) for three or more focal species. PHS Corridors include any location identified by the WHCWG as a landscape integrity corridor (i.e., minimal human land use barriers to movement) and additional locations identified as corridors for four or more focal species (i.e., areas with minimal species-specific barriers to movement). Although PHS Biodiversity Areas and Corridors are defined and mapped separately here, they form a continuous network of habitat on the landscape. Detailed methods are described in [PHS Technical Report: PHS Biodiversity Areas and Corridors Map](#).



**Figure 1.** PHS Biodiversity Areas and Corridors within the Columbia Plateau Region of Washington.



## Intended Use of the PHS Biodiversity Areas and Corridors Map

The PHS Biodiversity Areas and Corridor (BAC) map provides local governments and decision-makers with a source of landscape-scale information that is useful for flagging regions of high-quality, intact habitat and wildlife corridors of regional ecological significance. Conservation actions or low intensity land use activities within the PHS BAC network will best support wildlife sustainability and resilience on the Columbia Plateau. High intensity land uses can negatively impact the network by fragmenting large blocks of habitat or severing or constricting wildlife corridors.

The PHS BAC map can be used to help local governments designate and protect Biodiversity Areas and Corridors. For example, the BAC map can inform open space planning and designation, Urban Growth Area changes, zoning designations, comprehensive planning, and siting of major developments. This map can also be useful for highlighting places where incentive-based voluntary efforts (e.g., Transfer of Development Rights) may be applied to conserve or enhance ecological functions. In its current format, this map is not intended to assess site-specific land use proposals (e.g., where to site buildings on a parcel), except for major projects with large spatial footprints, such as large industrial solar farms.

The PHS BAC map can be used to identify areas for open space, resource conservation, or low intensity land use designations. However, the current BAC boundaries as mapped are approximate. Biodiversity Areas and Corridors are not discrete areas that can be clearly delineated by their physical characteristics because habitat value naturally changes as a gradient across the landscape. Further review of local landscape conditions and refinement of any boundary lines are necessary additional steps before designating distinct boundary lines. An informed use of this map is best achieved when land use decisions are made in concert with a WDFW Habitat Biologist or another professional who understands the ecological functions and values provided by the PHS BAC network.

### Data Limitations and Sources of Error

Users of this data should be aware of the following potential sources of error with the PHS Biodiversity Areas and Corridors map:

**Resolution.** The WHCWG models that form the basis of the PHS Biodiversity Area and Corridor map used various input data layers. Many of these input data layers were produced with satellite generated imagery with a resolution of 30 meters (a pixel 30m on a side is 0.22 acres). In these types of data, each pixel is given a single value (e.g., identified as “urban” or “forest”) associated with the majority characteristic within that pixel. The coarse nature of satellite imagery means there are inherent limitations in accuracy.

**Temporal Errors.** The WHCWG models that form the basis of the PHS Biodiversity Area and Corridor map were published in 2012 and the data used to develop the models were 5-15 years older than that date. Land cover changes due to factors such as disturbance, land use, or processes will not be reflected in the models. Further review of local landscape conditions and refinement of any boundary lines are necessary additional steps before designating distinct boundary lines. We will periodically evaluate the PHS BAC map to determine whether land use changes warrant a change or refinement in PHS BAC delineation.

**Modeled Data.** The WHCWG created models of habitat quality and connectivity to create the products that form the basis of the PHS Biodiversity Area and Corridor map. These models make assumptions about what types of landscape conditions make good habitat for individual species and what types of landscape features facilitate or impede animal movement through the landscape. The landscape integrity model makes the general assumption that greater intensity of human landscape modification leads to lower habitat value and reduced ability for species to move through the landscape. These assumptions are most

reasonable for species that are sensitive to human development, which are also the species most in need of conservation attention. In all cases, experts used best available science to inform these decisions and the models have been extensively reviewed (see WHCWG 2012 for details).

## Applying the PHS Biodiversity Areas and Corridors Map in Land Use Decision Making

### Growth Management Act

The PHS Biodiversity Area and Corridor map is a source of BAS that local governments can use to inform mandatory and optional elements of GMA in accordance with WAC 365-195-905. The BAS requirement states that sources of BAS must be created through a valid scientific process. The process used to develop the underlying PHS BAC source data included all the major characteristics of a valid scientific process (WAC 365-195-905[5a]).

### Long-range Planners

The PHS Biodiversity Area and Corridor map can be used to inform regional-scale, long-range planning decisions such as:

- Planning for expansions of Urban Growth Areas,
- Designating rural and natural resource lands,
- Designating greenbelts and open spaces, including open space corridors,
- Identifying eligibility for incentives, including density transfers, conservation easements, and other innovative habitat protection mechanisms.

### Current Planners

The PHS Biodiversity Area and Corridor map can provide context for understanding potential landscape-scale impacts of proposed land use changes that occur within Biodiversity Areas and Corridors. However, the map is not intended for reviewing siting decisions on individual parcels. The exception is project proposals with larger footprints, such as renewable energy facilities or new roads and transmission lines. These larger types of projects can have major impacts to the function of biodiversity areas and corridors (e.g., fragmenting large habitat blocks or severing a corridor) when not carefully sited.

### Other Land Use Settings

**Voluntary Stewardship Program.** Agricultural land uses can be compatible with biodiversity area and corridor needs, functions, and values. Many PHS Corridors are mapped in areas with lower intensity agriculture such as dryland non-irrigated farmlands. With wildlife-friendly management, these lands can act as important wildlife corridors and/or provide a low intensity land use buffer around important biodiversity areas.

As part of the Voluntary Stewardship Program, the map can help counties identify fish and wildlife habitats of local importance, where to prioritize areas for landowner outreach, and where to implement conservation activities that can help counties meet their VSP goals and benchmarks for protecting and enhancing critical areas. Mapped PHS Biodiversity Area and Corridors make for ideal areas to offer incentives to encourage conservation-related activities. An example could be the offer of an incentive to restore habitat along the outer perimeter of a corridor to help increase its width and habitat function.

Additionally, the PHS Biodiversity Area and Corridor map may support VSP participating counties with applying for competitive local, state, and federal grant programs that support local VSP efforts.

**Shoreline Management Act (SMA).** The PHS Biodiversity Areas and Corridors map provides a similar function for SMA as for GMA activities. Current planners can use this map for development within shoreline jurisdiction as outlined above for GMA use. Long-range planners can refer to this map when considering changes to Shoreline Environment Designations.

**State Environmental Policy Act.** When completing a SEPA checklist, the PHS Biodiversity Areas and Corridors map can be used when filling out the items for plants and land and shoreline use. The map is also helpful when reviewing SEPA checklists submitted by others to verify that they are considering potential impacts to PHS Biodiversity Areas and Corridors.

## Future Updates

PHS staff will review and revise the PHS Biodiversity Areas and Corridors map to determine whether land use changes warrant a change or refinement in PHS Biodiversity Areas and Corridors delineation or if improved data become available.

## Literature Cited

- Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). 2019. Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages. [doi.org/10.5281/zenodo.3831673](https://doi.org/10.5281/zenodo.3831673)
- MacArthur, R. H., and E. O. Wilson. 1967. The theory of island biogeography. Princeton University Press, Princeton, NJ.
- Washington Department of Fish and Wildlife (WDFW). 2008. Priority Habitat and Species List. Olympia, Washington.
- Washington Habitat Connectivity Working Group (WHCWG). 2012. Washington Connected Landscapes Project: Analysis of the Columbia Plateau Ecoregion. Washington's Department of Fish and Wildlife, and Department of Transportation, Olympia, WA
- Watson, J. E., T. Evans, O. Venter, B. Williams, A. Tulloch, C. Stewart, ... and D. Lindenmayer. 2018. The exceptional value of intact forest ecosystems. *Nature Ecology and Evolution*. 2:599-610.

# Appendix A: Frequently Asked Questions

## **What are Biodiversity Areas and Corridors?**

Biodiversity Areas and Corridors are defined by WDFW's Priority Habitats and Species program. The PHS Biodiversity Area and Corridor map is composed of Biodiversity Areas, which are the best remaining large areas of habitat that have minimal disturbances from development or agriculture. The map also includes Corridors, which are pathways between Biodiversity Areas with minimal barriers to wildlife movement.

## **How can I access the Columbia Plateau map of Biodiversity Areas and Corridors?**

The PHS Biodiversity Areas and Corridors map is available for download and is publicly accessible via a download on the [PHS Maps](#) website; it is also available via [geo.wa.gov](#). For WDFW staff, this information is available through the enterprise database, GeoLib (called "file name PHS\_ColumbiaPlateauRegionalBAC\_SV").

## **What is this map's primary intended use?**

The PHS Biodiversity Area and Corridor map is intended to inform regional-scale planning activities and land use decisions such as open space planning, changes to Urban Growth Areas, making land use and zoning designations, comprehensive planning, or siting major developments. In its current format, this mapped data is not well suited to address site-specific land use proposals (e.g., where to site buildings on a parcel), except for site-scale projects with an extraordinarily large footprint. Instead, the PHS Biodiversity Area and Corridor map is intended to flag regions with high-quality, intact wildlife habitat and corridors so that decision-makers can account for those values when making major regional land use decisions.

## **Is this map best available science?**

Yes. The process used to develop the underlying source data for mapping PHS Biodiversity Areas and Corridors meets all the major characteristics of a valid scientific process as described in the BAS chapter of the Growth Management Act (WAC 365-195). The map of PHS Biodiversity Areas and Corridors was produced with modeled source data. That source data depicted a network of large blocks of intact habitat as well as corridors of relatively intact lands that can support the movement of wildlife from one block of habitat to another. The highly qualified scientists who develop these models, relied upon widely used and accepted tools and methods. Their work to develop and refine these models received considerable expert review (Appendix B).

## **Can the BACs be validated on the ground through an on-site assessment?**

Biodiversity areas and corridors are not discrete areas that can be clearly delineated by their physical characteristics because habitat value naturally changes as a gradient across the landscape. Further review of local landscape conditions and refinement of any boundary lines are necessary additional steps before designating distinct boundary lines. An informed use of the PHS Biodiversity Areas and Corridors map is best achieved when land use decisions are made in concert with a WDFW Habitat Biologist or another professional who understands the ecological functions and values provided by the PHS Biodiversity Areas and Corridors network.

# Appendix B: Technical Advisors and Reviewers

Advisor	Area of Background / Expertise	Role
Jeff Azerrad (lead)	Oversees development of PHS publications	Technical Advisor
Terry Johnson	Management of spatial databases	Technical Advisor
Elizabeth Torrey	Eastern Washington habitats and southcentral Washington landscapes	Technical Advisor
Mark Teske	Southcentral Washington landscapes and expertise in connectivity modeling	Technical Advisor
Scott Downes	Eastern Washington habitats and southcentral Washington landscapes	Technical Advisor
Janet Gorrell	Landscape conservation principles	Technical Advisor
Keith Folkerts	Oversees development of PHS spatial products	Technical Advisor
Julia Michalak	Ecological and habitat connectivity modeling	Technical Advisor
Perry Harvester	Eastern Washington habitats and southcentral Washington landscapes	Technical Advisor
Tom Miewald	Ecological and habitat connectivity modeling	Technical Advisor
Mike Atamian	Eastern Washington habitats, landscapes, wildlife, and ecological modeling	Reviewer
Amanda Barg	Eastern Washington habitats, landscapes, and local government planning policy	Reviewer
Carmen Andonaegui	Eastern Washington habitats, landscapes, and local government planning policy	Reviewer
Jason Fidorra	Eastern Washington habitats, landscapes, and wildlife	Reviewer

# Appendix C: Key Resources

## General Resources

### Priority Habitats and Species

- PHS homepage: [wdfw.wa.gov/species-habitats/at-risk/phs](http://wdfw.wa.gov/species-habitats/at-risk/phs)
- PHS List: [wdfw.wa.gov/species-habitats/at-risk/phs/list](http://wdfw.wa.gov/species-habitats/at-risk/phs/list)
- PHS on the Web: [geodataservices.wdfw.wa.gov/hp/phs/](http://geodataservices.wdfw.wa.gov/hp/phs/)
  - PHS on the Web User Guide: [wdfw.wa.gov/species-habitats/at-risk/phs/maps/using](http://wdfw.wa.gov/species-habitats/at-risk/phs/maps/using)

### Washington Department of Fish and Wildlife

- WDFW Habitat Biologist areas of responsibilities map: [wdfw.maps.arcgis.com/apps/MapJournal/index.html?appid=48699252565749d1b7e16b3e34422271](http://wdfw.maps.arcgis.com/apps/MapJournal/index.html?appid=48699252565749d1b7e16b3e34422271)
- WDFW values: [wdfw.wa.gov/about](http://wdfw.wa.gov/about)
- WDFW conservation goals: [wdfw.wa.gov/about/administration/strategic-planning](http://wdfw.wa.gov/about/administration/strategic-planning)

### GIS Data

- WHCWG Columbia Plateau Report/Data: [waconnected.org/cp\\_focalspecies\\_landscapeintegrity/](http://waconnected.org/cp_focalspecies_landscapeintegrity/)  
Washington State Geospatial Portal: Homepage: [geo.wa.gov](http://geo.wa.gov)