

*Western Governors' Wildlife Council
White Paper -Version III*

*Western Wildlife Crucial Habitat Assessment Tool (CHAT):
Vision, Definitions and Guidance for
State Systems and Regional Viewer*

July 2013

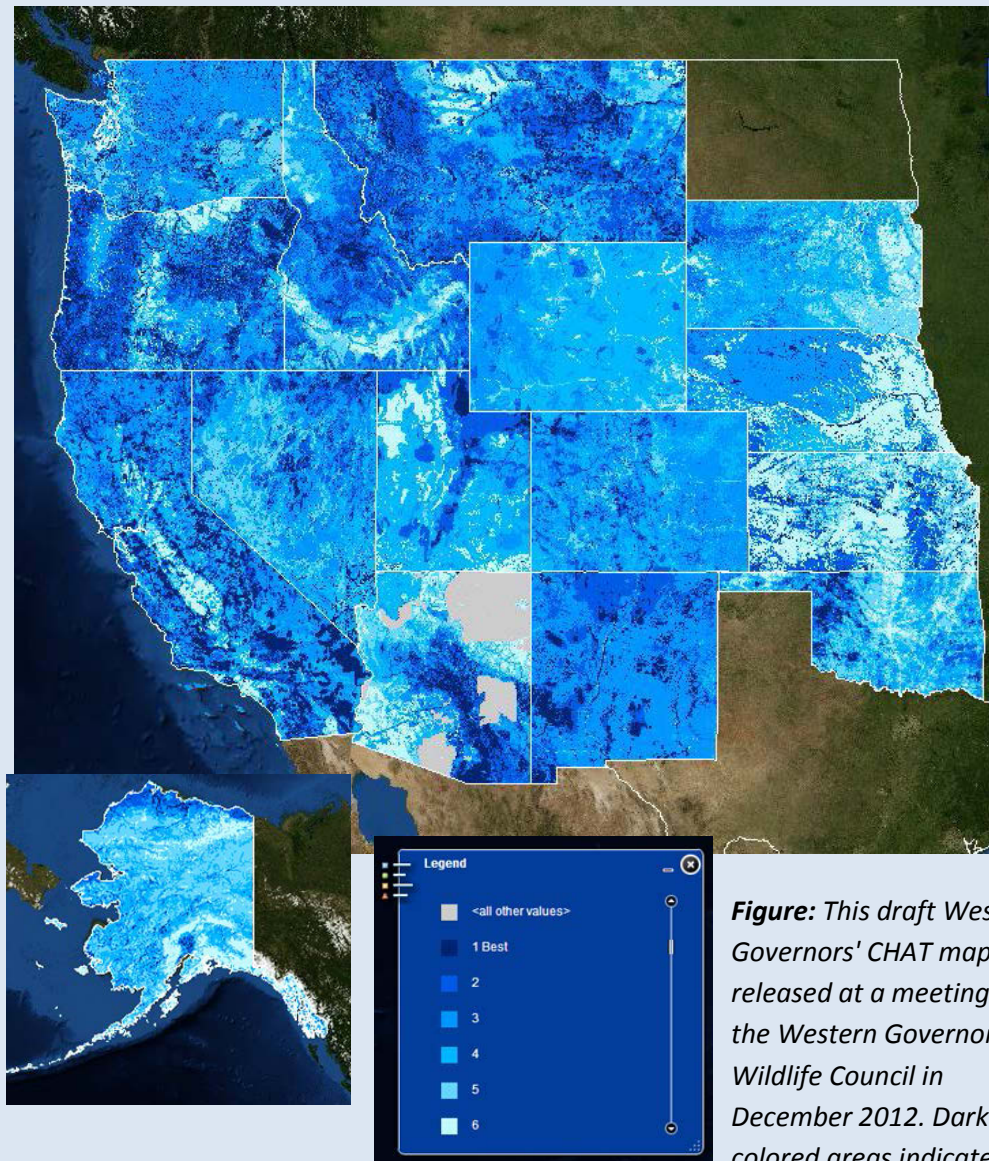


Figure: This draft Western Governors' CHAT map was released at a meeting of the Western Governors' Wildlife Council in December 2012. Darker colored areas indicate "Best Habitat."

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Wildlife Council Vision Statement

The Wildlife Council works to identify key wildlife corridors and crucial wildlife habitats in the West, as well as to develop and coordinate policy options and tools for conserving those landscapes. With this aim, the Council strives to provide a public, user friendly online tool with consistent and region-wide information on crucial habitats for fish and wildlife, for all interested parties to use to assess landscapes and connectivity while better informing land use decisions.

Wildlife Council Objectives

- Improve analysis of landscape-scale energy, land use and transportation projects as well as land conservation and climate adaptation strategies by providing prioritized information through individual state-level tools and a regional-level Western Governors Crucial Habitat Assessment Tool (CHAT).
- Integrate customers and other stakeholders into the development, maintenance and roll out of CHATs both at the state and regional level.
- Seek widespread use of CHATs so that decision makers at all levels rely on state information to better inform planning, while providing healthy and productive landscapes.
- Ensure federal, state and local agencies consult CHATs and integrate state wildlife information early into land management, energy/transmission or transportation planning processes.
- Seek resources for internal and external state agency efforts to develop and maintain CHATs and to support regional compatibility efforts.

Background

State wildlife agencies are among the preeminent and vested authority on wildlife in the United States. Federal agencies, other state agencies, local governments, tribes, conservation groups, businesses – even other countries – look to state fish and wildlife agencies for accurate data and information on fish and wildlife species and habitats. These customers often need to know which species are most important, where their habitat is located, what habitat is needed to maintain movement across the landscape, and how species should be managed and conserved. This information is vital to help communities grow, develop, live and recreate in accord with our environment.

To improve state wildlife agencies' capability to provide this information to their many customers, and strengthen their leadership position on wildlife matters, they need to innovate and refine how they do business. With the adoption of the Western Governors' Association's (WGA)

Wildlife Corridors Initiative Report in June 2008,¹ Western Governors created the Wildlife Council and provided direction on how to address these needs by working across political and legal boundaries and collaborating with other managers and the public. By putting these approaches into operation, states' important work to conserve the public's fish and wildlife resources will be enhanced, while at the same time facilitating necessary economic development in the region. Now guided by Western Governors' policy resolution 13-04, the Wildlife Council will soon be providing information on important fish and wildlife habitat that is compatible across the West and available to the public in 2013 and beyond.²

Utilization of Crucial Habitat and Corridor Information

In collaboration with governments and stakeholders that use fish and wildlife information, each Wildlife Council member state has or is planning to launch an online, public system that houses landscape-level digitized maps identifying crucial wildlife habitat and corridors across the West.³ These tools are intended to allow easy access to wildlife information for state agency "customers" so that it is considered early in planning processes. While not intended for project-level assessment, CHAT will provide a greater level of certainty for pre-planning efforts, leading to fewer conflicts and surprises while improving outcomes to better incorporate fish and wildlife values into land use decision-making and large-scale conservation projects.

Wildlife agencies are working with their customers to develop, improve and maintain these tools so that they are the most accurate and credible source in the region for information on fish and wildlife and the habitats on which they depend. This includes the challenge to achieve landscape-scale conservation objectives, as well as incorporating information on key ecosystem change agents.

Both within wildlife agencies, across levels of government and with the public, the Wildlife Council is to promote a regional approach to provide and display important fish and wildlife information. The Council will continue to share and learn with others as it develops and uses CHATs to best inform land use decisions and conservation planning and to identify wildlife connectivity needs. The intent of these tools is to inform gross infrastructure planning efforts,

¹ The Wildlife Council home page and the *Wildlife Corridors Initiative Report* can be found at: <http://www.westgov.org/initiatives/wildlife>.

² WGA policy resolution 13-04, *Conserving Wildlife Corridors and Crucial Wildlife Habitat in the West*, can be found at: <http://www.westgov.org/policies>.

³ Currently available state websites include: Arizona: HabiMap™ Arizona; California: Areas of Conservation Emphasis (ACE-II); Montana: Crucial Areas Assessment and Planning System (CAPS); Washington: Priority Habitats and Species (PHS); Wyoming: The Wyoming Interagency Spatial Database & Online Management (WISDOM) System; and in the Southern Great Plains states of Colorado, Kansas, Oklahoma, Texas, and New Mexico: The Southern Great Plains Crucial Habitat Assessment Tool.

wildlife corridor identification, and conservation planning. In most cases, CHATs are not designed to support detailed assessment at the individual project scale but likely will contain relevant information to advise or guide individual project assessment.

CHATs utilize landscape-level mapping to show crucial wildlife habitat and wildlife corridors, and identify areas that warrant more fine scale analysis. CHATs are non-regulatory, help to promote the conservation objectives of each state wildlife agency, and give the public access to important wildlife information for use in proactive planning and decision-making processes. The state-level CHATs and the Western Governors' CHAT will include on-going monitoring and updating of data to maintain relevancy.

Identifying Crucial Habitat⁴ and Corridors

Providing a Regional View

The Governors will be meeting their 2013 goal for a publically available system to display crucial wildlife habitat and corridor information in a consistent manner across the region. The Wildlife Council is also establishing individual state CHATs. While housed in each state, data utilized in the systems will be coordinated across all jurisdictions in the West so that a regional picture of crucial wildlife habitat and important wildlife corridors will be available through the Western Governors' CHAT. It will combine individual state crucial habitat layers together as derived, single regional layers. This regional view will be useful to inform large-scale planning spanning multiple jurisdictions, and it will be particularly useful for depicting important corridors for fish and wildlife across the region.

Regional Definitions

The Wildlife Council uses common definitions of crucial habitat and corridors for fish and wildlife and developed guidelines that states can use to identify crucial habitat in line with these definitions. The Council has refined the definitions included in the 2008 *Wildlife Corridors Initiative Report* to help states prioritize habitat and corridors within their boundaries in order to meet each state's conservation objectives. These refined definitions are significant because they guide the process each state wildlife agency is using to identify and geographically represent their conservation priorities.

The West-wide definitions are also a necessary step to achieve compatibility and consistency across state boundaries. With this baseline, states are in the process of assembling important data and addressing data standardization issues, analyzing and prioritizing that data by category

⁴ Crucial habitat as used by the Western Governors' Wildlife Council should not be confused with a legally defined "critical habitat" designation. Critical habitat is determined by the U.S. Fish and Wildlife Service or the NOAA Fisheries Service to be habitat necessary for conservation of a species listed under the provisions of the Endangered Species Act.

based on habitat conservation needs, and turning that data into a useful tool. A detailed approach to achieving these steps is outlined in this paper.

It should be understood that although Western states will make compatible many aspects of the data displayed in the regional viewer, how a state ultimately seeks to treat the different categories of habitat as development decisions are made will correspond to each state's own conservation objectives.

Crucial Habitat and Important Wildlife Corridors Definitions

The Wildlife Council definitions for Crucial Habitat and Important Wildlife Corridors are as follows:

Crucial Habitat are places containing the resources, including food, water, cover, shelter and "important wildlife corridors," that are necessary for the survival and reproduction of aquatic and terrestrial wildlife and to prevent unacceptable declines, or facilitate future recovery of wildlife populations, or are important ecological systems with high biological diversity value.

Important Wildlife Corridors are crucial habitats that provide connectivity over different time scales (including seasonal or longer) among areas used by animal and plant species. Wildlife corridors can exist within unfragmented landscapes or join naturally or artificially fragmented habitats, and serve to maintain or increase essential genetic and demographic connection of aquatic and terrestrial populations.

More refined, actionable definitions for subsets of crucial habitat, including important wildlife corridors, are presented below.

Categories of Crucial Habitat Conservation, Including Important Wildlife Corridors

The conservation of crucial habitat, including important wildlife corridors, is recognized by the Western Governors as an important goal for state, local and federal governments that can benefit from the adoption of compatible and consistent conservation categories across state and other jurisdictional boundaries. The Western Governors' Wildlife Council has adopted the following categories of crucial habitat conservation. These categories are populated as determined by each state.⁵ Other habitat categories, besides crucial habitat, may be defined by states as resources are available.

⁵ In populating these categories, states used, as necessary, recommendations for consistent processes and products that were developed by the Council's regional workgroups in 2012 and that are discussed further on in this White Paper and in Appendix C.

Category 1: Aquatic or terrestrial habitats, including wildlife corridors, that are rare or fragile and are essential to achieving and/or maintaining wildlife species viability or exceptional diversity. The habitat contains a unique combination of location or composition or complexity of the habitat or corridor which cannot be duplicated, and is therefore considered irreplaceable.

Category 2: Habitat, including wildlife corridors, which is limiting to a fish or wildlife community, population, or metapopulation. Loss of any of this habitat or corridor could result in a significant local or population-level decline in species distribution, abundance, or productivity. The habitat or corridor is essential to achieving and maintaining fish and wildlife target population or management objectives. Restoration or replacement is difficult, or may be possible only in the very long term.

Category 3: Habitat, including wildlife corridors, that contributes significantly to the maintenance of fish or wildlife communities, populations, or metapopulations. Loss of a significant portion of the habitat or corridor could result in local or population-level declines in species distribution, abundance, or productivity. Impacts can be minimized or reduced, and habitat or corridors restored or replaced by utilizing appropriate best management practices.

Other Habitat Categories

The following categories represent common habitat or otherwise insufficiently understood habitat that can be mapped to provide a full landscape perspective, but are not anticipated to be indicative of crucial habitat. The Wildlife Council recognizes that some states may, as resources allow, choose to analyze and map these other categories in a compatible manner with other states.

Common Habitat: Habitat which is relatively common, generally less limiting to fish and wildlife communities, populations, or metapopulations, and generally better suited for land use conversion. Large-scale or cumulative impacts to species or habitat could result in declines in species distribution or abundance, however, the loss may be difficult to measure. Impacts from individual projects or land use actions can be minimized, and habitat restored or replaced, so that effective habitat function or species distribution or abundance is maintained.

Habitat Significance Unknown: Lands likely to have significant wildlife values, but for which there is insufficient data or a lack of information about the importance of the habitat in meeting conservation objectives.

Guidance for Compiling Compatible Information for Analysis and Display

The Wildlife Council is using the steps below as they identify or assess crucial habitat and wildlife corridors, map those areas, and develop a system for displaying the information.

Step One: Compile types and layers of information valuable in to identify crucial habitat, including important wildlife corridors (aquatic and terrestrial):

The list below describes information that each state is considering including in their CHAT. The list is separated into two tiers, the first tier being those data layers that are considered to be the foundation of any crucial habitat layers and which states commit to including, as a minimum, in their systems. Second tier data can be important to identifying crucial habitat and corridors and maintaining conservation objectives. A tiered approach allows individual states to prioritize their data collection and standardization efforts as they build their crucial habitat layer. Having all states working with the same base categories of data in tier one will allow the Western Governors CHAT to function effectively across political boundaries.

This inventory helps to develop the necessary technical components of a regionally compatible system, and forms the target information necessary for states to perform analyses in Step Two. It represents data categories, with multiple examples of data sources that can be used to help delineate crucial habitats and corridors. The list includes both species and habitat data, understanding that in some instances known species occurrence data is used as a surrogate for identifying habitat. All five of these Tier 1 data categories are evaluated in assessing crucial habitat, but any individual or combination of the data categories in Tier 1 is a sufficient basis for states to make their crucial habitat category determinations.

Tier 1 Data:

1. Habitat for “Species of Concern”

- Species of Greatest Conservation Need within State Wildlife Action Plans or similar assessments - The following data sets should be included:
 - Locations of Federally or State Listed Species (Threatened or Endangered)
 - Candidate Species
 - Species protected under a signed Conservation Agreement
 - Other lists of species of special concern (state/federal/county)
 - Key or Priority Habitat boundary delineations from State Wildlife Action Plan/Comprehensive Wildlife Conservation Strategy
 - Plant and Animal species with special protective-rankings (e.g., NatureServe's Natural Heritage global ranks)
 - Priority habitat areas based on species diversity, habitat intactness and overlap with other crucial habitats. These would be high priority areas for management of "core conservation populations."

2. Native and Unfragmented Habitat: Areas that are contiguous, possess a high degree of intact core areas or diversity of natural habitat, or supply ecological function to meet wildlife objectives. These areas are unfragmented, or relatively unfragmented, by transportation routes, human habitation, industrial infrastructure, or other human-caused disturbances.

- Natural vegetation classification habitat maps

- Ecological systems of concern
 - Plant communities of concern (Heritage Rankings)
 - Priority habitat areas identified in updated State Wildlife Action Plans (SWAPs)
3. Riparian and Wetland Habitat: Areas that represent unique environments and function to support animal and plant diversity with respect to wildlife objectives and connectivity.
 - Spring/Seep/Cienega Locations
 - National Wetlands Inventory
 - National Hydrologic Database
 - Wetland components from State Comprehensive Outdoor Recreation Plans
 - Priority wetland areas and priority riparian habitats identified in updated SWAPs
 4. Connectivity or Linkage Assessment: Areas described explicitly for aquatic or terrestrial wildlife habitat connectivity.
 - Major animal movement corridors or pathways (documented)
 - Landscape connectivity zones
 5. Quality Habitat for Species of Importance: This category provides for species consideration if not otherwise included as “Habitat for Species of Concern”.
 - Sport Fish Quality Habitat: Areas recognized as important to meeting biological requirements and objectives of fish species whose harvest is regulated (i.e., blue ribbon streams).
 - Game Animal Quality Habitat: Areas recognized as important to meeting biological requirements and objectives of game species regulated by harvest, such as winter concentration areas or important breeding areas (i.e., crucial big game ranges, grouse lek locations or core grouse habitats if designated).

Tier 2 Data:

6. Terrestrial or Aquatic Native Species Richness: Areas where species composition represents a native, intact community and where habitats are associated with a relatively high and distinctively described species assemblage.
 - Aquatic species distribution maps
 - Ecoregional Assessments – Biodiversity Areas
 - Audubon Important Bird Areas
 - Gap-ReGap species composite maps
 - Christmas bird count and breeding bird survey data
7. Valued Lands: Lands that are protected or designated for their wildlife or aquatic values.
 - Protected Areas Database (PAD)

- Priority areas identified from ecoregional analyses
- Dedicated conservation lands locations
- Outdoor recreation priority/favored areas

8. Important Restoration Habitat: Lands that are proximate to other important habitats and have the potential to restore function or resiliency to target populations of fish and wildlife.
- Spawning or rearing habitat for fishes that are isolated from current populations
 - Habitat that was historically in one of the crucial habitat categories (2 or 3) and could provide fish or wildlife benefits with restoration

In 2012, the Council established regional technical workgroups to compile the data sets detailed under Step One above. Workgroups evaluated region-wide data products and processes to assist states in defining crucial habitat. Workgroups were organized to develop data for essential, “Tier 1” data categories as follows:

- Habitat for Species of Concern
- Native Unfragmented Habitat
- Species of Economic and Recreational Importance

These workgroups produced a suite of informed recommendations about how states can incorporate the products and prioritize into crucial habitat (See results in Appendix C).⁶

Step Two: States undertake analysis of compiled information (methodology, modeling, and prioritization) to rank areas as crucial habitat and wildlife corridors.

Through the creation of draft crucial habitat maps in 2012, the Wildlife Council and individual Western states considered several approaches to rank data into crucial habitat. The Council and individual states grappled with a number of challenges as they developed the maps for crucial habitat and wildlife corridors. Appendix A to this paper describes these technical challenges and how states have addressed them for the launch of state and Western Governors' CHAT.

Completion of Step Two has allowed each state to produce a state-wide map that depicts crucial habitats split by aquatic and terrestrial habitats, including connectivity, using at a minimum Tier 1 data that defines a spectrum of crucial habitat categories as defined in this paper. Crucial habitat identification is based on the application of a consistent prioritization approach to input datasets listed under Tier 1 using both a coarse filter and fine filter approach. In the system that displays these layers (Step 3), users will have the ability to interact with a variety of data layers allowing them to understand the underlying information and the biological rationale that is used to identify the crucial habitat areas. Users who wish to understand information about an

⁶ To provide link to Western Governors' CHAT metadata once available in December 2013

individual species, highlight specific development issues, or otherwise identify habitat conservation priorities will be able to do so, but within the context of a set of consistently-defined “crucial” areas and data security parameters that users will not be able to modify (i.e., the system will be able to generate a text list of the specific layers aggregated to depict crucial habitat in a specific area). Appendix B provides a general visual representation of how GIS layers are used to depict crucial habitat.

In 2012, the Council approved a recommendation from its state wildlife agency technical staff to implement the display of crucial habitat categories using a six-level relative ranking scheme⁷. To address West-wide process and compatibility issues, the Council also established a Crucial Habitat Roll-Up workgroup to test out different approaches to accomplishing Step Two. Finally, the Council encouraged each state to establish internal review team(s) to evaluate the regional workgroup recommendations and apply state-specific modifications as needed and all states did so. The final crucial habitat roll up approach approved by the Council in June 2013 is set forth in Appendix B.⁸

Finally, states may develop management recommendations to accompany their crucial habitat analysis as a parallel effort or separately once the identification and mapping steps are completed.

Step Three: States Develop the Crucial Habitat Assessment Tool to Deliver Information to Customers. There are many technical considerations involved in developing a tool that is user-friendly and transparent. With recommendations from the Regional Viewer Workgroup of state experts formed by the Council in 2012, emphasis has been placed on an information delivery system that promotes easy access and stimulates early consideration in planning by users, without the initial need for direct agency staff contact at a coarse scale. The Council has tried to meet the following priorities as it works to develop state CHATs and the Western Governors CHAT that can be compatible across the region:

- Systems must be capable of displaying crucial habitat in a compatible way across jurisdictions;
- Data quality must be assured;

⁷ Relative ranks implement the crucial habitat categories, while allowing necessary flexibility to states using several landscape-scale datasets that do not follow the more absolute and species-specific language in the definitions. Generally, relative classifications may be defined as “the higher the classification, the higher the relative wildlife value”: the more likely the CHAT user will encounter wildlife resource values that may require mitigation or avoidance; and that may provide greater overall conservation value.

⁸ To provide link to Western Governors' CHAT metadata once available in December 2013.

- Data, models and analyses must be built at useful scales to provide relevance to land use planning;
- Transparency and public input must be accommodated; and,
- Evaluation is needed on an ongoing basis to ensure efficacy of the system to meet conservation objectives.

As mentioned earlier in this paper, although Western states will make compatible their crucial habitat layers, how a state ultimately seeks to treat the different categories of habitat, within their management authorities, will correspond to each state's individual conservation objectives.

A key element of regional compatibility will be achieved through the development of the Western Governors' CHAT that will serve as a public regional viewer for all crucial habitat and wildlife corridors as determined by individual states. Conceptually, it will display aggregated crucial habitat data layers based on the common definitions outlined in this paper. The priority data layers articulated in Step One of this paper will be combined together as single regional layers for each category.

Importantly, the Western Governors' CHAT will not replace any individual state tools deemed necessary for providing important fish and wildlife information at a finer scale. The Western Governors' CHAT will conveniently link to individual state CHATs and individual state systems could also consume and display the regional crucial habitat layer.

Summary and Going Forward

The Wildlife Council is confident of meeting the Governors' goal of publicly available maps of crucial wildlife habitat and corridors in 2013.⁹ Building from lessons learned and progress in implementing this White Paper early on, the Council and state wildlife agencies progressed rapidly through additional collaborative efforts in 2011 - 2013 as follows:

- By working with guidance from regional workgroups and in collaboration with internal agency review teams, states:
 - Completed development of Tier 1 data, and completed alignment of the Tier 1 datasets from state – to – state to the extent possible
 - Applied crucial habitat categorization scheme to the Tier 1 datasets in a compatible manner;

⁹ WGA policy resolution 13-04, *Conserving Wildlife Corridors and Crucial Wildlife Habitat in the West*: <http://www.westgov.org/policies>.

- Produced draft crucial habitat maps to visualize outcomes and discuss inter-state alignment;
- Continued to build and improve upon individual state CHATs;
- Provided assistance to WGA in conjunction with development of the Western Governors' CHAT and oversight to assist WGA in hiring a contractor to develop it.
- Generated a preliminary mock-up of a West-wide crucial habitat with the assistance of the Kansas Biological Survey to serve as a visual example of the final product and to assess efficiency, cost and effectiveness.

Going forward, the Council is focused on knitting together each states' crucial habitat layers, aligning individual Tier 1 data layers, using/evaluating roll-up methodologies, and continuing to advise key aspects of regional CHAT architecture and interface. The first public version of a regional crucial habitat map will be available in December 2013. The Council looks forward to feedback from users of the Western Governors' CHAT as well as the state CHATs so that the maps and the mechanisms for displaying them can be improved over time.

Additional Background Information

Development of this Paper and Ongoing Revisions

This paper was initially released by the Wildlife Council in February 2010. This is the third revision. Revisions have been made to account for lessons learned from multi-state pilot programs, the development of systems at the state level, and collaboratively developed West-wide products and processes. The Wildlife Council has also worked to incorporate comment from partners, and will continue to do so in future revisions.

Ongoing Stakeholder Input

To coordinate with non-governmental representatives, industry and other stakeholders, the Council maintains a [Stakeholder Advisory Group](#) to serve as a longer-term sounding board for the Council. The Council is committed to a strong and enduring collaboration with the public and encourages feedback on this paper and other topics of interest to the Council.

Coordination with Federal Agencies

This White Paper was developed in part to assist with coordination efforts with federal land management agencies that undertake extensive wildlife mapping efforts and seek to utilize landscape-level wildlife information in their planning processes. To truly develop a regionally consistent picture of important areas for fish and wildlife in western states will require ongoing collaboration with the Fish and Wildlife Service, the Bureau of Land Management and the Forest Service, among others. The Western Governors' Association signed a [Memorandum of Understanding](#) with the Secretaries of Agriculture, Energy and the Interior in June 2009 that calls

for the establishment of state-based decision support systems and for cooperation among state and federal agencies in the identification and uniform mapping of habitat and corridors.

To undertake the coordination envisioned under the MOU, the Wildlife Council established a [State-Federal Implementation Group](#) (SFIG) for the purpose of providing ongoing collaboration and communications to develop, coordinate and make data more consistent between state wildlife agencies and federal natural resource management agencies for resource management purposes. In June 2011, SFIG representatives from the Department of the Interior (DOI) and the Department of Agriculture (USDA) signed an [agreement](#) with the Wildlife Council to take specific actions to implement the 2009 MOU. The agreement seeks to improve efficiency and enhance opportunities for mutual support between federal landscape conservation initiatives and the work of the Council. The agreement also confirms the intent of DOI and USDA agencies to utilize prioritized fish and wildlife data from state wildlife agencies as a principle source of information to inform federal land use, land planning and related natural resource decisions.

Funding

In accord with the MOU signed in June 2009, the Department of Energy made electricity transmission planning resources available for state-based wildlife information efforts that would help to develop CHATs in individual states and as a regional information source. In 2010, \$3 million was awarded to WGA as seed funding to aid CHAT development by each western state that would be capable of compiling all data on wildlife relevant to the development of renewable and other generation capacity and associated transmission facilities.

WGA has raised a total of \$4.1 million since 2009 from the U.S. DOE, the U.S. Forest Service, the Bureau of Land Management, the Wildlife Conservation Society, and the Wilburforce and Hewlett Foundations to support state wildlife agencies and this initiative. Individual state wildlife agencies have provided substantial in-kind and budgetary support to this effort. State agencies have also raised outside funds. For example, state agencies have raised almost \$1 million through Landscape Conservation Cooperatives to support data and CHAT development and maintenance.

1) Identifying Desirable Mapping Scale

Issue Framing

Mapping scale determines the amount of detail that can be represented on or extrapolated from maps. Individual states and groups of states have many considerations regarding mapping scale when choosing which data to include in the process for creating maps for CHAT that meet the criteria of the Council's white paper.

Challenges to Regional Compatibility

Scale considerations in developing regionally compatible CHATs are critical because of the need to produce defensible data that are also useful. Primary considerations include:

- Decisions made about map scale should largely consider the utility of the information to the CHAT user,
- Map scale should not create “false confidence” that the derived products can be used for project review (site-specific evaluation),
- The appropriate scale and purposes for using derived products should be made very clear to the user,
- Data may need to be generalized to protect locations of sensitive species or other sensitive information (e.g., rare plants subject to collecting or rare species located on private land). Generalization might be accomplished for example by aggregating information to a larger effective mapping unit,
- Map scale chosen must not be so gross that it promotes “over-generalization” in derived projects.

The technical subgroup recognizes that the biological community uses the word “scale” differently than the mapping/GIS community’s use of the word “scale.” Both uses of the word are valid. In general, “scale” refers to Vector data and “resolution” refers to Raster data. To minimize confusion, terminology documentation should be as explicit as possible, and metadata fields should be used as much as possible to help people understand and use the data appropriately.

Mapping Scale for 2013 Western Governors’ CHAT Launch

States have been examining advantages and disadvantages of different display scales, and have concluded that a one square mile hexagon is appropriate for the Western Governors CHAT. This scale will provide consistency with existing state CHATs to promote cross-referencing among systems. This resolution is large enough to allow the presentation of sensitive data and does not create “false confidence” for project review, but is also small enough to ensure heterogeneity

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across the region. However, for those states desiring a coarser level of resolution for the regional viewer, there is an option to display crucial habitat using a three square mile hexagon grid and a number of state may utilize this option. (Alaska's very special data development circumstances will result in an even larger display resolution for Alaska only).

Important Statements for CHAT User Interface:

The implications of scale and resolution on the use of the data in decision-making should be appropriately communicated to all users. The Western Governors' CHAT and individual state CHATs will communicate to users that CHAT is a 'pre-planning' tool intended to facilitate landscape decision-making at the early stage of a project proposal. That use of a CHAT is no substitute for consultation directly with fish and wildlife agency staff. Additional details on specific data sets will also be conveyed to CHAT users. For example, in the Species of Concern map theme, users should understand the need to differentiate between confirmed species location and predicted species distribution. Users should also understand, for example, that the absence of a depiction of species information in a particular hexagon could be explained by the absence of survey effort in that geography and not by the actual absence of the species.

2) Addressing Cross-Jurisdictional Data Challenges to Regional Compatibility

Issue Framing

Digital wildlife mapping is usually accomplished using a combination of vector data (points, lines, polygons) and raster data (a grid of cells of regular size and shape). If two organizations were to map the same landscape features along a shared boundary – without coordination – it is almost certain that their line-work and attribution schemes would not be the same and may prevent combining the data to create a seamless map without “edge matching”.

Edge matching is the procedure to adjust the position of [features](#) that extend across a [mapped](#) boundary. Past efforts to line up individual state maps have illustrated serious discrepancies at state borders, but addressing the issue of edge matching has been a challenge for many previous efforts as they attempt to build regional maps of important habitat.

A major purpose of the CHAT development effort is to address the reality that states do not necessarily map the same information for the same species. Additionally, there will likely be discrepancies at state borders when crucial habitat layers are identified and displayed. It is anticipated that customers of the CHATs will see value in a “regionally compatible” set of mapped crucial habitat across state boundaries, but it is unclear what that should look like since the Wildlife Council's white paper does not call for a seamless map of crucial habitat. Some challenges exist for developing “seamless” data; many may be impossible to overcome, but many will be dealt with and worked out within the phases of the CHAT projects and beyond.

Challenges to Regional Compatibility

There are two levels where discrepancies can occur:

1. Input/base layers - States differ in how they map the same variable:
 - Species/habitat/base layers may not match across state boundaries because states map the same variable differently (i.e., big game winter range), and some states place higher priorities on developing some mapped information over others. These decisions result in disparate mapping definitions, such as scale, feature representation and attribution.
2. Product/presentation layers - States differ in how they identify crucial habitat:
 - States have the responsibility/authority to manage fish and wildlife resources based on their own priorities and management objectives, and they also manage different types of habitat and species given the diversity across the region. Therefore, the categorization of and criteria used for crucial habitat may be different from state to state. Any differences in how states categorize crucial habitat will cause discrepancies in how crucial habitat data layers “match up” at state boundaries.

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- The multistep process for building the CHATs may move states toward developing a regional map of crucial habitat that is more seamless across political jurisdictions than past efforts. Since states do not manage wildlife resources the same way in every state, there will be some discrepancies in how crucial habitat data layers match from state to state across the region. Discrepancies may not be as important if species information is aggregated, but efforts through the CHAT projects will be necessary to test this concept.

Progress Towards Regional Compatibility for Western Governors' CHAT

Draft crucial habitat maps were produced in 2012 to inform the options for 2013 public product, and demonstrate progress towards a consistent product.

Use of common input data layers, with common definitions, data attributes and scale, has contributed toward a more consistent product. Regional workgroups provided recommendations for common data processes and products. In addition, states have further aligned Tier 1 data inputs with some collaborative review and documentation in early 2013. The development of metadata and the use of a common data schema, while still allowing for some flexibility for states' organization of data layers, has resulted in the ability to "compare apples to apples" across state lines.¹⁰

Overall, developing draft maps in 2012 has demonstrated that crucial habitat is an aggregated layer of information indicating wildlife value on a continuum. Key outcomes are not individual species maps but rather the aggregated overall measure of habitat quality to provide a "red flag to avoid," or conversely, where to get the "biggest bang for the conservation buck." As described above, the crucial habitat maps are not seamless across the western states. Differences remain because states have applied their own unique datasets and prioritization schemes to best represent crucial habitat.

¹⁰ To provide link to Western Governors' CHAT metadata for documentation and schema once available in December 2013.

3) Filling Data Gaps

Issue Framing

States have made tremendous progress and will continue to do so to fill gaps in data necessary to populate a robust CHAT. All efforts will continue to be made to incorporate the best available science and to work with partners, as the legitimacy of the CHATs will depend largely on data used to support decision making. Each state began the CHAT development process with different quality and quantity of data, so the challenges for each state have been unique. Some states will need to focus on modeling approaches to overcome data gaps, others will focus on addressing cross-state disparities in data type and quality, still others are able to explore what auxiliary data (i.e., wildlife corridor data, anthropogenic activities and climate models) are available that can be incorporated into regional CHAT development. One result of this effort will be the prioritization of future data collection needs in each state and for the region.

Challenges to Regional Compatibility

Specific to regional compatibility, states are developing a level of consistency in how non-state data are reviewed and considered for incorporation into CHATs. Consistency in how states develop new biological data will also be valuable in filling data gaps.

The Council's workgroups have produced a suite of informed recommendations, and those recommendations were reviewed and implemented by states producing draft 2012 crucial habitat maps. See workgroup recommendations documents for information on data filtering, use constraints, and other factors listed below.¹¹

Evaluation of Biological and Non-Biological Data

To enhance regional compatibility, all states are as discriminating as possible when evaluating data provided by governmental agencies, regulated communities, academia, non-governmental organizations and citizen scientists. The following factors are being used to evaluate all occurrence data or GIS layers proposed for CHAT inclusion. (These factors are in no particular order of priority and although all factors should be assessed, a single one may be sufficient to preclude the use of certain data.)

- Scale of the data
- Age of the data
- Expertise of the provider
- Quality of the metadata
- Methodology/Repeatability
- Already commonly accepted data

¹¹ Provide link to Western Governors' CHAT metadata once available in December 2013.

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- Constraints on the use of or access to the data
- Positional accuracy

Methods for Developing Biological Data Layers: Update for 2013 CHAT launch

To support crucial habitat mapping, in 2012 the Species of Concern workgroup worked with the University of Idaho GAP to setup a process for agency input and review into a common suite of region-wide species distribution models. The group also addressed buffering spatial data for confirmed species locations.¹²

Tribal Lands Data: Recommendation from draft crucial habitat mapping, 2012

While the governors have called for the development of state-wide and all-lands decision support systems, the Council recognizes the jurisdictional limitations and challenges to collecting or developing data on tribal lands. The Wildlife Council recognize that tribal lands may not be covered in the first iteration of the CHAT, but that there should be future efforts to work with the tribes to include tribal wildlife data.

Steps to Continue Progress in 2014:

Council workgroups have developed specific steps to continue to improve data quality, incorporate expert advice, and implement economies-of-scale from working collaboratively. To keep Tier 1 data updated and relevant state technical staff will:

- Continue to participate in ongoing modeling efforts.
 - All predictive species modeling efforts are a work-in-progress, and continued engagement of biologists and state technical experts is important.
 - Provide for state agency review of modeling output.
 - Consider incorporating additional modeling products in the future: More details are described in Workgroup Recommendations document (and pending development, NatureServe network-wide standards).
- Insure thoroughness of species' confirmed location records being used by continuing to incorporate Natural Heritage Program data standards (per Workgroup Recommendations document)
- Given the importance of high-quality data to the goals shared by many planning efforts, the Council is considering partnerships with GAP, Natural Heritage Programs, NatureServe, USGS MARIS, and others.

¹² To provide link to Western Governors' CHAT metadata once available in December 2013).

Crucial Habitat Roll Up Methodologies

The western states collaborated on guidelines for creating a West-wide map of Crucial Habitat, using each state's data and acknowledging state priorities in creating categorical definitions of what is "crucial" and what is not. A technical team with experts from several states provided "Roll-Up" framework guidelines for states to use in aggregating and weighting data to create a map layer of Crucial Habitat.

The technical team considered two major approaches to data aggregation:

- 1) **Categorical:** Uses a non-mathematical set of rules to combine Tier 1 layers into an overall Crucial Habitat layer. States categorize and prioritize data up front, using a rule set. The rule set and categorical prioritization is relatively easy to explain to users, and to compare results "across state lines" in reviewing draft maps.
- 2) **Weighted Sum:** Uses a mathematical equation to combine Tier 1 layers. States do not need to predefine categories (rule sets) for all possible combinations of data layers used in this method. States can incorporate a validation/verification or "trump" layer, if desired to best reflect conservation priorities. End users can readily understand the concept of adding layers on top of each other in an additive formula, and the Weighted Sum method has been formally vetted through agency review and public comment.

In addition to these two approaches, states considered several modifications to the methods to suit their needs. For example, states considered a potential hybrid approach, where rule sets would be specified for the highest prioritization level using methods adapted from the categorical approach; the remaining geography of the state would fall into a gradient using an additive approach.

Ultimately, the states concluded that there is no "one size fits all" approach, but rather, that both the Categorical and Weighted Sum approaches can offer adjustments to accommodate state priorities.

Depiction of Crucial Habitat Identification Product



Appendix C

Regional Workgroups - 2011-2013 Progress

In November 2011, the Wildlife Council established regional technical workgroups to complete Step One of this White Paper: Compiling essential data layers. Workgroups evaluated region-wide data products and processes to assist states in defining crucial habitat for draft 2012 maps, and for use in preparing product for public launch in 2013. This Appendix summarizes progress and provides direction to access more detailed process recommendations and data products.

Essential Tier 1 data categories addressed via regional workgroups to produce products for 2012 draft crucial habitat maps, and for use in 2013 public CHAT launch:

1. Habitat for “Species of Concern”

- Habitat for Species of Concern workgroup convened state technical expertise from 11 WGA states plus expert advice from Natural Heritage Programs in five WGA states; University of Idaho GAP; and from NatureServe. Regional workgroup products include:
 1. Recommendations document. Revised May 2013. Covers:
 1. How to select Species of Concern and create source data table
 2. Spatial data sources for terrestrial and aquatic species of concern
 3. How to aggregate terrestrial data (confirmed locations and GAP models) into Species of Concern data layer
 4. How to aggregate aquatic data, including examples on spatial processing methods from WA (MT example available separately)
 5. How to address SERI (terrestrial game and sportfish), if not already covered as SOC
 2. ArcGIS Toolbox: Assigns species data to WGA Hexagons. Includes documentation and examples
 3. GAP modeled species distribution datasets. Suite of 250 “SGCN” common to the greatest number of western states selected in 2012. Information on accessing models via USGS Species Viewer; information on using GAP models in CHAT covered in recommendations document above.¹³

2. Native and Unfragmented Habitat: Areas that are contiguous, possess a high degree of intact core areas or diversity of natural habitat, or supply ecological function to meet wildlife objectives. These areas are unfragmented, or relatively unfragmented, by transportation routes, human habitation, industrial infrastructure, or other human-caused disturbances.

- Natural vegetation classification habitat maps

¹³ Provide link to Western Governors' CHAT metadata once available in December 2013

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- Ecological systems of concern
- Plant communities of concern (Heritage Rankings)
- Priority habitat areas identified in updated SWAPs
- Landscape Integrity workgroup convened technical expertise from ten WGA states and engaged with experts from Colorado State University; NatureServe, the U.S. Forest Service, The Nature Conservancy and others to produce several innovative and useful west-wide products, and recommendations to guide crucial habitat mapping. Regional workgroup products include:
 - Westwide dataset on Native Unfragmented Landscapes (Large Intact Blocks)
 - Important Connectivity Zones (associated with LIBs)
 - NatureServe mapped Ecological Systems of Concern¹⁴

3. Riparian and Wetland Habitat: Areas that represent unique environments and function to support animal and plant diversity with respect to wildlife objectives and connectivity.

- Spring/Seep/Cienega Locations
- National Wetlands Inventory
- National Hydrologic Database
- Wetland components from State Comprehensive Outdoor Recreation Plans
- Priority wetland areas and priority riparian habitats identified in updated SWAPs

The Species of Concern workgroup identified the National Fish Habitat Action Plan's Assessment of Freshwater Integrity for use as a "wall to wall" national product to complement Aquatic Species of Concern. This science – based spatial assessment selected landscape variables important to assess habitat quality for the aquatic community assemblage to create an Index of Disturbance. Information on fish community assemblage was incorporated from a variety of sources. The HUC-12 data layer is publicly available and is classified into six priority levels.¹⁵

Prioritization and ranking of riparian and wetland habitats differs across the vast geography of the West (i.e., arid states are quite different than coastal states.)

4. Connectivity or Linkage Assessment: Areas described explicitly for aquatic or terrestrial wildlife habitat connectivity.

- Major animal movement corridors or pathways (documented)
- Landscape connectivity zones

This data category was addressed via the WGA Landscape Integrity workgroup, by producing a west-wide dataset on Important Connectivity Zones. Regional or state-

¹⁴ Provide link to Western Governors' CHAT metadata once available in December 2013

¹⁵ See <http://ecosystems.usgs.gov/fishhabitat>.

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specific efforts, such as the Washington Wildlife Habitat Connectivity Group and focal species connectivity maps, may be additional sources of information.

5. Quality Habitat for Species of Importance: This category provides for species consideration if not otherwise included as “Habitat for Species of Concern”.

- Sport Fish Quality Habitat: Areas recognized as important to meeting biological requirements and objectives of fish species whose harvest is regulated (i.e., blue ribbon streams).
- Game Animal Quality Habitat: Areas recognized as important to meeting biological requirements and objectives of game species regulated by harvest, such as winter concentration areas or important breeding areas (i.e., crucial big game ranges, grouse lek locations or core grouse habitats if designated).
- The Species of Economic and Recreational Importance or “SERI” workgroup convened technical expertise from seven WGA states and produced a recommendation for states lacking mapped data on SERI to use three existing big game datasets:
 - USFS Bighorn sheep
 - RMEF Elk distribution
 - WAFWA mule deer distribution map¹⁶

In addition, the workgroup produced an ArcGIS Toolbox for use in assigning game species to hexagons. Designation of species as “sportfish” must be accomplished by individual states. Geoprocessing methods for mapping sportfish may follow the methods for mapping aquatic Species-of-Concern.

¹⁶ Provide link to Western Governors’ CHAT metadata once available in December 2013