



# Crucial Habitat Assessment Tool for Nebraska: Overview, Data Layers, and Data Prioritization

## Overview

### Background

The Crucial Habitat Assessment Tool (CHAT) was a collaborative project of 16 state wildlife agencies working under the auspices of the Western Governors' Association, with guidance from the Western Governors' Wildlife Council. Support for the project came from the state wildlife agencies and a grant from the U.S. Department of Energy.

The goal of the project was to identify important wildlife habitat more consistently across state lines and make that information available via an interactive web-based map. The CHAT identifies places that are expected to contain the resources necessary for continued health of fish and wildlife populations or important habitats expected to provide high value for a diversity of fish and wildlife.

State wildlife agencies, working under coordination of the Western Governors' Wildlife Council, developed guidance for defining important habitat consistently throughout the western U.S. While striving for consistency, each state was given the flexibility to address priorities within its boundaries. This broad-based, collaborative effort has resulted in a west-wide habitat data layer derived from a set of input habitat data layers. The CHAT dataset represents an aggregated measure of the relative habitat quality for species of interest to the western states' wildlife agencies. The Nebraska project website and link to the westside CHAT can be found here: <http://outdoornebraska.gov/naturalheritageprogram/>

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## **Intended Uses**

The CHAT is intended to provide coarse-scale, non-regulatory wildlife information to facilitate landscape-level decision-making in the early stages of land-use project planning, using regionally consistent analyses and data definitions. It is also expected to facilitate efforts to identify important areas for conservation. While not intended for project-level approval, the CHAT was designed to reduce conflicts and surprises while ensuring wildlife values are better incorporated into land-use decision-making. The CHAT was designed to be useful for both intra-state and multistate projects.

CHAT values are in no way regulatory and do not imply specific avoidance or mitigation measures for a given area. The values combine information from many species and habitats and are not species-specific. The values should be interpreted as the relative probability, or risk, of encountering high-priority species or habitats in a given area.

Intended users of the CHAT include developers, consulting firms, policy makers, state and federal agencies, and conservation organizations. Users of CHAT are encouraged to contact individual state wildlife agencies for more detailed information about fish and wildlife habitat in their respective states.

## **Components**

The following data components were identified by the Wildlife Council as important for delineating crucial habitat. Not all components were used by all states. See the CHAT Data Layers document for a description of the layers used by Nebraska.

Species of Concern: terrestrial and aquatic

Species of Economic and Recreational Importance: terrestrial and aquatic

Native and Unfragmented Habitat: large natural areas, natural communities, ecological systems of concern, landscape corridors

Riparian and Wetland Habitat

Wildlife Corridors

States compiled data pertaining to the above categories and then prioritized the data within each category. The individual data layers were then combined (rolled up), using various rule sets or mathematical algorithms, into an overall crucial habitat layer. The CHAT layer uses a relative, six-level prioritization scheme, where 1 represents areas that are most important and 6 represents least important areas. In general, prioritization was based on degree of imperilment and certainty of location. More imperiled resources were given a higher priority than less imperiled and documented occurrences were ranked higher than modeled distributions. See the Data Prioritization and Roll-up document for information on Nebraska's approach.

Data are displayed using a hexagonal grid system. Most states, including Nebraska, used a system in which each hexagon encompasses 640 acres (1 square mile). A few states used a larger grid. Each hex was attributed with the score from each of the input layers as well as the overall CHAT score. For each hex, the scores from each of the input layers and the overall

CHAT layer are available to the CHAT user. The user also has access to the data prioritization scheme and roll-up rule set. However, no species names are provided in the CHAT map. For example, for the Species of Concern layer, the user can only see the score (from 1-6) and the characteristics of the group of species that determined that score (e.g. species with a NatureServe global conservation status rank of G1 or G2).

## **Limitations**

The CHAT is not a substitute for site-specific consultation with land and resource management agencies, nor does it satisfy the need for on-the-ground biological surveys or assessments. Users are encouraged to consult with state fish and wildlife agency staff regarding the proper use and interpretation of these data and to receive guidance on how to obtain site-specific information that may be available.

The CHAT dataset is a landscape-scale, coarse-resolution dataset not intended to establish precise boundaries for site-specific planning, regulation, or acquisition. It is not intended to determine the exact ecological health or condition of any specific location on the ground.

## **Nebraska CHAT Data Layers**

### **Species of Concern (SOC)**

This layer incorporates information for most of the Natural Legacy Project Tier 1 species, including all state and federally listed species. Bald and golden eagles were also included because they are regulated species (see NE CHAT species list). The species are represented in the data layers using confirmed locations (documented occurrences), and/or modeled potential habitat. Occurrence records prior to 1975 were excluded from use. A few of the Tier 1 species are not represented in the CHAT. In several cases, spatial data were not available and in other cases, bird species were migratory only and stopover habitat for these species was not considered to be limited.

For the whooping crane, the area designated as critical habitat by the U.S. Fish and Wildlife Service was treated as a documented occurrence. Migratory stopover records for whooping cranes were not used due to the low or unknown site fidelity for these sites. We treated areas identified as important for whooping cranes in the Nebraska Game and Parks Commission's 'Wind Energy and Nebraska's Wildlife' map as the modeled distribution. We categorized these as either High or Moderate priority based on the prioritization in the wind and wildlife map.

For some species rigorous mathematical models were used. Models for greater prairie-chicken, ferruginous hawk, golden eagle, and burrowing owl were produced under contract by the Rainwater Basin Joint Venture. Models for two portions of the range of American burying beetle were produced by Jessica Jurzenski and Shelly McPherron for their doctoral and master's theses respectively. For these cases we processed and reclassified the model data based on input from biologists.

However, resources (time, money) were not available to develop such models for most species. Therefore, for about 50 of the remaining Tier 1 species, we created relatively simple conceptual models. These models were based primarily on land cover type associations or associations with mapped aquatic features. Key reference data sources for this work were the Rainwater Basin Joint Venture's land cover of Nebraska and the US Geological Survey's National Hydrography Network. Some of the models incorporate additional criteria such as land cover patch size, proximity to other mapped features, soils, and slope. All models were clipped by range maps developed or refined during the course of the project. The conceptual modeling approach taken was not suitable for some species because their specific habitat requirements were not captured well by land cover or other readily available data.

### **Large Natural Areas (LNA)**

The Western Governors' Association contracted with NatureServe to develop a landscape integrity model for the entire West. Model values were based on the amount of human modification (roads, cities, industrial sites, agriculture, etc.) of the landscape both at and near each 90 m<sup>2</sup> pixel. Next, Large Natural Areas were delineated by a WGA workgroup based on a minimum size and minimum integrity score. The minimum size was set at 1,000 hectares (~ 2,470 acres). A minimum (qualifying) integrity score was developed for each ecoregion (Great Plains, Rocky Mountains, etc.) and was based on an evaluation of integrity scores within protected natural areas within the ecoregion. More detailed documentation regarding the development of these datasets is available.

We grouped the Large Natural Areas into two categories. The first category included those LNAs with landscape integrity scores that were in the top 1/3 of all LNA integrity scores above the minimum score to qualify as a LNA. These areas were considered relatively more intact and given a higher value. The second category included all the remaining LNAs (those with scores in the bottom 2/3 of qualifying scores).

### **Natural Communities**

This layer contains documented occurrences of natural communities with NatureServe global conservation status ranks of G1 through G4. These are sites with known good to high quality natural areas which are globally very rare to relatively rare and thus worthy of consideration in land use planning. For G1 through G3 communities, only occurrences with an A through C condition rank (or unranked) were used. For G4 communities, only occurrences with an A or B condition rank (or unranked) were used.

Ecological Systems are a coarser scale of classification than natural communities and each System comprises several similar natural community types. These Systems have been assigned global conservation status ranks by NatureServe, and Nebraska has one G1 Ecological System – Central Tallgrass Prairie. We used data from the Rainwater Basin Joint Venture to map this system. Using aerial photography, RWBJV staff hand-digitized boundaries around areas that appeared to be native grassland. Conservation Reserve Program lands were excluded from this layer. To improve the accuracy of the map, we excluded all grassland polygons that were less than 40 acres in size (because many small fragments are misclassified in the mapping process).

In addition, we required that at least 25% of a hexagon be covered by the Ecological System in order for the hex to be attributed with the Ecological System score. Because these data have not been verified in the field, they are treated as modeled data.

## **Wetlands**

The wetland layer has several components which are valued differently (see Data Prioritization document for values assigned).

1. Protected wetlands in the Rainwater Basin (RWB) and Central Table Playas (CTP).  
This component includes wetlands that are within Wildlife Management Areas, Waterfowl Production Areas, and conservation organization lands, as well as those that have 30 year or perpetual easements under the Wetland Reserve Program. These areas have long term protection and in most cases are being managed for wetland values. Given the importance of the RWB and CTP to migratory waterfowl and shorebirds, it is important that the integrity of these protected wetlands not be compromised. While these wetlands themselves are protected, the area outside them is not. Wind energy development just outside these protected areas could compromise their usefulness as migratory stopover sites.
2. High priority functional wetlands in the Rainwater Basin region.  
For this component of the wetlands layer, we used two wetland layers developed by the Rainwater Basin Joint Venture (RWBJV). The first identifies high priority wetlands based on factors including wetland size, distance from roads, and proximity to other wetlands. The second identifies those wetlands that still pond water in some years (functional wetlands), based on 10 years of aerial photography. We selected those features that were both high priority and functional. Features less than 5 acres were excluded.
3. Priority wetlands in the Central Table Playas region.  
For this dataset we used a wetlands priority layer developed by the RWBJV. There was not a functional wetland layer available for this region so we selected all features ranked as high priority by the RWBJV.
4. Sandhills wetlands.  
To capture the high quality wetlands in the Sandhills, we used the National Wetlands Inventory features and excluded those for which attributes indicated they had been dammed, excavated, or drained (H, X, D modifiers). Wetlands were included if they were within Large Natural Areas within the Sandhills ecoregion.
5. Playa clusters.  
This layer was developed by the RWBJV and the Playa Lakes Joint Venture. It identifies clusters of playas across Nebraska. To develop this layer, they used information on all playas, both current and historic. Most of the area delineated by the playa clusters layer is currently cropland.

## Nebraska CHAT Data Prioritization and Roll-up Rule Set

Below are the prioritizations for each of the input data sets, followed by the rule set that was used to combine them into a single Crucial Habitat layer. In general, prioritization is based on imperilment status, or rarity, of a resource and whether mapped locations are based on observations or models. More imperiled resources were given a higher priority than less imperiled and documented occurrences were ranked higher than modeled distributions. Level 1 is the highest priority.

The mapping unit is a square mile hexagon and, in general, any amount of a feature within a hexagon will cause the entire hex to be attributed with the respective score. For any given level, only one of the required items needs to occur in a hexagon for the hexagon to be assigned that score. For any given data layer, if a hexagon meets the requirement for more than one priority level, the higher priority level (closer to 1) is assigned. For example, for the Species of Concern layer, if a hexagon has a documented occurrence of a Tier 1, G4 species (level 2) and a modeled distribution of an endangered species (level 4), then the SOC score for that hexagon would be 2. See the CHAT Data Layers document for more information on each of the input data layers.

### Input Data Layers

#### Species of Concern (SOC)

<u>Priority level</u>	<u>Requirements</u>
1	Documented occurrences: State and Federal threatened and endangered species, Bald & Golden Eagles, species with a NatureServe global conservation status rank of G1 or G2, designated critical habitat for Whooping Crane and Salt Creek Tiger Beetle
2	Documented occurrences: Natural Legacy Project Tier 1 species with NatureServe ranks of G3 through G5
3	Modeled distribution: Whooping Crane high priority landscapes
4	Modeled distribution: State and Federal T&E species, species with a NatureServe rank of G1 or G2, Whooping Crane moderate priority areas
5	Modeled distribution: Natural Legacy Project Tier 1 species with NatureServe ranks of G3 through G5
6	None of the above

#### Natural Communities

<u>Priority level</u>	<u>Requirements</u>
1	Documented occurrences: natural communities with a NatureServe rank of G1 or G2 and occurrence quality rank of A or B

- 2 Documented occurrences: G1 or G2 natural communities with other occurrence quality ranks
- 3 Documented occurrences: G3 or G4 natural communities
- 4 Modeled distribution: G1 or G2 Ecological Systems
- 5 NA
- 6 None of the above

**Large Natural Areas (LNA)**

Priority level

Requirements

- 1 LNA with Landscape Integrity score in top 1/3 of qualifying scores
- 2 LNA with Landscape Integrity score in bottom 2/3 of qualifying scores
- 3 NA
- 4 NA
- 5 NA
- 6 None of the above (i.e. hexagon does not occur in a LNA)

**Wetlands**

Priority level

Requirements

- 1 Protected wetlands in Rainwater Basin and Central Table Playas
- 2 Priority functional wetlands in the Rainwater Basin with buffers, priority wetlands in the Central Table Playas, selected National Wetlands Inventory wetlands occurring in the Large Natural Areas (those without H, X, or D modifiers)
- 3 Playa wetland clusters
- 4 NA
- 5 NA
- 6 None of the above

## Crucial Habitat Data Roll-up

A categorical approach was used to combine or roll up input data layers into an overall CHAT Crucial Habitat layer, based on a set of rules. This approach makes explicit the prioritization scheme that was used and makes it clear what values went into making up the Crucial Habitat priority score for a given hexagon. This approach also allows a state to ensure that certain resources rise to the top, regardless of what else may be in a hexagon. It also provides for a mechanism to value the synergism of multiple input layers overlapping in a hexagon.

### Roll-up Rule Set

For any given level, only one of the required items needs to occur in a hexagon for the hexagon to be assigned that score. For example, for a hexagon to have a Crucial Habitat score of 1 (highest priority), it needs to have a Species of Concern score of 1, or a Species of Concern score of 2 plus a Large Natural Area score of 1 or 2, or a Natural Communities score of 1.

#### Crucial Habitat Priority Level

#### Requirements

1	Species of Concern level 1 Species of Concern level 2 + Large Natural Area level 1 or 2 Natural Communities level 1
2	Species of Concern level 2 or 3 Natural Communities level 2 Large Natural Area level 1 Wetlands level 1
3	Large Natural Area level 2 Natural Communities level 3 Wetlands level 2
4	Species of Concern level 4 Natural Communities level 4
5	Species of Concern level 5 Wetlands level 3
6	None of the above