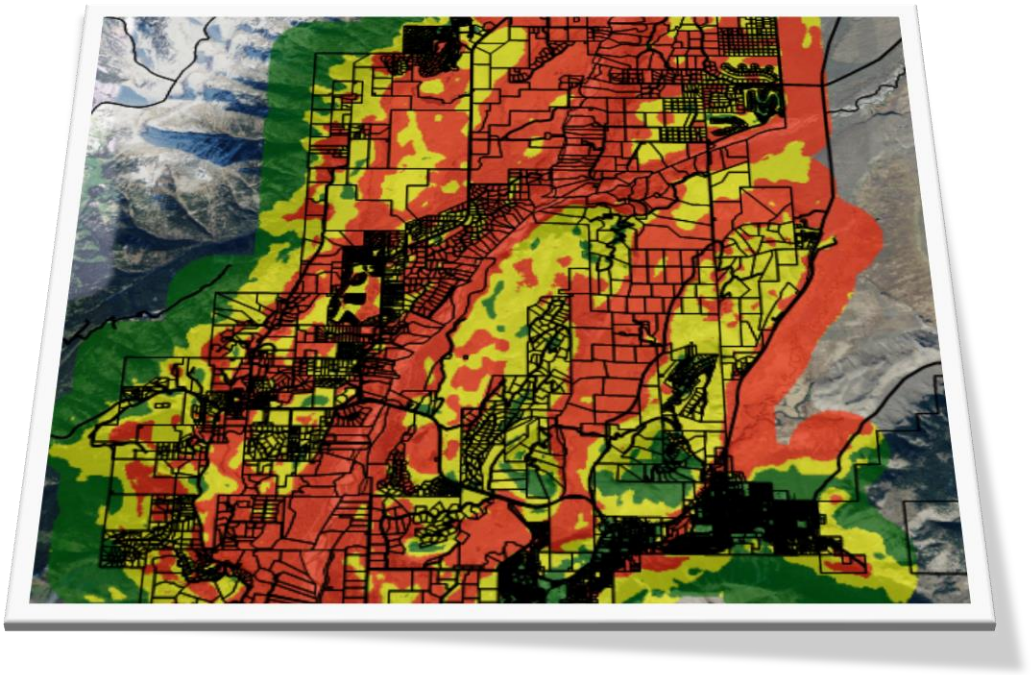
FOCAL SPECIES HABITAT MAPPING FOR TETON COUNTY, WY

REPORT ADDENDUM



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NATURAL RESOURCE STAKEHOLDER GROUP

As is noted in the following report addendum, several Natural Resources Stakeholder Group Members have given input throughout this process of moving from the *Focal Species Habitat Mapping for Teton County, WY* (2017) project product to a Tiered NRO product as directed by the Jackson/ Teton County Comprehensive Plan (2012). Those stakeholders have dedicated a significant amount of time and energy providing feedback to this process. Their participation and perspectives are very much appreciated. The stakeholder's diverse array of perspectives has strengthened this process immensely.

Natural Resource Stakeholder Group Members who have dedicated additional time and energy to the Tiered NRO process:

Aly Courtemanch, Wyoming Game and Fish Department

Rich Bloom, Neighborhood Association Stakeholder Representative

Roby Hurley, Teton County Planning Department

Kelly Lockhart, Agriculture Stakeholder Representative

Hank Phibbs, Property Rights Stakeholder Representative

Tom Segerstrom, Teton County Conservation District

Anna Senecal, Wyoming Game and Fish Department

Teton County Planning Department Staff:

Alex Norton, Teton County Planning Department

TIERED NRO METHODOLOGY

This methodology report is intended to be an addendum to the *Focal Species Habitat Mapping for Teton County, WY* report (April 21, 2017). The methodologies outlined here will be difficult to decipher without a complete understanding of the full methodology as described in the original April 2017 report.

POTENTIAL/ SUITABLE HABITAT CHANGE IN TERMINOLOGY

The term "potential habitat" in the 2017 report has been refined to "suitable habitat" in this addendum. The data defining the habitat have not changed, merely the term has been refined. The term "suitable" more accurately describes habitat which contains the natural resources needed to support a focal species. With either term, the habitat referenced is nonetheless habitat where the natural resources needed by a particular species are likely to be present. Therefore, the areas indicated have the potential to have a particular focal species present on them because they are thought to be suitable habitat for that species.

TETON COUNTY VEGETATION DATA LAYER UPDATE

Teton County's vegetation data layer (Cogan and Johnson, 2013) was found to have some errors that were misinforming the relative values model output in the Focal Species Habitat Map. The most significant errors were found within the Natural Lakes and Ponds (map code NLP) with the erroneous designation of water. These errors were detected when the group began to analyze breakpoints for separating tiers (see below) and discovered that some areas of intense development (primarily) contained high relative values. Upon further investigation, it was discovered that parking lots and swimming pools were incorrectly mapped (attributed) as Natural Lakes and Ponds. The totality of the vegetation layer, including other water features, was not updated. An revision of this vegetation layer should be done before future updates of this relative values habitat information.

FOCAL SPECIES SUITABLE HABITAT MODELS RE-PROCESSING

Once the vegetation layer was corrected, the focal species habitat models were then re-processed. Sixteen focal species models were re-processed because changing the NLP errors affected the model outputs for all species with vegetation selection in the model. These corrections are detailed in the revised vegetation layer's attribute table. Species suitable habitat models for Great Gray Owl (Summer and Winter) and Northern Goshawk (the remaining three habitat models) were not re-processed because these models were built by the Teton Raptor Center and do not have the same methodology as species models developed specifically for this project.

SNAKE RIVER CUTTHROAT TROUT ALTERNATIVE MODEL

The suitable habitat model for Snake River Cutthroat Trout used in the April 2017 relative values dataset included Teton County and Grand Teton National Park vegetative cover designations of canals (NID) (eg irrigation ditches). This decision was made by a group of species experts because some irrigation ditches in Teton County have Snake River cutthroat trout in them. The consensus was to try to map all suitable habitat even if that meant including irrigation ditches that do not provide habitat for trout. However, as with the vegetation data changes, as the project progressed to the stage of creating tiers, it became apparent that the inclusion of the canals vegetative data may be over-representing cutthroat trout suitable habitat on the landscape. Therefore, canals were removed from the Teton County and Grand Teton National Park vegetative cover features selection. Within the revised trout model framework, canals that are designated as, or associated with, classified trout streams from other sources (National Hydrology Dataset, Wyoming Game and Fish Department, Wyoming Department of Environmental Quality) were maintained in the revised suitable habitat model for Snake River Cutthroat Trout.

RELATIVE VALUES HABITAT FOR TETON COUNTY

The relative values habitat model for Teton County was reprocessed following the weighted sum methodology as detailed in the Focal Species Habitat report (April 2017). Two changes where made to this methodology: (1) the removal of migration and movement layers and (2) the reprocessing to a 30-m pixel size.

The first change to this methodology was to remove the migration and movement layer from the model. This layer is to be used in the creation of a separate movement and migration overlay. This change was made because the foreseeable use of these relative values will be the framework of Teton County's Natural Resource Regulations. Since regulations associated with wildlife habitat are distinctly different from regulations associated with wildlife movement and migration, the movement and migration layers were removed from the relative values dataset.

The second change to methodology was that the resulting relative values habitat information were reprocessed to a 30m pixel size landscape tool (bilinear processing). The reasoning behind reprocessing to a 30 meter dataset are: (1) 30 meter pixel is a standard size for landscape scale geographic tools and (2) it will likely function better for the general public and require less computer processing capabilities. As a validation of this choice, the 30m result was visually compared with a 10m pixel result. Once categorized as tiers (see below), the two resulting raster datasets were remarkably similar. As should be expected, the 10m relative values raster appears to have smoother edges between tiers but provides less generalization across the landscape.

The 30m relative values habitat raster was then processed using a moving window, averaging tool to account for connectivity of resources across the landscape using ESRI ArcGIS Desktop (Focal Statistics Tool, Spatial Analyst Toolbox, 1 acre Circular Neighborhood converted to a 117.8 foot radius). This moving window technique averaged the values of cell centers that fall within a circular, 1 acre window. This technique allows for anomalies in the landscape to be blended with larger, landscape features. The common example given is that a singular, willow bush located in the middle of a large, agricultural field should be blended to allow the agricultural field's values to have more of an influence on the resulting value than the small, willow feature. However, while the goal is to have a single bush blended into the landscape, a medium sized feature, such as a row of cottonwoods, would preferably remain an influence on the values in that area. To this end, the circular window size of 1 acre was chosen. Moving window sizes considered were 1 ac, 2.5 acres, 5 acres, 10 acres and 20 acres. A 1 acre window allows for the representation of resource connectivity across the landscape without losing definition of the natural resources present. As the window size increases, definition of resources present on the landscape are lost.

TIERED NATURAL RESOURCES OVERLAY

The Jackson/ Teton County Comprehensive Plan (2012) *Policy 1.1.b Protect wildlife from the impacts of development* directs that "a tiered system of protection should be established so that the most critical habitat and movement corridors receive the highest level of protection and site specific study". To this end, the relative values for habitat on private lands and adjacent public lands (1/2 mile buffer) were divided into three categories of high, medium and low relative value. It is important to emphasize that these are relative values and that all habitat within Teton County, WY has habitat value to some species of wildlife. These relative values were developed based on the suitable habitats of focal species. There is no known model in other jurisdictions to inform Teton County's vision and process.

The high, medium and low categories were developed by referring back to the focal species suitable habitat layer rankings found in the April 2017 report. Refer to the *Relative Values Habitat Map of Teton County* (pg 10-12) of the April 2017 report for an explanation of the ranking of focal species suitable habitat layers. In this focal species habitat layers ranking, there were five species habitat layers with a ranking of one (1). The next grouping of species were four species habitat layers with a ranking of two (2). Therefore, the initial proposal for tier relative value breakpoints considered by a subcommittee of the Natural Resources Stakeholder Group were:

TIER	RELATIVE VALUES	RATIONALE
Low Tier	5 and below	5 species with rank of 1 = 5x1 = 5
Medium Tier	5 to 13	4 species with rank of 2 = 4x2 = 8 + 5 from low tier = 13
High Tier	greater than 13	All other species and ranks above 2

However, when these categories were placed on a map and examined from a diverse array of stakeholders, the general feeling was that relative values of 5 and below did not adequately represent areas of the County where extensive habitat alteration and fragmentation has previously and greatly diminished the suitable habitat available to wildlife species.

Likewise, at the break point between medium and high tiers using the value of 13 and above, relatively large areas of the County were included in the high tier. This breakpoint resulted in an emphasis on not only natural water features such as rivers and creeks but also included the ecological connectivity of surrounding habitats across the County. These riparian corridor and adjacent habitats are ecologically of importance to the overall landscape function and resilience to support wildlife.

Several natural resource topics that were central to an extensive process of comparing various tier breakpoints were natural waterbodies, changes in topography resulting in transitions in natural resources across the landscape and connectivity of resources. Through these discussions, the influence of irrigation ditches' inclusion in the Snake River Cutthroat Trout suitable habitat model (detailed above) was considered and compared with the original relative values output.

In the end, a subcommittee of the Natural Resources Stakeholder Group came to the following intermediate consensus and associated rationale. The subcommittee recommended that this intermediate consensus and associated rational be shared with the entire Natural Resources Stakeholder Group for a final decision.

TIER	RELATIVE VALUES	RATIONALE
Low Tier	7 and below	A relative value of 7 is agreed upon to incorporate habitat that has been previously and extensively altered/ fragmented into the low tier.
Medium Tier	greater than 7 to 13/ 14	The remaining relative values indicate areas where future land use has an opportunity to improve the natural resources present on the property. Relative values of 13, 14, and 15 were all strongly considered.
High Tier Option 13	13 and above	A breakpoint of 13 fully maintains landscape connectivity aspects across private lands.
High Tier Option 14	14 and above	A breakpoint of 14 maintains this connectivity but some of the spring fed creeks which play an important natural resources role in this landscape are moved to the medium tier. When the Tiered NRO is reprocessed with the redesigned Snake River Cutthroat Trout, this breakpoint of 14 maintains natural waterbodies values without overrepresenting irrigation ditches in the landscape.
High Tier Option 15	15 and above	A breakpoint of 15 loses landscape connectivity aspects and spring fed creeks are fully moved to the medium tier. Major, natural waterways of the valley are maintained in the high tier.

ECOCONNECT CONSULTING'S RECOMMENDATION

EcoConnect Consulting's recommendation (Figure 1a & 1b) is that the stakeholder group move forward with the Tiered NRO product inclusive of the redesigned Snake River Cutthroat Trout suitable habitat model as outlined above. Recommended tier breakpoints for this model are the following with associated rationale.

TIER	RELATIVE VALUES	RATIONALE
Low Tier	6 and below	When applied to this model, a relative value of 6 incorporates habitat that has been previously and extensively altered/ fragmented into the low tier.
Medium Tier	greater than 6 to 13	The remaining relative values indicate areas where future land use has an opportunity to improve the natural resources present on the property.
High Tier	13 and above	A breakpoint of 13 maintains landscape connectivity as well as spring fed creeks. When the Tiered NRO includes the redesigned Snake River Cutthroat Trout this product maintains natural waterbody values and the value of large tracks of undeveloped land without overrepresenting irrigation ditches in the landscape.

REFERENCES

Cogan D. and S. Johnson. 2013. Final Report: Vegetation and Non-Vegetation Cover Type Mapping for Teton County. Jackson, Wyoming. Available online at: http://www.tetonwyo.org/plan

Tiered Natural Resources Overlay
Teton County, WY
Figure 1a - Private Lands Subsection

June 22, 2018

1 inch = 2.0 miles

Miles

0 1 2 4

N

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Sources
NAIP
- 1m 2017 Aerial Imagery
Teton County, WY
- Ownership Parcels
- Roads

Tiered NRO Note
The Tiered NRO raster displayed here contains the redesigned Snake River Cutthroat Trout suitable habitat model and has 30m pixels

Legend

Ownership Parcels

Roads

Tiered NRO

Low Tier - less than 6

Medium Tier - 6 to 13

High Tier - 13 and above

Tiered Natural Resources Overlay
Teton County, WY
Figure 1b - All Private Lands

June 22, 2018

1 inch = 4.5 miles

0 2 4 8 Miles

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Sources
USGS
- Topographic Map

Tiered NRO Note
The Tiered NRO raster displayed here contains the redesigned Snake River Cutthroat Trout suitable habitat model and has 30m pixels

Legend

Highways

Tiered NRO

- Low Tier - less than 6
- Medium Tier - 6 to 13
- High Tier - 13 and above