Board of County Commissioners ***Staff Report***

Workshop

Meeting Date: December 8, 2014 **Presenter:** Susan Johnson

Requesting Dept: Planning and Development **Subject:** Focal Habitat Feature Project Update

---

Statement / Purpose:

To discuss issues associated with the Focal Habitat Feature project in advance of the Board hearing on December 16, 2014, when the Board will be asked to consider if additional time and funding will be provided to the contractor to complete the project.

Background:

On August 20, 2013 the Board of County Commissioners approved a notice of award to Biota Research and Consulting (Biota) for the Focal Habitat Feature project. This project will develop a map and description of Focal Habitat Features and Valuable Matrix Features in Teton County. Based upon available wildlife data along with the vegetation map of Teton County, the consultant was tasked to identify areas that are crucial to the health of native species and describe the relative value of the landscape between these crucial areas. The overall purpose of this project is to implement Principle 1.1 of the Comprehensive Plan—*Maintain healthy populations of all native species*. This requires the identification of focal species that are indicative of ecosystem health and a determination of important habitat types for these species. The Focal Habitat Feature project will assist in evaluating habitat importance, abundance and use to determine relative criticalness of various habitat types, and will ultimately create the foundation for a revision to the Natural Resources Overlay.

A contract between Teton County and Biota was signed on November 5, 2013, which was based upon time and materials and included a not to exceed cap of $86,504.00. The contract also included a timeline for project completion, which was to occur by July 2014. The contract, including timeline and scope of work, is attached to this staff report.

Project Update

In early fall 2014 Staff requested that the contractor provide a project update. Biota produced a memo on October 28, 2014, which discussed the status of the project. At this time Staff was made aware that the project was not only past the deadline, but was over budget, as well. It was not surprising that the project was past the deadline. In the spring of 2014 Biota expressed to Staff and the Natural Resources Technical Advisory Board (NRTAB) that they were experiencing difficulties obtaining data. Staff discussed this issue with NRTAB and Hank Phibbs, liaison to NRTAB, and all were in agreement that we would rather have the project take longer to finish with the benefit of a more complete data set. What was surprising was that Biota had spent almost $134,000.00 on the project thus far, but had only billed the County for $79,000.00. A spreadsheet of budget and expenses through October 31, 2014 is provided on page 5 of Biota's revised memo dated November 19, 2014, which is attached to this staff report. Biota's rationale for the extensive over expenditure is due to the fact that a project like this had never been completed elsewhere, and therefore lacked a pre-defined method that could easily be applied to this project. Biota spent a considerable amount of time evaluating statistical tests and predictive models to assist in identifying focal habitat features for each species for which Biota had data. These problems are described at length in Biota's memo, but in summary, the predictive modeling efforts did not end up being a feasible method for identifying focal habitat features without a significant amount of time and resources being spent refining the model for each species.

Staff, the NRTAB, and Commissioner Phibbs discussed the update provided by Biota at a regular NRTAB meeting in early November, and decided that further clarification from Biota was necessary, as their original memo was rather technical. Biota revised their memo on November 19, 2014. In response, the NRTAB prepared a memo (erroneously dated November 18, 2014), and submitted it to staff on November 30, 2014 (attached to this staff report). The memo from NRTAB endorses continuing to work with Biota on the project, provided certain obligations are met, and includes a revised timeline, prepared by Biota at the request of Staff and NRTAB, for completion of the project.

Completion of the Project:

Biota estimates that it will take an additional six months to complete the project. They have provided a cost-effective technique to identify focal habitat features that is satisfactory to the NRTAB. A breakdown by tasks is provided on the last two pages of the memo from NRTAB.

Cost:

Biota is requesting an additional $36,900.00 to complete the project, as well as an opportunity to negotiate with Teton County for compensation of the unbilled, but expended hours totaling approximately $55,000.00.

Alternatives:

The following options may be considered as the Board proceeds forward at the December 16th hearing to consider amending the contract with Biota:

1. Approve Biota to continue to complete the project with the timeline and scope of work attached to the NRTAB's memo and negotiate a fee; or
2. Hold Biota to completing the scope of work as originally agreed to in the contract signed November 5, 2013; or
3. Advertise a revised RFP to complete the work remaining on the project.

If there are additional alternatives the Board would like Staff to explore for their consideration prior to the December 16, 2014 hearing, please let Staff know.

Attachments:

- Original contract with Biota signed on November 5, 2013
- Memo from Biota dated November 19, 2014
- Memo from NRTAB dated November 18, 2014, but provided to Staff on November 30, 2014

CONTRACT

AGREEMENT FOR FOCAL HABITAT FEATURE PROJECT

This Agreement for Services ("Agreement") is entered into this 5th day of November, 2013, (hereinafter referred to as the effective date of the Agreement) by and between Teton County, a duly organized county of the State of Wyoming, P.O. Box 1727, Jackson, Wyoming 83001 (hereinafter referred to as **County**) and Biota Research and Consulting, Inc., a Wyoming Corporation, P.O. Box 8578, Jackson, Wyoming 83002 (hereinafter referred to as **Contractor**).

Witnesseth

WHEREAS, the County desires to hire a consultant to develop a map and description of focal habitat features and valuable matrix features in Teton County; and

WHEREAS, Contractor has skill and experience in identification of focal species that are indicative of ecosystem health and determination of important habitat types for these species; and

WHEREAS, the County desires to hire Contractor and Contractor desires to provide services.

NOW THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree to the terms and conditions set forth herein.

Article 1. Statement of Work

Contractor shall provide services to the County as more fully described in Exhibit A – Scope of Work which is hereby incorporated herein by reference as if fully set forth herein, along with the Project Approach, as developed by Contractor and Natural Resources Technical Advisory Board (NRTAB), and Preliminary Timeline.

Article 2. Timetable

Contractor shall complete the Scope of Work as outlined in Exhibit A, attached hereto.

Article 3. Compensation and Payment

The County agrees to pay Contractor, as full compensation for all services provided hereunder, not to exceed, eighty six thousand five hundred four dollars (**$86,504.00**), as set forth in Exhibit A. Contractor shall present an appropriate voucher to the Clerk of Teton County on the 1st day of every month with a detailed breakdown of work performed by hourly unit. The Contractor shall be paid per hour. The County will

provide Planning Staff from the County to assist with certain tasks. It is specifically understood and agreed to by the Contractor that the amounts listed is a "not to exceed" amount. Contractor shall not receive compensation in excess of the total "not to exceed" amount as set forth in this Article without the prior written approval of the County. The amount of compensation shall not vary as a result of the time of day the services are performed or the number of hours during which services are performed in any given period of time. The County may examine all records of Contractor during reasonable hours for a period up to and including one (1) year after termination of this contract in order to audit and verify the aforesaid charges.

Article 4. Term and Termination Without Cause

The terms of this Agreement shall commence on the effective date of this Agreement and shall expire July 31, 2014. Contractor or County may terminate this agreement at any time with or without cause by giving thirty (30) days written notice to the other its intent to terminate this Agreement; provided, however, that all compensation earned or costs incurred prior to such termination shall be payable to Contractor. The provisions of Article 8 shall survive termination or expiration hereof.

Article 5. Place of Performance

Contractor shall be responsible for maintaining its own office facilities and will not be provided with either office facilities or secretarial support by the County. The Contractor shall supply at its own expense, all materials, supplies, equipment, and tools required to accomplish the work that is agreed to be performed in accordance with this Agreement.

Article 6. Independent Contractor Status

It is understood and agreed the Contractor will provide the services under this Agreement on a professional basis and as an independent contractor and that during the performance of the services under this Agreement, Contractor's employees will not be considered employees of the County within the meaning or the applications of any federal, state, or local laws or regulations including, but not limited to, laws or regulations covering unemployment insurance, old age benefits, worker's compensation, industrial accident, labor, or taxes of any kind. Contractor's employees shall not be entitled to benefits that may be afforded from time to time to County employees, including without limitation, vacation, holidays, sick leave, worker's compensation and unemployment insurance. Further, the County shall not be responsible for any such withholding or paying of taxes or social security.

Article 7. Trademark and Trade Name

This Agreement does not give either Party any ownership rights or interest in the other Party's trade name or trademarks.

Article 8. General Provisions

A. Entire Agreement

This Agreement represents the entire and sole agreement between the Parties with respect to the subject matter hereof and supersedes any and all prior negotiations, understanding, representation, or consulting agreements whether written or oral. This Agreement cannot be modified, changed, or amended, except in writing signed by the Parties.

B. Waiver

The failure of either Party to require performance by the other of any provision hereof shall in no way affect the right to require performance at any time thereafter, nor shall the waiver of a breach of any provision hereof be taken to be a waiver of any succeeding breach of such provision or as a waiver of the provision itself. All remedies afforded in this Agreement shall be taken and construed as cumulative; that is, in addition to every other remedy available at law or in equity.

C. Relationship

Nothing herein contained shall be construed to imply a joint venture, partnership, or principal-agent relationship between Contractor and the County; and neither Party shall have the right, power, or authority to obligate or bind the other in any manner whatsoever, except as otherwise agreed in writing.

D. Assignment and Delegation

Neither Party shall assign or delegate this Agreement or any rights, duties, or obligations hereunder without the express written consent of the other. Subject to the foregoing, this Agreement shall inure to the benefit of and be binding upon the successors, legal representatives, and assignees of the Parties hereto.

E. Severability

If any provision of this Agreement is declared invalid or unenforceable, such provision shall be deemed modified to the extent necessary and possible to render it valid and enforceable. In any event, the unenforceability or invalidity of any provision shall not affect any other provision of this Agreement, and this Agreement shall continue in force and effect, and be construed and enforced, as if such provision had not been included, or had been modified as provided above, as the case may be.

F. Governing Law

This Agreement shall be governed by, and construed in accordance with, the laws of the State of Wyoming, without giving effect to the principles of conflict of laws thereof.

The Parties hereto irrevocably elect as the sole judicial forum for the adjudication of any matters arising under or in connection with this Agreement, and consent to the jurisdiction of, the courts of the County of Teton, State of Wyoming, or the United States of America for the District of Wyoming. This Agreement was negotiated by both Parties hereto. As such, this Agreement shall not be construed against or in favor of any Party by virtue of which party drafted the Agreement or any portion thereof.

G. Dispute Resolution

In the event of a dispute arising under the terms of this Agreement the Parties shall, prior to resort to the Courts, enter into good faith efforts to mediate their differences. The Parties shall jointly select a disinterested third party to act as a mediator to facilitate the resolution of their dispute. In the event the Parties are unable to jointly decide on a mediator, they shall each select an impartial representative, the two of whom shall decide on the mediator. The mediator shall, within ninety (90) days, conduct a hearing on the matter, and submit his or her findings and conclusions to the Parties. The provisions of W.S. §§ 1-43-101 through 1-43-104 shall apply to the mediation process. Each of the Parties shall share equally in the cost of the mediator, but shall otherwise each bear their own costs in the mediation process.

H. Paragraph Headings

The paragraph headings set forth in this Agreement are for the convenience of the Parties, and in no way define, limit, or describe the scope or intent of the Agreement and are to be given no legal effect.

I. Indemnity

Contractor agrees to indemnify and hold County, their officers, agent and employees harmless from any and all claims, damages, costs, liability or expenses (including attorney's fees) arising out of the performance of the Scope of Work as set forth in this Agreement.

J. Declaration by Independent Contractor

The Contractor declares and states that it has complied with all federal, state, and local laws regarding business permits and licenses that may be required to carry out the work to be performed under this agreement.

K. Third Party Beneficiary

The Parties do not intend to create in any other individual or entity the status of third party beneficiary, and this Agreement shall not be construed so as to create such.

L. Sovereign Immunity

County does not waive their sovereign immunity by entering into this Agreement, and fully retain all immunities and defenses provided by law with respect to any action based on or arising out of this Agreement.

M. Ethics and Standards

Consultant shall conform to all federal, state, local and applicable laws and regulations, and to the highest business ethics in performing its obligations in accordance with the terms of this Agreement.

N. Counterparts

This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

Article 9. Notice

For purposes of this Agreement, any notice shall be deemed properly sent and received when sent by certified mail with return receipt requested to the parties at the following addresses until or unless changed by one Party giving written notice of such change of address to the other Party:

Teton County
ATTN: Keith Gingery
P.O. Box 1727
Jackson, WY 83001

Biota Research and Consulting, Inc.
ATTN: Thomas M. Campbell
P.O. Box 8578
Jackson, WY 83002

APPROVAL AND EXECUTION

IN WITNESS WHEREOF the Parties have executed this Agreement on this 5th day of November, 2013.

TETON COUNTY, STATE OF WYOMING

Paul Vogelheim, Chair, Board of Teton County Commissioners

Attest:

for Sherry Daigle, Teton County Clerk

STATE OF WYOMING COUNTY CLERK TETON COUNTY

BIOTA RESEARCH AND CONSULTING, INC.

Thomas M. Campbell, President

EXHIBIT A – SCOPE OF WORK

Fee Schedule

The contract is a Time and Material Contract with a not-to-exceed amount of $86,504.00

Task A. Compile Available Wildlife Data

Initial efforts will involve developing GIS overlays for all wildlife species relevant to Teton County and with adequate datasets. These coverages will be rasterized so they can be overlain onto extensive vegetation mapping on private lands within the county, which is scheduled to be available in mid-July 2013. To accomplish this task, all available information and datasets pertaining to Teton County's wildlife will be collated. Much of the list of known available datasets described in Appendix A of the RFP are already in the possession of Biota, and have been and/or are used regularly during various projects. In addition, Biota's maintains an extensive library of information relevant to this project. GIS overlays will, at a minimum, include the following:

Ungulates – areas of crucial and noncrucial winter, winter yearlong, spring/summer/fall ranges; parturition areas where adjacent to or within private lands; and migration corridors;

Avifauna – nesting areas and important seasonal habitats for bald eagles, trumpeter swans, sage-grouse, raptors, migratory songbirds and other avian species;

Mammalian Predators – such as black bears, grizzly bears, mountain lions, and coyotes

Other Mammal Species of Interests – such as pikas and Uinta ground squirrels

Native Cutthroat Trout – particularly known spawning areas;

Reptiles and Amphibians – such as spotted frogs, boreal toads, rubber boas, and bull snakes

Wildlife Vehicle Collisions – "Hotspots" for collisions and roadkill.

Thematic map layers depicting vegetation, aquatic, riparian and topographic features will be generated in order to illustrate arrays, patterns, proportions and dispersions. Metadata will be developed following Federal Geographic Data Committee (FGDC) standards to ensure appropriate use by a wide range of communities working in the Greater Yellowstone Ecosystem

Task B. Develop a Classification System for FHFs and VMFs

After completing Task A, Biota will facilitate a series of meetings with the members of the Natural Resource Technical Advisory Board. The purpose of these meetings will be to identify Focal Habitat Features and the relative value of areas within a landscape "matrix" that surrounds and/or lies between Focal Habitat Features. Outcomes of this effort will be the criteria for identifying:

1. Focal Habitat Features – Although not defined in the RFP, FHFs refer to vegetation, aquatic, wetlands, riparia, and topographic features that combine in some fashion to provide important habitat to one or more wildlife species. It is anticipated that FHF criteria to be identified will include consideration of habitat importance (from vegetation mapping and existing ordinal rankings for covertypes); relative habitat abundance, which can be calculated from the vegetation map using calculations implemented in ArcMap; and habitat use, which can be determined in part from important species use probability areas currently being delineated by managers and from the spatial analysis of wildlife movements and stop-over sites, as developed under this proposal (see Task C.1).

2. Valuable Matrix Features – VMFs refers to the relative value of areas within a landscape "matrix" that surrounds and/or lies between Focal Habitat Features. The landscape matrix, referred to in the RFP as Valuable Matrix Features, will be based in part on wildlife and vegetation layers developed and consolidated in Task A.

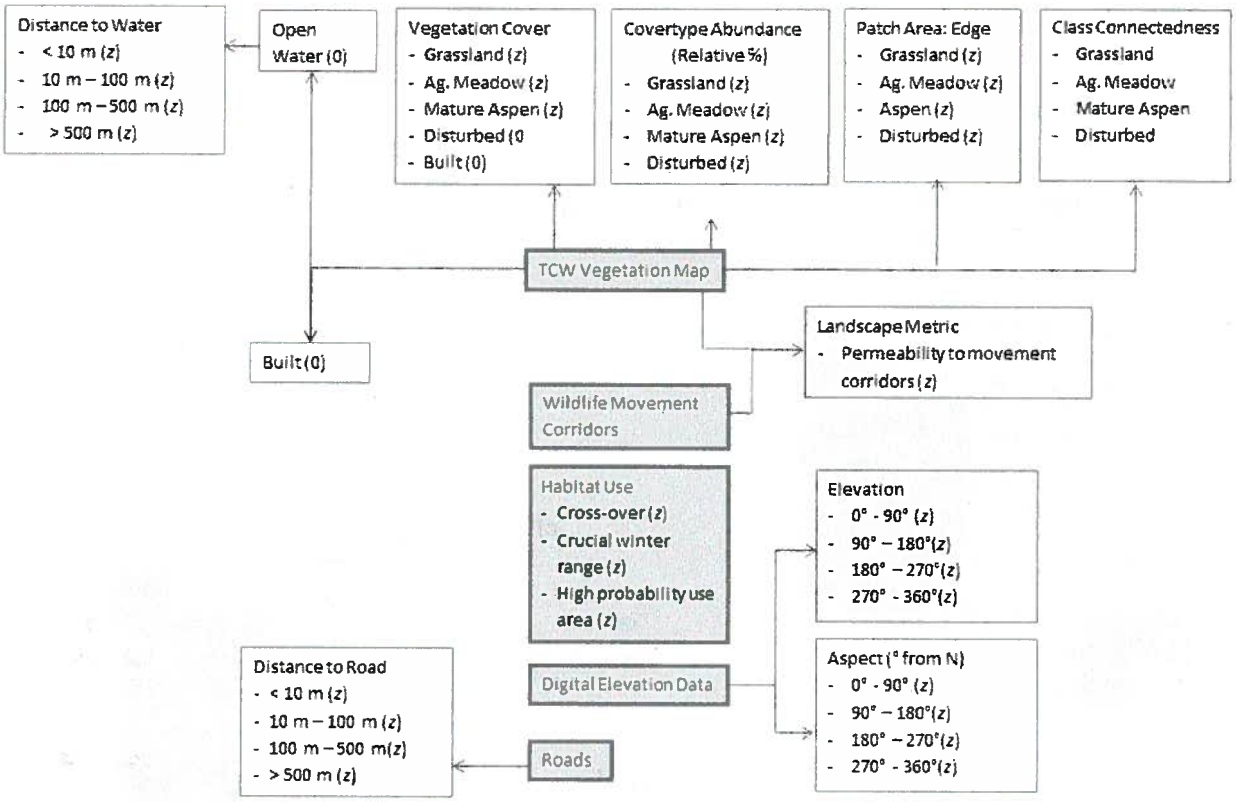
3. Matrix Tiers – Matrix Tiers are also undefined in the RFP. However, a review of the 2012 Comprehensive Plan leads Biota to believe that matrix tiers refer to the relative value of VMFs in relation to private lands in Teton County. We see this as an apparent means of complying with the public policy intent defined in Policy 1.1.a by ultimately forming some Land Development Regulations to protect the most critical wildlife habitat.

Biota will work with NRTAB members to develop descriptions of ecological function for the identified FHFs. Results will be recorded as text and reformulated into spreadsheet tables. Biota will work with NRTAB members in a similar fashion to describe ecological relationships and connectivity patterns both between FHFs and between FHFs and VMFs. These first two ecological description spreadsheets (i.e., FHF ecological function and FHF-to-FHF ecological relationships and connectivity) will be incorporated into final FHF and VMF GIS layers as attribute information. The third ecological description spreadsheet (FHF to VMF ecological relationships and connectivity) can be used to generate preliminary boundaries for tiered levels of protection and site study detail. In addition, resultant information is also expected to support the design of land development regulations to protect habitat per Chapter 2 of the Comprehensive Plan.

The final raster results will be converted to polygon features and associated attribute tables.

Task C. Map and Describe FHFs and VMFs

Under this task FHF identification criteria will be translated into geospatial variables that can be derived from relevant wildlife, vegetation and abiotic (e.g., topography) mapping. For example, if it is determined under Task B that covertype and habitat use are criteria for identifying FHFs, then abundance and proximity measurements will be calculated from vegetation and wildlife mapping. Subsequent covertype abundance and habitat use layers will then be integrated into a final raster output by assigning categories to the covertype abundance and habitat use layers, where a scaled value (z) is associated with each category (see figure 1 for a more detailed illustration). Biota will work with NRTAB to assign weights to map layer categories.



OUTPUT GRID = $\sum[\beta$(Vegetation Cover) + β(Covertype Abundance) + β(Patch Area: Edge) + β(Class Connectedness) + β(Permeability to movement corridors) + β(Habitat Use) + β(Distance to water) + β(Distance to Roads) + β(Aspect) + β(Elevation) * 0(Open water) * 0(Built)]

Figure 1. A simplified illustration of workflow for spatially identifying Focal Habitat Features (FHFs) for private lands in Teton County, Wyoming. In this case, each layer category is assigned a scaled value (z) based on FHF criteria. A final output grid is generated by algebraically combining weighted (β) layers.

The Output grid will be used to identify FHFs and VMFs using threshold clustering criteria determined by Biota and NRTAB (Figure 2). A final GIS layer of FHFs will be converted to vector polygon format, whereby individual FHF polygons will contain attribute information, including ecological function defined under Task B. The final polygon boundaries of all FHFs on private lands in Teton County will be further refined by using clear vegetation covertype edges, clear topographic features and/or private property boundaries (where cover-type edges and/or clear topographic features are absent) to account for boundary fuzziness introduced when converting from pixel to vector.

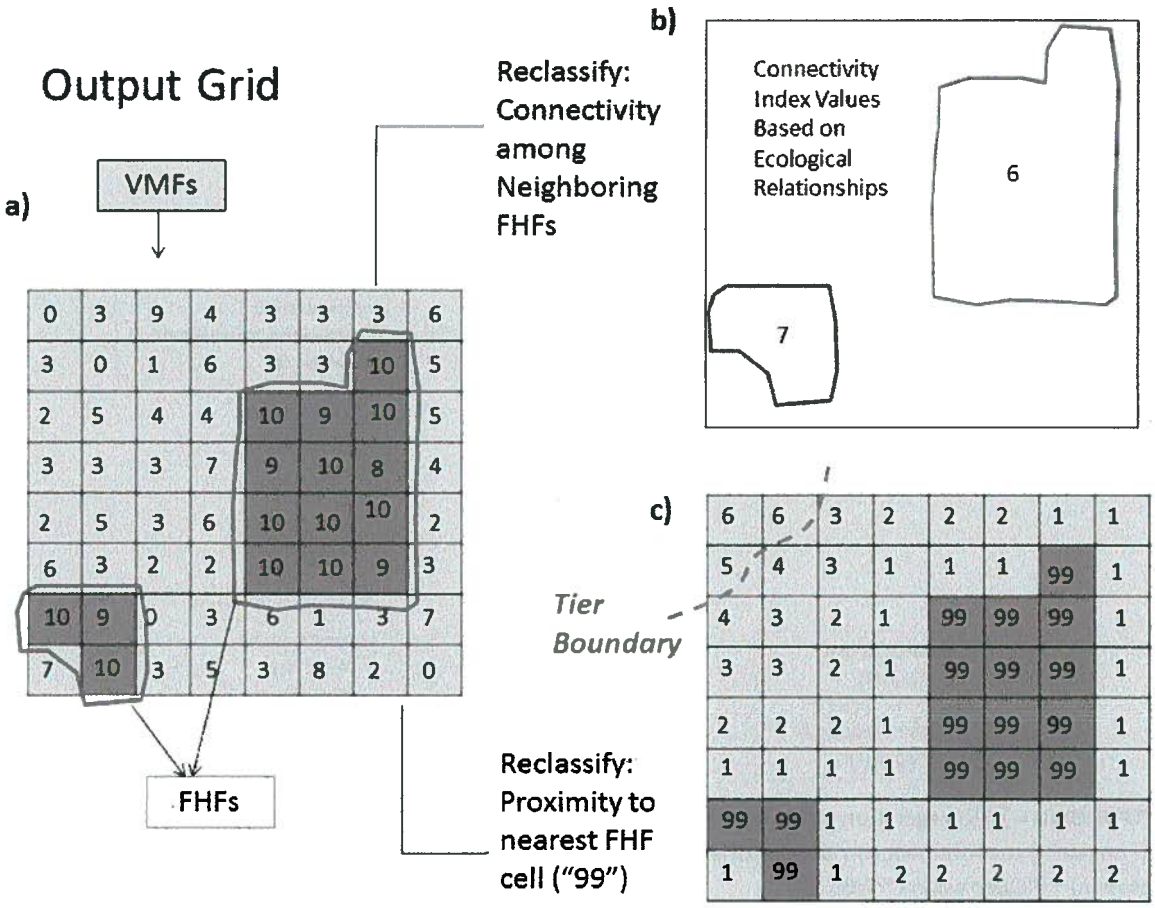


Figure 2. Simplified illustration of approaches to **a)** spatially identifying Focal Habitat Features (FHFs) and Valuable Matrix Features, **b)** FHF-to-FHF connectivity metrics, and **c)** Tier boundaries.

Approaches to developing connectivity descriptors that are based on ecological rather than structural relationships are available for vector and raster datasets at the patch, class and landscape scales in Fragstats, which also operates on the principle of focal and matrix features. Metrics include edge density, patch diversity and evenness, interspersion, and connectedness.

A comprehensive final report will be prepared and provided to the Teton County and Town of Jackson Planning Departments that compiles and presents GIS map layers, metadata, text, spreadsheet and tabular information, and selection and delineation criteria. The final report will also contain detailed methods sections, including a workflow processing template. This user-friendly documentation will be designed to support re-running rule-based models in the future, as new information becomes available.

Proposed Work Schedule: Focal Habitat Feature Identification Project

Task	Task Description	2013 MONTHS		2014 MONTHS						
		Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
A	Project Kickoff Meeting (County and NRTAB)									
A	Collate Information									
A	Second Meeting (County and NRTAB)									
A	Meeting with Wildlife Resource Managers									
A	Wildlife GIS Layers									
A	Thematic GIS Layers									
B	Meetings (2) with NRTAB to Define Criteria for FHFs									
B	FHF Ecological Function									
B	FHF Ecological Relationships and Connectivity									
B	FHF-VMF Ecological Relationships and Connectivity									
C	FHF GIS Layers									
C	VMF GIS Layer									
C	Final Report									

MEMO FROM

P. O. Box 8578, 140 E. Broadway, Suite 23, Jackson, Wyoming 83002; voice: (307) 733-4216 • fax: (307) 733-1245

To: **Susan Johnson, NRTAB**

From: **Tom Campbell**

Date: **November 19, 2014**

Re: **Teton County Commissioners FHF Progress Report**

The Natural Resources Technical Advisory Board (NRTAB) met with Teton County Planning Department Planning Manager Susan Johnson, County Commissioner Hank Phibbs, and Biota Research and Consulting, Inc. representatives Tom Campbell and Hamilton Smith on November 3, 2014. Subsequently, I met with you and Commissioner Phibbs on November 10, 2014. The purpose of these meetings was to discuss the Focal Habitat Feature (FHF) Project, progress to date, and a means to complete the Tasks outlined in the Request For Proposal (RFP) and Biota's subsequent proposal. During these meetings, a memo that Biota recently prepared and delivered to those listed above was discussed. This memo, in part, outlined the current status of the project and elaborated on a variety of problems that have been encountered and continue to impact the progress of the project. The outcome of these meetings was that Commissioner Phibbs requested the following information so that he could update the Board of County Commissioners:

1) What is the current status of the project? Where are we in terms of Tasks A, B, C as described in the RFP and Biota's proposal?
2) Why is the project currently over-budget and over-schedule?
3) What is the best estimate of additional needed time to complete the project?
4) What is the best estimate of additional budget needed to complete the project?

The FHF Project has overrun the contracted budget and exceeded the project timeframe as a result of encountering several difficult challenges. Although not explicitly stated in the original RFP, study methods and definitions were derived from an emerging and untested analytical framework. As a result, Biota has been required to test and develop various study methods prior to being able to proceed with the project scope of work.

Task A

Task A1, the compilation of available wildlife data, was perceived by both Biota and NRTAB at the beginning of the project as a relatively minor task and subsequently was budgeted as such. Although this Task has now been completed, the effort required to obtain datasets was extremely difficult. Unanticipated meetings, prolonged correspondences with agencies and potential collaborators, and development of individual and unique data sharing agreements with each collaborating entity resulted in

considerable loss of time and unforeseen budgetary overruns at the very outset of the project. As a result, Task A1 took nearly 7 months to complete, and ended up being almost $21,000 (262%) over budget.

Task A1 efforts began on November 6 of 2013, and our final dataset was delivered on July 14th, 2014. During this 7-month timeframe, data that was received from collaborators required numerous steps, from project introduction, data handling discussions, and thoroughly vetting all of the collaborators concerns about data usage. Once a potential agreement could be agreed upon, a follow-up "contract" for data sharing was required, which in itself became an iterative process with each contributor. At least 7 unique data sharing "contracts" were formulated in the interest of meeting the various concerns about misuse of data from each of the project contributors. Weeks would elapse between communications from potential collaborators, and follow-up in itself was time consuming. For example, considerable effort was expended seeking data from public entities with multiple contacts made by phone or email, and these sources still have not provided potentially valuable wildlife data.

Datasets that have been collected and are available for the completion of the project include large GPS-based point location datasets of single species from 6 separate local research projects. Species represented by these studies include moose (2 studies), elk, mule deer (3 studies), pronghorn, and sage grouse. State agency biologists have contributed nest location data for bald eagles and trumpeter swans, and additional species' point location information has been derived from databases contributed by the Wyoming Game and Fish Department Wildlife Observation System, University of Wyoming-Wyoming Natural Diversity Database, and the local Nature Mapping project. The three databases mentioned include data of different accuracy for most observable fauna extant throughout the County. Biota considers the datasets that have been provided to date are adequate to successfully complete the project and does not recommend seeking additional datasets at this juncture.

Task A2, the development of thematic layers, was successfully completed under budget (62%) and in a timely manner as the underlying data was available from the public domain. This included development of comprehensive "cross-walked" vegetation layers that integrate the Teton County vegetation layer with vegetation data from neighboring federal lands including Bridger-Teton and Caribou-Targhee National Forests, Grand Teton National Park, and the National Elk Refuge. Thematic layers were generated to meet project spatial and technical parameters in a GIS environment. The complexity of the 65-class County vegetation map was a critical early task that had to be addressed. Then, through collaboration with the NRTAB, it was decided the County vegetation map could be condensed into a 16-class vegetation map, as basis for the comprehensive "cross-walk" vegetation layer. Additional thematic layers developed for the project area extent include a digital elevation model (including data for the development of slope and aspect thematic layers); a distance to roads raster; and a preliminary water layer that is being used to develop a distance to water thematic layer. Our thematic layers, and in-house vegetation master map were ready for use on the project by the end of March.

Task B

Completion of Task B has been an exploratory effort that involved evaluating statistical tests and the power of predictive models to help identify FHFs on a species-by-species basis. Once datasets were

delivered to Biota, considerable effort was required to standardize different raw data formats. Once converted to a consistent spreadsheet format, those data were depicted and analyzed in GIS and statistics software packages. Biota, with the approval of NRTAB, began exploring the use of Resource Selection Models (RSMs) as a possible means of determining FHFs in March of 2014. Because Biota does not retain an experienced RSM modeler on staff, Biota engaged a sub-contractor to aid in developing the RSMs. Dr. John Kie (formerly of Idaho State University, now with Bluesail, LLC) provided methodologies for developing Resource Selection models using each of the GPS-based datasets in our possession. Through Dr. Kie's guidance, considerable time and effort was invested in applying RSM to discern what landscape features had the highest probability of use.

From the outset, there was no guarantee that modeling wildlife distribution and landscape associations using RSMs would provide meaningful results or prove a useful tool in identifying FHFs. Many hours went into developing a single model generated for a single species and in a single season. This endeavor was labor intensive, costly, and unfortunately resulted in unsatisfactory outcomes in terms of the utility of RSMs for identifying FHFs. Iterative changes within the RSMs resulted in considerable additional time and effort expended to refine Resource Selection Models. Although it took considerable effort to reach this juncture, it is now apparent to Biota that Resource Selection Modeling would require additional refinement for the results to be informative on a per species basis, and that the time and resources are simply not there to extend that type of effort towards a final product that requires a comprehensive assemblage of multiple FHFs. Through this arguably frustrating, but in hindsight necessary process, Biota gained insight and confidence on how to proceed in an effective and cost-efficient way to identify and map focal habitat features and the valuable matrix features (VMFs) associated with them.

Budgetary overruns that resulted from the development of a feasible method to approach Task B were significant and involved each of the subtasks for developing a Classification system for FHFs and VMFs. Meetings with the NRTAB ended up almost $17,000 (782%) over budget. This illustrates the complexity of the project, and the challenges before Biota and NRTAB to refine a novel technique to define these essential building blocks of the project. Tasks B2 and B3 are inherently related, and speak to the amount of effort required to develop and use RSM techniques in an attempt to distill statistically significant habitat relationships from animal locations. Dr. Kie generated independent models for mule deer in 4 seasons, for 2 separate datasets, producing a total of 8 unique models. A complete report of the preparation of these models, and outcome was generated and distributed to NRTAB. Given that model output lacked spatial and apparent predictive accuracy, consensus was to identify more than just one dominant vegetation type (of 16 potential) within each sampling unit. Models were again produced with even less precision than the first model output. To date, Subtasks B2 and B3 are collectively $35,000 (583%) over budget. Task B4 has been addressed on 3 separate levels; first, when simple Logistic Regression was used as a basis for predictive modeling; second, to attempt to integrate the Resource Selection models from the GPS-based mule deer dataset, and a third time in establishing the most recent methodology from which we believe the FHF Study can be completed. Task B4 efforts expended to date are approximately $4,000 (212%) over budget.

Biota participated in an NRTAB meeting in August where the Chairman came to the same conclusion that Biota made, that RSM models were not proving useful in identifying focal habitat features. The Chairman then requested NRTAB members use the datasets that Biota had generated and begin mapping FHFs on a per species basis purely computer-driven modeling environment. All of the wildlife datasets described in Task A, along with the Task A2 thematic layers were made available to the NRTAB members. Biota has not yet received any contributions from NRTAB in this area of Task B.

Since that meeting Biota felt the urgency to move the project forward and independently generated and presented to NRTAB a Focal Habitat Feature map for mule deer observations on crucial winter range as an example of how this project can be completed. Biota used the full suite of thematic layers, including the Cogan Vegetation mapping on private lands, to show how this approach can be broadened to identify FHFs for other wildlife species with locational datasets. Observations of any target species can be overlain with thematic layers (e.g., slope, aspect, elevation, CTI vegetation, distance to water) such that associations with each thematic layer can be extracted, from which FHFs can be identified for that species. Each species map of thematic associations (FHFs) will then be combined as a means of generating a County-wide matrix of FHF values, from which Valuable Matrix Features will subsequently be identified.

Biota believes it is now in a position to complete Task B and move directly into Task C, that being the development of GIS layers depicting the FHFs and VMFs, and the preparation of a final report. The proof of concept approach mentioned above has been shared with the NRTAB and the Planning Department, and Biota believes this is a credible, feasible, and efficient approach to moving the project towards completion. The analysis techniques for identifying and mapping FHFs, refined during the project to date, can now be applied to datasets we have in-hand in a relatively short period of time. We need NRTAB and the Planning Department to examine the proof of concept FHF map and determine whether or not it the approach Biota should proceed with. Once all of the FHFs are combined across species/datasets, Biota will need input from NRTAB on a preferred method for ranking FHFs and spatially analyzing these features to determine VMFs. This Task C approach is similar to the conceptual approach Biota presented in Task C of our proposal. However, successful completion of this portion of Task C will require a collaborative effort with members of NRTAB, which introduces a certain amount of time and effort that is difficult to estimate. The Planning Department has indicated that there is a critical timing component to the current efforts to revise the Land Development Regulations, and that will necessitate completion of the Focal Habitat Feature project in 6 months or less. Biota commits to this timeline, and we believe NRTAB has also committed to providing the collaborative component for Task B completion so that this timeline can be met.

Although Biota has exceeded the contract budget and project timeline, by no means is this project stuck at “square one”. Task A has been completed, and methodology has been developed for efficient and effective completion of Task B. The remaining Task C will be completed promptly. In order to get to this stage of the project, an unanticipated trial and error process had to be completed in order to develop suitable study methodologies. What is being attempted with this project has no real analog in the science-based planning realm, and no package of methods can be simply pulled off the shelf and employed to achieve project goals and objectives. We have a high level of confidence that our approach

can be extended to other datasets to yield final FHFs and VMFs, contingent upon efficient collaboration with the NRTAB.

Attached to this memo is a spreadsheet that tabulates project costs through October 31, 2014 and also provides a cost estimate required to complete the project. Briefly, the project was originally budgeted at $86,504. Biota has billed approximately $79,000 and has accrued approximately $55,000 in unbilled time to date. It should be noted that much of the overages were the result of the difficulty encountered acquiring data and, in particular, exploring innovative analysis techniques necessary to achieve project objectives. In hindsight, I acknowledge Biota could have and, arguably, should have better communicated project difficulties and budgetary overages to the Planning Department and the County Commissioners. However, I was reluctant to engage in those discussions earlier because I was unable to simultaneous present a logical and effective path forward to achieve the project goals. Biota diligently continued efforts to develop this approach and only intimated to Planning staff and NRTAB that the project was behind schedule and over budget. Only after Biota internally identified what we consider to be an appropriate path forward to complete the project did I fully disclose the details of challenges and shortfalls.

Having successfully navigated the hurdles and challenges listed above, Biota believes that $37,000 is required to complete the project and respectfully requests this additional amount. Regarding the $55,000 associated with hours Biota has expended but not yet unbilled, Biota respectfully request the opportunity to negotiate with Teton County for compensation of unbilled but expended hours.

Budget and Expenses through October 31, 2014

Task	Task Description	Amount Budgeted	Current Billed & Unbilled	% Original Budget	Requested Additional $	% Original Revised Budget
A1	Wildlife GIS Layers	$12,936.00	$33,851.75	262%	$0.00	262%
A2	Thematic GIS Layers	$19,748.00	$11,955.50	61%	$0.00	61%
B1	Meetings	$2,880.00	$19,642.60	682%	$0.00	782%
B2	FHF Ecological Function	$3,600.00	$11,592.25	322%	$3,000.00	422%
B3	FHF Ecological Relationships & Connectivity	$3,600.00	$30,392.47	844%	$3,000.00	944%
B4	FHF-VMF Ecological Relationships & Connectivity	$3,600.00	$7,639.75	212%	$3,000.00	312%
C1	FHF GIS Layers	$15,480.00	$4,871.75	31%	$10,000.00	100%
C2	VMF GIS Layers	$5,880.00	$0.00	0%	$5,800.00	100%
C3	Final Report	$13,560.00	$2,657.50	20%	$10,900.00	100%
D	Project Coordination and Management	$2,160.00	$11,284.46	522%	$1,200.00	522%
	Expenses	$3,060.00	$0.00	0%	$0.00	0%
	Totals	**$86,504.00**	**$133,888.03**	**155%**	**$36,900.00**	

MEMO
To: Hank Phibbs, Teton County Commissioners
From: Natural Resources Technical Advisory Board (NRTAB)
Date: November 18, 2014
Re: Teton County Commissioners Focal Habitat Feature Progress Report

---

Preface:
The goal of the Focal Habitat Feature Identification Project is to accurately map and describe crucial habitat features in Teton County based on the best existing wildlife and vegetation data. This project is the essential first step toward updating any environmental regulations in County code and in particular the existing Natural Resource Overlay. This project follows directly from policy 1.1a in Teton County's recent Comprehensive Plan, "to protect focal species' habitat based on relative critical value." It aims to meet strategy 1.1.S.2 in the Comprehensive Plan to "evaluate habitat importance, abundance and use to determine relative criticalness of various habitat types." To that end, this Focal Habitat Feature Identification Project has already compiled a wide array of data in order to map and describe important habitat features in our county for use by the Planning Department. This project combines several methods of characterizing wildlife-habitat relationships including attempting to develop new tools to bring together diverse data into a unified layer that illustrates the relative habitat value of different locales within the county.

Below, we provide an update on the progress of the project to date, explain some challenges that NRTAB and the contractor have faced and outline a way forward to ensure that this important project is completed in a useful timeframe. The NRTAB strongly believes this project will result in valuable information necessary for effective ecosystem stewardship. Recent challenges associated with executing this project should not diminish the validity and imperativeness of the overall objective: to accurately map and describe critical habitat based on the best available data.

We address these items requested by Hank Phibbs, Teton County Commission liaison to the NRTAB:

1. What is the current status of the Focal Habitat Feature Identification Project?
2. Why is the project currently over-budget and over-schedule?
3. What is the best estimate of additional time needed to complete the project?
4. What is the best estimate of additional budget needed to complete the project?

Current project status
Task A (Compile Available Wildlife Data) is complete, including the development of a comprehensive vegetation layer.

Task B (Develop a Classification System for Focal Habitat Features and Valuable Matrix Features) remains partially complete. Biota has produced a focal habitat feature layer for mule deer winter range using high-quality data provided by Teton Science Schools. Additionally, Biota has provided a proof-of-concept approach for identifying a focal habitat feature layer for data sets which are less robust in quantity and quality. The output from both of these methods may be used to help create a final habitat features classification system. Development of the final classification system remains incomplete.

Task C (Map and Describe Focal Habitat Features and Valuable Matrix Features) remains incomplete. Biota produced a proof-of-concept focal habitat feature map including mule deer, trumpeter swan, and sage grouse on September 11. This pilot technique will be fully vetted as more species data are analyzed.

Why is the project currently over-budget and over-schedule?

The Teton County Focal Habitat Feature Project is currently over-budget and over-schedule as a result of various challenges encountered by both Biota and the NRTAB. The first task of the project, collecting wildlife datasets from various public and private agencies and organizations, proved to be more time-consuming and costly than Biota had planned. Biota reported that wildlife data collection was mostly complete at the March 7, 2014 NRTAB meeting, and efforts were to be directed towards Task B, developing a classification system for focal habitat features and valuable matrix features.

Since this time, much of Biota's effort has been directed at developing an approach to create focal habitat feature layers from the wildlife datasets that meet the goals of Tasks B and C. A major challenge of the project is developing an end-product that is novel in conservation and planning, and thus lacks pre-defined methods that can be easily applied. The NRTAB and Biota agreed that it was appropriate to explore a modeling technique that is commonly used for this type of analysis called resource selection function modeling. Biota obtained Dr. John Kie, Bluesail LLC, a well-published expert in this field, as a subcontractor to contribute to the specific modeling effort. Dr. Kie introduced the modeling approach in a report on February 18, 2014, then presented this material at an NRTAB meeting on March 7, and followed with an in-depth report on April 11, detailing methods and preliminary results. This report was discussed during the April 18 NRTAB meeting, and it was noted that Dr. Kie was satisfied with results and planned to proceed with the approach.

Unfortunately, Biota's efforts to apply this analysis method to wildlife datasets have been unsuccessful, with time and budget dedicated towards these efforts greatly limiting the overall progress of the project. Based on the published resources and expertise available to Biota, and the positive progress reports received in April, the NRTAB had a general understanding that Biota was making progress on developing layers for mule deer and additional species using this approach. However, Biota has encountered various obstacles to successfully applying this technique to meet the goals of the project.

The specific reasons as to why the approach was unsuccessful have not yet been provided to NRTAB in detail, and there has been a general lack of effective communication between NRTAB and Biota over the summer of 2014 while modeling efforts were pursued. In part, the NRTAB was not explicit in providing specific, directed tasks to Biota. However, given Dr. Kie's support and direction, NRTAB assumed that Biota was moving successfully forward with this analysis.

The NRTAB did not receive clear notification that Biota's work had not been progressing towards project goals until September 17, and efforts to pursue alternative approaches have only recently been initiated. The project contract provided that Biota facilitate meetings with NRTAB as necessary to complete tasks, and the NRTAB feels that Biota could have notified board members at an earlier date as to the obstacles that were encountered. Additionally, the NRTAB became increasingly aware of the budget and schedule situation, with some members expressing urgency as to the need to consider different data analysis approaches. However, the project has unfortunately not moved forward as planned.

What is the best estimate of additional time needed to complete the project?

Using a professional level understanding of ecological principles, conservation biology, and the available, historical wildlife reports and data sets for Teton County, the attached methods and resulting products could be performed and completed for review by the Planning Department within 6 months, by June 30, 2015, by Biota working with NRTAB. These products can serve as a guide for creating land development regulations, transportation and infrastructure planning, strategic mitigation and restoration processes, and cumulative effects tracking.

What is the best estimate of additional budget needed to complete the project?
The NRTAB respectfully leaves this conversation between the County and the contractor, Biota.

Endorsement
The NRTAB endorses a continued working relationship with Biota if certain obligations are met. Given budget over-expenditures, an overdue deadline, lack of outreach to NRTAB and a general lack of deliverables, NRTAB recommends retaining Biota only if the County and Biota are able to resolve the current budget and deadline issues and provide a solution to moving ahead. If a resolution is met on these accounts, NRTAB will actualize effective communication and methodological strategies with Biota, as described in this memo. We suggest that the hiring of an alternate contractor would increase the time and resources commitment beyond reasonable limits. Hence, we suggest continuing with Biota.

Brief description of Proposed framework for completion of Focal Habitat Feature Identification Project [For more in-depth description of work to be completed and timeline, as approved by NRTAB, see attachment]

1. Create species and guild predictive layers using wildlife data and landscape variables (vegetation/habitat, slope, aspect, etc.) and expert opinion
2. Combine these layers into Focal Habitat Features, which will represent the highest ecologically important tier in Teton County
3. Develop connectivity descriptors for the lands that are not classified as Focal Habitat Features that use geometric classifications (e.g., patch size, distance to nearest Focal Habitat Feature), ecological factors (e.g., migration routes, offspring rearing areas) and expert opinion to determine tier level for the matrix in between Focal Habitat Features (the Valuable Matrix Features)
4. Combine the above outputs into a cohesive, tiered map product
5. Prepare final report

Attachment: **Biota's Proposed Timeline For Completion of Focal Habitat Feature Identification Project**

Biota's Proposed Timeline For Completion of Focal Habitat Feature Identification Project

The intent of the following narrative is to provide a succinct timeline and efforts associated with completion of the Focal Habitat Feature Identification Project within a 6-month timeframe and assume work will commence **January 1, 2015**.

Focal Habitat Features

Task 1 Use existing data developed through Task A of the FHF project to generate species associations with vegetation, and abiotic thematic layers, including slope and aspect; distance to water; and a distance to roads. Point locations from unique wildlife species or guild datasets will be queried in GIS to derive vegetation covertype, sin aspect representing "eastness", cosin aspect representing "northness", elevation, distance to water, distance to roads, and slope. Vegetation mapping from Cogan Technologies will be used in the initial 65-category resolution and then compared to the Biota binned vegetation suite previously presented to NRTAB.

This component of the project will be completed by Biota by **February 2, 2015**.

Task 2 NRTAB reviews first draft FHF maps. Effort will include interaction between Biota and NRTAB to define comprehensive ecological functions on a per species basis. This collaborative effort should require no more than 2 weeks by NRTAB. All verifications/revisions of the first draft FHF maps will be returned to Biota by **February 16, 2015** for preparation of Final Draft FHF maps.

Task 3 Biota will integrate recommended changes to FHF maps by **February 27, 2015** and return to NRTAB. Biota will develop a spreadsheet and accompanying text of the following parameters:

- Key ecological functions
- The key ecological features that support the functions
- The key ecological relationships among and between other focal habitat features
- The list of physical zones and features of ecological importance not captured within Focal Habitat Features delineation for consideration within the matrix of tiered ecological importance

Task 4 Task Final FHF refinement may include peer-review consultation with area biologists. Dissemination of FHF maps (with spreadsheet and accompanying text) will be the responsibility of the NRTAB. NRTAB will provide FHF maps with suggested changes to Biota by **March 13, 2015**.

Task 5 Final FHF Maps will be completed by Biota by **March 20, 2015**.

Task 6 Species-specific FHF maps will then be combined to generate a County-wide matrix grid of FHF values, from which Valuable Matrix Features will subsequently be identified. This effort will be completed by **April 1, 2015**.

Valuable Matrix Features

Valuable Matrix Features (VMFs) refer to the relative value of areas within a landscape "matrix" that surrounds and/or lies between Focal Habitat Features.

Task 7 Produce a GIS map of tiered areas of ecological importance that support the Focal Habitat Features. Tiered levels are based on the development of connectivity descriptors, and a final output grid will be reclassified to illustrate the combination of VMF based on ecological descriptors and proximity to nearest FHF cell. Approaches to developing connectivity descriptors that are based on ecological rather than structural relationships are available, that include patch, class and landscape scale associations. Assign levels of importance as follows:

- Habitat supports the function of a single or multiple species' ecology
- Habitats have important associations to the Focal Habitat Features
- Wildlife data, reports, or expert opinion demonstrate the importance of these habitats

Task 8 Provide a spreadsheet and text for each tier listing the following parameters that are intended to be conserved:

- The key ecological functions and features of each tier, including biotic and abiotic components or features that relate to the function of one or more focal habitat feature, citing the pertinent wildlife datasets
- The relationship between each tier, Focal Habitat Features and other tiers within the matrix

Tasks 7 and 8 will be completed by **April 17. 2015**.

Task 9 Final VMF parameters and thresholds will be confirmed in consultation with the NRTAB, in the form of a Draft VMF map. Task 9 will be completed by **May 1. 2015**.

Final Product

Task 10 Prepare and present work products listed above to the NRTAB and Teton County Planning and Development for review and improvement by **May 29, 2015**.

Task 11 Draft Report review by NRTAB completed and returned to Biota by **June 12, 2015**

Task 12 Final Report delivery by **June 30, 2015.**