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September 21, 2017

City of Keene  
Planning Department  
3 Washington Street  
Keene, NH 03431

## **SCOPE OF WORK AND BUDGET**

### **Task A – Review Existing Information**

A thorough review and synthesis of existing data is a crucial step in project planning. It provides a basis from which field surveys will follow. Existing spatial data in a GIS will be used to better understand the 1,044-acre Greater Goose Pond Forest prior to field work. This will include, but not limited to, landcover, topography, soils, geology, wetlands, vernal pools, forests, streams and ponds, wildlife habitat features, and boundary conditions, as well as identified uses such as recreational, educational, and agricultural.

This data will include, but not limited to, NH Fish and Game Wildlife Action Plan (WAP) habitats, NH Natural Heritage Bureau known rare elemental occurrences, aerial photography, USGS topography, NH hydrography datasets, National Wetlands Inventory, and geology, as well as other data specifically developed for the region and/or property. Sources for this data may include, but not limited to, GRANIT GIS database, City of Keene, and NH Natural Heritage Bureau. Aerial photography interpretation will be conducted to identify and map potential fine-scale habitats (e.g., vernal pools) and natural communities.

Other existing information will be reviewed. This will include, but not limited to, the Conservation Easement deeds, Baseline Documentation Reports for the Greater Goose Pond Forest, the 2006 Management Plan, and natural resources inventories prepared by Van de Poll and Dubois and King, as well as other significant reports about the property or surrounding area.

<b>Personnel</b>	<b>Estimated Hours</b>	<b>Budget</b>
Jeff Littleton	10	\$650
Swift Corwin	10	<u>\$600</u>
		\$1,250

### **Task B – Ecological and Timber Resources Inventories**

The ecological and timber resources inventories will commence after an assessment of existing information is completed. These inventories will place emphasis on species of conservation concern, wildlife habitats, natural communities, invasive plants, forest pathogens, timber resources, and potential threats to aquatic systems within the watershed. The results of

Task A will inform the project design for wildlife and plant surveys, as well as mapping habitats, natural communities, and potential threats to aquatic systems on the Greater Goose Pond Forest.

Ecological inventories will occur from summer of 2017 through spring of 2018 to optimize efficient detection of focal species. This level of effort will focus on identifying large-scale habitats mapped by the Wildlife Action Plan and fine-scale wildlife habitats (e.g., vernal pools, den sites, etc.), exemplary/unique natural communities, invasive plants, forest pathogens (e.g., beech bark scale disease), and ecologically sensitive areas, as well as focal wildlife and plant species. This inventory provides an excellent opportunity to better understand the presence of focal species associated with the Greater Goose Pond Forest throughout the seasons, affording an opportunity to efficiently sample species when they are easiest to detect. This information is a critical piece of the Stewardship Plan.

All wildlife observations will be recorded during each field visit. While birds will be sampled during each visit special emphasis will be placed on the breeding season (spring to early summer). For mammals, special emphasis will be placed on snow tracking and wildlife cameras. Amphibians and reptiles will be sampled from spring through summer with an emphasis on vernal pools, streams, and wetlands. These surveys will be designed to develop baseline data on species presence on the property. They are not intended to be intensive but rather designed to provide a sense of the biodiversity on the property.

Surveys will place a special emphasis on species of conservation concern, as well as other focal species (such as bear, moose, otter, beaver, and mink). These focal species can be used to better understand the ecological integrity of the property as a means to identify future desired conditions in the Stewardship Plan. All observations of wildlife, as well as unique, rare, and invasive plants, will be noted throughout field work, including visual and auditory observations. Other signs such as feeding stations, browsing, tracks, scat, and scent stations will be noted. A GPS unit and digital camera will be used to record significant findings.

A statistically reliable timber inventory will be conducted to better understand the potential for forest management on the property. The inventory will include a breakdown of species by size classes for each species on each tract. Each numbered tract will be treated as a compartment but the bigger tracts may be broken into several compartments if it makes sense. The timber will be listed with volumes and market prices for each species for each compartment. There will be an overall volume and value of the whole area combining information from all the tracts. Other information will include, but not limited to:

- Record tree species, tree diameters, and tree heights.
- Record incidence and extent of invasive species.
- Comment on forest health and composition of the understory.
- Examine and note the incidence and extent of insect and tree disease
- Record any and all cultural features like cellar holes, dams, stone walls, old fields, currently managed fields.
- Isolate timber volumes to specific management areas of the property.

<b>Personnel</b>	<b>Estimated Hours</b>	<b>Budget</b>
Jeff Littleton	100	\$6,500
Swift Corwin	70	<u>\$4,200</u>
		\$10,700

### **Task C – Recreational Use Assessment**

A recreational use assessment will be performed that will identify appropriate recreational activities that can be supported on the site. This assessment will include a review of the existing trail system and its impacts/benefits on the forest ecosystem and wildlife along with recommendations on how to improve the trail system.

The full length of the Greater Goose Pond Forest trails is currently unknown. NEMBA trails provided by the City indicate 18.7 miles. However, these may include some non-sanctioned trails, as well as woods roads/Class VI roads. Based on recent trails data provide by the Keene Planning Department we have estimated approximately 8.5 miles of trails at the GGPF not including Old Gilsum Road, which is a Class VI road. As such, approximately 8.5 miles of trails will be prioritized in conjunction with the City to be assessed. Additional funding will be needed if additional trails are requested for the assessment. The following criteria will be used for the assessment.

- Level of erosion
- Presence of standing water
- Appropriate trail layout
- Safety of trail conditions
- Areas for possible trail relocation
- Maintenance needed for trail repair

Field notes will aid in the creation of the Trail Maintenance Management Plan. All observations will be recorded, sites will be photographed, and sites will be identified with a GPS waypoint. Information gathered from the public outreach effort on trail use will be incorporated into this assessment.

<b>Personnel</b>	<b>Estimated Hours</b>	<b>Budget</b>
Josh Ryan	80	<u>\$4,400</u> \$4,400

### **Task D – Management Goals and Objectives**

A list of management goals and objectives will be developed in cooperation with the City of Keene and other stakeholders as necessary (i.e., SPNHF). These goals and objectives will be consistent with the purposes of the SPNHF Conservation Easement and previously identified management/stewardship goals for the property. This task can serve as a template that can be used to assess goals and objectives on other City-owned lands.

<b>Personnel</b>	<b>Estimated Hours</b>	<b>Budget</b>
Jeff Littleton	8	\$520
Swift Corwin	2	<u>\$120</u> \$640

### **Task E – Stewardship Plan and Maps**

The Stewardship Plan will conform to the Conservation Easement deed language and follow the format outlined in the Forest Stewardship Plan for the Greater Goose Pond Forest RFQ. In general, the Plan will include, at a minimum, the following elements:

1. Habitat improvement and diversification;
2. Management of forest health and protection (including wildfire and catastrophic risk reduction and rehabilitation where appropriate);
3. A work plan for silvicultural operations/timber resource management;
4. Management and enhancement of recreation and education activities;
5. Invasive species management;
6. Maintenance of roads, trails and boundaries;
7. Protection of aquatic and wetland resources and rare/endangered/threatened plant and animal species;
8. Identification of outstanding scientific, educational, biological, geological, paleontological, or scenic value areas;
9. Recommendations for appropriate agricultural uses and activities;
10. Discussion of site context within larger ecosystem of City/Region; opportunity for recreational and migratory connectivity, and potential changes to site as climate shifts;
11. A description of how implementation activities will achieve stewardship goals, and be economically self-sustaining and/or viable.

Specifically, we will begin with an overall background of the property, including a description of existing conditions. This will include the following sections:

- Stewardship Responsibilities, including management goals and objectives
- Location Description, including base maps (aerial and topography) and a description of the natural features; section will reference the following maps: soils, geology, surface waters (ponds and streams) and wetlands, and aquifers
- Property History, including a review by the State of New Hampshire archeological office to determine the presence and/or likelihood of ancient sites, and past land use and disturbance histories as observed from site visits, including basic types of agricultural history (cultivation, pastures, or hayfields) during the 1700-1800s and logging history after land abandonment, as well as potential sign of the '38 Hurricane
- Description of Conservation Easements
- Description of Ecological and Cultural Features, including but not limited to species of conservation concern, exemplary natural communities, significant wildlife habitats, trails, and timber resources

The Plan will then proceed to address Wildlife, Trails, and Forest Management. Based on the results of the species inventory, habitat mapping, and natural community classification a Wildlife Management Plan component will be prepared. This plan will specifically address recommendations for the protection of significant habitats, unique/exemplary natural communities, and species of conservation concern. It will also address the preservation of overall biodiversity of native plants and wildlife and ecological processes, including the potential effects of climate change over time. This section will include a map of ecologically sensitive areas to

inform the Trails and Forest Management Plan components. The Wildlife Management Plan will address how forest management can enhance specific habitats or species. For example, certain rare species and natural communities may require various management techniques, including forestry, for long term maintenance. As such, the Wildlife Management Plan will inform the Trails and Forestry Management Plan. Finally, we will include a discussion on a landscape perspective and how that will inform the Wildlife Management Plan. This part examines the relationship of the unfragmented landscape and surrounding conservation lands as it pertains to wildlife, habitat connectivity, and ecological health.

A Trails Management Plan will be prepared based on the results of the ecological and timber resources inventories, and in consultation with stakeholders to determine the extent and expected users of the trail system. The plan will explore the following categories for each trail: 1) Design Parameters – Type of recreational use the trail is suited for, 2) Maintenance Levels – Current condition of the trail, priority of the maintenance, 3) Maintenance Activities – Specific maintenance required for the segment of trail, 4) Maintenance Prescription – Materials / cost estimate for addressing each maintenance activity, and 5) Maintenance Plan – Addressing all maintenance levels as part of a 5 year plan

Finally, a Forestry Management Plan will be prepared based on the ecological and timber resources inventories and will help to inform the Trails Management Plan. We will provide tabular information on basal area per acre, trees per acre, and product volume for each management unit. This data will help to understand the finite limit of forest value and potential growth. Management units and timber stands will be mapped with points of interests noted. Within each management compartment we will isolate timber types describing overstory density, crown closure and species composition.

We will discuss the relative health of forests and the site potential of the timber types with particular mention about the best growing trees, and the timing of their marketable potential. We will reference the soil map to locate potential opportunities and risks for forest management activities.

Lastly, once Moosewood Ecological and Calhoun and Corwin have completed their fieldwork, we will meet to discuss the interplay of the wildlife management opportunities. At this time, we will determine the appropriate forestry management activities and timing to create the most positive effect and limit negative impacts inherent to the terms of the Conservation Easement deeds. These activities might be seasonal with respect to bird, amphibian, reptile, and mammal movement within habitats, taking into account the maximum benefit or regeneration activities and forest growth. As a result, we will develop a timetable map showing the location and timing of planned activities.

A minimum set of maps will be produced as identified in the RFQ and as follows.

1. Site Map - Clearly show the boundaries of the management area with scale and north arrow. This map will convey information on the site's location, general land forms, access roads, and adjacent land uses.
2. Stand Identification Base Map - Clearly identify bounds of forest stands and their relationship to roads, site boundaries, brooks, trails and other important landscape features. Each stand will be identified by number or letter.
3. Site Quality Map - Clearly identify good, medium and marginal growth capability sites within areas where active management of vegetation is recommended, including invasive

species or species expected to be at risk for insect/disease in the near future. Identify areas not requiring active management. Where active management of vegetation is recommended, identify size class by reference prescription.

4. Work Plan Map - This map will clearly identify the locations of forest blocks recommended for thinning, regeneration, habitat improvements, etc. as well as other proposed management activities.
5. Recreational Planning Map – This map will help identify the location of priority projects. The map will also include the Greater Goose Pond Forest parcel boundary, trail system, local roads, topography, hydrology, and location of each maintenance site explained in the report.
6. Special Features Map - Identify the location (and boundaries of large areas) of features of probable interest to the public or which may require special management practices.
  - a. Cultural – cemetery, building, foundation, seed orchard, etc.
  - b. Recreation/Public Use Areas – picnic areas, formal trail, special fishing area, parking areas, high maintenance wildlife areas.
  - c. Areas suitable for agricultural activity
  - d. Unique wetland areas including vernal pools and noteworthy natural communities
  - e. Critical Habitat – Rare and endangered vs. species of special concern

<b>Personnel</b>	<b>Estimated Hours</b>	<b>Budget</b>
Jeff Littleton	64	\$4,160
Swift Corwin	48	\$2,880
Josh Ryan	32	<u>\$1,760</u>
		\$8,800

#### **Task F – Final Project Geodatabase**

All data resulting from this project will be compiled and delivered to City GIS staff as an ArcGIS geodatabase. Layer files will also be developed to facilitate the data’s use by City staff. User-friendly metadata will also be provided. We will coordinate with City GIS staff to ensure that the data are provided in their desired format.

<b>Personnel</b>	<b>Estimated Hours</b>	<b>Budget</b>
Jeff Littleton	4	<u>\$260</u>
		\$260

#### **Task G – Meetings**

A total of 4 meetings will be held to initiate the project and provide periodic updates on the progress of the project. A schedule of meetings will be developed in cooperation with the City of Keene.

<b>Personnel</b>	<b>Estimated Hours</b>	<b>Budget</b>
Jeff Littleton	4	<u>\$260</u>
		\$260

## **Task H – Community Outreach and Engagement**

We will assist the City with public outreach and engagement and help to facilitate two community workshops. These community workshops will introduce the project to the public as well as help to assess user’s needs and interests, and will help to inform the final Stewardship Plan. These public exchange forums provide a means of facilitating the type of exchange necessary for a comprehensive inventory of the Greater Goose Pond Forest. In addition, a survey will be prepared to reach others not able to attend the workshops. Moosewood Ecological will provide the City with a list of questions. It shall be the responsibility of the City to develop an electronic survey (i.e., Survey Monkey) and distribute accordingly.

We will create a web map application that can be viewed by City staff and the general public. The application will be an interactive guide to the Plan we develop, allowing users to explore the different input datasets, as well as the results of the Stewardship Plan. The web map application can be promoted on the City’s social media and embedded in or linked from City web resources. The application will be built with ESRI’s ArcGIS Story Maps online tools.

In addition, a series of walking tours will be prepared to further engage the public. These tours will focus on the significant findings of the project and to demonstrate areas identified for wildlife and forest management. There will be a total of 5 walking tours: 3 focused on wildlife management (1 in the winter and 2 in the spring) and 2 on forest management. A walking tour will be held for City officials to better understand trail management recommendations, affording the opportunities to view a variety of issues and proposed remedies in the field. Finally, the draft Stewardship Plan will be presented to local interest groups and the general public. Comments from the public presentation will be recorded and incorporated in the Plan as necessary.

<b>Personnel</b>	<b>Estimated Hours</b>	<b>Budget</b>
Jeff Littleton	48	\$3,120
Swift Corwin	4	\$240
Josh Ryan	4	<u>\$220</u>
		\$3,580

## **Task I – City Council Presentations**

We will prepare and deliver two public presentations – one to a City Council committee and one to the full City Council on the final Stewardship Plan. These presentations will include brief findings and overall management recommendations.

<b>Personnel</b>	<b>Estimated Hours</b>	<b>Budget</b>
Jeff Littleton	8	\$520
Swift Corwin	4	\$240
Josh Ryan	4	<u>\$220</u>
		\$980

This Scope of Work and Budget was developed in accordance with the City’s RFQ and our interview. The recreation assessment task provided the greatest difficulty for cost appropriations since the full length of trails are currently unknown, as indicated above. Our budget was based on the following hourly rates:

Jeff Littleton	\$65/hour
Swift Corwin	\$60/hour
Josh Ryan	\$55/hour