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FY15 I&M Network Small Proposal

Project Title: Conservation of Price's Potato Bean on Sauta Cave National Wildlife Refuge (NWR).

Funding Requested:

Salary = 7,950

Per Diem = 2,250

Vehicle = 1,296

Fuel = 450

Supplies = 100

Overhead= 2,108

Total = \$14,154

Submitted by and contact information:

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List monitoring objectives:

Background: Price's Potato Bean (PPB) (*Apios priceana*) is a threatened plant species that currently occurs in four states – Kentucky, Tennessee, Alabama and Mississippi (U.S. Fish and Wildlife Service 1993). The recovery plan noted that all four states consider this species endangered and The Nature Conservancy ranks it as globally [critically] imperiled (G1). It is currently ranked as G2 (globally imperiled) on the NatureServe website (NatureServe 2015).

The population at Sauta Cave NWR is considered A-rated, meaning it is a healthy population of more than 150 individuals in relatively undisturbed forest habitat (Al Schotz, Alabama Natural Heritage Program, Pers. Comm.). Al noted a relatively large number of flowering plants in 2011 during a casual survey of plants in a portion of the population. However, this author (Bill Gates) has noted through casual observations of the plant for the last five or more years that the number of those flowering is generally low and that some plants have disappeared. Only one individual of the 100-125 plants located last year during a joint survey effort for half a day by Bill and two Tennessee Valley Authority (TVA) staff was flowering. The species does not flower every year and this could explain some of this discrepancy in proportion of the population flowering. This author had examined a population at Redstone Arsenal within two weeks of the survey at Sauta Cave NWR last year. Most plants within a power line corridor were healthy and profusely flowering and those found in dappled sunlight in open woodland nearby were also flowering. Inflorescences on plants at the arsenal were also much larger than the one in flower on the refuge. It is unknown whether different populations flower in different years.

It is hypothesized that the high level of canopy closure in the location where plants have disappeared on the refuge is the cause and this habitat variable is also impacting PPB reproduction onsite. The amount of canopy closure in the area of plant disappearance has been observed numerous times over the years by Bill and has decidedly increased (now at nearly 100%). PPB prefers open woodlands or forest edges (U.S. Fish and Wildlife Service 1993). Populations tend to be found in cleared areas along rights-of way, including roadsides and power lines. It is unknown how much canopy opening is needed to promote health of PPB individuals (Geoff Call, Recovery Coordinator, Pers. Comm.).

Any effort to determine if opening the canopy above some of the PPB population on the refuge to benefit this listed species will require control of exotics/invasives onsite. Species such as Chinese privet (*Ligustrum sinense*), Napalese browntop (*Microstegium vimineum*), English ivy (*Hedera helix*) and Japanese honeysuckle (*Lonicera japonica*) are major concerns.

In 2014, the refuge and TVA partnered in an effort to conserve listed species in the area of Sauta Cave. This included the survey for this listed plant in Summer 2014 noted above and treatment of a patch of English ivy about 1/10 of an acre in size with herbicides. In 2015 the project will include treatment of Chinese privet along the refuge's main access road prior to sprouting of nearby PPB and removal of 100% of the canopy in about a 0.3 acre area where PPB occurs. Canopy on an adjacent control area of the same size will not be disturbed. TVA will also have some money available for treatment of exotics/invasives in 2015. We also plan to treat exotics/invasives and monitor these two areas for effects on PPB in future years. This work combined with the proposed work herein will result in two treatment areas with different percentages of crown cover and their associated controls as well as exotic/invasive control capabilities for all of these areas.

Objectives Justification: The objectives of this project are two-fold. One is to continue our effort to help determine how much canopy opening PPB prefers. Initially a more complete survey of the PPB population than has been completed to date will be conducted. Two 0.25 – 1.0 acre areas will be delineated where similar conditions exist, including the number of PPB plants present. One will later serve as a treatment site where trees will be girdled or hack and squirted to leave 25-50% of the canopy intact (as an aside, trees will be treated in this manner to create potential roosting habitat for Indiana bats) and the other will serve as a control. Pre-treatment canopy closure will also be systematically determined with a spherical densitometer and the location of sites where measurements occurred determined by global positioning (GPS) to allow for future monitoring of percent canopy opening. Percent canopy closure in the 0.3 acre control area mentioned in the previous paragraph will also be measured and sampling points marked in the same manner. At least one day during the breeding season will be spent determining the number and percentage of PPB plants in flower in all four treatment and control areas. All plants located will be marked with plastic or similar permanent stakes. Different colored stakes will be used for those in a vegetative state and those in a flowering state. The second objective is to survey the area where PPB is found for exotics/invasives and to recommend priority species and areas for control.

What is the deliverable (map, report, evaluation, etc.):

Deliverables will include a final report describing investigative survey methods, interpretation of data and conclusions. Maps detailing areas where PPB is found, where relatively large populations or individuals of exotics (depending on each species distribution and abundance) occur, the location of the 0.25 – 1.0 acre treatment and control areas, and the GPSed sites where spherical densitometer readings to determine canopy closure were taken will be provided. Paper and electronic versions of the final report will be delivered. The contractor will spend one day on the ground showing refuge and TVA staff the location of new areas where PPB occur, where the treatment and control areas are located and key areas where exotics/invasives control should take place along with the species to be controlled.

Briefly, describe the deliverable in the context of the SHC framework, focusing on how the deliverable will affect Conservation Delivery:

This project will provide information that will address three basic elements of the SHC framework, *Biological Planning, Conservation Delivery and Monitoring*. These elements will be addressed through the implementation and establishment of a pilot project that will address limiting factors (e.g., canopy cover) as related to reproductive success of PPB at Sauta Cave NWR. Treatment effects will be monitored and any subsequent management needs and recommendations that are identified will be shared with taxa experts for consideration in developing/revising status updates for the species. In addition, continuous monitoring efforts will be implemented to assess PPB occurrence areas and to monitor the overall status of the species on refuge lands.

Briefly, if applicable, describe the deliverable in the context of the national I&M 7-Year Plan (which focus area, goal, and task does this work advance):

This project will support two of the three Strategic Goals (SG1 and SG2) within the national I&M 7-year Plan by addressing and supporting information for the following Operational Goals: *Invasive Species Inventory and Monitoring* (ISIM; supports SG2a, SG2b, and SG2c), *Endangered Species Act Reporting* (ESAR; supports SG2a, SG2b and SG2c), *Baseline Biotic Inventories* (BBI; supports SG2a) and *Phenological Monitoring* (PM; supports SG1b). Specifically, within each Operational Goal the following Objectives (and associated Tasks) are capable of being addressed and/or supported by this project: ISIM 3.0 (ISIM 3.2) and ISIM 4.0 (ISIM 4.1) by monitoring treatment areas for invasive plant species and establishing a pilot project for assessing treatment effects of invasive species in PPB occurrence areas; ESAR 1.0 (ESAR 1.3) and ESAR 2.0 (ESAR 2.2 and 2.3) by establishing a pilot monitoring effort for PPB at Sauta Cave NWR and providing information that will assist refuge, I&M and ES Recovery Lead staff to initiate an integrated monitoring program for PPB; BBI 3.0 (BBI 3.1) by conducting a baseline inventory of PPB and invasive species at Sauta Cave NWR; PM 1.0 (PM 1.4) by helping establish phenological data for PPB and identifying factors associated with seasonal influences and phenomena, most directly related to flowering occurrences.

Who would do the work and who would manage the data:

Al Schotz with the Alabama Natural Heritage Program – Auburn University.

What method or protocol will be used (if cited, citation only), include sample design and the number of sites and frequency of monitoring:

This is noted above. Note that an Intra-Service Section 7 has already been completed for this project.

Address ability to analyze and use information, including how a single year of information is enough to make decisions:

The project will designate treatment and control areas where we will begin the study of the effects of canopy opening on this listed plant species. It will provide a baseline assessment of the number and percentage of flowering and vegetative plants in a total of four areas, two treatments and two controls, to which future monitoring results can be compared. It will also permit us to focus our exotic control efforts to those species and areas where this is most needed.

What would the funding be spent on (e.g., equipment, techs, travel, etc.):

See the "Funding Requested" section above.

List Cooperators and Partners and what they will contribute:

Al Schotz, (Botanist), Alabama Natural Heritage Program - Principal Investigator (PI).

Bill Gates (Wildlife Biologist), USFWS, Wheeler NWR Complex, – Provide project oversight and assistance to the PI as needed. Serve as point of contact for the PI and other partners.

Adam Datillo (Botanist) and Josh Burnette (Forester), TVA – visit sites of treatment and control areas, key exotic control areas, and new locations of PPB. Assist the PI with onsite issues when Bill Gates is unavailable.

Lee Holt, USFWS, I&M Program –work with refuge staff to help with project oversight, especially project reporting.

Cited Literature

NatureServe. 2015. Website page for *Apios priceana*.

http://explorer.natureserve.org/servlet/NatureServe?sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=138209&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=138209&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=138209

U.S. Fish and Wildlife Service. 1993. Recovery plan for Apios priceana. Jackson, Mississippi. 43 pp.