

to

COOPERATIVE AGREEMENT 1443-CA4525-B-0004

between

**UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE**

and

THE UNIVERSITY OF RHODE ISLAND

Beginning Date: Date of Execution Completion Date: December 31, 2004

Fiscal Year 2002 Funding: 2301-SARA-N2Z

Not to Exceed \$25,000

Budget Object Class: 411C

Project Title: Develop a Conservation Strategy for Grassland birds at Saratoga National Park

ARTICLE I. BACKGROUND AND OBJECTIVES

WHEREAS, Cooperative Agreement 1443-CA4525-B-0004 has been made and entered into between The University of Rhode Island (hereinafter known as the Cooperator) and the National Park Service (hereinafter known as the Service).

NOW THEREFORE, in consideration of the premises and mutual covenants contained within the Cooperative Agreement, it is hereby agreed by and between the parties hereto to conduct the specific activities hereinafter described related to the educational and professional needs of the Cooperator and the protection of the natural and cultural resources of the Service.

ARTICLE II. STATEMENT OF WORK

Saratoga National Historical Park (hereinafter known as the Park or SARA) in northeastern New York provides critical habitat for a number of grassland birds. The park encompasses 1,100 ha, including over 335 ha of managed fields (Austin 1992). The importance of SARA to obligate grassland species was recently recognized when the Park was designated as a New York State Important Bird Area. Each field has a unique management history and most have been subjected to haying, burning, mowing and occasional manual shrub removal. Certain fields are leased to local farmers who cut the existing grasses and forbs for hay. The presence of several regionally important species of grassland birds have been documented in past surveys at the Park.

The Park Service is currently revising its General Management Plan for SARA, which will describe existing resource conditions, and include predictive models of expected changes in visitor use and resources over the next 15-20 years. In addition, the park is finalizing a Cultural Landscape Plan, which broadly defines the

habitat configuration necessary to deliver to the visiting public an accurate portrayal of the conditions in the park during the historic battle of 1777 when American troops defeated the British in one of the 15 most decisive battles in world history. The park is currently documenting the histories of fire management, agricultural leasing, and mowing in anticipation of the need to establish specific histories for affected park areas. Finally, there are a number of datasets documenting the presence/absence of songbirds overtime at fixed listening points throughout the park, species composition and structure of vegetation in the fields of SARA, and general vegetation characterization from parkwide transects and other sources.

The Cooperator plans to integrate the existing plans, guidelines and data into a synthetic, decision support document for SARA, detailing the present value of managed grassland habitats of SARA to obligate grassland bird species. In addition, improvements to existing management operations at the Park will be proposed and mitigation strategies will be proposed if the present or future values of grassland habitats to grassland birds are lost or diminished. The Cooperator agrees to:

1. develop guidelines for managing fields that integrates the Park's natural, cultural and maintenance programs;
2. develop GIS maps that show the current and past distribution of grassland habitats at SARA. These maps will be created by heads-up digitizing recent and past aerial photographs of the park;
3. assess existing natural, cultural and maintenance program activities (i.e., encampments, preservation of archeological features, proposed cultural landscape changes, etc.) that might compromise habitat value for grassland birds;
4. create a detailed assessment of current and past fire management that has taken place at SARA. This will include integrating information from the current fire treatment program with existing peer-reviewed literature;
5. assess the current mowing schedule at SARA and compare it to best management practices in the peer-reviewed literature;
6. assess the current distribution of non-native and invasive plant species in SARA based on available reports. We will summarize the spatial distribution and abundance of invasive species in SARA based on this available evidence. Finally, we will develop management recommendation for the control of invasive species based on the peer-reviewed literature;
7. assess adjacent land use patterns based on aerial photo interpretation of the most recently available photos. Heads-up digitize lands within 1 mile of the park to assess current (2003) land use patterns and determine the acreage of grassland habitats near (within 1 mile of the park). Ground truth this map during the 2003 field season to assess map accuracy;
8. based on the assessment of projected visitor flow patterns, compare estimate of potential human disturbance on nesting grassland birds to available peer-reviewed literature on the impact of human disturbance on grassland birds.

The Cooperator agrees to conduct all of the above tasks according to the guidelines, standards, and requirements of the Service's National and Northeast Region I&M Programs and the objectives, methods, procedures, schedule, and budget of the attached and hereby incorporated proposal.

And, the Service agrees to:

- (1) issue research and scientific collection permits for SARA if needed for the proposed work and if the proposed work meets Service and park policies and guidelines;
- (2) as available, provide detailed maps of SARA, including maps indicating sensitive areas and the location and distribution of primary habitat types;
- (3) provide technical support to the Cooperator for the creation and development of FGDC compliant

metadata and the use of the NPS Dataset Catalog database;

- (4) make available, not to exceed, \$25,000 to the Cooperator to conduct the activities and fulfill the requirements of this Amendment.

ARTICLE III. TERM OF AGREEMENT

Unless earlier terminated by operation of the terms of the Cooperative Agreement or by agreement of the parties in writing, this Supplemental Agreement shall remain in force from the date of execution thereof until midnight December 31, 2004. The term of agreement shall carry through to its completion under the Cooperative Agreement.

ARTICLE IV. KEY OFFICIALS

The personnel specified below are considered to be essential to ensure maximum coordination and communication between the parties and the work being performed hereunder. Either party, on notice to the other party, may designate another person or persons to act in his/her place in an emergency or otherwise. Permanent changes of key personnel must be made in writing to the other party.

A. The key official for the Service is:

Dr. Mary K. Foley
Chief Scientist Boston Office
Boston Support Office
15 State Street
Boston, MA 02109
617-223-5024

B. The key official for the Cooperator is:

Dr. Peter Paton, Principle Investigator
Natural Resources Science Department
University of Rhode Island
Kingston, RI 02881
401-874-2986

ARTICLE V. AWARD, PAYMENT, AND INVOICES

On a quarterly reimbursement basis, the Service will make available, not to exceed, \$25,000 to be paid to the Cooperator for costs incurred during the conduct of the tasks identified in the Statement of Work (Article II). Payments are conditioned on the satisfactory progress of project objectives and the timely submission of acceptable deliverables described in Article VII. A minimum of 10 percent of the total amount awarded must be held for final payment due upon the completion of all requirements of Article VII.

In accordance with the provisions found in OMB Circular A-110, invoices and other required supporting statement or certificates (all properly identified with the appropriate Cooperative and Amendment numbers and the name of the Service key official) shall be submitted by the Cooperator to the Service key official on Standard Form 270, or other format as approved by the Service's Contracting Officer, in triplicate; one original and two copies.

ARTICLE VI. PRIOR APPROVAL

This Amendment shall be subject to the prior approval conditions incorporated within the Cooperative Agreement.

ARTICLE VII. REPORTS AND/OR DELIVERABLES

For the Cooperator's Statement of Work the following deliverables are required:

- 1) a draft final report shall be submitted in MS Word format electronically on or before August 31, 2004. The report shall include the following:
 - guidelines for managing fields that integrates the SARA's natural, cultural and maintenance programs;
 - GIS maps that show the current and past distribution of grassland habitats at SARA;
 - an assessment of existing natural, cultural and maintenance program activities (i.e., encampments, preservation of archeological features, proposed cultural landscape changes, etc.) that might compromise habitat value for grassland birds at the park. Including a detailed assessment of current and past park fire management, projected visitor flow patterns, park grassland mowing schedule, the current distribution of non-native and invasive plant species and adjacent land use patterns based on aerial photo interpretation. The report will include a detailed comparison of the above mentioned management practices with existing peer-reviewed literature. Management recommendations for grassland birds at SARA will be developed;
- 2) a final report shall be submitted in MS Word format on CD-ROM and in hard copy on or before September 30, 2004. Five (5) paper copies of each final report, single-spaced, shall be submitted.
- 3) an ArcInfo coverage or ArcView shape file of current and past distribution of grassland habitats at SARA shall be submitted on or before September 30, 2004.
- 4) Federal Geographic Data Committee (FGDC) compliant metadata for all spatial data sets created as part of this project shall be submitted on or before September 30, 2004.
- 5) metadata (NPS Dataset Catalog format) of all existing data sets pertaining to grassland bird/habitat information for SARA will be developed and entered into the NPS Dataset Catalog database;
- 6) completion of Investigator's Annual Reports for the Park on or before December 31 of each calendar year that this Amendment is in effect, including the year of completion. The Park will provide the Cooperator's key official with instructions.
- 7) A presentation shall be made to park staff on the project methods and results on or before September 30, 2004.

All required deliverables shall be submitted to the Service's key official or her designee.

Unless otherwise specified, the Cooperator shall follow all the requirements of the Service's Northeast Region I&M Program Product Specifications, which specify the content and format for all deliverable reports, spatial and non-spatial databases, and metadata. These guidelines shall be provided to the Cooperator's key official.

All draft deliverables will be submitted to peer scientific and Service management reviews. All mutually agreed upon comments and revisions to draft deliverables shall be addressed and incorporated during the preparation of the final deliverables.

The Cooperator is encouraged to publish the results of this project in refereed professional scientific publications and to present findings at conferences and symposia during and after the time period that this Agreement is in effect. The Service's key official and appropriate Park(s) Superintendent(s) appreciate opportunities to review manuscripts or presentations and receive copies of final reprints or publications.

ARTICLE VIII. PROPERTY UTILIZATION AND DISPOSITION

Property utilization and disposition shall be in accordance with OMB Circular A-110.

ARTICLE IX. TERMINATION

This Amendment may be suspended or terminated in accordance with the provisions of 43 C.F.R. 12.961 and 12.962.

ARTICLE X. GENERAL AND SPECIAL PROVISIONS

This Amendment shall be subject to the general and special provisions which are incorporated within the Cooperative Agreement.

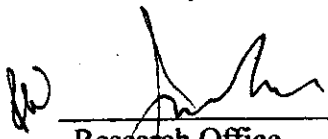
ARTICLE XI. ATTACHMENTS

This Amendment shall be subject to the attachments incorporated within the Cooperative Agreement and the following attachment, which is attached hereto and incorporated herewith by reference: Attachment—Project Proposal "Develop a conservation strategy for grassland birds at Saratoga National Park" submitted by Dr. Peter Paton, Department of Natural Resource Science, the University of Rhode Island.

ARTICLE XII. AUTHORIZED SIGNATURES

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be executed by their respective duly authorized contracting officers or representatives the latter day and year written below.

The University of Rhode Island



Research Office
University of Rhode Island
70 Lower College Road
Kingston, RI 02881

9/13/02

Date

National Park Service



Lorna Gunning, Contracting Officer
NPS, Boston Support Office

9/23/02

Date

Project Proposal

Develop a Conservation Strategy for Grassland birds At Saratoga National Park

Dr. Peter Paton
Department of Natural Resources Science
University of Rhode Island
Kingston RI 02881

16 July 2002

PMIS Project Number: 78136

INTRODUCTION

Grassland bird populations are declining at a dramatic rate throughout North America (Vickery et al. 1999). Based on Breeding Bird Surveys conducted throughout North America, 13 species were in significant decline from 1966-1996, 9 species remained stable, and 3 species increased (Peterjohn and Sauer 1999). In Northeastern North America, grassland and shrubland birds are the habitat-community groups exhibiting the most pervasive and steady declines in abundance of any guild of birds (Witham and Hunter 1992; Askins 1993, 2000), thus there is considerable interest among conservation biologists in this group of species. Among obligate grassland species in decline throughout North America, Henslow's Sparrow (*Ammodramus henslowii*) had the greatest rate of decline, which was estimated at 8.8% annually from 1966-1996 (Peterjohn and Sauer 1999), with the rate of decline increasing from 6.0% annually from 1966-1979 to 10.4% annually from 1980-1996. Henslow's sparrow has a limited breeding distribution rate, restricted to the northeastern and north-central United States. At least one obligate grassland subspecies is already extinct in the Northeast; the endemic Heath Hen (*Tympanuchus cupido cupido*) was extirpated from Martha's Vineyard, Massachusetts in 1932 due to habitat loss. Without immediate conservation measures and active management of remaining grassland habitat, several other obligate grassland bird species may also be extirpated from the region (Wells and Rosenberg 1999).

Current hypotheses suggest that grassland birds have declined throughout North America due to farmland abandonment and declines in hayfield acreage (Pruitt 1996, Vickery and Dunwiddie 1997; Askins 1997, 2000), intensification of agricultural practices such as increases in mowing rotations of hay fields (Norment et al. 1999), habitat loss (Young and Osborn 1990), habitat fragmentation (Vickery et al. 1994), mortality from toxicants (Stone 1979), increases in nest parasitism from Brown-headed Cowbirds (*Molothrus ater*) (Zimmerman 1983), and adverse weather (Sauer et al. 1996). Habitat conversion and intensification of agricultural practices are probably the two primary causes of grassland birds declines in the Northeast. Since the early 1900s, reforestation of agricultural landscapes in New England has resulted in a substantial decline in the acreage of grasslands available to obligate grassland species (Askins 2000).

Although there is some controversy over whether extensive native grasslands existed prior to European colonization of the Northeast, available evidence suggests that some large coastal sandplain grasslands and heathlands occurred in the region (Askins 1999). Mehrhoff (1997) provided evidence of prairie or large tracts of grasslands historically occurring in New England, and although extensive grasslands most likely never existed in the region, there are some notable exceptions such as Hempstead Plains on Long Island. There currently are few self-sustaining grasslands in the region. Askins (2000) emphasized that in eastern North America, obligate grassland bird species are generally restricted to artificial open habitats maintained by human intervention. Conservation efforts must focus on these highly artificial habitats to prevent regional extinctions of grassland specialists.

The National Park Service has one park in northeastern New York that provides critical habitat for a number of grassland birds. Saratoga National Historical Park (SARA: 43°00'N, 73°78'W) encompasses 1,100 ha, including over 335 ha of managed fields (Austin 1992). The importance of SARA to obligate grassland species was recently recognized when the Park was designated as a New York State Important Bird Area. Each field has a unique management history and most have been subjected to haying, burning, mowing and occasional manual shrub removal. Certain fields are leased to local farmers who cut the existing grasses and forbs for hay. Field vegetation is dominated by *Centaurea* spp., *Bromus* spp., and *Galium* spp. The presence of several regionally important species of grassland birds has been documented in a number of surveys (Appendix A) including Henslow's Sparrow, Grasshopper Sparrow (*Ammodramus savannarum*), Savannah Sparrow (*Passerculus sandwichensis*), Eastern Meadowlark (*Sturnella magna*), Bobolink (*Dolichonyx oryxivorus*), Horned Lark (*Eremophila alpestris*), Vesper Sparrow (*Poocetes gamineus*), Upland Sandpiper (*Bartramia longicauda*), and Northern Harrier (*Circus cyaneus*). The spatial distribution of birds on SARA was confirmed in 1985 during the New York Breeding Bird Atlas Project and more recently by surveys conducted by the University of Rhode Island.

The Park Service currently revising its General Management Plan for SARA, which will describe current resource conditions, and models expected changes in visitor use in the park and changes in resources

over the next 15-20 years. In addition, the park is finalizing a Cultural Landscape Plan, which broadly defines the habitat configuration necessary to deliver to the visiting public an accurate portrayal of the conditions in the park during the historic battle of 1777 when American troops defeated the British in one of the 15 most decisive battles in world history. Previous avian research in the park has primarily focused on grassland habitats (Appendix A), although quantitative surveys conducted by the University of Rhode Island during the 2002 and 2003 field seasons will assess the spatial distribution of birds in all habitats throughout the park (P. Paton, in prep.). The park is currently documenting the histories of fire management, agricultural leasing, and mowing in anticipation of the need to establish specific histories for affected park areas. Finally, there are a number of datasets documenting the presence/absence of songbirds overtime at fixed listening points throughout the park, species composition and structure of vegetation in the fields of SARA, and general vegetation characterization from parkwide transects and other sources (Appendix A).

We propose to integrate the existing resources, plans, guidelines and data into a synthetic, decision support document detailing the present value of managed grassland habitats of SARA to obligate grassland bird species. In addition, we will propose improvements to existing management operations at SARA. Finally, we will propose mitigation strategies if the present or future values of grassland habitats to grassland birds are lost or diminished.

- Specific Tasks

- (a) *Develop guidelines for managing fields that integrates the Park's natural, cultural and maintenance programs.*

- (i) We will develop a GIS map that shows the current and past distribution of grassland habitats at SARA. These maps will be created by heads-up digitizing recent and past aerial photographs of the park. These maps will be useful in quantifying changes in acreage of grassland habitats in the Park.

- (ii) We will assess existing natural, cultural and maintenance program activities (i.e., encampments, preservation of archeological features, proposed cultural landscape changes, etc.) that might compromise habitat value for grassland birds. Specifically, this task is to address impact of the following on current or future grassland avian habitat:

- a) *Prescribe Fire Treatment Program*-We will create a detailed assessment of current and past fire management that has taken place at SARA. There is a growing body of literature that has assessed the impact of fire management on grassland birds and grassland bird habitat (Shriver et al. 1999, Vickery et al. 1999, Herkert and Glass 1999, Rohrbaugh et al. 1999). We will integrate information from the current fire treatment program with existing peer-reviewed literature.

- ii) *Mowing with respect to vegetation management*: There has been considerable research conducted on the impact of the intensification of agricultural practices on grassland birds, including the rotation schedule of mowings (Jones and Vickery 1997). We will assess the current mowing schedule at SARA and compare it to best management practices in the peer-reviewed literature.

- iii) *Non-native and invasive plant species*: Orchard grass (*Dactylis glomerata*), Kentucky bluegrass (*Poa pratensis*), and timothy grass (*Phleum pratense*) are examples of non-native that grow in the spring and fall when native warm-season grasses are dormant, and the soil and air temperatures are cooler (Dickerson et al. 1998). These grasses were introduced throughout the northeast for crops and pastures. Available evidence suggests that cool-season grasses provide less suitable nesting habitat, particularly

invasive species such as fescue (*Festuca sp.*) and ricanary (*Phalaris arundinacea*). These two species of grass are avoided by grassland birds during the breeding season, although some cool-season species are tolerated by grassland birds (Jones and Vickery 1997b, Mitchell et al. 2000). We will assess the current distribution of non-native and invasive plant species in SARA based on available reports. We will summarize the spatial distribution and abundance of invasive species in SARA based on this available evidence. Finally, we will develop management recommendation for the control of invasive species based on the peer-reviewed literature.

- iii) Adjacent landuse : We will assess adjacent land use patterns based on aerial photo interpretation of the most recently available photos. We will heads-up digitize lands within 1 mile of the park to assess current (2003) land use patterns and determine the acreage of grassland habitats near (within 1 mile of the park). We will also ground truth this map during the 2003 field season to assess map accuracy.
- iv) Development proposals specifically listed in the GMP (e.g., effects of visitor flow patterns). Based on our assessment of projected visitor flow patterns, we will compare estimate of potential human disturbance on nesting grassland birds to available peer-reviewed literature on the impact of human disturbance on grassland birds.
- b) *Consolidate existing data associated with the management of park fields, and identify those areas of most value to grassland birds.*
 - (i) Based on available data, we will determine the spatial distribution and extent of grassland habitats in the park.
 - (ii) We will provide sources and meta-descriptions (using only Dataset Catalog descriptions) of existing datasets to provide a single source repository for grassland bird/habitat information in SARA.
- c) *Provide decision guidelines for management that make the best use of existing data and allow for tradeoffs and potential mitigation strategies for conflicting program activities.*
 - (i) Based on our assessment of current monitoring plans for SARA, we will provide guidelines on how we feel avian and habitat resources should be monitored into the future to guide management options. These monitoring protocols will be based on existing inventory data. We will provide guidelines to managers for when we feel grassland birds in the Park are in trouble and what mitigation strategies should be implemented if avian populations decline to a specific point.

PRODUCTS TO BE DELIVERED

The deliverables we produced will be in both paper and digital form for the Final Report following standard guidelines provided by the National Park Service's Boston Support Office.

Management Guidelines:

We will provide a comprehensive set of guidelines for managing park open areas for grassland bird habitat values, that integrates various program activities and recognizes the need for mitigation and trade-off analysis. A matrix that cross references various park program areas related to the specific recommendation shall be provided when completed and approved. Specifically, the following areas should be explicitly addressed:

Value of existing grassland bird habitat for the species:

- i) *Potential impacts of proposed landscape treatments:* We will conduct a thorough review of all scientific literature related to managing habitats for grassland birds. Based on that compilation of the literature, we will assess existing ongoing management activities at SARA and make recommendations, based on the literature, on how management could be improved at SARA.
- ii) *Reclamation of fallow pasture or shrublands:* We will search available peer-reviewed literature to assess potential strategies to reclaim pasturelands, shrublands, or even forested habitat (e.g., Mitchell et al. 2000)
- iii) *Effects of treatment types and timing:* There is a growing body of literature that has quantified the impact of fire management on grassland birds (Vickery et al. 1999, Herkert and Glass 1999, Shriver et al. 1999) and our summary of current/past fire management at SARA will be compared with current recommendations for fire management to maximize grassland bird productivity at the Park.
- iv) *Alternative treatments and applications:* Herbicides used in blueberry fields can have negative impacts on grassland birds (Vickery et al. 1999b). However, the impact of herbicides to maintain grassland habitats is less studied. We proposed to conduct a thorough literature review to assess alternative treatments to maximize avian abundance and productivity at SARA.

Metadata Standards

All existing data shall be properly documented using accepted metadata standards of the National Park Service (using Dataset Catalog standards established by NPS), including their potential for conversion to digital format (i.e., layers in a Geographical Information System).

Future Work

Suggestions for future research, monitoring, or management will be included in the final completion report. We will identify areas where consolidation of effort among program areas will be identified.

LITERATURE CITED

- Askins, R. A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North America. *Current Ornithology* 11:1-34.
- Askins, R. A. 1997. History of grasslands in the Northeastern United States: implications for bird conservation. Pages 119-136 in P. D. Vickery and P. W. Dunwiddie (eds.). *Grasslands of Northeastern North America: ecology and conservation of native agricultural landscapes*. Massachusetts Audubon Society, Lincoln, MA.
- Askins, R. A. 1999. History of grassland birds in eastern North America. *Studies in Avian Biology* 19:60-71.
- Askins, R. A. 2000. *Restoring North America's birds: lessons from landscape ecology*. Yale University Press, New Haven, Connecticut.
- Herkert, J. R., and W. D. Glass. 1999. Henslow's Sparrow response to prescribed fire in an Illinois prairie remnant. *Studies in Avian Biology* 19:160-164.
- Jones, A. J. and P. D. Vickery. 1997. *Conserving grassland birds: managing agricultural lands including hayfields, crop fields, and pastures for grassland birds*. Massachusetts Audubon Society, Lincoln, Massachusetts.
- Mehroff, L.J. 1997. Thought on the biogeography of grassland plants in New England. Pages 15-23 In Vickery, P. D and P. W. Dunwiddie (eds.). *Grasslands of Northeastern North America, ecology and conservation of native and agricultural landscapes*. Massachusetts Audubon Society, Lincoln, Massachusetts.
- Mitchell, L.R., C. R. Smith and R. A. Malecki. 2000. *Ecology of grassland breeding birds in the Northeastern United States-A literature review with recommendations for management*. U.S. Geological Survey, Biological Resources Division, New York Cooperative Fish and Wildlife Research Unit, Dept. of Natural Resources, Cornell University. Ithaca, NY, USA.
- Norment, C. J., C. D. Ardizzone, and K. Hartman. 1999. Habitat relations and breeding biology of grassland birds in New York. *Studies in Avian Biology* 19:112-121.

- Peterjohn, B. G., and J. R. Sauer. 1999. Population status of North American grassland birds from the North American Breeding Bird Survey, 1966-1996. *Studies in Avian Biology* 19:27-44.
- Rohrbaugh, R. W., D. L. Reinking, D. H. Wolfe, S. K. Sherrod, and M. A. Jenkins. 1999. Effects of prescribed burning and grazing on nesting and reproductive success of three grassland passerine species in tallgrass prairie. *Studies in Avian Biology* 19:165-170.
- Sauer, J. R., G. W. Pendleton, and B. G. Peterjohn. 1996. Evaluation causes of population change in North American insectivorous songbirds. *Conservation Biology* 10:465-478.
- Shriver, W. G., P. D. Vickery, and D. W. Perkins. 1999. The effects of summer burns on breeding Florida Grasshopper and Bachman's Sparrows. *Studies in Avian Biology* 19:144-148.
- Vickery, P.D., M. L. Hunter, Jr., S. M. Melvin. 1994. Effects of habitat area on the distribution of grassland birds in Maine. *Conservation Biology* 8:1087-1097.
- Vickery, P. D. and P. W. Dunwiddie. 1997. Grasslands of Northeastern North America: ecology and conservation of native agricultural landscapes. Massachusetts Audubon Society, Lincoln, MA.
- Vickery, P. D., P. L. Tubaro, J. M. Cardoso da Silva, B. G. Peterjohn, J. R. Herkert, and R. B. Cavalcanti. 1999a. Conservation of grassland birds in the Western Hemisphere. *Studies in Avian Biology* 19:2-26.
- Vickery, P. D., M. L. Hunter, Jr., and J. V. Wells. 1999. Effects of fire and herbicide treatment on habitat selection in grassland birds in southern Maine. *Studies in Avian Biology* 19:149-159..
- Wells, J. V., and K. V. Rosenberg. 1999. Grassland bird conservation in Northeastern North America. *Studies in Avian Biology* 19:72-80.
- Witham, J. W. and M. L. Hunter, Jr. 1992. Population trends of neotropical migrant landbirds in northern coastal New England. Pages 85-95 in J. M. Hagan and D. W. Johnston (eds). *Ecology and conservation of neotropical migrant landbirds*. Smithsonian Institution Press, Washington, D.C.
- Young, E. C. and C. T. Osborn. 1990. Costs and benefits of the Conservation Reserve Program. *Journal of Soil and Water Conservation* 45:370-373.
- Zimmerman, J. L. 1983. Cowbird parasitism of Dickcissels in different habitats and at different nest densities. *Wilson Bulletin* 95:7-22.

Appendix A. Potential data sources that provide information on birds and habitat at Saratoga National Historical Park that could be summarized as part of this proposal.

Avian Inventory/Surveys- resource management files.

Bird Inventory: Dr. Peter Paton, Mike Windsor, June 2002 (work in progress)

Bird Observation Lists: Linda White, Jane Graves, Jim Schabrel, - resource management files.

Bird Point Counts/Bird Monitoring: 1993 (36), 1994 (29), 1996 (38), 1997 (2), species lists and maps, 1998 (8) – resource management files.

Canada Geese Neck-Banding and Observations, 1998 - resource management files.

Grassland Bird Project: 1993, 1994, 1995, 1996, 1997- resource management files.

Christmas Bird Counts: Jane Graves, 1987, 2001, and other years, Jane Graves - National Audubon Society and the resource management files.

Breeding Bird Atlas: 1985 Linda White, 2000, 2001 and ongoing with Jane Graves - resource management files.

Bird Records: compiled on index cards by Ranger Chapman and Nelson, circa 1964, but dating back to 1954, (records transferred to a written document) - resource management files.

Bird Club Counts, including Birdathons, Hudson Mohawk Bird Club and Southern Adirondack Audubon Society - copies being obtained from these groups for resource management files.

Wild Turkey Program Review, 1987, by Michael Fobes - resource management files.

Gobble Count Survey (New York State Wild Turkey Research), 1987 (31), 1988 (25), 1889 (47), 1990 (34) - resource management files.

Turkey Counts: 19 - resource management files

Report by Rachel Mazur 1996, "Implications of Field Management for Henslow's Sparrow Habitat At Saratoga National Historical Park, New York" - copy in resource management files.

Long-eared Owl Pellet Analysis; Elly George, 1983 and 1984 - resource management files.

Report by Emily Russell (Cultural Landscape Report – draft) - copy of draft in resource management files.

Parkwide Transect Data, Brian Underwood – Brian Underwood's files.

Vegetation Sampling/Monitoring, (1987, 1992, 93, 94, 95, 96, 98) - resource management files.

"Factors Affecting Night-Spotlighting Counts of White-Tailed Deer at Saratoga National Historical Park" by Michael Bigger, 1996 – research management files.

Vegetation sampling from the fire monitoring program, 2001 - paper copies in resource management files, digital format at Shenandoa National Park (This is where the northeast fire effects monitoring module is based.)

"A Four Year Study of the Effect of Fire on the Vegetation in Two Fields, Saratoga National Historical Park", New York, by R. Stalter and J. Schabrel, 1992 – resource management files.

Cornus Research by Kelly Austin, 1987 to 1989 – resource management files.

Herp Inventory Report, 2001, by the Wildlife Conservation Society contracted for the NPS under the Inventory and Monitoring Program, currently in draft but final report is due) - resource management office, digital form on laptop.

Adjacent Land Use, 1995 and 2000 parcel Data, - GIS layer in resource management office.

Field Maintenance/Mowing History - resource management files.

Agricultural Lease Data – resource management files.

"Vegetation Treatment Plan, Saratoga National Historical Park, 1989", by Patrick Lynch (Draft) – resource management files.

"Interactions of White-tailed Deer and Vegetation at Saratoga National Historical Park", by H. Brian Underwood, 1994 – resource management files.

Fire Management History and Plan, (New FMP in draft) - resources management files.

Cultural Management Plan, to be completed.

Cultural Landscape Report, by the Olmsted Center, in draft, final to be ready by the summer of 2002.

Budget:

Item	Cost
GIS compilation of habitat data at SARA and adjacent lands; GIS research technician for 1 month: \$18/hr * 40 hr/wk * 4 weeks	\$2880
Data compilation of existing data/create Dataset Catalog of existing report/studies at SARA; research technician 3 months; compile peer-reviewed literature: \$12/hr * 40 hr/wk * 12 weeks	\$5760
Meta-analysis of existing data collected at SARA/help with report writing; \$3529/month for 1.5 months	\$5294
FICA on Salaries for research technicians	\$1066
PI salary, 1 month summer salary (\$5,000) for one year to assist with meta-analysis and final report writing	\$5000
SubTotal	\$20,000
URI overhead (25%)	\$ 5,000
Total	\$25,000