

COOPERATIVE AGREEMENT

1443CA4520-A-0020

between the

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

and the

UNIVERSITY OF CONNECTICUT

Beginning Date: Date of Execution Completion Date: March 15, 2002

Fiscal Year 2000 Funding: Not to Exceed : \$30,000

Fiscal Year 2000 Account Numbers: 2340-0004-NYZ-411C-N-0

Project Title: Invasive Plants

THIS AGREEMENT is made and entered into between the University of Connecticut hereinafter also called the University and the United States Department of the Interior, National Park Service hereinafter also called the NPS.

ARTICLE I. BACKGROUND AND OBJECTIVES

WHEREAS, pursuant to 16 U.S.C. Section 1g, the National Park Service may in fiscal year 1997 and thereafter enter into cooperative agreement that involve the transfer of National Park Service appropriated funds to State, local and tribal governments, other public entities, educational institutions, and private nonprofit organizations for the public purpose of carrying out National Park Service programs pursuant to 31 U.S.C. 6305 to carry out public purposes of National Park Service programs.

WHEREAS, pursuant to 16 U.S.C. Section 1a-2(j), the National Park Service may "enter into cooperative agreements with public or private educational institutions, States, and their political subdivisions, for the purpose of developing adequate, coordinated, cooperative research and training programs concerning the resources of the National Park System, and, pursuant to any such agreements, to accept from and make available to the cooperator such technical and support staff, financial assistance for mutually agreed upon research projects, supplies and equipment, facilities, and administrative services relating to cooperative research units as the Secretary deems appropriate; except that this paragraph shall not waive any requirements for research projects that are subject to the Federal procurement regulations."

WHEREAS, the University is an educational institution, non-profit institution of higher education and dedicated to undertaking research and education for the public good.

WHEREAS, the NPS and the University endeavor to undertake a cooperative effort to identify critical invasive plant species and assess distribution and abundance of those species in Northeast Region parks

NOW, THEREFORE, in consideration of the mutual covenants hereinafter contained, it is hereby agreed by and between the parties hereto:

ARTICLE II. STATEMENT OF WORK

PROBLEM STATEMENT:

Invasive plant species occurrences have been identified as a top resource management issue for parks in the Northeast Region of the National Park Service. The National Park Service has launched an aggressive control program aimed at highly invasive species in three regions, Hawaii, south Florida and the Washington, DC area. In order to take advantage of this program in the future, the Northeast must clearly define the invasive species problem in the Northeast, select species or habitats where management is possible and establish a baseline of areas impacted.

PROPOSAL

See the attached proposal.

ARTICLE III. TERMS OF AGREEMENT

Unless earlier terminated by operation of the terms of this agreement or by agreement of the parties in writing, this Agreement shall remain in force for five years from the date of execution thereof.

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 to be 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 Contracting Officer.

Key Official – National Park Service
Dr. Mary K. Foley
Boston, MA 02109

Key Official – University of Connecticut
Dr. John Silander
Department of Ecology and Evolutionary Biology
75 North Eagleville Road, U-43
Storrs, CT 06269-3043

ARTICLE V. AWARD, PAYMENT & INVOICES

In accordance with the provisions found in OMB Circular A-102 or A-110, as appropriate, invoices and other required supporting statements or certificates (all properly identified with the agreement number, the name of the National Park Service Key Official and, where applicable, the amendment number) will be submitted by the University to the Contracting Officer at the address shown on the signature page of this agreement.

These provisions include the following:

Reimbursement claims should be submitted on Standard Form 270 (Request for Advance or Reimbursement) or other format as approved by the Contracting Officer, in an original and one copy.

Advances of actual funds shall be requested by submittal of a Standard Form 270, (Request for Advance or Reimbursement), in an original and one copy.

The disposition of advanced funds shall be reported quarterly by submittal of Standard Form 272, Federal Transaction Report. This form must be submitted within 15 days after the end of each calendar quarter in which funds remain outstanding.

Travel: Not Withstanding any other provisions hereof, travel expenses related to any work element will be negotiated and compensated according to current applicable University of Connecticut travel regulations up to a specified daily rate. The University must make all travel arrangements and reimbursements for University employees.

ARTICLE VI. PRIOR APPROVAL

Prior to diverting any specified key official to other programs, the University and/or National Park Service shall notify the Contracting Officer reasonably in advance and shall submit a justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on the program. No substitution will be made without the written consent of the Contracting Officer. Such approval will not be unreasonably withheld.

In accordance with OMB Circular A-102 or A-110 and the "Common Rule", 43 CFR Part 12., Subpart C, Paragraph 12.70:

Cooperators are permitted to rebudget within the approved direct cost budget to meet unanticipated requirements and may make limited program changes to the approved project. However, certain types of post-award changes in budgets and projects shall require the prior written approval of the Contracting Officer as follows:

(a) Budget changes--non-construction: (1) Any revision which would result in the need for additional funding; (2) Cumulative transfers among direct cost categories, which exceed or are expected to exceed ten percent of the current total approved budget; or (3) any transfer of funds allotted for training allowances.

(b) Programmatic Changes: (1) Any revision of the scope or objectives of the project (regardless of whether there is an associated budget revision which requires prior approval); (2) Need to extend the period of availability of funds; (3) Changes to key personnel (see above); and (4) Contracting out or otherwise obtaining the services of a third party to perform activities which are central to the purpose of the award and are not included in the Scope of Work.

ARTICLE VII. REPORTS AND/OR DELIVERABLES

As the performing organization under this Agreement, the University shall follow the procedures set forth in OMB Circular A-102 or A-110, as appropriate. Reports shall be submitted to the Contracting Officer.

Performance Reports: The University shall submit an annual performance report. For multi-year projects, a final performance report shall be submitted 90 days after the expiration or termination of the agreement.

Financial Reports: (1) the University shall submit Standard Form 269 or 269A, Financial Status Report, which details program outlays and program income, on an annual basis.

ARTICLE VIII. PROPERTY UTILIZATION AND DISPOSITION

Property utilization and disposition shall be in accordance with OMB Circular A-102 or A-110, as appropriate.

ARTICLE IX. TERMINATION

While it is the express intent of both parties that the activities described under this agreement continue uninterrupted, this agreement may be terminated or suspended in accordance with the provisions set forth with 43 C.F.R. Part 12 which provides as follows:

Awards to Institutions of Higher Education, Hospitals and Other Non-Profit Organizations may be terminated in whole or in part only if paragraph (1), (2) or (3) of this section applies.

1. By the Federal awarding agency, if a recipient materially fails to comply with the terms and conditions of an award.
2. By the Federal awarding agency with the consent of the recipient, in which case the two parties shall agree upon the termination conditions, including the effective date and, in the case of partial termination, the portion to be terminated.
3. By the recipient upon sending to the Federal awarding agency written notification setting forth the reasons for such termination, the effective date, and, in the case of partial termination, the portion to be terminated. However, if the Federal awarding agency determines in the case of partial termination that the reduced or modified portion of the grant will not accomplish the purposes for which the grant was made, it may terminate the grant in its entirety under either paragraph (a) (1) or (2) of this section.

Awards to State and Local Governments may be terminated in whole or in part only as follows:

1. By the awarding agency with the consent of the grantee or subgrantee in which case the two parties shall agree upon the termination conditions, including the effective date and in the case of partial termination, the portion to be terminated, or
2. By the grantee or subgrantee upon written notification to the awarding agency, setting forth the reasons for such termination, the effective date, and in the case of partial termination, the portion to be terminated. However, if, in the case of a partial termination, the awarding agency determines that the remaining portion of the award will not accomplish the purposes for which the award was made, the awarding agency may terminate the award in its entirety.

ARTICLE X. GENERAL AND SPECIAL PROVISIONS

A. GENERAL PROVISIONS

1. This agreement shall be subject to the following provisions which are incorporated herein by reference:

- i. OMB Circular A-110, "Grants and Agreements with Institutions of Higher Education, Hospitals, and other Nonprofit Organizations"

and

- ii. OMB Circular A-133, "Audits of States, Local Governments and Non-Profit Organizations"

and

- iii. OMB Circular A-21, "Cost Principles for Educational Institutions"

2. Additional Provisions which apply to all cooperators include:

- a. 43 CFR Part 12 including

- (1) Applicability of various OMB circulars

- (2) Administrative requirements

- (3) Government Debarment and Suspension

- (4) Drug-Free Workplace Requirements

- (5) Buy American Requirements for Assistance Programs

- b. 43 CFR Part 18, Restrictions on Lobbying Disclosure Requirements

- c. MBE/WBE Utilization Under Federal Grants, Cooperative Agreements, and Other Federal Assistance Agreements, 505 DM 3.1 - 3.5C(1)(A) or 5.1 - 5.6E(1), as appropriate.

- d. Limitations on Payments to Influence Certain Federal Transactions, FAR 52.203-12.

- e. Non-discrimination Requirements. All activities pursuant to this Agreement and the provisions of Exec. Order No. 11246, 3 CFR 339 (1964-65) shall be in compliance with the requirements of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 USC Section 2000d et seq.); Title V, Section 504 of the Rehabilitation Act of 1973 (87 Stat. 394; 29 USC Section 794); the Age Discrimination Act of 1975 (89 Stat. 728; 42 USC Section 6101 et seq.); and with all other Federal laws and regulations prohibiting discrimination on the grounds of race, color, national origin, handicap, religious or sex in providing for facilities and service to the public.

3. The following certifications are required in accordance with the above provisions and are attached hereto and made a part of this agreement (the blue pages must be filled out, signed as appropriate, and returned with the signed agreement):

- a. Certifications Regarding Debarment, Suspension and Other Responsibility Matters, Drug-Free Workplace Requirements and Lobbying (Attachment A, DI-2010, 3 pages). Note various segments and alternatives: Part A should be prepared by each partner plus Part B by any "Lower Tiered Party" (sub-contractors, sub-consultants, NOT employees) to this agreement; Part C, if other than an individual or Part D, if an individual; plus Part E for all agreements which will exceed \$100,000 Federal assistance.
- b. Disclosure of Lobbying Activities (Attachment B, Standard Forms LLL and LLL-A, 3 pages) for all partners completing Attachment A, Part B.

B. SPECIAL PROVISIONS

1. Availability of Funding

This agreement and the obligations of the Service hereunder shall be subject to the availability of funding, and nothing herein contained shall be construed as binding the Service to expend in one fiscal year any sum in excess of appropriations made by Congress or administratively allocated for the purpose of the agreement for the fiscal year, or to involve the Service in any contract or other obligation for the further expenditure of money in excess of such appropriations or allocations.

2. Public Information

a. Promotions

The University shall not publicize, or otherwise circulate, promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts or other publications) which states or implies Federal Governmental, Departmental, Service or Federal Government employee endorsement of a product,

service, or position which the University represents. No release of information relating to this agreement may state or imply that the Government endorses the College's work product as superior to other products or services.

b. Federal Disclaimer

The University will ensure that all information submitted for publication or other public releases of information regarding this project shall carry the following disclaimer:

The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Government. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government.

c. Public Information Release

The University must obtain prior approval from the National Park Service Key Official for any public information releases which refer to the Department of the Interior, the National Park Service, any sub-unit or employee thereof (by name or title), or this agreement. The specific text, layout, photographs, etc., of the proposed release must be submitted, with a request for approval, to the person designated as the key official for the NPS in Article IV of this agreement.

d. Publication of Study Results

No party shall unilaterally publish a joint publication without consulting the other party. This restriction does not apply to popular publication of previously published technical matter. Publications pursuant to this Agreement may be produced independently or in collaboration with others, however, in all cases proper credit will be given to the efforts of those parties contributing to the publication. In the event no Agreement is reached concerning the manner of publication or interpretation of results, either party may publish data after due notice and submission of the proposed manuscripts to the other. In such instances, the party publishing the data will give due credit to the cooperation but assume full responsibility for any statements on which there is a difference of opinion.

3. Direct Benefit Clause

No Member of, Delegate to, or Resident Commissioner in, Congress shall be admitted to any share or part of this Agreement or to any benefit to arise therefrom, unless the share or part or benefit is for the general benefit of a corporation or company.

4. Lobbying Prohibition: The parties will abide by the provisions of 18 U.S.C. 1913 (Lobbying with Appropriated Moneys), which states:

No part of the money appropriated by any enactment of Congress shall, in the absence of express authorization by the Congress, be used directly or indirectly to pay for any personal service, advertisement, telegram, telephone, letter, printed or written matter, or other device, intended or designed to influence in any manner a Member of Congress, to favor or oppose, by vote or otherwise, any legislation or appropriation by Congress, whether before or after the introduction of any bill or resolution proposing such legislation or appropriation; but this shall not prevent officers or employees of the United States or of its departments or agencies from communicating to Members of Congress on the request of any Member or to Congress, through the proper channels, requests for legislation or appropriations which they deem necessary for the efficient conduct of the public business.

Whoever, being an officer or employee of the United States or of any department or agency thereof, violates or attempts to violate this section shall be fined not more than \$500 or imprisoned not more than one year, or both; and after notice and hearing by the superior officer vested with the power of removing him, shall be removed from office or employment.

5. Indemnification

The State Of Connecticut allows that in the event of loss, resulting from acts of omission or commission by University of Connecticut employees in connection with this Agreement, the National Park Service or any third party shall have recourse through the State of Connecticut Claims Commission as provided under Chapter 53 of the statutes of the State of Connecticut in which all claims against the State of Connecticut and the University of Connecticut will be filed with the State of Connecticut--Claims Commissioner.

6. Insurance and Related Liability

The University accepts responsibility for any property damage, injury, or death caused by the acts or omissions of their employees, acting within the scope of their employment, to the fullest extent permitted by law. To the extent work is to be provided by a nongovernmental entities, the University will require that entity to:

a. Procure and maintain during the term of the agreement, insurance in a form satisfactory to the Contracting Officer and by an insurance company acceptable to the Contracting Officer. The policies shall name the United States as an additional insured, shall specify that the primary insured shall have no right of subrogation against the

United States for payments of any premiums or deductibles due thereunder, and shall specify that the insurance shall be assumed by, be for the account of, and be at the primary insured's sole risk. The amounts of the insurance shall not be less than as follows:

- (1) Workman's Compensation and Employer's Liability Insurance: Compliance with applicable Federal and State worker's compensation and occupational disease statutes shall be required. Employer's liability coverage in the minimum amount established by state law.
 - (2) General Liability Insurance: General liability insurance in the minimum amount of one million dollars (\$1,000,000) per person for any one claim and an aggregate limitation of three million dollars (\$3,000,000) for any number of claims arising from any one incident.
 - (3) Automobile Liability Insurance: This insurance shall be required on the comprehensive form of the policy and shall provide for bodily injury and property damage liability covering the operation of all licensed motor vehicles used in connection with performing the agreement. The minimum limits of two hundred thousand dollars (\$200,000) per person and five hundred thousand dollars (\$500,000) per occurrence for bodily injury and twenty thousand dollars (\$20,000) per occurrence of property damage shall be required.
- b. Pay the United States the full value for all damages to the lands or other property of the United States caused by such person or organization, its representatives, or employees; and
 - c. Indemnify, save and hold harmless, and defend the United States against all fines, claims, damages, losses, judgments, and expenses arising out of, or from, any omission or activity of such person organization, its representatives, or employees.

ARTICLE XI. ATTACHMENTS AND APPENDICES

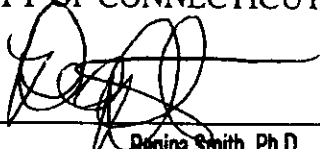
This agreement shall be subject to the following appendices which are attached hereto and incorporated herewith by reference, except as amended or waived by joint agreement:

1. Attachment A - Certification Regarding Debarment, Suspension, and Other Responsibility Matters, Drug-Free Workplace Requirements and Lobbying, DI-2010.
2. Attachment B - Disclosure of Lobbying Activities, SF-LLL and SF-LLL-A.

ARTICLE XII. AUTHORIZING SIGNATURES

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

UNIVERSITY OF CONNECTICUT

By: 

Name

Regina Smith, Ph.D.

Title

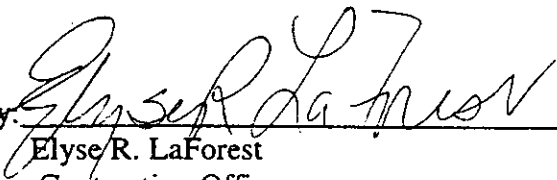
Executive Director, Office for Sponsored Programs
and Assistant Vice Provost for Research

Date

9/25/00

NATIONAL PARK SERVICE

Northeast Region

By: 

Elyse R. LaForest

Contracting Officer

Boston Support Office

15 State Street

Boston, MA 02109

elyse_laforest@nps.gov

(617) 223-5037

Date

9/19/00

A PROPOSAL FROM THE UNIVERSITY OF CONNECTICUT TO WORK WITH THE PARKS OF THE NORTHEAST REGION ON INVASIVE PLANTS

INTRODUCTION

The case has been clearly made by many scientists (e.g. Ridgway et al. 1999, Mooney and Hobbs 2000, *United State Invasive Species Draft Management Plan: Preparing for the Future 2000*) that invasive species pose perhaps the greatest threat to global biodiversity and ecosystem function. President Bill Clinton's Executive Order of 3 Feb 1999 calls for the development of: 1) an increased knowledge base on invasive species that will provide an assessment of their current status and their ecological characteristics, 2) new tools for an early warning system of potential invaders and means for rapid assessment of the status of invaders or potential invaders, and 3) an elevated educational awareness of invasive species and their environmental threat.

National Park Service sites are often viewed as the "crown jewels" of the United States landscape. Yet these parcels of land are just as vulnerable to the impacts of invasive plants as any other parcel. Currently, the status of invasive plants in most national park units is either poorly understood, based on anecdotal information or the result of personal interest of park staff. Some parks in the Northeast Region, notably Acadia National Park (in cooperation with the College of the Atlantic) and Shenandoah National Park (I&M and NRPP funding) have acquired the necessary resources needed to systematically gather baseline information on selected invasive species found in their most threatened habitats and ecosystems. Most National Park Service sites in the Northeast Region do not current have the required resources to obtain critical baseline information on invasive vegetation and are in need of immediate assistance. The work generated from this proposal would provide much needed invasive plant management assistance to these parks

The expansion of invasive species into and within the units of the National Park Service has become a much too common resource concern. In many of the park units, the expansion of invasives has significantly altered the natural scenes observed by park visitors. If one drives along US Route 209 through the Delaware Water Gap National Recreation Area you will pass dense stands of nonindigenous species that have invaded large tracts of lands. Hillsides are covered with Tree of Heaven (*Ailanthus altissima*) or Norway maple (*Acer platanoides*), forest understories are dominated by stands of shrubby Honeysuckles (*Lonicera* spp.) or Japanese Barberry (*Berberis thunbergii*) and the forest floor has carpets of Garlic Mustard (*Alliaria petiolata*). Other species such as winged Euonymus (*Euonymus alatus*), Glossy Buckthorn (*Frangula alnus*) and Japanese Stilt Grass (*Microstegium vimineum*) either exist in lower numbers on the park or are reported from the nearby countryside. Little more than anecdotal data document most of these occurrences at this time.

In addition to the well-known, widespread and often troublesome invasive species, those

less well-known invasive species that occur in close proximity to the park or are already in the park in low numbers need to be considered and targeted for removal or management before they become widely established. The need for early detection as the most cost-efficient control measure for invasive plants was the focus of a recent meeting in Fort Collins, Colorado sponsored by the Biological Resources Division of USGS.

The *United States Invasive Species Draft Management Plan* acknowledges the need for invasive species inventory and management of federally owned and managed lands. The National Park Service needs to systematically assess the current distribution, status and management potential of invasive plants within the parks. This can be done in a multistage program to identify the invasive and potentially invasive species at each park, assess and document their current distribution and abundance within the park boundaries and formulate management plans based on the best available information and expertise. Site restoration options will also be considered in determining management priorities. The data generated from the proposed baseline surveys will be useful in both understanding the biology and ecology of these invasive species as well as in formulating realistic management plans that address the need for control, maintenance or eradication of both invasive species that currently exist on the park as well as those that might be reasonably anticipated to become established on the park in the future.

Education and training are extremely important to the long-term success and usefulness of this proposed project. The inclusion of park staff, interns, and volunteers in education programs on invasive plant biology, habitat requirements, and management options will assure that the skills needed to identify, priorities, and manage invasive are located in each park. Park units will need to identify all potential participants so no serious source of inventory, survey or management assistance is left untrained. By increasing the awareness of the park staff, interns and volunteers to the problems and potential impacts of invasive plants, the NPS can hope to slow the spread of invasive non-native plants on its lands while acting as good neighbors to adjacent landowners. In addition to park staff, trained students will be utilized to assess and quantify the current distribution of invasive plants in a park. This information will provide the baseline by which the efficacy of management practices and techniques can be evaluated.

THE PARKS

The Northeast Region adopted a Natural Resources Strategic Plan that identified 10 parks in the Region, established primarily for protection of natural resources, and stated that those would be priority parks for natural resources inventory projects where sufficient funds were not available to address all parks.

Acadia National Park (ACAD)

Acadia National Park was a gift to the people of United States from the private citizens of Maine with the hope that its beauty could be preserved. With over 400 native plants found within the park, the movement of new invasive plants into the park represents a major threat to the preservation of that original beauty. With hard work and many hours

of planning, the park staff has been able to slow the spread of purple loosestrife within the park. However, the park staff will need assistance in addressing the many additional invasive plants that have been identified. One third of the park vegetation is now exotic. The park has collected information on its top invasive species, and is prepared to begin the management process. The assistance of the invasive plant management team in this process is critical.

- ◆ Vegetation inventory and species prioritization has been completed for the park.
- ◆ Post treatment monitoring protocols still needed for most species.

The current list of invasive plants of concern in the park includes:

- | | |
|----------------------------------|----------------------|
| ◆ <i>Lythrum salicaria</i> - | purple loosestrife |
| ◆ <i>Berberis thunbergii</i> - | Japanese barberry |
| ◆ <i>Frangula alnus</i> - | glossy buckthorn |
| ◆ <i>Celastrus orbiculatus</i> - | oriental bittersweet |
| ◆ <i>Lonicera</i> spp. | honeysuckle |
| ◆ <i>Rosa multiflora</i> - | multiflora rose |
| ◆ <i>Polygonum cuspidatum</i> - | Japanese knotweed |
| ◆ <i>Alliaria petiolata</i> - | garlic mustard |
| ◆ <i>Tussilago farfara</i> - | coltsfoot |

Acadia National Park will begin a systematic inventory of the top invasive species in the park to determine distribution and abundance. Acadia is not a part of this proposal.

Assateague Island National Seashore (ASIS)

A legislated mandate of Assateague Island National Seashore is the protection of the barrier island ecosystem. Two types of plant communities are integral to the natural functioning of this system: (1) Dune system dynamics influence rates of storm overwash and, consequently, the degree of protection for other plant communities and the rate of formation of wash flats that are critical habitat to a number of federal and state listed animals and plants. Asiatic Sand Sedge (*Carex kobomugi*) is a newly discovered (1999) exotic species on Assateague Island. It is regarded as invasive on dune systems in Virginia, displacing native dune species and, subsequently, changing the character and erodibility of dunes. Approximately 7 infestations were found in 1999. Although are fairly small and were treated by with herbicide park staff, it is not expected that this will have eradicated the species. Observations suggest that this species can proliferate rapidly on Assateague. It has potential to compete with the federally listed Seabeach Amaranth (*Amaranthus pumilus*). There is a window of opportunity to reduce or eradicate a known invasive species before it becomes a difficult, or expensive problem 2) Wetlands are areas of high ecosystem primary production and are often critical habitat to rare or distribution-limited species. The invasive common reed, *Phragmites australis* is widely distributed in Assateague Island wetlands and is likely to be difficult to control. The primary need for *P. australis* management is a means of monitoring its population status and trends islandwide and research into the causes for its [apparent] expansion. This information

would help determine whether park-level control would be feasible. A vegetation inventory has been completed for the park.

Invasive plants of concern in the park include:

- ♦ *Phragmites australis* - common reed
- ♦ *Carex kobomugi* Asiatic sand sedge

Although the islands provide important habitat for many species, including a number of state-listed species, they are characterized by highly modified landscapes and plant communities that are frequently dominated by invasive exotics including multiflora rose, oriental bittersweet, garlic mustard, or *Phragmites*.

Cape Cod National Seashore (CACO)

The Park is a fragile, nook-shaped peninsula containing woodlands, marshes, wildlife, dunes, and 40 miles of sandy beaches. Invasive species are adversely affecting all of the ecosystems within the park. Plants such as purple loosestrife and *phragmites* prefer freshwater wetlands and marshes. At Cape Cod, wetlands, freshwater ponds, non-tidal and tidal marshes are all unique or sensitive resources in the park that are being encroached upon by invasive plants species. These fresh water resources are extremely limited on the Cape and must be protected from further invasion. Other invasive plants such as the honeysuckles, oriental bittersweet, black locust, and multiflora rose are invading woodlands, grasslands, and heathlands. At the Cape, the heathland vegetation is considered globally rare, with increasing shrinking representation on Cape Cod. The various habitat types affected by invasive species at Cape Cod contain 17 state listed rare plants (endangered, threatened, and special lists) and at least 17 rare watch list plants. Cape Cod will be one of the first parks addressed in this proposal,

The current list of invasive plants of concern in the park includes:

- ♦ *Robinia pseudo-acacia* - black locust
- ♦ *Celastrus orbiculatus* - oriental bittersweet
- ♦ *Rhamnus cathartica* - common buckthorn
- ♦ *Rosa multiflora* - multiflora rose
- ♦ *Lonicera morrowii* - morrow honeysuckle
- ♦ *Lonicera tartarica* - tartarian honeysuckle
- ♦ *Lonicera japonica* - Japanese honeysuckle
- ♦ *Phragmites australis* - common reed
- ♦ *Lythrum salicaria* - purple loosestrife

Delaware Water Gap NRA (DEWA)

The 70,000 acre Delaware Water Gap National Recreation Area was established to provide recreational opportunities and protect the natural and cultural resources that surround 35 miles of the Middle Delaware River. Today, DEWA is flush with invasive exotic invasive plants due to past and present land disturbance, historical plantings, and

the open Delaware River corridor. Invasive exotic species are encroaching on areas of globally rare plant communities (including 20 state-listed plants) and animal species (bald eagle and bog turtle-Federally threatened, and the state-listed wood turtle and bobolink) along the 40-mile-long river corridor. For example, old eastern hemlock stands, already weakened by the hemlock wooly adelgid and other high-priority management zones with rare plant communities, are now also pressured by the encroachment of invasive exotic species. A key product from this proposal will be qualitative and quantitative information on the invasive species of DEWA. Staff and students from the University of Conn. will work with the park staff to obtain critical information on the significance of invasive plants in the park, the threats they present for the parks resources, and information on where priority management opportunities might exist.

The current list of invasive plants of concern in the park includes:

- ♦ *Lythrum salicaria* purple loosestrife
- ♦ *Alnus altissima* tree-of-heaven
- ♦ *Phragmites australis* common reed
- ♦ *Polygonum cuspidatum* Japanese knotweed
- ♦ *Elaeagnus umbellata* autumn olive
- ♦ *Berberis thunbergii* Japanese barberry
- ♦ *Rosa multiflora* multiflora rose
- ♦ *Lonicera japonica* Japanese honeysuckle
- ♦ *Celastrus orbiculatus* oriental bittersweet

Fire Island National Seashore (FIIS)

Fire Island National Seashore is an ecologically fragile, 32-mile long barrier island that protects Long Island from the Atlantic Ocean. It was established to protect the only developed barrier islands in the United States without roads. Within the park boundaries is a 1,300-acre national wilderness area, where pest management activities are not allowed. Protection of the beaches, woods, marshes, and bays of the park is a critical management goal of the park. The freshwater marshes in the park have seen a rapid expansion of *Phragmites* in the last 8 years. Park resources are such that management of this invasive plant is not currently possible. An inventory of current invasive plant distribution and abundance is critically needed before management efforts can be prioritized and initiated. Assistance from a regionally supported management project would enable Fire Island to address the management of these plants.

The current list of known invasive plants of concern in the park includes:

- ♦ *Phragmites australis* common reed
- ♦ *Phyllostachys spp.* Oriental bamboo

Gateway National Recreation Area (GATE)

Gateway National Recreation Area is a sprawling ring of historical, natural and recreational resources surrounding the entrance into the New York Harbor. This "ring" is

comprised of 5 separate management units, including the 2,474-acre Jamaica Bay Wildlife Unit. As invasive plant populations have expanded within the parks natural areas, the abundance and diversity of plants native to the region have rapidly disappeared. Within the Fort Wadsworth section of the park, invasive plant species have an intense foothold on and around a large number and variety of historic structures, hampering the park's ability to interpret the sites. The plants are also threatening the structural and historical integrity of the buildings. Fieldwork to determine invasive plant species distribution and abundance is badly needed in this park. Prioritization of invasive plants is also needed to assure wise plant management efforts.

The list of invasive plants of concern in the park includes:

- ♦ *Celastrus orbiculatus* oriental bittersweet
- ♦ *Lonicera japonica* Japanese honeysuckle
- ♦ *Rosa Multiflora* multiflora rose
- ♦ *Ailanthus altissima* tree-of-heaven
- ♦ *Acer platanoides* Norway maple

New River Gorge National River (NERI)

Bluestone National Scenic River (BLUE)

Gauley River National Recreation Area (GARI)

The New, one of the oldest rivers on the continent, is a rugged, whitewater river that travels northward through deep resource rich canyons and gorges. New River Gorge is faced with expanding invasive plant populations in formerly disturbed areas that threaten exemplary natural areas. Some relatively new invaders, such as Purple loosestrife need to be actively managed. The wild and unspoiled Bluestone National Scenic River needs a basic floristic survey. The Gauley River National Recreational Area, although mostly privately owned (the Federal Government owns 3,000 of the 11,000 acres within the designated boundary), will benefit from the education aspects of this proposal. Park staff has undertaken small site management projects in New River Gorge with funding from Regional Science, but quantitative assessment of invasive species has not been accomplished. Park resource managers have witnessed expanding populations and along with University cooperators and scientists from WV Department of Natural Resources, all agree that invasive species are the biggest threat to unique natural communities in these parks.

The current list of invasive plants of concern in the park includes:

- ♦ *Lythrum salicaria* - purple loosestrife
- ♦ *Polygonum (Falopia) cuspidatum* - Japanese knotweed
- ♦ *Lonicera japonica* - Japanese honeysuckle
- ♦ *Lonicera sp.* bush honeysuckle
- ♦ *Pueraria lobata* - kudzu
- ♦ *Lespedeza stipulacea* - Korean lespedeza
- ♦ *Microstegium*- Japanese stilt grass

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|--------------------------------|-----------------|
| ♦ <i>Rosa multiflora</i> - | multiflora rose |
| ♦ <i>Elaeagnus umbellata</i> - | Russian olive |
| ♦ <i>Alliaria petiolata</i> - | garlic mustard |

Shenandoah National Park (SHEN)

Shenandoah National Park has long recognized the need for a systematic inventory of invasive plants in the park. Such an inventory is underway through a NRPP grant that also includes other parks in Virginia. Shenandoah is not part of this proposal, but lessons learned will be incorporated into the management strategy for invasive plants for the Northeast Region.

PHASE 1: FORMULATING AN INVASIVE PLANT LIST

Regional, state and site-specific lists of invasives (such as the one from ACAD) will be obtained and compiled into a spread sheet for all listed species so that an all-inclusive master list of invasive species can be develop as a starting point for discussion. Rough categories will be established such as Widespread, Restricted or Potential (these are better terms than abundance-based or invasiveness-based categories at this point in the process). Included in these categories should be categories for probable ruderals, agricultural invasives (so-called noxious weeds that are included in some lists but unlikely to be invasive in natural plant communities) or native aggressive species such as Poison Ivy or Hay-scented Fern.

After completing the list, a 2-day workshop with key botanists and invasive species experts from universities, conservation agencies, and the National Park Service in the Northeast will be held. At this meeting, the experts will review composite lists and add or remove species based on the conceptual guidelines established and group opinion. This group will pay close attention to the potentials, ruderals and "noxious weeds" and decide if they should be included. Species agreed upon will again be roughly ranked according to the categories previously established (widespread, restricted or potential). Ultimately, this group will produce draft lists for NP units in the region. Lists of known invasive plants will be generated for each of the parks to be surveyed.

Attendees at the initial meeting will include Wayne Millington (NPS), Linda Gregory (NPS), James Akerson (NPS) Les Mehrhoff (UCONN), Steve Clemants (NY Botanical Gardens), Kris Winter (NYIPC), Ann Rhoads (Morris Arboretum), Bill Grafton (West Virginia University), Brian McDonald (WV DNR), a representative from the NPS Biological Resources Division, and other subject experts. Results from the meeting will be sent to each park for review, comments, and additions.

In order to address invasive species issues within the parks, certain conceptual questions will need to be answered during the course of discussions before and during the meetings. Some of the questions will be:

- ♦ What is invasiveness as it pertains to the protection, preservation and management of resources within a National Park Service unit?

- ◆ What is exotic? Are we really concerned about "exotic" plants or are we really just concerned about invasive plants?
- ◆ What is native?
- ◆ Will invasive native species be considered for management?
- ◆ What about ruderals?
- ◆ What about cultural landscapes and non-natives i.e. Norway Maple along a road in Jockey Hollow, or White clover or Cypress Spurge in a battlefield at Saratoga?
- ◆ What technical source will be used to assure consistent plant nomenclature?
- ◆ Will common names be used, and if so, which ones?

PHASE 2: FIELD ASSESSMENT (implementation of this phase will occur as funding become available)

There will be 2 parts to the field assessment. Unit managers often know better than anyone what is growing in their parks. Unfortunately, most park managers do not know all the species likely to be included in the draft list. Although some of these species will likely occur on the park, many will not. Park staff may have little or no knowledge of these lessors known species.

An identification workshop, to be held initially in DEWA, NERI, FIIS/GATE, and CACO, will serve 2 functions: 1) to introduce all species on the draft list to the park staff (volunteers, interns, etc) and 2) to conduct a survey of park staff. Interested staff from the smaller parks in the Region will also be included in these workshops. Similar workshops will be held for SHEN, ACAD, and ASIS upon request of the park managers. A survey form for all parks will be distributed at the workshop but completed later. The extra time allows park staff the opportunity to consider each of the plants on the list and time to generate questions or suggestions about any of the included taxa. This could be done in conjunction with databases of what species occur in each Park. It would be easy to pull up lists for the parks and crosscheck them with a master list. Park resource people could be asked to evaluate the status of each taxon on their Park using very broad descriptors for abundance, distribution in park (widespread, scattered, or restricted, nearby, again include not known or recognized) and problem status (serious problem, problem, minor problem, no problem again include not known or recognized). Finally, using all of the information and comments collected, resource managers, in conjunction with region biological staff, will be asked to set management priorities for their your park/region/network (1-urgent, 2-soon, 3-not urgent, I-needs inventory).

Each survey could also include taxa not on the lists from the database, which are predicted to be there based on the expert's opinion. If the resource managers don't recognize some of these it may indicate a need for assistance or inventory work.

The second part of Phase II is the actual field assessment of each site. For year one of funding, Cape Cod National Seashore and Delaware Water Gap National Recreation Area will probably serve as focal sites for a detailed mapping inventory in order to establish protocols and methodology. Students would be employed and trained in the University of

Connecticut's Ecology and Evolutionary Biology department and its George Safford Torrey Herbarium. In addition to providing trained staff for this effort, the students receive valuable education that might lead them into positions as invasive species biologists in the future.

A detailed mapping protocol will be developed as follows: First a sampling grid system will be established for each park (e.g. 1 km² cell). These will be laid out on small scale maps and/or aerial photographs. Transects will be walked and invasive species will be tallied (including null sites) at systematically located sites, approximately 1 hectare each, at 1 km intervals. At each site presence and relative abundance of each invasive species will be recorded, along with dominant or indicator native species present and simple ecological site attributes. Positions will be exactly located via GPS. When invasive species are located, then local sampling will be done more intensively. The spatial extent of the population will be determined: marking on maps and aerial photographs and accurately determining polygons with GPS units. The maps will be annotated with estimates of species cover, distribution and extent. This information will be stored in electronic databases, analyzed, and GIS display maps developed. This systematic inventorying will begin with known areas of occurrence or the most easily accessed areas (near roads) and proceed to the more inaccessible areas. Concurrent to the field data gathering, information on biology, management and control would be compiled from existing sources. Students hired to work on this project would gather these data and compile them into a report for park managers. All inventory procedures will be explained and demonstrated to critical park staff to assure that site inventory efforts can continue after the completion of the project by UCONN.

PHASE 3: IMPLEMENTATION

Once priority invasive species are defined for each park and critical sites have been defined by UCONN and NPS invasives experts, park managers will begin immediately with species specific management actions designed to control populations of invasive plants within and adjacent to their parks. Although the staff at UCONN will be available for advice, these management projects will fall for the most part outside the scope of this proposal. Management activities will complement existing efforts in other parks within the Region to establish consistent inventory, monitoring, and restoration practices in each park and will support achievement of park and servicewide commitments under GPRA Goal Ia1. For each park, it will be critical that formal monitoring programs are continued after management activities have been completed to continue tracking invasive plant populations and the success of previous management efforts.

BUDGET

Phase I

Preparation of the draft master list
Workshop logistics

14,000

Mehrhoff	2,000
Silander	1,000
Costs (printing, telephone etc.)	1,000

Park Workshops and park staff survey

Mehrhoff (planning and executing workshop, preparation)	3,000
Silander	2,000
Materials	1,000
Overhead (20%)	<u>6,000</u>

Project Budget Total	\$30,000
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"Equipment purchased will remain with the National Park Service upon completion of the project."