

# Draft Programmatic Environmental Assessment

for

Application by the Eastern New York Chapter of The Nature Conservancy  
for a Safe Harbor Agreement and Associated Permit  
for the Karner blue butterfly (*Lycaeides melissa samuelis*) and frosted elfin (*Callophrys irus*)  
in New York State

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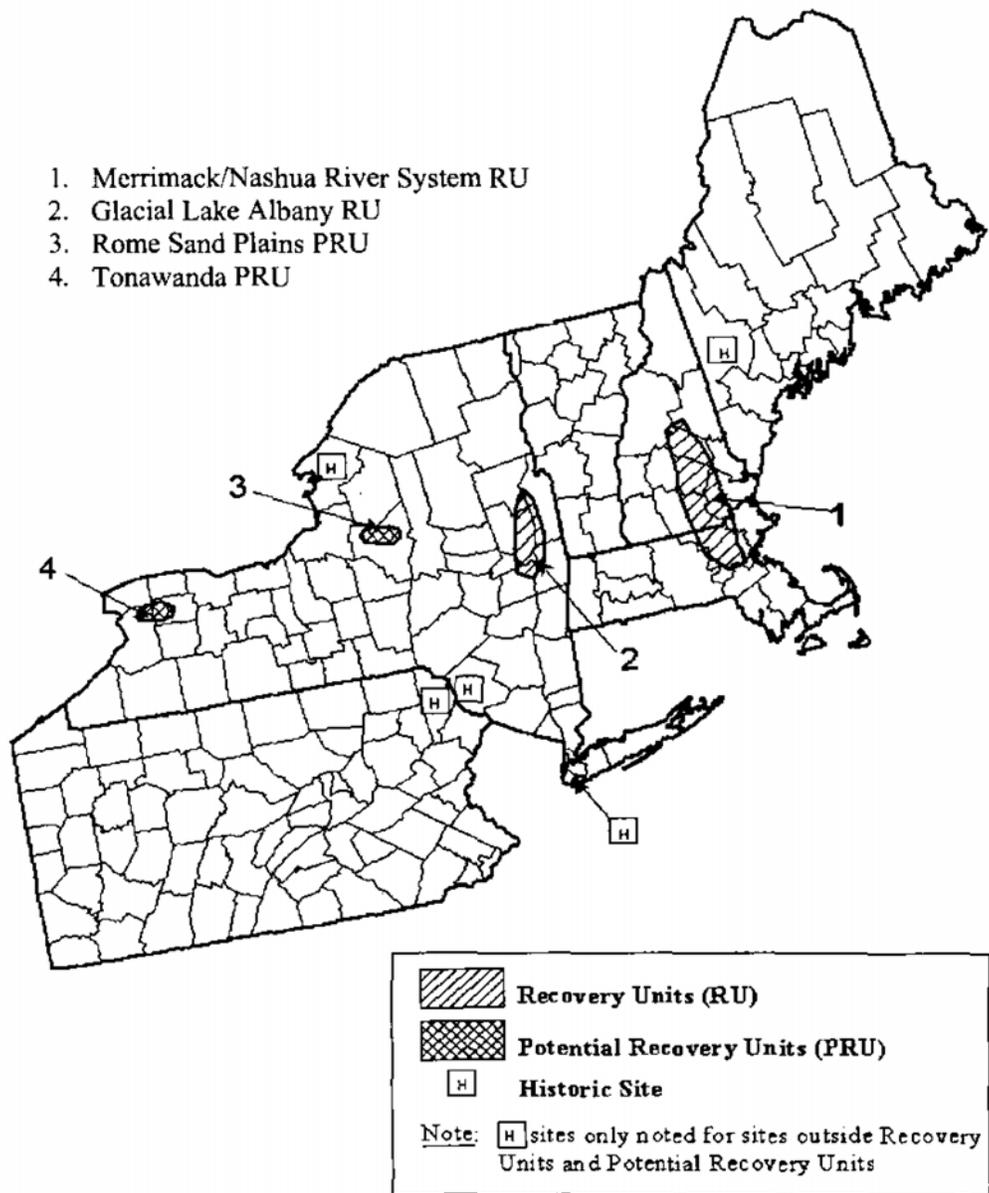
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## 1.0 Introduction

On October 4, 2005, the Eastern New York Chapter of The Nature Conservancy (TNC) submitted an application for an Enhancement of Survival Permit and Safe Harbor Agreement/Candidate Conservation Agreement with Assurances under Section 10(a)(1)(A) of the Endangered Species Act (ESA) to Region 5 of the U.S. Fish and Wildlife Service (Service). Subsequently, the Service and TNC modified their agreement and removed the Candidate Conservation Agreement with Assurances portion. The purpose of the Safe Harbor Agreement (SHA) is to promote the conservation of the Federally- and State-listed endangered Karner blue butterfly (*Lycaides melissa samuelis*) and State-listed threatened frosted elfin (*Callophrys irus*) through restoration, creation, enhancement, and management of their habitat on non-Federal land in eastern New York. The draft SHA specifically covers non-Federal (and non-TNC) lands within one of the priority recovery action areas within New York State as discussed in the Karner Blue Butterfly Recovery Plan (Recovery Plan) (Service 2003); the Glacial Lake Albany Recovery Unit, which includes portions of Albany, Saratoga, Schenectady, and Warren Counties (Figure 1, Figure B-2 Service 2003). The draft SHA has been prepared by the Service, TNC, and the New York State Department of Environmental Conservation (NYSDEC). Under the SHA, TNC would hold the Permit and sign up non-Federal landowners through cooperative agreements who implement conservation measures to benefit the Karner blue butterfly and frosted elfin. In return, these property owners receive regulatory assurances that the Service will allow the “incidental take” of Karner blue butterflies and frosted elfin (should they become listed in the future and TNC requests an amendment to the SHA and Federal permit) associated with their implementation of specified management activities and/or their lawful use of the enrolled property after the specified management activities identified have been initiated. The cooperating agency, NYSDEC, is also expected to sign the SHA as a commitment to allow the incidental take of both species consistent with New York State rules and regulations. The NYSDEC will also provide technical expertise to assist with implementation of the provisions of the SHA. The draft SHA is incorporated here by reference.

**Figure B-2** Karner blue butterfly recovery units in Massachusetts, New Hampshire and New York.



**Figure 1.** Recovery units and potential recovery units in New York and New England (Appendix B-11, Service 2003).

## **2.0 Purpose and Need for Taking Action**

### **2.1 Purpose**

The purpose of this environmental assessment (EA) is to evaluate the direct, indirect, and cumulative environmental effects of issuing a 10(a)(1)(A) Enhancement of Survival Permit and anticipate future effects of implementation of the SHA. The ultimate goal of the Service's actions is to recover populations of the Karner blue butterfly to the point where protections under the ESA are no longer necessary and to minimize threats to remaining populations of frosted elfins which are facing similar threats as Karner blue butterflies and are currently listed as threatened by the State of New York.

### **2.2 Need**

The primary need for the proposed SHA is to allow for implementation of a suite of conservation measures to secure and expand populations of the Karner blue butterfly and frosted elfin in eastern New York. The secondary need is to provide participating non-Federal landowners, in return for their cooperation with implementation of conservation measures on their properties, with regulatory assurances and limited exemption from incidental take of Karner blue butterflies, as well as the frosted elfin should they become listed in the future under the ESA.

### **2.3 Decisions that Need to be Made**

The Service's Regional Director will select one of the alternatives analyzed in detail and will determine, based on the facts and recommendations contained herein, whether this Environmental Assessment is adequate to support a Finding of No Significant Impact decision, or whether an Environmental Impact Statement will need to be prepared.

### **2.4 Background**

#### **2.4.1 Karner Blue Butterfly**

The Karner blue butterfly has a global status of G5T2 (imperiled) and a status of S1 in the State of New York (NatureServe 2006). The State of New York listed the species as endangered in 1977. The Karner blue butterfly was listed as an endangered species under the ESA on December 14, 1992 (57 FR 59236). The ultimate goal of the ESA is the conservation of endangered and threatened species and the ecosystems upon which they depend. The Service finalized a recovery plan for the Karner blue butterfly in September 2003. The Karner blue butterfly is closely tied to its habitat, as the sole source of food for larvae is wild blue lupine (*Lupinus perennis*) leaves. The Karner blue butterfly is bivoltine (completes two generations per year). The first flight is generally in late May into June and the second flight is generally in July. Karner blue butterflies overwinter in the egg stage at the base of lupine plants and/or on nearby grasses. They are generally short distance fliers with tight associations to lupine patches and nectar resources. Please see the Final Recovery Plan for the Karner Blue Butterfly (*Lycaeides melissa samuelis*) (Recovery Plan) (Service 2003) for a full discussion of Karner blue butterfly life history requirements.

The Recovery Plan designates the area between Glens Falls/Queensbury and the Albany Pine Bush as the Glacial Lake Albany Recovery Unit (GLA). A Recovery Unit is a management sub-unit of the listed entity, geographically or otherwise identifiable, that is essential to the recovery of the entire listed entity; conserves genetic or demographic robustness, important life history stages, or other feature for long-term sustainability of the entire listed entity. For the Karner blue butterfly, recovery units are designed to ensure the long-term sustainability across the species range (Service 2003). Within the GLA, three viable populations of Karner blue butterflies are required for the species to be downlisted to Threatened or delisted from the Endangered Species List. Karner blue butterflies are known to occur within four counties within the GLA (Albany, Saratoga, Schenectady, and Warren). However, not all areas within these counties are suitable for habitat restoration. Restoration work will be focused in the zone of sand deposits created by glacial melt water streams and rivers which flowed into Glacial Lake Albany. Therefore, when we refer to the GLA throughout the rest of the document, we generally mean these sand-deposit areas.

While population estimates have not occurred for Karner blue butterflies in New York, the NYSDEC and its partners monitor every site (where access is granted) in the State throughout both flights. Peak counts are used as indices of Karner blue butterfly abundance at each site to compare counts over time. However, given our current understanding of Karner blue butterflies (e.g., peak counts, available habitat, threats at sites), populations in New York do not meet “viable population” criteria (p. 55, Service 2003). Threats to Karner blue butterflies in New York include habitat degradation (through invasive species introduction and lack of habitat management), destruction, and fragmentation resulting in isolated patches of habitat across the GLA. Karner blue butterflies at small sites in the GLA appear less able to withstand weather events such as drought, heavy rain, or extreme temperatures (Margolis 1999).

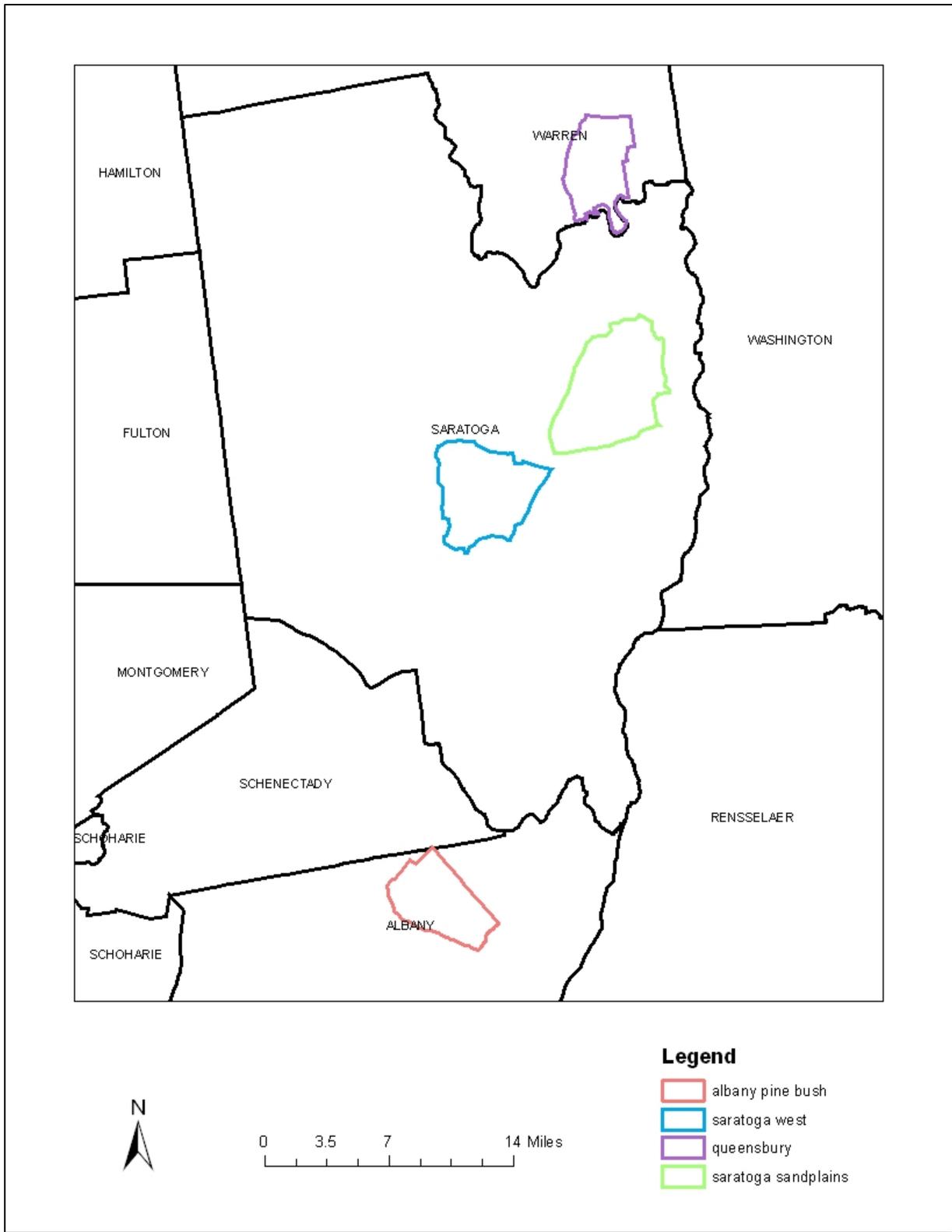
#### **2.4.2 Frosted Elfin**

The frosted elfin has a global status of G3 (vulnerable) and a status of S1S3 in the State of New York (NatureServe 2006). The frosted elfin was listed as threatened by the State of New York in 1999. NatureServe (2006) states the global long-term trend for the species shows very large to substantial declines (decline of 50 to >90%) and the global short-term trend is rapidly declining (decline of 10 to 50%).

Frosted elfin are similar to Karner blue butterflies in that they are closely tied to their habitats. There are two ecotypes or (unlikely) sibling species of frosted elfin (NatureServe 2006). One feeds on wild blue lupine flowers and developing pods and, if necessary, leaves in the last instar; the other feeds on young leaves of wild indigo (*Baptisia tinctoria*) or occasionally on other species of *Baptisia*. The SHA focuses on providing habitat for frosted elfin associated with wild blue lupine. In New York, frosted elfins associated with wild blue lupine occur in Albany, Oneida, Saratoga, Schenectady, and Warren Counties and those associated with wild indigo occur in Suffolk County. Frosted elfin are univoltine. In New York, adults fly in late April to early June. Frosted elfin overwinter as pupae just below the soil surface at the base of wild blue lupine plants. Threats to frosted elfin are similar to those of the Karner blue butterfly.

### 2.4.3 Recovery Strategy

The Service's Karner blue butterfly recovery strategy is to maintain extant populations throughout its geographic range and improve and stabilize populations where it is currently imperiled (p. 52, Service 2003). We anticipate that this strategy will also provide significant benefits to the frosted elfin. As discussed above, the Service established recovery units to ensure recovery of the Karner blue butterfly range-wide. Throughout the range, we are relying in part on Federal and State lands to conserve the Karner blue butterfly and its habitat. In New York, the majority of habitat restoration and management has occurred on State, local government, and private lands (*e.g.*, TNC). Due to the current ownership of lands in the GLA, we need cooperation from other interested landowners to assist with our efforts and expand the amount of habitat that is currently available for use by the Karner blue butterfly and frosted elfin. Through implementation of this SHA, we anticipate restoring and managing habitat through mowing, tree clearing and grubbing, removal of debris (*e.g.*, trash, gravel, yard waste), prescribed burning, limited use of herbicides, and planting (lupine and nectar species) seeds or seedlings by hand or mechanical equipment (*e.g.*, seed drill). While landowner participation may be opportunistic throughout the GLA, our priority is to restore and manage lands adjacent to existing Karner blue butterfly and frosted elfin populations within established potential viable population areas (Queensbury, Saratoga West, Saratoga Sandplains, and Albany Pine Bush) (Figure 2). We believe this will provide the greatest benefit to our extant populations. However, there are some extant sites outside these areas that could similarly benefit from habitat restoration and management; TNC may restore and manage lands in the vicinity of these more isolated sites. In addition, TNC may restore and manage lands even farther from existing populations. Over time, we would expect to connect these sites with occupied habitat through additional restoration actions. We may also assist with recolonization of sites through translocation of frosted elfin and Karner blue butterflies.



**Figure 2.** Potential viable population areas within the Glacial Lake Albany Recovery Unit, New York.

### **3.0 Alternatives, Including the Proposed Action**

#### **3.1 Alternatives Not Considered for Detailed Analysis**

We considered developing a programmatic SHA with TNC for the GLA as well as two potential recovery units (Rome Sand Plains and Tonawanda) in New York (see Figure 1). Potential recovery units are areas in which the Karner blue butterfly occurred historically or may exist in low numbers and in which sufficient restorable and suitable habitat occurs that potentially could support a viable metapopulation of Karner blue butterflies (Service 2003). The Rome Sand Plains potential recovery unit is located in Oneida County and the Tonawanda potential recovery unit is located in Erie and Genesee Counties. We are unaware of any extant populations of Karner blue butterflies in these areas. However, the frosted elfin is known to occur in the Rome Sand Plains potential recovery unit and may occur in the Tonawanda potential recovery unit. The Eastern New York Chapter of TNC is the cooperator for this project and the potential recovery units are outside the geographic boundary of their focus and responsibilities. In addition, the primary focus of the recovery program for the Karner blue butterflies is the GLA. Therefore, we decided to develop this SHA exclusively for the GLA. Should other TNC chapters wish to participate in this program, we can amend the SHA to include those areas in the future.

#### **3.2 Alternatives Carried Forward for Detailed Analysis**

##### **3.2.1 Alternative A - Issue Permit and Implement Programmatic SHA Program Through The Nature Conservancy (Proposed Action)**

Under Alternative A, TNC would implement a programmatic SHA program throughout the GLA. Each SHA implemented under this Alternative would contain site-specific management plans designed to conserve and/or restore habitat for the Karner blue butterfly and frosted elfin. Because Karner blue butterflies and frosted elfins require similar habitats throughout the GLA, most SHAs would contain similar management activities.

Management activities that would likely be implemented as part of a SHA include (but are not limited to):

**Black locust (*Robinia pseudoacacia*) clone removal** - This is generally conducted by heavy machinery. Tree boles are removed using feller bunchers and skidders, stumps are excavated and roots are raked from the soil using a bulldozer equipped with a root rake followed by light grading to remove tire ruts and prepare the site for restoration plantings. This technique effectively converts closed canopy invasive forest stands to open prairie/savannah capable of supporting Karner blue butterflies.

**Selective tree removal** - This technique involves selective removal of canopy trees using chainsaws by hand crews and/or mechanical tree felling equipment. Stumps and roots may or may not be removed using excavators or stump grinders depending on the particular site conditions and restoration goals. This technique effectively thins the canopy, increasing light penetration to the forest floor.

**Tree girdling** - Tree girdling involves using a hand-held, non-motorized bark-spud to remove a one-foot wide strip of bark from live trees. The technique is most commonly used to control aspen species (*Populus tremuloides* and *P. grandidentata*), but can also be used to effectively control other overstory species. Standing dead trees are generally left on site to decompose naturally. This technique also increases light penetration and creates snags that often support a number of wildlife species, including primary and secondary cavity nesting species.

**Herbicide application** - Herbicide applications may include localized spot treatments using hand-held foliar applicators (back-pack sprayer, cut stump drip applicators, or wick applicators) or broadcast mechanized applications (ATV, truck/tractor mounted) depending on site conditions and restoration objectives. All herbicide applications follow labeled instructions and applicable state and/or Federal guidelines. Herbicide applications result in decreased undesirable vegetation (overstory, understory, and/or groundcover) and increased cover of plants essential to Karner blue butterfly habitat.

**Site grading** - Soil grading restores topographic heterogeneity in heavily altered sites (parking lots, old agricultural fields, etc.) and/or to remove tire ruts in order to prepare a site for mechanized seeding.

**Restoration planting** - All plantings use locally-derived native seed. Similarly, on sites where white pine (*Pinus strobus*) or other native overstory trees are too dense, silvicultural thinnings are followed by native plantings that effectively convert forested stands to a more open oak and pine savannah where grasses and forbs dominate the ground-cover vegetation. Abandoned agricultural fields and paved parking lots are restored to native prairie openings. Depending on the site conditions and restoration objectives, seeding may include broadcast plantings with mechanized seed drills towed behind a tractor or bulldozer, hand-seeding using shoulder harnessed or walk-behind seeders, or non-mechanized hand broadcasting of seeds. Any of these seeding methods may be preceded and/or followed by cultipacking with a tractor and roller to ensure good soil-seed contact.

**Mowing** - Mowing generally involves mechanized mowing machines (*e.g.*, tractor and brush-hog, hydro-ax) to keep vegetation low in combination with prescribed fire treatments or as a sole vegetation management treatment in shrub-land and grassland-dominated sites or sites where fire management is precluded.

**Prescribed fire** - In pitch pine scrub oak barrens, fire treatments serve to thin the forest overstory and understory of fire-sensitive tree species such as red maple (*Acer rubrum*) and white pine, and decrease the dominance of aspen species (*P. tremuloides*, *P. grandidentata*, and *P. deltoides*) while increasing fire-dependent plants in the understory. Physically these treatments reduce accumulated litter and duff, increase light levels at the forest floor, increasing native grasses and wild flowers, and flower production. Top-killing fire-sensitive trees and shrubs also increase standing dead trees to the benefit of primary and secondary cavity nesting birds.

**Captive-rearing and translocation of butterflies** - To enhance the rate of butterfly colonization of sites, TNC, the NYSDEC, and the Service may employ captive-rearing and translocation

methods. This would involve capturing adult gravid females from a site, bringing them into captivity where they would lay their eggs, and returning the females to their collection site. Eggs would hatch into larvae, pupate, and be released to a site. The NYSDEC and Service would meet annually to develop a captive-rearing and translocation plan to identify sites for collection and release, maximum number of adults that can be collected, etc.

TNC-owned lands will not be covered by the SHA and any management activities that result in limited “take” of Karner blue butterflies will be covered through a Section 10(a)(1)(A) enhancement of recovery permit.

### **3.2.2 Alternative B - Continue Ongoing Conservation Measures Without Issuing Any Permits Associated with SHAs (No Action)**

Under Alternative B, TNC would continue their existing habitat restoration and management program using the same techniques as described in Alternative A. The program would occur on their own land, as well as any land owned by their partners or other interested private landowners. The Nature Conservancy would also continue their outreach programs designed to assist with the conservation of the Karner blue butterfly. The NYSDEC would also continue their existing Karner blue butterfly and frosted elfin conservation programs. The Service would assist TNC and the NYSDEC with these efforts whenever possible.

### **3.2.3 Alternative C - Develop Individual SHAs Directly with Non-Federal Landowners**

Under Alternative C, the Service would implement a SHA program throughout the GLA. Each SHA implemented under this Alternative would contain site-specific management plans designed to conserve and/or restore habitat for the Karner blue butterfly and frosted elfin using the same techniques as those described in Alternative A. Because Karner blue butterflies and frosted elfins require similar habitats throughout the GLA, most SHAs would contain similar management activities. Management activities that would likely be implemented as part of a SHA are listed in Section 3.2.1.

## **4.0 Affected Environment**

### **4.1 Physical Characteristics**

Normal seasonal temperatures in the Albany area range from 36-57°F in spring, 58-80°F in summer, 40-60°F in autumn, and 16-34°F in winter. Annual average precipitation is 38.6 inches. Annual average snowfall is 62.9 inches.

### **4.2 Biological Environment**

#### **4.2.1 Habitat/Vegetation**

A great variety of landscape types exist within the GLA, including urban centers, suburban residential areas, agricultural fields, etc. Beyond active agricultural uses, a number of common

and rare natural communities exist throughout the remaining open space in Glacial Lake Albany. Natural communities tracked by the New York State Natural Heritage Program (NYNHP) include a number of communities common throughout upstate New York including successional old field, Appalachian Oak – Pine Forest, Northern Hardwood, successional southern hardwoods, successional northern hardwood, and red-maple hardwood swamp among others. Less common communities include a number of wetlands communities such as sedge-meadow and shallow emergent marsh. Two globally rare communities, inland pitch pine scrub oak barrens and pine barrens vernal ponds, also exist within Glacial Lake Albany and are the main focus of conservation efforts by TNC and New York State in the GLA. A list of vegetative communities tracked by the New York Natural Heritage Program (NYNHP) and found within the GLA is found in Appendix A.

Habitats supporting or capable of supporting habitat for the Karner blue butterfly and frosted elfin are generally characterized by very well-drained sandy soils. Historically, habitats that supported Karner blue butterflies and frosted elfins within the GLA included inland pitch pine scrub oak barrens and oak-pine savannas. These communities are now considerably diminished in size and condition. This has resulted from urban and suburban residential and commercial development, as well as vegetative succession due to a lack of necessary disturbance regimes, including periodic wildland fires.

Communities found within the GLA that are best suited for restoration practices described in the SHA include inland pitch pine scrub oak barrens, oak-pine savannah, tall-grass prairie openings, Appalachian oak pine forest, successional northern hardwood forest, successional southern hardwood forest, successional old fields, and mowed lawns as long as the soils are appropriate. In addition, formerly disturbed sites such as paved parking lots have been restored to Karner blue butterfly and frosted elfin habitat.

#### **4.2.2 Federally-listed Threatened and Endangered Species, and Candidate Species**

There are no Federal candidate species known to occur within the GLA at this time. Three Federally-listed species are known to occur within the vicinity of the GLA – the Karner blue butterfly, the Federally-listed endangered Indiana bat (*Myotis sodalis*), and the Federally-listed threatened bald eagle (*Haliaeetus leucocephalus*). At this time we are unaware of properties within the GLA which contain more than one of these species. No “critical habitat” has been designated within the GLA. The Nature Conservancy will coordinate with NYNHP, NYSDEC, and the Service to ensure they have the most up-to-date listed species and critical habitat information for each proposed project.

#### 4.2.2.1 Karner blue butterfly

Karner blue butterflies are known to occur in Albany, Saratoga, Schenectady, and Warren Counties. See Section 2.4 for additional information.

#### 4.2.2.2 Indiana bat

There are two known winter hibernacula for Indiana bats in the GLA counties (one in Albany County and one in Warren County). However, both hibernacula are located outside the primary zone of sand deposits. There is a summer record of a male Indiana bat in Albany County; however, there are no summer records of Indiana bats within the GLA to date.

#### 4.2.2.3 Bald eagle

Bald eagles are known to occur in Albany County along the Hudson River and in Saratoga County along the Sacandaga River. Both of these areas are outside the GLA sand-deposit areas where habitat restoration will occur.

### 4.2.3 New York State-listed Species

In addition to the State-listed endangered Indiana bat and Karner blue butterfly, and State-listed threatened bald eagle and frosted elfin, there are several other State-listed species that may occur in the vicinity of the GLA.

The following State-listed species are known or have the potential to occur within pine barrens or oak savannah communities in the GLA:

#### Endangered

##### Plant

Bayard's adder's-mouth orchid (*Malaxis bayardii*)  
Slender Marsh bluegrass (*Poa paludigena*)  
Nuttall's tick-trefoil (*Desmodium nuttallii*)  
Virginia false gromwell (*Onosmodium virginianum*)  
Hooker's orchid (*Platanthera hookeri*)

#### Threatened

##### Plant

Mock-pennyroyal (*Hedeoma hispida*)  
Clustered sedge (*Carex cumulate*)  
Little-leaf tick-trefoil (*Desmodium ciliare*)  
Carey's smartweed (*Persicaria careyi*)  
Whip nutrush (*Scleria triglomerata*)

#### Special Concern

##### Animal

Inland barrens buckmoth (*Hemileuca maia maia*)

Mottled duskywing (*Erynnis martialis*)  
Eastern hognose snake (*Heterodon platyrhinos*)  
Eastern spadefoot toad (*Scaphiopus holbrookii*)  
Spotted turtle (*Clemmys guttata*)  
Jefferson salamander (*Ambystoma jeffersonianum*)  
Blue-spotted salamander (*Ambystoma laterale*)  
Worm snake (*Carphophis amoenus*)  
Henry's elfin (*Callophrys henrici*)  
Tawny crescent (*Phycoides batesii batesii*)

The following State-listed species are known or have the potential to occur within other communities in the GLA:

### **Endangered**

#### Animal

Peregrine falcon (*Falco peregrinus*)  
Short-eared owl (wintering) (*Asio flammeus*)

#### Plant

Canadian single-spike sedge (*Carex scirpoidea*)  
Carolina clubmoss (*Lycopodiella caroliniana* var. *caroliniana*)  
Climbing fern (*Lygodium palmatum*)  
Downy wood-mint (*Blephilia ciliata*)  
Leiberg's panic grass (*Dichanthelium leibergii*)  
Midland sedge (*Carex mesochorea*)  
Puttyroot (*Aplectrum hyemale*)  
Side-oats grama (*Bouteloua curtipendula* var. *curtipendula*)  
Slender marsh bluegrass (*Poa paludigena*)  
Sweet coltsfoot (*Petasites frigidus* var. *palmatus*)

### **Threatened**

#### Animal

Blanding's turtle (*Emydoidea blandingii*)  
Henslow's sparrow (*Ammodramus henslowii*)  
King rail (*Rallus elegans*)  
Least bittern (*Ixobrychus exilis*)  
Northern harrier (breeding and wintering) (*Circus cyaneus*)  
Pied-billed grebe (*Podilymbus podiceps*)  
Sedge wren (*Cistothorus platensis*)  
Upland sandpiper (*Bartramia longicauda*)

#### Plant

Back's sedge (*Carex backii*)  
Fernald's sedge (*Carex merritt-fernaldii*)  
Golden corydalis (*Corydalis aurea*)  
Golden-seal (*Hydrastis canadensis*)  
Green rock-cress (*Arabis missouriensis*)

Handsome sedge (*Carex formosa*)  
Meadow horsetail (*Equisetum pretense*)  
Shrubby St. John's-wort (*Hypericum prolificum*)  
Small bur-reed (*Sparganium natans*)  
Smooth cliff brake (*Pellaea glabella* ssp. *glabella*)  
Stiff-leaf goldenrod (*Oligoneuron rigidum* var. *rigidum*)  
Terrestrial starwort (*Callitriche terrestris*)  
Yellow giant-hyssop (*Agastache nepetoides*)  
Thicket sedge (*Carex abscondita*)  
Violet wood-sorrel (*Oxalis violacea*)  
Wiry panic grass (*Panicum flexile*)

## **Special Concern**

### **Animal**

Eastern small-footed bat (*Myotis leibii*)

## **4.2.4 Other Natural Communities and Wildlife Species**

For a complete list of natural communities found within the GLA, refer to Appendix A. A long list of plant and animal species can be found within these communities. Throughout the sandy soils of the GLA most plant communities are dominated by oak and pine species and on richer soils are dominated by various eastern deciduous forests. These communities include Northern hardwood forest, beech-maple forest, and oak hickory forest. Wildlife common to these communities include a host of bird species such as ruffed grouse, wild turkey, wood thrush, and black-capped chickadees. Common mammals include whitetail deer, red and gray squirrels, cottontail rabbits, coyote, red fox, and gray fox. Snapping turtles, garter snakes, and green frogs are a few of the common reptiles and amphibians common throughout the area (Kricher 1998).

## **4.3 Land Use**

Many Karner blue butterfly and frosted elfin populations occur on protected lands owned by TNC, the NYSDEC, or local municipalities. However, most sites are currently owned by private landowners without commitments to protect and manage the habitat for the butterflies into perpetuity. Common land uses around current Karner blue butterfly and frosted elfin sites include agriculture, forest, commercial, and residential areas. We anticipate future habitat restoration projects to occur in a similar landscape. It is unlikely that any prime or unique farmlands would be impacted by the proposed action. Ecologically critical areas may be located near some of the proposed project areas, but would not be negatively affected.

## **4.4 Cultural Resources**

The GLA area contains historical resources. Evidence has been found of native peoples utilizing natural resources of the GLA as many as 10,000 years ago and European settlers arrived in the area in the 17<sup>th</sup> century (Barnes 2003). During this time, the Albany Pine Bush area was established as an important trade route and transportation corridor and later became an important site for glass production. Barnes (2003) highlights the human history of the Albany Pine Bush

Area. The northern regions of the GLA are also of historical significance; most notable are important battlegrounds of the American Revolutionary War. In particular, the Saratoga National Historical Park (Park) is maintained by the National Park Service in Saratoga County. First authorized as a New York State site in 1927 on the sesquicentennial of the Battles, the Battlefield was made part of the National Park System in 1938 when Saratoga National Historical Park was authorized by the United States Congress. While the Park supports remnant plant communities, including tall grass prairie capable of supporting Karner blue and frosted elfin butterflies, it does not currently support either species.

#### **4.5 Public Health and Safety**

A number of management strategies are employed to restore and manage habitat for the two butterfly species, including prescribed fire. Specifically, where fire management is used, smoke produced from controlled burning has the potential to adversely impact visibility along transportation corridors and human health (Hawver 1996). The Albany Pine Bush Preserve area of the GLA is currently the only area of the GLA to utilize prescribed fire management; fire management is a potential land management tool on SHA lands in the Albany area. The Albany Pine Bush Preserve Commission (APBPC) implemented a prescribed fire program in 1991 to restore and maintain globally-rare inland pitch pine scrub oak barrens and Karner blue butterfly habitat. To date more than 1,000 Preserve acres have been treated with prescribed fire. The fire management program is part of an overall management plan for the Preserve and is described in detail in the 2002 Management Plan and Final Environmental Impact Statement for the Albany Pine Bush Preserve (APBPC 2002). This plan was prepared and evaluated consistent with the New York State Environmental Quality Review Act (6 NYCRR Part 617), including extensive public review and comment, and was unanimously adopted by all members of the APBPC. Similar methodologies used on APBPC lands will be used for any prescribed fires on SHA lands.

Understanding the potential for public health and safety impacts posed by prescribed fire activities in the Preserve and methods of mitigating such risks have been evaluated by the APBPC (Hawver 1996, APBPC 2002). According to the April 2002 [NY] State Environmental Quality Review Findings Statement for the 2002 Management Plan and FEIS:

“Ecological restoration and management as proposed in the 2002 Plan will serve to enhance public health, safety and welfare by reducing potential for uncontrolled fires by maintaining low fuel loads, by providing easier access to control wildfire, [and] by preventing undergrowth from becoming too dense.....”

Considerable efforts are taken to reduce potential impacts of controlled burning, including an extensive public notification process prior to and the day-of conducting controlled burning operations, as well as controlling when, where, and how controlled burns are conducted so that fire and smoke are not likely to impact smoke-sensitive areas and/or people. Information regarding the burns and a questionnaire used to identify individuals potentially sensitive to smoke are mailed to all residents and businesses located within an approximate ¼ mile radius of the burn sites. Known sensitive individuals are called on each day of a burn to notify them of the burn. An informational meeting is held annually and flyers are distributed one month prior to the burn season to notify all Preserve neighbors near the burn sites of the anticipated timing of the

burns (the burn window). Press releases are also provided to major newspapers and television and radio stations. The APBPC uses New York State Department of Transportation-approved signage for roadways and utilizes digital variable message signs along Interstate 90, notifying drivers of on-going controlled burns and instructing them to drive cautiously in case of smoke. Local and State police and all local fire departments are notified one month prior to conducting controlled burns and of the specific locations being managed on the day of every burn.

Careful attention to the fundamentals of prescribed burning also serves to minimize adverse impacts of fire on human health and safety. These include: 1) selecting burn prescriptions that predict behavior for a fire to assure it can be controlled; 2) designing burn size and shape to aid in the ability to control the fire; 3) designing ignition patterns to ensure that fire behavior can be controlled to reduce potential smoke hazards; 4) burning large areas as smaller units in highly sensitive areas so that small, quickly dispersed puffs of smoke will be generated instead of large continual amounts; 5) ensuring proper equipment and experienced personnel are available to control the fire and respond to changing conditions if necessary; 6) ensuring proper monitoring of fire behavior, weather, and smoke dispersal during a fire so that, if necessary, adjustments can be made to reduce potential impacts on people; and 7) bordering all fire units by wide firebreaks to prevent fire damage to surrounding areas (Hawver 1996).

To respond to controlled burns that may escape, a wildfire contingency plan has been prepared and is outlined in the Fire Management Plan. Radios and cellular phones are at the burn site and the burn crew has direct contact with local police and fire dispatch for rapid communication. Equipment at the site of the burns is available for fire suppression should this be necessary.

“Discussions with individuals, results from post-burn questionnaires and general observations made during the burns indicate that fire can be used without adversely impacting the surrounding community, especially if adequate buffer areas are available. In general, the benefits of fire management, particularly the ecological benefits and reduced likelihood of catastrophic wildfire outweigh the minimal impacts that controlled fires may have on the local public” (APBPC 2002).

None of the other actions associated with Karner blue butterfly and frosted elfin habitat restoration and management are anticipated to have any impact on human health or safety.

#### **4.6 Local Socio-economic Conditions**

Because the scope of the proposed action encompasses dispersed activities across four counties in New York and specific project locations are unknown at this time, a detailed analysis of existing socio-economic conditions was not feasible for each property where activities are proposed. However, given the nature of the proposed action (implementing the SHA), no adverse effects to local socioeconomic conditions are anticipated.

## **5.0 Environmental Consequences**

### **5.1 Elements Common to All Alternatives**

We anticipate similar environmental consequences regardless of which alternative is selected. However, we anticipate differences among the three alternatives with respect to timing and scale of the impacts.

#### **5.1.1 Physical Impacts**

Restoration and management activities that may be used at various sites in the GLA include whole tree removal of non-native invasive black locust or selective tree thinning of dense stands of trees; tree girdling; limited herbicide application; site grading; planting wild blue lupine, native grasses, and nectar plants; mowing; and prescribed burning. Each of these methods serve to restore and/or manage inland pitch pine scrub oak barrens and oak-pine savannah cover types and involve some degree of physical disturbance. Limited disturbance is likely from tree girdling, selective tree thinning, herbicide application, and planting activities. However, greater impacts may be anticipated from the heavy machinery used for black locust removal, site grading, and mowing, and from prescribed burning. For further description of the activities, see Section 3.2.1. All physical impacts are anticipated to be geographically localized and limited in duration.

#### **5.1.2 Biological Resources**

The above-described management activities and their changes to the landscape will result in changes to the vegetation and wildlife as further described below. In many cases, activities associated with the SHA will shift forests to a more open canopy condition with an understory dominated by shrubs, grasses, and wildflowers.

We anticipate a reduction in common northern hardwood forest and roadside disturbance plant species and a commensurate increase in pitch pine scrub oak barrens, oak-pine savannahs, and tall grass prairie openings. For example, silvicultural treatments in black locust stands eliminate this species and the habitat it provides to other plants and animals. Beachy (2002) found that two bird species – red-eyed vireo (*Vireo olivaceus*) and rose-breasted grosbeak (*Pheucticus ludovicianus*) – typical of closed canopy hardwood forests were significantly more abundant in invasive southern hardwood forests in the Albany Pine Bush Preserve, compared to un-invaded pitch pine scrub oak barrens. Within recent decades, however, habitat for such species has significantly increased across upstate New York (Smith et al. 1993) while early successional open grassland and shrub-land habitats, like those capable of supporting Karner blue and frosted elfin butterflies, have declined (DeGraaf and Yamasaki 2003, Dettmers 2003, Thompkins and DeGraaf 2001).

Beachy (2002) found a variety of migratory birds within both black locust/aspen invaded sites and uninvaded sites within the Albany Pine Bush Preserve. However, six species were significantly more prevalent at uninvaded sites – Eastern towhee (*Pipilo erythrophthalmus*), house wren (*Troglodytes aedon*), field sparrow (*Spizella pusilla*), prairie warbler (*Dendroica*

*discolor*), red-breasted nuthatch (*Sitta canadensis*), and pine warbler (*Spizella passerina*). According to breeding bird survey data, two of these species (Eastern towhee and field sparrow) have experienced declines of  $\geq 2\%$  per year from 1966 to 2001 in the northeast (Sauer et al. 2002).

Overall, management activities are anticipated to result in a net gain in habitat for migratory birds, including above-listed species that are increasingly becoming rare in the northeast. We anticipate limited short-term impacts to shrubland nesting birds (e.g., brown thrasher [*Toxostoma rufum*]) during clearing of non-native shrubs. However, native shrub species will replace these and provide future nesting habitat. We anticipate no direct impacts to nesting tree bird species as all tree clearing will be conducted in the fall after nesting.

Successfully managing barrens and savannah communities with prescribed fire and mowing treatments generally maintains and bolsters populations of at-risk and listed species described above that are characteristic of early successional plant communities in the GLA. In the Albany Pine Bush, populations of several at-risk species including eastern hognose snake and inland barrens buckmoth, appear to increase in areas managed with prescribed fire. Using these management techniques may also arrest the decline of certain species by maintaining appropriate habitat; the absence of wildland fire in inland pitch pine scrub oak barrens and oak-pine savannah reduces the viability of these plant communities and their ability to support characteristic and at-risk species.

### **5.1.3 Federally-listed Species**

#### **5.1.3.1 Karner blue butterfly**

All of the potential management actions described above should provide significant benefits to the Karner blue butterfly by enhancing or maintaining suitable Karner blue butterfly habitat. While management efforts at sites occupied by Karner blue butterflies may result in some take of individual butterflies (egg, larvae, pupae, or adult) or temporary short-term degradation of habitat, the overall benefits of the above-described actions outweigh these potential adverse impacts. In addition, TNC, the NYSDEC, and the Service have developed conservation measures to minimize potentially negative management effects on Karner blue butterflies and frosted elfins (e.g., conducting activities during certain times of the year, minimizing disturbance to occupied habitat), which will be included as permit conditions.

#### **5.1.3.2 Indiana bat**

Based on our current understanding of Indiana bats in New York, we do not anticipate any effects to Indiana bats from the above-described habitat restoration activities. Within the vicinity of the GLA, there are few wintering Indiana bats; therefore, the likelihood of encountering a maternity colony is quite low. In addition, the majority of trees proposed for removal have smooth bark (e.g., aspen, young black locust) which do not provide roosting sites for Indiana bats. As we continue to learn more about Indiana bats in the GLA, we may find it necessary to incorporate conservation measures to avoid potential adverse effects to this species.

### **5.1.3.3 Bald eagle**

As stated in Section 4.2.2.3, bald eagles are known within the vicinity of the GLA, however, no nest or winter roost sites are known within priority restoration areas and we anticipate no effects to bald eagles from activities conducted under the proposed SHA. The Nature Conservancy will coordinate with NYNHP, NYSDEC, and the Service to ensure they have the most up-to-date bald eagle information for each proposed project.

### **5.1.4 Cultural Resources**

Most cultural resources concerns can be identified through established processes pursuant to the Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470) and Section 14.09 of the New York State Historic Preservation Act of 1980.

Under Section 106 of the National Historic Preservation Act and Section 14.09 of the New York State Historic Preservation Act, the State Historic Preservation Office's role in the review process is to ensure that effects or impacts on eligible or listed properties are considered and avoided or mitigated during the project planning process.

To reduce paperwork, avoid duplication, and expedite decision-making, the Section 106 process as defined in 36 CFR Part 800 will be followed for purposes of the environmental assessment.

The Regional Director, as the responsible Federal agency official (800.2(a)), will ensure identification of cultural resources and historic properties within the areas of potential effect. Absent objections from Historic Preservation Officers (HPOs) or from other interested persons who have standing (800.2(c)(3), (4), and (5)), for every project (undertaking) involving land acquisition, ground disturbance, or buildings and structures 50 years and older:

1. The Nature Conservancy is authorized to consult with the HPO as agent for the Service for the specific project (undertaking) for the purpose of identifying cultural resources in the area of potential effect and obtain from the HPOs a determination of no historic properties or no effect on historic properties;
2. The Nature Conservancy will:
  - allow the HPO at least 30 calendar days to respond to requests for a determination of historic property presence
  - provide appropriate public and local government notification of the project
  - notify appropriate Indian tribes about the project
  - provide the Regional HPO with sufficient documentation to determine if the Section 106 process is completed before the project is implemented
  - provide the Service with copies of the HPO letters of no historic properties or no effect on historic properties before the project commences;
3. In event the HPO fails to respond appropriately after 30 calendar working days, the Service will take over the Section 106 process; and

4. If evaluation of cultural resources for being eligible for the National Register of Historic Places is needed, or if properties on or eligible for the National Register could be affected by the project, Service will take over the Section 106 process.

### **5.1.5 Environmental Justice**

Environmental justice is achieved when everyone, regardless of race, culture, or income, enjoys the same degree of protection from environmental and health hazards and equal access to a healthy environment to live, work, and play. None of the alternatives would have any environmental or socio-economic impacts on women, minority, ethnic, religious, or social groups or the civil rights of any citizen of the United States. Potentially affected Native American Tribes will be consulted under Secretarial Order 3206. The only environmental health risk inherent in any of the alternatives is reactions to smoke from prescribed fire (discussed above); no prime farmland or rangeland would be adversely impacted.

### **5.1.6 Human Health and Safety**

As discussed in Section 4.5, we do not anticipate any impacts to human health and safety from activities associated with the SHA. While prescribed burns may have the highest potential to effect human health and safety (out of all of the proposed activities), this is not anticipated given the strict requirements under which prescribed burns must follow.

### **5.1.7 Cumulative Impacts**

The incremental cumulative impacts of Alternatives A, B, and C would differ on the resources discussed above. However, regardless of which alternative in this EA is chosen, the effects of other past, present, and reasonably foreseeable future actions on these resources are the same. Because each alternative under consideration is regional in scope, cumulative impacts have also been analyzed on a regional scale.

Early-successional pine barrens and oak savannah communities have experienced significant degradation, loss, and fragmentation since European settlement of the GLA. The sandy soils found in these communities provide ideal sites for human development. Development pressures are expected to continue to increase along the Interstate 87 corridor between Albany and Warren Counties. Fire suppression has also increased in areas with intensive human development. While the APBPC prescribed fire program has successfully expanded over the past several years, alternative forms of management are required at many Karner blue butterfly and frosted elfin sites.

These conditions have led to the decline and isolation of many remaining Karner blue butterfly populations. Karner blue butterfly recovery efforts will need to include expansion of existing sites, restoration of additional sites, and increased connectivity among sites.

## **6.0 Future NEPA Analyses**

Should the preferred alternative be selected, there will likely be multiple individual SHAs entered into by TNC, each of which will involve various management activities. We anticipate that activities conducted under individual SHAs will require no further NEPA analysis unless they result in any extraordinary circumstances (516 DM 2, Appendix 2).

## **7.0 List of Preparers**

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## **8.0 Consultation/Coordination with the Public and Others**

During the preparation of this EA, consultation and coordination occurred among the New York Ecological Services Field Office, the Green Bay Ecological Services Field Office, the Service's Northeast Regional Office, the Northeast Regional Office of the Solicitor, and the New York State Department of Environmental Conservation. Consultation pursuant to Section 7 of the ESA has been initiated and will be completed concurrently with the review of this EA during the public comment period. All requirements and suggestions resulting from the Section 7 consultation will be followed and addressed in the final EA.

The Service's Region 5 Regional Director will provide the State Historic Preservation Officers and Tribal Historic Preservation Officers with this EA as part of the public review and comment drawing their attention to the recommended procedure for implementing Section 106 of the National Historic Preservation Act as described in 36 Code of Federal Regulations Part 800.

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Appendix A. GLACIAL LAKE ALBANY COMMUNITIES AND PLANT AND ANIMAL SPECIES TRACKED BY NEW YORK NATURAL HERITAGE PROGRAM

Plants and Animals Found Within the Pine Barrens Community in Albany, Schenectady, Saratoga, and/or Warren Counties						
SCIENTIFIC NAME	COMMON NAME	GROUP	NYS LISTING	FEDERAL LISTING	STATE RANK	GLOBAL RANK
<i>Myotis sodalis</i>	Indiana bat	Vertebrate Animal	Endangered	Endangered		
<i>Lycaeides melissa samuelis</i>	Karner Blue	Invertebrate Animal	Endangered	Endangered	S1	G5T2
<i>Callophrys irus</i>	Frosted Elfin	Invertebrate Animal	Threatened		S1S3	G3
<i>Erynnis martialis</i>	Mottled Duskywing	Invertebrate Animal	Special Concern		S1S2	G3G4
<i>Hemileuca maia maia</i>	Inland Barrens Buckmoth	Invertebrate Animal	Special Concern		S1	G5T5
<i>Atrytonopsis hianna</i>	Dusted Skipper	Invertebrate Animal			S3	G4G5
<i>Satyrrium edwardsii</i>	Edwards' Hairstreak	Invertebrate Animal			S3S4	G4
<i>Itame sp. 1</i>	Barrens Itame	Invertebrate Animal			S1	G3G4
<i>Catopyrrha coloraria</i>	Broad-lined Catopyrrha	Invertebrate Animal			S2S3	G4
<i>Zanclognatha martha</i>	Pine Barrens Zanclognatha	Invertebrate Animal			S1S2	G4
<i>Macrochilo bivittata</i>	A Noctuid Moth	Invertebrate Animal			SU	G3G4
<i>Cerma cora</i>	Bird Dropping Moth	Invertebrate Animal			S1S3	G3G4
<i>Acronicta albarufa</i>	Barrens Dagger Moth	Invertebrate Animal			SH	G3G4
<i>Papaipema sp. 2</i>	Ostrich Fern Borer Moth	Invertebrate Animal			S1?	G3G4
<i>Chytonix sensilis</i>	A Noctuid Moth	Invertebrate Animal			S1S3	G4
<i>Chaetagnaea cerata</i>	A Noctuid Moth	Invertebrate Animal			S1S2	G3G4

<i>Apharetra dentata</i>	Toothed Apharetra	Invertebrate Animal			S2S3	G4
<i>Malaxis bayardii</i>	Bayard's Adder's-mouth Orchid	Vascular Plant	Endangered		S1	G2
<i>Cyperus schweinitzii</i>	Schweinitz's Flatsedge	Vascular Plant			S2S3	G5
<i>Hedeoma hispida</i>	Mock-pennyroyal	Vascular Plant	Threatened		S2S3	G5
Pitch pine-scrub oak barrens	Pitch Pine-Scrub Oak Barrens	Community			S1	G2
Pitch pine-oak forest	Pitch Pine-Oak Forest	Community			S4	G4G5
Pine barrens vernal pond	Pine Barrens Vernal Pond	Community			S2	G3G4
<b>Other Animals within Glacial Lake Albany</b>						
<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>GROUP</b>	<b>NYS LISTING</b>	<b>FEDERAL LISTING</b>	<b>STATE RANK</b>	<b>GLOBAL RANK</b>
<i>Myotis leibii</i>	Eastern Small-footed Myotis	Vertebrate Animal	Special Concern		S2	G3
<i>Podilymbus podiceps</i>	Pied-billed Grebe	Vertebrate Animal	Threatened		S3B,S1N	G5
<i>Ixobrychus exilis</i>	Least Bittern	Vertebrate Animal	Threatened		S3B,S1N	G5
<i>Rallus elegans</i>	King Rail	Vertebrate Animal	Threatened		S1B	G4
<i>Cistothorus platensis</i>	Sedge Wren	Vertebrate Animal	Threatened		S3B,SNAN	G5
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Vertebrate Animal	Threatened	Threatened, Proposed for Delisting	S2S3B,S2N	G4
<i>Falco peregrinus</i>	Peregrine Falcon	Vertebrate Animal	Endangered		S3B	G4
<i>Tyto alba</i>	Barn Owl	Vertebrate Animal			S3	G5
<i>Circus cyaneus</i>	Northern Harrier (breeding and wintering)	Vertebrate Animal	Threatened		S3B,S3N	G5
<i>Asio flammeus</i>	Short-eared Owl (wintering)	Vertebrate Animal	Endangered		S2	G5

<i>Bartramia longicauda</i>	Upland Sandpiper	Vertebrate Animal	Threatened		S3B	G5
<i>Ammodramus henslowii</i>	Henslow's Sparrow	Vertebrate Animal	Threatened		S3B,SNAN	G4
<i>Emydoidea blandingii</i>	Blanding's Turtle	Vertebrate Animal	Threatened		S2S3	G4
<i>Asterocampa clyton</i>	Tawny Emperor	Invertebrate Animal			S3	G5
<i>Hetaerina americana</i>	American Rubyspot	Invertebrate Animal			S2S3	G5
<b>Other Plants within Glacial Lake Albany</b>						
<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>GROUP</b>	<b>NYS LISTING</b>	<b>FEDERAL LISTING</b>	<b>STATE RANK</b>	<b>GLOBAL RANK</b>
<i>Petasites frigidus</i> var. <i>palmatius</i>	Sweet Coltsfoot	Vascular Plant	Endangered		S1	G5T5
<i>Oligoneuron rigidum</i> var. <i>rigidum</i>	Stiff-leaf Goldenrod	Vascular Plant	Threatened		S2	G5T5
<i>Arabis missouriensis</i>	Green Rock-cress	Vascular Plant	Threatened		S2	G5?Q
<i>Callitriche terrestris</i>	Terrestrial Starwort	Vascular Plant	Threatened		S2S3	G5
<i>Hypericum prolificum</i>	Shrubby St. John's-wort	Vascular Plant	Threatened		S2	G5
<i>Corydalis aurea</i>	Golden Corydalis	Vascular Plant	Threatened		S2	G5
<i>Agastache nepetoides</i>	Yellow Giant-hyssop	Vascular Plant	Threatened		S2S3	G5
<i>Blephilia ciliata</i>	Downy Wood-mint	Vascular Plant	Endangered		S1	G5
<i>Oxalis violacea</i>	Violet Wood-sorrel	Vascular Plant	Threatened		S2S3	G5
<i>Hydrastis canadensis</i>	Golden-seal	Vascular Plant	Threatened		S2	G4
<i>Carex abscondita</i>	Thicket Sedge	Vascular Plant	Threatened		S2	G4G5
<i>Carex backii</i>	Back's Sedge	Vascular Plant	Threatened		S2	G4

<i>Carex formosa</i>	Handsome Sedge	Vascular Plant	Threatened	S2S3	G4
<i>Carex merritt-fernaldii</i>	Fernald's Sedge	Vascular Plant	Threatened	S2S3	G5
<i>Carex mesochorea</i>	Midland Sedge	Vascular Plant	Endangered	S2	G4G5
<i>Carex scirpoidea</i>	Canadian Single-spike Sedge	Vascular Plant	Endangered	S1	G5
<i>Aplectrum hyemale</i>	Puttyroot	Vascular Plant	Endangered	S1	G5
<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Side-oats Grama	Vascular Plant	Endangered	S1	G5T5
<i>Dichantherium leibergii</i>	Leiberg's Panic Grass	Vascular Plant	Endangered	S1	G5
<i>Panicum flexile</i>	Wiry Panic Grass	Vascular Plant	Threatened	S2	G5
<i>Poa paludigena</i>	Slender Marsh Bluegrass	Vascular Plant	Endangered	S1	G3
<i>Scheuchzeria palustris</i>	Pod Grass	Vascular Plant	Rare	S3	G5
<i>Sparganium natans</i>	Small Bur-reed	Vascular Plant	Threatened	S2	G5
<i>Pellaea glabella</i> ssp. <i>glabella</i>	Smooth Cliff Brake	Vascular Plant	Threatened	S2	G5T5
<i>Equisetum pratense</i>	Meadow Horsetail	Vascular Plant	Threatened	S2	G5
<i>Lycopodiella caroliniana</i> var. <i>caroliniana</i>	Carolina Clubmoss	Vascular Plant	Endangered	S1	G5T4
<i>Lygodium palmatum</i>	Climbing Fern	Vascular Plant	Endangered	S1	G4
<i>Scorpidium scorpioides</i>	a moss	Nonvascular Plant		S1S2	G4G5
<i>Sphagnum subfulvum</i>	a moss	Nonvascular Plant		S1	GNR

<b>Other Communities within Glacial Lake Albany</b>				
<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>GROUP</b>	<b>STATE RANK</b>	<b>GLOBAL RANK</b>
Floodplain forest	Floodplain Forest	Community	S2S3	G3G4
Red maple-hardwood swamp	Red Maple-Hardwood Swamp	Community	S4S5	G5
Silver maple-ash swamp	Silver Maple-Ash Swamp	Community	S3	G4
Vernal pool	Vernal Pool	Community	S3S4	G4
Red maple-tamarack peat swamp	Red Maple-Tamarack Peat Swamp	Community	S2S3	G3G4
Northern white cedar swamp	Northern White Cedar Swamp	Community	S2S3	G4
Rich hemlock-hardwood peat swamp	Rich Hemlock-Hardwood Peat Swamp	Community	S2S3	G3G4
Black spruce-tamarack bog	Black Spruce-Tamarack Bog	Community	S3	G4G5
Deep emergent marsh	Deep Emergent Marsh	Community	S5	G5
Shrub swamp	Shrub Swamp	Community	S5	G5
Sedge meadow	Sedge Meadow	Community	S4	G5
Marl fen	Marl Fen	Community	S1	G2G3
Rich shrub fen	Rich Shrub Fen	Community	S1S2	G3G4
Medium fen	Medium Fen	Community	S2S3	G3G4
Inland poor fen	Inland Poor Fen	Community	S3	G4
Dwarf shrub bog	Dwarf Shrub Bog	Community	S3	G4
Highbush blueberry bog thicket	Highbush Blueberry Bog Thicket	Community	S3	G4
Limestone woodland	Limestone Woodland	Community	S2S3	G3G4
Calcareous talus slope woodland	Calcareous Talus Slope Woodland	Community	S3	G3G4
Shale talus slope woodland	Shale Talus Slope Woodland	Community	S3	G3G4
Pitch pine-oak-heath rocky summit	Pitch Pine-Oak-Heath Rocky Summit	Community	S3S4	G4
Red cedar rocky summit	Red Cedar Rocky Summit	Community	S3	G3G4

Appalachian oak-hickory forest	Appalachian Oak-Hickory Forest	Community	S4	G4G5
Maple-basswood rich mesic forest	Maple-Basswood Rich Mesic Forest	Community	S3	G4
Hemlock-northern hardwood forest	Hemlock-Northern Hardwood Forest	Community	S4	G4G5
Calcareous shoreline outcrop	Calcareous Shoreline Outcrop	Community	S2	G3G4
Calcareous cliff community	Calcareous Cliff Community	Community	S3	G4
Shale cliff and talus community	Shale Cliff and Talus Community	Community	S3	G4
Rocky summit grassland	Rocky Summit Grassland	Community	S3	G3G4
Successional fern meadow	Successional Fern Meadow	Community	S3S4	G4