Brookhaven National Laboratory

NATURAL RESOURCE MANAGAMENT PLAN

ANNUAL REPORT

CALENDAR YEAR 2008 & 2009

1.0 Introduction

This document summarizes activities carried out under Brookhaven National Laboratory's (BNL) Natural Resource Management Plan (NRMP) during calendar years 2008 and 2009. Previous year's reports may be obtained from BNL's Cultural and Natural Resource Manager. All activities carried out under the NRMP during CY2008 and CY2009 will be discussed and the report will facilitate development of summary information for the Site Environmental Report for 2007.

2.0 Comprehensive Natural Resource Management Plan

The Laboratory completed and issued the Comprehensive Natural Resource Management Plan in December 2003. The development of this plan was carried out over several years with the assistance of the Technical Advisory Group (TAG) that was established to provide input to the Natural Resource Program and the Upton Ecological and Research Reserve.

This report discusses work related to actions established within the NRMP and through subsequent annual reviews. Incremental changes from annual reviews will be incorporated annually with the completion of the required Annual Report. All incremental changes will be addressed during the 5-year re-write of the Plan scheduled to begin in late 2008.

3.0 Progress

3.1 Transition Wildlife Management Plan Actions into NRMP

This was completed in December 2003 with the publishing of the current NRMP.

3.2 Annual Summary Report

An annual summary report of activities under the NRMP was written for CY2007. This report covers CY2008 and CY2009. No report was written in CY2008 due to other higher priority work assignments.

3.3 TAG Review of Annual Report

The CY2006 report on the NRMP was submitted to the TAG for informational purposes. The TAG no longer exists due to multiple restructuring of outside organizations, and increased responsibilities, within organizations, being carried out by members from participating organizations.

3.4 Adaptive Management Cycle

The current report combines the sixth and seventh Annual Report in the Adaptive Management Cycle. It is not expected to result in a need for significant changes. However, the NRMP is due for a comprehensive review and re-write as necessary.

3.5 Improve Decision making through use of Innovative Tools

The use of global positioning systems (GPS) and geographic information systems (GIS) are routinely utilized in the Natural Resource Management program. No significantly new data has been added in 2008 and 2009. However, GPS and GIS have been used for planning and evaluation of environmental factors associated with the construction of the proposed BP Solar 32 MW photovoltaic arrays.

3.6 Maintain and Improve Relationships with Stakeholders

BNL continues to maintain good relationships with all of its stakeholders. Through interactions with the Office of Education Program's – Open Space Stewardship initiative increased activities with stakeholders is taking place. More than 20 school districts, 4 towns, Suffolk County, and over two dozen teachers are participating. The Natural Resource Program at BNL plays a role in training teachers to carryout monitoring of open space throughout Suffolk County. This activity strengthens BNL's relationship with numerous stakeholders.

The FERN, in working with BNL, developed a set of freshwater wetland monitoring protocols in 2007 and 2008. The protocols were developed on behalf of the Central Pine Barrens Joint Planning and Policy Commission. During the development of the protocols various stakeholders were consulted and provided review of the protocols.

FERN and the Natural Resource Program at BNL are closely allied to ensure sound operation of the Upton Reserve and to encourage the use of the Reserve, BNL and the Pine Barrrens for ecological research.

NYSDEC is routinely consulted on issues related to construction activities as they relate to natural resources. In 2008 & 2009, NYSDEC was consulted for construction activities associated with the Relativistic Heavy Ion Collider and throughout the environmental assessment and design stages for the BP Solar – Long Island Solar Farm. Early consultation with NYSDEC has proven to be beneficial in identifying sensitive environmental aspects of concern.

3.7 Peconic River Flow Monitoring

Peconic River flow is measured at several locations including above the outfall (HE), down river at the East Firebreak (HMn), and near the boundary of the Laboratory (HQ). In addition flows from the central wetlands are monitored before they enter the Peconic River station at the East Firebreak (HMs), and flows from the STP are measured prior to discharge into the Peconic River. Flow data for 2008 is presented in Figure 1 and flow data for 2009 is presented in Figure 2. In 2008 flow data indicated a typical wet spring followed by drying conditions. By mid-June 2008 flows from HM-S and HQ had pretty much stopped. Flows at HM-N indicate combined flows of the STP discharge as well as river flows from upstream of the discharge pipe. By June 2008 all onsite flows consisted primarily of the STP Discharge.

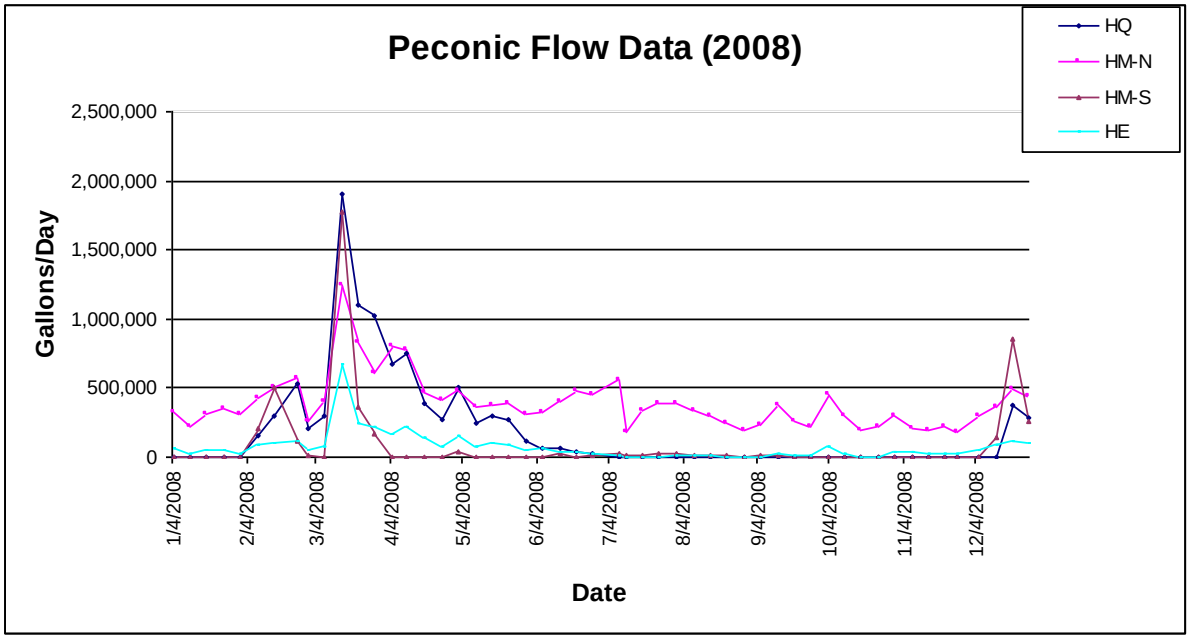

Figure 1. Peconic River flow data for 2008.

Peconic River flows in 2009 were non-typical for with low flows throughout the year with three minor increases in flow in April, May, and June followed by one heavy flow event in July. Flows then tapered off until late in the year when repeated heavy storms resulted in steadily increasing flows from mid-November through to the end of the year.

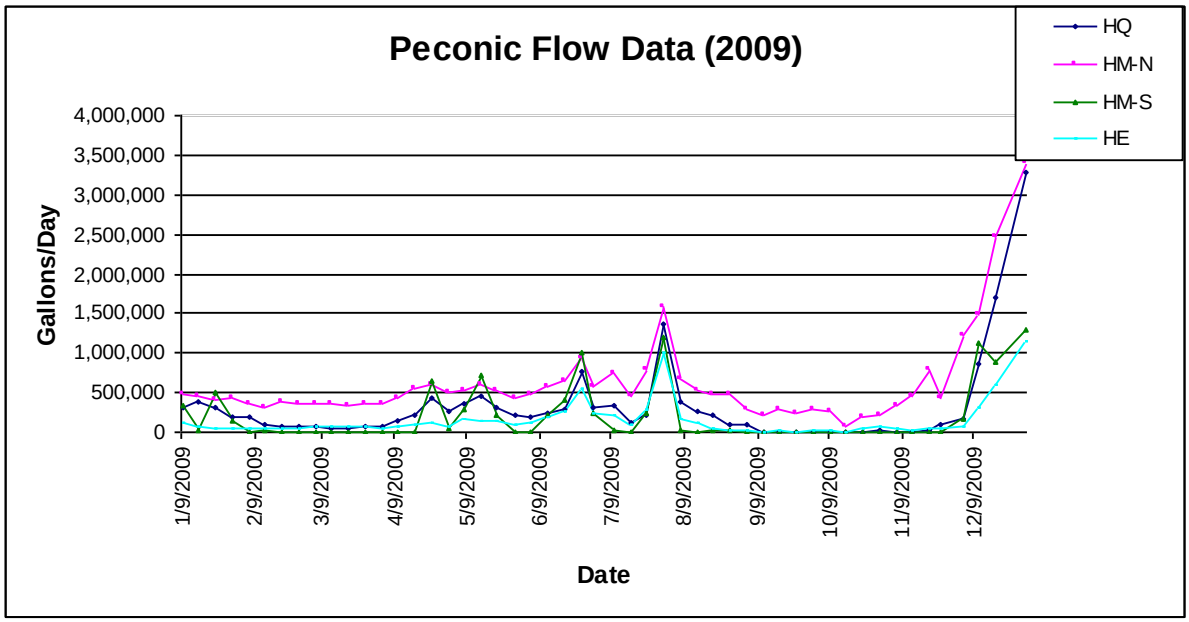

Figure 2. Peconic River flow data for 2009

3.8 Water Quality Monitoring

Water quality is monitored as a requirement of BNL's State Pollutant Discharge and Elimination System (SPDES) permit. Water quality is measured at various outfalls including the STP discharge to the Peconic River and at several recharge basins that receive stormwater and/or once through cooling water. Results are reported to the NYSDEC on a monthly basis and summarized in the Site Environmental Report each year. The Site Environmental Report for the previous year is made available in October and may be viewed via the Internet at http://www.bnl.gov/esd/SER.asp. Sampling in 2008 and 2009 did not indicate any concerns for threatened or endangered species within basins or the Peconic River.

In 2009 the NYSDEC issued BNL a new SPDES permit for its operations with a schedule for reducing discharge limits on several measured parameters including multiple metals. BNL began assessing all of its effluent sources in an effort to identify further opportunities for reducing metals content. The assessment process will continue into 2010 in order to establish the final parameters and discharge of STP effluents.

3.9 Fish Sampling Peconic River

A population assessment of the onsite portion of the Peconic River was not completed in 2008 or 2009 since numerous larger fish were captured during surveillance monitoring and sampling. Fish sampling on the Peconic River was initiated in April and continued through early June in both years. The early season sampling allowed for more and larger fish to be obtained. Historically, late summer sampling resulted in fewer samples taken which was likely due to low dissolved oxygen content in the shallow slow moving waters. Sampling did not appear to affect the population within the onsite portions of the river as numerous smaller fish were seen during sampling events.

Onsite banded sunfish population assessment was not carried out in 2008. However, students working in the Science Undergraduate Laboratory Internship (SULI) program worked with NYSDEC Fisheries biologist to assess banded sunfish populations throughout eastern Suffolk County in 2008 to gather sufficient information on the current status to begin writing a recovery plan for this threatened species. No work on banded sunfish occurred in 2009.

3.10 Deer Management

While the need for deer population management continues to be an issue for BNL, there was little change in deer management in 2008. Population estimates were carried out in both 2008 and 2009.

Discussions on various deer management issues are provided below.

3.10.1 Issue and Decision Paper on Deer Management

The Issue and Decision Paper on Deer Management was completed in November 2007 and the Laboratory Director was briefed on the paper. The paper was being reviewed for comment at the close of the year. In February 2008, the Issue and Decision Paper for Deer Management was presented to the BNL Policy Council. The Policy Council recommended going forward with establishing Deer Management.

3.10.2 Laboratory Input on Deer Management

Working with Community, Education, Governmental, and Public Affairs (CEGPA) personnel, several informational meetings or "Brown Bag" seminars were held to inform employees about the Issue and Decision Paper and to gather input. A Deer Management web page was developed http://intranet.bnl.gov/esd/wildlife/DeerManagement/ to make information available and to accept employee opinions.

One main comment from participants of the informational meetings was a desire to gather a Lab Wide opinion via survey. CEGPA assisted the Natural Resource Manager with development of a Lab wide survey. The survey was distributed to all employees and guests (~2800 surveys sent out) in October 2008 with 825 surveys being returned (~29% returned). 78 percent of respondents agreed an on-site deer management program is needed, while 13 percent disagreed. The other nine percent was split, between those who didn't know whether management was needed, and those who either didn't mark the question or marked "other. A summary of the results from the survey was published in a Monday Memo article and a database of survey results was developed.

From the Survey results a path forward was established in 2009 with a recommendation to develop an Environmental Assessment to establish deer management at BNL.

3.10.3 Environmental Assessment for Deer Management

No change in 2008. In 2009 after gathering employee input on deer management the decision to adopt or develop an Environmental Assessment for Deer Management was made. However, the environmental assessment process was suspended to work on the higher priority BP Solar – Long Island Solar Farm Environmental Assessment. The Deer Management EA will resume in 2010.

3.10.4 Implement Deer Management

No additional work has been done on this action in 2008 or 2009.

3.10.5 Deer Population Estimation

Deer population estimates were conducted in both spring (prior to birth of fawns) and in the fall (after birth of fawns and while bucks had antlers) in both 2008 and 2009. Figure 3 shows the population trend over the past ten years. Population levels are considered to be above the ecosystems carrying capacity and the effects of over population on the ecosystem are still evident.

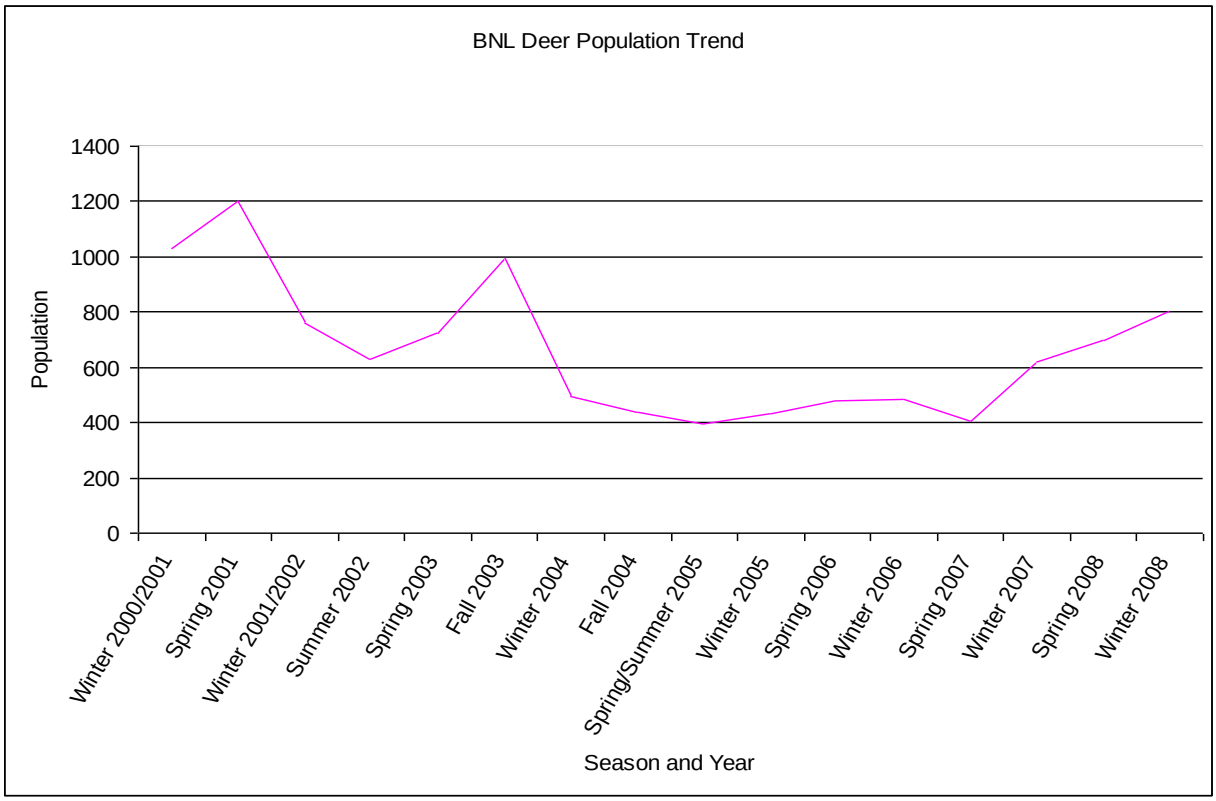

Figure 2. Trend in population estimates of white-tailed deer between 2001 and 2009.

3.11 Special Status Species

BNL is home to a number of plants and animals that are considered special status species including the New York State endangered tiger salamander and Persius duskywing, and the state threatened banded sunfish, swamp darter, frosted elfin butterfly and northern harrier (Table 1). Endangered and threatened plants include the crested fringed orchid, stargrass, and stiff goldenrod. There is also a relatively long list of species of special concern, and rare or vulnerable plants. Under the NRMP the Lab is working to identify areas that may be suitable habitat for species on this list.

In addition to the list in Table 1, species like the wild turkey and Canada goose are also of interest due to their prominence and potential to interact with humans. Information on these species is maintained simply to be aware of potential issues that may arise.

3.11.1 Maintain Special Status Species List

Table 1 is the most recent update of the special status species list. A threatened damselfly species, the pine barrens bluet (*Ennalagma recurvatum*) was placed on the list in 2005 after it was confirmed to exist onsite. Table 1 contains all species identified onsite since the mid-1980s. The sharp-shinned hawk and osprey were added in 2006 based on repeated identifications during routine bird surveys or other observations. The sharp-shinned hawk may nest on-site and the osprey has been documented using cellular communication towers and built a nest in 2009 on the cell tower located behind the Brookhaven Center.

3.11.2 Identify Habitats of Special Status Species

When special status species are identified as being present on the BNL site, their habitats are also identified, if possible. If applicable, surveys for the correct habitat take place with surveys for the species in question and information concerning presence or absence of the species is recorded and maintained in BNL's GIS. Currently surveys for four species take place at least annually, these are the tiger salamander, banded sunfish, swamp darter, frosted elfin, and pine barrens bluet.

3.11.3 Tiger Salamander

The eastern tiger salamander, a New York endangered species, is locally abundant on the BNL site. This species has been documented using at least 26 of the 27 ponds or pond systems on site. During the development of the NRMP pond designations were modified to lessen the confusion between confirmed (TS) and unconfirmed (ts) habitat.

Table 1. New York State Threatened, Endangered, and Species of Special Concern.

Common Name	Scientific Name	State Status	BNL Status
Insects			
Frosted elfin	*Callophrys iris*	T	Likely
Mottled duskywing	*Erynnis martialis*	SC	Likely
Persius duskywing	*Erynnis persius persius*	E	Likely
Pine Barrens Bluet	*Enallagma recurvatum*	T	Confirmed
Fish			
Banded sunfish	*Enniacanthus obesus*	T	Confirmed
Swamp Darter	*Etheostoma fusiforme*	T	Confirmed
Amphibians			
Eastern tiger salamander	*Ambystoma tigrinum tigrinum*	E	Confirmed
Marbled salamander	*Ambystoma opacum*	SC	Confirmed
Eastern spadefoot toad	*Scaphiopus holbrookii*	SC	Confirmed
Reptiles			
Spotted turtle	*Clemmys guttata*	SC	Confirmed
Eastern box turtle	*Terrapene carolina*	SC	Confirmed
Worm snake	*Carphophis amoenus*	SC	Confirmed
Eastern hognose snake	*Heterodon platyrhinos*	SC	Confirmed
Birds (nesting, transient, or potentially present)			
Whip-poor-will	*Caprimulgus vociferus*	SC	Likely
Grasshopper sparrow	*Ammodramus savannarum*	SC	Confirmed
Northern harrier	*Circus cyaneus*	T	Confirmed
Cooper's hawk	*Accipiter cooperii*	SC	Confirmed
Osprey	*Pandion haliaetus*	SC	Confirmed
Sharp-shinned Hawk	*Accipiter striatus*	SC	Confirmed
Plants			
Stargrass	*Aletris farinosa*	T	Confirmed
Butterfly weed	*Asclepias tuberosa*	V	Confirmed
Spotted wintergreen	*Chimaphila maculata*	V	Confirmed
Flowering dogwood	*Cornus florida*	V	Confirmed
Pink lady's slipper	*Cypripedium acaule*	V	Confirmed
Winterberry	*Ilex verticillata*	V	Confirmed
Sheep laurel	*Kalmia angustifolia*	V	Confirmed
Narrow-leafed bush clover	*Lespedeza augustifolia*	R	Confirmed
Ground pine	*Lycopodium obscurum*	V	Confirmed
Bayberry	*Myrica pensylvanica*	V	Confirmed
Cinnamon fern	*Osmunda cinnamomera*	V	Confirmed
Clayton's fern	*Osmunda claytoniana*	V	Confirmed
Royal fern	*Osmunda regalis*	V	Confirmed
Crested fringed orchid	*Plantathera cristata*	E	Likely
Swamp azalea	*Rhododendron viscosum*	V	Confirmed
Long-beaked bald-rush	*Rhynchospora scirpoides*	R	Confirmed
Stiff goldenrod	*Solidago rigida*	T	Confirmed
New York fern	*Thelypteris novaboracensis*	V	Confirmed
Marsh fern	*Thelypteris palustris*	V	Confirmed
Virginia chain-fern	*Woodwardia virginica*	V	Confirmed

Notes: * information based on 6 NYCRR Part 182, 6 NYCRR Part 193, and BNL survey data.

No federally listed threatened or endangered species are known to occur at BNL.

E = endangered, T = threatened, SC = species of special concern, R = rare, V = exploitably vulnerable

3.11.3.1 Tiger Salamander Annual Egg Mass Surveys

Egg mass surveys were not conducted in either 2008 or 2009. A Ph.D. candidate from SUNY Binghamton was finishing up research on the tiger salamander in 2008 and work loads for natural resource staff were such that surveys could not be completed in 2009.

3.11.3.2 Tiger Salamander Larval Surveys

Larval surveys were not completed in either 2008 or 2009.

3.11.3.3 New Pond at RHIC

No additional actions took place with this pond in 2008 or 2009, the pond routinely holds water and native vegetation has established in the area designed for tiger salamanders.

3.11.3.4 Cover Board Surveys on one TS Pond

Cover board surveys were discontinued in 2004, all remaining cover boards have either been moved by periodic high water levels or have decayed naturally.

3.11.3.5 TS-A7 Restoration of Meadow Marsh

Restoration was completed in 2003. This pond is currently being monitored as part of a long-term study of tiger salamanders being conducted by the State University of New York at Binghamton to compare its use by tiger salamanders to typical use of coastal plain ponds by salamanders. Results of the research are still pending and a dissertation is expected in 2010.

3.11.3.6 TS-W6b Pond Remediation ER Program

The TS-W6B Pond is located on the northwest edge of the Former Hazardous Waste Management Facility (FHWMF). The clean up and restoration of the wetland was completed in September 2005 and was conducted under a wetlands equivalency permit issued by the NYSDEC. While tiger salamander egg mass surveys were not completed in either 2008 or 2009, larval salamanders were seen in the pond in 2008.

3.11.4 Banded Sunfish

The banded sunfish (*Enneacanthus obesus*) is a New York threatened species that inhabits backwater areas of the Peconic River and Zeke's Pond. Two interns working under the Science Undergraduate Laboratory Internship program worked to document the population in Zeke's pond in 2007. The same two interns worked with fisheries biologists from the NYSDEC to document the presence/absence of banded sunfish throughout its range in the Peconic River watershed in order to begin developing a recovery plan for this species. Water levels in Zeke's Pond continue to be maintained supporting this fish. A poster of the 2008 research results is attached.

3.11.4.1 Peconic River Flow Monitoring HMn

As mentioned above in section 3.7 Peconic River flows are recorded at numerous locations including at HMn.

3.11.4.2 OU V Peconic River Remediation Program

Post cleanup monitoring of the Peconic River continued in 2008 and 2009. Sediment, fish, and water column samples were obtained. On site sediment samples were analyzed for radiological, PCB, and mercury content; off site sediment samples were analyzed for radiological and mercury content; fish were analyzed for mercury content; and water was analyzed for mercury, methyl mercury, and total suspended solids. Results of all sampling is published annually in the Peconic River Monitoring report and summarized in the Site Environmental Report for both years.

3.11.5 Frosted Elfin

The frosted elfin (*Callophrys iridis*) is a small orange-brown butterfly that is dependent on wild lupine. Historically, the frosted elfin was found along the south boundary and LIRR right of way at the south east corner of the Lab. This area is typified by soil disturbance that enhances habitat for wild lupine that in turn provides habitat for the butterfly.

3.11.5.1 Confirm Presence/Absence of Frosted Elfin

Surveys of the primary area of lupine occurring on site showed little or no increase in plant production over 2007 surveys. Due to the lack of suitable habitat of sufficient size, the Frosted Elfin is unlikely to occur on site.

3.11.5.2 Establish Monitoring Protocols for Frosted Elfin

No additional information on this has been forthcoming. At this point only surveys of host plants appear to be effective.

3.11.5.3 Maintain and Enhance Habitat for Frosted Elfin

Wild lupine likes disturbed soil areas as is found along the south firebreak at the southeast corner of the Lab. Disturbance of the primary area of lupine has not yet resulted in additional plants establishing.

3.11.5.4 Habitat assessment for Lupine

Since lupine is not spreading due to disturbance practices, the Natural Resource Program must consider either purchasing and planting or attempt to collect and plant seeds to encourage the spread this host plant to more areas. Attempts to collect seed have failed due to a narrow one to two day window to collect seeds prior to pods opening.

3.12 Habitat Enhancement other species

Several species of birds have been targeted for improvements in nesting habitat. These include the eastern blue bird, kestrel, and wood duck. As information is gained on other species of special interest, habitat improvement needs will be identified and implemented as necessary.

3.12.1 Bird nests/boxes

Nest boxes are important for many species of birds because of the lack of proper habitat. This is particularly true of birds that utilize cavities for nesting. The eastern bluebird is one of the better know birds for which nest boxes are important. BNL had 54 boxes distributed across the site in appropriate habitat (open fields near forested areas) in 2008 and 48 boxes in 2009. Several boxes were removed from around a recharge basin that was being enlarged to accommodate increased storm water flows. House wrens, tree swallows, chickadees, and tufted titmouse also use the bluebird boxes (Table 2). The successful use of boxes by bluebirds increased while use by other species decreased. The use of the nest boxes by different species is indicated in Figure 3. The percent use of nest boxes by bluebirds increased to nearly 60% in 2008 while use by other species like tree swallows declined.

All nest boxes including bluebird, wood duck, and kestrel boxes continue to be monitored by volunteers several times each year. To date, four years of monitoring suggest very limited use of wood duck boxes near the biology fields and in the RHIC ring, and apparently no use of kestrel boxes is occurring.

Table 2. Results of Bluebird Nest Box Monitoring 2001 – 2009. Some boxes are used more than once per season.

Summary of Nesting Success							
Year	# of Boxes	Empty/other	Bluebird	House Wren	Tree Swallow	Chickadee	Tufted Titmouse
2001	37	12	19	6	1		
2002	46	13	19	6	6	2	
2003	46	14	21	4	4		2
2004	48	12	23	6	6	1	
2005	53	9	39	6	6	1	
2006	56	8	38	9	6	1	
2007	54	20	27	14	3	3	
2008	54	19	32	14	1	2	
2009	48	20	27	7	5		

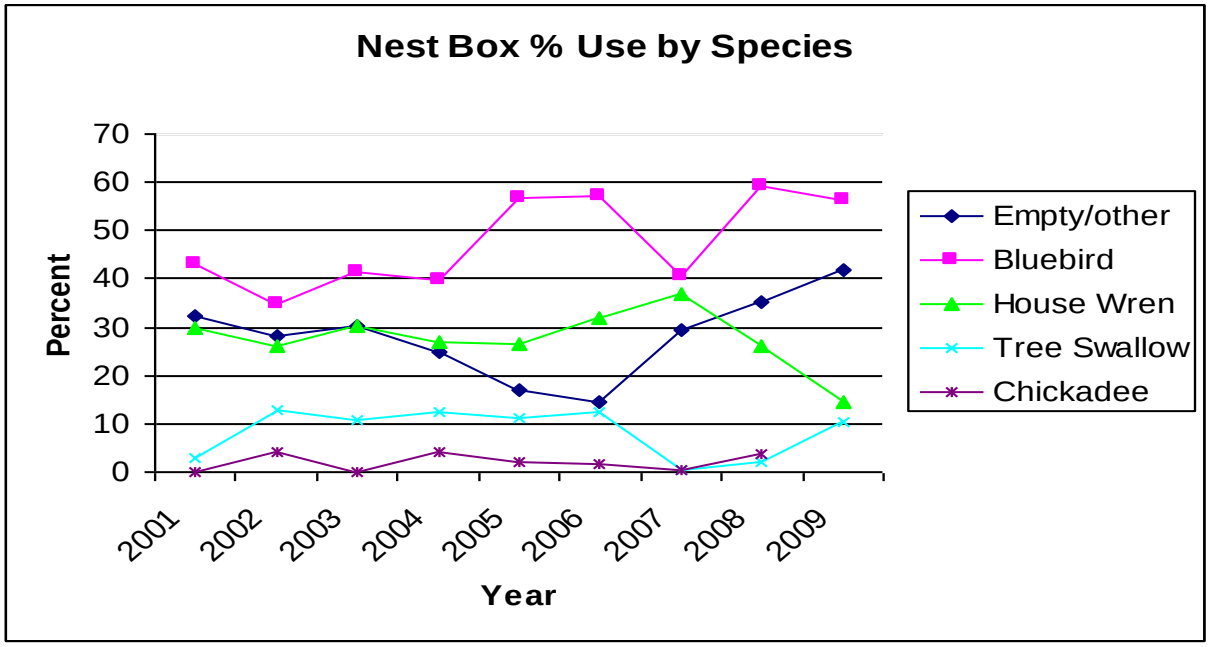

Figure 3. Bluebird nest box use based on a percentage of available boxes.

3.12.2 Surveys and Monitoring

Conducting surveys and routine monitoring allows BNL to identify, track, and trend population status for a number of species. New surveys for reptiles and amphibians, Odonata (damselflies and dragonflies), and incidental reporting of other species during routine activities results in a better understanding of which species are present. The following discussions will touch on the results of various surveys and monitoring in 2008 and 2009.

3.12.3 Develop Survey Methodology to document all Biota on BNL

A full set of monitoring and survey protocols are still needed. Contracts for a research data base and forest health monitoring protocols were completed in 2005. The forest health monitoring protocols have been implemented across BNL. Additional details are discussed below. Working with FERN, development of protocols for freshwater wetlands was started in the fall of 2006 and finalized in 2008.

A three year survey of BNL plants was initiated in 2007. Dr. Richard Stalter from St. John's University began random collection of plant species. The intent is to collect from spring through late fall each year in order to document as many species as possible from all habitats across the Laboratory. This work is to supplement the work completed in the 1994-95 biological surveys of BNL. A publication of the work is still pending after collections were made in 2008 and 2009.

3.12.3.1 Reptiles and Amphibians

Interns began marking all eastern box turtles (*Tarrapene carolina*) found by notching their carapace and releasing them. The practice started in 2003 and continued in 2007.

Turtle shell notching continued in 2008 but was not practiced in 2009. A database of marked turtles was started. As reported in last year's annual report, turtles are routinely inspected and recaptures documented.

In 2005 several box turtles were found with upper respiratory infections with three documented as having an amphibian ranavirus (iridovirus) isolated from their tissues. Based on this information, a study of the box turtles was initiated. Several turtles were captured in the TS-7 area, radio transmitters attached and then followed during the summers of 2006 and 2007. Similar work was conducted in 2008, a poster of that work is attached.

3.12.3.2 Monitor Canada Goose & Wild Turkey Populations

The Canada goose (*Branta canadensis*) population on site was estimated to be 157 birds in 2007. Oiling of goose eggs continued in 2008 and 2009. Canada goose population estimates went to approximately 148 in the fall of 2008 and down to around 120 in the spring of 2009. By fall of 2009 estimates were around 105 birds.

3.12.3.3 Turkey Sighting Reports to NYSDEC

The NYSDEC did not request assistance in monitoring of wild turkey populations in 2008. And turkey trapping in the fall of 2009 was unsuccessful. Trapping was intended to mark multiple birds prior to the first turkey hunting season on Long Island in November 2009. Rough estimates of the turkey population continue to place the number around 300 birds.

3.12.3.4 Song Bird Surveys

Songbird surveys have been carried out since May 2000. Monitoring involves recording ambient weather conditions at the beginning and end of each of the six routes, and counting the number of individuals of each species heard or seen during a five minute period at each point on the route. Points are spaced approximately 300 meters (Fig. 4) apart to prevent overlap of counts from point to point. Monitoring is carried out monthly from April through September each year.

The current summary of monitoring is provided in Table 3 below. In 2008, 70 species of birds were detected and in 2009 71 species were detected. Routes next to wetlands (Peconic River, Biology Fields, and Z-path routes) continue to have the highest number of species detected. This is likely due to higher biodiversity in these habitats that support a greater variety of nesting sites and foraging opportunities. Results along the Z-Path route are also beginning to indicate high number of species, likely due to the variability of habitats along this route. The Z-Path route goes through the most diverse habitats, ranging from pine forest, to wetlands, to mixed forest.

Bird survey data was used in determining potential effects of the proposed BP Solar – Long Island Solar Farm. The data was utilized in the development of the environmental assessment that was prepared in accordance with the National Environmental Policy Act of 1969.

Table 4 below provides detailed information on transect and numbers of birds detected between 2000 and 2009.

BNL will continue monitoring in 2010.

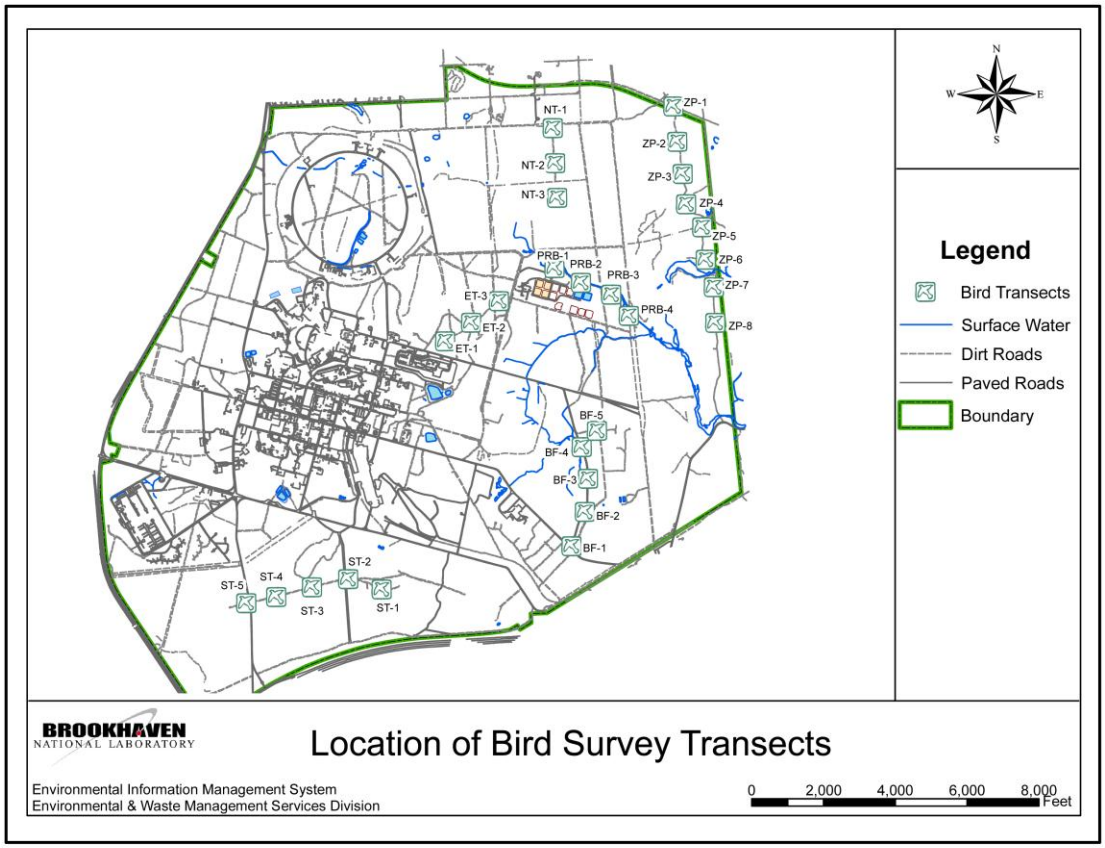

Figure 4. Songbird survey routes.

Table 3. Results of Bird Surveys 2000-2009

Year	# of Species Identified	# New Species Identified	Total # of Species	# of Species Biology Fields	# of Species East Trenches	# of Species North Transect	# of Species Peconic River	# of Species South Transect	# of Species Z-Path
2000	70		70	50	31	23	48	32	
2001	73	23	93	53	32	34	45	39	
2002	73	6	99	45	29	30	43	29	47
2003	79	4	103	49	27	31	47	33	44
2004	68	2	105	45	24	33	44	28	41
2005	67	3	108	49	26	32	43	26	43
2006	70	2	110	58	29	33	42	25	37
2007	69	1	111	51	23	34	43	23	46
2008	70	2	113	57	26	31	40	30	45
2009	71	1	114	52	29	31	50	26	43

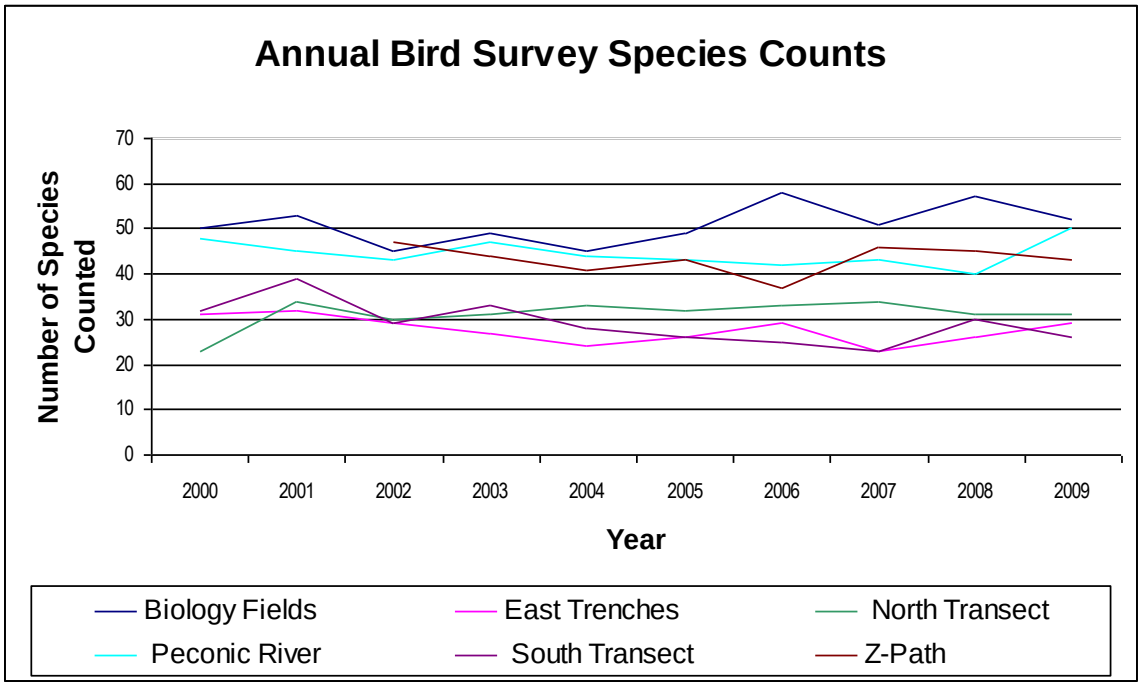

Figure 5. Trends in species counts of songbirds per transect from 2000 – 2009.

Table 4. Data concerning routinely documented bird species

		Year - Number									
Common Name	***Scientific Name***	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Acadian Flycatcher	*Empidonax virescens*		4								
American Crow	*Corvus brachyrhynchos*	71	74	87	121	49	29	43	41	57	29
American Kestrel	*Falco sparverius*				1			1			
American Redstart	*Setophaga ruticilla*	1	2								
American Robin	*Turdus migratorius*	207	120	492	231	176	178	278	128	356	264
Baltimore Oriole	*Icterus galbula*	6	41	39	53	53	35	61	41	40	59
Barn Swallow	*Hirundo rustica*		2	2	5	1	2	2	1	7	2
Belted Kingfisher	*Ceryle torquata*			1	1	3				2	1
Bewick's Wren	*Thryomanes bewickii*		1								
Black-and-White Warbler	*Mniotilta varia*	11	10	11	12	1	9	10	1	3	2
Black-billed Cuckoo	*Coccyzus erythropthalmus*	10	14	9	3		3	2	3	7	1
Black-capped Chickadee	*Poecile atricapillus*	84	114	122	111	173	135	186	168	105	137
Blackpole	*Dendroica striata*		1	2							
Black-throated Green Warbler	*Dendroica virens*	2	1								
Blue Jay	*Cyannocitta cristata*	123	216	319	288	253	199	230	180	251	182
Blue-Grey Gnatcatcher	*Polioptila caerulea*		5	6	3	3	4	2	4	10	5
Blue-headed Vireo	*Vireo solitarius*										2
Blue-winged Warbler	*Vermivora pinus*	1		3	3	1	1	4	4	6	7
Broad-winged Hawk	*Buteo platyteris*									2	
Brown Creeper	*Certhia americana*	13	1		3	3	1	1	1		
Brown Thrasher	*Toxostoma rufum*	9	6	1	7	1		2	1	5	1
Brown-headed Cowbird	*Molothrus ater*	9	34	98	81	84	78	69	71	52	73
Canada Goose	*Branta canadensis*	28	82	46	216	103	93	85	17	115	50
Carolina Wren	*Thryothorus ludovicianus*	1	1	7	1	9	5	10	9	14	6
Cedar Waxwing	*Bombycilla cedrorum*	39	2	22	2	1	8	46	44	10	20
Chestnut-sided Warbler	*Dendroica pensylvanica*	1								2	
Chimney Swift	*Chaetura pelagica*			1	1					2	
Chipping Sparrow	*Spizella passerina*	124	130	195	182	237	197	249	148	177	239
Common Grackle	*Quiscalus quiscula*	40	55	64	90	153	89	556	127	176	110
Common Loon	*Gavia immer*										1
Common Peafowl	*Pavo cristatus*					1		1			
Common Yellowthroat	*Geothlypis trichas*	11	10	20	15	11	16	13	15	19	19
Cooper's Hawk	*Accipiter cooperii*		1	4	2	1			3		1
Dark-eyed Junco	*Junco hyemalis*		2		1	1		2			
Double-crested Cormorant	*Phalacrocorax auritus*		3	70	42		15				52
Downy Woodpecker	*Picoides pubescens*	7	17	30	24	35	26	30	13	16	29
Eastern Bluebird	*Sialia sialis*	1	2	7	3	3	3	5	2	3	8
Eastern Kingbird	*Tyranus tyranus*	2	1	4	8	3	3	5	7	5	6
Eastern Phoebe	*Sayornis phoebe*	3	10	9	2	10	3	12	3	10	4
Eastern Screech Owl	*Otus asio*				1						
Eastern Towhee	*Pipilo erythrophthalmus*	151	216	252	211	219	220	213	179	215	210
Eastern Wood Peewee	*Contopus virens*	68	51	67	59	70	52	56	67	68	70
European Starlings	*Sturnus vulgaris*	32	21		18	7		1	11	5	14
Field Sparrow	*Spizella pusilla*		1		8	7	4	5	7	19	8
Fox Sparrow	*Passerella iliaca*							3			

		Year - Number									
Common Name	***Scientific Name***	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Fish Crow	*Corvus ossifragus*		3	1	2	2			2	2	4
Glossy Ibis	*Plegadis falcinellus*				8				1		
Golden Eagle	*Aquila chrysaetos*	3						6			
Golden-crowned Kinglet	*Regulus satrapa*	1				2					
Goldfinch	*Carduelis tristis*	54	35	49	70	82	47	87	74	56	59
Grasshopper Sparrow	*Ammodramus savannarum*	2				1					
Great Black-backed Gull	*Larus marinus*					1					
Great Blue Heron	*Ardea herodias*				1	1	1	1	2	5	3
Great Crested Flycathcer	*Myiarchus crinitus*			17	14	25	12	22	33	20	36
Great Egret	*Ardea alba*						1				1
Great Horned Owl	*Bubo virginianus*										
Green Heron	*Butorides virescens*				2				1		
Grey Catbird	*Dumetella carolinensis*	57	65	68	62	49	47	59	45	76	72
Hairy Woodpecker	*Picoides villosus*		3	3	2	2	4		5	4	7
Hermit Thrush	*Catharus guttatus*		5	4	1	4	10	4	1	10	
Herring Gull	*Larus argentatus*	2		1	24	6	5	3	1	4	3
Horned Lark	*Eremophila alpestris*	2									
House Finch	*Carpodacus mexicanus*		1		2		1	1			
House Wren	*Troglodytes aedon*	14	4	7	11	3	3	9	8	6	16
Indigo Bunting	*Passerina cyanea*		5	11	15	21	8	12	12	9	9
Killdeer	*Charadrius vociferus*	1				1	2		2	9	
Magnolia Warbler	*Dendroica magnolia*	2								1	
Mallard Duck	*Anas platyrhyncos*	2	7	3	2	1	6	1			2
Merlin	*Falco columbarius*						2				
Mourning Dove	*Zenaida macroura*	55	41	78	39	46	27	16	33	26	25
Nashville Warbler	*Vermivora ruficapilla*	6									
Northern Bobwhite	*Colinus virginianus*	31		1	1						
Northern Cardinal	*Cardinalis cardinalis*	15	13	7	16	8	14	17	14	8	9
Northern Flicker	*Colaptes auratus*	31	21	38	20	27	21	42	12	32	37
Northern Mockingbird	*Mimus polyglottos*	6	13	13	9	6	7	8	11	7	3
Northern Parula	*Parula americana*	1			2		5				
Northern Rough-winged Swallow	*Steligdopteryx serripennis*	8				2				1	
Orchard Oriole	*Icterus spurius*					1			2		5
Osprey	*Pandion haliaetus*								2		1
Ovenbird	*Seiurus aurocapillus*	19	71	86	58	65	56	89	62	62	82
Palm Warbler	*Dendroica palmarum*		1	3	1				4	1	1
Pine Warbler	*Dendroica pinus*	5	23	54	25	81	57	91	57	90	54
Plain Pigeon	*Columbus livia*		1				5	4			
Prairie Warbler	*Dendroica discolor*	3					1			1	
Purple Martin	*Progne subis*				6						
Red-bellied Woodpecker	*Melanerpes carolinus*	12	8	4	7	15	3	4	4	15	7
Red-breasted Nuthatch	*Sitta canadensis*	5	19	13	11	25	43	38	49	15	27
Red-eyed Vireo	*Vireo olivaceus*	24	31	15	20	28	19	32	20	14	22
Red-headed Woodpecker	*Melanerpes erythrocephalas*									1	
Red-tailed Hawk	*Buteo jamaicensis*	3	2	2	6	6	5	5	5	11	9

		Year - Number									
Common Name	***Scientific Name***	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Red-throated Loon	*Gavia stellata*									1	
Red-winged Blackbird	*Agelaius phoeniceus*	8	12	45	16	34	25	18	9	15	20
Ring-billed Gull	*Larus delawarensis*	4					4				
Rose-breasted Grossbeak	*Pheucticus ludovicianus*	2			2			1			1
Ruby-crowned Kinglet	*Regulus calendula*	2		1	1			7	1		
Ruby-throated Hummingbird	*Archilochus colubris*			1	1		1	1	3	3	5
Savannah Sparrow	*Passerculus sandwichensis*							3			
Scarlet Tanager	*Piranga olivacea*	3	8	7	15	11	13	25	18	7	18
Sharp-shinned Hawk	*Accipiter striatus*	1		1	1	2		1			1
Song Sparrow	*Melospiza melodia*				2		1				
Summer Tanager	*Piranga rubra*						1				
Tree Swallow	*Tachycineta bicolor*	6	3	8	9	17	3	10		7	3
Tufted Titmouse	*Baeolophus bicolor*	34	19	29	32	25	26	17	20	30	49
Veery	*Catharus fuscescens*	3	1	6	3	3			7	1	2
White-breasted Nuthatch	*Sitta carolinensis*	5	3	3	3	3	9	8	4	9	11
White-eyed Vireo	*Vireo griseus*	1									
White-throated Sparrow	*Zonotrichia albicollis*	12	1	1					4	8	
Wild Turkey	*Meleagris gallopavo*	15	3	7	8	9	36	38	15	24	20
Wood Duck	*Aix sponsa*				7	3	4	6	2	4	4
Wood Thrush	*Hylocichla mustelina*	43	16	10	10	12	10	20	18	17	4
Worm-eating Warbler	*Helmitheros vermivorus*							1			
Yellow Warbler	*Dendroica petechia*	1		1	1	1			6	2	2
Yellow-bellied Sapsucker	*Sphyrapicus varius*	1						1			1
Yellow-billed Cuckoo	*Coccyzus americanus*	13	8	20	26	5	6	18	8	29	11
Yellow-rumped Warbler	*Dendroica coronata*		3		12			7	1		2
Yellow-throated Warbler	*Dendroica dominica*		1								

3.12.3.5 Odonate Surveys

Surveys of Odonata (dragonflies and damselflies) were conducted in 2008 and 2009 as part of student and teacher summer research programs. In 2008 a summer undergraduate research intern completed population assessments using visual surveys of several ponds following protocols established by Jason Bried at the Albany Pine Bush. In 2009, a teacher working under the ACTS program looked at variations in Odonate biodiversity between natural and man-made ponds at the Lab. Both posters are attached to this report.

Table 5 below provides a summary of all of the Odonate species known from the BNL site.

Table 5. Dragonfly and damselfly species identified during surveys at BNL.

DRAGONFLIES			
Aeshnidae	***Scientific Name***	***Libellulidae (cont.)***	***Scientific Name***
Shadow Darner	*Aeshna umbrosa*	Slaty Skimmer	*Libellula incesta*
Common Green Darner	*Anax junius*	Widow Skimmer	*Lebellula luctuosa*
Comet Darner	*Anax longipes*	Twelve-spotted Skimmer	*Libellula pulchella*
Swamp Darner	*Epeaeschna heros*	Painted Skimmer	*Libellula semifasciata*
Harlequin Darner	*Gophaeschna furcillata*	Band-winged Meadowhawk	*Sympetrum semicinctum*
Gomphidae		Black Saddlebags	*Tramea lacerata*
Unicorn Clubtail	*Arigomphus villosipes*	Blue Dasher	*Pachydiplax longipennis*
Ashy Clubtail	*Gomphus lividus*	Carolina Saddlebags	*Tramea carolina*
Corduliidae		Cherry-faced Meadowhawk	*Sympetrum internum*
Common Baskettail	*Epitheca cynosura*	Common Whitetail	*Libellula lydia*
Williamson's Emerald	*Somatochlora williamsoni*	Eastern Amberwing	*Perithemis tenera*
Libellulidae		Great Blue Skimmer	*Libellula vibrans*
Bar Winged Skimmer	*Libellula axilena*	Black Setwing	*Dythemis nigrescens*
Calico Pennant	*Celithemis elisa*	Spot-winged Glider	*Pantala hymenaea*
Halloween Pennant	*Celithemis eponina*	Wandering Glider	*Pantala flavescens*
Martha's Pennant	*Celithemis martha*	White-faced Meadowhawk	*Sympetrum obtrusum*
Eastern Pondhawk	*Erythemis simplicicollis*	Double-ringed Pennant	*Celithemis verna*
Dot-tailed Whiteface	*Leuchorrhinia intacta*	Ruby Meadowhawk	*Sympetrum rubicundulum*
Spangled Skimmer	*Libellula cyanea*	Frosted Whiteface	*Leucorrhinia frigida*
Blue Corporal	*Libellula deplanata*	Elfin Skimmer	*Nannothemis bella*
DAMSELFLIES			
Calopterygidae	***Scientific Name***	***Coenagrionidae (cont.)***	***Scientific Name***
Ebony Jewelwing	*Calopteryx maculata*	Azure Bluet	*Enallagma aspersum*
Lestidae		Familiar Bluet	*Enallagma civile*
Spotted Spreadwing	*Lestes congener*	Northern Bluet	*Enallagma cyathigerum*
Common Spreadwing	*Lestes disjunctus*	Atlantic Bluet	*Enallagma doubledayi*
Amber-winged Spreadwing	*Lestes eurinus*	Big Bluet	*Enallagma durum*
Sweetflag Spreadwing	*Lestes forcipatus*	Skimming Bluet	*Enallagma geminatum*
Elegant Spreadwing	*Lestes inaequalis*	Pine Barrens Bluet	*Enallagma recurvatum*
Slender Spreadwing	*Lestes rectangularis*	Citrine Forktail	*Ischnura hastata*
Lyre-tipped Spreadwing	*Lestes unguiculatus*	Fragile Forktail	*Ischnura posita*
Swamp Spreadwing	*Lestes vigilax*	Rambur's Forktail	*Ischnura ramburii*
Coenagrionidae		Eastern Forktail	*Ischnura verticalis*
Marsh Bluet	*Enallagma ebrium*	Sphagnum Sprite	*Nehalennia gracilis*
Variable Dancer	*Argia fumipennis*		

3.12.4 Population Management

There are currently four species on site whose populations either do or may require management in the near future. These are the white-tailed deer (discussed above), Canada geese, wild turkey, and feral cats.

3.12.4.1 Manage Canada Goose Population

As mentioned above, the Canada goose population is currently estimated at 105 birds living year round on the BNL site. The population levels of resident Canada geese has come down from a high of 157 birds to the present estimate of 105 birds largely due to aggressive nest management in both 2008 and 2009 and the implementation of an early, September, hunting season on Long Island and elsewhere. Aggressive nest management will continue in 2010 to maintain management of this species.

3.12.4.2 Manage Wild Turkey Population

The wild turkey population seems to be stabilizing around 300 - 350 birds. In 2008 and 2009 only a few instances of nuisance situations, birds pecking at paint on cars, or blocking access to buildings, were reported. These minor nuisances are comparable to the recent past. In general the turkeys have not cause significant nuisance situations, but if they do, NYSDEC is willing to issue permits for capture and transport of nuisance animals to other locations onsite. Issues with feeding turkeys and other animals seem to have diminished in most cases. When feeding is documented the issue is dealt with on a case by case basis.

3.12.4.3 Feral Animals

The existing feral cat colonies continue to be managed by an ad-hoc group of employees. There has been a minor decrease in the number of cats due to presence of several wild dogs that roamed through the BNL site. These dogs killed several of the feral cats before they were successfully captured and transferred to the Brookhaven Town animal shelter. One of the wild dogs gave birth to a litter of puppies. The Town allowed the mother to care for the puppies until they could be weaned and all of the puppies were adopted by local employees.

3.12.4.3.1 Establish BNL Policy on feral animals

A general agreement on feral cats was established with the ad hoc cat managers. This agreement basically provides for the continued care of existing cats and does not allow any additional cats to be added to the colonies regardless of whether they are introduced or wander into a colony. This policy ensures that the colony size will be reduced over time.

3.12.4.3.2 Protocols for monitoring and managing feral cats

Data collected by simple ad hoc monitoring of cat colonies by care givers is routinely submitted to the Natural Resource Manager for review.

3.13 Vegetation Management

BNL met its commitment to the EPA Region 2 Performance Track program with 42 acres of land either restored or place into fire rotation. An additional 15 acres were scheduled for prescribed fire in November 2008 and 2009. However, weather conditions were outside of the prescription and therefore no fire occurred. BNL has not been able to carry out a prescribed fire since 2006.

3.13.1 Native Vegetation

No additional plantings occurred in 2008, but the recharge basin south of East Princeton Avenue was modified in late 2008 and planted with native grasses in 2009.

3.13.1.1 Establish Protocol for Use of Native Vegetation

BNL now routinely uses native vegetation in its landscaping efforts. Where possible native vegetation is specified during the planning and design stages of projects

3.13.1.2 Use Native Vegetation on Restoration and new Construction Projects

This is routinely implanted.

3.13.1.3 RHIC Revegetation

Pitch pine seedlings planted in 2001 and 2005 continue to grow and the entire RHIC area is slowly reverting back to native Pine Barrens habitat.

3.13.1.4 Establish Policy and procedure for cutting trees

An informal process is used in which the Assistant Laboratory Director for Facilities and Operations makes a decision based on input from Plant Engineering and the Natural Resource Manager. This informal process appears to be efficient as it has become a routine procedure and no additional formalization is deemed necessary.

3.13.2 Invasive Species

BNL continued to participate in the Long Island Invasive Species Management Area efforts. In 2008, working in cooperation with the Central Pine Barrens Commission, a crew of Student Conservation Association interns worked several weeks at BNL removing Japanese Barberry from the southern portion of the Lab. BNL's Natural Resource staff also routinely participated in the Scientific Review Committee of the LIISMA in both 2008 and 2009. This committee worked to establish a ranking of 144 invasive plant species found throughout New York.

3.13.2.1 Identify and Monitor Distribution of Invasive Species

Nearly all areas of BNL have been surveyed for invasive species and documented in the GIS.

3.13.2.2 Establish Volunteer "Weed Watchers" group

No further action has occurred on this since determining that the group is not needed.

3.13.2.3 Removal or Control of Invasive Plants

In 2008 three areas were being developed for implementation as "Weed Free Areas." These include the southern portion of the Laboratory south of Princeton Ave.; the area east of the east firebreak; and the area north of the north firebreak. As mentioned above an SCA crew hired by the Central Pine Barrens Commission worked to remove Japanese Barberry in 2008. In 2009, BNL grounds crew treated approximately 4 acres along 1st Street to control black and pale swallowwort that had established in the area.

3.13.2.4 Identify Funding Sources

Other than the SCA crew mentioned above, no new source of funding has been identified for invasive species management at BNL. Natural Resources staff continue to request a modest increase in base funding to establish invasive species management for the Lab.

3.14 Ecosystem Monitoring & Management

Through efforts of student interns, several wetlands on BNL and within the Pine Barrens were sampled for water quality parameters. The results of these surveys were reported in posters at the end of the summer (attached) and data provide to The Nature Conservancy for further analysis.

3.14.1 Wetland Health Monitoring

Wetland Health protocols were developed in 2007 and 2008 but no funding was available for implementation.

3.14.1.1 Determine Functionality of BNL Central Wetlands

No activity on this item took place in 2008 or 2009.

3.14.1.2 Maintain or improve wetland functions

This action cannot be undertaken until wetland health monitoring and a determination on functionality is completed. Once the previous two actions are completed then plans for management of the wetlands can be made.

3.14.2 Forest Health Monitoring

No additional work was completed on this.

3.14.2.1 Develop Criteria

No additional work was completed on this in 2008 or 2009.

3.14.2.2 Establish Forest Health Monitoring locations

No additional plots were established under the Forest Health Monitoring program in 2008 or 2009. Existing plots, throughout the Pine Barrens, were visited in 2008 to collect soil samples to complete a soil microbial study of the Pine Barrens.

3.15 Security

Security issues associated with illegal ATV use continued in 2008 and 2009, but did not seem to increase.

3.15.1 Illegal Use of ATVs

Illegal ATV use continues to be a problem. The Central Pine Barrens Protected Lands Council conducted mitigative actions that appear to have reduced ATV traffic in the Sarnoff Preserve in Riverhead in many instances. These actions involved placing barriers to ATV entry at key points of the preserve and established a weekly inspection of the barriers with repair as needed. Barriers were as simple as a snow fence erected across trails, to piles of woody debris. This may be an option for BNL, but would require commitment of resources that are currently only partially available.

3.15.2 Other Trespass issues

No new issues have been identified in 2007.

3.16 Pesticide Use

No new work occurred in 2008 or 2009. BNL continues to use Integrated Pest Management for determining pesticide use, and is monitoring the success of the 4-Poster experiment on Shelter Island that is determining the effectiveness of that device to control ticks.

3.16.1 SBMS Subject Area

An SBMS subject area is currently not needed.

3.16.2 Use in Natural Resource Management

Glyphosate was utilized in 2009 to begin controlling a large infestation of black and pale swallowwort along First Street north of the National Weather Service. Each request for herbicide application is carefully considered before it is made. In this case the need for control to prevent further spread was deemed necessary and may be followed up with additional control in 2010.

3.17 Wildland Fire Management

BNL is working under an approved Wildland Fire Management Plan. The Wildland Fire Management Plan was updated and approved in 2009.

3.17.1 Implement Wildland Fire Management Plan

The Wildand Fire Management Plan continues to be implemented.

3.17.2 Implement Use of Prescribed Fire

An updated prescribed fire plan was developed for a 60 acre block of oak forest located in the northeast portion of the Laboratory. This plan is approved for a 5 year period with an annual review conducted prior to implementation.

Unfortunately, cooperative agreements between BNL and The Nature Conservancy fell through when TNC eliminated their prescribed fire program on Long Island. The last venue for cooperative agreements will be between BNL and the NYSDEC.

3.18 Integration of Cultural Resources

Cultural Resource Management issues are now routinely incorporated in natural resource planning. In 2009 cultural resource surveys were conducted in association with the development of an Environmental Assessment for the proposed BP Solar – Long Island Solar Farm. Cultural resource surveys covered areas of Civilian Conservation Corps plantations and a privy area located north of the Biology Fields. These areas are scheduled to become part of the Long Island Solar Farm.

3.18.1 Identify Cultural Resources and Develop GIS layers

Cultural resource map layers are routinely maintained within the GIS.

3.19 GIS and GPS

The Natural Resource Management program has integrated GIS and GPS into much of its management. No additional changes were made to this action in 2008 and 2009.

3.19.1 Develop Natural Resource data layers for GIS

The GIS has been used to map home range information for all species that are being tracked with radio telemetry equipment. This effort is routinely implemented as new work is identified and carried out.

3.19.2 Plan Trails and paths that limit impact

No new actions were taken on this in 2008 and 2009.

3.19.3 Fill data gaps concerning flora and fauna

Filling data gaps is documented throughout this annual report in earlier sections concerning endangered, threatened, and species of special concern, reptile and amphibian studies, and Odonate studies as examples.

The presence of red and gray fox on BNL has resulted in initial investigation into their habits and habitats. In 2008 a trapping and radio collar survey program was initiated. During the summer of 2008 traps were set to capture both red and gray foxes. Two red fox kits were trapped. The first was considered too small to place a collar on it, the second was fitted with a collar and tracked for about a week before the signal was lost. Repeated attempts to locate the collared animal were made but were unsuccessful.

Work was to continue on the project in 2009. However, camera traps placed in multiple locations around the Lab indicated a decreased number of foxes making trapping unlikely. Therefore no trapping or collaring occurred in 2009.

As part of work related to the development of the Environmental Assessment for the BP Solar – Long Island Solar Farm, extensive surveys for small mammals and flying squirrels was carried out during the summer of 2009. Results of small mammal trapping indicated that much of the area has very low population of small mammals, except for flying squirrels. The lack of small mammals in the proposed are for development is in agreement with earlier trapping efforts around the Lab. The low density of small mammals is likely due, in part, to an over abundance of deer.

Flying squirrels were found to be fairly common and 24 were marked with ear tags. Because of their ease of capture and long range movements over short periods of time, a future study project involving radio telemetry was planned for summer 2010.

3.20 Education Programs

In 2008, the Natural Resource Management program and the Foundation for Ecological Research in the Northeast hosted eighteen individuals that included a Faculty and Student Team (1 Professors and 2 -students), two Academies Creating Teacher Scientists (ACTS) interns, eleven undergraduate research interns, and two high school interns, all working on various projects. These interns completed work on salamanders, radio telemetry work on red and gray fox, inventory of Odonate species, island wide surveys for southern leopard frog, genetic work on foxes and iridovirus, invertebrate

distributional analysis of the Carmans River, soil microbial study of the Pine Barrens, distributional analysis of banded sunfish, and tiger beetle habitat analysis.

Each intern was responsible for their own research as well as assisting each other in the collection of data. Results of the research were presented in a poster session sponsored by the Office of Education Programs, and the research was also presented at a poster session at the Pine Barrens Research Forum. Copies of all posters are attached to this report.

In 2009, nineteen individuals that included a Faculty and Student Team (1 Professors and 2 -students), six Academies Creating Teacher Scientists (ACTS) interns, nine undergraduate research interns, and one high school intern, all working on various projects. These interns completed work on bathymetry, small mammal surveys including mice and flying squirrels, inventory of Odonate species, GIS work, night active bird surveys, invertebrate distributional analysis of the Carmans River, soil microbial studies of the Pine Barrens, quantification of soil nitrogen using the National Synchrotron Light Source, insect gall parasitism, and mtDNA analysis of Odonates.

Each intern was responsible for their own research as well as assisting each other in the collection of data. Results of the research were presented in a poster session sponsored by the Office of Education Programs, and the research was also presented at a poster session at the Pine Barrens Research Forum. Copies of all posters are attached to this report.

Each summer several of the interns and BNL staff participated in the BNL Science Learning Center's Summer Camp program. Each week, camp participants met on Thursday at the Weaver Rd. pond to learn about the environment. Each intern also presented their research to the campers. These lessons introduced students in grades 4 – 6 to the various research topics, and gave the student interns an opportunity to learn teaching skills.

3.21 Research

Research carried out in 2008 and 2009 through funding from FERN included the continued microbial studies of the Central Pine Barrens and the Gamma Forest soils. The three year study of BNL vegetation continued in both years as well.

Additionally, Jonathan Mawdsley from the Heinz Center conducted a survey for tiger beetles throughout the Central Pine Barrens. This work was coordinated and funded by the NY State Natural Heritage Program with funds acquired through the State Wildlife Grants program.

3.21.1 Identify, attract, and support ecological research to BNL

No new outside funded research was initiated in 2008 or 2009.

3.22 NRMP Plan Update

The plan update scheduled for FY2009 was delayed due to staff involvement in the BP Solar – Long Island Solar Farm project. The update was rescheduled for completion in 2010. Appendix C of the NRMP has been updated to reflect progress made in 2008 and 2009. Appendix C is attached.

This report once completed will be posted on BNL's Natural Resources web page.

APPENDIX C

NATURAL RESOURCE MANAGEMENT PLAN – ACTION ITEMS

Action Item	Site ID	Action	Planned Date	Action Taken
1	*Site-wide	Transition WMP Action into NRMP	December 2003	Complete
2	Site-wide	Annual Summary Report	Annual by April 30	Ongoing
3	Site-wide*	TAG Review of Annual Report	Annual by May	Discontinued
4	Site-wide*	Adapt Management based on new information	As Required	5th and 6th annual report May/2010, ongoing
5	Site-wide*	Improve decision making through use of innovative tools	As Necessary	Implemented 2003, ongoing
6	Site-wide*	Maintain and Improve relationships with stakeholders	Continual	Ongoing
Peconic River/Basins				
7	Peconic River Station HMn	Monitoring for flow: water quality	Monthly sampling SPDES Program	Ongoing
8	Fish Sampling Peconic River	Fish sampling with NYSDEC/Cold Spring Harbor: population assessment of banded sunfish and swamp darter	Annual Spring/Summer	Ongoing
9	TS-7	Monitoring for water quality	Monthly sampling SPDES Program	Ongoing
Deer Management				
10	*Site-wide	Issue and Discussion Paper on deer management by Natural Resource Manager	Fall 2007	Approved Feb. 2009
11	*Site-wide	Environmental Assessment under NEPA for deer management		On hold pending staff time
12	*Site-wide	Implement Deer Management		Decision to be made based on open meetings
13	Site-wide	Deer population estimation	Nov-Jan May-June	Ongoing. Routine estimates made twice a year, new protocol developed in 2004
Special Status Species				
14	*Site-wide	Maintain Special-status species list	Annual Review	Ongoing
15	*Site-wide	Identify habitats of special-status species	Continual	Ongoing
Tiger Salamander				
16	Site-wide	TS annual egg mass surveys at breeding ponds	Feb-April 2003	Ongoing
17	Site-wide	TS Larval Survey	Annual June-July	Ongoing
18	Education	Provide educational material or opportunities to BNL staff and public on environmental issues	Continual	Ongoing
19	*RHIC	New pond being added at RHIC	Summer 2004	completed
20	Tiger salamander	Set up cover boards around one breeding site (as a test case)	Summer	Summer 2001 & 2002, completed, drift fences installed, completed
21	TS-A7	Lining of pool ER program	Aug 2003	Completed
22	TS-W6b	Pond Remediation ER program	2004-2005	Completed

APPENDIX C

NATURAL RESOURCE MANAGEMENT PLAN - ACTION ITEMS

(continued)

Action Item	Site ID	Action	Planned Date	Action Taken
Banded Sunfish				
23	OU V	Peconic River Remediation Program	Spring 2004	Completed, tracking success of restoration completed
Frosted Elfin				
24	*Habitat Specific	Confirm presence/absence of Frosted Elfin	May-June Annually	Ongoing
25	*Habitat Specific	Establish standard monitoring protocols for the Frosted Elfin		Likely no longer needed
26	*Species Specific	Maintain and Enhance habitat for the Frosted Elfin	Continual	Ongoing
27	*Site-wide	Habitat assessment for lupine	Spring 2004	Ongoing
Habitat Enhancement/ other species				
28	Site-wide	Bird nests/boxes	Ongoing	Routine monitoring and maintenance of bluebird, kestrel, wood duck nest boxes
29	*Site-wide	Develop survey methodology to document all biota on BNL	2004	Still needed
30	Site-wide	Monitor Canada Goose and Wild Turkey populations	Ongoing	Ongoing,
31	Site-wide	Turkey sighting reports to NYSDEC	Ongoing	Reports sent annually in September or upon request
32	Site-wide	Song bird surveys	April – Sept.	Continuing
33	*Site-wide	Odonata Surveys	Summers	Initiated 2003, completed
34	*Site-wide	Reptiles and amphibian Surveys	Ongoing	Surveys are variable
Population Management				
35	*Site-wide	Manage Canada Goose population	As necessary	Implemented April 2007, ongoing
36	*Site-wide	Manage Wild Turkey population	As necessary	Not needed, yet
37	*Site-wide	Establish BNL policy on feral animals	General policy implemented	
38	*Site-wide	Establish monitoring and management protocols for feral animals	Fall 2003	Initiated, ad hoc group providing monitoring information
Vegetation Management				
39	*Site-wide	Establish protocol for use of native vegetation		Routinely done w/out protocol
40	*Site-wide	Use native vegetation on restorations and new construction landscaping	As necessary and applicable	Initiated 2003, ongoing
41	RHIC Revegetation	Implement Revegetation	Ongoing	Grasses planted 2002 and 2003, Completed 2005
42	*Site-wide	Establish policy and procedure for cutting trees		Informal Procedure appears adequate.
Invasive Species				
43	*Site-wide	Identify and monitor distribution of invasive species.	Ongoing	Mapping started Summer 2003, completed 2005

APPENDIX C

NATURAL RESOURCE MANAGEMENT PLAN - ACTION ITEMS

(continued)

Action Item	Site ID	Action	Planned Date	Action Taken
44	*Site-wide	Establish volunteer "Weed Watchers" group	Ongoing	Group formed May 2003, disbanded 2005
45	*Site-wide	Removal or control of invasive plants where possible.	As necessary	Removal or treatment occurred in 2008 and 2009
46	*Site-wide	Identify funding for removal or control of invasive plants where possible.	As necessary	Central Pine Barrens initiating work plan.
Ecosystem Monitoring and Management				
47	*Site-wide	Develop criteria to monitor wetland health	2007	completed
48	*Site-wide	Determine functionality of BNL Central wetlands	2007-2009	Not started
49	*Site-wide	Maintain or improve wetland functions		
50	*Site-wide	Develop criteria to monitor forest health	Fall 2004	Completed 2005
51	*Site-wide	Establish forest health monitoring locations	Summer 2005	Initiated 2005, continued 2006, completed
Security				
52	*Site-wide	Coordinate with Security to reduce illegal use of ATVs	Continual	Ongoing
53	*Site-wide	Other trespass Issues	Continual	Ongoing
Pesticide Use				
54	*Site-wide	Determine need for a SBMS subject area on pesticides	As necessary	Not currently necessary
55	*Site-wide	Pesticide use for natural resource management	As identified	Requested site maintenance to gain certification.
Wildland Fire Management				
56	*Site-wide	Implement Fire Management Plan	Sept. 2003	Plan Approved September 2003, re-written in 2009
57	*Site-wide	Implement use of prescribed fire and mechanical fuel reduction	March 2003	1st Fire November 2004 CY2006 Approved. CY2007 plan approved
Cultural Resource Management				
58	*Site-wide	Identify cultural resources and develop into GIS layers	Ongoing	LEED Area Identified 2005
GIS and GPS				
59	*Site-wide	Develop natural resource data layers of GIS	Ongoing	ongoing
60	*Site-wide	Plan trails and paths that limit impact on the environment while introducing employees to forest diversity.		
61	*Site-wide	Fill data gaps concerning all flora and fauna, including the following: terrestrial and aquatic invertebrates, Lepidoptera, wild flowers, and grasses.	Ongoing	On going

APPENDIX C

NATURAL RESOURCE MANAGEMENT PLAN - ACTION ITEMS

(continued)

Action Item	Site ID	Action	Planned Date	Action Taken
62	Site-wide	Education Programs	Ongoing	Utilize Office of Education Programs Interns, etc. 18 interns 2008, nineteen interns 2009
Research				
63	Site-wide	Cooperate with Upton Reserve, support and conduct research as needed	Ongoing	FERN periodically supports research with limited funds
64	*Site-wide	Identify, attract, and support ecological research at BNL	Ongoing	Coordinating with FERN
65	Site-wide	NRMP Plan Update	Every 5 years Next update 2008	Update delayed to 2010

Notes: * New initiative

ER – Environmental Restoration
GIS – Geographical Information System
NEPA – National Environmental Policy Act
NYSDEC - New York State Department of Environmental Conservation
NRMP – Natural Resource Management Plan
OU V – Operable Unit V
RHIC - Relativistic Heavy Ion Collider
TS – Tiger Salamander

ATTACHEMENTS

STUDENT INTERN POSTERS 2008

Posters and Papers Available at

http://www.bnl.gov/esd/wildlife/research.asp

STUDENT INTERN POSTERS 2009

Posters and Papers Available at

http://www.bnl.gov/esd/wildlife/research.asp