

Brookhaven National Laboratory

Natural Resource Management Plan

Annual Report

Calendar Year 2013

Introduction

This document summarizes activities carried out under Brookhaven National Laboratory's (BNL) Natural Resource Management Plan (NRMP) during calendar year 2013. Previous year's reports may be obtained from BNL's Cultural and Natural Resource Manager. All activities carried out under the NRMP during CY2013 will be discussed and the report will facilitate development of summary information for the Site Environmental Report for 2013.

Comprehensive Natural Resource Management Plan

An update to the comprehensive Natural Resource Management Plan originally issued in 2003 was completed in 2011. The update continues to build on successes and efforts to better understand the ecosystems and natural resources found on the BNL site.

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.

Progress

1. Annual Report.

An annual summary report of activities under the NRMP was written for CY2012. This report covers CY2013.

2. NRMP Update.

An update to the 2003 Plan was completed in 2011. The NRMP is typically reviewed and updated every five years so the next update is scheduled for 2016.

3. Adapt management based on new information.

This report acts as a summary of actions taken in 2013. The Adaptive management process was used in the development of the 2012 update. 2013 did not result in significant data acquisition that requires new actions or major modification of existing activities.

Migratory bird surveys were conducted from late April through mid-September to account for capturing spring migration and start of significant fall migration.

4. Maintain & improve relationships with stakeholders.

The NYSDEC is routinely consulted on wildlife issues and they conducted goose banding on site in 2013. Natural resource staff continues to participate with local agencies on issues involving the Pine Barrens Region including the Advisory Council, Protected Lands Council, Pine Barrens Research Forum, International Twinings (Migliarino-San Rosore- Massaciucolli Park in Pisa, Italy), the Wildfire Task Force, the New York State Wildfire and Incident Management Academy, and assist the State with prescribed fire operations. The natural resources manager also participates on the Peconic Estuary Program's Technical Advisory Committee. Natural resource management is often a topic for presentation and discussion with BNL's Community Advisory Council and the Department of Energy's Brookhaven Executive Roundtable.

In 2013, BNL's Natural Resources program sponsored the Pine Barrens Research Forum, the second annual Long Island Natural History Conference, and the 2nd Long Island Native Plant Initiative Conference. Natural Resources staff participated in regional and local activities including: A Day in the Life of the Carmans River; the Open Space Stewardship Program of the Office of Education Programs; Pine Barrens Discovery Day-Tri-Hamlet Day; Long Island Native Plant Initiative activities; and the Long Island Invasive Species Management Area activities.

5. Improve decision-making through use of innovative tools/ Develop & maintain natural resource and cultural resource data layers in GIS/ Use GIS to assist in mapping and planning/Maintain meta-data for GIS data.

The use of global positioning systems (GPS) and geographic information systems (GIS) are routinely utilized in the Natural Resource and Cultural Resource Management program. No significant additions were made to the existing GIS library in 2013. GPS and GIS continue to be used for planning and evaluation of environmental factors associated with construction and other major projects occurring at BNL.

6. Determine functionality of BNL central wetlands/ Maintain or improve wetland functions/Explore implementation of wetland monitoring protocols at BNL.

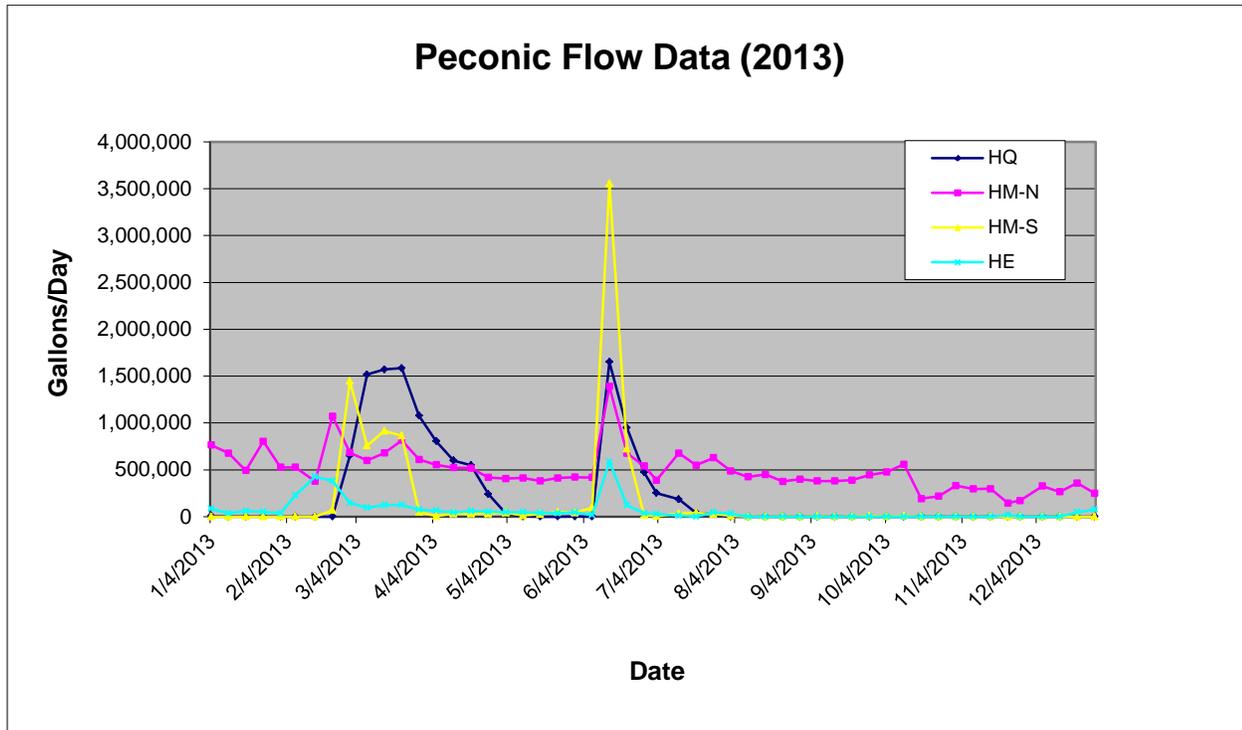
Due to funding and other resource constraints, this has not yet been started.

7. Monitor for flow and water quality.

Peconic River flow is measured at several locations including above the STP effluent discharge (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 2013 is presented in Figure 1.

2013 continued to be fairly dry. Flow as measured at station HM-N largely represents the flow from the STP and even then much of the water has recharged to ground. Little water ever left the BNL site in 2013 based on flows at Station HQ. The Peconic River was dry for much of the year from an area several hundred yards past the east firebreak to the east boundary.

Figure 1. Peconic River Flow Data for 2013.



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 2013 did not indicate any concerns for threatened or endangered species within basins or the Peconic River. Work on the Sewage Treatment Plant upgrades for the eventual conversion to a groundwater discharge system began in 2013 with the preparation of 4 recharge basing located in the former WW I sand filter beds south and southeast of the existing sand filter beds. The conversion of the STP discharge from a surface water discharge (Peconic River) to groundwater discharge is scheduled to be completed by September 2014.

8. Explore creating wildlife viewing areas.

Due to time and resource constraints this has not yet been started.

9. Evaluate removal of barriers to fish migration on site.

This action is planned for 2014 in association with the diversion of Sewage Treatment Plant discharges to groundwater.

10. Fish sampling with NYSDEC/Cold Spring Harbor due to remediation.

Fish sampling for 2013 took place between April and June 2013 and was conducted by BNL environmental monitoring staff. Samples were taken from Area A and D on site at BNL, at the Shultz Rd location and Donahue's Pond. Control samples were taken from Lower Lake on the Carmans River. Due to unanticipated levels of mercury in several onsite fish samples, BNL briefed the Community Advisor Council in July, 2013. The full report of fish monitoring will be provided in the 2013 Site Environmental Report which can be found at <http://www.bnl.gov/ewms/ser/> after October 1, 2014.

11. Evaluate continued need for environmental monitoring of fish.

Evaluation of the need for fish monitoring will occur once the STP begins discharging to groundwater in 2014.

12. Monitor ATV use and damage.

BNL works with the Pine Barrens Law Enforcement Task Force and on-site security in an effort to deter ATV riders, but more needs to be done to prevent further destruction of important habitat. ATVs continue to utilize the Laboratory illegally and have been seen as far as the central portions of the lab.

13. Establish deer exclosures associated with 4 forest health monitoring plots.

In 2011 student interns implemented the forest health monitoring protocols in three existing forest health monitoring plots and created 3 new plots adjacent to the existing ones for the establishment of deer exclosures. The 3 deer exclosures associated with forest health monitoring plots were constructed in 2012 and the final exclosure was ultimately placed in an area that experienced an intense wildfire in April of 2012 and monitoring data was collected in this exclosure in 2013. One additional exclosure will be erected adjacent to another forest health monitoring plot within a prescribed burn unit that is scheduled for treatment in 2014.

14. Develop cooperative agreement with NYSDEC to implement prescribed fire.

Following discussions with Colonel Andrew Jacob, the Assistant Director of the Division of Forest Protection for the NYSDEC in January 2013, it has been determined that due to the small scale burning that would take place at the Lab, it is well within the mission of the NY State Forest Rangers to allow someone from their agency to act as a burn boss on DOE land. Resources will continue to be shared among both parties to engage in prescribed fire operations on both State and DOE lands.

15. Implement Fire Management Plan/Implement use of prescribed fire and mechanical fuel reduction.

Everything is in place to begin conducting prescribed fires on site. September 2013 was targeted for implementation of the first growing season burn, however, fuel and soil/duff moistures were too low due to insufficient rainfall which would have resulted in fire intensity and severity higher than desired. Conditions will be assessed again beginning in June 2014 to conduct prescribed burns.

16. Investigate having timber companies come in to thin white pine stands.

This has not yet been started.

17. Investigate use of NY Wildfire & Incident Management Academy for management of white pines.

Based on consultation with instructors for the S-212 class, these sites would not present a meaningful learning experience for the students as they are too dense and cannot be safely used as practice for inexperienced sawyers, therefore, they will not be used and other alternatives must be explored.

18. Use native vegetation on restorations and new construction landscaping.

Planting lists containing native and non-native non-invasive species have been distributed to BNL's Facilities & Operations Division as a tool to aid in planning for new construction landscaping. Only native species and, if possible, local genotypes are being recommended for use in restoration projects. The LISF has been utilizing native grasses for replanting and will continue to do so.

19. Re-survey the current Invasive Species Prevention Zone (ISPZ), explore addition of new areas to ISPZ and rewrite ISPZ plan/ Monitor distribution of invasive species.

Due to resource/personnel constraints this has not yet been started.

20. Manage invasive plants where possible.

Due to budget constraints, no invasive plant management was conducted.

21. Maintain and monitor bird nests/boxes for bluebirds, kestrels & wood duck.

Nest boxes are important for many species of birds because of the lack of suitable habitat. This is particularly true of birds that utilize cavities for nesting. The eastern bluebird is one of the better known birds for which nest boxes are important. Forty new nest boxes were installed in 2012 in areas around the LISF and, of those, 27 were monitored for activity in June. Four nest boxes had been knocked down by falling trees or machinery. 22 contained nests, 10 of which were made by house wrens, and one contained young. 5 nests were empty and it was unclear if they were constructed by a bluebird or tree swallow. 3 nests contained bluebird eggs and/or young and 3 contained tree swallow eggs. One nest was too tall and its contents could not be assessed. Monitoring and data collection will continue in 2013.

Monitoring of wood duck nest boxes was not conducted in 2013.

22. Work with LISF to install nest boxes on-site once construction is completed/ Add nest box locations and other data to GIS library.

As mentioned above, 40 new nest boxes were installed around the northern area of the LISF in 2012 and an addition 40 boxes are expected to be installed around the remainder of the LISF in 2014.

23. Maintain special status species list.

Federal and State lists are monitored through regulatory compliance software called CyberRegs and will continue to be updated as needed. The list was reviewed and updated in 2013 after researchers conducted moth surveys on site documented . In addition, a plant list compiled by a former researcher at BNL was incorporated into the existing list of species occurring at BNL and additional special status species were found to be present on site. Table 1 contains a list of all special status species either confirmed to be present on site or likely to be present on site.

Table 1. New York State Special Status Species at BNL.

New York State Threatened & Endangered Species, Species of Special Concern, & Species of Greatest Conservation Need			
Common Name	Scientific Name	State Status	BNL Status
Insects			

Comet darner	<i>Anax longipes</i>	SGCN	Confirmed
Frosted elfin	<i>Callophrys iris</i>	T	Likely
New England bluet	<i>Enallagma laterale</i>	SGCN	Likely
Little bluet	<i>Enallagma minusculum</i>	T	Confirmed
Scarlet bluet	<i>Enallagma pictum</i>	T	Likely
Pine Barrens bluet	<i>Enallagma recurvatum</i>	T	Confirmed
Mottled duskywing	<i>Erynnis martialis</i>	SC	Likely
Persius duskywing	<i>Erynnis persius persius</i>	E	Likely
Pine barrens zanclognatha**	<i>Zanclognatha martha</i>	SGCN	Confirmed
Black-bordered lemon moth**	<i>Marimatha nigrofimbria</i>	SGCN	Confirmed
Fish			
Banded sunfish	<i>Enniacanthus obesus</i>	T	Confirmed
Swamp darter	<i>Etheostoma fusiforme</i>	T	Confirmed
Amphibians			
Marbled salamander	<i>Ambystoma opacum</i>	SC	Confirmed
Eastern tiger salamander	<i>Ambystoma tigrinum tigrinum</i>	E	Confirmed
Fowler's toad	<i>Bufo fowleri</i>	SGCN	Confirmed
Four-toed salamander	<i>Hemidactylium scutatum</i>	SGCN	Confirmed
Eastern spadefoot toad	<i>Scaphiopus holbrookii</i>	SC	Confirmed
Reptiles			
Worm snake	<i>Carphophis amoenus</i>	SC	Confirmed
Snapping turtle	<i>Chelydra serpentina</i>	SGCN	Confirmed
Spotted turtle	<i>Clemmys guttata</i>	SC	Confirmed
Northern black racer	<i>Coluber constrictor</i>	SGCN	Confirmed
Eastern hognose snake	<i>Heterodon platyrhinos</i>	SC	Confirmed
Stinkpot turtle	<i>Sternotherus odoratus</i>	SGCN	Confirmed
Eastern box turtle	<i>Terrapene carolina</i>	SC	Confirmed
Eastern ribbon snake	<i>Thamnophis sauritus</i>	SGCN	Confirmed
Birds (nesting, transient, or potentially present)			
Cooper's hawk	<i>Accipiter cooperii</i>	SC	Confirmed
Sharp-shinned hawk	<i>Accipiter striatus</i>	SC	Confirmed
Grasshopper sparrow	<i>Ammodramus savannarum</i>	SC	Confirmed
Great egret	<i>Ardea alba</i>	SGCN	Confirmed
Whip-poor-will	<i>Caprimulgus vociferus</i>	SC	Confirmed
Northern harrier	<i>Circus cyaneus</i>	T	Confirmed
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	SGCN	Confirmed
Northern bobwhite	<i>Colinus virginianus</i>	SGCN	Confirmed
Prairie warbler	<i>Dendroica discolor</i>	SGCN	Confirmed
Horned lark	<i>Eremophila alpestris</i>	SC	Confirmed
Wood thrush	<i>Hylocichla mustelina</i>	SGCN	Confirmed
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	SC	Confirmed
Osprey	<i>Pandion haliaetus</i>	SC	Confirmed
Scarlet tanager	<i>Piranga olivacea</i>	SGCN	Confirmed
Glossy ibis	<i>Plegadis falcinellus</i>	SGCN	Confirmed
Brown thrasher	<i>Toxostoma rufum</i>	SGCN	Confirmed
Blue-winged warbler	<i>Vermivora pinus</i>	SGCN	Confirmed
Plants			
Small-flowered false foxglove	<i>Agalinis paupercula</i>	R	Confirmed
Stargrass	<i>Aletris farinosa</i>	T	Confirmed
Butterfly weed	<i>Asclepias tuberosa ssp. interior</i>	V	Confirmed

Spotted wintergreen	<i>Chimaphila maculata</i>	V	Confirmed
Flowering dogwood	<i>Cornus florida</i>	V	Confirmed
Pink lady's slipper	<i>Cypripedium acaule</i>	V	Confirmed
Ground pine	<i>Dendrolycopodium obscurum</i>	V	Confirmed
Round-leaved sundew	<i>Drosera rotundifolia</i> var. <i>rotundifolia</i>	V	Confirmed
Marginal wood fern	<i>Dryopteris marginalis</i>	V	Confirmed
Engelman spikerush	<i>Eleocharis engelmannii</i>	E	Confirmed
Dwarf huckleberry	<i>Gaylussacia bigeloviana</i>	E	Confirmed
Winterberry	<i>Ilex verticillata</i>	V	Confirmed
Sheep laurel	<i>Kalmia angustifolia</i>	V	Confirmed
Narrow-leaved bush clover	<i>Lespedeza angustifolia</i>	R	Confirmed
Wild lupine	<i>Lupinus perennis</i>	R	Confirmed
Whorled loosestrife	<i>Lysimachia quadrifolia</i>	E	Confirmed
Bayberry	<i>Myrica pensylvanica</i>	V	Confirmed
Stiff-leaved goldenrod	<i>Oligoneuron rigida</i>	T	Confirmed
Cinnamon fern	<i>Osmunda cinnamomea</i>	V	Confirmed
Clayton's fern	<i>Osmunda claytoniana</i>	V	Confirmed
Royal fern	<i>Osmunda regalis</i>	V	Confirmed
Crested fringed orchid	<i>Plantathera cristata</i>	E	Likely
Green fringed orchis	<i>Platanthera lacera</i>	V	Confirmed
Swamp azalea	<i>Rhododendron viscosum</i>	V	Confirmed
Long-beaked bald-rush	<i>Rhynchospora scirpoides</i>	R	Confirmed
New York fern	<i>Thelypteris novaboracensis</i>	V	Confirmed
Marsh fern	<i>Thelypteris palustris</i> var. <i>pubescens</i>	V	Confirmed
Virginia chain-fern	<i>Woodwardia virginica</i>	V	Confirmed
Notes: * information based on 6 NYCRR Part 182, 6 NYCRR Part 193, and BNL survey data.			
** species added in 2013.			
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, SGCN = species of greatest conservation need			

24. Identify habitats of special status species.

Seven new plant species were added in 2012 (Table 1. New York State Special Status Species at BNL.). Habitats for these species need to be identified and management actions implemented, if necessary.

25. Confirm presence/absence of Frosted Elfin/Habitat assessment for lupine/Increase lupine populations; maintain & enhance lupine habitats.

The Frosted Elfin 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. Due to the lack of suitable habitat of sufficient size, the Frosted Elfin is unlikely to occur on site. 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. Areas favorable for the growth of lupine have been identified. Seeds were collected in 2012 from the small existing population located within the LISF and will be planted on the edges of the north and east fire breaks in 2014 to increase the existing population as well as to create new ones. Due to time constraints, seeds were not planted in 2013.

26. Monitor for banded sunfish and survey for swamp darter/ Explore re-introduction of both species to on-site portions of the river/ Remove predatory fish.

Tissue samples from 2011 survey work were transferred to Sayville High School's science research program for genetic analysis. Information from that analysis was being completed at the end of 2013 for inclusion in Science competitions for 2014. Initial review of the data indicated that various Banded Sunfish populations on Long Island were transferring genetic material. Full data review is to be completed in 2014.

27. Annual tiger salamander egg mass and larval surveys at breeding ponds.

Egg mass surveys were conducted in February and March 2013 with the help of interns. It had been relatively dry, although not as dry as 2012. 11 ponds contained egg masses, 1 of those contained larvae, and 2 ponds contained adults that were measured and sexed before being released. A total of 144 egg masses were found and 16 adults were captured and measured.

28. Conduct songbird surveys.

Songbird surveys have been carried out since May 2000 and since that time 129 species have been documented. Monitoring involves recording ambient weather conditions at the beginning and end of each of the seven routes, and counting the number of individuals of each species heard or seen during a five minute period at each point on the route. The detailed information is tracked in a database that is updated annually. In 2010, 1 new transect was added in order to begin more targeted monitoring of bird species at the LISF. Points are spaced approximately 300 meters apart to prevent overlap of counts from point to point.

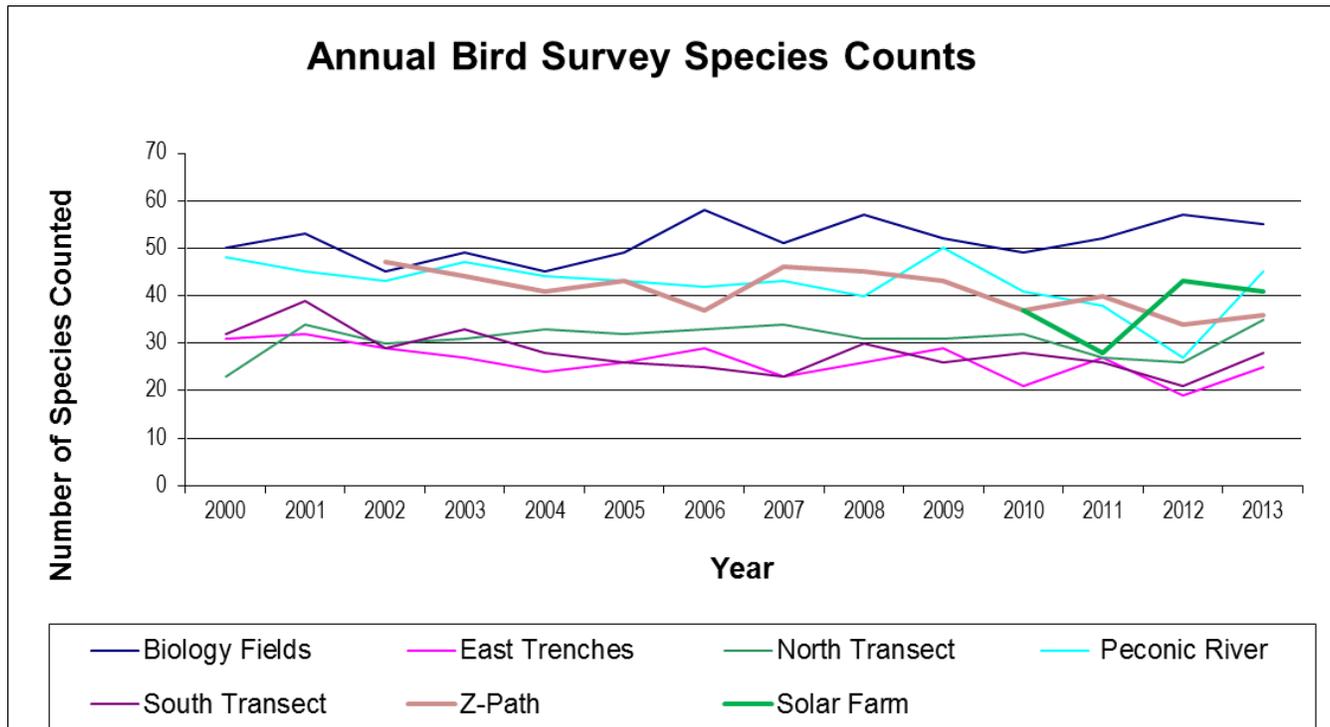
In 2012, monitoring was adjusted to be carried out from May through August to reflect results of earlier work documenting primarily winter residents in April and September. Transects near the LISF were monitored more frequently, once every two weeks, to gather finer detail of bird use in the area in and near the LISF. In 2013 monitoring included data collection beginning at the end of April through mid-September. The current summary of monitoring is provided in Table 2 below and Figure 2 shows the trends in species counts from year to year for each transect.

In 2012, 69 species were detected and in 2013 74 species were heard or seen. 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.

Table 2. Results of Bird Surveys by Transect 2000-2012.

Year	# of Species Identified	# New Species Identified	Total # of Species	# of Species Biology Fields	# of Species East Trenches	# of Species Solar Farm	# 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
2010	71	1	115	49	21	37	32	46	28	37
2011	62	2	117	52	27	28	27	38	26	40
2012	69	5	122	57	19	43	26	27	21	34
2013	74	7	129	55	25	41	35	45	28	36

Figure 2. Trends in species counts by transect from 2000-2012.



29. Monitor turkey populations/Provide NYSDEC with sighting reports/Cooperate with NYSDEC management actions.

Turkey populations appear to have stabilized in recent years and consist of approximately 350-500 birds. Some data was collected for the NYSDEC on turkeys observed at the Lab in 2012, but there has been no indication of changes in the population here.

30. Monitor Canada goose populations/Manage goose populations by oiling eggs.

Nest management occurred in 2013 and 20 nests had eggs oiled or nests destroyed. It became very apparent around mid-May that many nests were missed as more than 30 goslings were produced.

Goose banding resulted in 43 geese being banded.

31. Odonate surveys.

No Odonate surveys were conducted in 2013. These will begin again once the necessary resources become available.

32. Reptile & amphibian surveys.

In 2013 radio telemetry of box turtles was continued in addition to shell-notching. 93 eastern box turtles were marked in 2013 and a total of 26 turtles with transmitters were tracked using the telemetry. The radio telemetry work is focused on understanding impacts of the LISF on turtle home range; reproductive success of turtles; and food/habitat use by turtles. For the reproductive success study, all female turtles were x-rayed to determine presence of eggs. If found to be gravid, the female turtles were followed to identify nesting sites so that nests could be protected and hatchlings captured to conduct genetic testing. Work in fall 2013 looked at hibernation site selection and temperature/humidity regimes of hibernation.

33. Environmental assessment under NEPA for deer management/Establish & implement deer management.

The Environmental Assessment for Deer management was completed with a Finding of No Significant Impact being written and the EA finalized in March 2013. Planning for an Archery Hunt was completed for implementation in fall 2013 but a planned hunt was cancelled by the Laboratory Director. Natural Resources staff began working on a planned cull for 2014.

34. Continue deer population estimation.

Both Spring and Fall counts were completed with estimates of between 500 and 600 animals.

35. Establish feral, free-ranging nuisance animal policy/Implement BNL policy on feral animals.

Under the current policy, all stray dogs and those cats living outside of approved colonies are brought to the Brookhaven Animal Shelter for disposition. In order to more effectively manage nuisance animals a Statement of Work was developed for the humane euthanasia of nuisance animals and was okayed by the end of the calendar year, and was to be sent to contracting early in 2014.

36. Keep informed of LCC research findings and management recommendations/Explore possibility of performing research on local effects of climate change on-site.

Little has changed since the initial consultation with the Landscape Conservation Cooperative (LCC). They are aware of BNL's interest in keeping abreast of new developments in climate change research as well as the potential to conduct research on-site.

37. Provide educational material or opportunities to BNL staff & public on environmental issues.

Natural Resource Management staff actively participated in Earth Day activities in 2013, Safety Day activities, participated in the Green Institute, and the Open Space Stewardship Program, A Day in the Life of the Carmans River, Summer Sundays, the Environmental Summit, the 2nd Annual Long Island Natural History Conference, and provided hands on experience during Pine Barrens Discovery Day.

38. Continue to host interns to assist with and conduct research on-site.

Every year, interns are hosted to conduct ecological and wildlife research to assist in understanding how the natural environment works. The information gained from these projects is used to make management decisions at the Laboratory. Interns are high school or undergraduate students participating in BNL's Office of Education summer programs. During 10 weeks, the students conduct experiments, population surveys, ecological monitoring, and other natural resource investigations. Students are required to complete a paper and/or poster as part of their internship. Additionally, faculty from various colleges or universities may participate in the Visiting Faculty Program and work on specific projects with students.

In 2013, students collected radio telemetry data on eastern box turtles to determine home ranges and movements; conducted acoustic and mist-netting surveys for bat species present both at the Lab and throughout parts of eastern Long Island; conducted small mammal trapping; vegetation surveys at the LISF, and conducted statistical analysis on migratory bird data and environmental surveillance data.

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. Papers and posters related to the Long Island Solar Farm or where data is being used for a peer reviewed paper are not posted (most of the 2013 work). These papers are reserved in order to continue gathering data associated with doctoral dissertation work. Providing public access to papers and posters may negate the planned publication of results in peer-reviewed literature.

39. Support and conduct research as needed.

BNL established a contract for mist netting bats in 2013 specifically looking for the eastern small-footed bat that has been detected in both 2012 and 2013.

40. Identify, attract, & support ecological research at BNL.

BNL had several talks with SUNY College of Environmental Science and Forestry (ESF) about conducting research at the Lab. Dr. Dylan Parry and a graduate student began conducting surveys of Lepidoptera using burned and unburned areas to gain an understanding of the impacts of wild fire on Lepidoptera populations. Dr. Parry and Dr. Greg McGee are investigating opportunities to participate in the DOE Visiting Professor Program for 2015.

Appendix A - Natural Resource Management Plan – Completed 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	NRMP Plan Update	Every 5 years Next update 2016	Completed 2011
3	Site-wide	TAG Review of Annual Report	Annual by May	Discontinued
Deer Management				
10	Site-wide	Issue and Discussion Paper on deer management by Natural Resource Manager	Fall 2007	Completed, approved Feb. 2009
Tiger Salamander				
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
	TS-10	Expansion of pond to lessen slopes	2006	Completed as part of NSLS-II project 2008
Banded Sunfish				
23	OU V	Peconic River Remediation Program	Spring 2004	Completed, tracking success of restoration completed
Frosted Elfin				
25	Habitat Specific	Establish standard monitoring protocols for the Frosted Elfin		Likely no longer needed
Population Management				
36	Site-wide	Manage Wild Turkey population	As necessary	Not yet necessary
37	Site-wide	Establish BNL policy on feral animals	General policy implemented	Completed
38	Site-wide	Establish monitoring and management protocols for feral animals	Fall 2003	Completed , initiated, ad hoc group providing monitoring information
Vegetation Management				
39	Site-wide	Establish protocol for use of native vegetation		Routinely done w/out protocol, planting list provided
41	RHIC Revegetation	Implement Revegetation	Completed	Grasses planted 2002 and 2003, Completed 2005. No active revegetation needed as species are colonizing on their own.
42	Site-wide	Establish policy and procedure for cutting trees		Informal procedure appears adequate.
Ecosystem Monitoring and Management				
47	Site-wide	Develop criteria to monitor wetland health	2007	Completed
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
Pesticide Use				

Action Item	Site ID	Action	Planned Date	Action Taken
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	Completed
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	1 st Fire November 2004 CY2006 Approved. CY2007 plan approved

Appendix B - Natural Resource Management Plan – Ongoing and New Action Items

Site ID	Action	Planned Date	Action Taken
Site-wide	Annual Summary Report	Annual by April 30	Ongoing
Site-wide	Adapt Management based on new information	As Required	Ongoing
Site-wide	Maintain and Improve relationships with stakeholders	Continual	Ongoing
Site-wide	Improve decision making through use of innovative tools	As Necessary	Implemented 2003, ongoing
GIS			
Site-wide	Develop & maintain natural resource data layers of GIS	Ongoing	Ongoing
Site-wide	Use GIS to assist in mapping and planning	Ongoing	Ongoing
Site-wide	Maintain meta-data on GIS data	Ongoing	Ongoing
Cultural Resource Management			
Site-wide	Continue to develop & maintain GIS layers documenting cultural resources.	As required	Ongoing
Freshwater Wetlands & the Peconic River			
Site-wide	Determine functionality of BNL Central wetlands	2007-2009	Not started
Site-wide	Maintain or improve wetland functions		
Wetlands	Explore implementation of monitoring protocols at BNL	As funds become available	Not yet started
Monitoring Station HMn	Monitor for flow & water quality	Monthly sampling SPDES Program	Ongoing
Peconic River Remediation	Explore creating wildlife viewing areas	As funds become available	Not yet started
Peconic River	Evaluate removal of barriers to fish migration on site	2014	Not yet started
Peconic River	Fish sampling with NYSDEC/Cold Spring Harbor due to remediation	Annual Spring/Summer	Ongoing
Peconic River	Evaluate continued need for environmental monitoring of fish should BNL move to onsite recharge to groundwater system	2014	Not yet started
Law Enforcement			
Site-wide	Monitor ATV use and damage	Continual	Ongoing
Site-wide	Work to reduce ATV use; investigate deterrents	Continual	Ongoing
Site-wide	Work with security on other trespass issues	Continual	Ongoing
Vegetation Monitoring & Management			
Site-wide	Revisit forest health monitoring plots; collect and analyze data	Every 10 years.	Ongoing
Site-wide	Establish Deer Enclosures associated with 4 forest health plots	2011	Enclosures established, monitoring to start 2013
Site-wide	Develop cooperative agreement with NYSDEC to implement prescribed fire at	2012	Per NYSDEC, formal agreement not necessary

BNL			
Site ID	Action	Planned Date	Action Taken
Site-wide	Implement Fire Management Plan	Sept. 2003	Plan approved September 2003, re-written in 2009
Site-wide	Implement use of prescribed fire and mechanical fuel reduction	March 2003	1 st Fire November 2004 CY2006 Approved. CY2007 plan approved
White pine stands	Investigate having timber companies come in to thin stands—possibly for cost of lumber	2013	Not yet started
White pine stands	Investigate use of NY Incident Command and Wildland Fire Academy for management of white pines	2012	Academy classes determined to be not appropriate as a management option
Site-wide	Use native vegetation on restorations and new construction landscaping	As necessary and applicable	Initiated 2003, ongoing
ISPZ	Re-survey the current ISPZ, explore addition of new areas to ISPZ and rewrite the ISPZ plan.	2011-2012	Not yet started
Site-wide	Monitor distribution of invasive species	Continual	Ongoing; initiated Summer 2003
Site-wide	Manage invasive plants where possible	As necessary	Ongoing; initiated 2008
Habitat Enhancement – other species			
Site-wide	Maintain and monitor bird nests/boxes for bluebirds, kestrel & wood duck	Annually	Ongoing
LISF	Work with LISF to install nest boxes on-site once construction is completed.	2012	Started 2012, ongoing
Site-wide	Add nest box locations and other data to GIS library.	As necessary	Start in 2013
Special Status Species – General			
Site-wide	Maintain Special-status species list	Annual Review	Ongoing
Site-wide	Identify habitats of special-status species	Continual	Ongoing
Frosted Elfin			
Habitat specific	Confirm presence/absence of Frosted Elfin	May-June Annually	Ongoing
Site-wide	Habitat assessment for lupine	Spring 2004	Ongoing
Species specific	Increase lupine population; maintain and enhance lupine habitats	Continual	Ongoing
Banded Sunfish & Swamp Darter			
Site-wide	Monitor for banded sunfish and survey for presence of swamp darter	Biennially	Ongoing
Site-wide	Remove predatory fish	As necessary	Ongoing
Site-wide	Explore re-introduction of both species to on-site portions of the river	As necessary	Ongoing
Tiger Salamander			
Site-wide	TS annual egg mass & larval surveys at breeding ponds	Annual Feb-April, June-July	Ongoing
Population Monitoring & Management – other species			
Site-wide	Conduct songbird surveys	Annual May-August	Ongoing
Site-wide	Monitor turkey populations	Continual	Ongoing
Site-wide	Provide NYSDEC with sighting reports	As necessary	Ongoing
Site-wide	Cooperate with NYSDEC management actions	As necessary	Ongoing

Site ID	Action	Planned Date	Action Taken
Site-wide	Monitor goose populations	Continual	Ongoing
Site-wide	Manage goose populations by oiling eggs	As necessary	Ongoing
Site-wide	Odonate surveys	Summers, periodic	Initiated 2003, periodic
Site-wide	Reptile and amphibian surveys	Ongoing	Surveys are variable
Deer Management			
Site-wide	Environmental Assessment under NEPA for deer management	2011	In process
Site-wide	Establish & implement deer management	2013	Decision to be made based on open meetings
Site-wide	Continue deer population estimation	Nov-Jan May-June	Ongoing. Routine estimates made twice a year, new protocol developed in 2004
Feral & Nuisance Animals			
Site-wide	Establish feral, free-ranging, nuisance animal policy	2012	In process
Site-wide	Implement BNL policy on feral animals	Continual	In process
Climate Change			
Site-wide	Keep informed of LCC research findings and management recommendations	Continual	Not yet started
Site-wide	Explore possibility of performing research on local effects of climate change on site	2012-2013	Not yet started
Education & Outreach			
Education	Provide educational material or opportunities to BNL staff and public on environmental issues	Continual	Ongoing. Utilize Office of Education Programs Interns, etc.
Site-wide	Continue to host interns to assist with and conduct research on-site as part of BNL's Office of Education summer programs.	Ongoing	Ongoing
Research			
Site-wide	Support and conduct research as needed	Ongoing	FERN periodically supports research with limited funds
Site-wide	Identify, attract, and support ecological research at BNL	Ongoing	Coordinating with FERN

ATTACHMENTS

STUDENT INTERN POSTERS 2012

Posters and Papers Available at

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

Due to need for future publication, posters related to studies on the LISF are not available. Data are being maintained for completion of a doctoral dissertation and associated journal publication.