

Brookhaven National Laboratory

WILDLIFE MANAGMENT PLAN

ANNUAL REPORT

CALENDAR YEAR 2001

1.0 Introduction

This document summarizes activities carried out under the Wildlife Management Plan (WMP) during calendar year 2001. All activities during CY2001 will be touched on. The format will follow past reporting documents. This report will also facilitate development of summary information for the Site Environmental Report for 2001.

2.0 Comprehensive Natural Resource Management Plan

The Technical Advisory Group (TAG) was formed in December 2000. The TAG was formed to provide technical advice and input on the development of the Natural Resource Management Plan (NRMP) and develop criteria for soliciting, reviewing, and approving research to be carried out in the Upton Ecological and Research Reserve (Upton Reserve). The TAG is composed of 10 individuals representing nine groups. The TAG was originally to include twelve members, but the National Park Service declined membership and the Peconic Estuary Program did not respond to the request for participation.

The TAG met five times during CY2001. The first meeting was designed as an introduction to BNL, the existing WMP, the need for the NRMP, and was followed-up with a tour of the Lab. Subsequent meetings have been used to establish criteria for selecting research, reviewing research, recommending funding projects, development of fire management plan, review of fire management plan documents, and discussion of current management problems being faced by the Lab in the near future (deer management, insect infestations).

The U.S. Fish and Wildlife Service sent out a request for research proposals in June 2001 with a due date of mid-July. Three research groups forwarded proposals to be considered by the TAG at their August 2001 meeting. One proposal on physiological effects of insect damage to woody vegetation was accepted based on merits as well as rapid response that could be achieved. This research should provide timely information on the effects of the orange-striped oakworm on oaks at BNL. The other two proposals dealt with various aspects of the effect of prescribed fire on ecosystem health. Both proposals were well above the amount of funding available and both research groups were contacted with a request to modify their proposals to bring scope and budget within an attainable level. Subsequently one proposal was put on hold pending availability of prescribed fire plots for carrying out research. This was done as the proposal was to clear all vegetation and leaf litter from plots and apply fertilizer to mimic effects of fire and nutrient deposition. It was thought that the approach would not be as strong than if actual fire

was used. The other proposal was being modified at year's end to eliminate the need for clearing and use previously cleared areas in the Upton Reserve as-well-as fire break margins in areas outside of the Upton Reserve.

The second Request for Proposals is scheduled to go out in mid-January 2002 with a due date of April 1, 2002 for submission. Proposals will be evaluated and notices of approval will be issued at the Spring meeting of the TAG with expectations of the research starting during the summer field season.

The first draft of the NRMP was prepared for submission to the TAG by the close of CY 2001. The TAG was to review the NRMP and be prepared to discuss the plan at the first meeting of the year in January 2002.

The U.S. Fish and Wildlife Service developed a draft Fire Management Plan (FMP) based on criteria identified during the June 2001 meeting. The required content of the FMP was discussed at the August meeting and the first draft of the FMP was reviewed and discussed page-by-page at the October 2001 meeting, appropriate changes were made. The draft FMP was reissued and discussed at the December 2001 meeting. Minor modifications were to be made and the draft FMP was to be sent to BNL affected BNL managers for review and approval. Subsequent to an approved FMP the need for developing an appendixes for prescribed fire management, fire management unit designations, and support personnel was identified as needing to be completed. The U.S. Fish and Wildlife Service (FWS) District Fire Management Officer made the suggestion to broaden the FWS authority identified in the Interagency Agreement to include responsibility for all prescribed fire at BNL. This action could open the door for funding to be used at BNL for prescribed fire and fuel reduction. This recommendation must be reviewed and approved by both the U.S. Fish and Wildlife Service and the Department of Energy.

3.0 Progress

Progress on implementation is based on the 17 action items listed in the appendices of the WMP.

3.1 Progress Reports

Progress reports were converted from monthly to quarterly in the Annual Report for 2000. Due to work loads and spacing of activities this was changed mid-year to semi-annual reporting with the first two quarters being reported on in July and the final two quarters incorporated in the annual report which is normally due by March 31 of the following year. This annual report has been delayed due to the necessity of investigating concerns associated with cesium-137 contamination in the deer population.

The semi-annual report for the first half of 2001 was issued August 13, 2001 upon completion of all internal reviews.

3.2 Annual Summary Report

The annual summary report for CY2000 was approved and released on February 26, 2001. This report summarized all of the activities that had occurred in the previous calendar year. This was

also the first time that the summary report covered a calendar year instead of the fiscal year. The change in reporting cycle facilitated the inclusion of pertinent information in the Site Environmental Report for 2000.

The Annual Summary Report for 2000 was instrumental in the close-out of the Consent Order requiring the establishment of the Wildlife Management Plan. Last year's report documented the full implementation of the Wildlife Management Plan which was the key point for close-out.

3.3 Tiger Salamander Surveys

Annual tiger salamander surveys were conducted for egg masses in the March-April time frame and larval surveys were conducted in the June-July time frame. During the summer of 2001, Heather Kling, an ERULF intern conducted research on the use of coverboards by emerging tiger salamanders. All surveys and research were carried out under an endangered/threatened species permit (License No. ESP01-0085) issued to Tim Green. The summary of the surveys and research may be seen in attachment 1.

3.4 Peconic River Monitoring

Monitoring of discharges to the Peconic River continue as required under BNL's State Pollution Discharge and Elimination System permit. Flow and water quality are reported monthly to the NYSDEC and results of monitoring are summarized in the Site Environmental Report 2000 – Brookhaven National Laboratory (BNL, 2001).

3.5 Peconic River Fish Sampling

Environmental monitoring of fish for contaminant content was suspended for the BNL portion of the Peconic River beginning in 2001. This suspension is expected to last for at least three years in order to allow the onsite fish population to recover from several years of heavy sampling efforts. Replacing the environmental monitoring program was a population health survey that was conducted in the July-August, 2001 time frame. The population survey used electro-shocking techniques to capture virtually all fish inhabiting the stretch of the Peconic River extending from the Sewage Treatment Plant Outfall to about 75 feet east of the east firebreak. A total of 159 fish from five species were taken during the sampling. All fish were measured and released. See Table 1 and 2 as well as Figure 1 and 2 below for comparison of sizes and size distribution, and numbers and distribution.

Banded sunfish (*Enneacanthus obesus*) and swamp darter (*Etheostoma fusimorme*) both occur in Zeke's pond but no sampling or population estimates were made during 2001. In 2000 the banded sunfish was absent from the Peconic River on either side of the east firebreak, but were present in 2001 as shown below.

Table 1. Summary data of Peconic River fish sampling onsite at BNL.

	Banded Sunfish	Brown Bullhead	Chain Pickerel	Creek Chubsucker	Golden Shiner	Largemouth Bass	Pumpkinseed
Peconic River Location	Average Length in Inches						
East of HMn*	2.63	4.36	6.68	4.30		5.50	3.59
HMn Flume	2.86		6.54	4.46			3.63
West of HMn 150'		6.00	13.00	4.35	4.39		5.75
West of HMn 750'		4.54		3.47			
West of HMn >750'		5.00	7.04				

Note: * HMn is the name identifying the monitoring station located at the east firebreak.

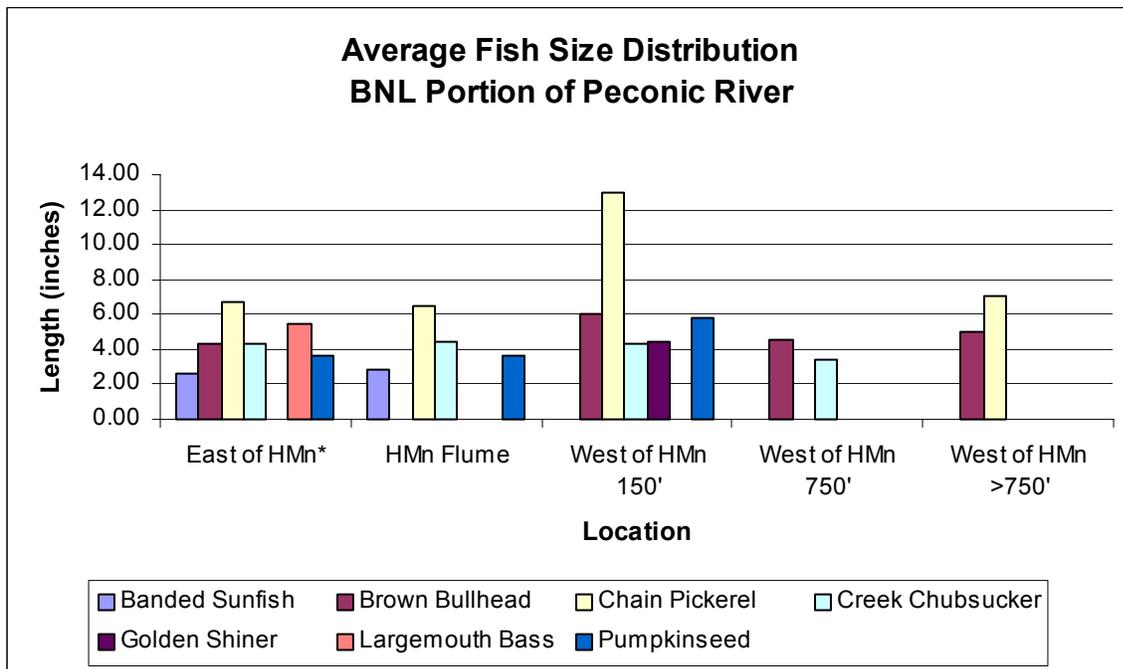


Figure 1. Size distribution of fish taken between the sewage treatment plant and east firebreak.

Table 2. Population distribution of the 159 fish sampled from the onsite portion of the Peconic River.

	Banded Sunfish	Brown Bullhead	Chain Pickerel	Creek Chubsucker	Golden Shiner	Largemouth Bass	Pumpkinseed
Peconic River Location	Number of Fish in Each Section						
East of HMn*	4	7	7	26		1	11
HMn Flume	14		6	6			2
West of HMn 150'		12	1	13	9		2
West of HMn 750'		6		8			
West of HMn >750'		18	6				
Total Counted	18	43	20	53	9	1	15

Note: * HMn is the name identifying the monitoring station located at the east firebreak.

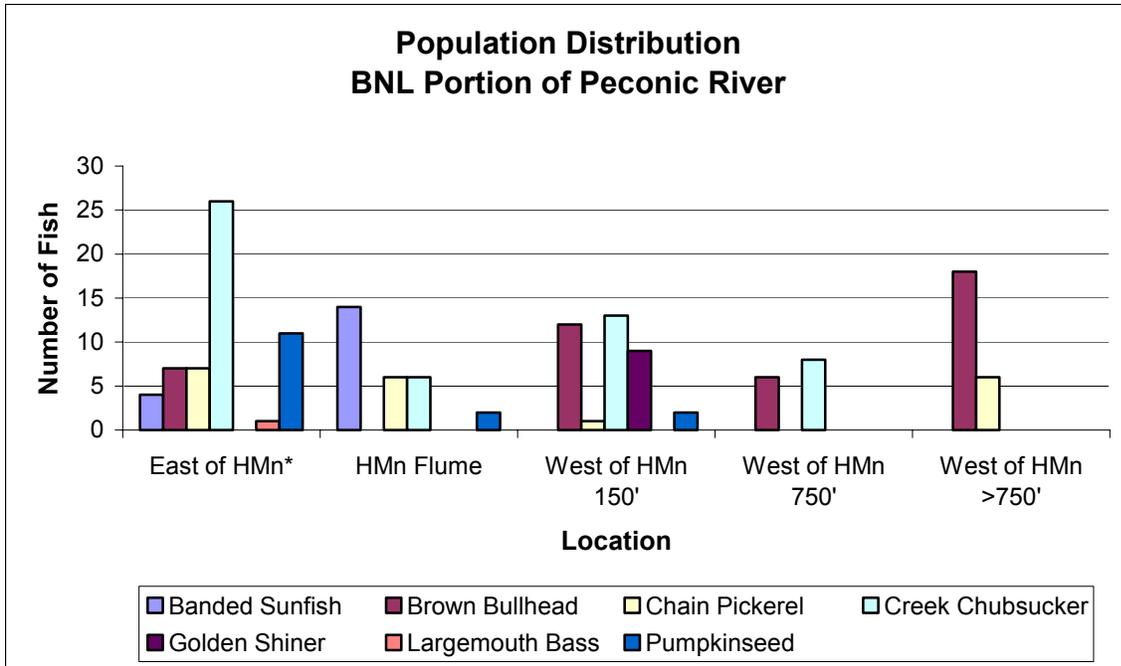


Figure 2. Population distribution of fish species between the sewage treatment plant and the east firebreak in the onsite portion of the Peconic River on BNL.

3.6 Education

BNL-sponsored events during the week of Earth Day which included student art contests, fun runs, wildlife displays, and a display on the Upton Reserve. During the year, BNL's natural resource manager also give talks and ecology walks for civic organizations, student groups and Take Your Sons to Work Day participants.

The Environmental Services Division hosted three students one under the Energy Research Undergraduate Laboratory Fellowships (ERULF) and two under the Pre-Service Teacher (PST) program. The ERULF student worked on emergent tiger salamander use of coverboards, and has subsequently presented her poster at three separate research symposia. The two PST students worked primarily under the Suffolk County Community College summer ecology field investigations program that was jointly funded by Brookhaven Science Associates and funds from the Upton Reserve.

One of the PST students developed educational curriculum to include field investigations within a junior and senior high curriculum. The other student developed a fire behavior model based on BNL specific data. The fire modeling work was presented at the 2001 Pine Barrens Research Forum in October 2001. This student also received a Pine Barrens Research award for his work. Brookhaven National Laboratory along with the Central Pine Barrens Joint Policy and Planning Commission and the Long Island Ground Water Institute at SUNY-SB hosted the 6th Annual Pine Barrens Research Forum on October 4 – 5, 2001. This forum was to have celebrated the Pine Barrens twinning with the Migliarino - San Rossore - Massaciucoli (MSM) Regional Park

in Tuscany, Italy but the unfortunate events of September 11, 2001 forced the restructuring of this event to a half day of papers covering local Pine Barrens research.

3.7 TS-1, TS-2, TS-7 and TS-W3: Attachments for Egg Masses

These four sites all provided excellent habitat for tiger salamander production in 2001. Egg mass surveys identified 8 egg masses at TS-1, 21 at TS-2, 11 at TS-7, and 148 at TS-W3. Ponds TS-1, TS-2, and TS-7 were so deep that surveys could only be conducted along the shoreline, the vast majority of these three ponds could not be surveyed.

By the end of 2001 drought conditions had set in in the northeastern United States and ponds were gradually drying and ATV users were beginning to use TS-2 as a racetrack.

3.8 TS-10 Excavation to allow Retention of Water.

This action was postponed in the 2000 Annual report for re-evaluation. Subsequently the Lab has increased discharges from non-contact cooling water systems. This increased discharge has resulted in permanent water in the basin. Because of the presence of permanent water this basin was used as one of the research sites by the summer ERULF intern discussed above. As long as this basin is receiving significant volumes of water, no further action will be taken on deepening any part of the basin.

3.9 TS-2: Institute Security Patrol of Area

As mentioned above, this pond was beginning to be used by ATV users as a racetrack toward the end of 2001. BNL's security force was alerted to the increased ATV use in the area. BNL Security began participating in the Law Enforcement Task Force of the Central Pine Barrens and has requested "sting" operations to enforce ATV use laws. The natural resource manager periodically monitors the area and informs security of increasing traffic. Unfortunately, the increase in ATV use is occurring throughout the Central Pine Barrens and will likely go unstemmed due to a lack of law enforcement personnel to keep on top of the problem.

3.10 Bird Nests

Ten additional bluebird boxes were installed in various open fields in 2001. This addition brings the total number of boxes up to 36. A volunteer who checks on the boxes every 3-4 weeks during the breeding season keeps track of nesting success. Of the 36 boxes, 19 bluebird nests were identified. House wrens built seven nests, of which, four nests were built over bluebird nests after the bluebirds fledged.

3.11 Turkey Sighting Reports

Turkey sighting reports are received periodically via the Turkey Sighting Report form on the Natural Resources Web Page or direct e-mail. The turkey population is currently estimated at 250 birds with the largest wintering flock counted at over 100 birds. Population estimates are periodically reported to NYSDEC for their records. In 2001, The New York Times published an

article on the wild turkey and featured BNL as one of the locations with significant turkey populations.

3.12 Deer Population Estimation and Control

The deer population was estimated to be 1942 animals in November-December 2000. The winter of 2000-2001 was a wetter than usual winter with significant snow pack lasting from February through most of March 2001. The large deer population had already eaten most of the available food supply going into the winter and a lack of an acorn crop didn't help the situation. Beginning in January 2001 deer began eating evergreens and other shrubbery around the buildings at BNL and pine needles throughout the Lab. Beginning in early March mortality became evident with reports and documentation of carcasses in the forest. Surveys in June of 2001 estimated the deer population around 864 deer. Winter surveys from November 2001 through January 2002 estimated the population at 1169 deer. With mortality from the winter of 2000-2001 and recruitment in the summer of 2001 the overall loss between the two years was roughly 40%.

Documentation to begin implementation of deer management activities was submitted for review under the requirements of the National Environmental Policy Act. This submission occurred early in October 2001 and was still under review at year's end. It is expected to be carefully reviewed due to the potential for public controversy.

3.13 Wildlife Management Plan Update

The Wildlife Management Plan continued to be implemented while the update, the Natural Resource Management Plan, is being developed with the input from the Technical Advisory Group. The NRMP will also contain a wildfire management plan. The first major draft of this plan was near completion at the end of the year. The final version will be submitted for management review and approval in early summer 2002.

3.14 Remediation of TS-W4, TS-W6b, and OUV

Design work for TS-W4 and TS-W6b are in process but funding and implementation of clean-up plans is not scheduled until FY04 or FY05. The Sewage Treatment Plant portion of OU V is scheduled to begin in FY02 and pilot studies for the Peconic River clean-up were scheduled to begin in early 2002.

3.15 Songbird Surveys

Songbird surveys were carried out each month from March through October 2001. Five transects were established in 2000 to monitor migratory bird population in the various habitats that exist on the BNL site. As the database builds trending will be completed to determine the health of various bird species onsite at BNL. The CY2001 data is summarized below.

- 73 species identified
- 20 new species compared to CY2000

- A total of 93 species identified over both years
- 53 species common in both years
- 1115 data points collected
- 2562 individuals counted
- 17 species were counted only once
- 23 species were counted between 2 and 5 times
- 9 species were counted between 6 and 10 times
- 24 species were counted more than 10 times
- Biology Fields Transect had 53 species identified
 - 3 more than in CY2000
 - 16 species not identified in CY2000
 - 66 species over two years
- East Trenches Transect had 32 species identified
 - 1 more than in CY2000
 - 10 species not identified in CY2000
 - 42 species over two years
- North Transect had 34 species identified
 - 11 species more than in CY2000
 - 17 species not identified in CY2000
 - 40 species over two years
- Peconic River Transect had 47 species identified
 - 1 less than in CY2000
 - 13 species not identified in CY2000
 - 61 species over two years
- South Transect had 39 species identified
 - 7 species more than in CY2000
 - 17 species not identified in CY2000
 - 49 species over two years
- 19 species counted on all five transects
- 6 species counted on four transects
- 9 species counted on 3 transects
- 17 species counted on 2 transects
- 22 species counted on only 1 transect

Table 3. Results of BNL Bird Surveys CY2000 and CY2001

Common Name		Biology Fields		East Trenches		North Transect		Peconic River		South Transect	
		2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Acadian Flycatcher	<i>Empidonax vireescens</i>										
American Crow	<i>Corvus brachyrhynchos</i>	X	X	X	X						
American Redstart	<i>Setophaga ruticilla</i>	X	X								
American Robin	<i>Turdus migratorius</i>	X	X	X	X						
Baltimore Oriole	<i>Icterus galbula</i>	X	X	X	X						
Barn Swallow	<i>Hirundo rustica</i>										
Bewick's Wren	<i>Thryomanes bewickii</i>		X								
Black-and-White Warbler	<i>Mniotilta varia</i>	X	X	X	X						
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	X	X	X	X						
Black-capped Chickadee	<i>Poecile atricapillus</i>	X	X	X	X						
Blackpole	<i>Dendroica striata</i>		X								
Black-throated Green Warbler	<i>Dendroica virens</i>										
Blue Jay	<i>Cyanocitta cristata</i>	X	X	X	X						
Blue-Grey Gnatcatcher	<i>Polioptila caerulea</i>		X								
Blue-winged Warbler	<i>Vermivora pinus</i>										
Brown Creeper	<i>Certhia americana</i>			X							
Brown Thrasher	<i>Toxostoma rufum</i>	X	X	X	X						
Brown-headed Cowbird	<i>Molothrus ater</i>	X	X	X	X						
Canada Goose	<i>Branta canadensis</i>										
Carolina Wren	<i>Thryothorus ludovicianus</i>		X	X	X						
Cedar Waxwing	<i>Bombycilla cedrorum</i>	X		X							
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>										
Chipping Sparrow	<i>Spizella passerina</i>	X	X	X	X						
Common Grackle	<i>Quiscalus quiscula</i>	X	X	X	X						
Common Yellowthroat	<i>Geothlypis trichas</i>	X	X	X	X						
Cooper's Hawk	<i>Accipiter cooperii</i>		X								
Dark-eyed Junco	<i>Junco hyemalis</i>		X								
Double-crested Cormorant	<i>Phalacrocorax auritus</i>										
Downy Woodpecker	<i>Picoides pubescens</i>	X	X	X	X						
Eastern Bluebird	<i>Sialia sialis</i>	X	X								
Eastern Kingbird	<i>Tyrannus tyrannus</i>										
Eastern Phoebe	<i>Sayornis phoebe</i>										
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	X	X	X	X						
Eastern Wood Peewee	<i>Contopus virens</i>	X	X	X	X						

BNL Bird Surveys Two Year Comparison

Common Name	Scientific Name	Biology Fields		East Trenches		North Transect		Peconic River		South Transect	
		2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
European Starlings	<i>Sturnus vulgaris</i>	X	X	X	X					X	
Field Sparrow	<i>Spizella pusilla</i>	X	X								
Fox Sparrow	<i>Passerella iliaca</i>						X				
Fish Crow	<i>Corvus ossifragus</i>								X		
Golden Eagle	<i>Aquila chrysaetos</i>				X						
Golden-crowned Kinglet	<i>Regulus satrapa</i>				X		X				X
Goldfinch	<i>Carduelis tristis</i>	X	X	X	X				X		X
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	X									
Great Horned Owl	<i>Bubo virginianus</i>				X				X		
Grey Catbird	<i>Dumetella carolinensis</i>	X	X	X	X		X		X		X
Hairy Woodpecker	<i>Picoides villosus</i>						X				X
Hermit Thrush	<i>Catharus guttatus</i>						X				X
House Finch	<i>Carpodacus mexicanus</i>										X
Herring Gull	<i>Larus argentatus</i>	X									
Horned Lark	<i>Eremophila alpestris</i>	X									
House Wren	<i>Troglodytes aedon</i>	X	X						X		
Indigo Bunting	<i>Passerina cyanea</i>										
Killdeer	<i>Charadrius vociferus</i>				X				X		
Magnolia Warbler	<i>Dendroica magnolia</i>	X							X		
Mallard Duck	<i>Anas platyrhynchos</i>						X		X		
Merlin	<i>Falco columbarius</i>						X		X		
Mourning Dove	<i>Zenaidura macroura</i>	X	X	X	X		X		X		X
Mute Swan	<i>Cygnus olor</i>				X						
Nashville Warbler	<i>Vermivora ruficapilla</i>	X							X		
Northern Bobwhite	<i>Colinus virginianus</i>	X		X	X		X		X		X
Northern Cardinal	<i>Cardinalis cardinalis</i>	X	X	X	X		X		X		X
Northern Flicker	<i>Colaptes auratus</i>	X	X	X	X		X		X		X
Northern Mockingbird	<i>Mimus polyglottos</i>	X	X				X		X		X
Northern Parula	<i>Parula americana</i>	X									
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>										
Ovenbird	<i>Seiurus aurocapillus</i>	X	X	X	X		X		X		X
Palm Warbler	<i>Dendroica palmarum</i>		X								
Pine Warbler	<i>Dendroica pinus</i>		X	X	X		X		X		X
Plain Pigeon	<i>Columbus livia</i>		X	X	X		X		X		X

BNL Bird Surveys Two Year Comparison

Common Name	Scientific Name	Biology Fields		East Trenches		North Transect		Peconic River		South Transect	
		2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Prairie Warbler	<i>Dendroica discolor</i>	X				X					
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	X	X		X			X	X	X	X
Red-breasted Nuthatch	<i>Sitta canadensis</i>	X	X	X		X	X	X	X		X
Red-eyed Vireo	<i>Vireo olivaceus</i>	X	X		X	X				X	X
Red-tailed Hawk	<i>Buteo jamaicensis</i>	X	X			X					
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	X	X	X		X		X			
Ring-billed Gull	<i>Larus delawarensis</i>									X	
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	X									
Ruby-crowned Kinglet	<i>Regulus calendula</i>	X						X			
Scarlet Tanager	<i>Piranga olivacea</i>	X	X			X				X	X
Sharp-shinned Hawk	<i>Accipiter striatus</i>	X									
Song Sparrow	<i>Melospiza melodia</i>								X		
Tree Swallow	<i>Tachycineta bicolor</i>	X	X								X
Tufted Titmouse	<i>Baeolophus bicolor</i>	X	X			X	X	X	X	X	X
Veery	<i>Catharus fuscescens</i>										
White-breasted Nuthatch	<i>Sitta carolinensis</i>		X			X				X	X
White-eyed Vireo	<i>Vireo griseus</i>	X		X						X	
White-throated Sparrow	<i>Zonotrichia albicollis</i>		X	X				X	X	X	
Wild Turkey	<i>Meleagris gallopavo</i>		X	X		X	X	X	X	X	
Wood Thrush	<i>Hylocichla mustelina</i>	X	X	X		X	X	X	X	X	X
Yellow Warbler	<i>Dendroica petechia</i>										
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>		X					X	X		
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	X	X	X				X	X	X	
Yellow-rumped Warbler	<i>Dendroica coronata</i>		X								
Yellow-throated Warbler	<i>Dendroica dominica</i>		X								
Species/Transect		50	53	31	32	23	34	48	47	32	39

3.16 Tiger Salamander Breeding Pond Survey

As mentioned above, a Summer ERULF student conducted a coverboard study at ponds TS-7 and TS-10 during June and July 2001. Her report is attached as part of the annual report required for the Threatened and Endangered Species Permit.

A student from Hofstra University has proposed completing a life history study on the tiger salamander that would include several BNL ponds that would have drift fences around them. This would allow tracking salamanders entering and exiting ponds. This study would also include the implantation of passively induced transponder (PIT) tags to permanently identify individuals, as well as taking toe clips to age breeding salamanders. This research is expected to start no earlier than the fall of 2002.

3.17 RHIC Revegetation

The Activity Data Sheet (ADS) budgeting process approved funding of the RHIC revegetation plan in FY01 but due to other higher priority activities of the Lab, the funding was suspended for FY01 with the promise of funding in FY02. The FY02 funding was approved at \$75K. In December 2001 a Truax Model 812 seed drill was ordered for the planting of native grasses in 56 acres of bare area in the RHIC Ring. The plan for revegetation called for a series of experimental areas to determine the best planting mix of seeds and soil. This plan did not agree with other land management agencies experience with revegetation. Therefore the revegetation plan was modified to simply plant native grass species, native wildflowers, if seed were available, and native trees as they became available. This tactic would allow quicker revegetation, reseeding as needed, and cost less over the five-year life of the funding.

4.0 Other Related Initiatives

Two initiatives started in CY2000 were carried over into CY2001. These two are the Upton Ecological and Research Reserve and the Resource Zoning Map of BNL. A third initiative started in CY2001 was development of ecological overlays for BNL in the geographic information system (GIS).

4.1 Upton Ecological and Research Reserve

The Upton Reserve was gearing up to be fully functional by the end of FY2001. Two staff members had been hired and research proposals were approved see section 2.0 above. The two personnel included a biologist and a forester. In December 2001 the biologist moved on to another position with the U.S. Forest Service research division. That vacancy was scheduled to be filled in 2002. An annual report on the Upton Reserve for FY2001 is attached.

4.2 Resource Zoning

The resource-zoning map developed in CY2000 for the Site Master Plan was included in a list of overlays for the geographic information system. This overlay will allow the natural resource manager the ability to coordinate research, and natural resource protection.

4.3 Geographic Information System (GIS) Overlays

The natural resource management program includes a half-time employee assigned to GIS. A prioritized list of GIS needs was developed for implementation and development of GIS overlays. Included in this list were overlays for cultural resources, bird transects, tiger salamander data, the resource zoning mentioned above, deer transects, frost damage, fire area information, and data collection to be established in the Upton Reserve (deer exclosures, forest health monitoring locations, etc.). As data is gathered for natural resource management it will be added to the GIS if it is suitable to do so. This mapping effort was just beginning at years end.

Attachment 1

Annual Report for

Endangererd/Threatened Species Permit

License No. ESP01-0085

Attachment 2

Fiscal Year 2001 Accomplishments

Upton Ecological and Research Reserve