

REVIEW AND APPROVALS

MUSCATATUCK NATIONAL WILDLIFE REFUGE

Seymour, Indiana

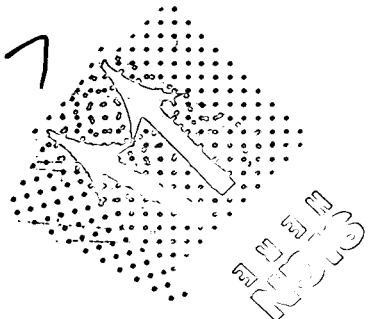
ANNUAL NARRATIVE REPORT

Fiscal Year 2006

Maureen 8/30/07
Refuge Manager Date

Ann Kauffeld 9/27/07
Refuge Supervisor Date

Nita M. Felt 9-24-2007
Regional Office Approval Date





U.S. Fish & Wildlife Service

Muscatatuck

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Department of the Interior
U.S. Fish and Wildlife Service
National Wildlife Refuge System

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M. W. Smith 8/30/07
Refuge Manager Date

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Refuge Annual Performance Plan (RAPP) FY '06

Muscatatuck National Wildlife Refuge

Annual Narrative

Seymour, Indiana

Fiscal Year 2006 (October 1, 2005 to September 30, 2006)
(*Calendar year data are used for climate and waterfowl Use Days)

*2006 Climatic Data				
Month	Temperatures (AVG)		Precipitation	
	Maximum	Minimum	NWR	Normal
January	46.7	33.7	4.42	3.30
February	39.6	25.8	1.72	2.94
March	48.4	34.7	8.98	4.22
April	65.2	46.5	3.81	3.83
May	69.6	53.1	5.34	4.31
June	78.5	61.0	5.81	4.14
July	83.5	66.8	4.53	4.77
August	82.0	65.7	8.93	2.91
September	70.4	53.4	6.70	3.03
October	60.0	42.9	5.87	2.47
November	50.3	37.5	4.61	3.09
December	45.6	30.9	5.65	3.16
Totals	61.7 (AVG)	46.0 (AVG)	66.37**	42.17

**Record total precipitation recorded at MNWR

1. Precipitation and temperature data from the office gauge.
2. Normal precipitation is from the 1951 to 1977 period (recorded at Seymour, IN).

June 7, 2006 saw an F1 tornado in Jackson County that touched down near Reddington, IN. From Reddington it traveled due south for 8 miles before lifting near Interstate 65. The tornado came through the west edge of the refuge knocking down trees and snapping many tree limbs, fortunately, there was no damage to any refuge structures. Maintenance Mechanic Pike and STEP student Wallace did the necessary clean up. Many neighbors on CR 400 North - the west entrance to the refuge sustained major damage to trees and homes.

INTRODUCTION

The Muscatatuck National Wildlife Refuge (MNWR) established October 6, 1966, is located in south central Indiana midway between Indianapolis, Indiana, and Louisville, Kentucky. The refuge is just south and east of the junction of I-65 and US 50 and is divided by the county line of Jackson and Jennings Counties. The Restle Unit, a 78 acre parcel northwest of Bloomington in Monroe County, Indiana, was donated in 1990 as part of the Muscatatuck National Wildlife Refuge and includes bottomland hardwoods and a restored wetland. The 50,000 acre Big Oaks National Wildlife Refuge (former Jefferson Proving Ground) was established June 30, 2000 and formally dedicated July 8, 2000 and was managed as part of Muscatatuck / Big Oaks NWR complex until August 2002 when it became a "stand alone" refuge.

The refuge name, Muscatatuck, means "Land of the Winding Waters" which historically reflects the topography of the area. Approximately 36% of the refuge lies within the annual flood plain of the Muscatatuck River-Vernon Fork which forms the southern boundary of the refuge. The topographic relief from the refuge bottomlands to gently sloping uplands ranges from 540 to 620 MSL in the otherwise flat region known as the Scottsburg lowlands. Given the physiographic diversity of the area, the refuge is rich in history of early cultures.

The refuge was authorized by the Migratory Bird Conservation Commission in 1966 and purchased with "Duck Stamp" money. A total of 7,724 acres were purchased. The primary objectives for the refuge are to provide migratory waterfowl with a resting/feeding area during the migration and to produce wood ducks.

To start achieving these objectives at significant levels, 1,200 acres of managed waters, i.e., lakes, moist soil impoundments and green tree impoundments were constructed with Bicentennial Land Heritage Program (BLHP) funding by the fall of 1983. Hardwood forest dominates 4,160 acres of the flood plain and on the upland slopes. An additional 2,015 acres of land are reverting to forest lands and brush lands and an ongoing cooperative farming program of 307 acres provides corn, wheat, soybeans and hay to a broad spectrum of wildlife to compliment the habitat diversity within the Muscatatuck National Wildlife Refuge.

The Muscatatuck NWR Fish and Wildlife Easement Management District includes 30 Indiana counties.

HIGHLIGHTS

- National Wildlife Refuge Week celebration (sec. 7a)
 - Conservation Field Days attended by 600 third graders in October
 - Dedication of Roberts Auditorium during Refuge Week
- FFA National Convention in Louisville, KY (sec.7b)
- Nineteen whooping cranes from "Class of 2005" visit Muscatatuck in route to Florida, spectators watched the lift-off as the journey south continued (sec. 4c)
- Junior Duck Stamp Contest attracts 451 entries from throughout the state (sec. 7a)
- Wings over Muscatatuck migratory bird festival attended by 600 people (sec. 7a)
- Annual "Take a Kid Fishing" event held on June 3, 2006 attracts over 600 (sec. 7a)
- Student volunteer/interns assist at Muscatatuck (sec.7b)
- Copperbelly pit tag monitoring project continues (sec. 1a)
- Invasive control expands (sec.3h)

MONITORING AND STUDIES

1a. Surveys and Censuses

The annual FWS Greater Sandhill Crane (*Grus canadensis*) Survey was conducted by Biotech Dailey from November 1-5, 2005. Survey results were submitted to Sean Kelly in the USFWS Division of Migratory Birds. No cranes were found on the refuge during the survey, but migration did start later in November. Flocks of cranes stopped at the refuge throughout autumn and winter, with sightings of up to 1,000 individuals occurring through February 2006. As in previous years, the area on refuge most frequented by the cranes was the northern edge of Moss Lake just south of the maintenance area.

Skilled volunteers again conducted our annual Christmas bird count on January 1, 2006. All areas of the refuge were surveyed using the protocol established by the National Audubon Society. Seventy-three bird species, up from 60 the previous year, and 6,450 individuals were counted.

The annual FWS Midwinter Waterfowl survey was conducted on January 3, 2006 by Biotech Dailey and Biology Intern Lance LaBonte, a student from Franklin College in Franklin Indiana. Survey results were submitted to Adam Phelps, Indiana Department of Natural Resources (IDNR) Waterfowl Biologist. During the refuge survey 11 species and 3,531 individuals were counted. Over 95% of the birds seen were either Canada geese (*Branta Canadensis*) or mallards (*Anas platyrhynchos*), but a flock of 14 tundra swans (*Cygnus columbianus*) was also present.

The Indiana Mid-Winter Bald Eagle (*Haliaeetus leucocephalus*) Survey, conducted January 9, 2006 by Biotech Dailey and Wildlife Refuge Specialist Knowles, saw 2 mature and 3 immature eagles on the refuge. Our survey results were submitted to John Castrale, IDNR Non-game Bird Biologist. Castrale summarized statewide eagle survey data and found that 211 bald eagles were present in Indiana; this total is 29% greater than the state average over the previous ten years. The eagle nest located on MNWR was active again and produced one chick, as documented by Castrale during a flyover of the refuge on May 31, 2006.



Wintering Bald Eagles at Muscatatuck NWR

The annual May Day bird count was conducted May 13, 2006. This survey also covered all areas of the refuge and used protocol established by the National Audubon Society. A total of 110 species and 1,517 individuals were counted in spite of rain that persisted most of the day. Highlights from the day included an abundance of warbler species and the sighting of a common loon (*Gavia immer*).



Active great blue heron nest on MNWR, June 2006.

The great blue heron (*Ardea herodias*) rookery located in the eastern portion of Moss Lake was checked in June 2006 by biology interns Faller, Halcomb, Holzinger, and Roumie. Forty active nests were seen, including one nest that appeared to be occupied by a great egret (*Ardea alba*). Great egrets are not known to nest on the refuge, but this unusual occurrence could not be documented photographically by the interns due to its distance from their vantage point.



Interns Charlie Halcomb, Jamie Faller, Nadia Roumie, and Joe Holzinger find a dry place to take a break while surveying the heron rookery at Moss Lake.

MNWR volunteers held a butterfly count on July 22, 2006 using a protocol established by the North American Butterfly Association. Five surveyors documented 17 different species on the refuge during the counting period, which was an unusually low count. This count is an annual effort and over time the information should provide insight on trends in the butterfly populations on the refuge.

Muscatatuck NWR again participated in the North American Amphibian Monitoring Program. This program is part of a larger international effort and is designed to determine the abundance and distribution of amphibians to better understand their conservation needs. Our survey route was completed in March, May, and July as prescribed by the national protocol, and results were submitted to IDNR. Eight species were recorded; spring peeper (*Hyla crucifer*), chorus frog (*Pseudacris triseriata*), southern leopard frog (*Rana utricularia*), bullfrog (*Rana catesbeiana*), cricket frog (*Acris crepitans*), Copes gray tree frog (*Hyla chrysoscelis*), green frog (*Rana clamitans*), and wood frog (*Rana sylvatica*).

As in previous years, the refuge population of the state endangered southern tubercled orchid (*Platanthera flava* var. *flava*) was monitored by refuge volunteer Brian Lowry with the assistance of interns. This year's survey took place on July 21st, 2006. Forty plants were confirmed at the original Seep Spring Location and 58 plants were confirmed at the Endicott Marsh location.

Waterfowl counts were conducted throughout the year and waterfowl brood surveys were conducted throughout the breeding season by refuge staff and volunteers. These counts allowed us to estimate total waterfowl use days (459,209) and total waterfowl production (685 wood ducks and 68 Canada geese). In recent years, there has been an increase of permanently protected wetlands on private lands (5,449 acres of WRP in the Muscatatuck River basin), which offer off-refuge habitat. It's hoped that the Comprehensive Conservation Plan (CCP) process that the refuge will soon undertake will help in refining our estimating techniques.

Water Quality monitoring was done quarterly in 2006 on five refuge creeks: Sandy Branch, Mutton Creek, Storm Creek, a Richart Lake tributary, and a Stanfield Lake tributary. All were used as sampling sites as they entered refuge property. As in the past, these monitoring efforts were accomplished by volunteers using the Hoosier Riverwatch protocol, which includes habitat assessment, chemical monitoring (phosphate and nitrates only), and biological monitoring. No contamination problems were found through this monitoring – the sampled creeks were found to contain low levels of bacterial and chemical pollutants while providing good habitat for macroinvertebrates. All data were entered into the statewide Riverwatch Database which can be accessed at <http://www.hoosieriverwatch.com/>. Hard copies of the data can be found in refuge files.

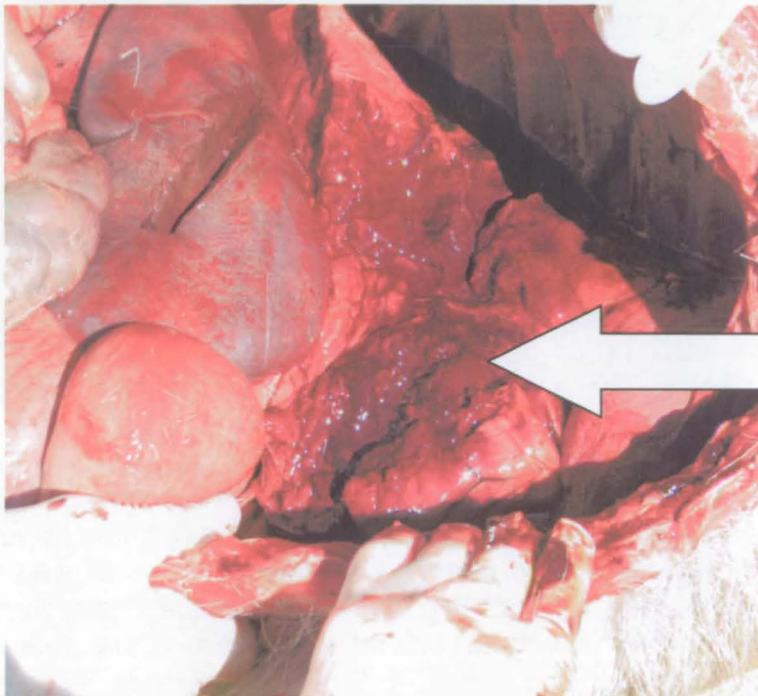
Interesting wildlife sightings through the year included: a white ibis (*Eudocimus albus*), tundra and trumpeter swans (*Cygnus columbianus* and *C. buccinator*), common loon (*Gavia immer*), little blue heron (*Egretta caerulea*), rough-winged swallow (*Stelgidopteryx serripennis*), winter wren (*Troglodytes troglodytes*), rusty blackbird (*Euphagus carolinus*), barn owl (*Tyto alba*) (Restle Unit), cattle egrets (*Bubulcus ibis*), snowy egret (*Egretta thula*), and black vultures (*Coragyps atratus*).

1b. Studies and Investigations

In early April 2006, 4 white-tailed deer (*Odocoileus virginianus*) that died under unusual circumstances were found on MNWR. The deer were found in an open field on a Saturday morning following severe electrical storms the previous night. Three deer were touching or only inches apart, while the fourth was about 50' away from the others. There was some blood coming from the eyes and noses of several of these, and froth from the mouth of one. The only other external sign noted was that one of the group of three had an obvious veining pattern on the head, neck, shoulder, and front legs, which were both broken. No entry/exit wounds indicative of gunshot, etc were found, and the animals appeared to be in good health immediately prior to death. Our initial conclusion was that the deer had died of electrocution by lightning strike. Because references stated that electrocution may rupture the heart, we opened one of the deer to determine whether this had occurred, and indeed it had. We therefore concluded that our initial assumption regarding cause of death was correct, and that this was a fairly unusual record of white-tailed deer mortality.



Electrocuted deer with visible veining pattern on head, neck, and leg.



Chest cavity of electrocuted deer showing ruptured heart (indicated by arrow)

Along with Muscatatuck and Bloomington Field Office (BFO) staff, summer interns conducted a survey for deformed frogs at the refuge. Field work was coordinated by Robin McWilliams- Munson (FWS Bloomington Field Office Wildlife Biologist), and is part of the FWS Nationwide Abnormal Amphibian Monitoring Project. The Sand Pond wetland site was used to collect samples of southern leopard frogs (*Rana utricularia*), and green frogs (*Rana clamitans*), however, an interim report including the 2006 data has not yet been made available.



Interns Holzinger and Roumie collect frogs for deformed amphibian study.

The long-term copperbelly watersnake (*Nerodia erythrogaster neglecta*) monitoring project initiated last year continued throughout the summer of 2006. The former primary investigator for this project unexpectedly chose to discontinue his participation and the project was instead led by Biotech Dailey, who was assisted by refuge interns, IDNR staff, and volunteers. The purpose of this study was to estimate population size, compare population statistics to prior studies, and analyze population viability of the species through a mark-recapture/release study. Snakes were captured and permanently marked with Passive Integrated Transponder (PIT) tags to enable future identification. Data from the previous year were insufficient to obtain statistically significant results on population size, so we decided to focus capture efforts on a smaller portion of the refuge and expand our capture methods to include drift fences and funnel traps in the hope of getting a higher proportion recaptures and thereby improving the significance of the results. We captured 32 copperbelly watersnakes and implanted 26 PIT tags. Other data such as sex, age, body mass, length, and location were also recorded to provide life-history data on future recaptures. Despite our more concentrated effort and the help of many skilled field workers, we only succeeded in getting 2 recaptures, which is insufficient for significant results. After much discussion among staff and with input from snake researchers, we decided that before proceeding with future seasons using these same methods, we should try instituting a visual index sampling method to try to determine population size and for long-term monitoring. Perhaps the index will tell us where better to focus our efforts. If work on this project continues in the future, changes in protocol will need to be made in order to ensure that proper sample sizes are obtained.



Interns Constructing Drift Fence for Copperbelly Watersnake Project



IDNR/MNWR Staff and Interns Who Participated In Copperbelly Watersnake Fieldwork



Interns Processing a Captured Copperbelly

John Marshall, PhD student from Purdue University continued using MNWR as a study site for his research investigating the genetic "connectedness" of various populations of copperbelly watersnake. Working in conjunction with MNWR staff and volunteers, John collected tissue samples from 50 individuals by collecting scale clippings, an established harmless technique. John performed genetic analyses of samples. Over the winter with some interesting results: it appears that the snakes at MNWR are genetically distinct from all other populations, including the snakes near Austin, IN, an area a few miles downstream from us. It also appears that our snakes have the lowest genetic diversity, even lower than the protected population in Ohio/Michigan. More interesting is that the Ohio population is more genetically similar to Kentucky animals than to our animals, despite the geographic proximity. John will continue his analysis and keep us informed of any conclusions, which could prove to have interesting implications for refuge management.

Wildlife Refuge Specialist (WRS) Knowles, Biotech Dailey, Refuge Manager (RM) Webber reviewed the ten year Contaminant Assessment Process (CAP) update information in September 2006, and sent corrections, additions, and edits to BFO, Robin McWilliams-Munson. The CAP was first accomplished in 1996, and this completes the 2006 update.

Dr. Vicky Meretsky, IU-SPEA professor, requested and was issued a Special Use Permit (SUP) to monitor for the state endangered Kirtland snakes (*Clonophis kirtlandii*) at the Restle unit for the field season in 2006. They set 14 cover objects on the dikes of the dam of the Restle unit, on the southeast corner. These were checked irregularly in April and May - the peak times, elsewhere. There were no Kirtland's snakes found. Reed canary grass was very dense in the ditch by midsummer, and some of the cover objects during this time were lost. The remainder of the cover objects were removed in October.

Kirtland's snakes were found on the Baugh property that borders the Restle unit, and Dr. Meretsky thought that perhaps construction activity from the rehabilitation of the Restle unit dike the fall of 2005, made the area unattractive for a while. There is not any evidence that the Kirtland's snakes move very far, so it may be a while before they reoccupy the site, if they do so. Crawfish holes and turrets were also in short supply on the Fish and Wildlife Service (FWS) property, which may limit attractiveness for the snakes, as well.

Special use permits issued for studies and investigations for FY06 were to Dr. Vicky Meretsky, Elizabeth Carey to conduct fieldwork as part of Monarch Watch, Dr. Bryant McAllister to study patterns of clinal variation in populations of *Drosophila americana*, John Marshall to non-invasively collect tissue samples from *Nerodia erthrogaster neglecta* to determine the genetic diversity of the population of this sub-species on Muscatatuck NWR, Phillip Marshall, IDNR, to determine if *Sirex noctilio* is established in Indiana funded by USFS, and Landon McKinney with ASC contracted by the USEPA to develop quick assessment

protocols for various types of natural areas throughout EPA Region 5 and Muscatatuck NWR served as one of approximately ten study sites.

HABITAT RESTORATION

2a. Wetland Restoration

Muscatatuck NWR staff, BFO Private Lands Coordinator, Jeff Kiefer and Dave Hudak (retired USFWS, BFO), continue to work within the Restle unit area. There is now along with the 78 acre Restle Unit tract over 700 contiguous acres protected in the Bean Blossom Bottoms area of Monroe County, IN. Protected acres include land owned by IDNR, Sycamore Land Trust, TNC, WRP acreage, and Partners for Fish and Wildlife Program projects.

Rehabilitation of the Restle unit dike with 36 acres of emergent wetland was needed due to muskrat, beaver and flood damage. It was rebuilt in FY05 beginning with dewatering in July, construction in August and September, 2005. This project was done as a Region 3 Maintenance Action Team (MAT) project utilizing Maintenance Management System funding and wonderful help from maintenance employees throughout the region. Maintenance Mechanic Rusty Pike and region 3 – Dale Pittman spearheaded the project.

The seeding of the restored dike was inspected in the spring of 2006 and additional spot seeding was conducted to allow for more growth. Swinney Excavating was contracted to mow the dike monthly and RM Webber and WRS Knowles checked the unit monthly. The unit is holding water well and has had good use by waterfowl.

2b. Upland Restoration – nothing to report

2c. Riverine Restoration – nothing to report

2d. Deepwater/Coral Reef Restoration - N/A

HABITAT MANAGEMENT

3a. Water Level Management

1,130 acres of wetland areas in 11 units were managed by Refuge staff guided by the 2006 water management plan to benefit fish, wildlife and water quality.

Water level gauges on managed water units were monitored biweekly. The year ended with all moist soil and greentree units full. The total precipitation for 2006 was well above normal with 66.37 inches of precipitation recorded at the refuge office, a record high for Muscatatuck. The 2006 year will go down in the record books as a warm and very wet year.

Greentree unit drawdown began in early March 2006. Our water management plan calls for the units to be maintained empty until flooding begins in November, but numerous flooding problems occurred during the summer due to heavier than normal rainfall and beaver blocking of the water control structures. Beaver continue to be a problem during the drawdown efforts. Beaver are cutting and felling many trees in these units some of which are falling across the constructed dikes and need to be removed as part of maintenance activities.

3b. Moist Soil Management

270 acres in eight units were managed by Refuge staff guided by the 2006 water management plan to benefit fish, wildlife and water quality.

Vegetation checks of all Moist Soil Units (MSU) were conducted August 31, 2006 on all units. M4 was rehabilitated in October 2006 by mowing and dozing to promote moist soil plant production.

The M8 and M9 units were maintained full as brood marshes and habitat for migrant waterfowl until August 3, 2006 when we began to empty them for the planned rehabilitation. Shorebird use, great blue heron, and egret use was high while the units were empty and maintained with exposed mudflats. Our goal was to rehabilitate the units, when they dried in late fall to reduce tree growth. Abundant rainfall caused the units to flood four times, which is very rare for fall in Indiana. Beaver continued to plug the water control structures (WCS) causing us to spend many hours to clean them out so the units would empty. The situation did not improve so a decision was made to place stop logs back in the WCS and maintain it as a pool for winter migrants. Rehabilitation of the unit will be planned again for next fall 2007. It is hoped that emptying of the units would confuse the muskrats as their runs were no longer available by water entry and it might help protect the dike from muskrat damage.

3c. Graze/mow/hay

In accordance with the refuge grassland and cropland management plans, hay cutting was done on 123 acres.

3d. Farming

Croplands are managed for migrant waterfowl, sandhill cranes and resident wildlife. Cropland production supports the moist soil management program in food production for migratory birds. In 2006, 307 acres were farmed using a rotation of corn, soybeans, wheat, and hay. The different crops are evenly distributed across the farming acreage and in accordance with the cropland/grassland management plan and the Refuge Cooperative Farming Agreement.

3e. Forest Management

Approximately 350 acres of cropland was removed from the farm program after the 2003 season and allowed to revert back to forest through natural succession. Thirty acres of this retired cropland were planted with 14,000 oak seedlings in spring 2004.

Preliminary work was begun on a forest succession study. The goal is to evaluate natural succession and oak plantings of former agriculture fields in order to evaluate the success of prior supplemental oak seed plantings versus natural succession and the forests they produce at the same age stand.

Beaver continue to block some of the creeks with dams causing damage to the forest, we feel beaver dams are affecting about 490 acres of forests and we continue to open them up, but this is a continuous maintenance problem.

During plot work in 2004 the invasive Japanese stilt grass (*Microstegium vimineum*) was found in the Hackman trail area, we aggressively and strategically attacked this invasive in 2006 (see section 3h below).

3f. Prescribed burning

With a change in refuge objectives beginning in 2003, reforestation may negate the need for future prescribed burn plans at the refuge.

3g. Pest Plant Control

As required by Indiana noxious weed laws spraying and mowing was conducted for Johnsongrass (*Sorghum halepense*) and Canada thistle (*Cirsium arvense*) control.

3h. Invasive Plant Management

In April 2006, interns Andrew Kennedy and Henry Schmitt took the first step in eliminating the refuge's small Tree-of-Heaven (*Ailanthus altissima*) population by girdling and chemically treating the stand of trees near Turkey Trail. Monitoring of the trees will continue in the future.

Japanese stilt grass (*Microstegium vimineum*) was first documented on the refuge late in the summer of 2004. This grass can quickly spread through forests, crowding out native vegetation and establishing thick carpet-like stands of grass. In 2006 we continued the effort begun a year earlier to map and treat the on-refuge infestation. We were able to map and treat the entire affected area, which is approximately 120 acres in size. Treatment included a combination of FWS-approved herbicides (glyphosate and sethoxydim) and mowing. Summer interns Faller, Holzinger, Halcomb, and Roumie and fall intern Kate Greemann assisted Biotech Dailey on this project and were instrumental in making great strides.



Intern Applying Herbicide to Stilt Grass

Kudzu (*Peuraria lobata*) is a vine that can quickly cover anything that doesn't move – including large sections of forest and it is common in warmer states south of Indiana. By covering trees with their vines, kudzu can deprive trees of essential sunshine and, eventually, kill them. We moved quickly to remove this plant when it was reported on the eastern edge of the refuge. Again we used a combination of techniques (hand cutting and herbicides) as a remedy. In this case, the affected area was less than an acre, so we were able to treat the entire infestation for the second consecutive year. There were many fewer plants this year, indicating that our control efforts are succeeding

Oriental bittersweet (*Celastrus orbiculata*) is another invasive vine that was found on the refuge. Although this vine grows slower than kudzu, the results are the same: trees are eventually cut off from the necessary sunshine and then begin to

die. Areas treated last year were inspected this year, and no bittersweet was found. We will continue to monitor for re-growth and the presence of bittersweet in other areas of the refuge.

Garlic mustard (*Alliaria petiolata*) control was begun this year, with the help of many volunteers. Several groups of students worked on pulling plants from several target areas on the refuge that will help check the spread of this plant (see 7b). A handful of adult volunteers assisted Biotech Dailey in removing garlic mustard from a section of road near the west entrance in June of 2006.



Volunteers Displaying Bags of Garlic Mustard Removed from the Refuge

A large infestation of purple loosestrife (*Lythrum salicaria*) was found on neighboring private land near Sandy Branch west of US Hwy 31 by summer interns Faller and Roumie. WRS Knowles notified the absentee landowner, Greg Hoeverer, of the problem area and with his permission we treated the plants on his property. Jeff Kieffer, BFO Private Lands was notified and he said we were allowed to spray on private land with permission of the landowner. The entire infestation was chemically treated by interns in July of 2006.



Intern Applying Herbicide to Purple Loosestrife

FISH AND WILDLIFE MANAGEMENT

4a. Bird Banding

No duck banding occurred on the refuge in 2006. There was some discussion with Big Oaks NWR (BONWR) Biologist Jason Lewis about the possibility of the Big Oaks and Muscatatuck interns working together to band wood ducks (*Aix sponsa*) on both refuges. However, full schedules of staff and interns at both refuges didn't allow this to happen. We plan to continue this dialogue with BONWR in the future in the hope that we can cooperate on banding efforts.

4b. Disease monitoring and treatment

Refuge staff were vigilant for signs of West Nile disease and Chronic Wasting disease on the refuge in 2006. No cases were reported.

4c. Reintroductions

For the fifth year in a row Whooping Cranes led by ultra light aircraft visited Muscatatuck NWR. Nineteen Whooping Cranes and the Operation Migration (OM) crew arrived as a wonderful sight on Veterans Day, November 11, 2005, to the delight of several visitors who got a glimpse of the birds in the air. For seven mornings refuge staff and visitors arrived for the potential departure of the 19 Whooping Cranes. Crowds varied from 350 people to several dozen each morning, providing a great forum for questions to the OM pilots and traveling crew when weather delayed the migration flight. Indiana experienced many warm days to the delight of great fall weather but the strong southern headwinds prevented flights and then rain and tornado warnings made the "GO-NO GO" morning ritual for all concerned interesting. But then conditions changed and temperatures dropped to 15 degrees and tailwinds prevailed as the Whoopers and crew headed into Kentucky, November 17, 2005.

The project used the same secluded field as last year for a landing strip and overnight penning of the cranes. The project is part of an international partnership effort to establish a migrating flock of Whooping Cranes in the Eastern United States. All portions of the stop-over went well, with refuge staff accommodating needs of both the cranes, aircraft and ground crew. Muscatatuck NWR is the only national wildlife refuge on the stop-over schedule between the winter breeding sites of Necedah NWR and the wintering grounds at Chassahowtzka NWR.

4d. Provide nest structures

Bluebird boxes attached to some road sign posts were not monitored in FY2006. The volunteer that has monitored these in the past was unable to monitor them this year.

4e. Native Animal and Predator Control

Beaver continue to plug Water Control Structures especially during greentree unit and moist soil unit draw down. Affected structures requiring maintenance staff time to clean out include G1/ML, G1/M7, M3, M4, M5, Lake Linda, Display Pond, M2, M8, M9 M10, Wood duck pond, Persimmon pond, and G3. Beaver dams backing up drainage are beginning to affect the integrity of some of our forests and affect our water management goals in the moist soil units and greentree units.

Muskrats continue to damage dikes especially M8, M7, M9, Moss Lake, and M2. At this time the only control method being used is water elevation changes. This has not been successful.

4f. Invasive Animal and Other Invasive Non-Plant Taxa Management

The IDNR continued to place and monitor gypsy moth (*Lymantria dispar*) traps on the refuge. All traps were negative for gypsy moths in 2006.

Ken Cote and Phil Marshall of IDNR were issued a SUP to implement monitoring for European Wood Wasps (*Agrilus planipennis*) the summer of 2006 on MNWR. All traps were negative for the European Wood Wasp.

In June of 2006 a domestic goat was spotted on the refuge just south of Stanfield Lake. Sightings of the goat continued for several weeks before interns were able to lasso the goat and remove her from refuge land.



Intern Halcomb, Administrative Assistant Rarey, and Intern Abner Removing Goat

As in many other natural areas, the presence of feral cats (*Felis catus*) has become a problem on MNWR. Although we have no studies measuring the impact of these animals on refuge wildlife, the frequency with which the animals are spotted suggests that they are abundant. In an effort to decrease the impacts of these non-native predators, Biotech Dailey began a trapping effort using live traps baited with tuna fish. Several traps were stolen during the year, but we began chaining the traps to nearby trees and the problem was eliminated. Throughout the year a total of 12 feral or abandoned cats were captured, either by hand or with live traps, on the refuge. Captured animals were released to Jennings County animal control for adoption or disposal.



Feral cat trapped on the refuge in May 2006.

COORDINATION ACTIVITIES

5a. Interagency Coordination

This year's annual conservation field days held in May for Jennings County and October in Jackson County at the refuge continues as a collaborative effort for environmental education with students working their way through rotating stations. The sessions consisted of wetlands, wildlife, forestry, soils, geology, and recycling. The sessions were taught by personnel from Purdue Extension, Jackson and Jennings County Soil and Water Conservation District's (SWCD), IDNR, Natural Resource Conservation Service (NRCS), Jackson Co. Solid Waste Management District, and the refuge.

The DNR again provided outstanding support to the refuge in many areas.

The pre-construction conference for the Chestnut Ridge Trail asphalt project was held at the refuge Office March 27, 2006.

The refuge Outdoor Recreation Planner (ORP) spent considerable time working with the Jackson County Visitor Bureau on the Wings over Muscatatuck bird festival.

RM Webber and ORP Stanley met with DNR and Big Oaks NWR personnel in Bloomington on deer hunt drawing numbers on July 12, 2006.

The WRS continues to work with NRCS, SWCD, and IDNR with Wetland Reserve Program and Partners for fish and wildlife and other joint projects concerning the Muscatatuck River Basin and watershed.

Biotech Dailey cooperated with IDNR herpetologist Zack Walker to work on the copperbelly water snake project on refuge and a hellbender (*Cryptobranchus alleganiensis*) survey off refuge.

Biotech Dailey continues to be active in The Invasive Plant Species Assessment Working Group (IPSAWG), a group representing many governmental agencies and other organizations, with the goal of assessing Indiana's plant invaders and recommending workable solutions for their control.

A black vulture specimen was donated to the Indiana State Museum and various songbirds were donated to Ball State University. All specimens were to be used for teaching and research purposes.

5b. Tribal Coordination - N/A

5c. Private Land Activities

Muscatatuck NWR staff and local NRCS staff have concentrated Wetland Reserve Program (WRP) efforts in the Muscatatuck River basin and a lot of interest has been generated. In the Muscatatuck River Watershed there are currently (FY06) 84 easements totaling 5,449 acres of land under WRP easement protection.

Technical assistance was provided to NRCS for 4 WRP applications.

WRS Knowles and Refuge Officer Robison visited four Conservation Easement sites in Washington and Lawrence counties on August 24, 2006. The landowners were all contacted and no abuse was noted.

RESOURCE PROTECTION

6a. Law Enforcement

Muscatatuck NWR staff, Indiana Department of Natural Resources (IDNR) Law Enforcement Division, and the Indiana State Police (ISP) worked jointly to improve public safety and natural resource protection issues on the refuge. Indiana Conservation Officers (CO) cooperated and assisted with conducting several interagency law enforcement details. ISP Officers periodically responded to visitor lock-ins at the refuge when the Refuge Officer was unavailable.

The refuge does not currently have assigned a permanent, full-time law enforcement officer. However, Big Oaks NWR has one full-time law enforcement officer, Travis E. Robison, who spends 50-60% of his patrol time at Muscatatuck. This shared position provides adequate law enforcement coverage but does not address the full range of refuge needs.

Due to the absence of assigned law enforcement personnel during the previous three years, implementation of public use regulations languished, creating an atmosphere where visitors' failure to abide by established rules resulted in unsafe activity and diminishment of refuge management objectives. Therefore, the Refuge Manager and Officer Robison collaboratively established law enforcement priorities for MNWR during FY 2006. Key target areas for enforcement included vehicle lock-in after refuge closing, speeding, and natural resource issues.

Vehicle Lock-Ins After Closing

MNWR is open from official sunrise to sunset and automatic gates restrict access to the refuge when closed. Though closing time is official sunset, the north and west entrance gates are programmed to close approximately one half hour after sunset to allow visitors time to exit the refuge. A sunrise/sunset table is available to the public at the Refuge Headquarters and Visitor Center.

Visitors routinely enter the refuge shortly before sunset to view wildlife and often become locked behind the gates when they automatically close. Once locked in, visitors contact the Indiana State Police who dispatch an officer to open the gates. Because of the three-year absence of a Refuge Officer, no Notice of Violations were issued to visitors whom the ISP contacted. Initially (2003-2004) the lock-in rate was low and ISP willingly assisted the refuge. However, during 2005, the rate of vehicle lock-ins significantly increased. As a result, ISP Officers were contacted by locked-in visitors almost every day during the summer. The increased response requirement and lack of refuge enforcement for violators frustrated ISP who were becoming unwilling to assist the refuge address the vehicle lock-in problem.

Upon Officer Robison's arrival in late 2005, he contacted the ISP-Seymour Post Commander and established a cooperative relationship to address vehicle lock-ins. Officer Robison committed to work during times when vehicles were likely to become locked-in and the ISP agreed to continue responding to lock-in calls when Officer Robison was not on duty. Furthermore, whenever an ISP Officer responded to a lock-in, they provided Officer Robison the violator's personal information. Officer Robison used this information to issue Notices of Violation (NOV) to individuals who became locked-in (50 CFR 26.22 (a): failure to comply with refuge special regulations-remain after hours).

During FY 2006, 30 NOVs and five Written Warnings were issued to individuals who violated refuge regulations by remaining after hours and became locked behind refuge entrance gates. This accounted for 34% of the total NOVs issued for FY 2006 and 24% of total documented violations. The majority of the violations occurred earlier in the year when enforcement efforts were first increased, and a noticeable decrease in violation occurred as the year progressed. Furthermore, ISP Officers responded to less than 20 lock-in calls at the refuge. Lock-in enforcement continues, with increased focus occurring during the spring and summer months when refuge visitation is highest.

Speeding

Another key area of enforcement was speeding. Refuge visitors and people cutting through the refuge from U.S. Highways 50 and 31 often exceed the posted 20 mile per hour speed limit. Lack of speed enforcement directly contributed to a steady increase in the number and speed of observed drivers exceeding the speed limit.

Officer Robison focused on four key areas where speeding frequently occurred on the refuge. These areas included County Line Road south of the U.S. Highway 50 (north) entrance, County Road 400 North east of the U.S. Highway 31 (west) entrance, County Line Road in the vicinity of Sandhill Ponds, and County Line Road in the vicinity of Richart Lake.

Although speeding occurred and was detected on all refuge roads, the majority of NOVs and Written Warnings (50 CFR 27.31 (d): Exceeding posted speed limit) were issued at the locations listed above. Eighteen (18) NOVs, totaling 21% of all citations, and 19 Written Warnings were issued. Speeding violations comprised 25% of all documented violations. Regular refuge visitors now seem more aware of their speed, and the majority of recently apprehended violators are people cutting through the refuge to decrease their commute time.

Natural Resource Issues

The majority of detected resource violations involved fishing. Fishing related violations constituted 21% of the total detected violations during FY 2006, and

58% of those involved someone fishing in violation of refuge regulations (50 CFR 32.5 (e)), typically fishing in a closed area. An additional 5% of detected violations involved resource issues. These violations were infrequent and, though diverse in nature, did not reflect a high rate of resource violation occurring on the refuge.

Two issues arising during FY 2006 involved frequent use of the refuge by undocumented/illegal immigrants and spotlighting/road hunting along County Road 900 West (the MNWR east boundary). Both issues were anticipated, however their extent was unrecognized until Officer Robison devoted considerable time towards their remediation.

Local farms and businesses employ large numbers of undocumented/illegal immigrants who reside in Seymour and apartment complexes near the refuge. Particularly during the spring and summer, many Hispanic immigrants visit the refuge to fish, picnic, and observe wildlife. Though the uses are consistent with refuge objectives, they frequently violated refuge specific regulations due to a lack of knowledge about existing rules. Officer Robison made a concerted effort to contact these groups and discovered that a severe language barrier and fear of authority (stemming from their undocumented status) resulted in their inability to read refuge signs and avoidance of the Visitor Center where public use information is available.

These frequent contacts, using a combination of educational and enforcement actions, resulted in a noticeable drop in violations by this subset of visitors. Officer Robison is collaborating with Outdoor Recreation Planner Donna Stanley to develop a Spanish-language public use regulation brochure to distribute as needed. Additionally, bilingual signs stating the refuge hours of operation will be posted at each entrance.

Another significant issue for the refuge involved spotlighting and road hunting along County Road 900 West, the refuge's eastern boundary. Historically, this road is known for this activity because of its remoteness and relative lack of residences. Indiana COs identified this road as the most heavily hunted road in Jennings County. Farm and property owners frequently complain to both COs and refuge staff about the high incidence of spotlighting and road hunting that occurs. Officer Robison's arrival facilitated efforts to address this ongoing problem.

Officer Robison and Indiana COs jointly patrolled CR 900 W before, during, and after hunting season. Both COs and Officer Robison conducted decoy operations and frequently worked late nights along the road to combat road hunters. Although no road hunters were apprehended, over 100 spotlighters were contacted and checked for compliance with state and refuge regulations. Property owners report that they perceived a sharp decline in the incidence of road hunting along CR 900 W due to interagency efforts.

Ongoing and unresolved issues for the year include: 1) boundary encroachment issues; 2) illegal tree stands and ATV trespass by bordering properties on U.S. Highway 31; 3) illegal paintball course on the west boundary south of County Road 500 N; and 4) off-road vehicular travel.

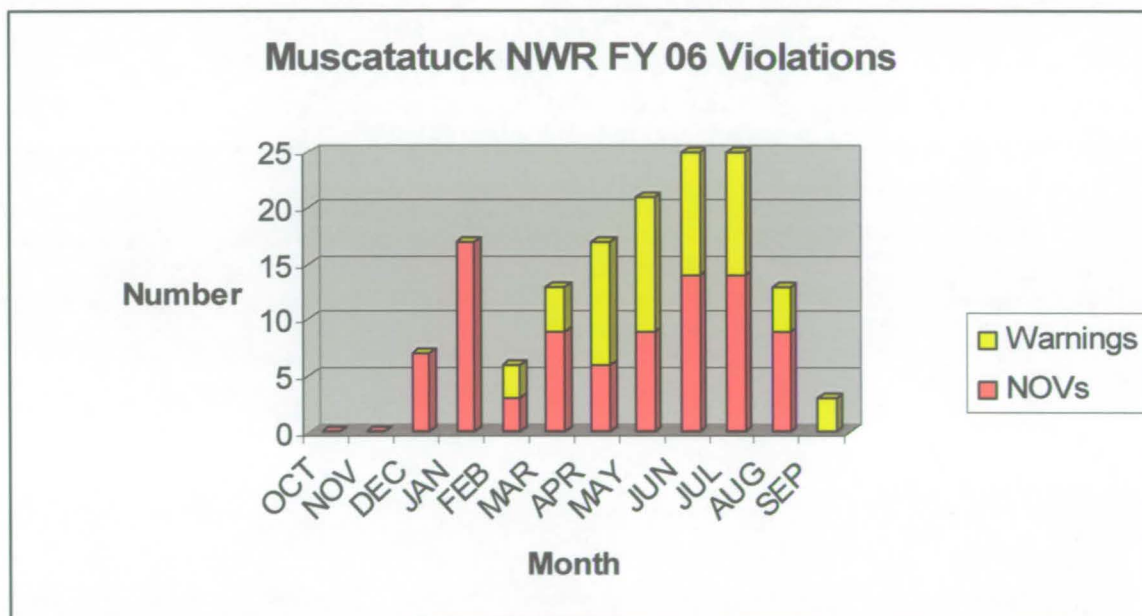
Detection, investigation, apprehension, and education efforts are ongoing. Refuge law enforcement program goals are continuously evaluated based on trends in seasonal visitor use, special events, and refuge management priorities. When appropriate, interagency coordination and support is used to enhance enforcement effectiveness, protect public safety and natural resources, and build relationships that benefit the refuge.

Refuge and state officers issued the following citations and written warnings during FY 2006:

CFR CITATION	VIOLATION	CITATIONS	WARNING
16 USC 703	Migratory Bird Treaty Act	1	0
50 CFR 20.21 (g)	Take waterfowl by use of electronic call	1	0
50 CFR 26.21 (a)	Enter a closed area on a NWR	3	1
50 CFR 26.22 (a)	Fail to comply with special regulations	30	5
50 CFR 27.31	Travel on other than designated route	4	3
50 CFR 27.31 (a)	Operate a vehicle in violation of state law	0	1
50 CFR 27.31 (c)	Operate a vehicle carelessly or heedlessly	1	0
50 CFR 27.31 (d)	Exceed posted speed limit	18	19
50 CFR 27.31 (f)	Operate vehicle without registration	0	3
50 CFR 27.31 (g)	Operate vehicle without driver's license	7	3
50 CFR 27.31 (h)	Block road access for other vehicles	0	1
50 CFR 27.32 (a)	Unauthorized use of a boat	0	1
50 CFR 27.32 (b)	Operate boat in violation of state law	0	1
50 CFR 27.41	Possess a firearm on a NWR	3	0
50 CFR 27.51	Disturb, injure, or damage plant/animal on NWR	0	1

50 CFR 27.82 (b)(2)	Possess controlled substance on a NWR	3	0
50 CFR 27.83	Indecency or disorderly conduct	0	1
50 CFR 27.94	Littering on a NWR	3	1
50 CFR 32.2 (e)	Hunt in violation of access requirements	1	0
50 CFR 32.5 (a)	Fish without a state license	7	3
50 CFR 32.5 (c)	Failure to comply with state fishing laws	0	3
50 CFR 32.5 (e)	Fail to comply with refuge fishing regulations	6	12
TOTAL		88	59

Below are the total number of citations and written warnings issued per month during FY 2006:



6b. Permits & Economic Use Management

Ten special use permits were issued during FY06. Two were for meetings at the Visitor Center, two for viewing birds in the Closed Area, and the rest for scientific studies (see section 1b for summary of the scientific studies).

6c. Contaminant Investigations - nothing to report

6d. Contaminant Cleanup - nothing to report

6e. Water Rights Management

The 2006 water management plan was written and approved February 16, 2006.

6f. Cultural Resource Management

Volunteers helped maintain the Myers Cabin and Barn during the year. Both structures are in good condition due to the efforts of the Refuge Friends group in past years. Volunteers from our Friends Group also contributed effort to maintain the grounds around the cabin and barn with weekly mowing and litter pick-up efforts.

6g. Landownership support - nothing to report

PUBLIC EDUCATION & RECREATION

7a. Provide Visitor Services

National Wildlife Refuge Week was celebrated on Oct. 15, 2005 with the dedication/ naming of the Conservation Learning Center (CLC) auditorium in memory of Jim Roberts, the former president of the Muscatatuck Wildlife Society Foundation who was instrumental in getting the Conservation Learning Center built. Cancer took Jim soon after the building was finished, but many family, friends, and refuge visitors were on-hand for the dedication.



Roberts Family at Auditorium Dedication

Following the dedication was a program on "Wildlife of the Lewis and Clark Expedition" by Falls of the Ohio State Park Manager Steve Knowles. Steve's program was followed by the annual Muscatatuck Wildlife Society's "Log Cabin Day" festival at Myers Cabin. The refuge closed area was also open to walk-in visitors during the week. Approximately 800 people attended the Saturday festival. This year, in addition to the free lunch, old-time crafts, music, and blacksmith who are normally features of the event, there was an interpreter with wildlife skins and bones at the cabin and a refuge intern with a spotting scope and eagle information in the closed area.

The October Conservation Field Days program was also held during refuge week October 11-12, 2005. It was attended by the usual numbers of Jackson County 3rd graders, teachers, and parents (around 600).

A Hunter Education course was held at the Visitor Center October 29-30.

The annual refuge deer hunt for permit archery and muzzleloader hunters was held in December and January. A new requirement this year was that all refuge hunters had to sign the front of the hunting leaflet and carry it with them in the field. 1600 archery deer permits were given out and 480 gun deer permits. Each of the drawn hunters could bring a partner with the same weapon effectively

doubling the potential harvest. Two hunter registration boxes were available (one at each gate) yet only 70 cards were placed in the boxes indicating a kill, which was a sharp reduction in numbers (with the exact same number of permits) from last year. Aside from an increase in license fees we don't know what to make of the numbers. There are still lots of deer on the refuge.

People started ice-fishing on the refuge December 19, 2005 and the ice lasted a few weeks.

The refuge started the year by opening Richart Lake, Stanfield Lake, and the other fishing areas to fishing year-round.

Two rehabilitated eagles that had overdosed on fish at Starve Hollow Lake were released on the refuge by IDNR personnel from the Hardy Lake Raptor Center, in a media event on February 5, 2006.

The Junior Duck Stamp Contest had 451 entries this year and the winning entry was by Becky French of Franklin Central High School.



The 2006 Indiana Jr. Duck Stamp Winner

Asphalt was installed on the Chestnut Ridge Trail in April by a contractor, Days Construction, from northern Indiana. The finished result was very nice and the paving did not interfere with the nesting of our trail Coopers Hawk.



Contractors Apply Asphalt To The Chestnut Ridge Trail

Muscatatuck NWR's second ever Turkey hunt was held April 26 – May 15, 2006. This was a 13 day hunt with 145 hunters drawn to participate. The harvest was 13 turkeys. Many hunters expressed thanks for this opportunity at MNWR.

In April 2006, Biotech Dailey and intern Kennedy were joined by four job-shadow students from Crothersville High School. The students helped with a variety of tasks including maintaining water control structures and checking a trail for reported large cat tracks (which proved to be domestic dog prints). The students were treated to the sight of two soaring bald eagles and were surprised to learn that these birds now nest throughout Indiana.

The Jennings County Conservation Field Days was held May 9-10, 2006 and attended by approximately 600.

A major reorganization of the old Visitor Center projection room occurred in the spring when the video was moved to the CLC auditorium and the old projection room was turned into storage. New shelving was purchased and installed in the old projection room and bookstore storage area.

Carpet was installed in the CLC on May 17, 2006 and linoleum in the Visitor Center storage room on May 25, 2006. For some reason almost immediately after the video was moved we started having strange problems with it that were not entirely resolved by year's end.

Wings Over Muscatatuck was held May 13, 2006 and suffered from rain. In spite of the weather approximately 600 people attended.



Dr. Ron Weiss Photographs Birds He Captured at Wings

The annual Take A Kid Fishing event was held June 3, 2006 and was attended by approximately 600. This year fishing was permitted in the Office Pond for this one day event to facilitate bank fishing. Some nice catches of largemouth bass were made.



One that Didn't Get Away

Biotech Dailey gave an invasive plant program at the Visitor Center on June 17, 2006.

Junior Birder programs for youngsters were held on several dates in June and July and a total of around 25 youngsters attended.

A Visitor Service evaluation of the refuge was held June 20-22, 2006 and conducted by Lauri Munroe-Hultman from the RO and Cheryl Groom from Minnesota Valley NWR.

The Indiana Turkey Federation held a "Women in the Outdoors" program for 55 women at the Visitor Center on July 8, 2006. The program was so successful the organizers received an award from the Turkey Federation for their efforts.

The Visitor Center was closed for the installation of new carpet in the old building Aug. 9-11, 2006.

The first refuge squirrel hunting season started in August in the rabbit and quail hunting area. The season ended, as did rabbit and quail, during the refuge deer hunts, and then reopened and continued to the end of January. Because of a lawsuit prohibiting implementation of our CFR regulation allowing 22's for squirrel hunting, and our already printed hunting leaflets allowing the weapons, we did no advertising for our new squirrel season and few hunters participated.

Contractors from Wilderness Graphics of Tallahassee FL met with RO contact Lauri Munroe Hultman and refuge staff on the exhibit plan for the old Visitor Center Aug. 22-23, 2006.

In September 2006, Levi Goforth and Marika Rarey, students from Seymour High School, participated in job-shadowing opportunities with Biotech Dailey and Administrative Support Assistant Rarey. Levi learned about invasive plants, methods to control them; waterfowl counts; water level manipulation and monitoring. Marika learned about managing the refuge office through processing financial transactions, reconciling the refuge budget, and managing purchases, contracts and acquisitions.

WRS Knowles assisted in a Wildlife Habitat Management Workshop for Foresters held at MWNR on September 26-27, 2006. This was in conjunction with the Indiana Society of Foresters, Purdue University, Department of Forestry and Natural Resources, and Dr. Brian Miller, as part of a series of formal continuing educational workshops. This workshop with 40 people in attendance including Consulting Foresters, and IDNR District Foresters who implement the Indiana Classified Forest and Wildlands program that currently has 585,000 acres of private lands enrolled. Programs were conducted in the CLC about woodlands, grasslands, and wetlands, and the many wildlife species they support. Field trips were conducted on the refuge and private lands to encourage wildlife habitat management as a primary consideration for planning on this large portion of Indiana private lands.

7b. Outreach

In October 2006 Muscatatuck staff participated in the Purdue University Agriculture and Franklin College job fairs. The booths were visited by over 600 students. Many students left resumes expressing an interest in Muscatatuck's volunteer/internship program. Over the years we have had many of our volunteer/internship students learn about the program from these opportunities.

ORP Stanley gave an endangered species program to 87 4-6th graders at Southside School in Columbus, IN Oct. 11, 2005.

Muscatatuck NWR and BONWR staff operated an exhibit at the 76th National FFA (fka Future Farmers of America) Convention in Louisville, KY October 26-28, 2005. The convention focused on careers and was attended by approximately 51,000 students, advisors and guests, the largest annual student gathering in the country. The diverse group of 34% females, 77% white, and 73% urban, non rural members are very interested in the work of the Service and kept the staff busy with career questions. This was the 26th year FWS has participated in the national agricultural career fair. Several of the student groups made Muscatatuck NWR a tour stop on their FFA trip.

Hayden School's Refuge Ranger group was active during the year doing volunteer work at the refuge. Group advisor Lori Kendrick was awarded a "Nature of Learning" grant during the year for the group to make a student version of "A Field Guide to Muscatatuck". Unfortunately as the year ended the group was still waiting for the money to come.



The Refuge Rangers at the Refuge Office

ORP Stanley recruited for refuge Interns at a Ball State University Intern Fair Jan. 24, 2006. Intern Kennedy also assisted Stanley at an Indiana University Intern Fair later in the year.

The ORP talked about the refuge to a First Methodist Church group on Feb. 11, 2006.

ORP Stanley talked to a Boy Scout Roundtable on volunteer opportunities in Columbus on Feb. 14, 2006.

ORP Stanley displayed a Refuge/Junior Duck Stamp exhibit at the State Ducks Unlimited Convention on March 11, 2006.

The ORP talked to the Seymour Elks Club about the refuge on March 23, 2006 to the Columbus Sierra Club on April 5, 2006 to the Men's Group at Trinity Lutheran Church on April 12, 2006 and to another Columbus Boy Scout group on April 24, 2006.

In April, WRS Knowles coordinated the use of Muscatatuck NWR's Video to be used in conjunction with Kentucky DFWR School Conservation Education Program Biologist Joyce Fitzgerald, in District 3. It was shown at 35 schools in the district reaching 2,858 students and 225 educators.

Refuge Intern Kennedy took refuge and Junior Duck Stamp exhibits to the Jackson-Washington State Forest Open House on April 20, 2006. Pouring rain reduced the crowd to about 50.

WRS Knowles helped coordinate an Arbor Day/Earth Day 2006 program held at Vienna Finley Elementary School April 28, 2006, for all 300 students and staff in grades K-5. The teachers incorporated conservation education in special programs throughout the week. This annual program conducted by teachers, features environmental education learning stations for students and then all participants went home Arbor day with a tree seedling to plant. This is the 16th year for this program.

May 17, 2006 WRS Knowles presented a program on Muscatatuck NWR to 40 participants in the Scott County Historical Museums Brown Bag Lunch series. Topics ranged from expanded big six public use opportunities, river otters, and copperbelly watersnake projects to avian flu questions. The group was very receptive and many questions were asked and many said they would be visiting the refuge soon.

In June WRS Knowles met with Paul Marti of Experience Works to review program and current enrollees. The program currently provides MNWR with two people each working 20 hours per week on the refuge.

On June 16, WRS Knowles partners with IDNR John Castrale by providing Indianapolis Star Reporter Tammy Webber and Photographer Kevin Martin, the opportunity to get photos of the adult eagle and fledgling on the nest to accompany an article on the IDNR successful reintroduction of eagles into Indiana. The result was a nice color front page photo and article June 20, 2006 in the paper with the largest circulation in the State.

Refuge Intern Abner assisted Big Oaks personnel in staffing Muscatatuck/Big Oaks exhibits at the Jennings County Fair in late June.

Refuge interns gave wildlife programs at the Jennings County Girl Scout Day Camp on July 18, 2006.

ORP Stanley gave a program on winter birds at a Jennings County SWCD

workshop at Streamcliff Farm on Sept. 23, 2006.

ORP Stanley also set-up an exhibit on the Junior Duck Stamp Art Contest at the Columbus Museum of Art in the Commons Mall during the Indiana Wildlife Artists Show in mid-September.

Volunteers/Work Programs/Cooperating Associations/Friends Groups

Approximately 9695 volunteer hours were recorded during the year. Volunteers continued to staff the Visitor Center most afternoons and some mornings. Most volunteer hours at Muscatatuck are in the Visitor Service category and are donated by many different individuals. College student interns were also very helpful in assisting with invasive plant control, wildlife monitoring and studies, and various maintenance activities.

Volunteers continued to assist with Christmas and May Day bird counts and the refuge butterfly count.

Volunteers planted 100 persimmon trees in various locations around the refuge Visitor Center in the spring.

Visitor Service Intern Kevin Abner did an outstanding job in his work at the refuge May-August. Kevin got off to a good start being long-time Green Thumb employee Hoke Baurle's grandson, but his enthusiasm, good nature, and willingness to take on any job made him a great asset to refuge operations. We wished we could have kept him longer. Other Biological Interns during the summer included Charlie Halcomb, Nadia Roumie, Jamie Faller, and Joe Holzinger III who also did a fine job.



The Summer 2006 Interns

Visitor Services Intern Kate Greemann started work in late August and also assisted Biologist Dailey with wildlife monitoring.

National Public Lands Day was attended by approximately 30 people on September 30, 2006 who worked on a variety of projects around the refuge including trash removal, invasive species plant removal, landscaping, and work around the Visitor Center bird feeders.



Girl Scouts Place Sand Around Visitor Center Feeders

The Muscatatuck Wildlife Society staffed a booth and "traveling bookstore" at the Hoosier Association of Science Teachers conference and assisted the refuge ORP in giving out refuge information. There were approximately 1600 participants at the conference and many stopped to talk and get information about the Indiana Junior Duck Stamp contest and Muscatatuck NWR.

Muscatatuck Wildlife Society board members, Bookstore Manager Maxine Wolfal, and ORP Stanley attended the Regional Friends Meeting in Bloomington, Minnesota from January 19-21, 2006. Wolfal gave a program on "Managing Friends Bookstores" that drew lots of compliments from attendees.

Approximately 30 4-H youngsters worked on pulling garlic mustard along the Visitor Center Entrance Road on April 10, 2006.

40 Hayden School youngsters moved brush and cut autumn olive near the Visitor Center on April 11, 2006.

Approximately 20 Trinity Lutheran High School students pulled garlic mustard on Apr. 12, 2006.

Potential Eagle Scout Jon Sheldon and helpers placed two dump truck loads of gravel on Wood Duck Trail in April and May. Jon's project greatly improved footing on the trail in wet weather.



The Sheldon Family All Helped with Jon's Project on Wood Duck Trail

A volunteer recognition dinner was held at Ryans Steakhouse on April 19, 2006 and attended by approximately 20 volunteers.

The Muscatatuck Wildlife Society Foundation formally dissolved during the year since their work of building the Conservation Learning Center was done. The remaining Muscatatuck Wildlife Society Foundation funds were transferred to the Muscatatuck Wildlife Society for CLC furnishings. Foundation board member Jim Fouts joined MWS as a board member replacing Marilyn Strickland. Ronnie Burns also joined the MWS board during the year replacing Norma King.

The Muscatatuck Wildlife Society funded many refuge projects during the year including snake research, installation of window film on the south CLC breezeway windows, new shelves for the bookstore storage room, tree trail signs for Wood Duck Hiking Trail, and a laptop computer for the CLC. The group had new carpet installed on the walls of the CLC auditorium and paid for additional Jr. Duck Stamp Art Contest display racks in the auditorium. They also sponsored Take A Kid Fishing Day, Wings Over Muscatatuck, the Junior Duck Stamp Contest, the Log Cabin Day festival, and paid for the mowing of the River hiking trails, the printing of the quarterly refuge newsletter, bumper stickers, and the fees for the May Day and Christmas Bird Counts. Another project of the group was to purchase and install two digital cameras on wildlife trails in an effort to find evidence of bobcat. At the end of the year they had some fine deer and coyote photos but no bobcat and the project continued.

Total bookstore sales for the year were \$27,300.

Muscatatuck has teamed with Experience Works (formerly Green Thumb) since refuge establishment in 1966. The refuge got down to one volunteer, Ken Ketcham, during the year.

PLANNING AND ADMINISTRATION

8a. Comprehensive Conservation Planning

The Muscatatuck Comprehensive Conservation Reporting is scheduled to start in FY 07.

8b. General Administration

Personnel

- Marc Webber, Refuge Manager, GS-12, PFT
- Susan M. Knowles, Wildlife Refuge Specialist, GS-12, PFT
 - Position Title Changed from Refuge Operation Specialist on 8/20/2006
- Donna Stanley, Outdoor Recreation Planner, GS-9, PFT
- Mark Rarey, Administrative Support Assistant, GS-7, PFT
- Theresa Dailey, Biological Science Technician (Wildlife), GS-5, TFT
- Frederick (Rusty) Pike, Maintenance Mechanic, WG-9, PFT
- Joshua Wallace, Laborer – STEP Student, WG-1, TPT
- Travis Robison, Park Ranger (LE), GS-9, PFT
 - Assigned to Big Oaks NWR with 50% of time spent at MNWR

Maintenance Mechanic Pike participated in a Maintenance Action Team (MAT) detail at Ottawa NWR, May 15-June 3 and July 3-17, 2006. The MAT team constructed a half-mile entrance road, two parking areas for a new visitor center, built a wetland behind the center, and excavated two storm ponds to collect storm water from the new parking areas.

Funding

Funds for operating the refuge the last six years are shown below. The figures reflect all funds appropriated and fund targeted as available to this station except quarters O&M.

FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
\$620,425	\$1,339,425	\$805,000	\$570,343	\$682,920	\$662,410

Feedback - none

Complex listing of stations for all RAPP measures

			R3 Regional NWRS Chief			
			Muscatatuck NWR			
			2005	2006		2007
			Actual	Target	Actual	Target
Goal 1i	1.05 Uplands receiving needed management	Uplands receiving needed management	550	550	550	550
	1.06 Wetlands receiving needed management	Wetlands receiving needed management	1200	1200	1200	1200
	1.07 Open water receiving needed management	Open water receiving needed management	400	400	400	400
	1.08 Total Acres of Class 1B Lands	Total Acres of Class 1B Lands	2150	2150	2150	2150
	1.09 Upland management deferred	Upland management deferred	3000	3000	3000	3000
	1.10 Wetlands management deferred	Wetlands management deferred	1800	1800	1800	1800
	1.11 Open water management deferred	Open water management deferred	50	50	50	50
	1.12 Total Acres of Class 2 Lands	Total Acres of Class 2 Lands	4850	4850	4850	4850
	1.13 Upland restoration deferred	Upland restoration deferred	384	384	384	384
	1.14 Wetland restoration deferred	Wetland restoration deferred	400	400	400	400
	1.15 Open water restoration deferred	Open water restoration deferred	18	18	18	18
	1.16 Total Acres of Class 3 Lands	Total Acres of Class 3 Lands	802	802	802	802
	1.17 Total uplands	Total uplands	3934	3934	3934	3934
	1.18 Total wetlands	Total wetlands	3400	3400	3400	3400
	1.19 Total open water	Total open water	468	468	468	468
	1.20 Total of classified acres	Total of classified acres	7802	7802	7802	7802
	1.21 Total Refuge Acres (from Realty)	Total Refuge Acres (from Realty)	7802.22	7802.22	7802.22	7802.22
	1.24 Riparian miles management deferred	Riparian miles management deferred	16	16	16	16
	1.25 Riparian miles restoration deferred	Riparian miles restoration deferred	1	1	1	1
	1.26 Total Riparian Miles	Total Riparian Miles	17	17	17	17
Goal	1.28 Is your Habitat Management Plan approved?	No	1	1	1	1
	1.31 Forest or Shrubland Improvement	Forest or Shrubland Improvement	490	490	490	490

	1.33 Cropland management	Cropland management	344	344	344	344
	1.34 Hayed/mowed grassland	Hayed/mowed grassland	170	177	177	177
	1.35 Water level manipulation	Water level manipulation	900	900	900	900
	1.36 Moist soil managed	Moist soil managed	300	300	300	300
	1.38 Upland Acres Restored	Upland Acres Restored	0	0	0	0
	1.39 Wetland Acres Restored	Wetland Acres Restored	36	0	37	58
	1.42 Total acres infested by invasive plants	Total acres infested by invasive plants	1800	1800	1800	1800
	1.43 Total acres treated for invasive plants	Total acres treated for invasive plants	80	160	190	190
	1.44 Total acres of invasive plants controlled	Total acres of invasive plants controlled	1	1	3	3
	1.45 Number of invasive animal populations	Number of invasive animal populations	11	11	16	16
	1.46 Number invasive animal populations controlled	Number invasive animal populations controlled	2	2	3	3
	1.47 Identify 1st invasive species of concern	Microstegium vimineum Japanese stiltgrass (P)			1	1
	1.48 Identify 2nd invasive species of concern	Alliaria petiolata Garlic mustard (P)			1	1
	1.49 Identify 3rd invasive species of concern	Lythrum salicaria Purple loosestrife (P)			1	1
	1.50 Identify 4th invasive species of concern	Pueraria montana Kudzu (P)			1	1
	1.51 Identify 5th invasive species of concern	Felis catus Domestic cat (A)			1	1
Goal 1iii	1.53 Is your Inventory & Monitoring plan approved?	No	1	1	1	1
	1.54 Number of I&M surveys	Number of I&M surveys	23	21	19	16
	1.55 # migratory bird populations w/ target goals	# migratory bird populations w/ target goals	1	1	0	0
	1.59 # fish populations w/ target goals	# fish populations w/ target goals	1	1	0	0
	1.63 # other populations w/ target goals	# other populations w/ target goals	1	1	0	0
	1.71 Number of T&E actions in recovery plan	Number of T&E actions in recovery plan	0	0	0	0
	1.72 Number of T&E actions implemented	Number of T&E actions implemented	2	2	3	0

	1.73 Number of population management actions	Number of population management actions	3	4	5	7
	1.74 Number of research studies	Number of research studies	1	0	0	0
Goal 2	2.05 Other documented water quality problems	No	1	1	1	1
	2.06 Water resource assessment conducted?	No	1	1	1	1
	2.07 Sufficient water resource legal protection?	Not needed	1	1	1	1
	2.08 Number surface/gw systems protected/restored	Number surface/gw systems protected/restored	0	0	2	2
Goal 3	3.03 Is your Wilderness Plan approved?	No	1	1	1	1
	3.12 Is a Cultural Resource Overview conducted?	No	1	1	1	1
	3.13 Total historic buildings or structures	Total historic buildings or structures	0	0	0	0
	3.14 Historic bldg/structures in good condition	Historic bldg/structures in good condition	0	0	0	0
	3.15 Total archeological sites	Total archeological sites	136	136	142	142
	3.16 Number arch sites in good condition	Number arch sites in good condition	61	61	21	21
	3.17 Total accessioned museum property collections	Total accessioned museum property collections	10	10	10	10
	3.18 Number museum collections in good condition	Number museum collections in good condition	10	10	10	10
	3.19 Total known paleontological sites	Total known paleontological sites	0	0	0	0
	3.20 Number of paleo sites in good condition	Number of paleo sites in good condition	0	0	0	0
Goal 4	4.01 Adequate directional signs to find refuge?	Yes	1	1	1	1
	4.02 Adequate signs to orient visitors?	Yes	1	1	1	1
	4.03 Percent of existing signs in good condition?	90	1			
		100		1	1	1
	4.04 Standard or approved entrance sign in place?	No	1		1	
		Yes		1		1
	4.05 Percent of boundary posted to	75	1			

	standards?	95		1	
		100		1	1
	4.06 Adequate supply of current general brochures	No	1	1	
		Yes		1	1
	4.07 Is a current web site maintained to standards	Yes	1	1	1
		No		1	
Goal 5	5.01 Is the refuge/WMD open to public entry?	Yes	1	1	1
	5.04 Total number of visitors	Total number of visitors	142000	142000	110000
	5.05 Special Events Hosted on site	Special Events Hosted on site	14	14	11
	5.06 Number of participants in special events	Number of participants in special events	4000	4000	3641
	5.07 Visitors to Visitor Center or Contact Station	Visitors to Visitor Center or Contact Station	10000	10000	7300
	5.08 Is hunting compatible?	Yes	1	1	1
	5.09 Is hunting offered?	Yes	1	1	1
	5.10 Indicate the quality of the hunt program	Good	1	1	1
	5.13 Upland game hunt visits	Upland game hunt visits	650	920	700
	5.14 Big game hunt visits	Big game hunt visits	3480	3480	3480
	5.15 Total hunting visits	Total hunting visits	4130	4400	4180
	5.16 Is fishing compatible?	Yes	1	1	1
	5.17 Is fishing offered?	Yes	1	1	1
	5.18 Indicate the quality of the fishing program	Good	1	1	1
	5.19 Freshwater fishing visits	Freshwater fishing visits	18000	25000	15000
	5.22 Total fishing visits	Total fishing visits	18000	25000	15000
	5.23 Is wildlife observation compatible?	Yes	1	1	1
	5.24 Is wildlife observation offered?	Yes	1	1	1
	5.25 Indicate quality of wildlife observ. program	Good	1	1	1
	5.26 Pedestrian visits	Pedestrian visits	44700	44700	55000
	5.27 Auto Tour Visits	Auto Tour Visits	70000	70000	25000
	5.28 Boat Trail/Launch Visits	Boat Trail/Launch Visits	300	300	300

5.29 Total wildlife observation visits	Total wildlife observation visits	115000	115000	80300	80300
5.30 Is wildlife photography compatible?	Yes	1	1	1	1
5.31 Is wildlife photography offered?	Yes	1	1	1	1
5.32 Indicate quality of wildlife photography	Good	1	1	1	1
5.34 Other Photography location visits	Other Photography location visits	2000	2000	2500	2500
5.35 Total photography visits	Total photography visits	2000	2000	2500	2500
5.36 Is environmental education compatible?	Yes	1	1	1	1
5.37 Is environmental education offered?	Yes	1	1	1	1
5.38 Indicate the quality of the EE program	Good	1	1	1	1
5.39 Number of teachers in on-site programs	Number of teachers in on-site programs	100	100	17	17
5.40 Number of teachers in off-site programs	Number of teachers in off-site programs	60	80	14	14
5.41 Number of students in on-site programs	Number of students in on-site programs	3000	3000	3000	3000
5.42 Number of students in off-site programs	Number of students in off-site programs	40	400	85	100
5.43 Total EE participants	Total EE participants	3200	3580	3116	3131
5.44 Is interpretation compatible?	Yes	1	1	1	1
5.45 Is interpretation offered?	Yes	1	1	1	1
5.46 Indicate the quality of the interp program	Good	1	1	1	
	Poor				1
5.47 Participants in on-site programs	Participants in on-site programs	10600	10600	9600	9600
5.48 Participants in off-site talks/programs	Participants in off-site talks/programs	400	400	340	340
5.49 Total interpretation participants	Total interpretation participants	11000	11000	9940	9940
5.50 Other recreational activities offered?	Yes	1	1	1	1
5.51 Total other rec participants	Total other rec participants	600	600	600	600
5.03 Is your Visitor Services Plan approved?	Yes			1	1
	No		1		

6	6.01 Does the station have a volunteer program?	Yes	1	1	1	1
	6.02 Number of volunteers	Number of volunteers	150	175	179	180
	6.03 Volunteer Hours for wildlife and habitat	Volunteer Hours for wildlife and habitat	2250	2750	2811	2800
	6.04 Volunteer Hours for Refuge maintenance	Volunteer Hours for Refuge maintenance	300	800	2824	3000
	6.05 Volunteer Hours for environmental education	Volunteer Hours for environmental education	6400	6400	160	200
	6.06 Volunteer Hours for other recreation	Volunteer Hours for other recreation	50	50	3301	4000
	6.07 Volunteer Hours for cultural resources	Volunteer Hours for cultural resources	200	200	273	300
	6.08 Volunteer Hours for other activities	Volunteer Hours for other activities	400	400	326	350
	6.09 Total Volunteer hours	Total Volunteer hours	9600	10600	9695	10650
	6.10 Does the station have a Friends Organization?	Yes	1	1	1	1
	6.11 Other Community Support Groups?	Yes	1	1	1	1
	6.12 Number of partnership projects	Number of partnership projects	10	10	12	12
	6.13 # of projects with monetary contributions	# of projects with monetary contributions	0	0	12	12
Goal 7	7.01 LE field hours	LE field hours as	250	1000	1080	1080
	7.02 Violation Notices issued	Violation Notices issued	35	100	95	100
	7.03 Criminal LE incidents documented	Criminal LE incidents documented	4	8	1	1
	7.04 Other LE incidents documented	Other LE incidents documented	100	200	115	125
	7.05 Community Policing Program in place	No	1	1	1	1
	7.06 Total number of easements	Total number of easements	8	8	8	8
	7.07 Number of easements inspected	Number of easements inspected	0	8	4	4
	7.08 Easements found in compliance	Easements found in compliance	0	8	4	4

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