RESULTS OF THE 2010 GOOSE POND FISH AND WILDLIFE AREA BIODIVERSITY SURVEY
GREENE COUNTY, INDIANA

Compiled from the Science Team Reports by Barbara Simpson, Friends of Goose Pond

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The first biodiversity survey of Goose Pond Fish and Wildlife Area (FWA), an 8000 acre wetland restoration located south of Linton in southwestern Indiana, was conducted July 16-17, 2010. This first step in assessing an important Indiana wetland provided baseline biodiversity information and laid the groundwork for future studies. The call for taxonomic experts in the March and June 2010 IAS newsletters received overwhelming response, with 100 scientists, naturalists, students, and others volunteering their time and expertise to make the event an overwhelming success. Thanks to generous support from The Indiana Academy of Science (IAS), the Rivers Institute at Hanover College, the Friends of Goose Pond, Amos Butler Audubon Society of Indianapolis, and the Greene County Soil and Water Conservation District, lodging and food were provided at no cost to the participants. In addition, the IAS sponsored an Amphibian and Reptile Workshop for educators and naturalists.

The 15 teams and their leaders reported over 899 species:

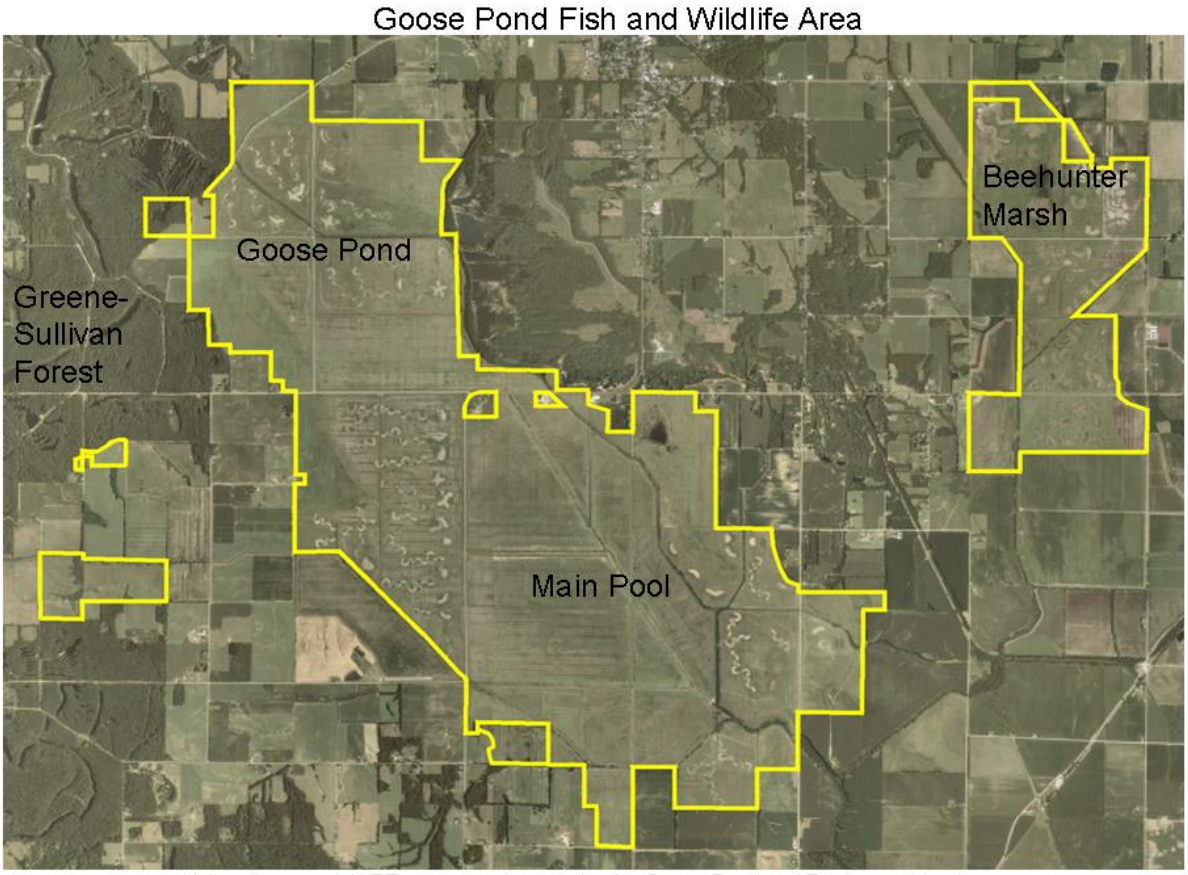
Team	**Leader**	**Number of Species Found**
Amphibians and Reptiles	Daryl Karns	20
Bees and Beetles	Robert Jean	37 (20 county records)
Beetles and Other Insects	Jeff Holland	18 families, 70-80 species
Biogeochemistry	Lenore Tedesco	
Birds	Lee Sterrenburg	122
Butterflies	Don Gorney	48 (county record detail not pursued)
Dragonflies and Damselflies	Amanda Bellian	21 dragonflies (7 county records) 9 damselflies (6 county records)
Fish and Freshwater Mussels	Brant Fisher	39 fish, 4 freshwater mussels
Fungi	Don Ruch	5
Macroinvertebrates and Plankton	William Jones	16 families of macroinvertebrates 18 genera of plankton
Mammals	John Whitaker	27
Moths	Megan McCarty	74 + 6 unidentified (3 state and 59 county records)
Non-vascular plants	Bill McKnight	0
Snail-killing flies	Bill Murphy	4
Vascular Plants	Scott Namestnik	379 (123 potential county records)

The teams all agreed that spending just two days in July only scratched the surface; painting a complete picture of the biodiversity to be found at Goose Pond FWA would require long-term seasonal surveys. But even with this brief look, the results show the richness and value of this developing wetland restoration. Highlight species reported included the purple fringeless orchid, American ruby spot dragonfly, bog lemming, and barn owl. Of the 30 species of dragonflies and damselflies, 7 dragonflies and 6 damselflies were new Greene County records. The vascular plant team reported 123 potential county records. Of particular interest to the plant team was the diversity of wetland plants that were present through natural recruitment, since no wetland vegetation was planted at the beginning of the restoration. The butterfly and moth team reported 59 moth county records. The amphibian and reptile team saw many turtle nests and found five species of turtles. A team from IUPUI Center for Earth and Environmental Science added a biogeochemistry survey to the mix. Data from the biodiversity survey will be shared with appropriate state agencies and a brief report will be submitted to the *Proceedings of the IAS* for publication.

There was general consensus that repeating this biodiversity survey in approximately 5 years during the same time period would be useful in assessing the progression of the restoration. To assess the development of the plant communities, a 10 year time frame was recommended. To continue to build upon the inventory of plants and animals begun with this survey, another biodiversity survey in a different season would be of benefit, recognizing that some early season species were undoubtedly missed. The large scale and habitat diversity, 8000 acres of wetlands, prairie, open water, and bottomland tree plantings, offer opportunities for a wide range of research projects.

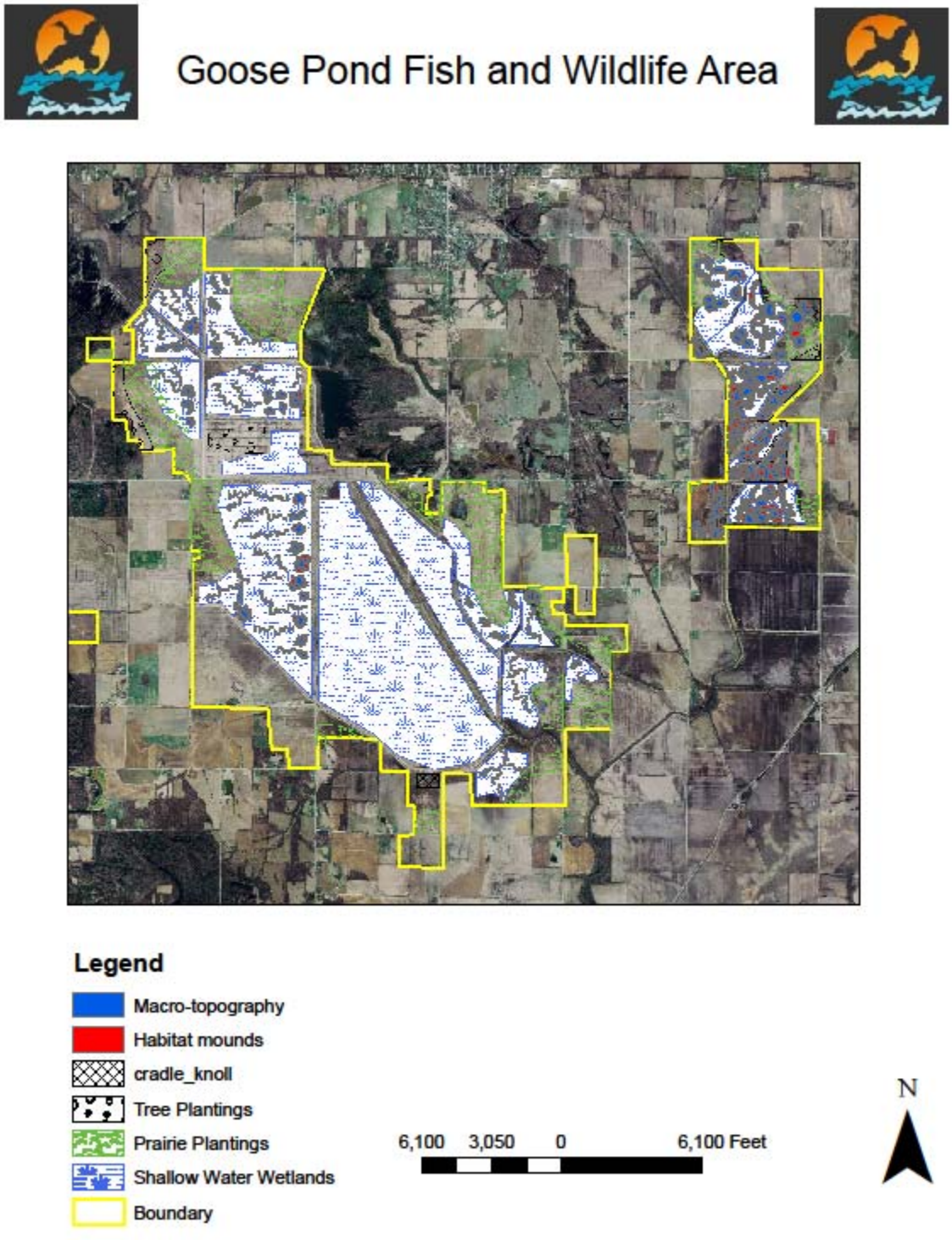
Goose Pond FWA is Indiana's largest wetland restoration done under the Natural Resources Conservation Service (NRCS) Wetlands Reserve Program (WRP), United States Department of Agriculture (USDA), and the 7th largest in the United States. The restoration covers 7138 acres in two sections, Goose Pond (5945 acres) and Beehunter Marsh (1193 acres) that are both part of Goose Pond FWA, Indiana Department of Natural Resources. The diverse habitats include 4000 acres of shallow open water, 400 acres of bottomland tree plantings, and 1380 acres of tall and short grass prairies. The NRCS and IDNR have limited resources for gathering baseline data and monitoring the development of the restoration. They rely on volunteers contributing to studies such as this biodiversity survey to gather data that assist them in the conservation and management of Indiana's public natural areas. To learn more about Goose Pond FWA please visit http://www.in.gov/dnr/fishwild/3094.htm, Friends of Goose Pond at http://friendsofgoosepond.org/, or the Indiana Academy of Science Newsletter at http://indianaacademyofscience.org/Documents/Publications/Newsletters/145-September-2010.aspx.

Map 1. Aerial Photo of Goose Pond Fish and Wildlife Area showing NRCS WRP easement boundaries.



Yellow lines mark WRP easement boundaries for Goose Pond and Beehunter Marsh

Map 2. Habitat Plan for Goose Pond NRCS WRP Restoration



Map 3. Goose Pond FWA Waterfowl Draw Map

(http://www.in.gov/dnr/fishwild/files/fw-GPFWA_Waterfowl_draw_map_7-6-09.pdf)

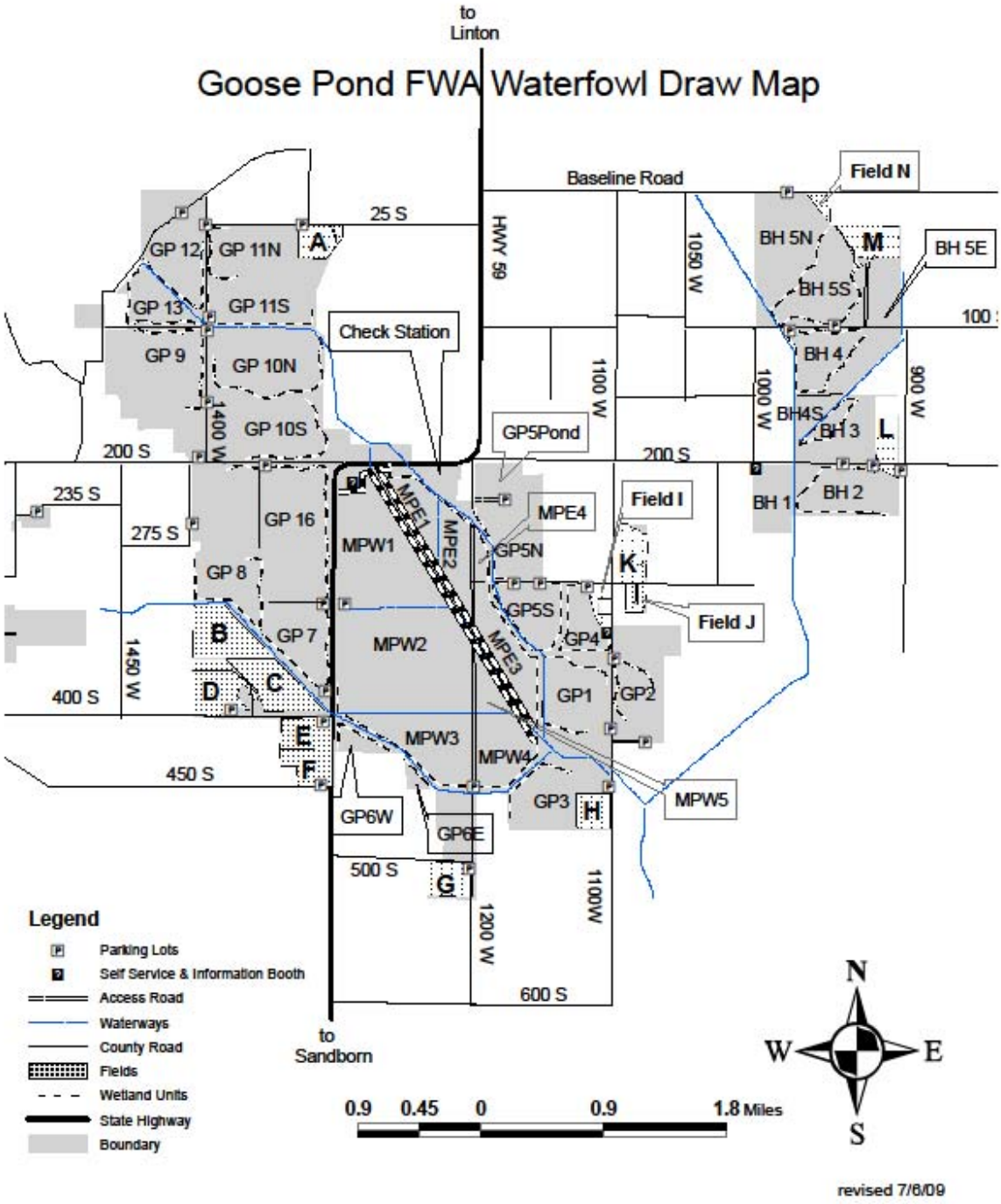


Table 1. List of the Amphibians and Reptiles (20 species) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leaders:

Daryl Karns (Hanover College, karns@hanover.edu), Vicky Meretsky, Andrew Hoffman, Rick Marrs, Mike Lodato, and Brittany Davis.

Amphibian and Reptile Workshop Participants:

Alan Austin, Austin Dicken, Sonya Fickett, Michelle Gray, Laura Halsey, Danny Hofstadter, Susan Knilans, Deena Nicole Patton, Marissa Reed, Beth Reinke, Amelia Reuter, Shelly Richardson, George Sly, Shaun Michael Ziegler

Order	Family	Species (Latin)	Species (English)
Anura	Bufonidae	*Bufo fowleri*	Fowler's Toad
Anura	Hylidae	*Acris crepitans*	Northern Cricket Frog
Anura	Hylidae	*Hyla chrysoscelis*	Cope's Gray Treefrog
Anura	Hylidae	*Pseudacris crucifer*	Spring Peeper
Anura	Hylidae	*Pseudacris triseriata*	Chorus Frog
Anura	Ranidae	*Rana catesbeianus*	American Bullfrog
Anura	Ranidae	*Rana clamitans*	Green Frog
Anura	Ranidae	*Rana sphenocephalus*	Southern Leopard Frog
Chelonia	Chelydridae	*Chelydra serpentina*	Eastern Snapping Turtle
Chelonia	Emydidae	*Chrysemys picta*	Painted Turtle
Chelonia	Emydidae	*Trachemys scripta*	Red-eared Slider
Chelonia	Kinosternidae	*Sternotherus odoratus*	Stinkpot
Chelonia	Trionychidae	*Apalone spinifera*	Spiny Softshell
Squamata	Colubridae	*Coluber constrictor*	Eastern Racer
Squamata	Colubridae	*Elaphe obsoletus*	Black Ratsnake
Squamata	Colubridae	*Lampropeltis calligaster*	Prairie Kingsnake
Squamata	Natricidae	*Nerodia sipedon*	Northern Watersnake
Squamata	Natricidae	*Storeria dekayi*	DeKay's Brownsnake
Squamata	Natricidae	*Thamnophis sirtalis*	Eastern Gartersnake
Squamata	Scincidae	*Eumeces fasciatus*	Five-lined Skink

Collecting Methods & Effort. We used hand collection, visual observation, searching under natural and artificial cover objects (wooden boards, debris, etc), large turtle traps, minnow traps and night road surveys (looking her amphibians and reptiles on the road).

Thursday evening: 4 collectors for 1 hour; 2 collectors for 2 hours = 8 hours
Friday: 19 collectors for three hours; 15 collectors for 3 hours = 102 hours
Saturday: 16 collectors for 7 hours = 112 hours
Sunday: 3 collectors for 3 hours = 9 hours

Special Interest Species. We did not encounter any species that could be considered of special interest due to federal or state status or geographic range.

Voucher Specimens. No specimens were collected. We took voucher photos of most species encountered.

Summary Overview. The amphibian and reptile survey team observed 20 species (7 anurans, 5 turtles, 6 snakes, 1 lizard) from Thursday evening, July 15, to Sunday noon, July 18. We physically observed or heard calls of most of the species that would be reasonably expected to be found in the Goose Pond FWA in July. Due to the time of year, we did not find any species of salamanders. We did not encounter any state or federally endangered species nor record any geographic range extensions (the state endangered Crawfish Frog has been recorded from the site, but we did not encounter this species). It is difficult to determine if we have any new county species records for Indiana because there is no centralized depository for this type of information.

We have developed a list of species that may be found at GPFWA, but that have not yet been recorded from the site (*Kinosternon subrubrum,* Eastern Mud Turtle; *Terrepene Carolina,* Eastern Box Turtle; *Graptemys geographica,* Northern Map Turtle; *Thamnophis sauritus,* Eastern Ribbon Snake; *Clonophis kirtlandii*, Kirtland's Snake; *Opheodrys aestivus*, Rough Green Snake; *Lampropeltis triangulum*, Milksnake; *Heterodon platirhinos*; Eastern Hog-nosed Snake *Rana blairi*, Plains Leopard Frog; *Ambystoma tigrinum,* Tiger Salamander). It may be useful to post this list in appropriate places so that people looking for amphibian and reptiles will have a reference list.

GPFWA provides a tremendous resource for amphibians and reptiles due to its size, habitat diversity and management practices. It is important to develop and maintain isolated pools that do not have fish; this is especially true for the state-endangered Crawfish Frog. This will promote reproductive success of a number of amphibian species. The area is ideal for turtle species; we saw numerous turtle nests.

The route of Highway 59 through Goose Pond is an obvious source of road mortality. It would be worthwhile to do road cruise mortality surveys and locate crossing "hotspots." GPFWA may wish to consider some sort of sign posting (indicating amphibian/reptile crossing sites) or under-the-road crossing structure. Signs and crossing structures have been used successfully at other localities.

Table 2. List of Bees (37 species) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: Robert Jean, Indiana State University, beeman_4602@yahoo.com

Team Members: Theresa Bordenkecher, Michelle Jean, Chia-Hua Lin, Tim Thomas, Peter Scott

Family	Genus	Subgenus	species	County Record
Andrenidae	*Calliopsis*	*(Calliopsis)*	*andreniformis*	
Apidae	*Apis*	*(Apis)*	*mellifera*	x
Apidae	*Bombus*	*(Bombias)*	*auricomus*	
Apidae	*Bombus*	*(Cullumanobombus)*	*griseocollis*	
Apidae	*Bombus*	*(Pyrobombus)*	*impatiens*	x
Apidae	*Ptilothrix*		*bombiformis*	
Apidae	*Florilegus*	*(Florilegus)*	*condignus*	x
Apidae	*Melissodes*	*(Eumelissodes)*	*trinodis*	x
Apidae	*Melissodes*	*(Melissodes)*	*bimaculata*	
Apidae	*Melissodes*	*(Melissodes)*	*comptoides*	
Apidae	*Svastra*	*(Epimelissodes)*	*obliqua*	
Apidae	*Triepeolus*		*lunatus*	x
Apidae	*Ceratina*	*(Zadontomerus)*	*cal_dupla*	
Apidae	*Ceratina*	*(Zadontomerus)*	*dupla*	x
Apidae	*Ceratina*	*(Zadontomerus)*	*strenua/nr dupla*	
Apidae	*Xylocopa*	*(Xylocopoides)*	*virginica*	
Colletidae	*Hylaeus*	*(Prosopis)*	*affinis*	x
Colletidae	*Hylaeus*	*(Prosopis)*	*modestus*	
Halictidae	*Augochlora*	*(Augochlora)*	*pura*	x
Halictidae	*Augochlorella*		*aurata*	
Halictidae	*Augochlorella*		*persimilis*	x
Halictidae	*Augochloropsis*	*(Paraugochloropsis)*	*metallica*	x
Halictidae	*Agapostemon*	*(Agapostemon)*	*sericeus*	x
Halictidae	*Agapostemon*	*(Agapostemon)*	*virescens*	x
Halictidae	*Halictus*	*(Nealictus)*	*parallelus*	
Halictidae	*Halictus*	*(Odontalictus)*	*ligatus*	
Halictidae	*Halictus*	*(Seladonia)*	*confusus*	
Halictidae	*Lasioglossum*	*(Dialictus)*	*bruneri*	x
Halictidae	*Lasioglossum*	*(Dialictus)*	*callidum*	x
Halictidae	*Lasioglossum*	*(Dialictus)*	*cressonii*	x
Halictidae	*Lasioglossum*	*(Dialictus)*	*nr.*	x

			admirandum	
Halictidae	*Lasioglossum*	*(Dialictus)*	*versatum*	x
Halictidae	*Lasioglossum*	*(Dialictus)*	*zephyrum*	x
Halictidae	*Lasioglossum*	*(Evylaeus)*	*nelumbonis*	x
Halictidae	*Nomia*	*(Acunomia)*	*nortoni*	x
Megachilidae	*Megachile*	*(Litomegachile)*	*mendica*	

Comments: Approximately 8% of the bee species known for the state were found in the two days of the survey. Three species were characteristic wetland species taken from flowering *Ludwigia peploides* and *Hibiscus moscheutos*. Two species were characteristic of prairie. For several species, the Goose Pond records are "range extensions" as far as in-state knowledge of distribution goes.

Table 3. List of Beetles (18 families, 70-80 species) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: Jeff Holland, Purdue University, jdhollan@purdue.edu.

Team Memeber: John Shukle

Family	***Genus & species***	**Common Name**
Cerambycidae	*Tetropes tetrathalmus*	Red milkweed beetle
Cerambycidae	*Orthosoma brunneum*	Brown prionid
Cerambycidae	*Eburia quadrigeminata*	Ivory-marked beetle
Cerambycidae	*Xylotrechus Sagittatus*	no common name
Cerambycidae	*Urographis fasciatus*	no common name
Cerambycidae	*Psyrassa unicolor*	no common name
Cerambycidae	*Monochamus titillator*	Southern pine sawyer
Cerambycidae	*Monochamus carolinensis*	A pine sawyer
Carabidae		Ground beetles
Elateridae		Click beetles
Elateridae	*Conoderus bellus*	Click beetles
Elateridae	*Aeolus mellillus*	Click beetles
Meloidae		Blister beetles
Chrysomelidae	*Chrysomela scripta*	Leaf beetles
Chrysomelidae	*Momocesta coryli*	Leaf beetles
Chrysomelidae		Leaf beetles
Ripiphoridae		Ripiphorid beetles
Coccinellidae		Ladybird beetles
Heteroceridae		Variegated mud-loving beetles
Elmidae		Riffle Beetles
Curculionidae		Weevils
Passalidae		Bess beetles
Lampyridae		Fireflies
Staphyliaidae		Rove beetles
Tenebrionidae		Darkling beetles
Hydrophilidae		Water scavenger beetles
Dytiscidae		Predatious diving beetles
Scarabidae		Scarab beetles
Scarabidae	*Osmoderma eremicola*	Scarab beetles
Scarabidae	*Pelidnota punctata*	Scarab beetles
Scarabidae	*Cotinis nitida*	Scarab beetles
Scarabidae	*Anomala flavipennis*	Scarab beetles
Scarabidae	*Strigoderma arboricola*	Scarab beetles

Scarabidae	*Phyllophaga forbesi*	Scarab beetles
Scarabidae	*Parastasia brevipes*	Scarab beetles
Scarabidae	*Tomarus gibbosus*	Scarab beetles
Scarabidae	*Trichiotinus sp.*	Scarab beetles
Scarabidae	*Aphodius sp. 1*	Scarab beetles
Scarabidae	*Aphodius sp. 2*	Scarab beetles
Scarabidae	*Ataenius sp.*	Scarab beetles
Eucnemidae		False click beetle

Invasive Species: Only the Japanese beetle and a scarab.

Collecting: Two people ran two arrays of lights for eight hours, 8:30pm to 4:30 am, for a total of 16 person-hours. The red milkweed beetle was caught during one hour of searching the site for areas with abundant flowers. This effort is only comparable to similar equipment – two 1000W metal halide lights, one 400W mercury vapor light, and four 20W UV lights- and this is very unlikely until we come back.

Voucher Specimens: Housed at the Purdue Entomological Research Collection.

Summary Overview: Diversity of diurnal species was very low because there was little in flower in mid-July at the site. This is the same trend we are seeing in ongoing summer-long projects at other locations. There is likely much diversity of these day-active species that we simply did not sample. The nocturnal species were abundant and diverse. We likely only sampled a small percentage of the diversity present because our light arrays were not portable enough to allow us to move to different sites. The diversity of ground beetles and longhorned beetles was impressive for a single evening. Sampling with lights and with sweep-nets for the day-active species, in May and September, would do much to improve the understanding of biodiversity at Goose Pond.

Table 4. List of Birds (122 species) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: Lee Sterrenburg, Friends of Goose Pond and Sassafras Audubon Society, sterren@indiana.edu.

Team Members: Don Allen, Jim Brown, John Castrale, Mike Clark, Jerry Downs, Brad Feaster, Bill Holladay, Amy Kearns, Gary Langell, Breck Robinson, Jeff Reigel, and Breck Robinson.

Members of Buttlefly Team who spent some time birding: Ross Brittain, Don Gorney, Kirk Roth

Members of other Teams who supplied incidental bird observations: Sandy Belth, Jess Gwinn, Scott Namestnik, Peter Scott, Lenore Tedesco

Order/Species	Number	Units - Species of Note
Anseriformes **Waterfowl**		
Branta canadensis Canada Goose	99	
Aix sponsa Wood Duck	157	
Anas platyrhynchos Mallard	88	
Anas discors Blue-winged Teal	9	7 MPE, 2 GP13
Galliformes **Turkeys, Bobwhite**		
Colinus virginianus Northern Bobwhite	77	
Podicipedformes **Grebes**		
Podilymbus podiceps Pied-billed Grebe	12	
Pelecaniformes **Pelicans, Bitterns, etc**		
Pelecanus erythrorhynchos American White Pelican	1	
Phalacrocorax auritus Double-crested Cormorant	150	
Botaurus lentiginosus American Bittern	7	1 BH5, 1 GP1, 1 GP5S, 2 GP7, 1 GP16, 1 MPW
Ixobrychus exilis Least Bittern	19	
Ardea herodias Great Blue Heron	89	
Ardea alba Great Egret	340	MPE night roost
Egretta thula Snowy Egret	3	MPE night roost
Egretta caerulea Little Blue Heron	4	MPE night roost
Bubulcus ibis Cattle Egret	7	MPE night roost
Butorides virescens Green Heron	13	
Nycticorax nycticorax Black-crowned Night-Heron	26	25 MPE rookery, 1 GP16

Nyctanassa violacea Yellow-crowned Night-Heron	1	BH5
***Accipitriformes* Vultures, Eagles, Hawks**		
Cathartes aura Turkey Vulture	2	
Pandion haliaetus Osprey	1	MPE
Haliaeetus leucocephalus Bald Eagle	2	
Circus cyaneus Northern Harrier	1	GP8
Accipiter cooperii Cooper's Hawk	1	
Buteo lineatus Red-shouldered Hawk	1	
Buteo jamaicensis Red-tailed Hawk	1	
Falconiformes Falcons		
Falco sparverius American Kestrel	6	
***Gruiformes* Rails, Cranes, etc**		
Rallus elegans King Rail	2	BH5
Porzana carolina Sora	1	BH5
Gallinula chloropus Common Moorhen	4	3 GP16, 1 MPE
Fulica Americana American Coot	2	
***Charadriiformes* Plovers, Sandpipers, Gulls, Terns**		
Charadrius semipalmatus Semipalmated Plover	1	MPW
Charadrius vociferous Killdeer	54	
Himantopus mexicanus Black-necked Stilt	25	6 GP13, 10 GP1, 9, MPW/E
Actitis macularius Spotted Sandpiper	8	
Tringa solitaria Solitary Sandpiper	7	
Tringa melanoleuca Greater Yellowlegs	4	
Tringa flavipes Lesser Yellowlegs	11	
Calidris minutilla Least Sandpiper	12	
Calidris melanotos Pectoral Sandpiper	6	
Calidris himantopus Stilt Sandpiper	17	MPE
Limnodromus griseus Short-billed Dowitcher	19	MPE
Gallinago delicata Wilson's Snipe	1	MPW
Phalaropus tricolor Wilson's Phalarope	1	BH3
Hydroprogne caspia Caspian Tern	6	BH2
Chlidonias niger Black Tern	2	1 BH5, 1 GP16
Sterna forsteri Forster's Tern	5	MPW
***Columbiformes* Doves and Pigeons**		
Columba livia Rock Pigeon	19	
Zenaida macroura Mourning Dove	81	
***Cuculiformes* Cuckoos**		
Coccyzus americanus Yellow-billed Cuckoo	7	
Coccyzus erythropthalmus Black-billed Cuckoo	1	MPW

Strigiformes **Owls**		
Tyto alba Barn Owl	1	BH5
Megascops asio Eastern Screech-Owl	3	
Strix varia Barred Owl	2	
Caprimulgiformes **Nightjars and Allies**		
Chordeiles minor Common Nighthawk	1	
Apodiformes **Swifts and Hummingbirds**		
Chaetura pelagica Chimney Swift	5	
Archilochus colubris Ruby-throated Hummingbird	7	
Coraciiformes **Kingfishers**		
Megaceryle alcyon Belted Kingfisher	1	
Piciformes **Woodpeckers**		
Melanerpes erythrocephalus Red-headed Woodpecker	5	
Melanerpes carolinus Red-bellied Woodpecker	3	
Picoides pubescens Downy Woodpecker	3	
Picoides villosus Hairy Woodpecker	3	
Colaptes auratus Northern Flicker	3	
Dryocopus pileatus Pileated Woodpecker	4	
Passeriformes **Passerines**		
Contopus virens Eastern Wood-Pewee	4	
Empidonax virescens Acadian Flycatcher	1	GP12 out of habitat
Empidonax traillii Willow Flycatcher	31	
Sayornis phoebe Eastern Phoebe	4	
Myiarchus crinitus Great Crested Flycatcher	3	
Tyrannus tyrannus Eastern Kingbird	28	
Vireo griseus White-eyed Vireo	2	
Vireo bellii Bell's Vireo	34	
Vireo flavifrons Yellow-throated Vireo	1	
Vireo gilvus Warbling Vireo	16	
Vireo olivaceus Red-eyed Vireo	1	
Cyanocitta cristata Blue Jay	6	
Corvus brachyrhynchos American Crow	5	
Eremophila alpestris Horned Lark	9	
Progne subis Purple Martin	10	
Tachycineta bicolor Tree Swallow	580	
Stelgidopteryx serripennis Northern Rough-winged Swallow	23	

Riparia riparia Bank Swallow	264	
Petrochelidon pyrrhonota Cliff Swallow	1	
Hirundo rustica Barn Swallow	115	
Poecile carolinensis Carolina Chickadee	4	
Baeolophus bicolor Tufted Titmouse	5	
Sitta carolinensis White-breasted Nuthatch	1	
Thryothorus ludovicianus Carolina Wren	12	
Troglodytes aedon House Wren	10	
Cistothorus platensis Sedge Wren	25	
Cistothorus palustris Marsh Wren	5	3 GP1, 2 GP16
Polioptila caerulea Blue-gray Gnatcatcher	1	
Sialia sialis Eastern Bluebird	4	
Hylocichla mustelina Wood Thrush	3	
Turdus migratorius American Robin	91	
Dumetella carolinensis Gray Catbird	103	
Mimus polyglottos Northern Mockingbird	3	
Toxostoma rufum Brown Thrasher	3	
Sturnus vulgaris European Starling	427	
Bombycilla cedrorum Cedar Waxwing	6	
Dendroica petechia Yellow Warbler	4	
Dendroica discolor Prairie Warbler	1	GP18
Geothlypis trichas Common Yellowthroat	160	
Icteria virens Yellow-breasted Chat	15	
Pipilo erythrophthalmus Eastern Towhee	7	
Spizella passerina Chipping Sparrow	1	GP17
Spizella pusilla Field Sparrow	84	
Pooecetes gramineus Vesper Sparrow	1	
Ammodramus savannarum Grasshopper Sparrow	20	
Ammodramus henslowii Henslow's Sparrow	29	
Melospiza melodia Song Sparrow	114	
Piranga rubra Summer Tanager	1	
Piranga olivacea Scarlet Tanager	1	
Cardinalis cardinalis Northern Cardinal	23	
Passerina caerulea Blue Grosbeak	19	
Passerina cyanea Indigo Bunting	132	
Spiza americana Dickcissel	80	
Agelaius phoeniceus Red-winged Blackbird	910	
Sturnella magna Eastern Meadowlark	37	
Quiscalus quiscula Common Grackle	121	
Molothrus ater Brown-headed Cowbird	14	
Icterus spurious Orchard Oriole	18	
Icterus galbula Baltimore Oriole	2	
Spinus tristis American Goldfinch	87	
Passer domesticus House Sparrow	15	

Total number of Species	**122**
Total number of individuals	**4904**

Location abbreviations:
BH= Beehunter Marsh Units,
GP=Goose Pond Units, MPW=Main Pool West,
MPE=Main Pool East

The Bird Team on the Goose Pond FWA Biodiversity Survey of July 16-17 2010 covered most of the Units on the property. We were primarily looking for species rather than trying to get comprehensive numbers of individuals. For some communally roosting species such as Great Egrets we did get fairly comprehensive numbers of individuals. The timing of the biodiversity survey in mid-July was late for some resident breeding bird species. We were already into fall migration for southbound shorebirds and post breeding dispersal for wading birds. The biodiversity survey found 122 species of birds on the two main days of the survey, which is very good in July on a property that is mostly open terrain, has almost no woods, and only four species of resident warblers. Goose Pond FWA does have the largest shallow water wetland complex in Indiana and the property also has a thriving restored warm season native grass prairie.

The weather was dramatic just before and just after the two main days of the survey. We dodged a bullet by missing two major storms. On Thursday evening prior to Friday July 16 a thunderstorm front dropped 2.5 inches of rain at GPFWA. On Friday afternoon the high temperature was a blistering 96 F, with high humidity from the overnight rain. Then on Saturday night following the second main day of the survey another torrential deluge dumped between 3 to 7 more inches of rain at various locales in the greater Linton area. Thankfully rain did not fall during the daytime on Friday and Saturday when most of the birding activity took place.

The most notable biodiversity survey results for birds were 21 species that are listed by the Indiana DNR as being of Greatest Conservation Need. They included 13 species listed as State Endangered and 8 more species listed as Special Concern. Indiana Endangered Species along with numbers of individuals in parentheses were American Bittern (7), Least Bittern (19), Black-crowned Night-Heron (26 including numerous juveniles at nests), Yellow-crowned Night-Heron (1), Osprey (1), Northern Harrier (1), King Rail (2), Common Moorhen (4), Black Tern (2), Barn Owl (1), Sedge Wren (25), Marsh Wren (5), and Henslow's Sparrow (29). Indiana Species of Special Concern and numbers of individuals were Great Egret (340), Bald Eagle (2), Red-shouldered Hawk (1), Solitary Sandpiper (7), Greater Yellowlegs (4), Short-billed Dowitcher (19), Wilson's snipe (1), and Common Nighthawk (1). Other notable species were Blue-winged Teal (7), Northern Bobwhite (77), American White Pelican (1), Snowy Egret (3), Little Blue Heron (4), Cattle Egret (7), Sora (1), Black-necked Stilt (25), Stilt Sandpiper (17), Wilson's Phalarope (1), Caspian Tern (6), Forster's Tern (5), Black-billed Cuckoo (1), Acadian Flycatcher

(1 first property record and far out of normal woods habitat), Yellow-throated Vireo (1 second property record and the first in summer), Chipping Sparrow (1 scarce for the property in summer), and Vesper Sparrow (1 likewise difficult to find on the property in summer). Three Eastern Screech-Owls were new single partly one day high count for the property. With the addition of Acadian Flycatcher the overall Goose Pond FWA property bird list goes up to 261 species.

The Barn Owl found by Jerry Downs in the early morning of July 17 was the outstanding highlight bird of the biodiversity survey. We were most gratified to find a Barn Owl using the restored Goose Pond FWA grasslands. This is the first breeding season record for Barn Owl on the Goose Pond FWA property.

Table 5. List of Butterflies (48 species) and Moths (74 + 6 unidentified species) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leaders: Don Gorney, Butterflies, Amos W. Butler Audubon Society, dongorney@yahoo.com; and Megan McCarty, Moths, dianemccarty@hotmail.com.

Team Members: Ross Brittain, Jess Gwinn, Kirk Roth, Sandy Belth, Megan McCarty, David McCarty, Steve Dunbar, and Don Gorney (Megan McCarty was a team member for both butterflies and moths).

Butterflies:

Family	Subfamily	Scientific Name	Common Name
Hesperiidae	Eudaminae	*Epargyreus clarus*	Silver-spotted Skipper
	Pyrginae	*Pholisora catullus*	Common Sootywing
			Wild Indigo
	Pyrginae	*Erynnis baptisiae*	Duskywing
	Hesperiinae	*Ancyloxypha numitor*	Least Skipper
	Hesperiinae	*Nastra lherminier*	Swarthy Skipper
	Hesperiinae	*Polites peckius*	Peck's Skipper
	Hesperiinae	*Polites themistocles*	Tawny-edged Skipper
	Hesperiinae	*Polites origenes*	Crossline Skipper
		Wallengrenia	Northern Broken-
	Hesperiinae	*egeremet*	Dash
	Hesperiinae	*Pompeius verna*	Little Glassywing
		Atalopedes	
	Hesperiinae	*campestris*	Sachem
	Hesperiinae	*Poanes zabulon*	Zabulon Skipper
	Hesperiinae	*Anatrytone logan*	Delaware Skipper
	Hesperiinae	*Euphyes vestris*	Dun Skipper
Papilionidae	Papilioninae	*Battus philenor*	Pipevine Swallowtail
	Papilioninae	*Eurytides marcellus*	Zebra Swallowtail
	Papilioninae	*Papilio polyxenes*	Black Swallowtail
			Eastern Tiger
	Papilioninae	*Papilio glaucus*	Swallowtail
	Papilioninae	*Papilio troilus*	Spicebush Swallowtail
Pieridae	Coliadinae	*Pyrisitia lisa*	Little Yellow
	Coliadinae	*Abaeis nicippe*	Sleepy Orange
	Coliadinae	*Colias philodice*	Clouded Sulphur
	Coliadinae	*Colias eurytheme*	Orange Sulphur
	Coliadinae	*Phoebis sennae*	Cloudless Sulphur
	Pierinae	*Pieris rapae*	Cabbage White
Lycaenidae	Lycaeninae	*Lycaena hyllus*	Bronze Copper
	Theclinae	*Satyrium calanus*	Banded Hairstreak

	Theclinae	*Strymon melinus*	Gray Hairstreak
	Polyommatinae	*Cupido comyntas*	Eastern Tailed-Blue
	Polyommatinae	*Celastrina neglecta*	Summer Azure
Nymphalidae	Libytheinae	*Libytheana carinenta*	American Snout
	Danainae	*Danaus plexippus*	Monarch
	Limenitidinae	*Limenitis arthemis*	Red-Spotted Purple
	Limenitidinae	*Limenitis archippus*	Viceroy
	Heliconiinae	*Euptoieta claudia*	Variegated Fritillary
	Heliconiinae	*Speyeria cybele*	Great Spangled Fritillary
	Apaturinae	*Asterocampa celtis*	Hackberry Emperor
	Apaturinae	*Asterocampa clyton*	Tawny Emperor
	Nymphalinae	*Vanessa virginiensis*	American Lady
	Nymphalinae	*Vanessa cardui*	Painted Lady
	Nymphalinae	*Vanessa atalanta*	Red Admiral
	Nymphalinae	*Polygonia interrogationis*	Question Mark
	Nymphalinae	*Polygonia comma*	Eastern Comma
	Nymphalinae	*Junonia coenia*	Common Buckeye
	Nymphalinae	*Chlosyne nycteis*	Silvery Checkerspot
	Nymphalinae	*Phyciodes tharos*	Pearl Crescent
	Satyrinae	*Lethe anthedon*	Northern Pearly-eye
	Satyrinae	*Megisto cymela*	Little Wood-Satyr

Moths:

			Records	
Family	**Scientific name**	**Common Name**	**State**	**Cnty**
Yponomeutidae	*Atteva punctella*	Ailanthus Webworm Moth	–	x
Cossidae	*Prionoxystus robiniae*	Carpenterworm Moth	–	x
Tortricidae	*Eumarozia malachitana*	Sculptured Moth	x	x
	Acleris subnivana		unverified	x
Zygaenidae	*Harrisina americana*	Grapeleaf Skeletonizer	–	x
Limacodidae	*Prolimacodes badia*	Skiff Moth	–	x
Crambidae	*Diatraea grandiosella*	Southwestern Corn Borer	x	x
Geometridae	*Epimecis hortaria*	Tulip-tree Beauty	–	x
	Melanolophia signataria	Signate Melanolophia	–	x
	Metarranthis homuraria	Purplish Metarranthis	x	x
	Besma quercivoraria	Oak Besma	–	x
	Eulithis diversilineata	Lesser Grapevine Looper	–	x

	Eupithecia sp.			
	Unknown geometrid			
	Unknown geometrid			
Saturniidae	*Eacles imperialis*	Imperial Moth	–	x
	Dryocampa rubicunda	Rosy Maple Moth	–	x
	Antheraea polyphemus	Polyphemus Moth	–	x
	Actias luna	Luna Moth	–	x
	Callosamia promethea	Promethea Silkmoth	–	x
	Callosamia angulifera	Tulip-tree Silkmoth	–	x
Sphingidae	*Ceratomia undulosa*	Waved Sphinx	–	x
	Paratrea plebeja	Plebian Sphinx	–	x
	Paonias myops	Small-eyed Sphinx	–	x
	Amorpha juglandis	Walnut Sphinx	–	x
	Pachysphinx modesta	Big Poplar Sphinx	–	x
	Eumorpha pandorus	Pandorus Sphinx	–	x
	Darapsa myron	Hog Sphinx	–	x
Notodontidae	*Nadata gibbosa*	White-dotted Prominent	–	x
	Gluphisia septentrionis	Common Gluphisia	–	x
	Unknown notodontid			
Arctiidae	*Hypoprepia miniata*	Scarlet-winged Lichen Moth	–	x
	Hypoprepia fucosa	Painted Lichen Moth	–	x
	Haploa clymene	Clymene Moth	–	x
	Virbia immaculata		unverified	x
	Pyrrharctia isabella	Isabella Tiger Moth	–	x
	Hypercompe scribonia	Giant Leopard Moth	–	x
	Cycnia tenera	Delicate Cycnia	–	x
	Cisseps fulvicollis	Yellow-collared Scape Moth	–	x
	Apantesis sp.			
Noctuidae	*Idia aemula*	Common Idia	–	x
	Hypena scabra	Green Cloverworm Moth	–	x
	Hypsoropha hormos	Small Necklace Moth	–	x
	Lesmone detrahens	Detraced Owlet	–	x
	Zale lunata	Lunate Zale	–	x
	Caenurgina crassiuscula	Clover Looper Moth	–	x
	Caenurgina erechtea	Forage Looper Moth	–	x
	Mocis texana	Texas Mocis	–	x
	Catocala judith	Judith's Underwing	unverified	x
	Catocala ilia	Ilia Underwing	–	x
	Rachiplusia ou	Gray Looper Moth	–	x
	Marathyssa inficita	Dark Marathyssa	–	x
	Paectes abrostoloides	Large Paectes	–	x
	Homophoberia apicosa	Black Wedge-Spot	–	x

	Leuconycta diphteroides	Green Leuconycta	–	x
	Eudryas unio	Pearly Wood-Nymph	–	x
	Alypia octomaculata	Eight-spotted Forester	–	x
	Callopistria mollissima	Pink-shaded Fern Moth	–	x
	Spodoptera ornithogalli	Yellow-striped Armyworm Moth	–	x
	Elaphria versicolor	Variegated Midget	–	x
	Elaphria grata	Grateful Midget	–	x
	Mythimna unipuncta	Armyworm Moth	–	x
	Unknown noctuid			
Arctiidae	*Cycnia inopinatus*	Unexpected Cycnia	–	x
Noctuidae	*Acronicta oblinita*	Smeared Dagger Moth	–	x
Crambidae	*Saucrobotys futilalis*	Dogbane Saucrobotys		
	Desmia funeralis sp. Grp.	Grape Leaf-folder Moth		
	Polygrammodes langdonalis			
	Herpetogramma thestialis	Zigzag Herpetogramma Moth		
	Urola nivalis	Snowy Urola		
Geometridae	*Tornos scolopacinarius*	Dimorphic Gray		
	Hypagyrtis unipunctata	One-spotted Variant		
Notodontidae	*Misogada unicolor*	Drab Prominent		
	Heterocampa guttivitta	Saddled Prominent		
Noctuidae	*Palthis angulalis*	Faint-spotted Palthis		
	Hypena abalienalis	White-lined Bomolocha		
	Panopoda rufimargo	Red-lined Panopoda		
	Baileya australis	Small Baileya		
	Thioptera nigrofimbria	Black-bordered Lemon Moth		
	Protodeltote muscosula	Large Mossy Lithocodia		

Abundance: 2705 butterfly individuals. Moth abundance could not be quantified from just one night of collecting.

Location: Moths were surveyed in the immediate vicinity around the DNR headquarters barn. The area habitat is primarily lawn, woods, and wetlands. Two listed species were found here (see below).

Field work for butterflies was conducted primarily in prairie units at both Beehunter Marsh and Goose Pond. Additional habitat types surveyed were woodlots, gravel roads and parking lots, and wetland edges. The more productive units were located at Goose Pond and included GP18, GP17, and GP 9. Prairies in these and other productive units contained a greater quantity and diversity of plants in bloom than did units at Beehunter Marsh. One listed species of butterfly was recorded.

Collecting Methods and Effort: Surveying for moths was completed during the night of July 16-17. The Beetle Team's lighting system was used as the primary collection method, which consisted of two, 1,000 watt metal Halide setups, a 250 watt mercury vapor light, and four, 20 watt UV lights. In addition, a 15 watt black light trap was used during the same time duration. A total of seven person hours was spent collecting from evening of the 16th through the morning of the 17th. It should be noted that an unknown number of person hours was spent by the Beetle Team in helping collect moths.

Surveying for butterflies was done by visual observation and, in limited instances, catch-and-release. Observer effort consisted of five parties, comprising seven individuals, which spent a total of 32 party hours in the field. All survey work for butterflies was conducted on July 16, 2010. Some hours were expended on July 17 to search for additional species. Since no additional species were observed on the second day, individuals observed during the limited surveying on July 17 are not included in reported results to avoid duplication from the previous day.

Total hours for the Lepidoptera team is 39, consisting of 32 for butterflies and 7 for moths.

Special Interest Species:

Moths

Endangered, Threatened, Rare, and Extirpated Animals and Insects of Indiana:
Cycnia inopinatu and *Lesmone detrahens* are listed as State Rare
State Records: 3 confirmed species – See Table 5 (additional 3 unverified)
County Records: 59 species – See Table 5
The last 15 specimens reported in Table 5, received from Steve Dunbar, arrived too late to verify state and county records to be included in this report.

Butterflies

Endangered, Threatened, Rare, and Extirpated Animals and Insects of Indiana:
Lethe anthedon (Northern Pearly-eye) – listed as State Rare
Undoubtedly, many of the butterfly species observed would constitute county records. However, since no butterflies were collected and few were photographed, county record detail was not pursued.

Voucher Specimens: Moth specimens will be housed at the Purdue Entomological Research Collection Museum, West Lafayette, Indiana. No butterflies were collected.

Summary Overview: Lepidoptera team members found a rich diversity of butterfly and moth species during the biodiversity survey. The 48 species of butterflies found on July 16, 2010 represents almost all species that could reasonably be expected from southwest Indiana in mid-July. Individual numbers were above expectations with 2,705 butterflies recorded. As is typical with butterfly surveys, certain species predominated and accounted for a large percentage of the total. The top five most abundant species, led by Pearl Crescent (*Phyciodes tharos*) with 1,023 individuals, accounted for 66 percent of total individuals. Both the species and individual count compares very favorably with a count that was held in the general area just one week before the biodiversity survey. Although that count incorporated much more area than just Goose Pond FWA, it only produced 38 species and 1,193 individuals.

Butterfly richness at Goose Pond FWA is attributed to the extensive prairie plantings containing both nectar sources and larval host plants, isolated woodlots on the property, and forest cover in nearby Greene-Sullivan State Forest and on adjacent private ground. Although wildflowers in bloom were present at both Goose Pond and Beehunter Marsh, the Goose Pond units had larger, and therefore generally more productive, stands. Still, it was surprising that Beehunter Marsh produced only 5 percent of the survey's skippers (family Hesperiidae). Even the common Silver-spotted Skipper (*Epargyreus clarus*) was virtually absent from Beehunter Marsh, with only two individuals detected. Species other than skippers and woodland-dependent butterflies were as likely to be present at Beehunter Marsh as Goose Pond.

As expected, woodland-dependent species were primarily found at Goose Pond units in areas in close proximity to Greene-Sullivan State Forest or on isolated woodlots. Oddly, all of the survey's Tawny Emperors (*Asterocampa clyton*) came from what is possibly the only woodlot at Beehunter Marsh. Northern Pearly-eye (*Lethe anthedon*), designated as rare, was the only state listed butterfly species observed. Although many county records would have been recorded, surveying for butterflies was completed through visual observation only.

Moths were surveyed at the DNR headquarters building on the night of July 16-17 with assistance from the Beetle Team and their lighting systems. The single-night, single-location of surveying produced 74 identified and six yet unidentified moth species. At least 59 of the species were county records and at least three are new state records. *Cycnia inopinatu* and *Lesmone detrahens*, both designated as rare, were the two state listed moth species collected. Voucher specimens will be housed at the Purdue Entomological Research Collection Museum.

Table 6. List of Dragonflies (21 species) and Damselflies (9 species) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: Amanda Bellian, University of Evansville, arbellian@UH.net.

Team Members: Donald Batema, Matthew Fleck, Cody Gadberry, Amber Hougland, Stephanie Mallory, Logan McGregor, Paul McMurray, Brooke Riddle, Jeremy Ross, Ethen Smith, Kyle Zoll

Anisoptera – Dragonflies

Family	***Genus/species***	**Common name**	Abundance
Aeshnidae	***Anax junius***	**Common green darner**	Common
	Anax longipes	**Comet darner**	Rare
	Basiaeschna janata	Springtime darner	Rare
Corduliidae	*Epitheca princeps*	Prince baskettail	Rare
Gomphidae	***Hagenius brevistylus***	**Dragonhunter**	Rare
Libellulidae	*Celithemis elisa*	Calico pennant	Common
	Celithemis eponina	Halloween pennant	Common
	Celithemis fasciata	Banded pennant	Common
	Dythemis velox	**Swift setwing**	Rare
	Erythemis simplicicollis	Eastern pondhawk	Very abundant
	Libellula cyanea	Spangled skimmer	Rare
	Libellula incesta	**Slaty skimmer**	Rare
	Libellula luctuosa	Widow skimmer	Very abundant
	Libellula pulchella	Twelve-spotted skimmer	Rare
	Pachydiplax longipennis	Blue dasher	Very abundant
	Pantala flavescens	Wandering glider	Common
	Pantala hymenaea	**Spot-winged glider**	Very abundant
	Perithemis tenera	Eastern amberwing	Common
	Plathemis lydia	Common whitetail	Very abundant
	Tramea carolina	**Carolina saddlebag**	Common
	Tramea lacerata	**Black saddlebag**	Common

Zygoptera - Damselflies

Calopterygidae	*Calopteryx maculata*	Ebony jeweling	Common
	Hetaerina americana	**American ruby spot**	Common
Coenagrionidae	***Argia apicalis***	**Blue fronted dancer**	Very abundant
	Argia sedula	**Blue ringed dancer**	Very abundant
	Enallagma civile	**Familiar bluet**	Common
	Enallagma signatum	**Orange bluet**	Rare
	Ischnura hastata	**Citrine forktail**	Common
	Ischnura posita	Fragile forktail	Very abundant
	Ischnura verticalis	Eastern forktail	Very abundant

Bold – New county record for Greene County.

Collecting method and Effort:

Our team used two different collecting methods during this survey. For aerial specimen, we used butterfly nets. After the specimen was identified to species, it was released. If identification was not possible in the field, the specimen was placed in a zip lock bag until identification was made. For aquatic specimens, dip nets were used around the edges of a body of water in the vegetation. All collected aquatic specimens were place in a vial with 70% ethanol and taken back to the University of Evansville for identification.

The dragonfly and damselfly team had 11 members volunteering totaling 70 hours of surveying between the two days.

Summary Overview:

Odonates are known to be a vital component in assessing ecological health in watersheds because they respond quickly to environmental change, therefore, by our team being able to find such a large diversity of Odonata in two days we can conclude the health of Goose Pond is very good. The dragonfly and damselfly team was very successful being able to identify a total of 30 different species within the boundaries of Goose Pond. We were able to catch and identify twenty-one dragonflies, seven of which were new county records for Greene County. The remaining nine were damselflies, six of which were new county records. There are seven additional species that have previously been identified in the county that we were unable to reconfirm during this survey. Greene County has one species that is considered to be state endangered according to the Indiana Department of Natural Resources. This species is the

turquoise bluet, but it was not found during this particular survey. The Odonata team was able to find a species of dragonfly which is not in Dr. Curry's book of Indiana dragonflies. The swift setwing was found hovering over the pond located directly behind the barn. A pair of dragonhunters, one of the most sought after dragonflies because of their size, was spotted by one of the members of the butterfly and moth team, Kirk Roth. With additional surveying, additional species, particularly damselflies, are bound to be identified.

Table 7. List of Fish (39 species) and Freshwater Mussels (4 species) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: Brant E. Fisher, Indiana Dept. of Natural Resources, bfisher@dnr.IN.gov.

Team Member: JoAnne Davis

Fish:

Family	Common Name	Genus	Species	Common Name
AMIIDAE		**(bowfins)**		
		Amia	***calva***	**bowfin**
CLUPEIDAE	herrings	***Dorosoma***	***cepedianum***	**gizzard shad**
CYPRINIDAE	carps and minnows	***Campostoma***	***anomalum***	**central stoneroller**
		Carassius	***auratus***	**goldfish**
		Cyprinella	***spiloptera***	**spotfin shiner**
		Cyprinella	***whipplei***	**steelcolor shiner**
		Cyprinus	***carpio***	**common carp**
		Hybognathus	***nuchalis***	**Mississippi silvery minnow**
		Lythrurus	***fumeus***	**ribbon shiner**
		Lythrurus	***umbratilis***	**redfin shiner**
		Notemigonus	***crysoleucas***	**golden shiner**
		Notropis	***buccatus***	**silverjaw minnow**
		Notropis	***stramineus***	**sand shiner**
		Pimephales	***notatus***	**bluntnose minnow**
		Semotilus	***atromaculatus***	**creek chub**
CATOSTOMIDAE	suckers	***Catostomus***	***commersonii***	**white sucker**
		Ictiobus	***cyprinellus***	**bigmouth buffalo**
		Minytrema	***melanops***	**spotted sucker**
ICTALURIDAE	North American catfishes	***Ameiurus***	***melas***	**black bullhead**
		Ameiurus	***natalis***	**yellow bullhead**
		Ictalurus	***punctatus***	**channel catfish**
		Noturus	***gyrinus***	**tadpole madtom**
ATHERINOPSIDAE	New World silversides	***Labidesthes***	***sicculus***	**brook silverside**
FUNDULIDAE	topminnows	***Fundulus***	***notatus***	**blackstripe**

				topminnow
POECILIIDAE	livebearers	***Gambusia***	***affinis***	**western mosquitofish**
CENTRARCHIDAE	sunfishes	***Lepomis***	***cyanellus***	**green sunfish**
		Lepomis	***gulosus***	**warmouth**
		Lepomis	***humilis***	**orangespotted sunfish**
		Lepomis	***macrochirus***	**bluegill**
		Lepomis	***megalotis***	**longear sunfish**
		Lepomis	***microlophus***	**redear sunfish**
		Micropterus	***punctulatus***	**spotted bass**
		Micropterus	***salmoides***	**largemouth bass**
		Pomoxis	***annularis***	**white crappie**
		Pomoxis	***nigromaculatus***	**black crappie**
PERCIDAE	perches	***Etheostoma***	***gracile***	**slough darter**
		Etheostoma	***nigrum***	**johnny darter**
		Percina	***sciera***	**dusky darter**
SCIAENIDAE	drums and croakers	***Aplodinotus***	***grunniens***	**freshwater drum**

Freshwater Mussels:

Family	**Genus**	**Species**	**Common Name**
UNIONIDAE	***Pyganodon***	***grandis***	**giant floater**
	Toxolasma	***parvus***	**lilliput**
	Uniomerus	***tetralasmus***	**pondhorn**
CORBICULIDAE	***Corbicula***	***fluminea***	**Asian clam**

Only four species of freshwater mussels were collected from the 13 locations sampled on the Goose Pond Fish and Wildlife Area. No state/federal endangered or special concern freshwater mussel species were collected. Two species (lilliput and pondhorn) were only found at one location, although of the two, only lilliput was found live. Giant floater, one of the most common freshwater mussel species inhabiting Indiana waters, was found live at four locations, while the exotic Asian clam was found live at five.

Table 8. List of Fungi and Fungal Allies (5 species) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: Donald G. Ruch, Ball State University, druch@bsu.edu.

Team Members: Bruce Behan, Ben Hess, Bill McKnight, Paul Rothrock

Scientific Name	Common Name
PHYLUM BASIDIOMYCOTA	
Family Boletaceae	
Boletus bicolor Peck var. *bicolor*	Red & Yellow Bolete
Boletus pallidus Frost	Pale Bolete
Family Hapalopilaceae	
Hapalopilus rutilans (Pers.) P. Karst	Tender Nesting Polypore
Family Polyporaceae	
Cerrena unicolor (Bull.) Murrill	Mossy Maze Polypore
PHYLUM OOMYCOTA	
Family Saprolegniaceae	
Saprolegnia parasitica Coker	Parasitic Water Mold

Location: True fungi were only found in the Goose Pond unit 13 forest. The fungal ally, *Saprolegnia parasitica*, was observed in all large ponds as a parasite on fish. It was prevalent in the ponds at Beehunter Marsh.

Species of Concern: None.

Collecting Methods and Effort: Meander surveys.

Special Interest Species: *Saprolegnia parasictica*: this is a common parasite of fish.

Voucher Specimens: None.

Summary Overview: A total of five fungi and fungal allies were observed. The four true fungi are all common and widespread across the state.

Table 9. List of Aquatic Macroinvertebrates (16 families) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: William W. Jones

Team Members: Julia Bond, Sarah Powers, Jay Snowden

Order	Family	#
Coleoptera	Curculionidae	4
Coleoptera	Gyrinidae	1
Coleoptera	Hydraenidae	2
Coleoptera	Hydrophilidae	5
Coleoptera	Noteridae	8
Diptera	Chironomidae	7
Diptera	Stratiomyidae	2
Ephemeroptera	Baetidae	9
Ephemeroptera	Ephemerellidae	37
Hemiptera	Corixidae	16
Hemiptera	Gerridae	20
Hemiptera	Hydrometridae	1
Hemiptera	Mesoveliidae	15
Hemiptera	Nepidae	5
Odonata	Coenagrionidae	75
Odonata	Libellulidae	4
TOTALS		**211**

Methods

On Friday morning, 7/17/10, we sampled the GP 7 pool and the Main Pool at the Goose Pond Fish and Wildlife Area. We launched a canoe into each pool from the shoreline. We used an Ekman dredge to collect a sample of sediment from each pool and spent 10 minutes picking macroinvertebrates from the sample. Specimens were placed in a jar containing 95% ethyl alcohol for preservative.

We also waded into the shallow water and sampled aquatic plant stems, shallow sediments and the water surface with kitchen strainers. Specimens collected in this way were also placed in the same jars. An equivalent sampling effort was used at both sites.

All specimens collected were identified under a dissecting microscope at 10 – 70 power. All identifications were according to Peckarsky et al. (1990).

Results

We used a spreadsheet calculator that we developed for river and stream research to organize the data and to apply the results to the Macroinvertebrate Index of Biotic Integrity (mIBI) developed and used by the Indiana Department of Environmental Management for rivers and streams. Although the mIBI was developed for streams and doesn't really apply to wetlands as used at Goose Pond, it still serves as a good summary and comparative metric. This is a family-level index, thus taxa are reported as families. High mIBI metric scores are "better" than lower scores. The Main Pool scored 2.7 = Moderately Impaired, and Goose Pond Unit 7 scored 4.0 = Slightly Impaired. The sediment grab samples contained no live aquatic macroinvertebrates. This is likely because of the anoxic dissolved oxygen concentrations in the sediments. We collected 133 individuals from the margins of the GP 7 Pool and 78 individuals from the margins of the Main Pool. Overall, the Main Pool received lower scores because it had lower family richness (11 vs. 13), more tolerant taxa (HBI 6.06 vs. 4.74), and more EPT individuals (32 vs. 14). EPT refers to Ephemeroptera, Plecoptera, and Trichoptera taxa that are less tolerant of organic pollution and thus, are indicators of higher water quality.

References

Peckarsky, B.L., P.R. Fraissinet, M.A. Penton, and D.J. Conklin, Jr. 1990. Freshwater Macroinvertebrates of Northeastern North America. Cornell University Press, Ithaca, NY.

Table 10. List of Mammals (27 species) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: John Whitaker, Indiana State University, John.Whitaker@indstate.edu.

Team Members: Angela Chamberlain and George Sly

Small mammals collected at Goose Pond July 2010 - snap trap lines

Scientific Name	**Common Name**
Microtus ochrogaster	Prairie vole
Microtus pennsylvanicus	Meadow vole
*Mus musculus**	House mouse*
Peromyscus leucopus	White-footed mouse
Cryptotis parva	Least shrew
Blarina brevicauda	Northern short-tailed shrew
Peromyscus maniculatus	Prairie deer mouse
Synaptomys cooperi	Southern bog lemming

Bats captured in mist net collected at Goose Pond area MPW4 stream 26 July 2010

Perimyotis subflavus	Eastern pipistrelle
Lasiurus borealis	Red bat

Mammals observed or on record - Goose Pond FWA

Myotis lucifugus	Little brown bat
Didelphis virginiana	Opossum
Tamias striatus	Eastern chipmunk
Marmota monax	Woodchuck
Sciurus niger	Fox Squirrel
Castor canadensis	Beaver
Ondatra zibethicus	Muskrat
Canis latrans	Coyote
Vulpes vulpes	Red fox
Lynx rufus	Bobcat
Procyon lotor	Raccoon
Mustela nivalis	Least weasel
Mustela vison	Mink
Mephitis mephitis	Striped skunk
Odocoileus virginianus	White-tailed deer
Sylvilagus floridanus	Cottontail
Scalopus aquaticus	Eastern mole

Small mammal trapping was done using 14 lines of snap-back mouse traps from 12 through 17 July, 2010, mostly in old fields and wetlands, which comprises most of the land, and 1 line of about 50 small mouse traps along with 30 rat traps set in the woods for flying squirrels. In addition, information was collected on other, mostly larger mammals by Brad Feaster and other property personnel. We also used a mist-net for bats on 26 July 2010. A total of about 116 man hours of labor was spent on this project.

A total of 305 small mammals of 8 species was taken in the mouse-traps. There is a colony of little brown bats in the barn at the headquarters area, totaling over 600 bats. Two additional species of bats were taken during mist-netting, a red bat and an eastern pipistrelle. Reports on other species, mostly larger, totaled an additional 16 species. The total number of mammals currently known to be living wild at Goose Pond is 27. For comparison, there are 59 species of mammals known to be living in Indiana, so the Goose Pond Fish and Wildlife Area is currently home to at least 47 percent of the species of mammals in the state.

There were no state records, and no endangered species observed during this work. Voucher specimens will be placed in the Indiana State University vertebrate museum.

Other species most likely to be found at Goose Pond are:

SHREWS, Soricidae (Order Soricomorpha)
Masked shrew (*Sorex cinereus)*, Southeastern shrew, (*S. longirostris)*

BATS, Vespertilionidae (Order Chiroptera)
Big brown bat (*Eptesicus fuscus)*, Northern bat (*Myotis septentrionalis)*, Indiana bat, (*M. sodalis)*
Silver-haired bat (*Lasionycteris noctivagans)*, Hoary bat (*Lasiurus cinereus)*

RODENTS (Order Rodentia)
Squirrels, Sciuridae
Southern flying squirrel (G*laucomys volans)*
Native mice, Cricetidae
Western harvest mouse (*Reithrodontomys megalotis)*
Old World rats and mice, Muridae
Norway rat (*Rattus norvegicus)*
Jumping mice, Dipodidae, Zapodinae
Meadow jumping mouse (*Zapus hudsonius)*

CARNIVORES (Order Carnivora)
Canidae, Gray fox (*Urocyon cinereoargenteus)*
Mustelidae, River otter (*Lontra canadensis),* Long-tailed weasel (*Mustela frenata)*
Mephitidae, Striped skunk (*Mephitis mephitis)*

Overview:

The two most interesting species taken at Goose Pond were the bog lemming, *Synaptomys cooperi*, and the least shrew, *Cryptotis parva*. Species expected, but not found were the masked shrew, *Sorex cinereus*, and the meadow jumping mouse, *Zapus hudsonius*. The distribution and abundance of three of the species present at Goose Pond, the house mouse, the prairie vole, and the prairie deer mouse were probably greatly affected by the agricultural history of the area.

Table 11. List of Nonvascular Plants observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: Bill McKnight, Indiana Academy of Science, bnmcknight@comcast.net.

No nonvascular plants were found.

Table 12. List of Plankton (18 genera) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: William W. Jones, Indiana University, joneswi@indiana.edu.

Team Members: Melanie Arnold and William McCormick

	Abundance (# cells/10 fields)	
GENERA	**Main Pool**	**GP 7**
Blue-Green Algae (Phylum: Cyanophyta)		
Anabaena	1200	
Planktothrix	9016	
Green Algae (Phylum: Chlorophyta)		
Eudorina		14
Schroederia		2
Ulothrix	20	30
Volvox		20
Diatoms (Phylum: Bacillariophyta)		
Aulacoseira		120
Synedra		1
Rotifers (Phylum: Rotifera)		
Filinia	8	2
Brachionus		1
Polyarthra	2	
Asplanchna	1	1
Lecane	1	
Phylum: Arthropoda		
Class: Crustacea; Order Cladocera		
Diaphanosoma	2	4
Ceriodaphnia	1	
Class Copepoda		
Nauplius	1	9
Calanoid Copepod	1	
Class: Insecta		
Chaoborus	1	

Methods

On Friday morning, 7/17/10, we sampled the GP 7 pool and the Main Pool at the Goose Pond Fish and Wildlife Area. We launched a canoe into each pool from the shoreline. We had planned to collect plankton with a vertical tow up through the water column using a plankton tow net with a 63-micron mesh. However, the shallow water depth made this sampling technique difficult so we instead towed the net through shallow water behind the canoe for approximately 10 meters. This did not allow us to accurately determine the total volume of water sampled thus we could not express units quantitatively as cells per liter. While on station, we also recorded temperature, dissolved oxygen, and conductivity levels in the water using a YSI Model 85 meter.

Each sample was rinsed from the tow net's bucket with deionized water, preserved with Lugol's solution, and placed in an iced cooler. Once in the lab, each sample was counted using a phase contrast light microscope at 200x. Difficult identifications were made at 400x. Ten microscope fields were counted diagonally across each slide. Plankton genera were reported as number of cells per ten fields.

Results

The Main Pool had a visible algal scum at the surface so it wasn't surprising that it was dominated by cyanobacteria (Anabaena and Planktothrix). I was surprised by the high richness of the zooplankton present. The cyanobacteria bloom would suggest an excess of nutrients, although no nutrient data were collected.

The GP7 Pool was dominated by green algae and diatoms, but these were in low densities. This site too had nice zooplankton richness present.

Both pools had lower phytoplankton species richness than I would have expected. Possible reasons for this include:

1. The shallow water may result in light intensities too high for optimal algal photosynthesis.
2. The flowing water, especially in GP7 sampling site, flushes out algae before their populations can fully develop, much like happens within rivers.

The water temperatures at both sites were typical of summer and showed no thermal stratification. Dissolved oxygen (DO) in the Main Pool was under-saturated, surprising given the algal bloom that was occurring. This shows that respiration exceeded photosynthesis. Further evidence of high levels of respiration, likely bacterial; occur at 1 and 1.5 meter depths, which are anoxic, despite mixing with the atmosphere that should drive DO saturation toward equilibrium, or 100%. Decaying organic matter at the sediment surface creates a biochemical oxygen demand as bacteria utilize the organic matter as an energy source while consuming oxygen in the process.

Table 13. List of Snail-killing Flies (4 species) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: Bill Murphy, Research Collaborator, Smithsonian Institution, billmurphy8@sbcglobal.net.

Diptera: Sciomyzidae

Species	Number
Dictya texensis Curran	2
Sepedon armipes Loew	21
Sepedon fuscipennis Loew	39
Tetanocera vicina Macquart	1
Previously found:	
Atrichomelina pubera (Loew)	1
Dictya sabroskyi Steyskal	1

Collecting method: sweep netting emergent vegetation.
Areas covered: n.w. BH4, s.w. Main Pool West, s.w. GP 10S.
Effort: About 16 hours by one person over two days.
Specimens will be deposited in the Purdue University and Indiana State Museum collections.

The results show a suite of species representing an early successional series of some of the regionally most common and least specialized species. Analysis of one species (*Sepedon fuscipennis* Loew) showed that the race present at Goose Pond (*S. f. fuscipennis* Loew) originated south of central Indiana. No individuals were found with characteristics of the race occurring from central Indiana north (*S. f. nobilis* Orth).

In general, sciomyzid flies were far less common than would be expected in a mature wetland environment. Possible reasons for this include exceptionally high temperatures during the survey period, surveying after the peak sciomyzid flight period (April-June), a groundwater pH above 7.0 (which greatly restricts snail shell development), and pesticide overspray or runoff from adjoining agricultural areas.

Collecting in adjacent areas of Greene County during the survey period also produced surprisingly low numbers of sciomyzids, results similar to those at Goose Pond, which eliminates the newness of the Goose Pond wetlands and other site-specific conditions as potential factors in the low numbers of sciomyzids found. The only other areas in Indiana where sciomyzids have been found in such low numbers in seemingly suitable habitat are the adjoining strip-mined counties of Clay, Knox, and Sullivan.

Table 14. List of Vascular Plants (379) observed at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: Scott Namestnik, JFNew, snamestnik@jfnew.com.

Team Members: Bruce Behan, Grace Chapman, Ben Hess, Scott Namestnik, Ed Paynter, Chris Reidy, Paul Rothrock, Don Ruch, John Taylor, Kevin Tungesvick; vascular plant observations also reported by Steve Dunbar, Brad Feaster, Don Gorney, Bill McKnight, and Kirk Roth.

Scientific Name	Common Name	Potential County Record
PTERIDOPHYTES		
Aspleniaceae (Spleenwort Family)		
Asplenium platyneuron (L.) Britton, Sterns & Poggenb. var. platyneuron	Ebony Spleenwort	
Ophioglossaceae (Adder's-tongue Family)		
Botrychium virginianum (L.) Sw.	Rattlesnake Fern	
GYMNOSPERMS		
Cupressaceae (Cypress Family)		
Juniperus virginiana L. var. *virginiana*	Eastern Redcedar	
Pinaceae (Pine Family)		
Pinus strobus L.	Eastern White Pine	x
Pinus virginiana Mill.	Virginia Pine	x
ANGIOSPERMS		
Acanthaceae (Acanthus Family)		
Ruellia strepens L.	Limestone Wild Petunia	
Aceraceae (Maple Family) [Sapindaceae]		
Acer negundo L.	Boxelder	x
Acer rubrum L.	Red Maple	
Acer saccharinum L.	Silver Maple	
Alismataceae (Water-plantain Family)		
Alisma subcordatum Raf.	American Water Plantain	x
Sagittaria brevirostra Mack. & Bush	Shortbeak Arrowhead	

Sagittaria calycina Engelm. var. *calycina*	Hooded Arrowhead	
Sagittaria latifolia Willd.	Broadleaf Arrowhead	
Amaranthaceae (Amaranth Family)		
Amaranthus tuberculatus (Moq.) Sauer	Roughfruit Amaranth	
Unidentifiable Amaranthaceae[5]		
Anacardiaceae (Sumac Family)		
Rhus glabra L.	Smooth Sumac	
Toxicodendron radicans (L.) Kuntze ssp. negundo (Greene) Gillis	Eastern Poison Ivy	
Apiaceae (Carrot Family)		
Cicuta maculata L.	Spotted Water Hemlock	
Conium maculatum L.	Poison Hemlock	x
Daucus carota L.	Queen Anne's Lace	
Eryngium yuccifolium Michx. var. *yuccifolium*	Button Eryngo	
Pastinaca sativa L.	Wild Parsnip	x
Sanicula canadensis L.	Canadian Blacksnakeroot	
Sanicula odorata (Raf.) K.M. Pryer & L.R. Phillippe	Clustered Blacksnakeroot	x
Apocynaceae (Dogbane Family)		
Apocynum cannabinum L.	Indianhemp	
Apocynum sibiricum Jacq.[1]	Indianhemp	x
Asclepiadaceae (Milkweed Family) [Apocynaceae]		
Asclepias incarnata L.	Swamp Milkweed	
Asclepias syriaca L.	Common Milkweed	x
Cynanchum laeve (Michx.) Pers.	Honeyvine	
Asteraceae (Aster Family)		
Ageratina altissima (L.) King & H. Rob.	White Snakeroot	
Ambrosia artemisiifolia L. var. *elatior* (L.) Descourtils	Annual Ragweed	
Ambrosia trifida L. var. *trifida*	Great Ragweed	
Arctium minus Bernh.	Lesser Burdock	x
Bidens aristosa (Michx.) Britton	Bearded Beggarticks	
Bidens bipinnata L.	Spanish Needles	
Bidens cernua L.	Nodding Beggartick	x
Bidens frondosa L.	Devil's Beggartick	

Bidens tripartita L.	Threelobe Beggarticks	
Bidens vulgata Greene	Big Devil's Beggartick	
Boltonia asteroides (L.) L. Hér. var. *recognita* (Fernald & Grisc.) Cronquist	White Doll's Daisy	
Cirsium altissimum (L.) Hill.	Tall Thistle	
Cirsium arvense (L.) Scop.	Canada Thistle	x
Cirsium discolor (Muhl. ex Willd.) Spreng.	Field Thistle	
Cirsium vulgare (Savi) Ten.	Bull Thistle	x
Conyza canadensis (L.) Cronquist	Canadian Horseweed	
Coreopsis tripteris L.	Tall Tickseed	
Echinacea purpurea (L.) Moench	Eastern Purple Coneflower	x
Eclipta prostrata (L.) L.	False Daisy	
Erechtites hieraciifolia (L.) Raf. ex DC.	American Burnweed	
Erigeron annuus (L.) Pers.	Eastern Daisy Fleabane	
Eupatorium perfoliatum L. var. *perfoliatum*	Common Boneset	
Eupatorium serotinum Michx.	Lateflowering Thoroughwort	
Eupatorium x *truncatum* Muhl. ex Willd. (pro sp.) [perfoliatum x serotinum]		x
Euthamia graminifolia (L.) Nutt. var. *graminifolia*	Flat-top Goldentop	
Gnaphalium uliginosum L.	Marsh Cudweed	x
Helenium L.[4]	Sneezeweed	
Helianthus grosseserratus M. Martens	Sawtooth Sunflower	
Helianthus tuberosus L.	Jerusalem Artichoke	
Heliopsis helianthoides (L.) Sweet	Smooth Oxeye	
Iva annua L.	Annual Marsh Elder	
Lactuca canadensis L.	Canada Lettuce	
Lactuca floridana (L.) Gaertn.	Woodland Lettuce	
Lactuca serriola L.	Prickly Lettuce	
Liatris pycnostachya Michx. var. *pycnostachya*	Prairie Blazing Star	
Parthenium integrifolium L. var. *integrifolium*	Wild Quinine	x

	Pyrrhopappus carolinianus (Walter) DC.	Carolina Desert-chicory	x
	Ratibida pinnata (Vent.) Barnhart	Pinnate Prairie Coneflower	
	Rudbeckia hirta L. var. *hirta*	Blackeyed Susan	
	Silphium integrifolium Michx. var. *integrifolium*	Wholeleaf Rosinweed	
	Silphium perfoliatum L. var. *perfoliatum*	Cup Plant	
	Silphium terebinthinaceum Jacq. var. *terebinthinaceum*	Prairie Rosinweed	
	Solidago canadensis L.	Canada Goldenrod	
	Solidago nemoralis Aiton	Gray Goldenrod	
	Symphyotrichum lanceolatum (Willd.) G.L. Nesom ssp. lanceolatum var. lanceolatum	White Panicle Aster	x
	Symphyotrichum lateriflorum (L.) A. Löve & D. Löve	Calico Aster	
	Symphyotrichum ontarionis (Wiegand) G.L. Nesom	Bottomland Aster	x
	Symphyotrichum pilosum (Willd.) G.L. Nesom var. *pilosum*	Hairy White Oldfield Aster	
	Symphyotrichum Nees[4]	Aster	
	Taraxacum officinale F.H. Wigg. ssp. *officinale*	Common Dandelion	
	Verbesina alternifolia (L.) Britton ex Kearney	Wingstem	
	Vernonia gigantea (Walter) Trel. ssp. *gigantea*	Giant Ironweed	
	Xanthium strumarium L.	Rough Cocklebur	
Balsaminaceae (Touch-me-not Family)			
	Impatiens capensis Meerb.	Jewelweed	
Betulaceae (Birch Family)			
	Alnus glutinosa (L.) Gaertn.	European Alder	x
	Corylus americana Walter	American Hazelnut	
Bignoniaceae (Trumpet-creeper Family)			
	Campsis radicans (L.) Seem. ex Bureau	Trumpet Creeper	x
	Catalpa speciosa (Warder) Warder ex Engelm.	Northern Catalpa	x
Boraginaceae (Borage Family)			
	Hackelia virginiana (L.) I.M. Johnst.	Beggarslice	
Brassicaceae (Mustard Family)			
	Barbarea vulgaris W.T. Aiton	Garden Yellowrocket	

Lepidium campestre (L.) W.T. Aiton	Field Pepperweed	
Lepidium virginicum L. var. *virginicum*	Virginia Pepperweed	
Campanulaceae (Bellflower Family)		
Campanulastrum americanum (L.) Small	American Bellflower	
Lobelia cardinalis L.	Cardinalflower	
Lobelia inflata L.	Indian-tobacco	
Lobelia siphilitica L. var. *siphilitica*	Great Blue Lobelia	
Cannabaceae (Hemp Family)		
Humulus lupulus L. var. *lupulus*	Common Hop	x
Caprifoliaceae (Honeysuckle Family)		
Lonicera japonica Thunb.	Japanese Honeysuckle	x
Lonicera maackii (Rupr.) Herder	Amur Honeysuckle	x
Lonicera morrowii A. Gray	Morrow's Honeysuckle	x
Sambucus nigra L. ssp. *canadensis* (L.) R. Bolli	American Black Elderberry	
Symphoricarpos orbiculatus Moench	Coralberry	
Caryophyllaceae (Pink Family)		
Cerastium fontanum Baumb. ssp. *vulgare* (Hartm.) Greuter & Burdet	Big Chickweed	
Dianthus armeria L.	Deptford Pink	x
Saponaria officinalis L.	Bouncing Bet	x
Ceratophyllaceae (Hornwort Family)		
Ceratophyllum demersum L.	Coon's Tail	
Chenopodiaceae (Goosefoot Family) [Amaranthaceae]		
Chenopodium album L.	Lambsquarters	x
Chenopodium pallescens Standl.	Slimleaf Goosefoot	x
Clusiaceae (Mangosteen Family) [Hypericaceae]		
Hypericum mutilum L.	Dwarf St. Johnswort	
Hypericum perforatum L.	Common St. Johnswort	
Hypericum prolificum L.	Shrubby St. Johnswort	
Hypericum punctatum Lam.	Spotted St. Johnswort	
Commelinaceae (Spiderwort Family)		
Commelina communis L.	Asiatic Dayflower	
Convolvulaceae (Morning-glory Family)		

Calystegia sepium (L.) R. Br.	Hedge False Bindweed	
Ipomoea hederacea Jacq.	Ivyleaf Morning-glory	
Ipomoea lacunosa L.	Whitestar	
Ipomoea pandurata (L.) G. Mey.	Man of the Earth	
Ipomoea purpurea (L.) Roth	Tall Morning-glory	x
Cornaceae (Dogwood Family)		
Cornus drummondii C.A. Mey.	Roughleaf Dogwood	
Cornus florida L.	Flowering Dogwood	
Cornus obliqua Raf.	Silky Dogwood	x
Crassulaceae (Stonecrop Family) [Penthoraceae]		
Penthorum sedoides L.	Ditch Stonecrop	
Cuscutaceae (Dodder Family) [Convolvulaceae]		
Cuscuta gronovii Willd. ex Schult. var. *gronovii*	Scaldweed	x
Cuscuta pentagona Engelm. var. *pentagona*	Fiveangled Dodder	x
Cyperaceae (Sedge Family)		
Carex annectens (E.P. Bicknell) E.P. Bicknell	Yellowfruit Sedge	x
Carex blanda Dewey	Eastern Woodland Sedge	
Carex bushii Mack.	Bush's Sedge	x
Carex cristatella Britton	Crested Sedge	x
Carex frankii Kunth	Frank's Sedge	
Carex granularis Muhl. ex Willd.	Limestone Meadow Sedge	x
Carex lacustris Willd.	Hairy Sedge	x
Carex laxiculmis Schwein var. *laxiculmis*	Spreading Sedge	x
Carex lupulina Muhl. ex Willd.	Hop Sedge	
Carex lurida Wahlenb.	Shallow Sedge	
Carex molesta Mack. ex Bright	Troublesome Sedge	x
Carex normalis Mack.	Greater Straw Sedge	x
Carex radiata (Wahlenb.) Small	Eastern Star Sedge	x
Carex scoparia Schkuhr ex Willd. var. *scoparia*	Broom Sedge	x
Carex squarrosa L.	Squarrose Sedge	
Carex swanii (Fernald) Mack.	Swan's Sedge	x
Carex tribuloides Wahlenb. var. *tribuloides*	Blunt Broom Sedge	
Carex vulpinoidea Michx. var.	Fox Sedge	

vulpinoidea		
Cyperus acuminatus Torr. & Hook. ex Torr.	Tapertip Flatsedge	
Cyperus echinatus (L.) Alph. Wood	Globe Flatsedge	x
Cyperus erythrorhizos Muhl.	Redroot Flatsedge	
Cyperus esculentus L. var. *leptostachyus* Boeckeler	Yellow Nutsedge	
Cyperus odoratus L.	Fragrant Flatsedge	
Cyperus pseudovegetus Steud.	Marsh Flatsedge	x
Cyperus squarrosus L.	Bearded Flatsedge	
Cyperus strigosus L.	Strawcolored Flatsedge	
Eleocharis acicularis (L.) Roem. & Schult. var. *acicularis*	Needle Spikerush	x
Eleocharis obtusa (Willd.) Schult.	Blunt Spikerush	
Eleocharis palustris (L.) Roem. & Schult. var. *palustris*	Common Spikerush	
Eleocharis quadrangulata (Michx.) Roem. & Schult.	Squarestem Spikerush	x
Eleocharis R. Br.[4]	Spikerush	
Schoenoplectus fluviatilis (Torr.) M.T. Strong	River Bulrush	x
Schoenoplectus mucronatus (L.) Palla	Bog Bulrush	x
Schoenoplectus pungens (Vahl) Palla	Common Threesquare	x
Schoenoplectus tabernaemontani (C.C. Gmel.) Palla	Softstem Bulrush	x
Scirpus cyperinus (L.) Kunth	Woolgrass	
Scirpus georgianus Harper	Georgia Bulrush	
Ebenaceae (Ebony Family)		
Diospyros virginiana L.	Common Persimmon	
Elaeagnaceae (Oleaster Family)		
Elaeagnus umbellata Thunb.	Autumn Olive	
Euphorbiaceae (Spurge Family)		
Acalypha rhomboidea Raf.	Common Threeseed Mercury	
Chamaesyce maculata (L.) Small	Spotted Sandmat	
Chamaesyce nutans (Lag.) Small	Eyebane	
Croton capitatus Michx. var. *capitatus*	Hogwort	x
Fabaceae (Pea Family)		
Amphicarpaea bracteata (L.) Fernald var. *bracteata*	American Hogpeanut	

	Apios americana Medik.	Groundnut	
	Baptisia alba (L.) Vent. var. *macrophylla* (Larisey) Isely	Largeleaf Wild Indigo	
	Chamaecrista fasciculata (Michx.) Greene var. *fasciculata*	Partridge Pea	
		Illinois	
	Desmanthus illinoensis (Michx.) MacMill. ex B.L. Rob. & Fernald	Bundleflower	x
	Desmodium canadense (L.) DC.	Showy Ticktrefoil	x
	Desmodium canescens (L.) DC.	Hoary Ticktrefoil	
	Desmodium paniculatum (L.) DC. var. *paniculatum*	Panicledleaf Ticktrefoil	
	Gleditsia triacanthos L.	Honeylocust	
	Glycine max (L.) Merr.	Soybean	x
	Kummerowia stipulacea (Maxim.) Makino	Korean Clover	
	Kummerowia striata (Thunb.) Schindl.	Japanese Clover	
	Lespedeza cuneata (Dum. Cours.) G. Don	Sericea Lespedeza	x
	Lespedeza Michx.[4]	Lespedeza	
	Medicago lupulina L.	Black Medick	
	Medicago sativa L. ssp. *sativa*	Alfalfa	
	Melilotus alba Medik.[2]	White Sweetclover	
	Melilotus officinalis (L.) Lam.	Yellow Sweetclover	
	Securigera varia (L.) Lassen	Crownvetch	x
	Senna hebecarpa (Fernald) Irwin & Barneby	American Senna	
	Senna marilandica (L.) Link	Maryland Senna	
	Strophostyles helvola (L.) Elliot	Amberique-bean	
	Trifolium hybridum L.	Alsike Clover	x
	Trifolium pratense L.	Red Clover	x
	Trifolium repens L.	White Clover	x
	Unidentifiable Fabaceae[5]		
Fagaceae (Beech Family)			
	Quercus bicolor Willd.	Swamp White Oak	
	Quercus imbricaria Michx.	Shingle Oak	
	Quercus palustris Münnch.	Pin Oak	
	Quercus rubra L.	Northern Red Oak	
Gentianaceae (Gentian Family)			
	Sabatia angularis (L.) Pursh	Rosepink	
Haloragaceae (Water Milfoil Family)			
	Myriophyllum spicatum L.	Eurasian	x

	Watermilfoil	
Hamamelidaceae (Witch-hazel Family) [Altingiaceae]		
Liquidambar styraciflua L.	Sweetgum	
Juglandaceae (Walnut Family)		
Carya cordiformis (Wangenh.) K. Koch	Bitternut Hickory	x
Carya ovata (Mill.) K. Koch	Shagbark Hickory	
Juglans nigra L.	Black Walnut	
Juncaceae (Rush Family)		
Juncus acuminatus Michx.	Tapertip Rush	
Juncus anthelatus (Wiegand) R.E. Brooks	Greater Poverty Rush	x
Juncus biflorus Elliot	Bog Rush	
Juncus brachycarpus Engelm.	Whiteroot Rush	
Juncus dudleyi Wiegand	Dudley's Rush	x
Juncus effusus L.	Common Rush	
Juncus interior Wiegand var. *interior*	Inland Rush	x
Juncus marginatus Rostk.	Grassleaf Rush	
Juncus tenuis Willd.	Poverty Rush	
Juncus torreyi Coville	Torrey's Rush	x
Lamiaceae (Mint Family)		
Lycopus americanus Muhl. ex W. Bartram	American Water Horehound	
Lycopus uniflorus Michx. var. *uniflorus*	Northern Bugleweed	x
Lycopus virginicus L.	Virginia Water Horehound	
Monarda fistulosa L. ssp. *fistulosa*	Wild Bergamot	
Physostegia virginiana (L.) Benth.	Obedient Plant	
Prunella vulgaris L. ssp. *lanceolata* (W. Bartram) Hultén	Lance Selfheal	
Pycnanthemum tenuifolium Schrad.	Narrowleaf Mountainmint	
Pycnanthemum virginianum (L.) T. Dur. & B.D. Jacks. ex B.L. Rob. & Fernald	Virginia Mountainmint	
Scutellaria lateriflora L. var. *lateriflora*	Blue Skullcap	
Stachys tenuifolia Willd.	Smooth Hedgenettle	
Teucrium canadense L. var. *canadense*	Canada Germander	
Lauraceae (Laurel Family)		
Sassafras albidum (Nutt.) Nees	Sassafrass	
Lemnaceae (Duckweed Family) [Araceae]		

Lemna minor L.	Common Duckweed	x
Spirodela polyrrhiza (L.) Schleid.	Common Duckmeat	
Wolffia brasiliensis Weddell	Brazilian Watermeal	x
Wolffia columbiana Karst.	Columbian Watermeal	x
Liliaceae (Lily Family) {Alliaceae, Hemerocallidaceae, Ruscaceae]		
Allium vineale L. ssp. *vineale*	Wild Garlic	
Hemerocallis fulva (L.) L.	Orange Daylily	x
Polygonatum biflorum (Walter) Elliot var. *commutatum* (Schult. & Schult. f.) Morong	Smooth Solomon's Seal	
Lythraceae (Loosestrife Family)		
Ammannia coccinea Rottb.	Valley Redstem	
Lythrum alatum Pursh var. *alatum*	Winged Lythrum	
Lythrum salicaria L.	Purple Loosestrife	x
Rotala ramosior (L.) Koehne	Lowland Rotala	
Magnoliaceae (Magnolia Family)		
Liriodendron tulipifera L.	Tuliptree	
Malvaceae (Mallow Family)		
Abutilon theophrasti Medik.	Velvetleaf	
Hibiscus laevis All.	Halberdleaf Rosemallow	
Hibiscus moscheutos L.	Crimsoneyed Rosemallow	
Sida spinosa L.	Prickly Fanpetals	
Molluginaceae (Carpet-weed Family)		
Mollugo verticillata L.	Green Carpetweed	
Moraceae (Mulberry Family)		
Morus alba L.	White Mulberry	
Najadaceae (Water-nymph Family) [Hydrocharitaceae]		
Najas guadalupensis (Spreng.) Magnus	Southern Waternymph	x
Najas minor All.	Brittle Waternymph	x
Oleaceae (Olive Family)		
Fraxinus americana L.	White Ash	
Fraxinus pennsylvanica Marsh.	Green Ash	
Onagraceae (Evening Primrose Family)		
Circaea lutetiana L. ssp. *canadensis* (L.) Asch. & Magnus	Broadleaf Enchanter's Nightshade	
Epilobium coloratum Biehler	Purpleleaf	x

	Willowherb	
	Biennial	
Gaura biennis L.	Beeblossom	
Ludwigia alternifolia L.	Seedbox	
Ludwigia palustris (L.) Elliot	Marsh Seedbox	x
Ludwigia peploides (Kunth) P.H. Raven ssp. glabrescens (Kuntze) P.H. Raven	Floating Primrose-willow	x
Ludwigia polycarpa Short & Peter	Manyfruit Primrose-willow	
Oenothera biennis L.	Common Evening Primrose	
Orchidaceae (Orchid Family)		
Platanthera peramoena (A.Gray) A. Gray	Purple Fringeless Orchid	
Oxalidaceae (Wood-sorrel Family)		
Oxalis fontana Bunge[3]	Common Yellow Oxalis	x
Oxalis stricta L.	Common Yellow Oxalis	
Phytolaccaceae (Pokeweed Family)		
Phytolacca americana L. var. *americana*	American Pokeweed	
Plantaginaceae (Plantain Family)		
Plantago aristata Michx.	Largebracted Plantain	
Plantago lanceolata L.	Narrowleaf Plantain	
Plantago major L.	Common Plantain	x
Plantago rugelii Decne.	Blackseed Plantain	
Platanaceae (Plane-tree Family)		
Platanus occidentalis L.	American Sycamore	x
Poaceae (Grass Family)		
Agrostis gigantea Roth	Redtop	x
Agrostis hyemalis (Walter) Britton, Sterns & Poggenb.	Winter Bentgrass	
Andropogon gerardii Vitman	Big Bluestem	
Andropogon virginicus L. var. *virginicus*	Broomsedge Bluestem	
Bouteloua curtipendula (Michx.) Torr. var. *curtipendula*	Sideoats Grama	x
Bromus inermis Leyss. ssp. *inermis* var. *inermis*	Smooth Brome	x
Bromus arvensis L.	Field Brome	x
Cinna arundinacea L.	Sweet Woodreed	

Dactylis glomerata L.	Orchardgrass	
Dichanthelium clandestinum (L.) Gould	Deartongue	
Dichanthelium sphaerocarpon (Elliot) Gould var. sphaerocarpon	Roundseed Panicgrass	
Digitaria ischaemum (Schreb.) Schreb. ex Muhl.	Smooth Crabgrass	
Digitaria sanguinalis (L.) Scop.	Hairy Crabgrass	
Echinochloa crus-galli (L.) P. Beauv.	Barnyardgrass	
Echinochloa muricata (P. Beauv.) Fernald	Rough Barnyardgrass	x
Eleusine indica (L.) Gaertn.	Indian Goosegrass	
Elymus repens (L.) Gould	Quackgrass	x
Elymus villosus Muhl. ex Willd.	Hairy Wildrye	
Elymus virginicus L. var. *virginicus*	Virginia Wildrye	
Eragrostis cilianensis (All.) Vign. ex Janchen	Stinkgrass	
Eragrostis frankii C.A. Mey. ex Steud.	Sandbar Lovegrass	
Eragrostis hypnoides (Lam.) Britton, Sterns & Poggenb.	Teal Lovegrass	
Eragrostis pectinacea (Michx.) Nees ex Steud.	Tufted Lovegrass	
Festuca rubra L. ssp. *rubra*	Red Fescue	x
Hordeum jubatum L. ssp. *jubatum*	Foxtail Barley	
Leersia oryzoides (L.) Sw.	Rice Cutgrass	
Leersia virginica Willd.	Whitegrass	
Leptochloa fusca (L.) Kunth ssp. *fascicularis* (Lam.) N. Snow	Bearded Sprangletop	x
Lolium perenne L. ssp. *perenne*	Perennial Ryegrass	x
Muhlenbergia schreberi J.F. Gmel.	Nimblewill	
Panicum dichotomiflorum Michx.	Fall Panicgrass	
Panicum virgatum L. var. *virgatum*	Switchgrass	
Paspalum pubiflorum Rupr. ex Fourn.	Hairyseed Paspalum	
Phalaris arundinacea L.	Reed Canarygrass	x
Phleum pratense L.	Timothy	x
Phragmites australis (Cav.) Trin. ex Steud.	Common Reed	x
Poa compressa L.	Canada Bluegrass	x
Poa pratensis L. ssp. *pratensis*	Kentucky Bluegrass	
Schedonorus phoenix (Scop.) Holub	Tall Fescue	x
Schizachyrium scoparium (Michx.) Nash var. *scoparium*	Little Bluestem	

Setaria faberi Herrm.	Japanese Bristlegrass	x
Setaria pumila (Poir.) Roem. & Schult. ssp. *pumila*	Yellow Foxtail	
Setaria viridis (L.) P. Beauv. var. *major* (Gaudin) Pospichal	Green Bristlegrass	x
Setaria viridis (L.) P. Beauv. var. *viridis*	Green Bristlegrass	
Sorghastrum nutans (L.) Nash	Indiangrass	
Sorghum halepense (L.) Pers.	Johnsongrass	
Sporobolus compositus (Poir.) Merr. var. *compositus*	Composite Dropseed	
Zea mays L. ssp. *mays*	Corn	x
Polygonaceae (Buckwheat Family)		
Polygonum amphibium L. var. *emersum* Michx.	Longroot Smartweed	x
Polygonum aviculare L.	Prostrate Knotweed	
Polygonum hydropiperoides Michx.	Swamp Smartweed	
Polygonum lapathifolium L.	Curlytop Knotweed	
Polygonum pensylvanicum L.	Pennsylvania Smartweed	
Polygonum persicaria L.	Spotted Ladysthumb	
Polygonum punctatum Elliot	Dotted Smartweed	
Polygonum ramosissimum Michx. var. *ramosissimum*	Bushy Knotweed	
Polygonum scandens L. var. *cristatum* (Engelm. & A. Gray) Gleason	Climbing False Buckwheat	
Polygonum virginianum L.	Jumpseed	
Rumex altissimus Alph. Wood	Pale Dock	
Rumex crispus L. ssp. *crispus*	Curly Dock	
Rumex obtusifolius L.	Bitter Dock	x
Potamogetonaceae (Pondweed Family)		
Potamogeton crispus L.	Curly Pondweed	x
Potamogeton foliosus Raf. ssp. *foliosus*	Leafy Pondweed	x
Potamogeton nodosus Poir.	Longleaf Pondweed	x
Primulaceae (Primrose Family)		
Lysimachia ciliata L.	Fringed Loosestrife	
Lysimachia nummularia L.	Creeping Jenny	
Samolus valerandi L. ssp. *parviflorus* (Raf.) Hultén	Seaside Brookweed	x
Rosaceae (Rose Family)		
Agrimonia parviflora Aiton	Harvestlice	

Crataegus L.[4]	Hawthorn	
Geum canadense Jacq. var. *canadense*	White Avens	
Geum laciniatum Murray	Rough Avens	
Geum vernum (Raf.) Torr. & A. Gray	Spring Avens	
Potentilla norvegica L. ssp. *monspeliensis* (L.) Asch. & Graebn.	Norwegian Cinquefoil	
Prunus serotina Ehrh. var. *serotina*	Black Cherry	x
Pyrus calleryana Decne.	Callery Pear	x
Rosa multiflora Thunb.	Multiflora Rose	x
Rosa setigera Michx.	Climbing Rose	
Rosa L.[4]	Rose	
Rubus allegheniensis Porter var. *allegheniensis*	Allegheny Blackberry	x
Rubus occidentalis L.	Black Raspberry	x
Rubus pensilvanicus Poir.	Pennsylvania Blackberry	x
Rubiaceae (Madder Family)		
Cephalanthus occidentalis L.	Common Buttonbush	
Galium aparine L.	Stickywilly	
Galium tinctorium (L.) Scop.	Stiff Marsh Bedstraw	x
Galium triflorum Michx.	Fragrant Bedstraw	
Salicaceae (Willow Family)		
Populus deltoides Bartram ex Marsh.	Eastern Cottonwood	
Salix nigra Marsh.	Black Willow	x
Scrophulariaceae (Figwort Family) [Orobanchaceae, Plantaginaceae, Linderniaceae, Phrymaceae, Scrophulariaceae]		
Agalinis tenuifolia (Vahl) Raf.	Slenderleaf False Foxglove	
Bacopa rotundifolia (Michx.) Wettst.	Disk Waterhyssop	x
Leucospora multifida (Michx.) Nutt.	Narrowleaf Paleseed	
Lindernia dubia (L.) Pennell var. *anagallidea* (Michx.) Cooperr.	Yellowseed False Pimpernel	x
Lindernia dubia (L.) Pennell var. *dubia*	Yellowseed False Pimpernel	
Mimulus alatus Aiton	Sharpwing Monkeyflower	
Mimulus ringens L. var. *ringens*	Allegheny Monkeyflower	
Penstemon calycosus Small	Longsepal Beardtongue	

	Penstemon digitalis Nutt. ex Sims	Talus Slope Penstemon	x
	Verbascum thapsus L.	Common Mullein	x
	Veronicastrum virginicum (L.) Farw.	Culver's Root	
Solanaceae (Potato Family)			
	Lycium chinense Mill.	Chinese Desert-thorn	x
	Physalis longifolia Nutt. var. *subglabrata* t (Mack. & Bush) Cronquis	Longleaf Groundcherry	
	Solanum carolinense L. var. *carolinense*	Carolina Horsenettle	
	Solanum ptycanthum Dunal	West Indian Nightshade	
Typhaceae (Cat-tail Family)			
	Typha angustifolia L.	Narrowleaf Cattail	
	Typha x *glauca* Godr. (pro sp.)] [angustifolia or domingensis x latifolia		x
Ulmaceae (Elm Family)			
	Ulmus americana L.	American Elm	
Urticaceae (Nettle Family)			
	Boehmeria cylindrica (L.) Sw.	Smallspike False Nettle	
	Pilea pumila (L.) A. Gray var. *pumila*	Canadian Clearweed	
Verbenaceae (Verbena Family) [Verbenaceae, Phrymaceae]			
	Phryma leptostachya L.	American Lopseed	
	Phyla lanceolata (Michx.) Greene	Lanceleaf Fogfruit	
	Verbena hastata L.	Swamp Verbena	
	Verbena urticifolia L. var. *urticifolia*	White Vervain	
Violaceae (Violet Family)			
	Viola sororia Willd.	Common Blue Violet	x
Vitaceae (Grape Family)			
	Parthenocissus quinquefolia (L.) Planch.	Virginia Creeper	
	Vitis aestivalis Michx.	Summer Grape	x
	Vitis riparia Michx.	Riverbank Grape	
	Vitis vulpina L.	Frost Grape	x

[1] Has been taxonomically included with *Apocynum cannabinum*

L.
[2] Has been taxonomically included with *Melilotus officinalis* (L.) Lam.
[3] Has been taxonomically included with *Oxalis stricta* L.
[4] Only identifiable to genus level
[5] Only identifiable to family level

Nomenclature: Nomenclature follows the PLANTS Database (USDA, NRCS 2010); where family classifications differ from those of the Angiosperm Phlogeny Group (APG), APG classifications are included in brackets. C-values and native/non-native status follow Floristic quality assessment in Indiana: The concept, use, and development of coefficients of conservatism (Rothrock 2004).

Abundance: Abundance categories used in this survey were: Rare (1-5 occurrences); Uncommon; Fairly Common; Locally Common; Common; Abundant (dominant within community). Results are in the detailed report provided to the Indiana Department of Natural Resources.

Location: Vascular plant surveys were primarily conducted within the following units: BH5S/5N (marsh), GP2 (shortgrass and tallgrass prairie and marsh), GP5S/MPE3 (shortgrass and tallgrass prairie and marsh), GP9 (shortgrass and tallgrass prairie and marsh), GP13 (marsh and forest) and GP16/7 (marsh). Occasional reports were also made from the following units: GP6W (old field along forested fencerow), GP12 (tallgrass prairie), GP18 (tallgrass prairie), MPW3 (ruderal roadside), Check Station (marshy ditch and maintained lawn) and Roadside (ruderal roadside).

Species of Conservation Concern:

- *Bacopa rotundifolia* (Michx.) Wettst. [State Threatened] – Few small populations observed in mudflats of MPE3 marsh. Apparently a spontaneous recurrence from the seed bank, or spread to site by visiting waterfowl.
- *Carex bushii* Mack. [State Threatened] – One population consisting of a few plants observed near interface of GP5S and MPE3. Apparently a spontaneous recurrence from the seed bank.
- *Catalpa speciosa* (Warder) Warder ex Engelm. [State Rare] – One plant observed in GP13 woods. Likely an escape from planting.
- *Cyperus acuminatus* Torr. & Hook. ex Torr. [State Watch List] – Many scattered plants observed within BH5S marsh, near interface between GP5S and MPE3, on south end of GP16 marsh and in lawn at Check Station. Apparently a spontaneous recurrence from the seed bank and persistent lawn weed.
- *Cyperus pseudovegetus* Steud. [State Rare] – Several scattered plants observed within GP2 prairie, GP2 marsh, GP9 marsh/prairie and in lawn at Check Station.

Apparently a spontaneous recurrence from the seed bank and persistent lawn weed.

- *Liatris pycnostachya* Michx. var. *pycnostachya* [State Threatened] – Numerous plants observed in the eastern third of the GP18 shortgrass prairie. Likely has arisen from prairie seed installed at the site.
- *Pinus strobus* L. [State Rare] – Less than 5 observed in GP13 woods. Likely planted.
- *Pinus virginiana* Mill. [State Watch List] – One young sapling observed at west side of GP16 in higher ground adjacent to marsh. Likely an escape from planting.
- *Platanthera peramoena* (A. Gray) A. Gray [State Watch List] – Two populations observed in GP6W in old-field along forest edge. One population consisted of two individuals, the other of 18 individuals. This species is likely a remnant from the historic natural flora of the Goose Pond area that has persisted along the forest edge and benefited from disturbance.

Collecting Methods & Effort: Meander surveys following the methods of Goff et al. (1982) were conducted. Approximately 100 person-hours were spent conducting the survey. Additional time was spent identifying unknown plants in the laboratory.

Special Interest Species: See above for state-listed species of conservation concern; see Table 14 for potential new county records. Potential new Greene County, Indiana records were determined by reviewing known county occurrences (USDA, NRCS 2010), records from Friesner Herbarium at Butler University (BUT) and county distribution maps from Rothrock (2009).

Voucher Specimens: See detailed report provided to Indiana Department of Natural Resources for voucher specimen collections. All collections will be submitted to Friesner Herbarium at Butler University (BUT). Not all plants were collected. Therefore, some of the potential county records have not been vouchered.

Summary Overview: A total of 379 vascular plant taxa (371 identified to at least the species level), 286 (76%) of which are native to Indiana, were observed during the two-day Goose Pond Biodiversity Survey. The vascular plant families represented by the most taxa were the Aster Family (Asteraceae, 53 taxa), the Grass Family (Poaceae, 48 taxa) and the Sedge Family (Cyperaceae, 37 taxa); the Sedge genus (*Carex*) was the most well represented genus, with 18 taxa observed. A total of 123 potential Greene County, Indiana records were identified. Nine species on the list of Indiana Endangered, Threatened, Rare and Watch List species were noted: Disk Waterhyssop (*Bacopa rotundifolia* (Michx.) Wettst. [State Threatened]); Bush's Sedge (*Carex bushii* Mack. [State Threatened]); Northern Catalpa (*Catalpa speciosa* (Warder) Warder ex Engelm. [State Rare]); Tapertip Flatsedge (*Cyperus acuminatus* Torr. & Hook. ex Torr. [State Watch List]); Marsh Flatsedge (*Cyperus pseudovegetus* Steud. [State Rare]); Prairie Blazing Star (*Liatris pycnostachya* Michx. var. *pycnostachya* [State Threatened]); Eastern White Pine (*Pinus strobus* L. [State Rare]); Virginia Pine (*Pinus virginiana* Mill. [State Watch List]) and Purple

Fringeless Orchid (*Platanthera peramoena* (A. Gray) A. Gray [State Watch List]). Of these, Disk Waterhyssop, Bush's Sedge and Marsh Flatsedge are of the most interest because they are likely to be naturally occurring at the site and their populations are tracked by the Indiana Department of Natural Resources – Division of Nature Preserves (plants listed as Watch List have enough known populations to have been removed from the Endangered, Threatened and Rare list).

The vascular plant communities at Goose Pond Fish and Wildlife Area including Beehunter Marsh (Goose Pond) consist primarily of early successional marsh and prairie communities dominated by common, disturbance-tolerant plant species. This is supported by the mean Coefficient of Conservatism (C) value of 2.2 and Floristic Quality Index (FQI) of 42.3, as plant species with C-values of 0-3 "provide little or no confidence that [their] inhabitance signifies remnant conditions" (Rothrock 2004), and sites with FQI values of less than 45 are not thought to possess natural area potential (Swink & Wilhelm 1994). It is interesting to note that no seeding or planting was conducted in the marsh communities; all vegetation present has arisen as a result of seed bank resurgence, volunteering vegetation from nearby areas or seed introduced by visiting waterfowl. Considering this, the resulting species richness within ten years of restoration is rather impressive. In the prairie communities, native tallgrass and shortgrass prairie species were introduced through seed. In part because many of these prairies have been installed in areas that were forest at the time of European settlement, an appropriate seed bank does not exist, and the resulting communities consist of seeded species interspersed within generalist volunteers.

Invasive species often pose the greatest threat to new restoration areas; with the exception of Hybrid Cattail (*Typha* × *glauca* Godr.), non-native invasive species are not currently dominant in the units of Goose Pond that were surveyed by the vascular plant survey teams. In the marsh communities, Common Reed (*Phragmites australis* (Cav.) Trin. ex Steud.) and Reed Canarygrass (*Phalaris arundinacea* L.) were observed in a few scattered locations, and only a single plant of Purple Loosestrife (*Lythrum salicaria* L.) was observed. In the prairie communities, Sericea Lespedeza (*Lespedeza cuneata* (Dum. Cours.) G. Don) and Johnsongrass (*Sorghum halapense* (L.) Pers.) were scattered in some of the units, but Canada Goldenrod (*Solidago canadensis* L.) appeared to be the most abundant plant species and likely presents the greatest threat to the long-term success of the seeded native species.

Acknowledgements: Special thanks to Marcia Moore (BUT) for providing a list of vascular plant specimens from Greene County, Indiana currently stored at Friesner Herbarium.

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Table 15. Biogeochemistry survey at the Goose Pond Fish and Wildlife Area Biodiversity Survey, July 16-17, 2010.

Team Leader: Lenore Tedesco, IUPUI Center for Earth and Environmental Science, ltedesco@iupui.edu.

Team Members: Allyson Smith, Amy Smith, and Mike Stouder

The biogeochemistry team reoccupied a series of six sites established in 2006 to assess carbon sequestration and wetland soil development in the wetland complex. Sites were initially selected to document the effects of different depth and duration of flooding as well as restoration age – with sites in both Beehunter and Goose Pond. The team reoccupied all six sites and repeated the sampling. Results are not yet available but they did find that up to 4-6 inches of organic muck had already accumulated in some areas showing rapid development of wetland soils.

Goose Pond FWA Biodiversity Survey 2010 Scientists, Naturalists, Students, and Staff Volunteers

Participant		Team
Don	Allen	Birds
Melanie	Arnold	Macroinvertebrates and Plankton
Alan	Austin	Amphibians and Reptiles
Donald	Batema	Dragonflies and Damselflies
Bruce	Behan	Vascular Plants
Amanda	Bellian*	Dragonflies and Damselflies
Sandy	Belth	Butterflies and Moths
Julia	Bond	Macroinvertebrates and Plankton
Theresa	Bordenkecher	Bees and Beetles
Ross	Brittain	Butterflies and Moths/Birds
James	Brown	Birds
Alisha	Burcham	Volunteer
John	Castrale	Birds
Angela	Chamberlain	Mammals
Grace	Chapman	Vascular Plants/Volunteer
Nancy	Ciskowski	Volunteer
Tom	Ciskowski	Volunteer
Mike	Clarke	Birds
Brittany	Davis	Amphibians and Reptiles
JoAnne	Davis	Fish and Mussels
Jerry	Downs	Birds
Steve	Dunbar	Butterflies and Moths
Brad	Feaster	Birds
Sonya	Fickett	Amphibians and Reptiles
Brant	Fisher*	Fish and Freshwater Mussels
Jim	Flanders	Volunteer
Marilyn	Flanders	Volunteer
Matthew	Fleck	Dragonflies and Damselflies
Cody	Gadberry	Dragonflies and Damselflies
Don	Gorney*	Butterflies and Moths
Michelle	Gray	Amphibians and Reptiles
Jess	Gwinn	Butterflies and Moths
Laura	Halsey	Amphibians and Reptiles
Ben	Hess	Vascular Plants
Dawn	Hewitt	Volunteer
Alice	Hill	Volunteer

Paul	Hoernig	Volunteer
Andrew	Hoffman	Amphibians and Reptiles
Danny	Hofstadter	Amphibians and Reptiles
Bill	Holladay	Birds
Jeff	Holland*	Beetles and Other Insects
Amber	Hougland	Dragonflies and Damselflies
Michelle	Jean	Bees and Beetles
Robert	Jean*	Bees and Beetles
William	Jones*	Macroinvertebrates and Plankton
Daryl	Karns*	Amphibians and Reptiles
Amy	Kearns	Birds
Susan	Knilans	Amphibians and Reptiles
Gary	Langell	Birds
Chia-Hua	Lin	Bees and Beetles
Mike	Lodato	Amphibians and Reptiles
Dan	Luczynski	Volunteer
Deborah	Lynn	Volunteer
Stephanie	Mallory	Dragonflies and Damselflies
Rick	Marrs	Amphibians and Reptiles
David	McCarty	Butterflies and Moths
Megan	McCarty*	Butterflies and Moths
Chase	McCormick	Macroinvertebrates and Plankton
Logan	McGregor	Dragonflies and Damselflies
Bill	McKnight*	Non-Vascular Plants
Paul	McMurray	Dragonflies and Damselflies
Vicky	Meretsky	Amphibians and Reptiles
Sandra	Miles	Volunteer
Bill	Murphy*	Snail-Killing Flies
Scott	Namestnik*	Vascular Plants
Deena	Patton	Amphibians and Reptiles
Ed	Paynter	Vascular Plants/Volunteer
Sarah	Powers	Macroinvertebrates and Plankton
Marissa	Reed	Amphibians and Reptiles
Chris	Reidy	Vascular Plants
Molly	Reidy	Vascular Plants
Beth	Reinke	Amphibians and Reptiles
Amelia	Reuter	Amphibians and Reptiles
Brooke	Riddle	Dragonflies and Damselflies
Jeff	Riegle	Birds
Nyle	Riegle	Volunteer

Breck	Robinson	Birds/Volunteer
Dee	Robinson	Vascular Plants/Volunteer
Jeremy	Ross	Dragonflies and Damselflies
Kirk	Roth	Butterflies and Moths/Birds
Paul	Rothrock	Vascular Plants
Don	Ruch*	Fungi
Peter	Scott	Bees and Beetles
Rita	Sharr	Volunteer
John	Shukle	Insects and Beetles
Barb	Simpson	Volunteer
George	Sly	Amphibians and Reptiles/Mammals
Ethen	Smith	Dragonflies and Damselflies
Amy	Smith	Biogeochemistry
Allyson	Smith	Biogeochemistry
Lee	Sterrenburg*	Birds
Mike	Stouder	Biogeochemistry
John	Taylor	Vascular Plants
Lenore	Tedesco*	Biogeochemistry
Tim	Thomas	Bees and Beetles
Kevin	Tungesvick	Vascular Plants
John	Whitaker*	Mammals
Becky	Yung	Volunteer
Shaun	Ziegler	Amphibians and Reptiles
Kyle	Zoll	Dragonflies and Damselflies

*Team Leader