

New York State Dragonfly and Damselfly Survey 2007 Otsego County, NY

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ABSTRACT

With increasing popularity in the study of insects throughout the 1990s, interest in dragonflies and damselflies emerged along with improved field identification guides (NYSDEC 2007). The New York State Dragonfly and Damselfly Survey (NYSDDS) was created in 2003 in response to this interest and the need for a statewide Odonate conservation plan. The goal of this study is to document species diversity, abundances, and distributions across the region. The NYSSDDS encourages volunteers to contribute data for a more complete database for future research, and species and habitat conservation.

This work, conducted during the summer of 2007, supports the efforts of the NYSSDDS through surveys conducted of dragonflies and damselflies throughout Otsego County, NY.

INTRODUCTION

Dragonflies and damselflies make up nearly 5,000 species (Corbet 1999) including over 170 species documented in New York State (USGS 2006). The order Odonata is divided into two suborders: Anisoptera (dragonflies) and Zygoptera (damselflies) (Silsby 2001). Characterized by highly developed compound eyes, two pairs of wings, long segmented abdomens, grasping legs, and piercing mouthparts, Odonates are formidable predators as both larvae and adults (Nikula et al. 2007). Dragonflies and damselflies have been regarded as biological indicators of environmental quality because of the complex habitat requirements of individual species (Corbet 1999). Therefore, the presence of vigorous and diverse Odonate populations have been a reliable indicator of the health of an ecosystem (Chovanec 1994). Furthermore, Odonates are beneficial to outdoor enthusiasts because they prey on many pest insects including mosquitoes (Nikula et al. 2007).

Despite the fact that Odonates are among the most dominant predacious insects in the littoral zones of freshwater ecosystems (Benke and Benke 1975), there have been few formal surveys conducted locally. House (1982) published the results of a dragonfly and damselfly survey conducted in Otsego County in 1980-1. Species distributions, habitat characteristics, illustrated keys to genera and species, ecology, biology, and evolution of Odonates are provided. During the sampling periods, 49 species of Odonates were documented in 57 sites throughout the county (House 1982).

The New York State Dragonfly and Damselfly Survey (NYSDDS) is a 3-year project aimed at documenting the species diversity, distributions, and habitats of Odonates (NYSDEC 2007). It is a project of the New York Heritage Program (NYHP) and the New York State

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Department of Environmental Conservation (NYSDEC), Division of Fish, Wildlife and Marine Resources. Funded by the State Wildlife Grants Program, the NYDDS has taken place during the 2005, 2006, and 2007 field seasons. The NYDDS was developed to encourage people become familiar with Odonates and recognize their ecological importance (NYSDEC 2007). Objectives specifically include documenting the distribution of all Odonates species in New York, surveying selected habitats, and evaluating the status of several threatened species (NYSDEC 2007).

Using a *Handbook for Workers* provided by the NYHP, volunteers are able to participate in this project by exploring aquatic habitats, documenting species, and contributing to a more complete database. A guide to suitable locations, capture techniques, identification, and specimen preparation on the NYSDEC website advises volunteers as they survey. Ultimately, people around the state have the opportunity to provide data and specimens for a Comprehensive Wildlife Conservation Strategy (NYSDEC 2007).

METHODS AND MATERIALS

Sampling was conducted during the 2007 flying season from June 14 to August 16. Odonates were collected in the field using methods suggested in the NYDDS *Handbook for Workers* (NYSDEC 2007). Figure 1 shows the general distribution of sites across Otsego County. Figures 2-4 provide greater detail of site locations within those more general areas. Table 1 provides site coordinates and descriptions. Sample sites were chosen by identifying lotic and lentic habitats preferable to dragonflies and damselflies. These sites included a diversity of ponds, lakes, woodland seepages, creeks, large rivers, swamps, and bogs. Adult Odonates were searched for along the edges of water, within vegetation, over open waters, as well as near forest edges and clearings. Local sites were visited frequently throughout the duration of the field season. Other sites were visited based on a particular species or species group that inhabited the area. Since many, but not all, damselflies and dragonflies thermoregulate using solar heat, sampling was conducted on warm, sunny days from mid-morning through late afternoon when they were most active (Corbet 1999).

Despite opportunities to successfully make “on the wing” and in-hand identifications, many species needed to be further examined under magnification in order to make a reliable identification. Voucher specimens were collected using a 15 inch aerial net. Odonates were captured perched on vegetation or in flight by sweeping the net from behind their line of vision. The net was then twisted to ensure capture, and the specimen carefully placed into a closed container for identification and transport back to the lab. Specimens were killed by placing them in acetone or into a freezer for 20 minutes. Specimens were then placed into acetone for at least 24 hours for preservation. After being removed from the acetone, they were placed on paper towels to dry with wings positioned above the thorax, abdomen straight, and legs spread out. Finally, specimens were placed into labeled plastic bags and were stored in a dry location. A *Field Guide to the Dragonflies and Damselflies of Massachusetts* (Nikula et al. 2007) and *The Dragonflies and Damselflies of Otsego County, New York* (House 1982) were used as guides for identification in the field and lab.

Field notes taken during each sampling period included date, time, collector/observer, location, weather conditions, habitat, bottom substrate, surroundings, and water quality. The number of individuals per species and observed reproductive behaviors were also recorded.

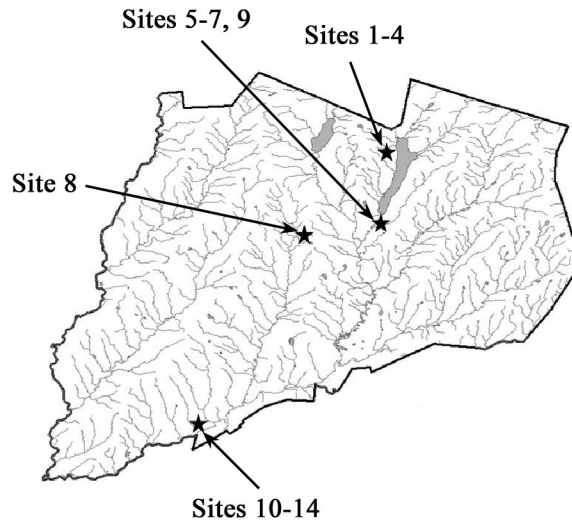


Figure 1. Map of Otsego County Odonate sampling areas, summer 2007. Greater detail is provided in Figures 2-4.

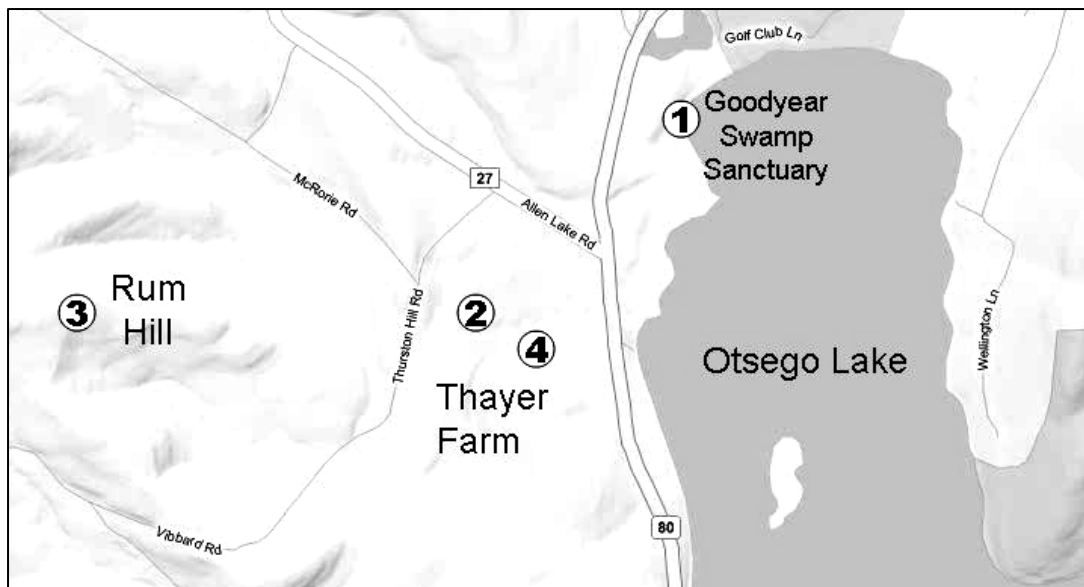


Figure 2. Odonate sampling sites in the Richfield Springs – Otsego Lake area (sites 1-4), Otsego County, NY, summer 2007.

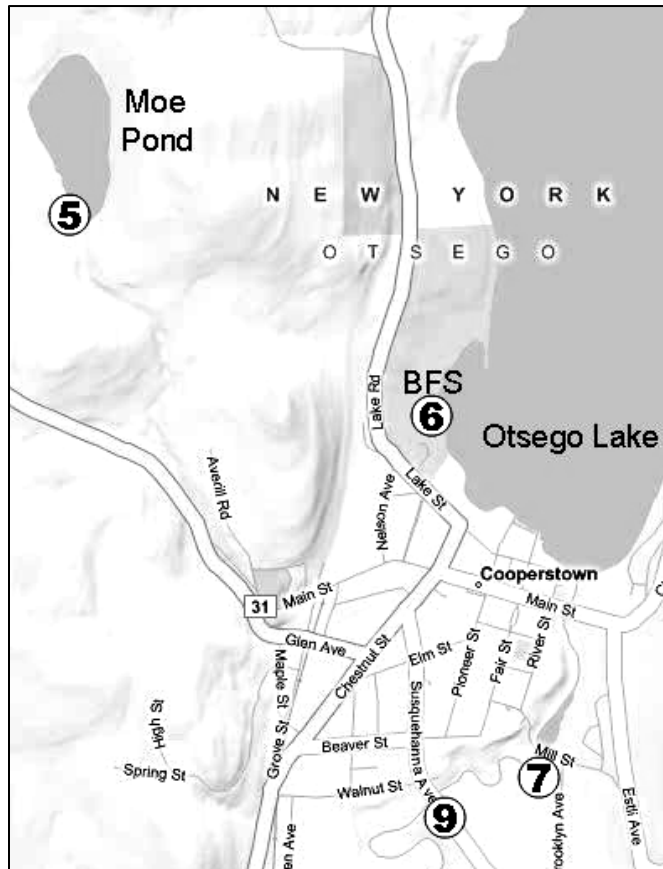


Figure 3. Odonate sampling sites in the Cooperstown area (sites 5-7, 9), Otsego County, NY, summer 2007.

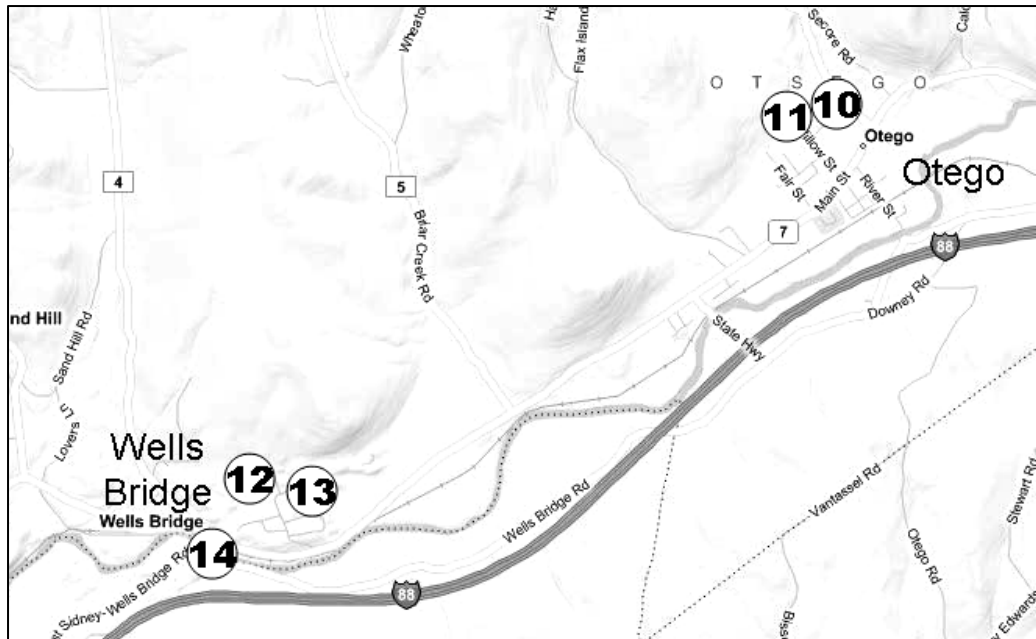


Figure 4. Odonate sampling sites in the Wells Bridge – Otego area (sites 10-14), Otsego County, NY, summer 2007.

	Site		Description
1	Goodyear Swamp Sanctuary (St. Rt. 80, Glimmerglass Opera)	N° 42' 48.354 W° 74' 53.520	Wetland adjacent to Otsego Lake; muddy waters and mucky bottom
2	Big Pond, Thayer Homestead (St. Rt. 80)	N° 42' 47.410 W° 74' 54.306	Clear water with mucky bottom; mixed woods & agriculture fields
3	Rum Hill, Thayer Property	N° 42' 47.589 W° 74' 55.074	N. Hardwood forests; few ponds; exposed bedrock; xeric uplands
4	Thayer Ponds 1 & 2, Thayer Homestead	N° 42' 47.374 W° 74' 54.041	Shallow depths with mucky bottom; mixed woods and old fields
5	Moe Pond, SUCO Biological Field Station	N° 42' 43.009 W° 74' 56.902	N. Hardwoods and old fields; clear water with mucky bottom
6	SUCO Biological Field Station, Otsego Lake (St. Rt. 80)	N° 42' 43.053 W° 74' 55.333	Meso-oligotrophic lake; sandy, gravel, & mud bottom; algaed water
7	Susquehanna River, Cooperstown, Bassett Hospital Parking Lot access	N° 42' 41.597 W° 74' 55.257	Stream with mucky, gravelly, or sandy bottom; mixed woods, & roads
8	Otego Creek, Hartwick (St.Rt. 205/Cty. Rt. 11)	N° 42' 39.868 W° 75' 02.989	Stream with gravelly bottom; clear water; N. hardwoods and roads near
9	Susquehanna River, Cooperstown, Susquehanna Avenue Bridge	N° 42' 41.533 W° 74' 55.615	Stream with gravelly and sandy bottom; riffles present; under bridge
10	Otsdawa Creek, Otego (Little League Field)	N° 42' 24.023 W° 75' 10.303	Stream with rocky bottom; park and mixed woods ; riffles
11	Otego Elementary School Wetland	N° 42' 23.550 W° 75' 10.313	Wetland drainage area for school athletic fields; mixed woods, mucky
12	Hickory Hill, Underwood Heights, Otego	N° 42' 48.354 W° 75' 14.176	N. hardwood and conifer forest; residential area; roads & nearby pond
13	Reiter's Pond, Underwood Heights, Otego	N° 42' 22.146 W° 75' 14.019	Turbid water with mucky bottom; residential area, fields, mixed woods
14	Susquehanna River, Well Bridge (Sidney-Wells Bridge Rd/St.Rt. 7)	N° 42' 21.590 W° 75' 14.435	River with rocky or muddy bottom; residential & roads surround

Table 1. Site locations and descriptions used during the 2007 field season. Site numbers correspond with those in Figures 1-4.

RESULTS

A complete list of dragonfly and damselfly species observed and collected at the sampling sites for 2007 can be found in Tables 2 and 3. Throughout the 14 sites in Otsego County, 21 species of dragonfly and 10 species of damselfly were collected, totaling 31 Odonata species.

The most common species of dragonfly observed in Otsego County were Common Whitetails (*Plathemis lydia*), Twelve-Spotted Skimmers (*Libellula pulchella*), Widow Skimmers (*Libellula luctuosa*), and a variety of Meadowhawks (*Sympetrum* sp.). Ebony Jewelwings (*Calopteryx maculata*) and Eastern Forktails (*Ishnura verticalis*) were the most abundant damselflies at the sites. Although many of the Darners (e.g. *Aeshna* sp.) and other agile dragonflies were commonly observed, few were accurately identified at a site because they were unable to be captured. The majority of Darners observed were found in wetlands, ponds, or foraging near forest edges. Within the streams and rivers, Clubtails (*Gomphus* sp.) and Jewelwings (*Calopteryx* sp.) were the most abundant species. The more common Odonates, such as *Libellula luctuosa*, were found in diverse habitats that included ponds, lakes, forest edges, old fields, and swamps. No threatened or endangered species were observed or collected during the sampling period.

Species	1 GSS	2 Big Pond	3 Rum Hill	4 Thayer Ponds 1 & 2	5 Moe Pond	6 Otsego Lake	7 SR Bassett	8 Otego Creek
<i>Aeshna tuberculifera</i>								
<i>Aeshna umbrosa</i>	S							
<i>Aeshna verticalis</i>								
<i>Anax junius</i>	O				S			
<i>Argia fumipennis</i>							CR	
<i>Argia moesta</i>								
<i>Calopteryx amata</i>								S
<i>Calopteryx maculata</i>	S						O	O
<i>Celithemis elisa</i>		S						
<i>Celithemis eponina</i>					S	CR		
<i>Didymops transversa</i>	O					S		
<i>Dorpcordulia libera</i>			S					
<i>Dromogomphus spicatus</i>						S	S	
<i>Enallagma signatum</i>						S		
<i>Enallagma civile</i>						S		
<i>Epitheca cynosura</i>	CR	S				S		
<i>Erythemis simplicicollis</i>					S			
<i>Gomphus spicatus</i>		S			S			
<i>Ishnura verticalis</i>	O	O	O	O	S	O		
<i>Ladona julia</i>		S			S			
<i>Lestes inequalis</i>						S		
<i>Lestes rectangularis</i>								
<i>Leucorrhinia intacta</i>		S		O	S			
<i>Libellula luctuosa</i>		S		O	S	O		
<i>Libellula pulchella</i>		O		S	S			
<i>Plathemis lydia</i>	S	S			O			
<i>Perithemis tenera</i>		O			O	O		
<i>Somatochlora sp.</i>		S						
<i>Sympetrum internum</i>								
<i>Sympetrum rubicundulum</i>								
<i>Sympetrum semicinctum</i>								

Table 2. Odonate survey results of sites 1-8, Otsego County, NY, summer 2007.

O – Observed

S – Specimen collected

CR – Captured and released

Species	9 SR Sus.Ave.	10 Otsdawa Creek	11 Otego wetland	12 Hickory Hill, UH	13 Reiter's Pond, UH	14 SR Wells Bridge
<i>Aeshna tuberculifera</i>				S		
<i>Aeshna umbrosa</i>						
<i>Aeshna verticalis</i>			S			
<i>Anax junius</i>					O	
<i>Argia fumipennis</i>						
<i>Argia moesta</i>						S
<i>Calopteryx amata</i>						
<i>Calopteryx maculata</i>	O	O				O
<i>Celithemis elisa</i>						
<i>Celithemis eponina</i>					CR	
<i>Didymops transversa</i>						
<i>Dorpcordulia libera</i>						
<i>Dromogomphus spicatus</i>						CR
<i>Enallagma signatum</i>					S	
<i>Enallagma civile</i>						
<i>Epitheca cynosura</i>					CR	
<i>Erythemis simplicicollis</i>						
<i>Gomphus spicatus</i>	S					
<i>Ishnura verticalis</i>					O	
<i>Ladona julia</i>						
<i>Lestes inequalis</i>						
<i>Lestes rectangularis</i>		S				
<i>Leucorrhinia intacta</i>						
<i>Libellula luctuosa</i>					O	
<i>Libellula pulchella</i>			O		O	O
<i>Plathemis lydia</i>				S	O	
<i>Perithemis tenera</i>					S	
<i>Somatochlora sp.</i>						
<i>Sympetrum internum</i>			S		O	
<i>Sympetrum rubicundulum</i>					S	O
<i>Sympetrum semicinctum</i>			S			

Table 3. Odonate survey results of sites 9-14, Otsego County, NY, summer 2007

O – Observed

S – Specimen collected

CR – Captured and released

DISCUSSION

Throughout the field season of 2007, species of Odonates were more commonly observed and collected in pond, lake, and wetland habitats. This may be due to the fact that lentic habitats are more easily accessible to the collector because they offer more open space to search for and capture specimens. In stream and river habitats, it is difficult to verify species present because of obstacles such as dense vegetation, unstable bottom substrate, and decrease in size of the accessible area.

Despite the fact that Odonates are already difficult to sample as adults because of their maneuverability and visual acuity, there were also areas of the methods that could have been more efficient. In using the methods suggested by the NYDDS *Handbook for Workers* (NYSDEC 2007), surveying was very time consuming and yielded limited results. The net method required skill, patience, and immediate knowledge of where adults were foraging or mating. House (1982), in *The Dragonflies and Damselflies of Otsego County, New York*, collected by means of .22 caliber rat shot fired from a handgun. As a result, House's method enhanced collection efficiency while minimizing damage to the specimen. Another possible addition to increasing collection success is through rearing Odonate larvae. However, though easily collected in bottom substrate, larvae are difficult to raise because of their increasing demand for food as they mature (NYSDEC 2007).

Due to the limited surveying completed in the summer of 2007, distributions of Odonate species cannot be accurately defined. However, once the NYDDS data is compiled and documentation from around New York State has been assimilated, distributions of species will be able to be created.

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