CHANGES IN THE COMPOSITION OF ODONATA
(Dragonflies and Damselflies)
UTILIZING THE
LOWER FARMINGTON RIVER/SALMON BROOK
WILD AND SCENIC AREA

October 2024

Sympetrum vicinum (Autumn Meadowhawk)
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Superb jewelwing pair

From fewer insects flying around the porch light at night, to the decline of fireflies, to the lack of "bugs" hitting the car windshield, most people would agree that insects have declined from what they remember seeing twenty or more years ago. Insects account for approximately 80% of all animal life on earth. While some species are declining, others are stable and still others are increasing. Some scientific studies postulate that about 40% of all insect species are now in decline. Insect declines can be attributed to habitat loss, increased use of pesticides and fertilizers, the proliferation of invasive species, and in some instances, to a changing climate. The declines have been more obvious in butterflies and moths, however, habitat loss, and changes in agricultural practices and to climate may have affected damselflies and dragonflies to some extent. These insects are often called "environmental indicators," providing us with clues as to the health of our environment. Damselflies and dragonflies, the insect Order known as Odonata,

require healthy waterways in which to breed and mature, and healthy uplands in which to hunt and live out their adult lives before returning to the water to mate and lay eggs. Like amphibians, detrimental changes to either their terrestrial or aquatic haunts can wreak havoc with their populations. Currently, 157 species of odonates have have been documented in Connecticut.

Beginning in the late 1990s, Mike Thomas and others began surveying dragonfly and damselfly populations on the lower Farmington River and Salmon Brook. Results of these and other surveys done throughout the state were compiled into an odonate database for Connecticut. The database is housed at the University of Connecticut. Additions to the database have been made since that time by others, including Roaring Brook Nature Center's "Chasing Dragons" program, a program for older students that began in 2002 and continued until 2019, when COVID 19 curtailed many programs throughout the state.

Slaty skimmer

In 2024, Jay Kaplan, Co-Director of Roaring Brook Nature Center, visited many of the previously surveyed sites along the lower Farmington River and Salmon Brook, in an effort to determine if species compositions had changed over the ensuing years. A list of 15 sites was chosen, and each site was surveyed on a minimum of three occasions.

It should be noted that an adult dragonfly's life is measured in weeks, not months. Dragonflies on the wing in June are gone by late July, and many species of adult dragonflies that do not

emerge until August have mated, laid eggs, and disappeared by the end of the summer season. Only a few species persist into fall. Thus, all sites were visited during June, July and August.

One flaw in a study of this nature, relying on one-day field visits to the various sites, revolves around the ephemeral life expectancy and behaviors of adult dragonflies. Although some species like *Anax junius* (common green darner) may live for 4-6 weeks, others may measure their lives in a span of even fewer weeks. As such, a week or more of poor weather can make a difference as to whether or not such short-lived species will be found. An example of timing was the presence of *Gomphus abbreviatus* (spine-crowned clubtail), several of which were seen at the bridge over the Farmington River near Fisher Meadow Recreation Area, Avon in early June. When study members returned to the site 2 and 3 days later in an effort to take better photographs, these dragonflies were nowhere to be found!

Superb jewelwing male

Eastern amberwing

Ebony jewelwing female

It should be noted that surveying for dragonflies is very much dictated by weather patterns. Like many insects, dragonflies do not fly during inclement weather. Much of July was characterized by unsettled weather, and therefore, it was difficult to conduct surveys on many days during the month. Temperatures well into the nineties and torrential rainstorms are not ideal conditions for odonates and, in fact, can shorten the life spans of the adults. Mid-August featured multiple days of heavy rain, and much cooler temperatures that again curtailed fieldwork. Another question that cannot definitively be answered at this time is whether warming temperatures are changing the flight times of adult odonates. Are clubtails and other species emerging earlier in response to warmer temperatures in the spring? Finally, it should be noted that weather events from the previous year affect populations the following year. A severe weather event that compromises species as they leave the water and mature into adulthood will result in fewer individuals the following year. Most odonates spend most of their lives in the water as nymphs, and may

emerge a year later or longer if conditions are not favorable. As such, a multi-year survey would provide more information on species composition than did the one year survey done in 2024.

The original study plans called for surveying at 16 sites along the Farmington River and Salmon Brook. Site #11, described as the East Branch of Salmon Brook north of Route 20 in Granby, was listed in error on the old survey forms and this site does not exist. Thus, it was dropped from the study. Site #16, East Branch Salmon Brook East Street, is listed as "Salmon Brook Mountain Road" on the old survey forms. Mountain Road becomes East Street north of Route 20. Finally, since the original data was compiled, significant changes have occurred to many of the sites. Road construction, including new bridges, and changes in land use have altered a number of sites. For example, what were originally agricultural fields at Fisher Meadow Recreation Area in Avon are now a massive complex of soccer fields. Road construction and a new bridge across Salmon Brook at Floydville Road have provided easier access to this site. Finally, invasive plant growth along the River in many areas including multiflora rose, barberry, Oriental bittersweet, Japanese knotweed, and other invasives along with the proliferation of poison ivy have altered riverbanks, and now make access more difficult in a number of locations. Below are discussions of each of the 15 sites, including the author's comments as to what may have caused changes to the odonate species composition over time, as well as what to expect for the future.

Halloween pennant

Spine-crowned clubtail

Eastern forktail

Finally, it should be noted that some of the more common species may have been overlooked during the earlier studies. At those times, researchers may have been concentrating on the less common species. Over time, earlier researchers compiled a total of 55 odonate species in the study area. In 2024, 31 of these species were still documented. Of those species that were not observed in 2024, 7 were damselflies and 11 were dragonflies, all being clubtails. A number of these species may have completed their life cycles and disappeared prior to the start of the 2024

surveys. It may also be likely that the two spiketail species seen historically were gone by the time the 2024 surveys took place. An additional eight species observed in 2024 did not appear on any of the earlier surveys (refer to table in Appendices).

The first survey was done on June 7th at Nod Brook Wildlife Management Area, while the final surveys were undertaken on September 2nd in Windsor and East Granby. Approximately 70 hours were spent in the field surveying odonates. Almost all the surveys were conducted by Jay Kaplan, with some assistance from volunteers including Mike Cirilli, Josh Kaplan and Jonathan Wright-Goodison. A few hours were spent surveying by Alison and Chris Wilcox, who submitted documentary photographs to aid in their identifications. All surveys were undertaken under suitable weather conditions.

Blue dasher

Twelve-spotted skimmer

SURVEY SITES

Common pond hawk, male, Nod Brook Wildlife Management Area, Simsbury

1. Nod Brook Wildlife Management Area, Avon 41.826032°N, 72.819687°W

This 125 acre wildlife management area (WMA) on the Simsbury/Avon town line is a state-managed dog training and field trial area that is used extensively by groups throughout the summer season. As such, access to the site for survey work is limited on many weekends during the summer season. The site consists of two large, man-made ponds that are stocked with bass for fishing, as well as for use in dog training. These ponds and associated wetlands provide habitat for a diversity of odonate species that breed in still waters. The Farmington River borders the east side of the area and offers habitat for a completely different complex of odonates. Twenty-two species were found during the survey period. Although a substantial number of odonate species were found in this area in 2024, there were previously recorded damselflies that were not found this summer. These included several *Enallagma* species including *E. basidens (*double-striped bluet) and *E. triviatum* (slender bluet). Both species are uncommon, and their earlier presence at this site may have been as vagrants. However, this does not mean these species are no longer present at this site. It may be that some of these species had completed their adult lives prior to the start of the survey period. It may also be that the torrential rainstorms this summer curtailed their adult lifespans. This could also be the case for the skimmer, *Leucorrhinia int*acta (dot-tailed whiteface). Species found in 2024 that were not found on the earlier surveys were all very common species that were likely overlooked by researchers who were more intent on finding the less common species. On a positive note, this area is in no danger of being developed and is managed in such a way that enhances populations of odonates and other insects. However, there has been and continues to be extensive development immediately outside the borders of the WMA. It remains to be seen if any loss of these adjacent open field areas will impact dragonfly populations in the future. This area had the

greatest diversity of odonates (28), as there are several different habitats that provide different conditions to support this array of species. These habitats include the River, two large ponds, and adjacent wetlands.

2. Fisher Meadows Recreation Area, Avon 41.772137° N, 72.821442°W

This 250 acre area is owned by the Town of Avon. It is bordered by the Farmington River on the east, by Old Farms Road on the south, and by Avon Old Farms School property on the west. A new bridge across Old Farms Road at its intersection with Route (Waterville Road) 10 was built in 2020, and includes a boat launch for canoes, providing additional access to the River that was not previously found at this site. When earlier surveys were conducted, the area bordering the large pond/lake was leased to farmers for corn. Fertilizer use resulted in massive algal blooms later in the summer. However, the large brushy fields provided a wealth of insects for hunting dragonflies The farm fields have now become a massive soccer field complex. It is unknown how much treatment the fields now receive, however, since youngsters play on these fields through much of the year, it is not likely that any pesticide treatments would affect wildlife populations. Interestingly, none of the five species noted on previous surveys were re-found in 2024, whereas the 13 species found this summer were not found during the earlier surveys. As noted previously, the *Enallagma sp.* may have completed their life cycles prior to the start of the surveys, while the new species found in 2024 are all common and were likely overlooked in the early surveys. In 2024, several *Hylogomphus abbreviatus* (spine-crowned clubtails) were found at this site for the first time. In earlier surveys, this species was found several miles to the north near the Simsbury Airport. It is unknown whether this represents a range expansion or if this species was always present in this section of the Farmington River. During the time the initial surveys were being done, this species was listed on Connecticut's Endangered Species list as a Species of Special Concern. Subsequent surveys have found this species to be more common than previously thought. Other than nearby road construction on Old Farms Road, and current and future development being done by Avon Old Farms School, this area is not likely to be impacted by development in the coming years.

3. Spoonville Bridge Area, East Granby 41.897042°N 72.749539°W

Spoonville Bridge was originally called Scotland Bridge. The Spoonville Dam, built in 1899 and destroyed by the Flood of 1955, was one-half mile upriver from the bridge. Remnants of the dam were removed in 2012, under the supervision of the Farmington River Watershed Association, to promote the passage of anadromous fish, and because it was considered a safety hazard. The banks have now grown in with vegetation, much of which is invasive, and there are but a couple of small areas that provide river access, primarily under the bridge itself. The River is wide here, and the substantial rains resulted in a deeper and faster moving river than might have been found during earlier visits. Little in the way of odonates were found this summer. *Calopteryx maculata* (ebony jewelwing) were found in good numbers. Several species of

clubtails, including *Phanogomphus exilis* (lancet clubtail) and *P. lividus (*ashy clubtail*)* found in earlier surveys may have completed their lives prior to the start of the survey period as the initial survey at this site was not conducted until July 8th. On the September 2nd visit, there were numerous *Stylurus spiniceps* (arrow clubtails) and a few *Dromogomphus spinosus* (black-shouldered spinylegs) at the bridge. It does not appear that any development will affect this section of the River in the future.

4. Northwest of Garden Street, Farmington 41.726743°N 72.30503°W

There is a pull-off from Route 4 that leads to a ramp and deck overlooking the west bank of the River northwest of Garden Street. It is used as a put in for watercraft, although there is no real boat launch here. The River moves slowly through this area north towards Avon. There is little likelihood of additional development. To the north of Route 4, Tunxis Golf Course provides open space for adult odonates. The Farmington sewage treatment plant to the immediate west maintains ponds for sewage, and the Farmington Meadows to the south are town-owned agricultural lands not likely to be developed in the future. This area held multiple *Macromia illinoiensis* (swift river cruisers) on one visit, but little on the others, demonstrating the ephemeral lifespan of adult dragonflies. There is also the question of changes in behavior, as this is one of a number of species that will forage away from the River, as opposed to on the breeding territory. *Stylurus spiniceps* (arrow clubtail) was the primary odonate found here from late July onward. Neither of these species was found in the earlier surveys. It is possible that the clubtail has extended its range southward on the River. This is the southernmost survey point of the study area. The cruiser is a common species that was likely overlooked in earlier surveys.

5. Farmington River at Curtiss Park, Simsbury 41.896592°N, 72.778258°W

Curtiss Park is town-owned park in the Tariffville section of Simsbury on the west side of the Farmington River. A popular summer picnic spot, the park draws sizeable numbers of people, dogs and canoes, especially on summer weekends. Just north of the park is a large oxbow that provides habitat for a wide array of "pond" odonates. This is in contrast to the open, flowing River that is home to a different assemblage of species. It is possible that the oxbow did not receive coverage during the earlier surveys as many of the common skimmers were not listed. More likely, the earlier studies did not list the more common species in some of the survey areas. Although the east side of the River is protected by the town park, the west side is privately held property, and at one time there were "for sale" signs posted. These signs are no longer present in the area.

6. **Farmington River at Tariffville Park, Simsbury 41.913874°N 72.766731°W**

Located 1.7 miles downriver from Curtiss Park, Tariffville Park is another Simsbury town-owned Park that will not be subject to future development along the River corridor. The park does receive substantial visitation, however, there is ample shoreline frontage to provide odonates the space they need. Many of the species found previously were still present in 2024.

Those that were not located were likely out earlier in the season and gone by the time the surveys began in mid-June. The *Rhionaeschna mutata* (spatterdock darner) observed in mid-July is a pond species that was likely a vagrant, and is not to be routinely expected in this riverine habitat.

7. **Farmington River at Pinchot Sycamore, Simsbury 41.845957°N 72.805942°W**

This small park provides boat access to the River, and is home to the Pinchot Sycamore, reputed to be the "largest tree" in Connecticut. It is heavily utilized as a picnic spot, and also used to launch canoes, kayaks, tubes and all manner of watercraft. The area from here downstream to Curtiss Park is about a six mile distance and the species assemblage is fairly constant in this stretch of the River. *Stylurus spiniceps* (Arrow Clubtail) is found throughout. Anecdotal comments from canoeist, kayakers and fishermen who use the River year after year might indicate that odonate populations in 2024 were not what they were in past years, however, there is no concrete evidence to support or refute these comments. If true, these comments might be a function of the weather conditions this summer.

8. **Farmington River Route 185 to north of Drake Hill Bridge Section, Simsbury 41.869863°N 72.796913°W (GPS coordinates at Simsbury Crew Boat House)/41.868715°N 72.799738°W (Drake Hill Bridge)**

The mouth of Hop Brook, an area that would have been surveyed in past years, was off limits this summer due to work being done on the "Flower Bridge" that crosses the River in the Drake Hill area. This section of the River is most easily surveyed by boat, and we canoed the area on two occasions. A majority of odonates found on previous surveys are still present in this area. A notable exception, both here and at other survey sites, is *Argia moesta* (powdered dancer). This previously common damselfly was not found in a number of survey sites. It is at this time unknown if this was just a "bad year" for this species, or if the population has declined. More site visits will be needed.

9. **Mouth of River, Windsor, CT (near Loomis Chaffee School) 41.844163°N 72.639608°W**

This site was actually surveyed behind the Loomis Chaffee School's "lower fields." The initial trip to this site provided perhaps the most exciting assemblage of odonates of the season, as hundreds of *Pantela flavescens* (wandering glider) with a lesser number of *Pantela hymenaea* (spot-winged glider) were in the air over the fields. The numbers were astounding. Later trips to this site did not approach this initial visit in numbers or excitement. It should be noted that the initial surveys here included the area at the mouth of the Farmington and perhaps into the Connecticut River. It was determined, after consultation with Mike Thomas, that the mouth of the Connecticut River should not be included in the study. Furthermore, it should be noted that species like *Gomphurus vastus* (cobra clubtail) are really Connecticut River species and any incursions into the Farmington at this site would be uncommon.

10. **Farmington River behind Bart's Drive-In, Windsor 41.856363°N 72.639809°W**

The early trips to this section of the Farmington River were not productive with few species or individuals found. On September 2nd, Jonathan Wright-Goodison and I encountered Metacomet Tours behind Bart's, so we rented a canoe and traveled to the mouth of the Farmington and back. This allowed us to more closely approach odonates and to cover a greater distance along the River. There were numerous sightings of clubtails that we had not seen on previous visits, but even at close range it was impossible to differentiate the minor difference between *Stylurus spiniceps* (arrow clubtail) and the less common *S. amnicola* (riverine clubtail) that had been found at this site at an earlier survey at this season. A highlight of the canoe trip was the sighting of two *Hagenius brevistylus* (dragonhunters). Unlike some other clubtails including the *Stylurus* genus, this largest of the clubtails alights on rocks and logs, and allows a much closer approach. The canoe trip also provided looks at a number of damselflies that had not been previously found, or perhaps reported, at this site including *Argia apicalis* (blue-fronted dancer), *A. moesta* (powdered dancer) and *A. translata* (dusky dancer), and both *Ischnura* species (fragile and eastern forktail)

11. **East Branch Salmon Brook north of Route 20 at East Street, North Granby 41.997041°N 72.826402°W**

This site held few odonates during the original surveys, and no odonates were found here this summer. The site does not appear to have changed appreciably over the past 28 years since the original survey was conducted. Salmon Brook is rather small at this location, and access is limited by private property. Active farming continues in this area, and it is unknown what plans the landowners may have for their properties. The original survey uncovered *Calopteryx maculata* (ebony jewelwing) and *Boyeria vinosa* (fawn darner). It was somewhat surprising, especially in the case of the former, that no odonates were found in 2024 on three attempts.

12. West Branch Salmon Brook at Barn Door Hills Picnic Area, McLean Game Refuge, Granby 41.41.939343°N 72.816881°W

The farm fields adjacent to Salmon Brook just across the brook from the picnic area provided one of the more interesting observations of the 2024 study. On both the June and August visits, these fields hosted literally several hundred *Anax junius* (common green darners) feeding over the fields. These observations may have coincided with the synchronous hatching into adults of this species at this location. Few species were observed at this location on previous surveys. One, *Calopteryx amata* (superb jewelwing), was thought to be uncommon some twenty years ago. Since that time, this species has been found to exist in good numbers throughout much of the Salmon Brook drainage. Another species, *Helocordulia uhleri* (Uhler's sundragon), was not re-found in 2024 on three visits to this and the following area. Perhaps this is an example of a species that may be completing its adult life earlier than it did in past years, and is gone by mid-June. Protected as part of McLean Game Refuge, there are no threats to this or the following area.

13. West Branch Salmon Brook at Barn Door Hills Road Bridge, Granby 41.938282°N 72.816992°W

Perhaps more than any other area, results from this site were disappointing. Other than an abundance of both jewelwing species, the diversity of odonate species found on the earlier surveys was not found in 2024. For a majority of species, this again may be likely due to an earlier emergence due to changes in our climate. Even more likely, changes in weather conditions from one year to the next can result in a shift in odonate flight times. It is recommended that this site be surveyed in May to determine if this indeed might be the case. Among the missing species were clubtails and spiketails, and the previously mentioned weather/flight times may certainly play a role.

14. West Branch Salmon Brook at Salmon Brook Park (Route 20 entrance), Granby 41.951642°N 72.801537°W

Many of the odonates found during earlier surveys at this location were clubtails and spiketails that likely now emerge earlier in the season. This is another site that might be surveyed in May of next year to determine if they are still to be found here. Salmon Brook Park is a town-owned park that includes numerous open upland areas on which dragonflies can hunt after emergence from Salmon Brook that runs through the park. There are no threats to this site.

15. Salmon Brook at Floydville Road Bridge, East Granby 41.41.925577°N 72.767264°W

Two species found during earlier surveys at this site, *Calopteryx amata* (superb jewelwing) found in 2010, and S*tylurus scudderi* (zebra clubtail) found in 2003, could not be relocated during the 2024 surveys. The sides of Salmon Brook at this site are now heavily grown in with invasive Japanese knotweed, although it is not likely this had any bearing on an inability to relocate these odonates. A new bridge was constructed at this site in 2009, and there have been continuing concerns with regard to the structure since that time. A "scouring" project in 2017 may have resulted in a loss of habitat for odonate larvae in the vicinity of the bridge. In any case, the habitat at this site does not appear to support the diversity of species that might have occurred here in the past. Several of the "pond skimmers" noted earlier in the season (July 8th) were likely transients that do not breed in Salmon Brook.

Slaty skimmer

Prince baskettail

CONCLUSIONS

From the beginning, it became apparent that the author did not take into account changes in our climate since the initial surveys were undertaken in the 1990s and early 2000s. The initial surveys were done beginning in mid-June. The first survey in 2024 was done June 7th,and other site surveys were not conducted until later in the month. In fact, due to weather delays, the East Granby sites were not surveyed until July 8th. A number of species, including clubtails, emeralds and certain damselflies emerge in May, and by mid-June have completed their life cycle and disappeared. Therefore, these species do not appear in our spreadsheets. It would be beneficial to run a series of surveys in 2025, beginning in early to mid-May, depending upon weather conditions at that time. It would also be beneficial to compare differences in weather between 2024 and 2025.

At a number of sites, invasive plants have almost completely closed in the canopy over the watercourse. This is particularly apparent over the smaller Salmon Brook at the Floydville Road Bridge, and at East Street. It is unknown if the lack of sunlight has affected odonates in these locations, but it cannot be ruled out. Plant growth also made access more difficult than it might have been during the initial surveys. Poison ivy was a real concern along several sites that likely had greater access to the water thirty years ago.

Anecdotal evidence from talking with boaters and fishermen might indicate that there are now fewer odonates along the Lower Farmington River. There is, however, no hard evidence to validate these claims.

A final consideration is that many people now use the online social network “iNaturalist” in order to share biodiversity information and to help each other learn more about the natural world. Setting up a project for identification of odonates on the lower Farmington River and Salmon Brook would add to our knowledge and to the existing database.

Female widow skimmers

APPENDIX I

CT'S ENDANGERED,THREATENED AND SPECIAL CONCERN ODONATES IN THE FARMINGTON VALLEY

The Connecticut Department of Energy and Environmental Protection (CT DEEP) maintains a list of Connecticut's Endangered (E), Threatened (T) and Special Concern (SC) species. The following odonates are included on this list as of 2024, and have been found in the Farmington Valley:

Cordulegaster erronea (T) Tiger Spiketail

Phanogomphus descriptus (T) Harpoon Clubtail

Phanogomphus quadricolor (T) Rapids Clubtail

Gomphurus vastus (SC) Cobra Clubtail

Somatochlora elongata (SC) Ski-tailed Emerald

Stylurus amnicola (T) Riverine Clubtail

Of these listed species, *Stylurus amnicola (*riverine clubtail) was reported from the Farmington River in Windsor at two locations in 2015. Two other state-listed species have been found in close proximity to the study area. *Gomphurus vastus* (cobra clubtail) has been found on the Connecticut River (2008) near the mouth of the Farmington, and could conceivably be found in Windsor on the Farmington River, itself. A single adult of *Somatochlora elongata* (ski-tailed emerald) was found along the Talcott Mountain ridge (7/9/2012) in Penwood State Park, Bloomfield. This species has also been found in Peoples State Forest, Barkhamsted and near West Hill Pond, New Hartford, so there is the likelihood that this emerald might be found within the study area. *Phanogomphus descriptus* (harpoon clubtail) has been found in Barkhamsted, while *Cordulegaster erronea* (tiger spiketail) has been found breeding in freshwater seeps in Canton. Neither of these last two species has been found in the Lower Farmington River/Salmon Brook study area. See CT DEEP for definitions of Endangered, Threatened and Special Concern species.

APPENDIX II SPECIES COMPARISON HISTORICALLY VERSUS 2024

Species	Site # 1	Site #2	Site #3	Site #4	Site #5	Site #6	Site #7	Site #8	Site #9	Site #10	Site #11	Site #12	Site #13	Site #14	Site #15
Broad-winged Damselflies															
Calopteryx amata												H, X	H, X	H,X	H
Calopteryx maculata	X	X	H, X	H		X	X		H, X		X	X	X	H, X	H, X
Spread-winged Damselflies															
Lestes rectangularis						X			H						
Lestes vigilax					H										
Pond Damselflies															
Argia apicalis	X	X			X	X	H, X	H, X	H, X	X					
Argia fumipennis			H	X			X	H, X	X					X	X
Argia moesta	H	X				H, X	X	H		X					X
Argia translata		X			X		H, X	X		X					
Enallagma aspersum	H			H											
Enallagma basidens	H														
Enallagma civile						H			H						
Enallagma divagans		H													
Enallagma durum									H						
Enallagma exulsans	H			H, X		H, X	X	H	H						
Enallagma geminatum	H				X	X			H					X	
Enallagma signatum	X			H	X			H	H						
Enallagma triviatum	H	H													

Species	**Site # 1**	**Site #2**	**Site #3**	**Site #4**	**Site #5**	**Site #6**	**Site #7**	**Site #8**	**Site #9**	**Site #10**	**Site #11**	**Site #12**	**Site #13**	**Site #14**	**Site #15**
Ischnura posita	X			X	X	X	X		H	X			X	X	
Ischnura verticalis	H, X			H, X	X	X			H	X					
Darners															
Aeshna canadensis														H	
Aeshna tuberculifera									H						
Aeshna umbrosa									H						
Aeshna verticalis												X			
Anax junius	H, X	X						X	H, X	X		X		X	
Boyeria vinosa	X		H				X				X				H, X
Rhionaeschna mutata						X	H	H					H		
Clubtails															
Argiogomphus furcifer	X														
Dromogomphus spinosus		X	H, X			X	H	H, X	H						
Hagenius brevistylus			H				H		H, X	X			H	X	
Hylogomphus abbreviatus		X													
Ophiogomphus aspersus														H	
Ophiogomphus mainensis													H		
Ophiogomphus rupinsulensis						H	H	H							
Phanogomphus exilis		H	H												
Phanogomphus lividus			H										H		
Phanogomphus quadricolor						H	H								
Phanogomphus spicatus														H	

Species	**Site # 1**	**Site #2**	**Site #3**	**Site #4**	**Site #5**	**Site #6**	**Site #7**	**Site #8**	**Site #9**	**Site #10**	**Site #11**	**Site #12**	**Site #13**	**Site #14**	**Site #15**
Stylurus amnicola									H	H					
Stylurus scudderi									H					H	H
Stylurus spiniceps		X	H, X	X	X	X	H, X	H, X	H, X	H, X					
Spiketails															
Cordulegaster diastops													H		
Cordulegaster maculata													H	H	
Cruisers															
Macromia illinoiensis			H	X	X	X	H, X	H	H						
Emeralds															
Epitheca cynosura	X		H		H								H		
Epitheca princeps	H, X	H		X		H, X						X			
Helocordulia uhleri												H	H		
Skimmers															
Celithemis eponina	H,X														
Erythemis simplicicollis	H, X	X			X	X	X	X	X	X			H	X	X
Leucorrhinia intacta	H														
Libellula cyanea	X														
Libellula incesta	H, X					X									
Libellula luctuosa	H, X	X		H, X	X							X		X	
Libellula pulchella	H,X		H	H		H	X								
Libellula semifasciata												X			
Pachydiplax longipennis	H, X	X		X	X		X	X	X			X	X	X	X

Species	Site # 1	Site #2	Site #3	Site #4	Site #5	Site #6	Site #7	Site #8	Site #9	Site #10	Site #11	Site #12	Site #13	Site #14	Site #15
Pantala flavescens	X						X		X	X		X			
Pantala hymenaea		X		X	H				X						
Perithemis tenera	H, X														
Plathemis lydia	H, X	X			X	X	X							X	
Sympetrum internum	H, X													X	
Sympetrum semicinctum					H				H						
Sympetrum vicinum					X										
Tramea lacerata	H, X								X						

Legend: **H** = observed prior to study but not recorded during 2024 site visits
X = Observed during 2024 study

Site # with name of site:

Site #1 Nod Brook Wildlife Management Area, Avon/Simsbury
Total Species: 28 Historic Species: 20 2024 Species: 22

Site #2 Fisher Meadow Recreation Area, Avon
Total Species: 16 Historic Species: 4 2024 Species: 11

Site #3 Spoonville Bridge, East Granby
Total Species: 11 Historic Species: 11 2024 Species: 3

Site #4 Northwest of Garden Street, Farmington
Total Species: 15 Historic Species: 7 2024 Species: 10

Site #5 Curtiss Park, Tariffville section of Simsbury
Total Species: 17 Historic Species: 4 2024 Species: 13

Site #6 Farmington River at Tariffville Park, Simsbury
Total Species: 20 Historic Species: 7 2024 Species: 16

Site #7: Farmington River at Pinchot Sycamore, Simsbury
Total Species: 20 Historic Species: 9 2024 Species: 15

Site #8: Simsbury Crew Boat House/Drake Hill Bridge South, Simsbury
Total Species: 13 Historic Species: 8 2024 Species: 8

Site #9 Behind Loomis-Chaffee School, Windsor
Total Species: 26 Historic Species: 20 2024 Species: 11

Site #10 Farmington River behind Bart's Drive-In, Windsor
Total Species: 11 Historic Species: 2 2024 Species: 10

Site #11 East Branch Salmon Brook at East Street North of Route 20, North Granby
Total Species: 2 Historic Species: 2 2024 Species: 0

Site #12 West Branch Salmon Brook, Barn Door Hills Picnic Area, Granby
Total Species: 10 Historic Species: 2 2024 Species: 9

Site #13 West Branch Salmon Brook at Barn Door Hills Road Bridge, Granby
Total Species: 13 Historic Species: 10 2024 Species: 4

Site #14 Salmon Brook at North End Salmon Brook Park, Granby
Total Species: 17 Historic Species: 7 2024 Species: 13

Site #15 Salmon Brook at Floydville Road Bridge, East Granby
Total Species: 8 Historic Species: 4 2024 Species: 6

APPENDIX III POTENTIAL FUTURE STUDIES/STUDY SITES

Going forward, it might be of interest to check the 15 sites covered in this study to determine if there are changes in the species assemblages ten, twenty or more years in the future. It might also be of significance to add a few additional sites to be studied. After some analysis, the following sites are suggested:

1. **Alsop Meadows, Avon**. This site lies midway between the Nod Brook Wildlife Management Area and Fisher Meadows Recreation Area, both in Avon. Alsop Meadows is 2.7 miles south of Nod Brook WMA, and 3 miles north of Fisher Meadows. There are community gardens on the east side of the River, which at this point is used as a canoe launching spot. The canoe put-in is just south of the Route 44 bridge, and the bridge and Route 44 traffic are obvious. In 2024, the erection of a large "frisbee golf" area has altered the east riverbank. This is not to the benefit of insect populations.

2. **Farmington Meadows, Farmington**. The Kolp Community Gardens are located 1.6 miles south of the site in the vicinity of Garden Street. The River is bordered by agricultural areas to the south and by the Farmington Sewage Treatment plant fields to the north. The large open fields are leased and create a large, open area that is conducive to odonates. To the north is Riverside Cemetery.

3. **Salmon Brook sites, East and West**. North of Route 20, both the east and west branches of Salmon Brook are small and heavily shaded. There is not likely to be great diversity of odonates in these areas, but they might be checked.

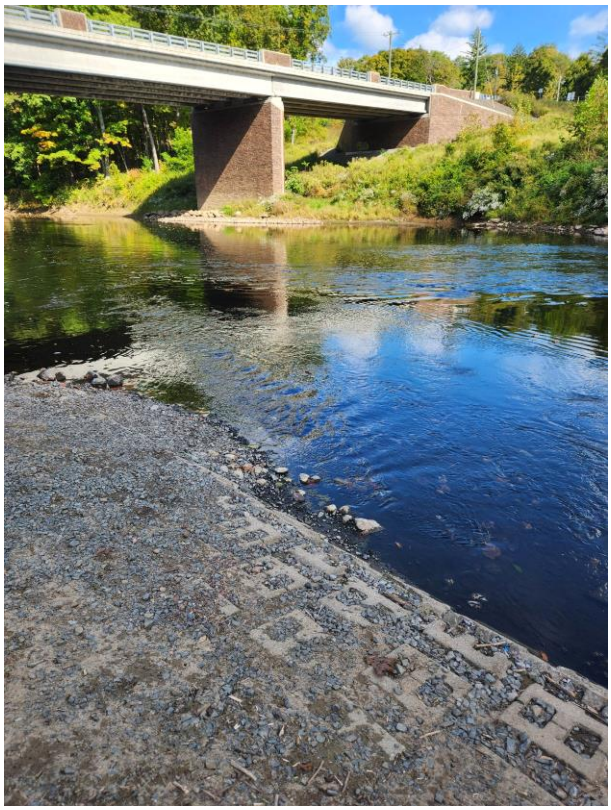
4. **Granbrook Park, East Granby**. This public park along Salmon Brook is maintained by the Town of East Granby. It is 2.5 miles east of Salmon Brook Park in Granby. It is 1.5 miles west of the Floydville Road bridge.

5. **Rosedale Farm in Simsbury borders the River on the east bank**. The species here are likely similar to those found to the north at other Simsbury sites. This area opens up and provides access to the River at the terminus of a trail put in by the Simsbury Land Trust, who has purchased the development rights to this property.

APPENDIX IV PHOTOGRAPHS OF THE STUDY SITES

Site #1

Nod Brook Wildlife Management Area,
Avon/Simsbury

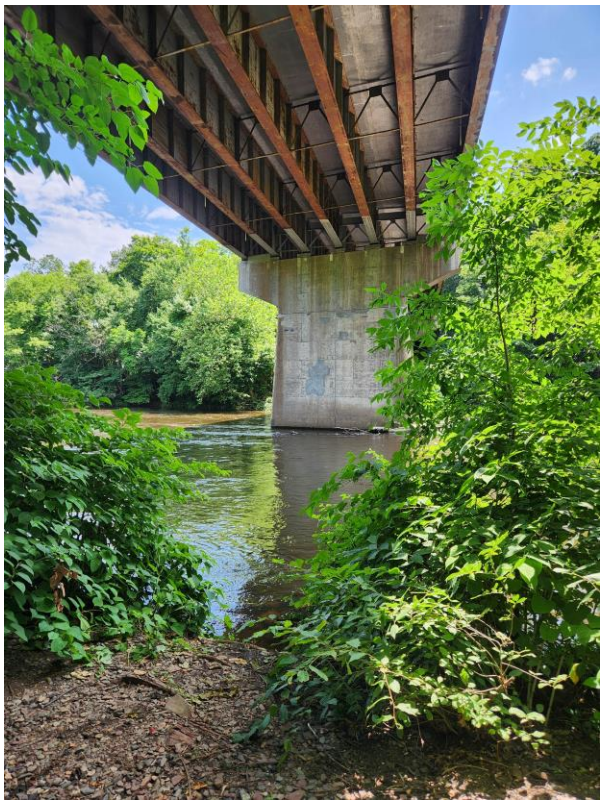


Site #2

Fisher Meadow Recreation Area,
Avon

Site #2

Fisher Meadow Recreation Area,
Avon

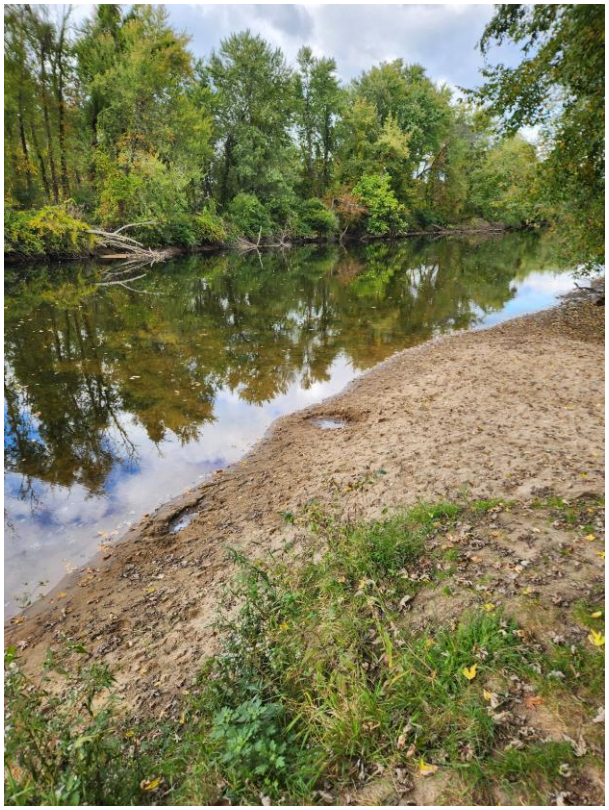


Site #3

Spoonville Bridge,
East Granby

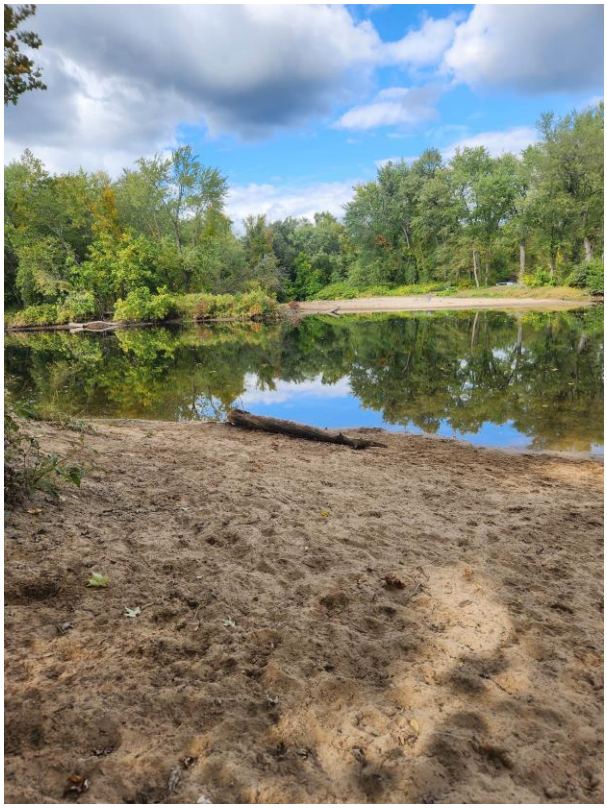
Site #4

Northwest of Garden Street,
Farmington



Site #5

Curtiss Park,
Tariffville section of Simsbury

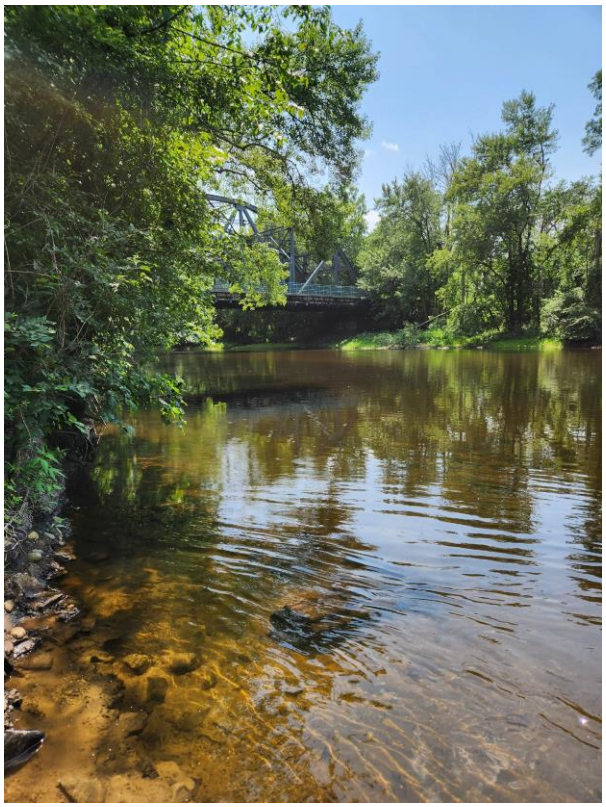


Site #6

Farmington River at Tariffville Park, Simsbury

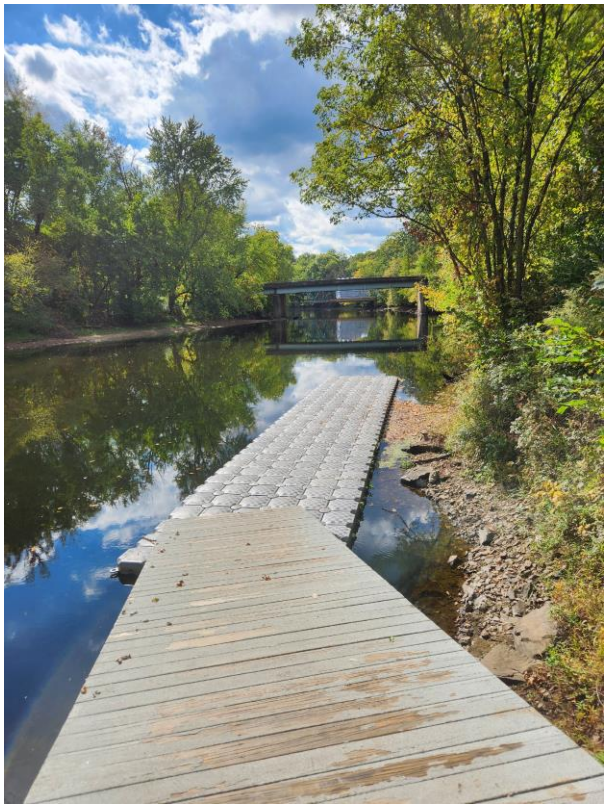
Site #7

Farmington River at Pinchot Sycamore, Simsbury



Site #7

Route 185 Bridge,
Simsbury



Site #8

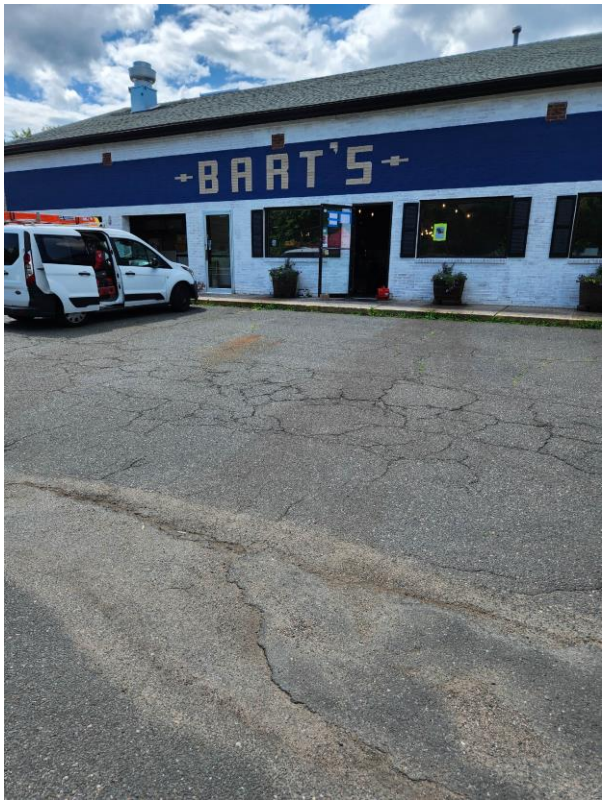
Farmington River at Simsbury Boat House,
Simsbury

Site #9

Farmington River behind Loomis Chaffee School, Windsor

Site #9

Loomis Chaffee School lower fields, site of massive glider flight,
Windsor

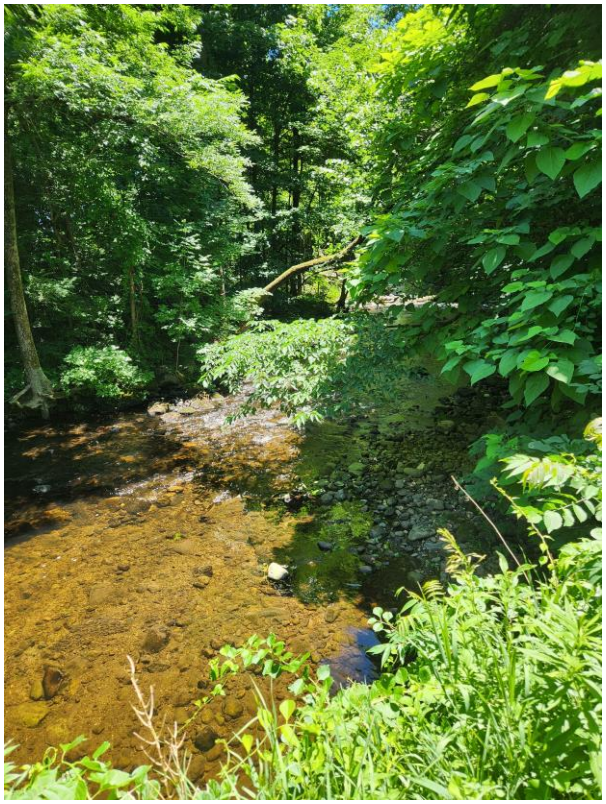


Site #10

Farmington River behind Bart's Drive-In,
Windsor

Site #10

Route 159 Bridge,
Windsor



Site #11

East Branch Salmon Brook at East Street North of Route 20,
North Granby

Site #12

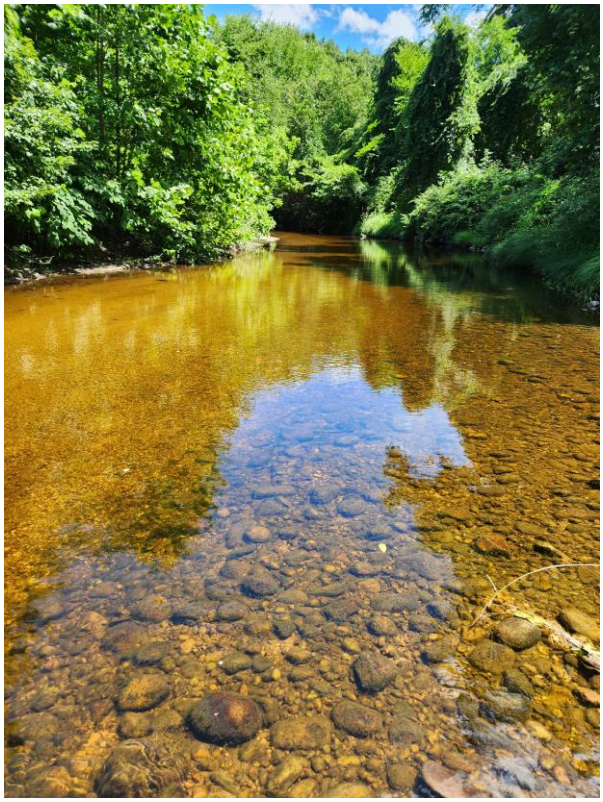
Salmon Brook, Barn Door Hills Picnic Area,
Granby

Site #12

Fields adjacent to Barn Door Hills Picnic Area, Granby

Site #13

Barn Door Hills Road Bridge, Granby



Site #14

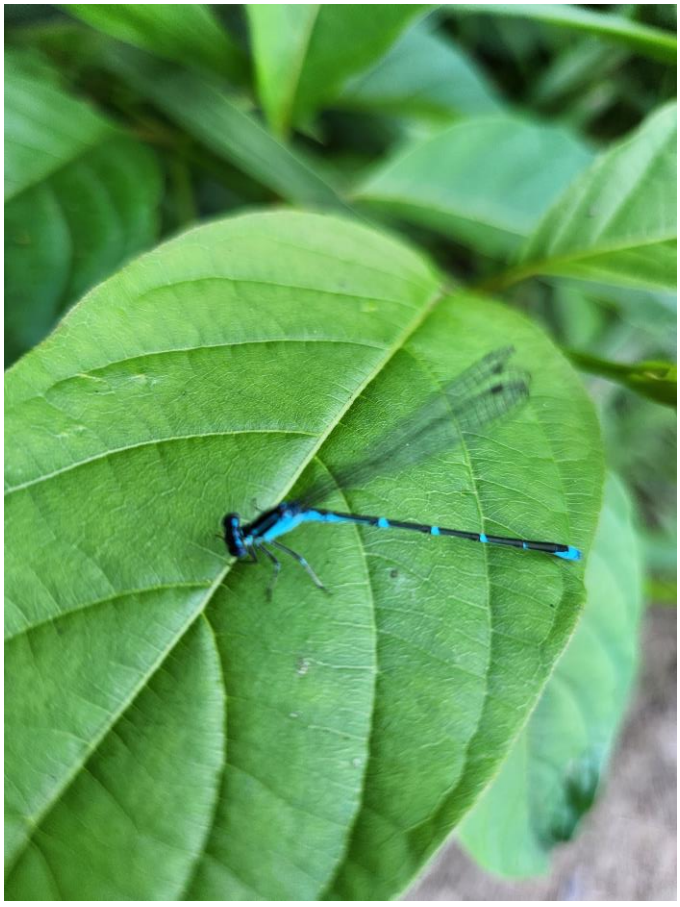
Salmon Brook, Salmon Brook Park off Route 20, Granby

Site #15

Floydville Road Bridge,
East Granby

ACKNOWLEDGMENTS

This study was not a one-person effort. Thanks to J. Garrett Tilton for providing GPS coordinates for the 15 survey sites, and to Margery Winters for assisting with the formatting of this report. Thank you to Nick Barnett, Mike Cirilli, Greg Hanisek, Josh and Jayden Kaplan, Alison and Chris Wilcox for assisting with the survey work; and especially to Jonathan Wright-Goodison, a former participant in Roaring Brook Nature Center's "Chasing Dragons" programs and now a senior at William Hall High School in West Hartford for accompanying me on multiple surveys. Last, but not least, my appreciation to Michael Thomas, former biologist with Connecticut's Agricultural Experiment Station and one of the State's early proponents of research in this field. Along with Dr. David Wagner and a few others, Mike did much of the early survey work in the 1990s, helped to organize Connecticut's odonate database, and has been my friend and "Dragonfly Guru" for the past 25 years. This study would not have been possible without Mike's encouragement and enthusiasm for it, and his patience in reviewing portions of the report and correcting my errors.



Stream bluet, Tariffville Park