Newsletter of the Wisconsin Dragonfly Society

Wisconsin Odonata News

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Featured in this issue:

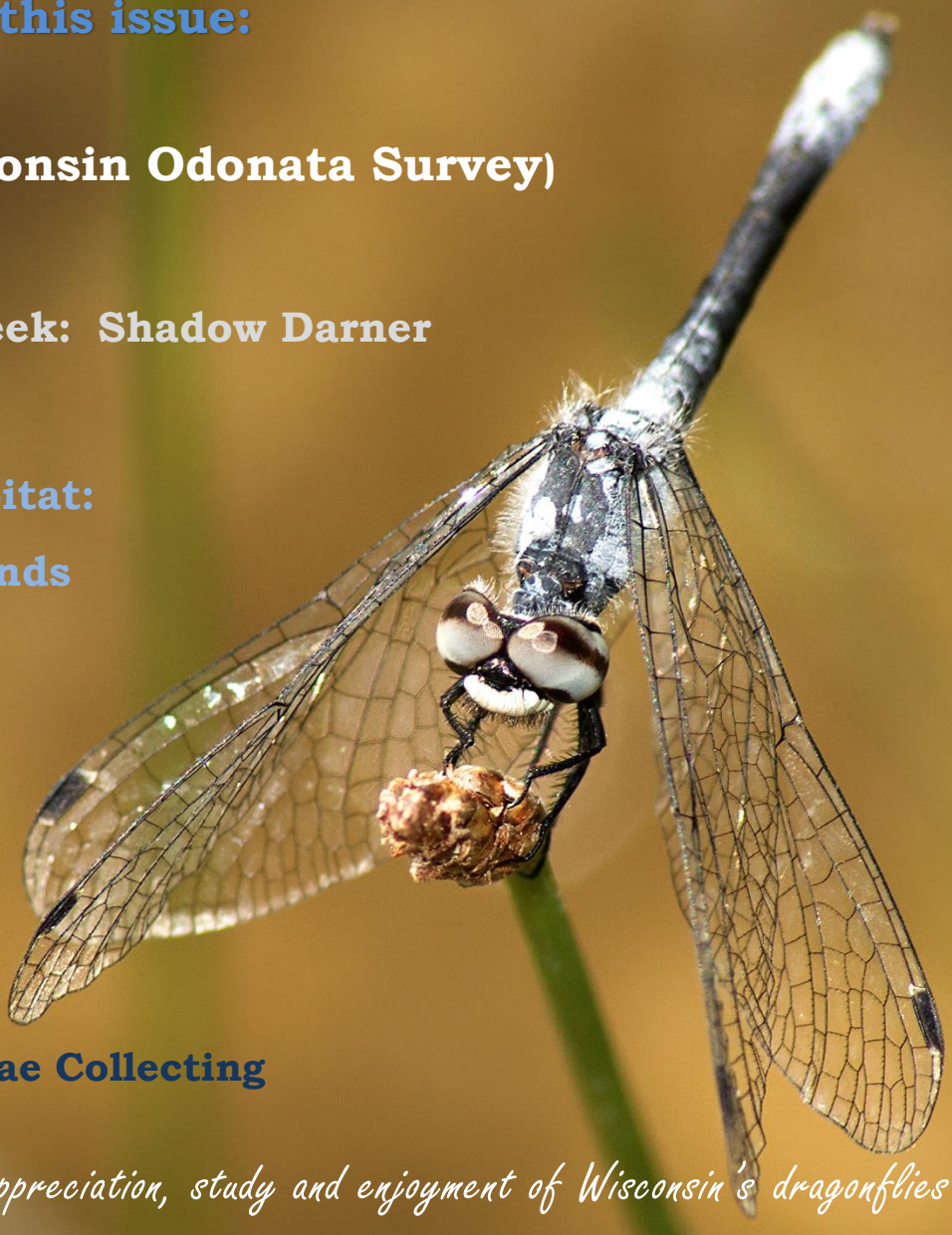
WOS (Wisconsin Odonata Survey)

Bug o' the Week: Shadow Darner

Focus on Habitat: Retention Ponds

WWBD?* (What Would Birders Do?)

Project: Exuviae Collecting



Fostering the appreciation, study and enjoyment of Wisconsin's dragonflies and damselflies and the aquatic habitats on which they depend.

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Cover photo: Elfin Skimmer *(Nannothemis bella)*

By ***Laurie Smaglick Johnson***

Wisconsin Dragonfly Society

Board Members

Reflections and Intentions

It is hard to believe that this year's Odonata flight season has come and gone and is already becoming a distant memory. It seems as though each year passes a little quicker than the last and this year went by in a whirlwind.

As an organization, I think that we had a good year. We had a great annual meeting in Door County in July that allowed those who attended to get up close and personal with our country's rarest species of dragonfly (the Hine's Emerald). It was also a great opportunity to meet new friends and get to know some of the other Odonata enthusiasts from Wisconsin, Illinois, and Minnesota.

We also carried out an impressive schedule of field trips, presentations, and workshops this year that I hope have convinced a few more people to get out and enjoy the natural world in general and the world of "Damsels and Dragons" in particular. These events had an attendance of over 300 people and I sincerely hope that we have reached some of them and ignited a spark of interest in Odonata.

I have been very pleased to see the membership in our organization and the membership of our Facebook group grow throughout the year. The Facebook group has now passed 525 members and that is truly amazing to me. It is wonderful to see that there are many more Odonata enthusiasts out there than I ever imagined. My great hope is that we can get many of these people even more engaged with the Wisconsin Dragonfly Society and the Wisconsin Odonata Survey!

As this year draws to a close, I have been enjoying the memories of the past year and am also starting to think about the possibilities that exist in the next. The most exciting is an effort that is currently under way to create some amazing presentations that will extend our abilities as an organization to teach even more people about the exciting world of Odonata. Thank you very much to Laurie Smaglick Johnson for her work on these presentations! The work that she has done to date has been spectacular and has me really excited about the educational possibilities.

2016 is also definitely the year where we must finish the task of becoming a 501 (c)(3) organization. This step will be a key one in our efforts to grow and generate the funds that will be required to complete future projects that will allow us to reach more people and learn more about the dragonflies and damselflies around us.

I am looking forward to 2016 and hope that you will join me in making it a great year for our organization. If you have any ideas or suggestions, please share them with me or any other member of the board. I hope that everyone has a wonderful Holiday Season and a new year filled with great experiences with Dragonflies and Damselflies!

Dan Jackson
President of the Wisconsin Dragonfly Society

Hine's Emerald (*Somatochlora hineana) male in flight*


Hine's Emerald (*Somatochlora hineana) female*

Have YOU Been Taking Advantage of the Statewide Dragonfly and Damselfly Survey (WOS)?

Bob DuBois

Although people have been recording their observations of Odonata in Wisconsin for more than 100 years, there has been a well-organized statewide Odonata survey project in place only since about 2002. We affectionately call this survey project "WOS" (Wisconsin Odonata Survey), and it is housed at this website: (http://wiatri.net/inventory/odonata/) There you will find an easy to use reporting page at the Submit Observations tab, where you can record your observations of odonates that you find anywhere in the state. You can also post your photographs of the odonates that you would like to report. This site has plenty of neat "bells and whistles", so if you have never checked it out, please take a few moments to do so.

Here's how the WOS project works. The observations that you report are entered into a statewide Odonata database. The information in this database is used to construct county and statewide distribution maps, and to determine flight periods and critical habitats for all of the 165+ species known to occur in Wisconsin. This information has also been used many times to adjust rarity designations for species that are Endangered, Threatened, of Special Concern, or are simply being tracked by the Natural Heritage Inventory (NHI) of the Department of Natural Resources (DNR). We have also gained a wealth of ecological insights about many species through this project. In other words, much of what we know about odonates in Wisconsin is directly attributable to data gained through WOS. Clearly, WOS has been and will continue to be an extremely useful project.

In order for the data collected through WOS to be useful, it must be checked for accuracy before it is entered into the database. Having erroneous data in the database would obviously be a very bad thing, so this vetting process must be taken seriously and done carefully. The vetting process is currently done by me, but it could easily be done by anyone with good Odonata identification skills (any volunteers?). Whether it is me or someone else who does the vetting in the future, there is a certain process to follow for anyone new to submitting their observations through WOS to ensure that the data are as accurate as they can be. This process works best if a new cooperator (YOU!) submits a photograph with each species observation they report. The photograph is needed so that the person vetting the report can verify that the species being reported really is what it is claimed to be. Over time, the need to submit photographs of the more common and easily identified species lessens as the person doing the vetting becomes familiar with the identification skills of each cooperator. Even highly skilled cooperators continue to submit photographs of many of the species they report because they realize how important it is to keep errors from creeping into the process.

Over the years, tens of thousands of observations have been reported through WOS, usually with at least 2,000 observations reported each year. I asked Jill Rosenberg, the DNR database manager for WOS, for a brief summary of cooperator activity this year and last year. In 2014, from 18 April through 26 October, 56 cooperators reported 613 trips that resulted in 3,398 species observations. In 2015, from 11 April through 20 October, 38 cooperators reported 671 trips that resulted in 3,945 species observations. Although the number of cooperators was down in 2015 compared to the previous year, the number of trips and the number of species observations were both up, the latter by 16%. I think we can all appreciate how valuable it is to get all of these thousands of verified records into a database each year.

As in past years, the majority of these records have come from just two highly skilled and dedicated people, Dan Jackson from La Crosse and Ryan Chrouser from Eau Claire. Through the efforts of these men, the odonate faunas in the counties near La Crosse and Eau Claire are among the best known in the state. For the sake of completeness I should add that both of them also travel frequently to less well-surveyed parts of the state to improve our knowledge about dragonflies in those areas, and both also submit their records to the national Odonata database housed at OdonataCentral (http://www.odonatacentral.org/).

While leaders in the community of dragonfly enthusiasts in Wisconsin are deeply appreciative of what Dan, Ryan, and others have accomplished, and hope that these folks will keep up their efforts long into the future, we also realize that *many other areas in Wisconsin would also greatly benefit from much more survey work*. There are many under-surveyed counties in the state with fewer than say 50 species known – is yours one of them? You can check out the list of species documented for your county at the WOS website (bearing in mind that there is often a time lag of several months before all submitted observations are entered into the database).

Are you going to be the next notable odonatist in Wisconsin who will substantially add to the scientific knowledge of dragonflies in your neck of the woods? There is no doubt that a substantial learning curve is involved in getting good enough with odonate identifications to contribute meaningfully to WOS, but just think of all the satisfaction you will get from improving your ID and macro-photography skills, gaining all those ecological insights, and setting all those first county records! Or you could just ask Dan or Ryan how their efforts have enriched their lives.

Planning Your Dragonfly Field Trips? WWBD*?

Joanne Kline

On one of the last, warm, sunny days in October, I was headed east toward Lake Michigan, not to look for odes, but to sit inside a big room full of people. The shades were drawn, between me and the beautiful view, to accommodate a morning of PowerPoint presentations. Sadly, long before I knew the weather forecast for the day, I had agreed to be a note-taker for this bird workshop.

Researchers, banders, and other bird enthusiasts came from as far as Maine and Mississippi to collaborate on big picture questions about how monitoring can benefit the future of migratory birds. What data are needed to understand what birds need for their full life cycle? How can we inform decisions, and set priorities, for land protection, management, and restoration?

The birders' challenge boiled down to this: *Find out where, when, and how many birds are using the Midwest region during the migratory period.* "Where" to monitor, was a hot topic. Typical locations, like the shores of the Great Lakes and other "big waters", and large blocks of grassland and forest filled the list. Then one of the speakers reminded us that monitoring where the birds haven't been recorded is equally important. Bird populations may be where we haven't looked yet. Does not finding a species where it's expected indicate a problem? Or is our understanding of that species' habitat needs incomplete? In other words, we need data from everywhere.

Substitute "dragonfly" for "bird" above and you have a good idea of what's needed to protect dragonflies and their habitat. Documenting where dragonflies occur is a main reason that the Wisconsin Odonata Survey (WOS) exists. The more survey locations with species that we submit to WOS, the more useful WOS becomes.

Survey data help determine what habitat type a species uses, whether birds or dragonflies, as well as where and when, they use it. They allow us to predict other areas where this species may occur, and better understand what habitat features it relies on. The more locational data we have for a species, the more precise are our predictions of where else this species is likely to occur, and the easier it becomes to set conservation priorities to protect it.

The county checklists on WOS can guide us to counties that are "under surveyed". With only 26 species recorded in Calumet, and 25 in Manitowoc, there's ample opportunity for locating new records in both these counties.

The county checklists can be misleading. Ozaukee County, for example, looks like it's well surveyed, with 75 of our 160+ Wisconsin species found there. But if you look at the locations of those records, you find that most are from a single place, Cedarburg Bog, the largest wetland in southeast Wisconsin, and an odonate "hot spot". With a dozen different habitats that make up the complex ecosystem of the Cedarburg Bog, in *which* one was the species found? Which species frequent the county's coastal wetlands along Lake Michigan, and which frequent the small forested streams that lead to the Milwaukee River?

Not surprisingly, this same clustered data occurs in counties with other hot spots. If I only have one field day in Portage County, I'm headed to the Plover River! Like most birders, we usually go where, based on ***past*** records, we have a good chance of finding many species, those we need to expand our photo collection, or those we haven't seen before. But, dragonfly conservation, like bird conservation, requires exploring the less traveled roads, for ***new*** records that build a broad foundation for further study.

Wisconsin Dragonfly Society (WDS) members have been filling in the gaps. In the past year, Milwaukee County alone had over 100 observations at 18 locations. Yet, many unexplored areas remain, and maybe they include a stream, lake or bog near you. Next season, when you plan your dragonfly field trips, include some places you haven't searched before, and be sure to let WOS know what you find. Where dragonflies occur, and don't occur, are important, and the more precisely those locations are documented and made available to those working to protect them, the better off dragonflies will be.

***What Would Birders Do?**

Forested stream in Ozaukee County

Every Journey Has a Beginning

Ryan Chrouser

Every journey has a beginning. Though I'm a little fuzzy on the date the journey officially began, I know the exact date when it escalated.

Backstory:

I had the good fortune to grow up in northern Price County, Wisconsin, on one of the many beautiful north woods lakes. I spent many summer days in and around the water marveling at all the interesting creatures that were intricately tied to the lake ecosystem. This of course included the dragonflies and damselflies that seemed to be everywhere during those warm summer days.

For several reasons, the Odonata became my favorite insects. They were amazing to observe in both their nymph and adult life stages. It also helped that before I knew much about them I had a bonding experience with a large dragonfly (probably a Common Green Darner, but I was very young so it is hard to remember for certain) that avenged me after I was painfully bitten by a horsefly. The vicious horsefly attacked, my reflexive swatting attempt was woefully inadequate and the Tabanid mockingly buzzed at me as it made its escape. It only made it a few feet when a huge avenging insect swooped in, grabbed the horsefly, and landed on a tree to devour its lunch. That was my first memory of an encounter with a dragonfly. They have been my favorite insects ever since.

I learned about them by reading what I could, but when I was a kid, there was no internet and no field guides. I was content to tell people that dragonflies were my favorite insect, and was able to explain why I thought they were so fascinating. That's where it remained for many years. I never even considered that there was more I needed to know about the Odonata.

Years passed, I was called to Madison to pursue a degree in Zoology. I did take a few insect classes during my time there, but these were largely survey courses or classes dealing with pest species. Dragonflies were still my favorite insects, and I have a fond memory of chasing an early season Common Green Darner in a field at Picnic Point in Madison for the insect collection I had to make for my Intro to Entomology class. I needed an insect from the order Odonata to count toward my goal. One my good friends and I chased the poor darner all around the field until we were exhausted. My insect netting skills were not as well practiced as they are now and the Anax eluded us. Instead I focused my attention on finding an Odonata nymph, a quest which proved to be much more successful.

To summarize; I graduated, got a job (unfortunately not a lot out there for a Zoologist), got married, had kids. In short, I largely gave up on doing anything useful with my degree, and focused my attention on being a good husband and father. Call it divine intervention, karma, fate, or whatever philosophy you ascribe to (I'm going with divine intervention) I was given a sign that there was actually something I needed to do. On July 9th, 2011; we arrived back from a family vacation up north. We noticed something amazing resting on the antennae of the car sitting in the driveway: a dragonfly with yellow racing stripes down the side; and boldly patterned, white and black spots on the wings, was waiting for us. I was captivated. I took photos, and as a recovering birder (who has since relapsed) I needed to have the name of this captivating insect.

Twelve-spotted Skimmer Photo by Ryan Chrouser

Armed with the internet and a Google search engine that I did not have as a child, I typed in the description of the insect along with "Wisconsin". My life changed completely on that day. The Wisconsin Odonata Survey opened a world up to me that I didn't even know existed. I read every description of every species on the site. I remember being particularly excited about Halloween Pennants and Blue Dashers. I was fascinated with a species called the Blue-Eyed Darner, whose only sighting in Wisconsin was at an Eau Claire County lake only a couple of miles from our house.

Things escalated quickly. I shared the website with my wife, and she encouraged me (she was very aware that I lamented not doing anything useful with my degree). I ordered field guides. This probably sounds familiar to some of you at this point. The most important thing I did was submit my dragonfly sighting, a male Twelve-spotted Skimmer, to the WOS website. I began to search for more dragonflies and damselflies to report. At this time I didn't have a net, so I had to rely on photography; another area in which there was much to be learned. I found out that the Eau Claire Blue-eyed Darner location (Half-Moon Lake) was a prime location for the two species of dragonflies that I most wanted to photograph that first year. In fact I still have not found a better site for either Blue Dashers or Halloween Pennants, and I have been to many lakes at this point. I submitted everything I could identify to the WOS. As the odonate flight season wound down in 2011, I started to plan for what I

could do next year. I ordered a net, purchased a compact digital superzoom camera, and studied.

In January of 2012, Bob DuBois sent out an email to the folks that had submitted sightings to the WOS, asking if there was interest in starting a formal Wisconsin Dragonfly Society. My wife basically told me, and I am paraphrasing here, that I needed to be involved in this. I can't argue with that kind of wisdom, so I replied to Bob that I would be ecstatic to be involved in any capacity and help in any way that I could. Then he asked me to be on the board of directors, and I panicked a bit. I thought that maybe I was in over my head. I had half of a field season to my name, and the first meeting was to be in June 2012 before I could get much more field time. I stuck with it, thinking that I would have to study like mad to not look like a novice at the first meeting. I needn't have worried, for when my wife and I arrived at the first meeting the experts made all feel truly welcome and patiently shared their knowledge. I have learned so much in the last few years, including that being a novice is just fine, and am so thankful that there is still so much more to learn.

What's the point?

Where am I going with this? What am I trying to say? Well here it is: **the Wisconsin Odonata Survey website changed my life.** I remember being so nervous about meeting some of the experts. These people had published field guides (Bob DuBois and Kurt Mead), discovered new species in Wisconsin (Bill Smith), and were internationally renowned Odonatologists (Ken Tennessen). For a science geek like me, this was like hanging out with movie stars and rock stars. Each and every expert (and everyone from all levels of expertise) I have had the good fortune of meeting at the WDS and DSA (Dragonfly Society of the Americas) meetings have been more gracious and wonderful than I could have possibly imagined.

At the 2014 meeting of the DSA in Wisconsin, Kurt Mead celebrated with my six year old son when he netted an F-0 Dragonhunter nymph in the Wisconsin River. I actually had been reading Kurt's field guide to my son as a bedtime story, and of course the Dragonhunter was his favorite one to read. How incredibly cool is that! The photo that I have of Kurt and my son together at the river posing with the nymph is a memory that I will cherish forever. That same trip Marla Garrison (another incredibly gracious and wonderful Odonatist from our friendly state to the south) let my son take another Dragonhunter nymph home to rear out. Both of those nymphs emerged in the next week. Marla actually gave us more nymphs this year: four Fawn Darners (all reared out and all females) and an Arrowhead Spiketail that won't be ready to emerge until 2016. Marla if you read this, Spike (that's his name) is doing very well.

It is impossible for me to overstate just how important the WOS has been to me. All of these memories and so many more are a direct result of one Twelve-spotted Skimmer and the website that it led me to. As one of our Minnesota neighbors stated at our 2015 WDS meeting, the Wisconsin Odonata Survey website is the best state reporting website in the country. We are so fortunate to have it and we should celebrate it. How can you help celebrate it? Simple, use it. There are a lot of people in the Wisconsin Dragonfly Society and the WDS Facebook group who are finding odonates. The goal of this testimonial is to encourage you to report what you find to the WOS. In fact I am exhorting you to do so. It is important, and your records are valuable to the scientific community. I want to keep this ball rolling so that others can have the opportunity to experience what I have experienced. Please feel free to contact me if there are any questions about how to make an entry in the WOS and I will happily walk you through it.

Kurt Mead with Isiah Photo by Ryan Chrouser

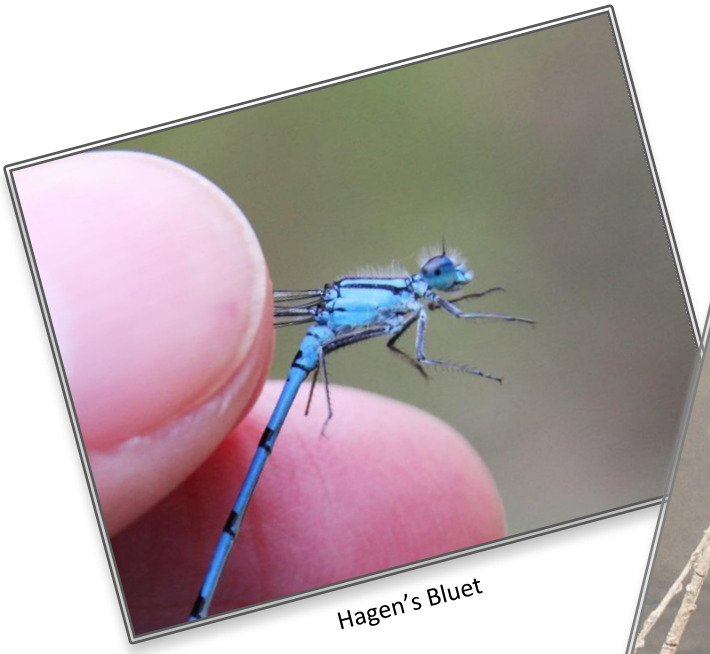
Acknowledgements:

I would like to express my deepest thanks and gratitude to the following people:

- Firstly to Bob DuBois; for his patience, encouragement, and his ability to teach. He has given me the confidence to teach others.
- To Dan Jackson; for blazing the trail for the non-professionals/non-experts to actually become experts, and leading us forward. You are a true model to aspire to.
- My son, Isiah; you enable me to see the wonder of the world through the eyes of a child, and help me capture that enthusiasm all over again.
- Most importantly, to my wife Carey; for the encouragement, support, planning sessions, and willingness to spend so much time with me in the field (our 2013 field season was legendary and I don't think we will ever be able to duplicate it). You are a marvel and model of what a true partner is and I love you beyond words.

Scenes from a field trip to Dunn County

June 28th; led by Ryan Chrouser



Hagen's Bluet

River Jewelwing

Swift River Cruiser

A demonstration of lightning fast netting skills

Prince Baskettail in flight.

Undeterred by mosquitoes, fun was had by all.

Focus on Habitat

Part II: Retention Ponds

Bob DuBois and Dan Jackson

When considering aquatic habitats for dragonflies and damselflies, what could be a more mundane, casually used term than “pond”. Every waterbody that is roundish and not too big tends to be called a pond. But in fact, there are many different types of ponds, though the distinctions among then are often fuzzy. There isn’t even a universally agreed upon distinction between ponds and lakes, although limnologists have proposed many formal definitions of each. Among these are size (ponds usually < 10 or 20 acres, lakes larger), whether or not light reaches the bottom at the deepest part allowing rooted plants to grow there (ponds yes, lakes no), and whether the water temperature is relatively uniform throughout (ponds) or whether it forms layers (stratifies) at some times of the year (lakes). But at some times or places all of these differences tend to break down and we are left with whatever people choose to call the waterbodies near them. In the western United States, almost all waterbodies are called lakes, regardless of size, and in New England, many large waterbodies are called ponds, even though they would be lakes anywhere else. Now that we’ve muddied up the waters for you, let’s consider a certain type of pond called a retention pond (aka wet pond, stormwater pond, wet retention pond, or extended wet detention pond).

Retention ponds are man-made basins that have a permanent pool of water all year. This distinguishes them from detention ponds, which are typically dry during some parts of the year. Both pond types are used to control flooding and to treat stormwater runoff because they have natural physical, chemical, and biological processes that function to remove or breakdown at least some pollutants, and fine sediments will settle down to the bottom. Retention ponds tend to be rather small (often < 5 acres) and relatively shallow, and they vary regionally in turbidity and productivity depending on the kinds of landscapes they drain. Though usually designed to support emergent and submergent vegetation, they vary in the types and amounts of vegetation they have.

Of course dragonflies could care less about the names we attach to ponds, but there are certain attributes of ponds that are important to them. These include water permanence, productivity, water chemistry, temperature regime, presence or absence of fishes, landscape type (e.g. open or forested), and bottom particle sizes. It is beyond our scope to discuss all of these aspects of retention ponds, so we’ll focus on two particularly important ones: the presence/absence of fishes, and water permanence.

Many species of odonates in North America don’t coexist well with fish, especially fish in the family Centrarchidae (black basses and sunfishes). This is because nymphs of these species of odonates lack or have in reduced form the physical or behavioral adaptations needed to coexist with fish. Among the physical adaptations are the lateral spines and dorsal hooks on many species of nymphs that render those nymphs “prickly” to fish and increase their chances of escaping an attack. In fact, it has been shown in Europe that the nymphs of the White-faced Darter (*Leucorrhinia dubia*) have larger lateral spines and dorsal hooks in waters where they coexist with fish than they do in waters without fish (a form of induced morphological defense). Among the behavioral adaptations of nymphs are fright responses that cause some species of American Bluet damselflies (genus *Enallagma*) to swim away when threatened as opposed to staying put and hiding. Hiding works well when nymphs are trying to escape from fish, but swimming away does not because fish are faster swimmers. Conversely, if there are no fish in the pond and the main predators are other insects (usually dragonflies) then swimming away is effective. Interesting studies have shown that species of *Enallagma* can be rather neatly divided into “fish-tolerant” and “fish-intolerant” groups based on the type of fright response of their nymphs

Figure 1: Azure Bluet male *(Enallagma aspersum),* a species of American Bluet that does not coexist well with fish. Photo by Dan Jackson

The same seems to be true with dragonflies as well, although their particular behavioral defense adaptations are not as well studied. Because retention ponds are man-made and are typically small and shallow, they often lack fish. Even if local residents introduce fish, the fish in small, shallow waterbodies will often die off from a lack of oxygen during winter at the latitude of Wisconsin (called winterkill). This lack of fish allows fish-intolerant odonate species to thrive in many retention ponds.

Water permanence is another big issue for odonates. Nymphs of most odonate species live underwater for nearly, or more than, a full year and they require water to be present during that entire time. Shallow waterbodies are often rich in food, and lack fish, which allows many odonate species to thrive. But shallow waterbodies often dry up during the driest part of the year (typically late summer and fall). Some odonates can cope with a dry season, and they do so in a variety of ways. These include overwintering in the egg stage so nymphs don't have to endure a dry pond, or by having explosive growth rates so they can blast through all their instars during spring and summer and then emerge before the pond dries up in the fall, or the nymphs are hairy allowing them to retain moisture well, so they can survive for a while in the bottom sediments or under wood in the bottom of dry ponds. Many odonate nymphs cannot cope with a dry pond. So, if a pond has a permanent pool of water all year, as retention ponds do, and it lacks fish, as most retention ponds do, then those conditions form a "best of all possible worlds" scenario for many species of odonates!

Figure 2: Holmen Retention Pond surrounded by a closely manicured lawn. Photo by Dan Jackson

In closing we want to introduce you to one particular retention pond in the Town of Holmen in La Crosse County. It is small (about 1/5th of an acre), shallow, apparently productive, has a permanent pool of water, is near a major migration corridor (the Mississippi River), and it has no fish. Dan has surveyed this pond for six years and has recorded 50 species of odonates in seven families there! A couple of these species were seen near, not at, this pond and likely didn't originate in the pond, but still, 48 or so odonate species is more than the total we have documented in 21 COUNTIES in Wisconsin. That's right, this small pond, that didn't exist at all not long ago, now provides a home for more species of odonates than we have been able to document for nearly a third of our counties. Lack of sufficient survey effort is still a problem in some of our counties to be sure, but you get the point – retention ponds can be treasure troves of odonate diversity! Is there a retention pond near you that merits a closer look?

Nymph Identification Workshops

Freda van den Broek

Bob DuBois presented two workshops on the Identification of Odonata Nymphs of the Upper Midwest this year. The first of these - a one-day seminar presented through the Society for Freshwater Science - was held in Milwaukee in May. The second workshop was presented as a two-day program which incorporated field work. This was hosted by the Minnesota Dragonfly Society at the Eastman Nature Center in Osseo, Minnesota, in September. Altogether, approximately 70 people attended this amazing workshop!

Why learn about odonate nymphs?
Aside from the fact that it is a fascinating, fun and addictive topic, the presence of odonate nymphs and their exuviae is a clear indicator of a viable breeding habitat. The more people who are trained in nymph identification and who actively contribute data on species distribution and habitat requirements, the more complete and accurate the body of knowledge to inform strategies for conservation. Additionally, the presence of some of the more elusive species in a habitat, especially the strong fliers and treetop dwellers, may be more easily detected by the exuviae that are left behind on emergence.

How were the workshops presented?
Workshop participants received a copy of the draft (to be published in the near future!) ***Family and Genus Key to the Nymphs of the Odonata of Wisconsin***, compiled by Ken Tennessen, Bill Smith and Bob DuBois, and a handy summary sheet of the Odonata of the Upper Midwest, grouped according to family and genus.

Workstations were equipped with microscopes and sets of 25 numbered and labeled vials containing different exuviae, preserved in alcohol. After basic instruction in anatomical terminology, Bob guided the attendees through the examination of the fine detail of each of the 25 specimens (selected to represent the three family groups of damselflies and 6 of the 7 dragonfly families). Although the focus was on learning to recognize the main identifying characteristics of each of the nine families covered, in some cases differences were explored down to genus and species level - as with the large, unmistakable Dragonhunter *(Hagenius brevistylus).*

Bob DuBois' Nymph Identification Workshop is a unique opportunity to gain a working familiarity with the nymphs of the main odonate families and genera of the Upper Midwest region. (It was truly incredible to be able to examine and compare all those specimens!)This class comes most highly recommended!

Be sure to check the spring 2016 edition of WON for a schedule of upcoming events and classes!

Kate Redmond, also known as ***The BugLady*** has been writing a **Bug o'the Week**, every week, for the last eight years. A wealth of these informative and entertaining articles about various insects, including many of our dragonflies and damselflies can be accessed via the UWM Field Station's website. Visit the archives to enjoy more of the The *BugLady's* delightful sense of humor and her stunning photographs. We thank *The BugLady* for permission to reprint this article.

Bug o' the Week – Shadow Darner

Salutations, BugFans,

The BugLady is yearning for a Shadow Darner. The books say they're "common," and other people are up to their ankles in them, but not the BugLady, although she scared up some big, dark darners in early fall that didn't stick around to have their pictures taken. She has read that Shadow Darners may collect in small groups on tree trunks, but really, one would be enough.

Darners are large dragonflies in the family Aeshnidae. They're big-eyed and powerful dragonflies that are sexually *dimorphic* (males and females look different), and the females of many species are called *polymorphic* ("*many forms*," because they come in several different color phases). Mosaic darners (genus *Aeshna*) get their names from the blue "mosaic" patches on the abdomens of the males. Caveat - if you're using a camera instead of a hand lens to identify some of the mosaic darners, the ID is a "probably."

Shadow Darners (*Aeshna umbrosa*) live throughout most of North America (except the very southern edges of the US and a few Rocky Mountain states), and their range stretches well north into the boreal forests of Canada. They're found in a variety of wetlands, from the still waters of bogs, pools, and ditches, to slow streams. There is an eastern subspecies (*Aeshna umbrosa umbrosa*) and a western one (*A. umbrosa occidentalis*), with slight differences in coloration (the former has small, green abdominal spots and the latter has blue ones). See an awesome comparison of the subspecies, at https://www.flickr.com/photos/gyr/sets/72157614135970414?view=sm.

Overall, this is a large, brown dragonfly (some sources refer to it as "dull") that's around 3" long with a wingspread close to 4." The all-important lateral thoracic stripes are straight and generally pale, and an Ohio DNR wildlife website says that "*the green mark on fore part of thorax often resembles the Nike 'swoosh*.'" The face is pale and lacks a conspicuous black stripe across it (males may show a hairline stripe), and the male's cerci, described as "*wedge-shaped*" by some references and "*paddle-shaped*" by others, are spine-tipped. Females' wings may be brown-tinted. Some sources say that the thoracic stripes are outlined in black – not an "in flight" field mark.

As their name suggests, Shadow Darners spend most of their lives in shady woods and edges, and they may fly until it's too dark to see them (though they're more likely to be active during the daylight when the cooler weather of fall sets in). Shadow darners are associated with the tail end of the dragonfly season; almost three-quarters of Wisconsin sightings are in August and September, but there are May records and they are seen well into October.

What do bumblebees and Shadow Darners have in common? They push the limits of cold-bloodedness, remaining active in very cool temperatures, when other dragonflies are grounded. Odonates use a variety of strategies to regulate their body temperature – passively, by basking to collect heat or assuming the obelisk position to avoid it; and actively, by contracting the wing muscles/quivering their wings while perched ("*wing whirring*"), to warm up the flight muscles (and therefore the thorax), and also by slowing circulation to the abdomen in order to keep heat in the thorax instead of sending it to the abdomen, where the larger surface area allows cooling. Their colors may darken in cold weather, and dark colors absorb more radiation from the sun. An overheated Shadow darner may immerse its abdomen in water ("*water dipping*").

Shadow darners are agile and active flyers, scooping small, soft-bodied insects (and the occasional fellow-Odonate) out of the air into legs arranged like a basket, discarding the wings, and feeding in flight. One source said that they consume as much as 20% of their body weight daily. They sometimes form feeding swarms or join other darners in mixed swarms. They are, in turn, fed upon by raptors, especially the smaller falcons, and by purple martins. Ovipositing females may fall prey to frogs. A well-annotated source added predation on females by salamanders/newts. The BugLady had trouble picturing the dragonfly-salamander intersection, so she consulted her herp guy, and he couldn't picture a salamander taking on a large darner, either – a salamander lucky enough to grab a dragonfly doesn't have the equipment to process it into smaller pieces (thanks, BugFan Tom). Naiads, like their elders, are unapologetic carnivores, feeding underwater on any aquatic invertebrate (or small tadpole, larval salamander or fish) that they can wrap their labium around, and being fed on by fish and birds and by a variety of parasites (therefore, warns one site, *do not* eat dragonflies!).

There's not much of a courtship, and even less of a honeymoon. Females mate with the owner of the territory they enter (or they don't, arching their body in the opposite direction to show lack of interest). He takes her to a promising spot, they separate and she oviposits alone, while he guards his genetic investment from the air.

Paulson, in Dragonflies and Damselflies of the East, describes the Shadow darner's strenuous reproductive activity. "*Males fly beats up and down streams and along lake shores, with much hovering while facing the shore, even as long as 30 sec in one spot. …..May patrol and defend entire small pond, usually for a period of less than 1 hour, and typically move from one patrol area to another, often at different water bodies. …Females oviposit on logs and twigs in water or on moist tree trunks or earth banks, sometimes well above water and even in rather dry situations. Less likely to use living plants than most other darners. Perhaps because of woody oviposition substrates, females much more likely than other mosaic darners to break off cerci as they mature*." See https://naturallycuriouswithmaryholland.wordpress.com/category/darners/ for a picture of an ovipositing female that didn't get the "living plants" memo.

In cooler climes, eggs hatch the following spring – and in cooler climes, naiads may overwinter until the year after that, emerging in early summer.

Interesting Shadow Darner factoid: Shadow Darner naiads are sometimes introduced into rice fields as a biological control of mosquitos (a task at which their elders excel when both the dragonflies and the mosquitoes emerge from water into adulthood).

The BugLady

Shadow Darner *(Aeshna umbrosa)* female (above), male (below)

Photos by Freda van den Broek

As the *BugLady*, Kate Redmond's mission statement is "Less stepping on bugs." She hopes that people will be wowed by the beauty and intricacy of bugs. She's happiest when she's taking pictures, preferably in a wetland.

See the Bug o 'the Week archives at http://www4.uwm.edu/fieldstation/naturalhistory/bugoftheweek/

The possibility of ovo-viviparity in *Helicocypha perforata* rejected

Freda van den Broek

The possibility of ovo-viviparity in the Asian damselfly *Helicocypha perforata* (see the spring 2015 issue of the Wisconsin Odonata News) is rejected by researchers Albert G. Orr and André Gunther in an article published in the *International Journal of Odonatology* (Vol 18 no 2 2015).

Upon re-examination of the original video footage, wherein a prolarva-like organism appears to be attached to or emerging from the female's oviduct, and a study of *H. perforata*'s reproductive anatomy, three alternative hypotheses are considered:

In hypothesis 1 a fertilized egg could have become trapped or retained in the oviduct for an abnormally long period of time, and thus eclosed almost immediately upon deposition.

In hypothesis 2 an egg, close to hatching, was possibly dislodged by the female's probing ovipositor.

In hypothesis 3, the female could have dislodged a small aquatic prolarva or larva of an entirely different species by accident during oviposition.

The authors consider hypothesis 3 to be the most plausible based on the unlikelihood of the first two scenarios and the fact that the organism attached to the oviduct valves appeared larger and of a different coloration than a mature egg of that species would be.

The resulting conclusion of the study by Orr and Gunther is that there is still no concrete evidence of live birth in Odonata.

Female damselfly ovipositing while being contact-guarded by a male in the sentinel position

Collecting Dragonfly Exuviae

Bob DuBois and Ken Tennessen

Collecting exuviae - the shed exoskeletons left behind when dragonflies emerge - is fun and addicting. One friend refers to getting his "exuviae fix" each June when our spring species are emerging on river banks. But collecting exuviae is about much more than just having fun. The presence of exuviae on a shoreline is known to be an excellent indicator that links a species with a waterbody, because the exuviae show that successful breeding occurred there with all life stages surviving. Further, exuviae collections are very useful for detecting species' presence, for determining distributions, and for gathering a host of other ecological data. In fact, the late, great odonatist Philip Corbet stated in several publications that it is impossible to exaggerate the value of exuviae collections for population studies.

Okay, we know what you're thinking: If exuviae collecting is so much fun and so clearly useful, why isn't everybody doing it? There must be a downside. Well, there is: exuviae are difficult to identify, ultimately requiring expensive tools, dense scientific keys, and considerable experience. But consider these points:

1) For some applications, identifying exuviae to genus or species isn't necessary, and identifying them to family is fairly easy with an inexpensive stereomicroscope,

2) Ken, Bob, and others are in the process of producing improved keys to nymphs (which work for exuviae too), hopefully within a few years, that will ease the process,

3) Rearing nymphs through emergence from the water body you are studying is tons of fun, and will give you known exuviae (the newly emerged adults are relatively easy to identify) that you can use for reference, and

4) You might be able to find specialists (like us) who could help you through some of the rough patches of the identification process. If you design a study that is useful and interesting, Bob might offer to do the exuviae identifications for you.

As much fun as it would be to just amble along a riverbank and toss the exuviae you find into a Skippy jar, it is valuable to standardize collections so they could be comparable among different bank sections. For example, if you wanted to learn if the Common Green Darners (*Anax junius*) in a small pond were emerging in greater numbers along the east bank than the west bank, you could set up an exuviae collecting station on each bank to compare them, but to be a fair test, you would have to make sure that you did the collecting in


Photo by Freda van den Broek

exactly the same way on each shore. ***Here are some suggestions for standardizing exuviae collections:***

1). Always *measure the length of shoreline you will sample and record the distance from the water's edge* that you will search. This will give you a defined sampling area. Flag the ends of each station so you can return to exactly the same areas for future samples. The length of shoreline can be any distance that will provide you with enough exuviae for your purposes – 100', 50', or even less if exuviae are plentiful. Just be sure to measure and record it. Distances to search inland from the water's edge are usually just 3' to 5'. Small numbers of exuviae will be further from water than that, but the great majority will be in that area.

2). *Wade in the water along the shore and look up on the bank when searching*. This gives better sight angles than if you are standing on the bank looking down at your feet, and you won't be trampling on your subjects. Be careful when sampling deep and steep shorelines for safety reasons. Such areas can sometimes be safely sampled from a canoe, kayak or small boat.

3). *Move slowly as you search*, carefully parting vegetation with your hands so that you can see exuviae that are on stems or on the ground from multiple angles. Also, inspect the washed-root areas of undercut banks. Bob usually moves about 3 feet per minute when collecting exuviae. *Collect every exuvia you find*. Not surprisingly, this is called exhaustive exuviae collecting!

4). *Consider making more than one pass (aka collecting trip) along a shoreline*. The reason is that if you only make one pass along a shoreline, you won't know what proportion of exuviae you collected of the total number present. Bob recently wrote about a multiple-pass way of standardizing

collections using four passes at each station (DuBois 2015), but making even just two passes will allow use of a population estimation tool that will give some indication of your sampling efficiency, and will enable you to make an "apples to apples" comparison of exuvial densities on different banks. If you'd like to use this tool, contact Bob to get a copy of his paper.

5). *Place exuviae collected during each pass in a jar along with a label (written in pencil) giving the date and location*. Exuviae can be kept dry (only if they are all dry) or preferably add 70% isopropanol to each jar (rubbing alcohol you can buy in any drug store).[1]

6). *Sample shortly after the emergence period* of the species of interest. Exuviae don't persist in nature for very long (half-life of exuvial persistence is not usually more than 10 days) because rains will knock them down and wash them away. Therefore, some scouting beforehand in the area you plan to sample can be helpful so that when emergence starts, you'll be ready. Many of our spring species emergence in large numbers over a fairly short time span from late May through mid-June, so that can be a good time to start looking, but try to get there before heavy rains because your collecting will be more efficient then.

7). Identifying your exuviae can be as simple or complicated as you want to make it. At the simple end, *sort them into look-alike groups*. See if you can *identify them to family or genus* using online Odonata nymph keys or get a copy of Tennessen (2008). If you focus initially on just one or a few species, you could rear some nymphs that you collect with a kick net in the same area to help figure out their identity. Don't be afraid to ask for help. If you want to jump in deep, contact Bob for information on species keys and the equipment you will need.

References

DuBois, R. B. 2015. "Detection probabilities and sampling rates for Anisoptera exuviae along river banks: influences of bank vegetation type, prior precipitation, and exuviae size. *International Journal of Odonatology* 18(3): 205-215 http://dx.doi.org/10.1080/13887890.2015.1045560.

Tennessen, K. J. 2008. Odonata, pp. 237-294 (Chap. 12). *In* R. W. Merritt, K. W. Cummins, and M. B. Berg (eds.), ***An Introduction to the Aquatic Insects of North America***, 4th ed. Kendall/Hunt Publishing Co., Dubuque, IA.

Simple outline for designing exuviae collections:

PLAN a sampling design based on what you would like to learn.

CHOOSE your location based on your sampling design (and get permission to access the site).

MEASURE your sampling area (length of shoreline and the distance up the bank to search).

SELECT your sampling date or intervals (to occur right after emergence of your target species).

COLLECT your specimens making one or two exhaustive collecting passes in your station(s).

LABEL your collecting jars with the date and location in a way that the data won't be lost.

IDENTIFY your specimens to the taxonomic level you need, or get help to do so.

ANALYZE your data as appropriate (can be as simple as summing your collection totals).

WRITE down the results of your study (so you can share what you learned in WON)!

[1]Many entomologists prefer ethanol to isopropanol as a preservative for most aquatic insects for a variety of technical reasons, but isopropanol is cheaper, easier to obtain, and works well for exuviae. Exuviae can be stored in a weaker alcohol solution than nymphs (at least 80% for nymphs, anything > 50% for exuviae).

Comet Darner *(Anax longipes)* exuvia specimen preserved in alcohol

MEMBERSHIP MATTERS

Membership in the Dragonfly Society of the Americas (DSA)

Membership in the DSA is open to any person in any country and includes a subscription to ARGIA. Dues for individuals in the US, Canada or Latin America are $20 US for regular membership and $25 US for institutions or contributing membership, payable annually on or before 1 March of membership year. Dues for members in the Old World are $30 US. Dues for all who choose to receive Argia in PDF form are $15. The Bulletin of American Odonatology is available by a separate subscription at $20 US for North Americans and $25 US for non-North Americans and institutions. Membership dues and BAO subscription fees should be mailed to Jerrel Daigle, 2067 Little River Lane, Tallahassee, FL, USA 32311. More information on joining DSA and subscribing to BAO may be found at www.dragonflysocietyamericas.org/join

Wisconsin Dragonfly Society (WDS) Membership Application

Membership in the WDS is open to any person in any state.

The WDS dues are as follows: $5 annual single member; $7.50 for family membership.
WDS costs are minimal; members must opt-in before WDS will share their e-mail address or other contact information with other members of WDS.

Send check or money order to:

Matt Berg

572 N. Day Rd

St Croix Falls, WI 54024

Name _____

Address _____

City, State, Postal Code _____

E-mail _____ Share? _____

Check membership category that applies:

Annual Individual Membership: $5.00 ☐ Annual Family Membership: $7.50 ☐

Lifetime Individual Membership: $50.00 ☐ Lifetime Family Membership: $75.00 ☐

Total enclosed $ _____

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Recommended Reading

ARGIA Vol. 27, No. 3, 20 September 2015

Front cover: Male Blue-winged Helicopter Damselfly (*Megaloprepus caerulatus*), La Selva Biological Station, Costa Rica, 29 May 2015. Photo by Steve Valley.

RESOURCES

Links

http://wiatri.net/inventory/odonata/WDS/Images/WDS_ConstitutionBylaws.pdf
Wisconsin Dragonfly Society constitution and by-laws

http://wiatri.net/inventory/odonata/WDS/Images/WDS_Brochure.pdf
Printable brochure of the WDS

http://wiatri.net/inventory/Odonata/ Resource for citizen participation

http://wiatri.net/inventory/Odonata/Resources.cfm List of resources from Bob DuBois

http://www.facebook.com/groups/wisconsindragonflysociety/ - our group on Facebook - it's a joy to see these contributions from many people and our members helping them identify their odes.

www.facebook.com/WisconsinDragonflySociety/photos stream - our Facebook page photos. You can go to this link even if you are not a Facebook member.

http://bryanpfeiffer.com/2013/12/31/the-year-in-flight/#gallery/4056/264/0 Bryan Pfeiffer is a blogger who enjoys dragonflies as well as birds. This slide show has several beautiful pictures of odonates. "Follow" him and you'll get lots of good reporting on the habits of the Odonata.

http://bryanpfeiffer.com/2014/01/09/surviving-the-polar-vortex/ - an amazing story of the early collecting of Philip Powell Calvert in Costa Rica.

http://bryanpfeiffer.com/ - the home page of Bryan Pfeiffer's website – many great photos here and news of GLOM, etc.

http://www.odonatacentral.org/ - OdonataCentral hosts the official website of the Dragonfly Society of the Americas. The journals *Argia* and the *Bulletin of American Odonatology* are online and searchable.

Supplies

Nets, vials, pins, etc. can be purchased from BioQuip Products, Inc., website:
http://www.bioquip.com

Collecting envelopes can be acquired on-line from: see tab for Books and Supplies, Envelopes
http://www.iodonata.net/

RESOURCES

Recommended Guide Books

· Burton, Paul. 2010. ***Common Dragonflies of Northern Door County****:* Stonehill Publishing; Ephraim, Wisconsin. (Available from www.doorcountybooks.com)

· Legler K., D. Legler, and D. Westover. 2013. ***Color Guide to Dragonflies of Wisconsin***: Edition 5.1; Karl Legler, Sauk City, Wisconsin. This new version has been expanded to include all WI species of dragonflies; available from http://uwarboretum.org/bookstore/

· Lam, Ed. 2004. ***Damselflies of the Northeast*****:** Biodiversity Books; Forest Hill; New York. 96 pp. (Note: very useful for WI, having all but one of our species.) http://www.edlam.net/book.html

· DuBois, R. 2005. ***Damselflies of the North Woods***: Kollath-Stensaas Publishing; Duluth, Minnesota. 128 pp. (Omits several species found only in the southern-most counties - out of print but useful if you can find a copy at a reasonable price.)

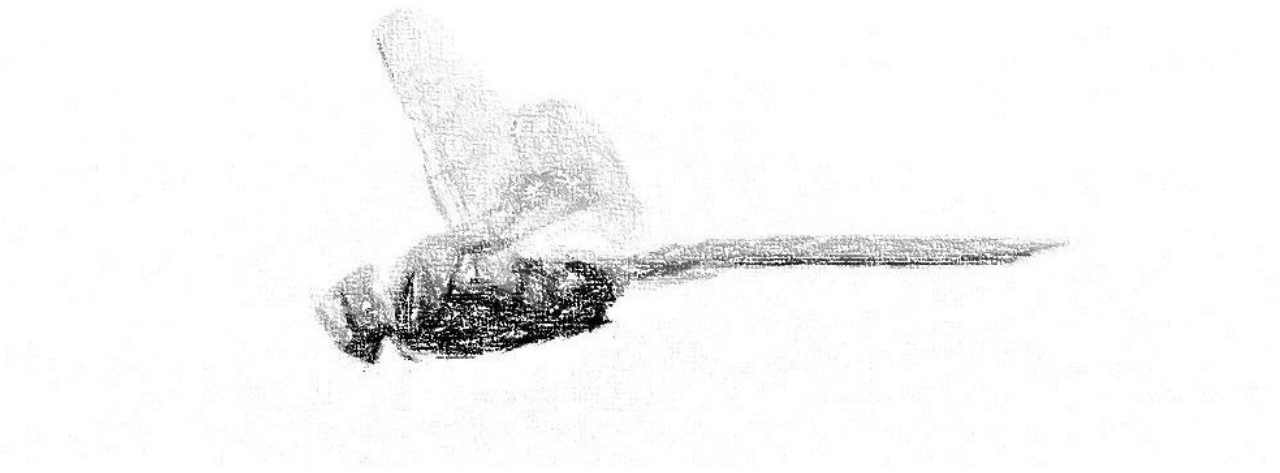
· Mead, K. 2009. ***Dragonflies of the North Woods***: 2nd Edition. Kollath-Stensaas Publishing; Duluth, Minnesota. 193 pp. http://www.dragonfliesofthenorthwoods.com

· Paulson, D. 2012. ***Dragonflies and Damselflies of the East***: Princeton University Press, Princeton, NJ. (This is the most complete reference for eastern North America).

· Garrison, M. 2011. ***Damselflies of Chicagoland: A Photo Field Guide***, version 2, 135 pp. (Free PDF down-load). http://fieldguides.fieldmuseum.org/guides/guide/388

· Rosche, L., J. Semroc, L. Gilbert. 2008. ***Dragonflies and Damselflies of Northeast Ohio***: 2nd Edition. Cleveland Museum of Natural History, Ohio, 300 pp. http://www.ddneo.info

· Tennessen, Ken. 2010. ***Waushara County Dragonflies and Damselflies****:* 32 pp. (Available from the author: ktennessen@centurytel.net).



Annual Meeting to be held in Black River Falls

Dan Jackson

The Wisconsin Dragonfly Society (WDS) will hold its next annual meeting on the weekend of June 25-26, 2016 in Black River Falls, Wisconsin. The meeting place for the event will be the shelter at the Castle Mound Campground which is located about 1 mile east of Black River Falls on Hwy 12. We will start each morning at the shelter and, if the weather cooperates, we'll head out into the surrounding area to look for dragonflies and damselflies at the many diverse habitats located in the area.

We will hold a business meeting at the start of the day on Saturday. This section of the event will likely take about ½ hour and it may be followed by a short presentation before the day's field trips begin. On Sunday, we will assemble at the shelter and then head out for the day. Those who are interested in doing so may reconvene at the shelter at the end of each day's trips to compare notes on sightings and experiences.

In the event of inclement weather, the shelter may be also be used for indoor activities such as presentations and demonstrations.

Black River Falls is the county seat of Jackson County. Jackson County and the nearby sections of Clark and Wood Counties offer a tremendous diversity of wetlands, ponds, streams, and rivers, with a huge potential for seeing many species of dragonflies and damselflies. There are over 100 species listed for Jackson County alone, which represents close to 2/3 of the species found in the entire state of Wisconsin!

This meeting is timed to be at the end of the Clubtail flight season, the beginning of the Emerald flight season, and the middle of the flight season for many damselflies. If the weather cooperates, this should be a great opportunity to see, study, and enjoy many species of Odonata.

The Castle Mound Campground is located in the Black River State Forest and has about 30 sites for those interested in camping. There are other campgrounds in the area including another state forest campground on the East Fork of the Black River and a county campground on Lake Arbutus. The area also-has a variety of restaurants and motels to choose from.

We hope that you will add this event to your calendar as it is a wonderful location for our next annual meeting!


Happy Holidays!