Ohio Dragon-Flyer

Newsletter of the Ohio Odonata Society

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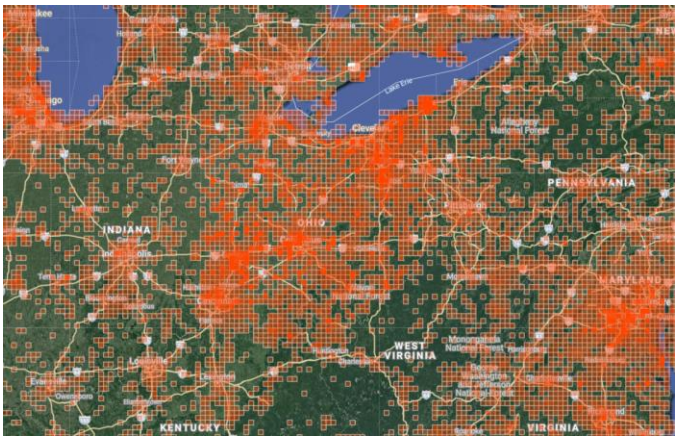
Ohio's an Ode Hotspot



Odonata (iNaturalist® 2021)

There are four times as many dragonflies in Ohio than in the five bordering states combined.

"Huh?"

There are four times as many dragonflies *observed* in Ohio than in the five bordering states combined.

Missing the key word – *observed,* the statement was inaccurate. The corrected statement offers less about the Ode population but more about the Ode observers; it indicates the presence of an engaged and knowledgeable naturalist community here in Ohio – a community science hotspot driving the Ohio Dragonfly Survey. Community Science is the focus of this month's newsletter.

Observing the Duckweed Firetail, from left to right – Pat Osterhaus, Dennis Meyers (discovered the Firetail), Jim Lundberg, David Tibbetts. Group photo credit: Cathy Gunn. Cover photo credit: Jim Lundberg.

Ohio Dragonfly Survey

The Ohio Department of Natural Resources (ODNR) Division of Wildlife mission was broadened enormously in 1973 by the statutory addition of several hundred more species of wild animals to its care, and two years later by the legal mandate to identify, manage, and protect all endangered species in Ohio. (ODNR)

In order to identify endangered species in Ohio, a scientific survey was required. The original Ohio Odonata Survey ran from 1991 – 2001. This first survey was based on museum specimens, new collections of specimens, and published articles in peer reviewed journals.

An extensive examination of the dynamic list is conducted every five years, and the ODNR Division of Wildlife determined a need to update the original survey – but how to conduct it?

One scenario, *from an over-active imagination*, involves the ODNR Division of Wildlife Chief and staff huddled over a winter campfire, roasting S'mores and discussing difficulties encountered recruiting over-skilled but under-paid associate researchers willing to slog through mosquito-laden bog, tick-infested meadow and a slew of unidentified observations. A young firebrand, more tech-savvy than the rest, pumps the air with his roasting stick, and blurts, *"Eureka!"* First apologizing for slinging molten marshmallow onto the Chief's park-uniform, he explains that, community members might be persuaded to do the survey, and on a far greater scale than otherwise possible. *"And, the bug-bitten fools do the job for free!"*

The reality is different; the Chief, she does not wear a park uniform, and community science, it was not a new concept; researchers have long recognized that, for certain projects, community science minimizes cost and time and maximizes data sampling. In fact, the ODNR Division of Wildlife had collaborated with the Ohio Odonata Society on the original Odonata Survey (1991-2001).

Advances in digital photographic equipment and online data collection sites have made community science even more relevant since 1990. But how did the iNaturalist platform work for the Ohio Dragonfly Survey? As it turns out, quite well. Unlike many orders of insects, the majority of species in the Order Odonata can be correctly identified from community images.

For 2017-2020, we have ID to species for 91% of the submitted observations, ID to genus for another 2%, then the balance (7%) as not Research Grade - meaning they've been left as unidentified or to a classification about genus. (Jim Lemon)

The updated survey ran from 2017 through 2019 with the following goals:

1. To identify every species known for each county.
2. Identify species introduced/established in Ohio since the original survey.
3. Determine changes in distribution and abundance, especially rare species.
4. It will also culminate in a lay-person book on Ohio Dragonflies and Damselflies similar to the Ohio Bird Atlas.

"That's the yardstick, so, how did the survey measure up?"

Identifying every species known for each county is an unending process since we always want to know which species are where – though we have slowed down a bit.

Identifying species introduced/established in Ohio since the original survey is also, technically, an unending process, and we expect new species to show up and establish soon as things move northward.

Determining changes in distribution is relatively easy to document and worth still trying to do. Following points 1 and 2 will help document changes in distribution. Documenting changes in abundance requires standardized sampling efforts, which we do not really do.

The book is still a work in progress. I need to get a few days where I can get back to reviewing comments. Dave (McShaffrey) has been working on it the most.

(MaLisa Spring)

Ohio Dragonfly Survey has been a success in acquiring data with 125,000+ observations, at this point, from over 3,400 different people. We have Research Grade observations for 157 species. All of which is commendable. Additionally,

4 new Odonata species were added in the period 2017-2020.

The Ohio Odonata Society database has 172 species defined. While several of these are single observations, our survey species list falls short of the historical record. Part of this may be species loss, part may be inadequate survey. Also note that we're comparing 100+ year of data to 4 years - but quadrupling the data should have some advantages for the survey (OOS database had just under 30,000 records prior to the new survey. With 2020 data, the total was just under 120,000 records).

Setting aside the question of species loss, consider our iNaturalist survey numbers. If we set a baseline requirement of monthly observations for May-Sep with an average of 10 observations/month, only 22 counties (1/4 of 88) have data to meet this baseline. Even this may be inadequate to find rarities, particularly in months with rare species that have a restricted flight date range.

If we stretch to 6 months (May-Oct) to pick up a few more species, the lowest quartile only has 3 counties where we increased the species count in the recent survey over historical data. Even our counties with the most observations saw marginal increases in the species record.

While we had 877 new county records for 2017-2020, we also had 1859 instances of a species in a county from historical data that we failed to confirm in the new survey.

Comparing record counts of species, 94 species had fewer observations in the survey than historical records, with 20 historical species absent from survey data. The biggest declines were for Ruby Meadowhawk and Fawn Darner: Ruby Meadowhawk is an ID issue. Fawn Darner has many larval records from OEPA. (Aside - What happened to our Pronghorn Clubtails and Rainbow Bluets?) 72 species had increases in the survey numbers - 12 species with 1000+ more (Wow to jumps in Slaty Skimmer, Carolina Saddlebags, Eastern Ringtail, Banded Pennant, Dusky Dancer).

Taken together, it seems we need some solid planning to fill in gaps and/or determine a species status - Shadowdragons, rare Emeralds, Meadowhawks.

(Jim Lemon)

While the listing process identifies individual wildlife species needing protection, it also provides direction for the allocation of personnel time and funds in Division programs and projects (ODNR). Odonates, their lives inextricably linked both to land and water, are a bellwether for the health of our woodlands and wetlands. Endangered status not only protects Endangered species but other species within their protected habitat. Decisions about habitat preservation and a better understanding of the effects of pollution and warming trends reference data from our observations. Although the sponsored period ended in 2019, our community continues the survey with volunteer observation, identification, data compilation and analysis. The extensive database in the continuing Ohio Dragonfly Survey tracks trends and is building an exceptional baseline for future research. Bug-bitten fools, we may be, but observation of nature is our recreation and our refuge. When we also share our observations, we protect our communities.

Ohio's Listed Species

The ODNR Division of Wildlife determines which species are listed Endangered, Threatened, Species of Concern, Special Interest, Extirpated or Extinct. Conservation status for a species found on iNaturalist does not match the ODNR conservation status. iNaturalist partners with NatureServe for conservation status rankings within the United States and Canada. Status criteria, goals and designations vary between the two agencies. For example, the NatureServe status descriptions of *Imperiled* or *Critically Imperiled* are closest to the Ohio Department of Natural Resources status description of *Endangered*. NatureServe status *Threatened* is closest to ODNR status *Vulnerable*. Summaries of Ohio currently listed species include status from both agencies – ODNR status wearing blue and NatureServe status wearing green.

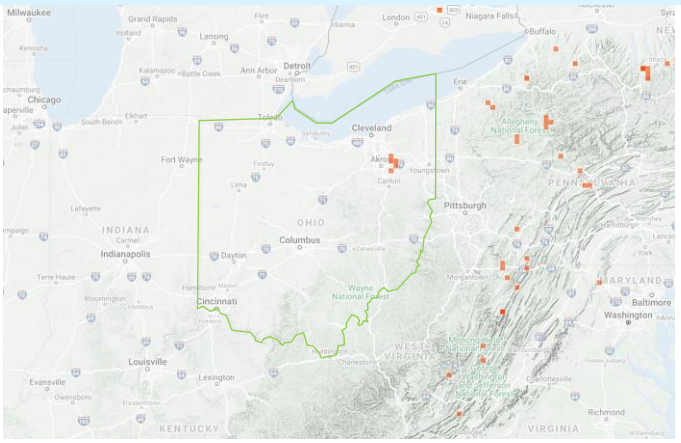
ODNR Status

NatureServe Status

(Maps – iNaturalist® November 2021)

Endangered – A native species or subspecies threatened with extirpation from the state. The danger may result from one or more causes, such as habitat loss, pollution, predation, interspecific competition or disease (ODNR). Currently, 13 species of dragonflies and three species of damselflies reside on the Ohio Endangered Species List:

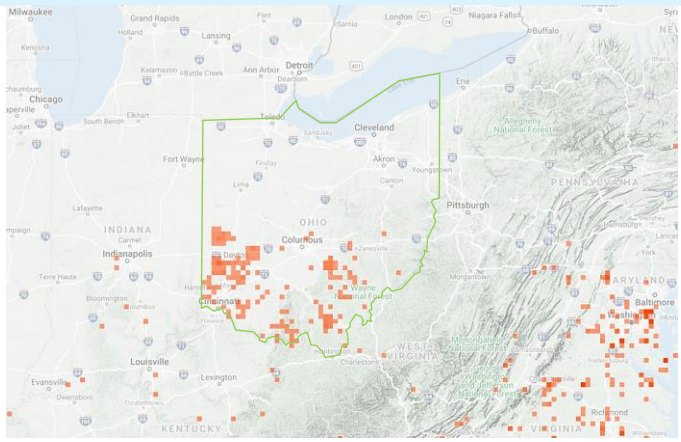
Endangered



American Emerald *(Cordulia shurtleffi)*
Core populations in Canada and scattered populations in the Appalachians. Beaver lakes and bog ponds typical (Paulson 2011). The American Emerald, in Ohio, is on the edge of its range. A handful of Ohio observations in 2018, 2019 and 2020 east of Akron.

Globally Secure Ohio Critically Imperiled.

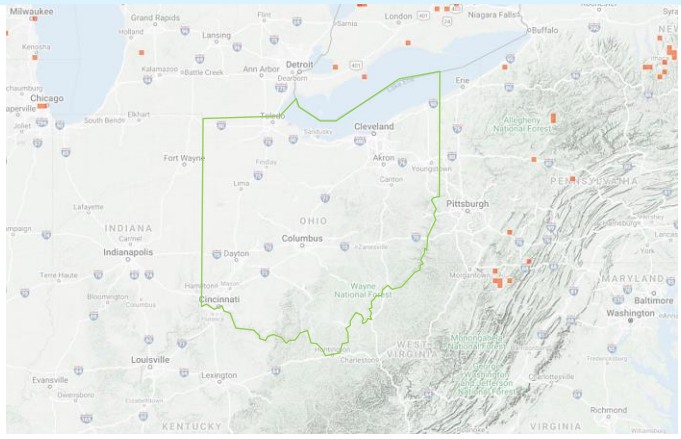
Endangered



Blue Corporal *(Ladona deplanata)*
Southeastern United States. Lakes, ponds, streams, ditches with at least some mud (Paulson 2011). The Blue Corporal in Ohio has expanded north past Interstate 70.

Globally Secure Ohio Imperiled.

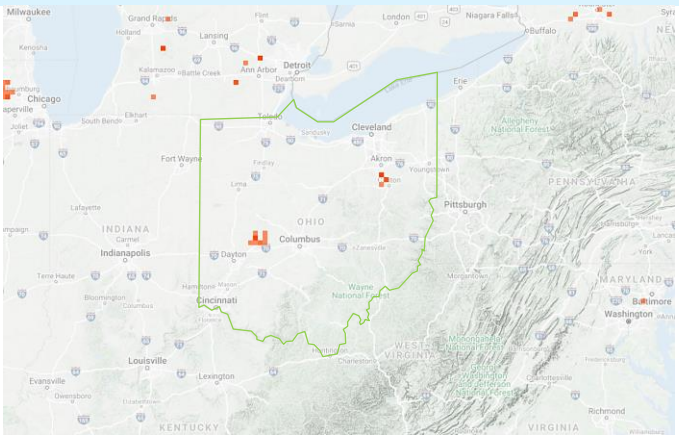
Endangered



Canada Darner *(Aeshna canadensis)*
The aptly-named Canada Darner is also found scattered through the northern Appalachians. Forest lakes & ponds, with abundant emergent vegetation, also bogs and beaver ponds (Paulson 2011). There have been no recent observations in Ohio.

Globally Secure Ohio Critically Imperiled

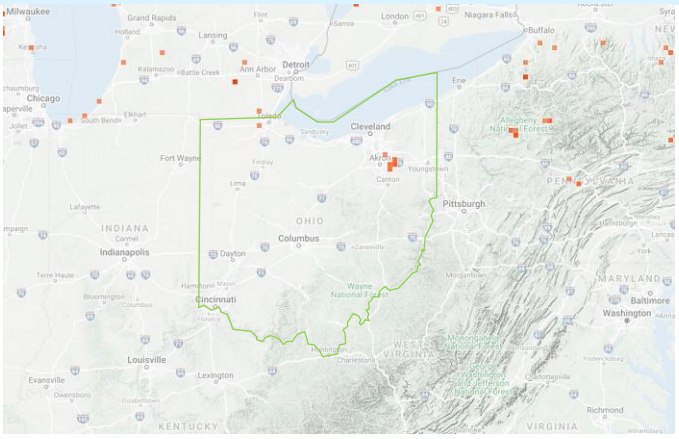
Endangered



Elfin Skimmer *(Nannothemis bella)*
Eastern United States and Canada. Sphagnum bogs and sedgy seepage areas at lake edges (Paulson 2011). With niche habitat requirements, the diminutive Elfin Skimmer has found strongholds in two spots in Ohio.

Globally Apparently Secure Ohio Critically Imperiled

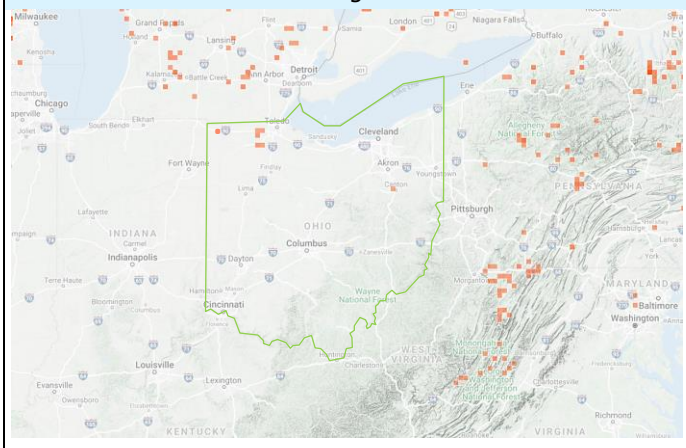
Endangered



Frosted Whiteface *(Leucorrhinia frigida)*
Common in Southeastern Canada and Northeastern United States. Mud-bottomed lakes and ponds with abundant emergent vegetation especially pools in fens and bogs (Paulson 2011). A northern species, observations near Toledo and Akron represent the Frosted Whiteface southern range limit.

Globally Secure Ohio Critically Imperiled

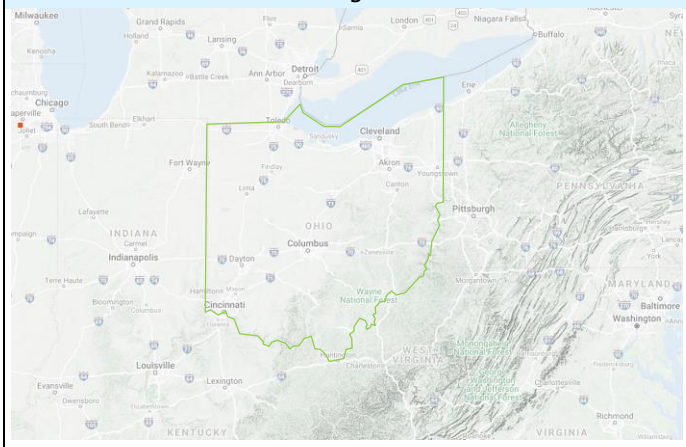
Endangered



Chalk-fronted Corporal *(Ladona julia)*
Canada and Western and Northeastern United States. Lakes and ponds. Few Ohio observations, all in N Ohio.

Globally Secure Ohio Critically Imperiled

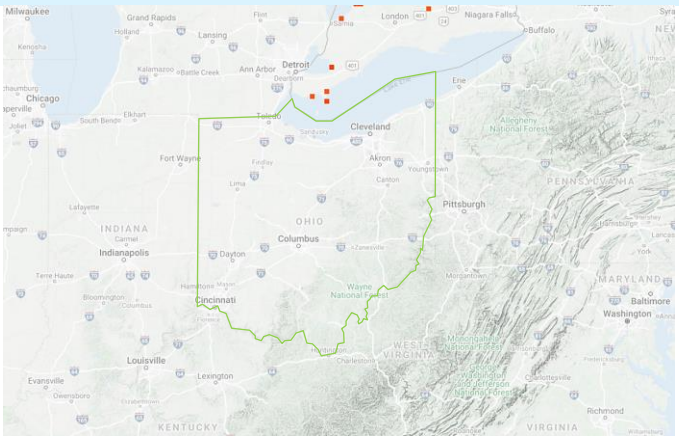
Endangered



Hine's Emerald *(Somatochlora hineana)*
A few spots in the Midwest, tip of Michigan and Toronto. Discovered 1931 near Indian Lake in Logan County by Ohio History Connection's first curator of natural history, Dr. James Hine. Grass and sedge fens (meadows) with no more than a sheet of water in depressions, usually fed by ground water (Paulson 2011). The Hine's Emerald has developed a behavior to tolerate drought conditions in the larval stage by moving into crayfish burrows. The only federally endangered dragonfly, the Hine's Emerald is the subject of breeding programs in other states. Curator Emeritus of the Ohio History Connection, Bob Glotzhober and other members of the OOS conducted surveys, but there have been no Ohio sightings since 1961.

Globally Imperiled Ohio Presumed Extirpated

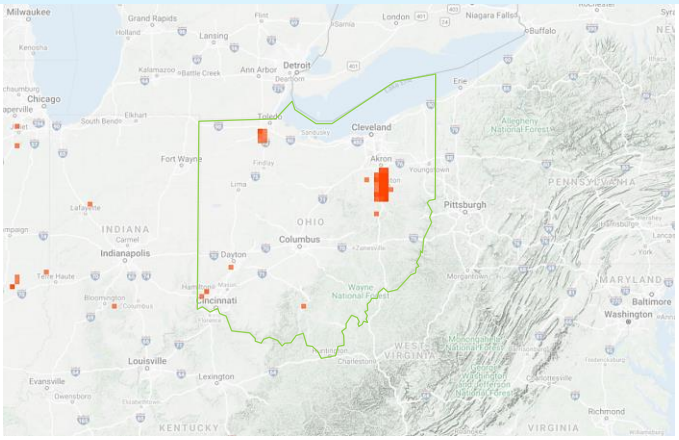
Endangered



Mottled Darner *(Aeshna clepsydra)*
Northeastern United States and Southeastern Canada. Most references indicate the Mottled Darner prefers open waters. Males fly along close to shore vegetation or bog matt (Paulson 2011). The Mottled Darner has no recent observations in Ohio.

Global Apparently Secure Ohio Critically Imperiled

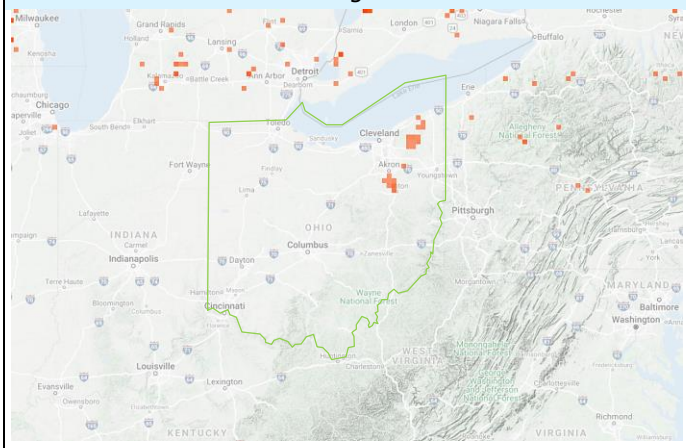
Endangered



Plains Clubtail *(Gomphus externus)*
Widespread in the Midwest. Sandy or muddy streams and rivers with moderate current, open grassy or wooded banks (Paulson 2011). Observed annually in the Canton – Akron region which is the Plains Clubtail most easterly population.

Globally Secure Ohio Critically Imperiled

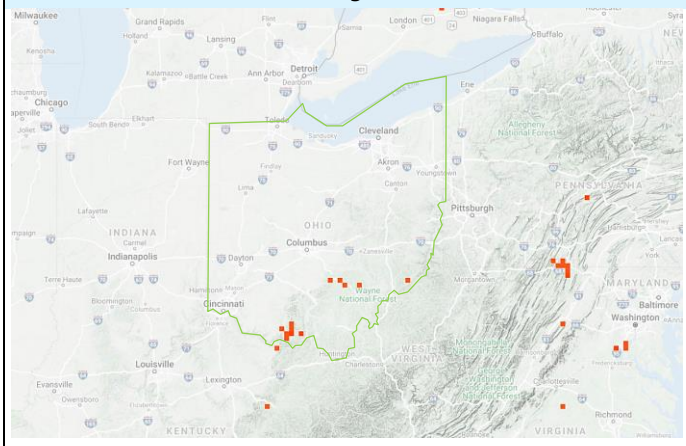
Endangered



Racket-tailed Emerald *(Dorocordulia libera)*
Southeastern Canada and contiguous northern United States. Lakes and ponds commonly associated with bogs (Paulson 2011). In NE Ohio but no 2021 observations.

Globally Secure Ohio Critically Imperiled

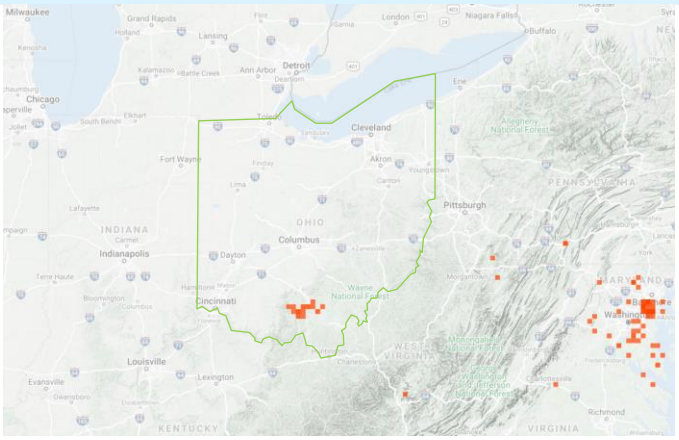
Endangered



Uhler's Sundragon *(*Helocordulia uhleri*)*
Southeastern Canada and scattered through the Eastern United States. Wide habitat choice from woodland streams to open rivers (Paulson 2011). Ohio observations, all south of Interstate 70, are hit and miss year to year.

Globally Secure Ohio Critically Imperiled

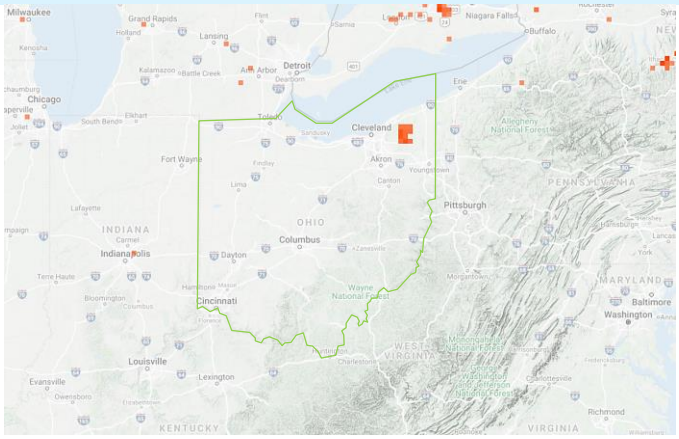
Endangered



Yellow-sided Skimmer *(Libellula flavida)*
Southeastern United States. Boggy ponds, seeps, slow streams and weedy ditches (Paulson 2011). Observations in Southcentral Ohio appears to be separated from core populations states east and south.

Globally Secure Ohio Critically Imperiled

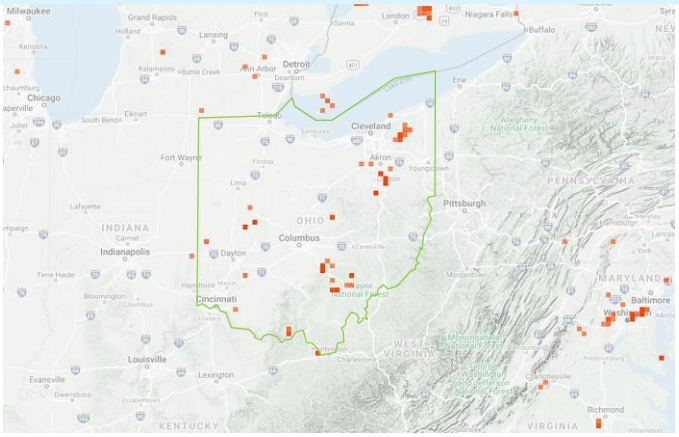
Endangered



River Jewelwing *(Calopteryx aequabilis)*
Northern species. Clear streams and rivers with slow to moderate current and sub-emergent aquatic vegetation (Paulson 2011). Ohio observations limited to NE.

Globally Secure Ohio Critically Imperiled

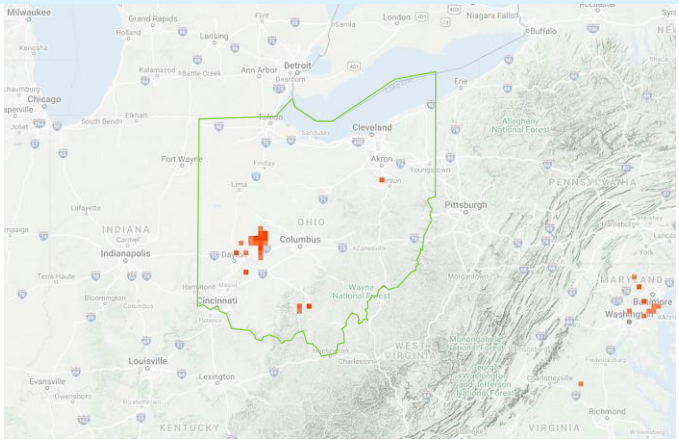
Endangered



Lilypad Forktail *(Ischnura kellicotti)*
Wide-ranging eastern species. The Lilypad Forktail has found suitable habitat in several Ohio locations. Ponds and lakes with water lilies of any species (Paulson 2011). Observations and locations in Ohio are on the rise.

Global – Secure. Ohio – Critically Imperiled.

Endangered

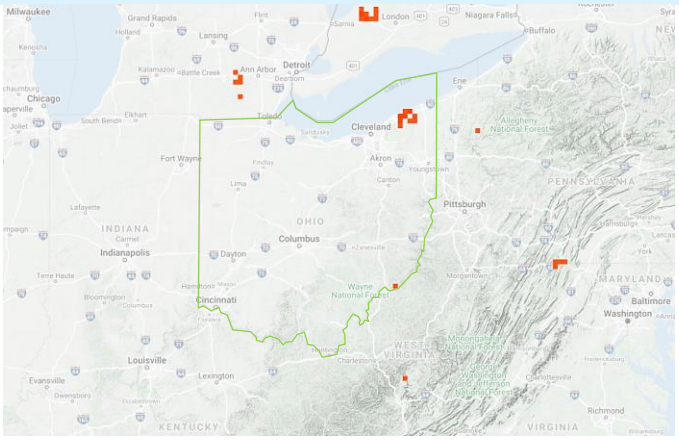


Seepage Dancer *(Argia bipunctulata)*
Southeastern and eastern seaboard states. Seepage or bog waters with abundant vegetation, also weedy flowering ditches (Paulson 2011). Semi-niche species with few Ohio breeding locations.

Globally Apparently Secure Ohio Critically Imperiled

Threatened – A species or subspecies whose survival in Ohio is not in immediate jeopardy, but to which a threat exists. Continued or increased stress will result in it becoming endangered. (ODNR). There are three dragonflies and three damselflies on the Ohio Threatened Species List:

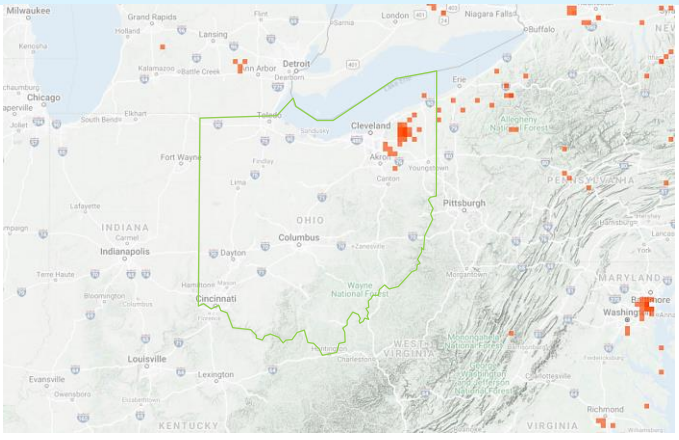
Threatened



Green-faced Clubtail *(Gomphus viridifrons)*
Northern mid-west and Appalachian states. Good-sized rocky rivers with moderate to swift current, sand and silt on the bottom (Paulson 2011). Ohio observations NE and one observation in Washington County.

Globally Vulnerable *Ohio Imperiled*

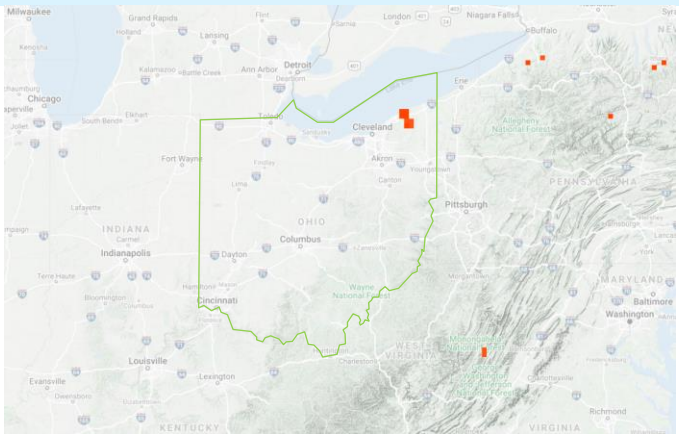
Threatened



Harlequin Darner *(Gomphaeschna furcillata)*
Primarily eastern seaboard and southeastern states. Shallow pools and ditches in swampy areas or sphagnum bog ponds (Paulson 2011). Ohio observations limited to NE.

Globally Secure *Ohio Critically Imperiled*

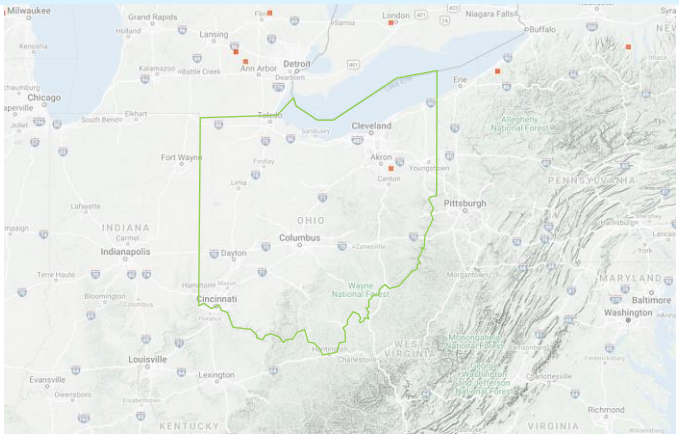
Threatened



Riffle Snaketail *(Ophiogomphus carolus)*
Northeastern rivers. Clear rocky and sandy streams and rivers with pools and riffles bordered by riparian shrubs and trees (Paulson 2011). Ohio observations limited to NE.

Globally Secure *Ohio Critically Imperiled*

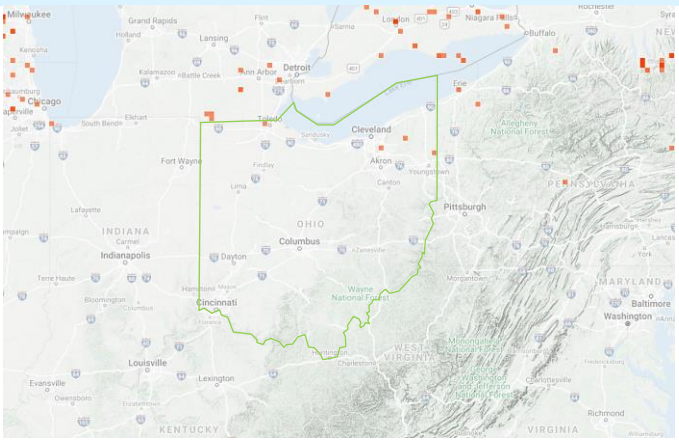
Threatened



Boreal Bluet *(Enallagma boreale)*
Canada and northern United States. Ponds and lake margins with much emergent vegetation (Paulson 2011). Difficult to separate from the Northern Bluet without close examination, there are no recent research grade observations of the Boreal Bluet in Ohio.

Global Secure *Ohio Imperiled*

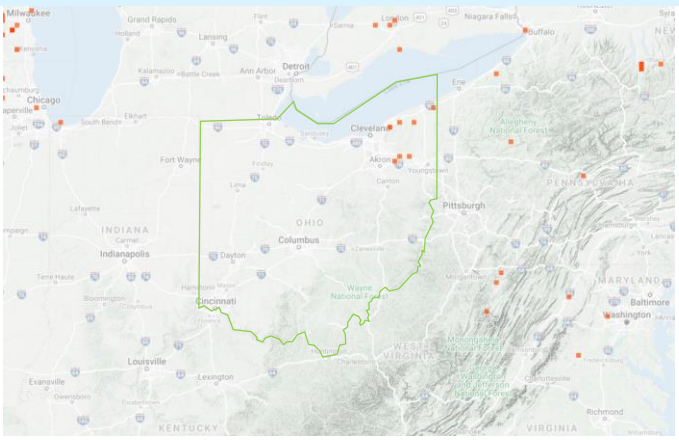
Threatened



Marsh Bluet *(Enallagma ebrium)*
Canada and northern United States. Lakes and ponds typically bordered with abundant emergent vegetation (Paulson 2011). Another Northern species, Marsh Bluet observations in Ohio are historically few and diminishing. Recent observations are limited to N Ohio.

Global Secure Ohio Vulnerable.

Threatened

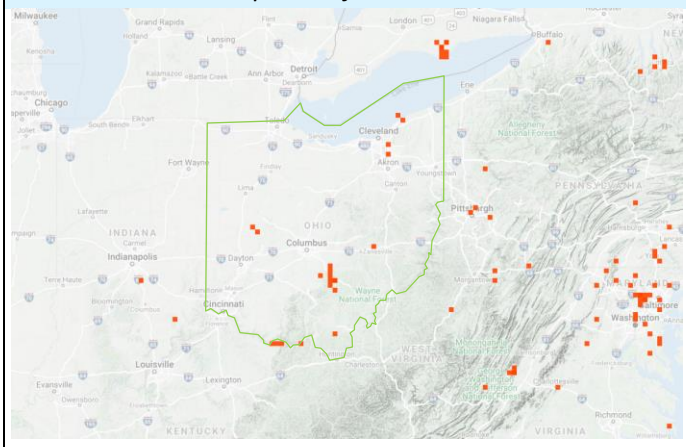


Northern Bluet *(Enallagma cyathigerum)*
Canada and northern United States. Marshy and open lakes and ponds (Paulson 2011). There are limited Ohio observations of this northerly species in the last two decades and all from NE counties.

Globally Secure Ohio Imperiled

Special Concern – A species or subspecies which might become threatened in Ohio under continued or increased stress. Also, a species or subspecies for which there is some concern but for which information is insufficient to permit an adequate status evaluation. (ODNR). There is one dragonfly on Ohio's Species of Concern List:

Species of Concern



Tiger Spiketail *(Cordulegaster erronea)*
Eastern United States. Small forest streams and seeps, often with Skunk Cabbage and interrupted fern (Paulson 2011). A niche species, observations of the Tiger Spiketail are few as they require focused searches in areas unlikely to yield other species.

Globally Apparently Secure Ohio Imperiled

Revision Process and Status

The foundation of the current Ohio Listed (Odonata) Species revision process is the Ohio Dragonfly Survey.

The revision process continues by eliciting listing proposals from professional and amateur biologists and wildlife advocacy organizations – many of these people regularly post to and identify observations in the Ohio Dragonfly Survey. Even armed with comprehensive survey data, the process has challenges:

<u>Interpretation and Application</u>

Species with increasing observations may be due to increased sampling. Some species may be over-reported; single rare individuals have drawn multiple observations from the Community. Some species that appear rare may

be under-reported due to species behavior such as flight limited to late or early day, treetop perching or less-accessible habitat. Some species are under-reported or not identified down to species due to difficult taxonomy without in-hand study. Another issue that requires interpretation is sampling disparity between Ohio and the five surrounding states. For example, Ohio appears to be an isolated stronghold for the Blue Corporal in the Midwest, but is likely the advancing edge of a similar (under-reported) contiguous population in bordering states south.

Listing proposals are submitted; that part of the process is complete. Armed with the listing proposals, the ODNR Division of Wildlife examines, discusses, proposes changes, justifies, drafts and re-drafts. Whether this is done around a campfire with or without S'mores is a closely held secret.

The biggest threat is habitat loss. The ODNR Division of Wildlife must determine whether the species has a specialized habitat, is that habitat decreasing and can it be recovered? The state can protect habitat by controlling development and pollutants but has no control over warming trends that change vegetation and water temperatures. The Ohio Dragonfly Survey data indicates that Odonates do not respect existing range maps and state lines; some southerly Odonates are increasing in Ohio, while northerly Odonates are decreasing. Species at the edge of a larger, contiguous range with viable population(s) within the core of its range but are at low breeding densities in the state fall in a category of **Special Interest**. Minimal management efforts will be directed for these species (ODNR). Decreasing species that are not at the edge of a larger contiguous ranges are considered for listing **Special Concern, Threatened or Endangered**.

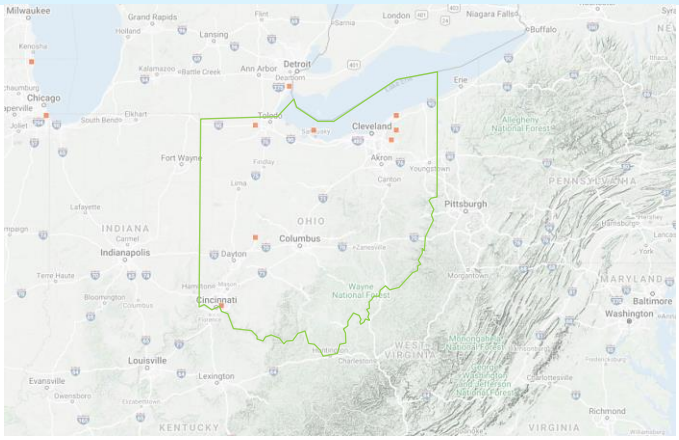
If the Division of Wildlife has followed the ODNR timeline, they have already submitted final drafts and, now, it follows an executive process that ultimately results in rulemaking (Ohio Revised Code 1531.25) and revision of Publication 316 sometime Spring 2022.

"Another 5-year listing cycle – so, what's new?"

What's new is that this Ohio's Listed Species revision draws recent and relevant data from the community's Ohio Dragonfly Survey. Ohio Listed Species up-lists, down-lists, listings and de-listings – expect movement!

CURRENTLY UNLISTED - This list includes some, but not all, of the currently unlisted species considered for listing in the 2022 revision.

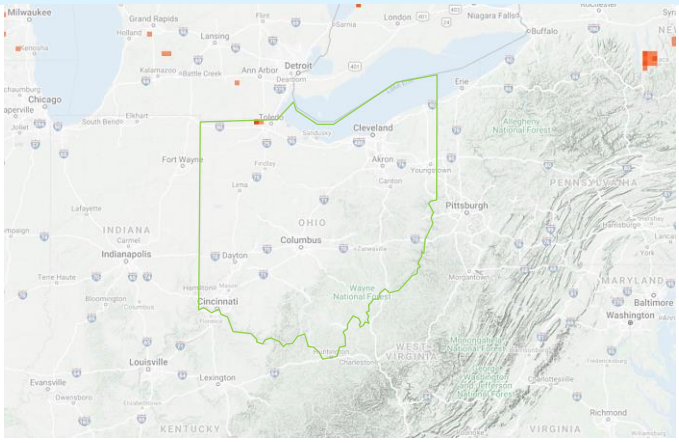
Currently Unlisted



Band-winged Dragonlet *(Erythrodiplax umbrata)*
South America, Texas, Florida and scattered observations elsewhere. Shallow marshy ponds, often temporary, with scattered to dense sedges and grass (Paulson 2011). Few and scattered Ohio observations of this southern species since 2006 might represent anthropological appearances.

Globally Secure Ohio No status

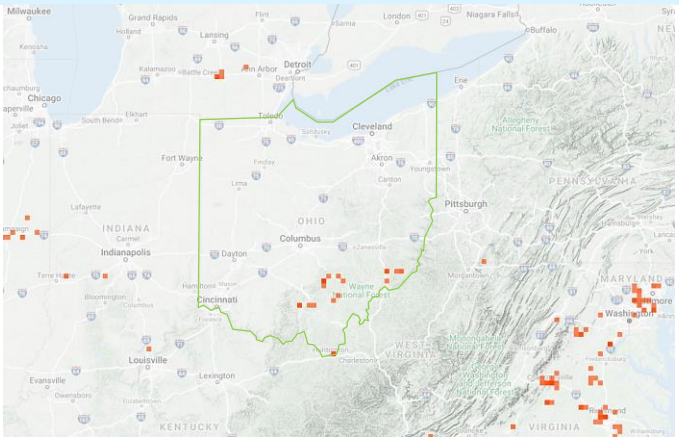
Currently Unlisted



Belted Whiteface *(Leucorrhinia proxima)*
Canada, Northeastern United States and scattered through the Rocky Mountains. Lakes and ponds with emergent vegetation (Paulson 2011). The Belted Whiteface in Lucas County Ohio is on the southern edge of its range.

Globally Secure Ohio No Status.

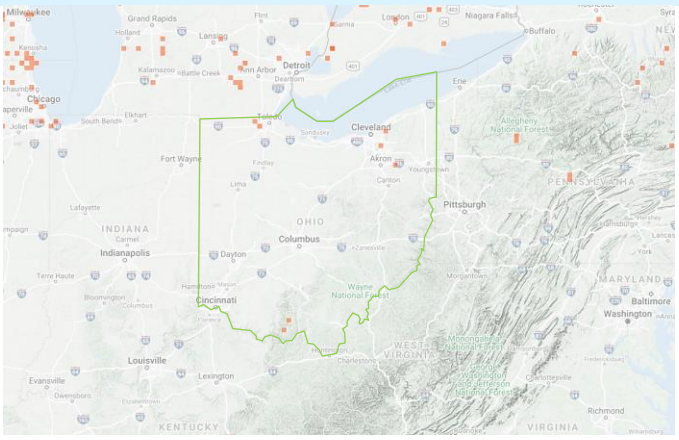
Currently Unlisted



Common Sanddragon *(Progomphus obscurus)*
Wide range throughout the eastern United States. Sandy woodland streams, sandy lakes in northern part of range, sometimes rocky rivers (Paulson 2011). Observed annually in SE Ohio since 2017.

Globally Secure *Ohio Vulnerable.*

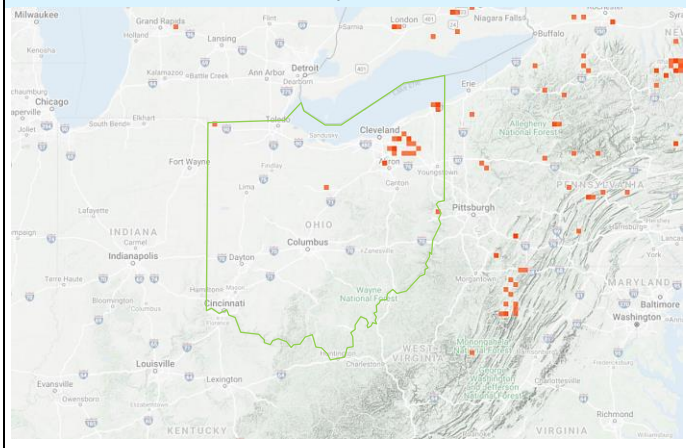
Currently Unlisted



Four-spotted Skimmer *(Libellula quadrimaculata)*
Canada. Northern United States. Lakes and ponds with mud bottoms, prefers acidic waters (Paulson 2011). Northerly species, but the few Ohio observations also include southern Ohio.

Globally Secure *Ohio Vulnerable.*

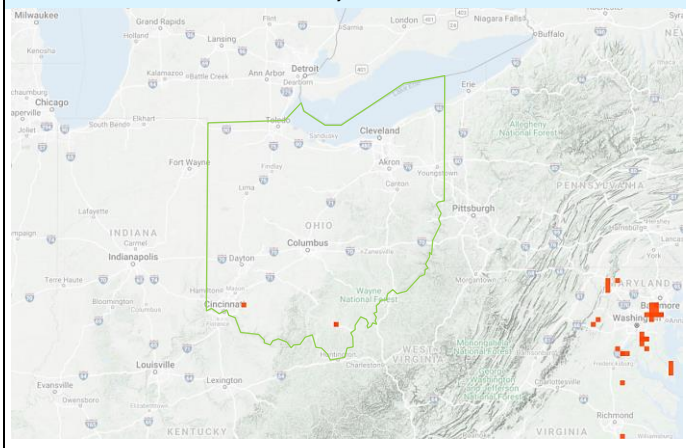
Currently Unlisted



Delta-spotted Spiketail *(Cordulegaster diastatops)*
Highest concentration of Delta-spotted Spiketail observations is in the Province of Ontario and the Northeastern United States. Spring-fed seeps and small streams, usually wooded but also open glades (Paulson 2011). Of the 49 observations within Ohio, most are concentrated in a region east of Akron and Cleveland.

Globally Secure *Ohio Imperiled.*

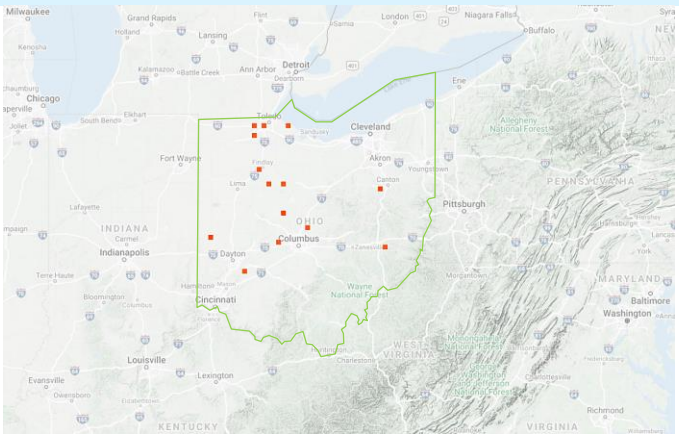
Currently Unlisted



Double-ringed Pennant *(Celithemis verna)*
Southeastern United States. Open ponds and small lakes with band of emergent vegetation along shore (Paulson 2011). A single 2021 observation in Clermont County could indicate the Double-ringed Pennant is expanding from Jackson County where it has been observed annually from 2019-2021.

Globally Secure *Ohio No Status.*

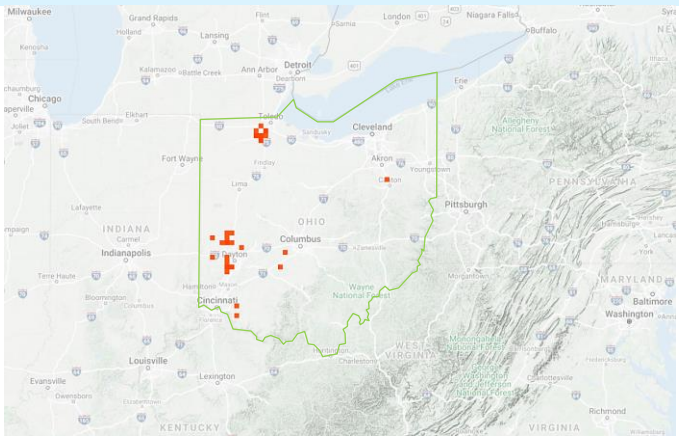
Currently Unlisted



Gilded River Cruiser *(Macromia pacifica)*
Scattered observations from Texas to Ohio. Wooded streams and rivers, sometimes large sand-bottomed lakes (Paulson 2011). Ohio observations scattered throughout the state and some years absent.

Globally Apparently Secure Ohio Imperiled

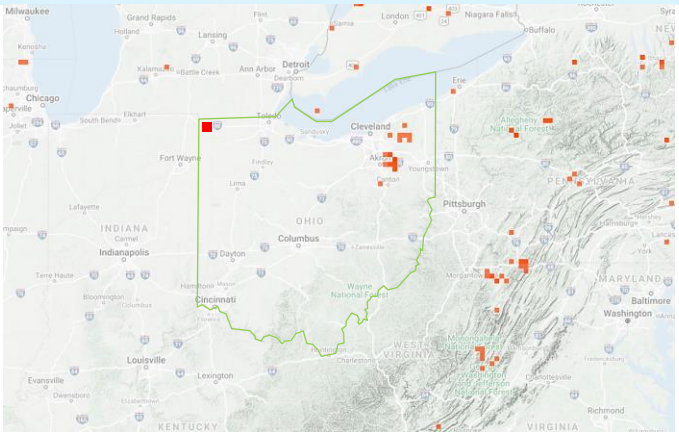
Currently Unlisted



Handsome Clubtail *(Gomphurus crassus)*
Scattered distribution from Alabama to Ohio. Fair-sized rocky rivers in wooded areas (Paulson 2011). Annual Ohio observations since 2017 with concentrations in the Toledo and Dayton regions.

Globally Vulnerable Ohio Imperiled.

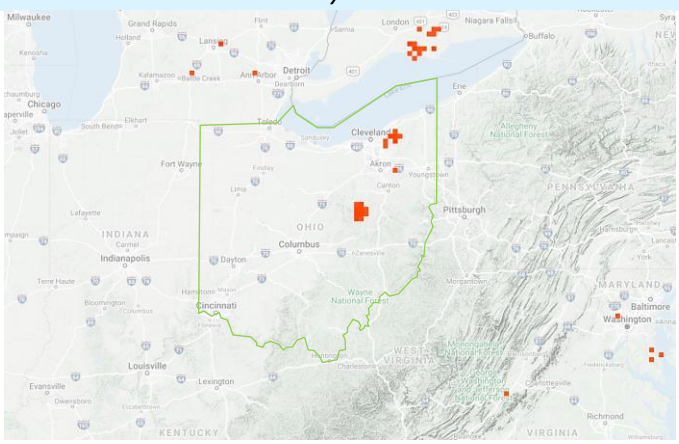
Currently Unlisted



Hagen's Bluet *(Enallagma hageni)*
Canada, northern United States and the Appalachians. Marshes, lakes and ponds with abundant emergent vegetation (Paulson 2011). Ohio observations N counties.

Globally Secure Ohio Vulnerable

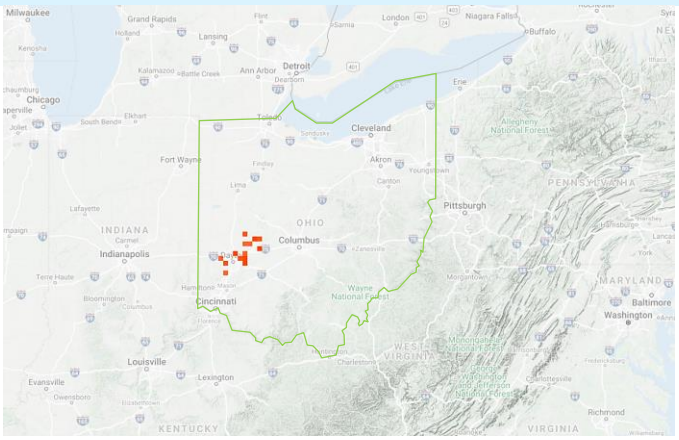
Currently Unlisted



Laura's Clubtail *(Stylurus laurae)*
Scattered populations from Texas to Toronto. Clear, shallow forest streams with rocky riffles, sand or mud bottoms (Paulson 2011). Ohio observations restricted to NE and East Central counties.

Globally Apparently Secure Ohio Imperiled

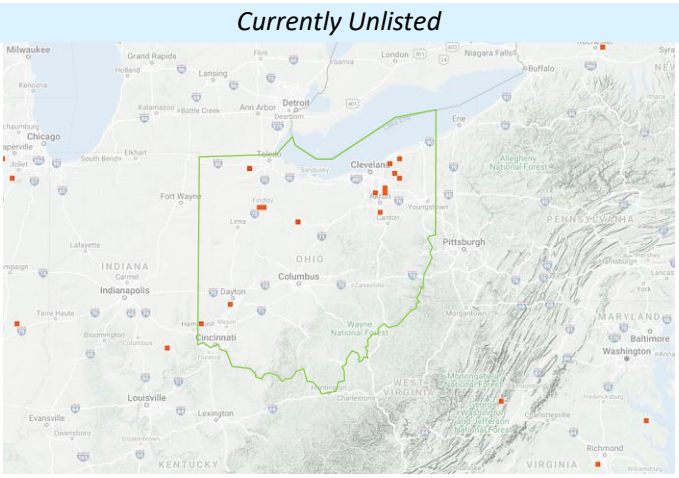
Currently Unlisted



Paiute Dancer *(Argia alberta)*
Primarily a western species with no other recorded populations east of Missouri, the Paiute Dancer was identified in Ohio in 2017. Review of photo records reveals earlier records exist, misidentified as the similar Blue-ringed Dancer. The Paiute Dancer has breeding populations in the Dayton – Springfield region.

Global Apparently Secure Ohio No Status.

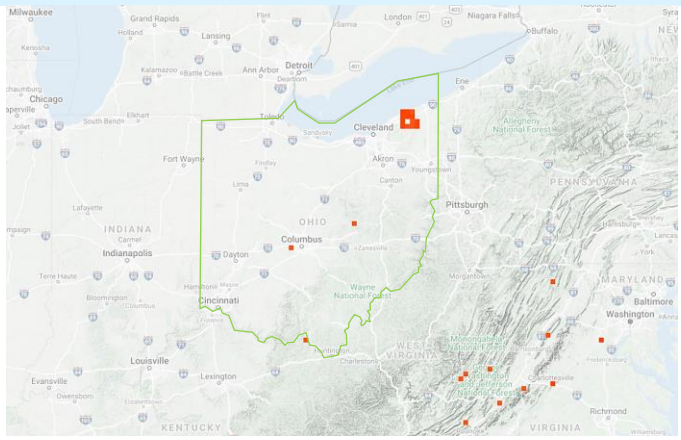
Currently Unlisted



Slender Basketail *(Epitheca costalis)*
Eastern United States. Sandy ponds, lakes and streams (Paulson 2011). A few Ohio observations annually.

Globally Secure Ohio No Status Rank

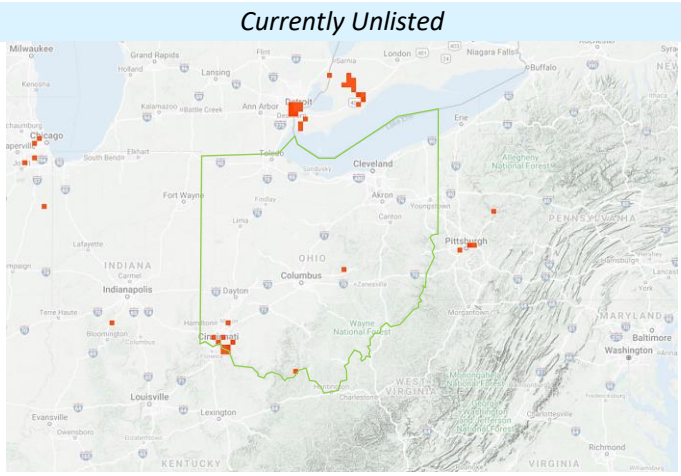
Currently Unlisted



Splendid Clubtail *(Gomphurus lineatifrons)*
Eastern United States. Good-sized rivers with much mud, usually rocks and cobbles (Paulson 2011). Rare Clubtail observed almost annually within the Grand River watershed.

Globally Apparently Secure Ohio Imperiled.

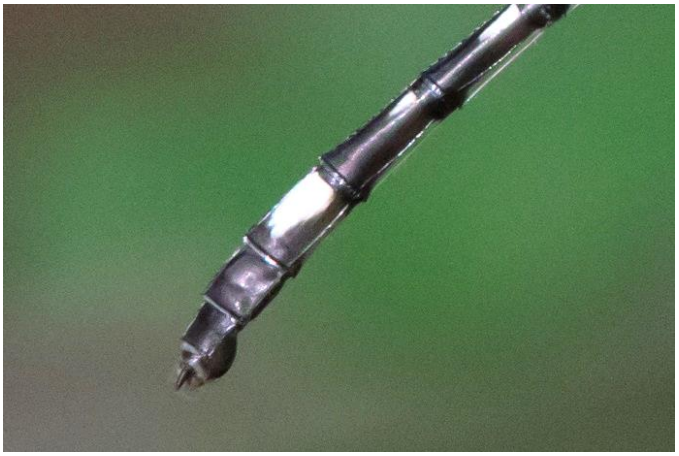
Currently Unlisted



Elusive Clubtail *(Stylurus notatus)*
Midwest and Canada. Large, slow-flowing rivers, less-often large lakes (Paulson 2011). Rare, but with a large range, the Elusive Clubtail has been extirpated from major portions of its range. A problem with this species is that it prefers large rivers which are few in number and seldom in pristine condition (NatureServe). Ohio observations, historically few, but 2020 and 2021 from the Little Miami River.

Globally Vulnerable Ohio Critically Imperiled.

November Challenge Revealed



Congratulations to Jim Heflich on correctly identifying the **Swift Setwing *(f)*** *"I think the new photo quiz is of a Swift Setwing. Very narrow abdomen and white spots - yellowish" far more common than white. And the large S7 spot leads me to Swift Setwing." (Jim Heflich)*

Virtual Dragonhunters

Mary Gardiner, Professor at The Ohio State University, Department of Entomology offers an excellent discussion on the limitations and benefits of **Community Science**: Contributions of Community Science to Entomology: Benefits to People and Nature

Newsletter Help Wanted

- Your favorite Ode Photos from 2021.
- Dragonfly ID challenge submissions.
- Planning strategies

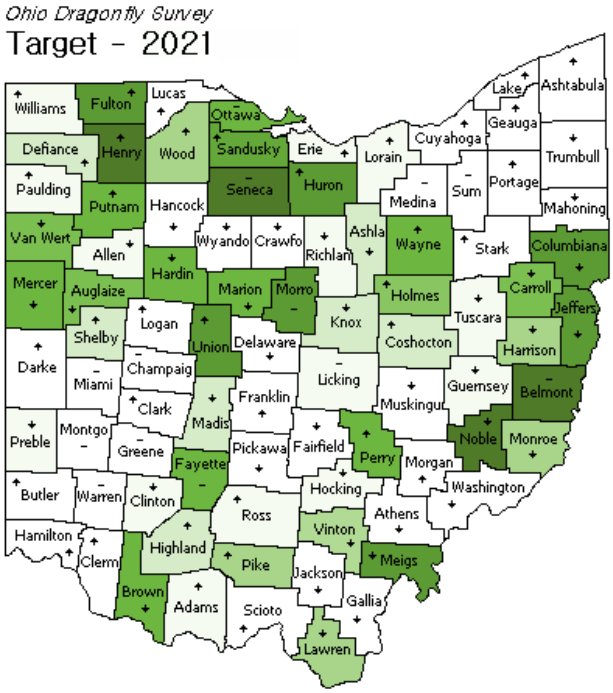
lundbergj@hotmail.com

Ohio Dragonfly Survey

Year-To-Date Overview

The 2021 Season is very near its end. There may be a few Meadowhawks that will still find a sunny perch if we get a warm day. We are now over 26,000 RG observations on the year. These come from over 1,000 citizen scientists, and comprise 140 species. A very commendable effort for all involved.

For November, we recorded 257 observations for 8 species. The majority of submissions were Autumn Meadowhawks (205), followed by Familiar Bluet (29), Common Green Darner (9), Shadow Darner (2), Great Spreadwing (2), and singles for Blue Dasher, Azure Bluet, Citrine Forktail. Several of these observations will be new late flight date records (Common Green Darner, Shadow Darner, Blue Dasher, Azure Bluet, Citrine Forktail).



The 2021 Targets map has been updated to show where 2021 fits in the trend. Counties that have the up-arrow had a 10+ percent increase in observations over the survey average (2017-2020). Counties with the down-arrow failed to get within 10 percent of the survey average. The balance was fairly level with survey years, these counties have the long-dash.

So far, we have 37 counties with increases, 19 level, 38 with decreases. The counties previously identified as priority (color-coded for priority - darker is high priority) follow the same trends.

15 target counties had increases in 2021 observations, 5 target counties were basically level with previous survey years, 18 target counties had decreases relative to survey.

If you still have photos to submit, please do so.

(Jim Lemon)

Questions to: jlem@woh.rr.com

Ohio Dragonfly Survey

Numbers by Species

Species	#	# Counties
Eastern Pondhawk	1726	88
Blue Dasher	1700	88
Common Whitetail	1460	84
Eastern Forktail	1382	88
Fragile Forktail	1379	88
Widow Skimmer	1377	88
Autumn Meadowhawk	1118	61
Eastern Amberwing	1034	86
Ebony Jewelwing	912	69
Violet Dancer	729	71
Familiar Bluet	710	73
Blue-fronted Dancer	671	73
Powdered Dancer	654	53
Slaty Skimmer	526	57
Common Green Darner	500	62
American Rubyspot	478	44
Double-striped Bluet	473	68
Blue-tipped Dancer	472	57
Twelve-spotted Skimmer	460	64
Stream Bluet	426	57
Halloween Pennant	423	70
Slender Spreadwing	365	51
Calico Pennant	334	52
Skimming Bluet	326	61
Orange Bluet	320	63
Black Saddlebags	289	60
Prince Baskettail	274	64
Blue-ringed Dancer	257	39
Westfall's Slender Bluet	244	40
Azure Bluet	217	43
Unicorn Clubtail	204	45
Carolina Saddlebags	169	38
Blue-faced Meadowhawk	167	19
Lancet Clubtail	151	36
Dot-tailed Whiteface	149	22
Dusky Dancer	148	35
Turquoise Bluet	143	13
Wandering Glider	140	37
Great Spreadwing	131	14
Eastern Red Damsel	128	17
Citrine Forktail	121	32
Spangled Skimmer	118	29
Midland Clubtail	111	22
Seepage Dancer	109	5
Painted Skimmer	107	24
Spotted Spreadwing	98	17
Shadow Darner	95	27
Amber-winged Spreadwing	92	18
Vesper Bluet	86	19
Dragonhunter	81	21
Band-winged Meadowhawk	81	15
Lilypad Forktail	81	8
Cobra Clubtail	78	12
Ashy Clubtail	76	27
Banded Pennant	71	15
Black-shouldered Spinyleg	69	22
Flag-tailed Spinyleg	69	20
Tule Bluet	69	10
Smoky Rubyspot	66	4
Elfin Skimmer	66	2
Swamp Spreadwing	64	20
Sphagnum Sprite	63	9

Comet Darner	59	23
Plains Clubtail	54	2
Swamp Darner	53	28
Elegant Spreadwing	51	11
Swift River Cruiser	50	20
Sweetflag Spreadwing	49	12
Spot-winged Glider	47	16
Gray Petaltail	47	15
Pronghorn Clubtail	46	8
Swift Setwing	46	4
Aurora Damsel	44	12
Emerald Spreadwing	40	15
Fawn Darner	38	18
Paiute Dancer	38	3
Arrow Clubtail	36	8
Spatterdock Darner	32	13
Blue Corporal	31	13
Cyrano Darner	31	13
Brown Spiketail	31	4
Common Baskettail	28	17
Royal River Cruiser	28	16
Great Blue Skimmer	27	10
Sedge Sprite	26	4
Belted Whiteface	26	1
Eastern Least Clubtail	25	5
Russet-tipped Clubtail	25	2
Eastern Ringtail	23	4
Yellow-sided Skimmer	23	1
Rapids Clubtail	22	9
White-faced Meadowhawk	22	3
Southern Pygmy Clubtail	21	2
Ruby Meadowhawk	20	12
Springtime Darner	19	11
Arrowhead Spiketail	19	8
Delta-spotted Spiketail	19	2
Clamp-tipped Emerald	18	7
Rainbow Bluet	18	7
Lyre-tipped Spreadwing	18	1
River Jewelwing	17	1
Lilypad Clubtail	16	3
Mocha Emerald	15	6
Dusky Clubtail	15	5
Duckweed Firetail	14	1
Golden-winged Skimmer	13	4
Southern Spreadwing	12	6
Harlequin Darner	12	3
Common Sanddragon	11	3
Handsome Clubtail	10	3
Double-ringed Pennant	10	2
Rusty Snaketail	9	2
Black-tipped Darner	8	3
Elusive Clubtail	7	3
Tiger Spiketail	7	3
Lance-tipped Darner	7	2
Jade Clubtail	6	2
Twin-spotted Spiketail	5	4
Green-faced Clubtail	5	1
Slender Baskettail	4	4
Laura's Clubtail	4	2
Stream Cruiser	4	2
Northern Bluet	4	1
Ocellated Darner	3	3
Beaverpond Baskettail	3	2
Green-striped Darner	3	2
Macromia Hybrid	3	2
Gilded River Cruiser	3	1
Red Saddlebags	2	2
Striped Saddlebags	2	2
Chalk-fronted Corporal	2	1
Marsh Bluet	2	1
Rambur's Forktail	2	1
Frosted Whiteface	1	1
Riffle Snaketail	1	1
Saffron-winged Meadowhawk	1	1
Smoky Shadowdragon	1	1
Splendid Clubtail	1	1
Stygian Shadowdragon	1	1
Variegated Meadowhawk	1	1

Ohio Dragonfly Survey

Numbers by County

County	Observations	Species	Observers
Adams	177	35	21
Allen	57	21	5
Ashland	71	28	18
Ashtabula	1954	64	27

Athens	86	33	18
Auglaize	67	26	6
Belmont	48	15	4
Brown	76	31	6
Butler	717	45	48
Carroll	26	13	3
Champaign	960	58	44
Clark	545	53	28
Clermont	425	55	51
Clinton	89	24	12
Columbiana	56	17	9
Coshocton	1142	53	9
Crawford	78	36	9
Cuyahoga	788	53	92
Darke	286	54	7
Defiance	75	33	8
Delaware	156	35	54
Erie	221	33	16
Fairfield	62	27	22
Fayette	120	36	6
Franklin	1937	56	151
Fulton	82	28	5
Gallia	25	17	4
Geauga	985	77	49
Greene	647	59	56
Guernsey	47	20	4
Hamilton	644	57	93
Hancock	191	46	16
Hardin	52	24	2
Harrison	58	32	8
Henry	75	25	4
Highland	134	34	16
Hocking	82	33	23
Holmes	83	25	18
Huron	141	22	5
Jackson	107	22	12
Jefferson	46	17	5
Knox	63	23	14
Lake	835	71	50
Lawrence	41	18	5
Licking	288	36	27
Logan	277	47	7
Lorain	860	57	44
Lucas	1983	77	71
Madison	272	30	15
Mahoning	63	20	20
Marion	65	21	6
Medina	329	40	30
Meigs	31	16	3
Mercer	83	25	2
Miami	241	50	15
Monroe	23	13	3
Montgomery	1026	73	69
Morgan	119	29	9
Morrow	52	22	10
Muskingum	83	33	12
Noble	39	18	3
Ottawa	125	28	29
Paulding	80	29	2
Perry	121	23	6
Pickaway	61	22	19
Pike	144	32	10
Portage	522	67	41
Preble	72	25	20
Putnam	87	24	4
Richland	54	21	14
Ross	164	33	14
Sandusky	262	33	17
Scioto	112	20	12
Seneca	64	22	8
Shelby	184	45	10
Stark	1484	72	32
Summit	1029	64	110
Trumbull	137	33	13
Tuscarawas	74	26	6
Union	178	27	18
Van Wert	51	21	2
Vinton	56	19	4
Warren	234	50	44
Washington	61	26	3
Wayne	121	28	30
Williams	209	43	5
Wood	201	34	18
Wyandot	48	22	7

Ohio Dragonfly Survey

Change

County	2021	Survey Avg	Delta	% Change	2021 Target
Sandusky	262	59	204	348	**
Stark	1484	481	1004	209	
Coshocton	1142	403	739	183	*
Huron	141	50	91	182	**
Clermont	425	159	266	167	
Cuyahoga	788	301	487	162	
Lucas	1983	760	1223	161	
Union	178	69	109	159	**
Williams	209	87	123	142	
Butler	717	313	404	129	
Wood	201	90	111	124	**
Geauga	985	455	530	117	
Portage	522	263	259	98	
Pike	144	76	69	91	*
Erie	221	119	102	86	
Ashtabula	1954	1066	888	83	
Hamilton	644	356	289	81	
Lake	835	517	319	62	
Logan	277	184	94	51	
Lorain	860	575	285	50	
Darke	286	195	92	47	
Perry	121	83	38	46	**
Ross	164	113	52	46	
Morgan	119	83	36	44	
Holmes	83	60	23	38	**
Highland	134	101	34	33	*
Franklin	1937	1470	467	32	
Henry	75	58	18	30	***
Putnam	87	67	20	30	**
Adams	177	138	40	29	
Paulding	80	64	16	25	
Scioto	112	91	21	23	
Clark	545	444	101	23	
Fulton	82	67	15	22	**
Shelby	184	155	29	19	*
Wayne	121	107	14	13	**
Defiance	75	68	7	10	*
Ottawa	125	117	9	7	**
Montgomery	1026	956	70	7	
Seneca	64	62	2	3	***
Summit	1029	999	30	3	
Fayette	120	117	3	3	**
Belmont	48	48	0	-1	***
Warren	234	236	-2	-1	
Licking	288	302	-14	-5	
Greene	647	682	-35	-5	
Medina	329	348	-19	-6	
Morrow	52	56	-4	-8	**
Miami	241	265	-24	-9	
Champaign	960	1058	-98	-9	
Madison	272	306	-34	-11	*
Mercer	83	94	-11	-12	**
Brown	76	87	-11	-12	**
Ashland	71	84	-13	-15	*
Columbiana	56	66	-10	-15	**
Athens	86	103	-17	-17	
Vinton	56	69	-13	-19	*
Noble	39	49	-10	-20	***
Crawford	78	105	-27	-26	
Tuscarawas	74	100	-26	-26	
Marion	65	88	-23	-26	**
Jefferson	46	64	-18	-28	**
Jackson	107	151	-44	-29	
Trumbull	137	196	-59	-30	
Clinton	89	130	-41	-32	
Preble	72	110	-38	-35	
Hocking	82	126	-44	-35	
Auglaize	67	109	-42	-38	**
Harrison	58	95	-37	-39	*
Knox	63	106	-43	-41	*
Hancock	191	322	-131	-41	
Hardin	52	92	-40	-43	**
Delaware	156	278	-122	-44	
Richland	54	98	-44	-45	
Muskingum	83	160	-77	-48	
Mahoning	63	125	-62	-50	
Meigs	31	63	-32	-50	**
Guernsey	47	98	-51	-52	
Lawrence	41	90	-49	-55	*
Van Wert	51	117	-66	-56	**
Allen	57	140	-83	-59	
Monroe	23	77	-54	-70	*
Fairfield	62	232	-170	-73	
Carroll	26	102	-76	-74	**
Pickaway	61	240	-179	-75	
Washington	61	260	-199	-76	
Gallia	25	111	-86	-77	
Wyandot	48	229	-181	-79	