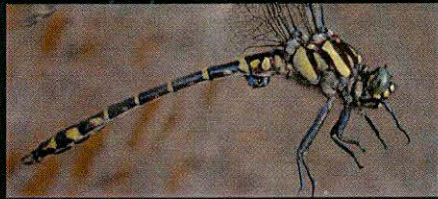
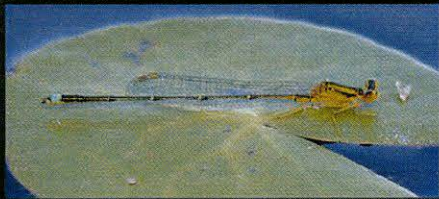




The Maine Damselfly
and Dragonfly Survey
A Final Report



The Maine Damselfly and Dragonfly Survey: A Final Report

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Background

Insects in the order Odonata are a conspicuous and ecologically important component of Maine's natural heritage. Currently, 158 species have been confirmed in the state, comprising about one third of the North American odonate fauna. Several of Maine's odonate species are of regional, national, and global conservation concern. Currently, the Maine Department of Inland Fisheries and Wildlife (MDIFW) lists the Ringed Boghaunter (*Williamsonia lintneri*) as Endangered, the Pygmy Snaketail (*Ophiogomphus howei*) as Threatened, and an additional 17 odonates as Species of Special Concern.

There is increasing demand for information on the status, distribution, and conservation needs of damselflies and dragonflies. Forest industry, hydroelectric, land-trust, and municipal interests are requesting guidance from MDIFW concerning these, and other wildlife species, for decisions involving environmental permitting, relicensing projects, land acquisition, and voluntary habitat protection. Demand for information is also growing from the general public as interest and concern for biodiversity increase. While several odonates are considered sensitive to freshwater habitat degradation and may be experiencing declines nationwide, baseline information for the group has been lacking in Maine, until recently.

In 1998, MDIFW received a grant from the Maine Outdoor Heritage Fund to initiate the Maine Damselfly and Dragonfly Survey (MDDS), and the survey officially got underway in 1999. Further support was received in 2000 from the U.S. Fish and Wildlife Service. MDDS is among the first completely state-sponsored dragonfly atlas projects in North America and has received considerable attention. Having recently completed its sixth and final field season in 2004, the survey's results far exceeded expectations, and are summarized in the following report.

MDDS Methods

MDDS employed a three-pronged approach for gathering both historical and new data on Maine's odonates:

- 1 A baseline assessment of published literature records and public (museum) and private specimen collections,
- 2 A participatory survey by volunteer citizen-scientists, and,
- 3 MDIFW survey for species of high conservation concern.

Baseline Assessment

Prior to inviting public participation, a baseline study was completed in 1998 with the purpose of providing a comprehensive review of the status of our knowledge of Odonata in Maine. General sources consulted included published literature, unpublished survey reports, institutional and private specimen collections from throughout the Northeast, and a compilation of recent MDIFW surveys. This baseline study resulted in an internal report to MDIFW (Brunelle 1998), and a published article on known species presence and distribution in the state (Brunelle 1999b). Data sources consulted during the assessment are provided in both the report and article. As the first such summary of the subject in over fifty years (since Borror 1944), the assessment provided a baseline upon which subsequent surveys could build.

Volunteer Survey

Publicly, MDDS has come to be synonymous with the Volunteer Survey component of the project, a highly visible component that was active from 1999 to 2004, and which is expected to continue at a reduced level in the future, serving as a coordinating body for all efforts in the study of odonates in the state. Prior to the Volunteer Survey a very small number of professional and amateur biologists had contributed to our limited understanding of odonates in Maine over more than a century of study. By engaging and training over 200 volunteers, distributed from Fort Kent to Kittery, the Volunteer Survey proved an efficient means of harnessing a large amount of survey effort in a relatively short period of time. Having contributed eight new state records, hundreds of new county records, and myriad novel flight and habitat observations, volunteers have made an extraordinary contribution to our knowledge.

Volunteer survey protocols and supporting materials were prepared by Brunelle in 1998. In order to encourage and guide volunteers, the *MDDS Manual* and *data submission forms* (Brunelle 1999d) were produced, along with an informative *color poster* (appended to this report).

In 1999 two weekend *briefing seminars* for volunteers were hosted by the Department at the Humboldt Field Research Institute in Steuben. Similar seminars were held each year until 2002.

Four issues of *Mainensis*, the official newsletter of the survey (<http://mdds.umf.maine.edu/MDDS%20Newsletter.htm>), were distributed to all participating volunteers. The newsletter was effective in encouraging volunteers to focus their attention on specific geographical (counties and regions) and biological (habitats and flight periods) data gaps. Articles for the newsletter were contributed by the editors, Brunelle and deMaynadier, as well as by volunteers.

The *MDDS website* (<http://mdds.umf.maine.edu/>), established and managed by deMaynadier and Ronald Butler (UMaine Farmington), proved to be an effective tool for keeping participants informed of how their individual data submissions were contributing to the general state of our knowledge. In addition to providing periodic survey announcements and recommendations, the website hosts a wealth of information on Maine Odonata, including county checklists, adult flight windows, a digital photo library, and links to related supporting resources. Currently, the website is managed by Butler and serves as the primary mechanism for post-MDDS communications with volunteers and regional odonate enthusiasts.

Supporting all efforts in MDDS are the *relational databases* maintained by Brunelle, containing information on species, sites, visits, habitats, survey efforts, flight windows, surveyors, and other details associated with each of the over 25,500 Maine records accumulated to date. Data from these files is backed up annually at MDIFW.

MDIFW Surveys

Since the discovery of the Ringed Boghaunter in Maine (McCollough 1997) there has been a considerable on-going survey for this globally rare dragonfly in the southwest of the state. Nearly all data generated for this cryptic species has resulted from targeted, contractual surveys supported jointly by MDIFW and USFWS (Ward and deMaynadier 2004). Additionally, much data has been tendered to MDDS of other spring-flying species encountered incidentally during Boghaunter surveys.

Following Andy Brand's state record of the rare pond damsel, Scarlet Bluet (*Enallagma pictum*), and Ron Butler's discovery of the Dusky Dancer (*Argia translata*), there has been considerable focused survey for rare lacustrine damselflies in southern and coastal Maine in an effort to better understand their distribution and habitat relationships (Butler and deMaynadier, *in prep.*). The proposed removal of the New England Bluet (*Enallagma laterale*) from Special Concern status is a direct result of the increased information obtained for this species during such targeted surveys.

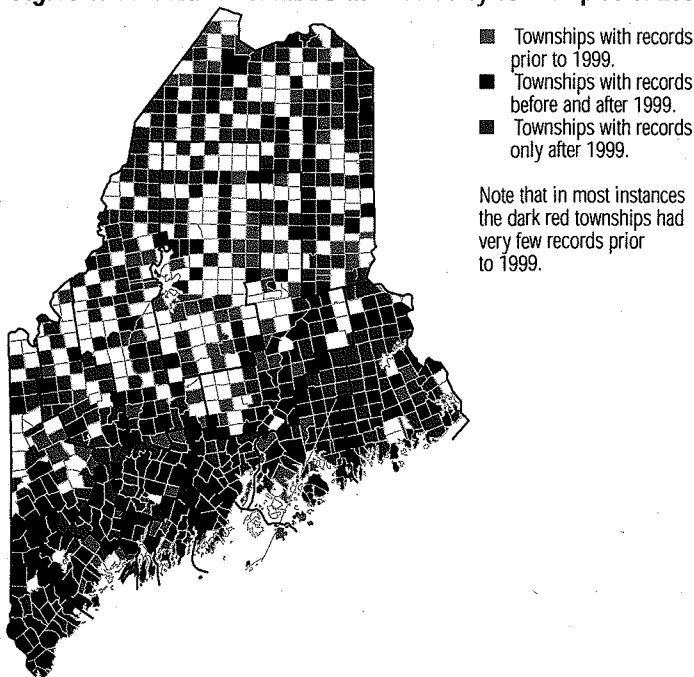
MDIFW is undertaking, in collaboration with the Maine Natural Areas Program (Department of Conservation), an assessment of Maine's biodiversity through comprehensive ecoregional surveys of rare plants, animals, and natural communities. To date, eight of the state's fifteen ecoregions (McMahon 1990) have been surveyed, with rare peatland and riverine odonate species receiving considerable attention during most surveys to date (e.g.: deMaynadier and Hodgman 1998). As a result of this work, numerous odonate records were added to the MDDS database.

Other Surveys

Establishment of MDDS has encouraged interest in odonates among other organizations that have contributed significantly to our collective knowledge of Odonata in Maine. The following are projects or surveyors that have contributed substantial data before or during MDDS.

- Dr. Harold B. White III has been surveying for Odonata on Mount Desert Island since the 1960s; generously copying all data to MDDS.
- In 1999, Brunelle surveyed in the Boundary Plateau and Saint John Uplands for The Nature Conservancy, Maine Chapter (Brunelle 1999c).
- MDIFW/Maine Natural Areas Program surveys were conducted by John Albright and Daniel Reeve throughout the state. These well-preserved adult specimens, tendered to MDDS in 2004, had an unusually high degree of interest, and the first record of Eastern Amberwing (*Perithemis tenera*).
- In the 1990s, Billie Bradeen and Daniel Boland, students of Dr. Elizabeth Gibbs (University of Maine, Orono), conducted exuviae surveys in northeastern Maine, principally dealing with *Ophiogomphus* species. Boland subsequently conducted exuviae surveys for MDIFW throughout Maine.
- Christy and Todd Findlayson, with support from the Eastern Maine Conservation Initiative, surveyed Washington County extensively for both adults and larvae; her specimens and data having been contributed to MDDS.
- In 2001, Fred Sibley kindly reviewed the collection of Yale University and deposited the odonate specimen information with MDDS.
- In addition, the specimens of several environmental impact studies reviewed by MDIFW have been tendered to MDDS. These specimens, mostly larvae and exuviae, have been determined to species where possible by Karen Hopkins and entered into the MDDS database.

Figure 1: Contribution of MDDS in Records by Township as of 2004



MDDS Next Steps

The primary data-gathering phase of the MDDS is considered complete, though on-going survey of odonates in Maine is anticipated, contributing to a growing and dynamic MDDS database. The next phase of the project will unfold during the period 2005–2007 with the production and publication of a regional atlas and conservation assessment of Acadia's (Maine, New Brunswick, Nova Scotia, and Prince Edward Island) odonate fauna. Work is currently underway on this atlas by Brunelle and deMaynadier.

Following in the tradition of several previously state-sponsored wildlife atlasing efforts – the Maine Breeding Bird Atlas (1983), Maine Amphibian and Reptile Atlas Project (1998), and Maine's Freshwater Mussel Atlas (2000) – the Acadian Odonate Atlas is intended to serve professional biologists, state and federal agencies, and nongame wildlife constituents throughout northeastern North America.

MDDS Final Results

The goals of the MDDS project were two-fold:

- 1 To raise public awareness and concern for damselflies and dragonflies specifically, and invertebrate conservation generally, and,
- 2 To improve the Maine Department of Inland Fisheries and Wildlife's ability to protect those odonate species of greatest conservation concern.

Underlying the achievement of both goals was the need for an improved understanding of the distribution and status of Odonata in Maine. The balance of this report provides a graphical and tabular summary of MDDS's final results. In summary, the project exceeded initial expectations for public participation and scientific contributions, as evidenced by the following summary statistics:

Outreach Contributions:

Volunteer participation statewide:	>200
Volunteers trained in MDDS seminars:	95
Newsletters published (see attached copies of <i>Mainensis</i>):	4
Major press articles covering the project:	5
Website hits (http://mdds.umf.maine.edu/~odonata/):	>16,000

Scientific Contributions:

Total records submitted (% increase on 1999 baseline):	17,264 (229%)
New Rare, Threatened, and Endangered species records:	297
New state species records:	10
New U.S. species records (Québec Emerald and Canada Whiteface):	2
Scientific publications completed or in progress (4 articles; 1 book):	5

Table 1: Odonata Listing and Encounter Frequency in Maine

Suborder ZYGOPTERA – Damselflies			0	1	2	3	4	5	%
Family Calopterygidae – Broadwings									
<i>Calopteryx aequabilis</i> Say 1839 – River Jewelwing	G5,N5	308							1.20
<i>Calopteryx amata</i> Hagen 1890 – Superb Jewelwing	G4,N4	140							0.54
<i>Calopteryx maculata</i> (Beauvois, 1805) – Ebony Jewelwing	G5,N5	475							1.85
<i>Hetaerina americana</i> (Fabricius 1788) – American Rubyspot	G5,N5	23							0.08
Family Lestidae – Spreadwings									
<i>Lestes australis</i> – Southern Spreadwing	G5r5,?	11							0.04
<i>Lestes congener</i> Hagen 1861 – Spotted Spreadwing	G5,N5	301							1.17
<i>Lestes disjunctus</i> Selys 1862 – Common Spreadwing	G5,N5,?	511							1.99
<i>Lestes dryas</i> Kirby 1890 – Emerald Spreadwing	G5,N5	103							0.40
<i>Lestes eurinus</i> Say 1839 – Amber-winged Spreadwing	G4,N4	64							0.24
<i>Lestes forcipatus</i> Rambur 1842 – Sweetflag Spreadwing	G5,N5	126							0.49
<i>Lestes inaequalis</i> Walsh 1862 – Elegant Spreadwing	G5,N5	135							0.52
<i>Lestes rectangularis</i> Say 1839 – Slender Spreadwing	G5,N5	338							1.31
<i>Lestes unguiculatus</i> Hagen 1861 – Lyre-tipped Spreadwing	G5,N5	65							0.25
<i>Lestes vigilax</i> Hagen in Selys 1862 – Swamp Spreadwing	G5,N5	350							1.36
Family Coenagrionidae – Pond Damselfs									
<i>Amphiagrion saucium</i> (Burmeister 1839) – Eastern Red Damself	G5,N5	16							0.06
<i>Argia fumipennis violacea</i> (Hagen 1861) – Variable Dancer	G5r5,N5	484							1.88
<i>Argia moesta</i> (Hagen 1861) – Powdered Dancer	G5,N5	249							0.98
<i>Argia translata</i> Hagen in Selys 1865 – Dusky Dancer s	G5,N5,PSC	17							0.06
<i>Chromagrion conditum</i> (Selys 1876) – Aurora Damself	G5,N5	242							0.94
<i>Coenagrion interrogatum</i> (Hagen in Selys 1876) – Subarctic Bluet	G5,N3?,WSC	19							0.07
<i>Coenagrion resolutum</i> (Hagen in Selys 1876) – Taiga Bluet	G5,N4	55							0.21
<i>Enallagma annexum</i> (Hagen 1861) – Northern Bluet	G5,N5,?	121							0.47
<i>Enallagma aspersum</i> (Hagen 1861) – Azure Bluet	G5,N5	172							0.67
<i>Enallagma boreale</i> Selys 1875 – Boreal Bluet	G5,N5	172							0.67
<i>Enallagma carunculatum</i> Morse 1895 – Tule Bluet	G5,N5,PSC	4							0.01
<i>Enallagma civile</i> (Hagen 1861) – Familiar Bluet	G5,N5	280							1.09
<i>Enallagma divagans</i> Selys 1876 – Turquoise Bluet	G5,N5,WSC	33							0.12
<i>Enallagma durum</i> (Hagen 1861) – Big Bluet	G5,N5,PET	3							0.01
<i>Enallagma ebrium</i> (Hagen 1861) – Marsh Bluet	G5,N5	367							1.43
<i>Enallagma exulans</i> (Hagen 1861) – Stream Bluet	G5,N5	206							0.80
<i>Enallagma geminatum</i> Kellcott 1895 – Skimming Bluet	G5,N5	143							0.55
<i>Enallagma hageni</i> (Walsh 1863) – Hagen's Bluet	G5,N5	752							2.93
<i>Enallagma laterale</i> Morse 1895 – New England Bluet	G4,N4,WSC	44							0.17
<i>Enallagma minusculum</i> Morse 1895 – Little Bluet	G3/4,N3/4	152							0.59
<i>Enallagma pictum</i> Morse 1895 – Scarlet Bluet	G3,N3,PSC	27							0.10
<i>Enallagma signatum</i> (Hagen 1861) – Orange Bluet	G5,N5	109							0.42
<i>Enallagma vernale</i> (Gloyd 1943) – Springtime Bluet	G4Q,N4,?	13							0.05
<i>Enallagma vesperum</i> Calvert 1919 – Vesper Bluet	G5,N5	86							0.33
<i>Ischnura hastata</i> (Say 1839) – Citrine Forktail	G5,N5,PSC	5							0.01
<i>Ischnura kellcottii</i> (Williamson 1898) – Lilypad Forktail	G5,N5,WSC	32							0.12
<i>Ischnura posita</i> (Hagen 1861) – Fragile Forktail	G5,N5	166							0.64
<i>Ischnura ramburii</i> (Selys 1850) – Rambur's Forktail	G5,N5	2							<0.01
<i>Ischnura verticalis</i> (Say 1839) – Eastern Forktail	G5,N5	1283							5.00
<i>Nehalennia gracilis</i> Morse 1895 – Sphagnum Sprite	G5,N5	69							0.26
<i>Nehalennia irene</i> (Hagen 1861) – Sedge Sprite	G5,N5	453							1.76
Suborder ANISOPTERA									
Family Aeshnidae									
<i>Aeshna canadensis</i> Walker 1908 – Canada Darner	G5,N5	471							1.83
<i>Aeshna clepsydra</i> Say 1839 – Mottled Darner	G4,N4	110							0.42
<i>Aeshna constricta</i> Say 1839 – Lance-tipped Darner	G5,N5	110							0.42
<i>Aeshna eremita</i> Scudder 1866 – Lake Darner	G5,N4	183							0.71
<i>Aeshna i. interrupta</i> Walker 1908 – Variable Darner	G5,N5	188							0.73
<i>Aeshna juncea</i> (Linnaeus 1758) – Sedge Darner	G5,N3,PSC	1							<0.01
<i>Aeshna sitchensis</i> Hagen 1861 – Zigzag Darner	G5,N3,WSC	42							0.16
<i>Aeshna subarctica</i> Walker 1908 – Subarctic Darner	G5,N2,WSC	31							0.12
<i>Aeshna tuberculifera</i> Walker 1908 – Black-tipped Darner	G4,N4	191							0.74
<i>Aeshna u. umbrosa</i> Walker 1908 – Shadow Darner	G5,N5	398							1.55
<i>Aeshna verticalis</i> Hagen 1861 – Green-striped Darner	G5,N5	90							0.35
<i>Anax junius</i> (Drury 1770) – Common Green Darner	G5,N5	397							1.55
<i>Anax longipes</i> Hagen 1861 – Comet Darner	G5,N5,PSC	3							0.01
<i>Basiaeschna janata</i> (Say 1839) – Springtime Darner	G5,N5	329							1.28
<i>Boyeria grafiata</i> Williamson 1907 – Ocellated Darner	G5,N5,WSC	112							0.43
<i>Boyeria vinosa</i> (Say 1839) – Fawn Darner	G5,N5	309							1.20
<i>Epiaeschna heros</i> (Fabricius 1798) – Swamp Darner	G5,N5,PSC	19							0.07
<i>Gomphaeschna furcillata</i> (Say 1839) – Harlequin Darner	G5,N5	45							0.17
<i>Nasiaeschna pentacantha</i> (Rambur 1842) – Cyrano Darner	G5,N5,WSC	30							0.11
<i>Rhionaeschna mutata</i> Hagen 1861 – Spatterdock Darner	G3/4,N3/4,PSC	2							<0.01
			0	1	2	3	4	5	%

Suborder **ANISOPTERA** – Dragonflies

Suborder ANISOPTERA – Dragonflies			0	1	2	3	4	5	%
Family Gomphidae – Clubtails									
<i>Argomphus furcifer</i> (Hagen in Selys 1878) – Lilypad Clubtail	G5,N5,PSC	13							0.05
<i>Argomphus villosipes</i> (Selys 1854) – Unicorn Clubtail	G5,N5	24							0.09
<i>Dromogomphus spinosus</i> Selys 1854 – Black-shouldered Spinyleg	G5,N5	216							0.84
<i>Gomphus abbreviatus</i> (Hagen in Selys 1878) – Spine-crowned Clubtail	G3/4,N3/4	23							0.08
<i>Gomphus adelphus</i> (Selys 1858) – Moustached Clubtail	G4,N4	170							0.66
<i>Gomphus borealis</i> (Needham 1900) – Beaverpond Clubtail	G4,N5	95							0.37
<i>Gomphus descriptus</i> (Banks 1896) – Harpoon Clubtail	G4,N4,WSC	46							0.17
<i>Gomphus exilis</i> (Selys 1854) – Lancet Clubtail	G5,N5	478							1.86
<i>Gomphus quadricolor</i> (Walsh 1862) – Rapids Clubtail	G3/4,N3/4,PET	4							0.01
<i>Gomphus spicatus</i> (Hagen in Selys 1854) – Dusky Clubtail	G5,N5	247							0.96
<i>Gomphus vastus</i> (Walsh 1862) – Cobra Clubtail	G5,N5,PSC	8							0.03
<i>Hagenius brevistylus</i> Selys 1854 – Dragonhunter	G5,N5	296							1.15
<i>Lanthus parvulus</i> (Selys 1854) – Northern Pygmy Clubtail	G4,N4	40							0.15
<i>Lanthus vernalis</i> Carle 1980 – Southern Pygmy Clubtail	G4,N4,SC	28							0.10
<i>Ophiogomphus anomalus</i> (Harvey 1898) – Extra-striped Snaketail	G4,N4,WSC	254							0.99
<i>Ophiogomphus aspersus</i> (Morse 1895) – Brook Snaketail	G3/4,N3/4	82							0.32
<i>Ophiogomphus carolus</i> (Needham 1897) – Riffle Snaketail	G5,N5	192							0.74
<i>Ophiogomphus colubrinus</i> (Selys 1854) – Boreal Snaketail	G5,N4,PET	8							0.03
<i>Ophiogomphus howei</i> (Bromley 1924) – Pygmy Snaketail	G3,N3,PSC	74							0.28
<i>Ophiogomphus mainensis</i> (Packard 1863) – Maine Snaketail	G4,N4	280							1.09
<i>Ophiogomphus rupinsulensis</i> (Walsh 1862) – Rusty Snaketail	G5,N5	129							0.50
<i>Progomphus obscurus</i> (Rambur 1842) – Common Sanddragon	G5,N5,PSC	17							0.06
<i>Stylogomphus albiatylus</i> (Hagen in Selys 1878) – Least Clubtail	G5,N5	208							0.81
<i>Stylurus scudderii</i> (Selys 1873) – Zebra Clubtail	G4,N3/4	28							0.10
<i>Stylurus spiniceps</i> (Walsh 1862) – Arrow Clubtail	G5,N4,Psc	3							0.01
Family Cordulegastridae – Spiketails									
<i>Cordulegaster diastatops</i> (Selys 1854) – Delta-spotted Spiketail	G5,N5	105							0.40
<i>Cordulegaster maculata</i> (Selys 1854) – Twin-spotted Spiketail	G5,N5	192							0.74
<i>Cordulegaster obliqua</i> (Say 1839) – Arrowhead Spiketail	G4,N4,Pet	8							0.03
Family Macromiidae – Cruisers									
<i>Didymops transversa</i> (Say 1839) – Stream Cruiser	G5,N5	201							0.78
<i>Macromia illinoiensis</i> Walsh 1862 – Illinois River Cruiser	G5,N5	249							0.97
Family Corduliidae – Emeralds									
<i>Cordulia shurtleffi</i> Scudder 1866 – American Emerald	G5,N5	303							1.18
<i>Dorocordulia lepida</i> (Hagen in Selys 1871) – Petite Emerald	G5,N5	148							0.57
<i>Dorocordulia libera</i> (Selys 1871) – Rocket-tailed Emerald	G5,N5	225							0.87
<i>Epietheca canis</i> (McLachlan 1886) – Beaverpond Baskettail	G5,N5	270							1.05
<i>Epietheca cynosura</i> (Say 1839) – Common Baskettail	G5,N5,?	196							0.76
<i>Epietheca princeps</i> (Hagen 1861) – Prince Baskettail	G5,N5	165							0.64
<i>Epietheca semiaquea</i> (Burmeister 1839) – Mantled Baskettail	G4,N4,?	83							0.32
<i>Epietheca spinigera</i> (Selys 1871) – Spiny Baskettail	G5,N5	230							0.89
<i>Helocordulia uhleri</i> (Selys 1871) – Uhler's Sundragon	G5,N5	293							1.14
<i>Neurocordulia michaeli</i> Brunelle 2000 – Broadtailed Shadowdragon	G3,N4,PSC	61							0.23
<i>Neurocordulia obsoleta</i> (Say 1839) – Umber Shadowdragon	G4,N4	164							0.64
<i>Neurocor. yamaskanensis</i> (Provancher 1875) – Stygian Shadowdragon	G5,N5	17							0.06
<i>Somatochlora albicincta</i> (Burmeister 1839) – Ringed Emerald	G5,N4,PSC	9							0.03
<i>Somatochlora brevicincta</i> Robert 1954 – Quebec Emerald	G3,N1,PSC	7							0.02
<i>Somatochlora cingulata</i> Selys 1871 – Lake Emerald	G5,N4?	32							0.12
<i>Somatochlora elongata</i> (Scudder 1866) – Ski-tailed Emerald	G5,N5	75							0.29
<i>Somatochlora forcipata</i> (Scudder 1866) – Forcinate Emerald	G5,N4	50							0.19
<i>Somatochlora franklini</i> (Selys 1878) – Delicate Emerald	G5,N3?,WSC	59							0.23
<i>Somatochlora incurvata</i> Walker 1918 – Incurvate Emerald	G4,N3,WSC	48							0.18
<i>Somatochlora kennedyi</i> Walker 1918 – Kennedy's Emerald	G5,N3?	67							0.26
<i>Somatochlora minor</i> Calvert 1898 – Ocellated Emerald	G5,N4	54							0.21
<i>Somatochlora tenebrosa</i> (Say 1839) – Clamp-tipped Emerald	G5,N5	24							0.09
<i>Somatochlora walshii</i> (Scudder 1866) – Brush-tipped Emerald	G5,N4	92							0.35
<i>Somatochlora williamsoni</i> Walker 1907 – Williamson's Emerald	G5,N5	82							0.32
<i>Williamsonia fletcheri</i> Williamson 1923 – Ebony Boghaunter	G3/4,N3/4,WSC	65							0.27
<i>Williamsonia linterni</i> (Hagen in Selys 1878) – Ringed Boghaunter	G3,N2,EN	72							0.28

Table 1: continued

Suborder ANISOPTERA – Dragonflies			0	1	2	3	4	5	%
Family Libellulidae – Skimmers									
<i>Celithemis elisa</i> (Hagen 1861) – Calico Pennant	G5,N5	357							1.39
<i>Celithemis eponina</i> (Drury 1770) – Halloween Pennant	G5,N5,WSC	82							0.32
<i>Celithemis martha</i> Williamson 1922 – Martha's Pennant	G4,N4	78							0.30
<i>Erythemis simplicicollis</i> (Say 1839) – Eastern Pondhawk	G5,N5	56							0.21
<i>Erythrodiplox berenice</i> (Drury 1770) – Seaside Dragonlet	G5	34							0.13
<i>Ladona exusta</i> (Say 1839) – White Corporal	G4,N4	176							0.68
<i>Ladona julia</i> (Uhler 1857) – Chalk-fronted Corporal	G5,N5	552							2.15
<i>Leucorrhinia frigida</i> Hagen 1890 – Frosted Whiteface	G5,N5	370							1.44
<i>Leucorrhinia glacialis</i> Hagen 1890 – Crimson-ringed Whiteface	G5,N5	160							0.62
<i>Leucorrhinia hudsonica</i> (Selys 1850) – Hudsonian Whiteface	G5,N5	246							0.96
<i>Leucorrhinia intacta</i> (Hagen 1861) – Dot-tailed Whiteface	G5,N5	414							1.61
<i>Leucorrhinia patricia</i> Walker 1940 – Canada Whiteface	G4,PSC	2							<0.01
<i>Leucorrhinia proxima</i> Calvert 1890 – Red-waisted Whiteface	G5,N5	217							0.84
<i>Libellula cyanea</i> Fabricius 1775 – Spangled Skimmer	G5,N5	49							0.19
<i>Libellula incesta</i> Hagen 1861 – Slaty Skimmer	G5,N5	474							1.85
<i>Libellula luctuosa</i> Burmeister 1839 – Widow Skimmer	G5,N5	115							0.44
<i>Libellula needhami</i> Westfall 1943 – Needham's Skimmer	G5,N5,PSC	1							<0.01
<i>Libellula pulchella</i> Drury 1770 – Twelve-spotted Skimmer	G5,N5	251							0.98
<i>Libellula quadrimaculata</i> Linnaeus 1758 – Four-spotted Skimmer	G5,N5	440							1.71
<i>Libellula semifasciata</i> Burmeister 1839 – Painted Skimmer	G5,N5	23							0.08
<i>Nannothemis bella</i> (Uhler 1857) – Elfin Skimmer	G4,N4	67							0.26
<i>Pachydiplax longipennis</i> (Burmeister 1839) – Blue Dasher	G5,N5	149							0.58
<i>Pantala flavescens</i> (Fabricius 1798) – Wandering glider	G5,N5	71							0.27
<i>Pantala hymenaea</i> (Say 1839) – Spot-winged glider	G5,N5	24							0.09
<i>Perithemis tenera</i> (Say 1839) – Eastern Amberwing	G5,N5	107							0.41
<i>Plathemis lydia</i> (Drury 1770) – Common Whitetail	G5,N5	336							1.31
<i>Sympetrum corruptum</i> (Hagen 1861) – Variegated Meadowhawk	G5,N5	2							<0.01
<i>Sympetrum costiferum</i> (Hagen 1861) – Saffron-winged Meadowhawk	G5,N5	181							0.70
<i>Sympetrum danae</i> (Sulzer 1776) – Black Meadowhawk	G5,N5,WSC	28							0.10
<i>Sympetrum internum</i> Montgomery 1943 – Cherry-faced Meadowhawk	G5,N5,?	640							2.49
<i>Sympetrum janeae</i> Carle 1992 – Jane's Meadowhawk	G5,?	6							0.02
<i>Sympetrum obtrusum</i> (Hagen 1867) – White-faced Meadowhawk	G5,N5	342							1.33
<i>Sympetrum rubicundulum</i> (Say 1839) – Ruby Meadowhawk	G5,N5,?	105							0.40
<i>Sympetrum semicinctum</i> (Say 1839) – Band-winged Meadowhawk	G5,N5	207							0.80
<i>Sympetrum vicinum</i> (Hagen 1861) – Autumn Meadowhawk	G5,N5	577							2.25
<i>Tramea carolina</i> (Linnaeus 1763) – Carolina Saddlebags	G5,N5,PSC	2							<0.01
<i>Tramea lacerata</i> Hagen 1861 – Black Saddlebags	G5,N5,PSC	8							0.03

Notes to Table 1:

- 1 Full names of species are given in the table. Scientific names conform to current conventions as presented in Westfall and May (1996), and Needham *et al.* (2000), with the following exceptions:
 The genus *Epitheca* used here, was presented in Needham *et al.* (2000) as *Epicordulia* and *Tetragoneuria*.
Neurocordulia sp. nov. as presented in Brunelle (2000) has since been described as *Neurocordulia michaeli* (Brunelle 2000a).
Enallagma cyathigerum has been returned to its name of *Enallagma annexum* (Hagen 1861).
 Names presented in red are additions to the state list since Brunelle (1999).
 Common or English names are those accepted by the Dragonfly Society of the Americas, as presented in Paulson and Dunkle (1996), and subsequent revisions.
- 2 **Listing:** Global (g) and United States national (n) statuses are by NatureServe. Question marks in this information are from the NatureServe data, and reflect uncertainty in the assessment. In the NatureServe rating system the lower the number is, the higher the conservation concern; g1 is of the highest concern, g2 and g3 are of some concern as well, and g4 and g5 are thought to be secure. This ranking structure also applies to national statuses (n). State-level statuses are currently being developed by MDIFW based on MDDS findings.
 Statuses of conservation concern are given in bold in the table.
 Maine Department of Inland Fisheries and Wildlife listing statuses are:
Statuses which give legal protection – applied by legislation.
EN Endangered (*Williamsonia lintneri* only).
TH Threatened (*Ophiogomphus howei* only).
Statuses which do not give legal protection, but which indicate conservation concern – assigned by MDIFW.
PTH Proposed Threatened (4 species) have been proposed for TH status.
WTH Withdraw Threatened (*Ophiogomphus howei* is now proposed for PTH).
SC Species of Special Concern.
PSC Proposed Species of Special Concern.
WSC Withdraw Species of Special Concern.
 ? indicates that there is some reason to question our knowledge of distribution in the state; the following pairs are both present, but historical material has not been fully reviewed and distribution is currently uncertain – *Lestes australis* and *disjunctus*; *Enallagma cyathigerum* and *venale*; and *Epitheca cynosura* and *semiaquea*.
Sympetrum internum, *janeae*, and *rubicundulum* are very similar and there is disagreement about their validity as separate forms; their distribution in the state is very unclear.
- 3 The total number of records from Maine as of 2004 for each species.
- 4 Frequency of encounter; the species' percentage of the total state records, indicates how often the species has been encountered. The yellow bars visualize this figure, which somewhat reflects actual presence (not necessarily abundance). However, this figure should be assessed against the cryptic appearance and behavior of some species, the rarely-collected habitat of others, the flight of some during little-surveyed periods of the year, and the intensity of survey targeted towards the rarer species.
- 5 Additions to the State List – species discovered in Maine since the publication of Brunelle (1999b) are given in red. The discovery information is:
Argia translata: August 20 1999, R.G. Butler, Record 105464, Volunteer Survey.
Enallagma pictum: July 23 1999, A. Brand, Record 100160, Volunteer Survey.
Ischnura ramburii: July 17 2000, D.S. Potter, Record 117932, Volunteer Survey.
Aeshna juncea: July 18 2002, P.M. Brunelle, MDDS Record 119904, MDIFW Survey.
Anax longipes: June 26 2000, B.J. Nikula, Record 173657, Volunteer Survey.
Stylurus spiniceps: July 6 2003, M.F. Veit, MDDS Record 179950, Volunteer Survey.
Somatochlora brevicincta: June 26 1999, J.R. Trimble, Record 175959, Volunteer Survey.
Leucorrhinia patricia: June 18 2003, P.G. deMaynadier, Record 122714, MDIFW Survey.
Libellula needhami: June 26 2001, D.R. Paulson, Record 150644, Volunteer Survey.
Tramea lacerata: June 26 2001, D.R. Paulson, Record 150649, Volunteer Survey.
 Deletions from the State List – following MDDS, four species were withdrawn from the state list, as they were not encountered during the survey, and were known only from references.
Gomphus fraternus,
Gomphus lividus,
Libellula vibrans,
Sympetrum ambiguum.

Table 2: County Distribution

Suborder ZYGOPTERA	1	2																	3	4
Family Calopterygidae	5					6														
<i>Calopteryx aequabilis</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Calopteryx amata</i>	NH	ME		AR		FR	HA				OX	PE	PI		SO		WS		NB	EQ
<i>Calopteryx dimidiata</i> 7	NH																			
<i>Calopteryx maculata</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Hetaerina americana</i>	NH	ME	AN					KE	KN	LI	OX	PE				WL		YO	NB	
Family Lestidae																				
<i>Lestes australis</i>		ME		AR				KE			OX				SO	WL		YO		
<i>Lestes congener</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Lestes disjunctus</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Lestes dryas</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Lestes eurinus</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA		WL	WS	YO	NB	EQ
<i>Lestes forcipatus</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Lestes inaequalis</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA		WL	WS	YO	NB	EQ
<i>Lestes rectangularis</i>	NH	ME	AN		CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Lestes unguiculatus</i>	NH	ME			CU		HA	KE	KN	LI	OX	PE		SA	SO	WL	WS	YO	NB	EQ
<i>Lestes vigilax</i>	NH	ME	AN		CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	
Family Coenagrionidae																				
<i>Amphiagrion saucium</i>	NH	ME		AR		FR		KE			OX	PE	PI		SO			YO	NB	EQ
<i>Argia f. violacea</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Argia moesta</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Argia translata</i> 8		ME						KE												
<i>Chromagrion conditum</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Coenagrion interrogatum</i>		ME		AR						LI	OX	PE	PI		SO		WS		NB	EQ
<i>Coenagrion resolutum</i>	NH	ME	AN	AR		FR	HA	KE	KN	LI		PE	PI		SO	WL	WS		NB	EQ
<i>Enallagma antennatum</i>																				EQ
<i>Enallagma annexum</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN		OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Enallagma aspersum</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Enallagma boreale</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Enallagma carunculatum</i>		ME		AR			HA						PI						NB	EQ
<i>Enallagma civile</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE		SA	SO	WL	WS	YO	NB	EQ
<i>Enallagma clausum</i>																				EQ
<i>Enallagma divagans</i>	NH	ME			CU		HA	KE	KN	LI	OX	PE				WL	WS	YO		
<i>Enallagma durum</i>		ME					HA													
<i>Enallagma ebrium</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Enallagma exsulans</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Enallagma geminatum</i>	NH	ME	AN		CU	FR	HA	KE	KN	LI	OX	PE		SA	SO	WL	WS	YO	NB	EQ
<i>Enallagma hageni</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Enallagma laterale</i>	NH	ME	AN		CU			KE	KN	LI	OX					WL	WS	YO		
<i>Enallagma minusculum</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI		SO	WL	WS	YO	NB	
<i>Enallagma pictum</i>		ME	AN		CU			KE		LI	OX							YO		
<i>Enallagma signatum</i>	NH	ME	AN		CU	FR	HA	KE	KN	LI	OX	PE		SA	SO	WL	WS	YO	NB	EQ
<i>Enallagma vernale</i>	NH	ME			CU		HA				OX	PE			SO		WS			EQ
<i>Enallagma vesperum</i>	NH	ME	AN		CU	FR	HA	KE	KN	LI	OX	PE		SA	SO	WL	WS	YO	NB	EQ
<i>Ischnura hastata</i>		ME							KN	LI									YO	
<i>Ischnura kellicotti</i>		ME	AN		CU	FR	HA	KE	KN	LI	OX			SA					YO	
<i>Ischnura posita</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Ischnura ramburii</i>		ME														WL	WS			
<i>Ischnura verticalis</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Nehalennia gracilis</i>	NH	ME	AN	AR	CU	FR	HA	KE		LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Nehalennia irene</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ

Table 2: continued

Suborder ANISOPTERA

Family Aeshnidae

<i>Aeshna canadensis</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Aeshna clepsydra</i>	NH	ME	AN		CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	
<i>Aeshna constricta</i>	NH	ME	AN			FR	HA	KE		LI	OX	PE	PI		SO	WL	WS	YO	NB	EQ
<i>Aeshna eremita</i>	NH	ME	AN	AR	CU	FR	HA	KE			OX	PE	PI		SO	WL	WS	YO	NB	EQ
<i>Aeshna i. interrupta</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN		OX	PE	PI		SO	WL	WS		NB	EQ
<i>Aeshna juncea</i>	NH	ME													SO				NB	EQ
<i>Aeshna sitchensis</i>	NH	ME		AR			HA		KN			PE	PI		SO				NB	EQ
<i>Aeshna subarctica</i>		ME		AR			HA					PE			SO		WS		NB	EQ
<i>Aeshna tuberculifera</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE		SA	SO	WL	WS	YO	NB	EQ
<i>Aeshna u. umbrosa</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Aeshna verticalis</i>	NH	ME	AN	AR		FR	HA	KE	KN	LI	OX	PE	PI		SO	WL	WS	YO	NB	EQ
<i>Anax junius</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Anax longipes</i>		ME			CU						OX						WS		NB	
<i>Basiaeschna janata</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Boyeria grafiana</i>	NH	ME	AN	AR		FR					OX	PE	PI		SO	WL	WS		NB	EQ
<i>Boyeria vinosa</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Epiaeschna heros</i>	NH	ME			CU		HA	KE	KN	LI		PE						YO	NB	EQ
<i>Gomphaeschna furcillata</i>	NH	ME	AN	AR	CU		HA	KE		LI	OX	PE	PI			WL	WS	YO	NB	EQ
<i>Nasiaeschna pentacantha</i>	NH	ME	AN		CU	FR	HA	KE	KN		OX	PE				WL	WS	YO	NB	
<i>Rhionaeschna mutata</i>	NH	ME									OX									
<i>Tachopteryx thoreyi</i>	NH																			

Family Gomphidae

<i>Argomphus cornutus</i>																				EQ
<i>Argomphus furcifer</i>	NH	ME		AR	CU						OX	PE					WS	YO	NB	EQ
<i>Argomphus villosipes</i>	NH	ME	AN		CU			KE						SA	SO	WL		YO		
<i>Dromogomphus spinosus</i>	NH	ME	AN	AR		FR	HA	KE	KN	LI	OX	PE	PI		SO	WL	WS	YO	NB	EQ
<i>Gomphus abbreviatus</i>	NH	ME		AR	CU		HA	KE	KN	LI	OX	PE			SO	WL	WS		NB	
<i>Gomphus adelphus</i>	NH	ME		AR	CU	FR	HA		KN		OX	PE	PI		SO	WL	WS		NB	EQ
<i>Gomphus borealis</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN		OX	PE	PI	SA	SO	WL	WS		NB	EQ
<i>Gomphus desertus</i>	NH	ME		AR		FR					OX	PE	PI		SO	WL	WS		NB	EQ
<i>Gomphus exilis</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Gomphus fraternus</i>																				EQ
<i>Gomphus lividus</i>	NH																			EQ
<i>Gomphus quadricolor</i>	NH	ME									OX									
<i>Gomphus spicatus</i>	NH	ME	AN	AR	CU	FR	HA	KE		LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Gomphus vastus</i>	NH	ME			CU	FR					OX	PE						YO	NB	EQ
<i>Gomphus ventricosus</i>	NH																		NB	EQ
<i>Hagenius brevistylus</i>	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Lanthus parvulus</i>	NH	ME		AR		FR	HA	KE				PE	PI		SO				NB	EQ
<i>Lanthus vernalis</i>	NH	ME		AR	CU		HA	KE			OX					WL		YO		
<i>Ophiogomphus anomalus</i>		ME	AN	AR	CU		HA				OX	PE	PI	SA	SO	WL	WS	YO	NB	EQ
<i>Ophiogomphus aspersus</i>	NH	ME		AR		FR	HA				OX	PE	PI		SO		WS	YO	NB	EQ
<i>Ophiogomphus carolus</i>	NH	ME		AR	CU		HA		KN		OX	PE	PI		SO	WL	WS		NB	EQ
<i>Ophiogomphus colubrinus</i>	NH	ME		AR							OX	PE	PI						NB	EQ
<i>Ophiogomphus howei</i>		ME	AN	AR	CU						OX	PE					WS	YO	NB	
<i>Ophiogomphus mainensis</i>	NH	ME		AR	CU	FR	HA		KN		OX	PE	PI		SO	WL	WS	YO	NB	EQ
<i>Ophiogomphus rupinsulensis</i>	NH	ME		AR		FR	HA				OX	PE	PI		SO	WL	WS		NB	EQ
<i>Progomphus obscurus</i>	NH	ME			CU						OX							YO		
<i>Stylogomphus albistylus</i>	NH	ME		AR	CU	FR	HA	KE	KN	LI	OX	PE	PI		SO	WL	WS	YO	NB	EQ
<i>Stylurus scudderii</i>	NH	ME			CU	FR		KE			OX	PE	PI		SO		WS	YO	NB	EQ
<i>Stylurus spiniceps</i>	NH	ME	AN			FR									SO					EQ

Family Cordulegastriidae

<i>Cordulegaster diastatops</i>	NH	ME		AR	CU	FR	HA	KE		LI	OX	PE	PI		SO		WS	YO	NB	EQ
<i>Cordulegaster maculata</i>	NH	ME		AR	CU	FR	HA	KE		LI	OX	PE	PI		SO	WL	WS		NB	EQ
<i>Cordulegaster obliqua</i>	NH	ME			CU			KE		LI		PE								EQ

Family **Macromiidae**[illegible]

Table 2: continued

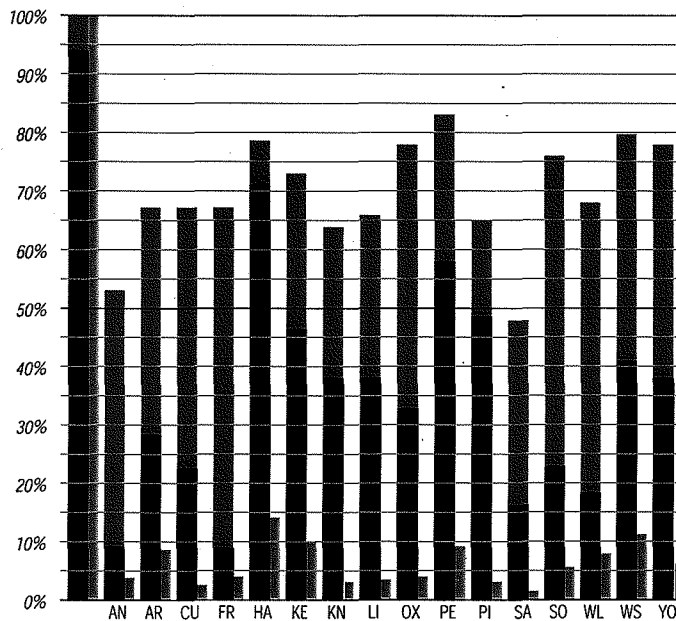
Family Libellulidae continued

Nannothemis bella	NH	ME		AR	CU		HA	KE		LI	OX	PE		SA	SO	WL	WS	YO	NB
Pachydiplax longipennis	NH	ME	AN		CU	FR	HA	KE	KN	LI	OX	PE		SA	SO	WL	WS	YO	NB
Pantala flavescens	NH	ME	AN		CU	FR	HA		KN	LI		PE	PI		SO	WL	WS	YO	NB
Pantala hymenaea	NH	ME		AR		FR	HA		KN	LI		PE					WS	YO	NB
Perithemis tenera	NH	ME	AN		CU	FR	HA	KE	KN	LI	OX	PE		SA		WL	WS	YO	
Plathemis lydia	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB
Sympetrum corruptum		ME					HA												
Sympetrum costiferum	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB
Sympetrum danae	NH	ME		AR		FR	HA	KE		LI		PE	PI		SO		WS		NB
Sympetrum internum	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB
Sympetrum janeae	NH	ME	AN										PI		SO		WS	YO	NB
Sympetrum obtrusum	NH	ME	AN	AR		FR	HA	KE	KN	LI	OX	PE	PI		SO	WL	WS	YO	NB
Sympetrum rubicundulum	NH	ME	AN		CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB
Sympetrum semicinctum	NH	ME	AN	AR		FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB
Sympetrum vicinum	NH	ME	AN	AR	CU	FR	HA	KE	KN	LI	OX	PE	PI	SA	SO	WL	WS	YO	NB
Tramea carolina		ME					HA											YO	
Tramea lacerata	NH	ME						KE		LI				SA				YO	EQ

Number of Species	142	158	94	106	105	106	125	116	101	104	126	131	103	76	120	108	126	121	131	127
% State Species (158)		100	53	67	67	67	79	73	64	66	78	83	65	48	76	68	80	77		
MDDS/MDIFW Additions (51%)		10	79	61	69	92	13	42	41	16	74	39	25	50	87	78	61	71		
% MDDS/MDIFW Additions/baseline		6.3	527	136	192	657	12	57	68	78	142	42	32	192	235	260	94	118		
Number of Records		25,560	1156	2285	763	1124	3676	2601	729	984	1120	2391	832	352	1474	2001	2927	1197		
% State Records (25,540)		100	4.5	8.9	3.0	4.4	14.4	10.2	2.9	3.8	4.4	9.3	3.3	1.4	5.8	7.8	11.4	6.7		

Figure 2: County Proportions of the State List

Black and red bars together are the proportion (%) of the state list of species.
 Red bars are the proportion of the MDDS additions to state and county lists.
 Blue bars are the county's proportion of total state records.



Notes to Table 2:

- 1 **New Hampshire:** data is principally from White and Morse (1973), however several species have been added since, as yet unpublished.
- 2 **Maine:** italic red type indicates an addition since Brunelle (1999b), taken through MDDS.
- 3 **New Brunswick:** data is principally from Brunelle (1997, 1999a), however several species included have been added since, as yet unpublished.
- 4 **Eastern Québec:** data is from Pilon and Lagacé (1998). Eastern Québec is defined here as areas in the province east of the St. Lawrence River.
- 5 **MDDS Additions:** red italic type in the County initial indicates discovery through MDDS.
- 6 **County Names:** see Figure 3, below, for full county names.
- 7 Species names are given in gray where they are known from adjacent provinces and states, but not Maine.
- 8 Species discovered in Maine since the publication of Brunelle (1999b) are given in red.

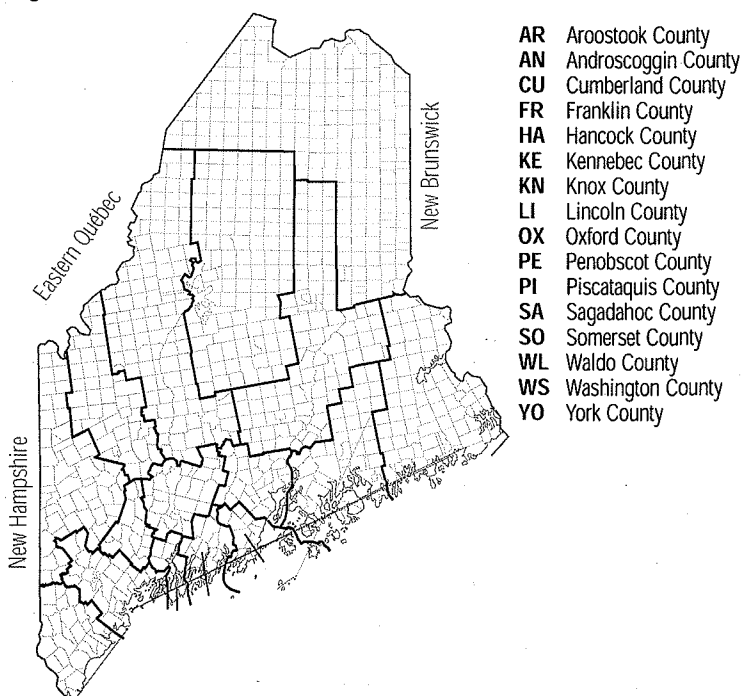
Figure 3: Counties of Maine

Table 3: Biophysical Region Distribution

Suborder ZYGOPTERA

Family Calopterygidae

1 2,3

<i>Calopteryx aequabilis</i>		AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Calopteryx amata</i>		AH	AL	BP	CI	CM	EC	EI	EL			SJ		SI	WF	WM
<i>Calopteryx maculata</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Hetaerina americana</i>					CI				EL				SC	SI		

Family Lestidae

<i>Lestes australis</i>			AL		CI	CM								SI		WM
<i>Lestes congener</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Lestes disjunctus</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Lestes dryas</i>	MD	AH			CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Lestes eurinus</i>	MD	AH	AL		CI	CM	EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Lestes forcipatus</i>	MD	AH	AL		CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Lestes inaequalis</i>	MD				CI		EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Lestes rectangularis</i>	MD				CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Lestes unguiculatus</i>	MD				CI		EC		EL	MC	PB	SJ	SC	SI		WM
<i>Lestes vigilax</i>	MD				CI	CM	EC	EI	EL	MC	PB		SC	SI	WF	WM

Family Coenagrionidae

<i>Amphiagrion saucium</i>			AL		CI							SJ	SC	SI		WM
<i>Argia f. violacea</i>	MD	AH	AL		CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Argia moesta</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Argia translata</i> 4					CI											WF
<i>Chromagrion conditum</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Coenagrion interrogatum</i>		AH	AL	BP	CI				EL			SJ				WM
<i>Coenagrion resolutum</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ			WF	WM
<i>Enallagma annexum</i>		AH	AL		CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Enallagma aspersum</i>	MD	AH			CI	CM	EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Enallagma boreale</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Enallagma carunculatum</i>	MD	AH					EC					SJ				
<i>Enallagma civile</i>	MD	AH			CI	CM	EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Enallagma cyathigerum</i>		AH	AL		CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Enallagma divagans</i>	MD				CI		EC		EL		PB		SC	SI		
<i>Enallagma durum</i>	MD						EC									
<i>Enallagma ebrium</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Enallagma exsulans</i>	MD	AH	AL		CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Enallagma geminatum</i>	MD				CI		EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Enallagma hageni</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Enallagma laterale</i>					CI				EL	MC	PB		SC	SI		
<i>Enallagma minusculum</i>	MD				CI	CM	EC	EI	EL	MC	PB			SI	WF	WM
<i>Enallagma pictum</i>					CI					MC			SC	SI		WM
<i>Enallagma signatum</i>	MD				CI	CM	EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Enallagma vernale</i>	MD							EI	EL					SI	WF	WM
<i>Enallagma vesperum</i>	MD				CI		EC	EI	EL	MC	PB			SI	WF	WM
<i>Ischnura hastata</i>										MC	PB		SC			
<i>Ischnura kellicotti</i>	MD				CI		EC		EL	MC	PB		SC	SI	WF	
<i>Ischnura posita</i>	MD	AH			CI		EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Ischnura ramburii</i>					CI		EC									
<i>Ischnura verticalis</i>	MD	AH	AL		CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Nehalennia gracilis</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC		SJ	SC	SI	WF	WM
<i>Nehalennia irene</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM

Table 3: continued

Suborder ANISOPTERA

Family Aeshnidae

<i>Aeshna canadensis</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Aeshna clepsydra</i>	MD				CI	CM	EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Aeshna constricta</i>	MD				CI	CM	EC	EI		MC	PB	SJ	SC	SI	WF	WM
<i>Aeshna eremita</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC		SJ		SI	WF	WM
<i>Aeshna i. interrupta</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL		PB	SJ	SC		WF	WM
<i>Aeshna juncea</i>				BP												
<i>Aeshna sitchensis</i>	MD	AH		BP	CI		EC				PB	SJ				WM
<i>Aeshna subarctica</i>	MD	AH		BP	CI		EC	EI	EL		PB					
<i>Aeshna tuberculifera</i>	MD		AL		CI		EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Aeshna u. umbrosa</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Aeshna verticalis</i>	MD		AL		CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Anax junius</i>	MD	AH			CI	CM	EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Anax longipes</i>								EI						SI		
<i>Basiaeschna janata</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Boyeria graefiana</i>		AH	AL	BP	CI	CM		EI	EL			SJ		SI	WF	WM
<i>Boyeria vinosa</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Epiaeschna heros</i>	MD				CI		EC			MC	PB		SC			
<i>Gomphaeschna furcillata</i>	MD	AH			CI		EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Nasiaeschna pentacantha</i>					CI				EL	MC	PB		SC	SI	WF	WM
<i>Rhionaeschna mutata</i>														SI		
Family Gomphidae																
<i>Arigomphus furcifer</i>					CI			EI	EL					SI		
<i>Arigomphus villosipes</i>					CI					MC			SC	SI		WM
<i>Dromogomphus spinosus</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Gomphus abbreviatus</i>		AH			CI			EI	EL		PB	SJ		SI		
<i>Gomphus adelphus</i>		AH	AL	BP	CI	CM	EC	EI	EL		PB	SJ		SI	WF	WM
<i>Gomphus borealis</i>		AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Gomphus descriptus</i>		AH	AL	BP		CM			EL		PB	SJ			WF	WM
<i>Gomphus exilis</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Gomphus quadricolor</i>														SI		
<i>Gomphus spicatus</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Gomphus vastus</i>									EL					SI	WF	
<i>Hagenius brevistylus</i>	MD	AH		BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Lanthus parvulus</i>	MD	AH		BP	CI	CM	EC					SJ				WM
<i>Lanthus vernalis</i>	MD	AH			CI		EC						SC	SI		
<i>Ophiogomphus anomalus</i>		AH	AL	BP	CI	CM		EI	EL	MC		SJ		SI	WF	WM
<i>Ophiogomphus aspersus</i>		AH	AL	BP		CM		EI	EL			SJ		SI	WF	WM
<i>Ophiogomphus carolus</i>		AH	AL	BP	CI	CM		EI	EL		PB	SJ		SI	WF	WM
<i>Ophiogomphus colubrinus</i>		AH			CI	CM								SI		
<i>Ophiogomphus howei</i>		AH	AL			CM		EI	EL			SJ		SI	WF	
<i>Ophiogomphus mainensis</i>		AH	AL	BP	CI	CM	EC	EI	EL		PB	SJ		SI	WF	WM
<i>Ophiogomphus rupinulensis</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL			SJ		SI	WF	WM
<i>Progomphus obscurus</i>														SI		
<i>Stylogomphus albistylus</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Stylurus scudderii</i>					CI	CM			EL			SJ		SI		WM
<i>Stylurus spiniceps</i>					CI											WF
Family Cordulegastridae																
<i>Cordulegaster diastatops</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC		SJ	SC	SI	WF	WM
<i>Cordulegaster maculata</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Cordulegaster obliqua</i>					CI					MC						

Table 3: continued

Family Macromiidae																
<i>Didymops transversa</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Macromia illinoensis</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
Family Corduliidae																
<i>Cordulia shurtleffi</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Dorocordulia lepida</i>	MD	AH	AL		CI		EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Dorocordulia libera</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Epitheca canis</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Epitheca cynosura</i>	MD	AH			CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Epitheca princeps</i>	MD	AH			CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	
<i>Epitheca semiaquea</i>	MD				CI	CM	EC	EI	EL		PB	SJ	SC	SI	WF	WM
<i>Epitheca spinigera</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Helocordulia uhleri</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Neurocordulia michaeli</i>		AH		BP	CI	CM	EC	EI	EL			SJ		SI	WF	WM
<i>Neurocordulia obsoleta</i>		AH	AL		CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	
<i>Neurocordulia yamaskanensis</i>					CI	CM			EL					SI	WF	WM
<i>Somatochlora albicincta</i>				BP								SJ				WM
<i>Somatochlora brevicincta</i>				BP					EL			SJ				
<i>Somatochlora cingulata</i>	MD			BP		CM	EC	EI	EL			SJ				WM
<i>Somatochlora elongata</i>	MD	AH		BP	CI	CM	EC	EI	EL	MC	PB	SJ		SI		WM
<i>Somatochlora forcipata</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Somatochlora franklini</i>	MD	AH		BP	CI	CM	EC	EI	EL			SJ			WF	WM
<i>Somatochlora incurvata</i>	MD	AH		BP	CI		EC	EI	EL		PB		SC			WM
<i>Somatochlora kennedyi</i>	MD	AH			CI	CM	EC	EI	EL	MC		SJ	SC	SI	WF	WM
<i>Somatochlora minor</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL			SJ			WF	WM
<i>Somatochlora tenebrosa</i>	MD	AH			CI	CM	EC	EI	EL	MC	PB			SI		
<i>Somatochlora walshii</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL		PB	SJ		SI		WM
<i>Somatochlora williamsoni</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Williamsonia fletcheri</i>	MD	AH			CI		EC	EI	EL		PB	SJ	SC	SI	WF	WM
<i>Williamsonia lintneri</i>													SC	SI		
Family Libellulidae																
<i>Celithemis elisa</i>	MD				CI		EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Celithemis eponina</i>					CI		EC	EI		MC	PB		SC	SI		
<i>Celithemis martha</i>	MD				CI		EC	EI	EL	MC	PB		SC	SI	WF	
<i>Erythemis simplicicollis</i>	MD				CI		EC			MC	PB		SC	SI	WF	
<i>Erythrodiplax berenice</i>	MD				CI		EC			MC	PB		SC			
<i>Ladona exusta</i>	MD				CI		EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Ladona julia</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Leucorrhinia frigida</i>	MD	AH		BP	CI	CM	EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Leucorrhinia glacialis</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ		SI	WF	WM
<i>Leucorrhinia hudsonica</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Leucorrhinia intacta</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Leucorrhinia patricia</i>				BP												WM
<i>Leucorrhinia proxima</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Libellula cyanea</i>					CI				EL	MC	PB		SC	SI		
<i>Libellula incesta</i>	MD				CI		EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Libellula luctuosa</i>	MD				CI		EC		EL	MC	PB		SC	SI	WF	WM
<i>Libellula needhami</i>													SC			
<i>Libellula pulchella</i>	MD	AH		BP	CI	CM	EC	EI	EL	MC	PB		SC	SI	WF	WM
<i>Libellula quadrimaculata</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Libellula semifasciata</i>	MD				CI		EC		EL	MC	PB		SC	SI		

Table 3: continued

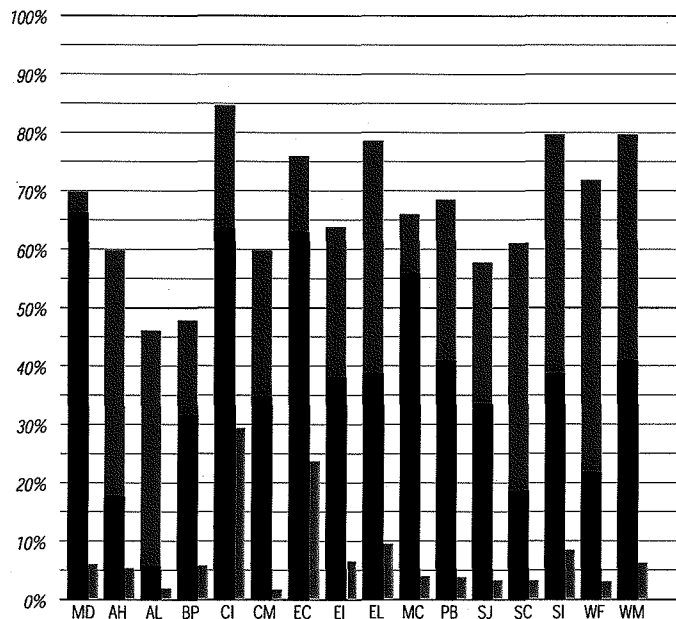
Family Libellulidae continued

<i>Nannothemis bella</i>	MD	AH	AL		CI		EC	EI	EL	MC			SC	SI		WM
<i>Pachydiplax longipennis</i>	MD				CI		EC		EL	MC	PB		SC	SI		WF
<i>Pantala flavescens</i>	MD				CI		EC	EI	EL	MC	PB	SJ	SC	SI		WF
<i>Pantala hymenaea</i>	MD			BP			EC		EL	MC	PB		SC	SI		WF
<i>Perithemis tenera</i>	MD				CI		EC		EL	MC	PB		SC	SI		WF
<i>Plathemis lydia</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Sympetrum corruptum</i>	MD						EC									
<i>Sympetrum costiferum</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Sympetrum danae</i>	MD	AH	AL	BP	CI	CM	EC		EL		PB	SJ				WM
<i>Sympetrum internum</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Sympetrum janeae</i>					CI		EC						SC		WF	
<i>Sympetrum obtrusum</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC		WF	WM
<i>Sympetrum rubicundulum</i>	MD				CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Sympetrum semicinctum</i>	MD	AH	AL		CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Sympetrum vicinum</i>	MD	AH	AL	BP	CI	CM	EC	EI	EL	MC	PB	SJ	SC	SI	WF	WM
<i>Tramea carolina</i>	MD						EC						SC			
<i>Tramea lacerata</i>					CI					MC	PB		SC			

Number of Species	111	94	73	74	135	95	120	108	124	104	109	91	97	126	110	113
% State Species (158)	70	60	46	47	85	60	76	68	79	66	69	58	61	80	70	72
MDDS/MDIFW Additions (46%)	6	66	64	24	34	39	21	42	62	15	44	37	67	64	59	79
% MDDS/MDIFW Additions/baseline	6	240	711	48	34	70	21	64	100	16	68	69	223	65	116	232
Number of Records	1621	1317	487	1437	7570	468	3164	1693	2501	1106	1026	860	749	2146	813	1244
% State Records (25,540)	6.4	5.2	1.9	5.6	29.6	1.8	24.1	6.6	9.8	4.3	4.0	3.4	2.9	8.4	3.2	4.9

Figure 4: Biophysical Region Proportions of the State List

Black and red bars together are the proportion (%) of the state list of species.
 Red bars are the proportion of the MDDS additions to state and bioregion lists.
 Blue bars are the county's proportion of total state records.



Notes to Table 3:

- 1 **Mount Desert Island:** although not itself a biophysical region (it falls in Eastern Coastal) the island is anomalous for that region due to its elevations and has received sufficient study to warrant separate listing.
- 2 **Biophysical Region Names:** see Figure 5, below, for full biophysical region names.
- 3 **MDDS Additions:** red italic type in the County initial indicates discovery through MDDS.
- 4 Species discovered in Maine since the publication of Brunelle (1999b) are given in red.

Figure 5: Biophysical Regions of Maine

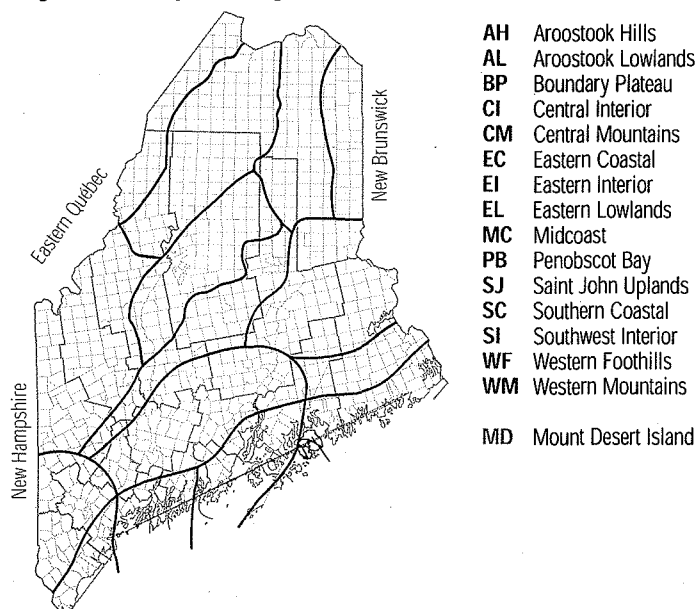
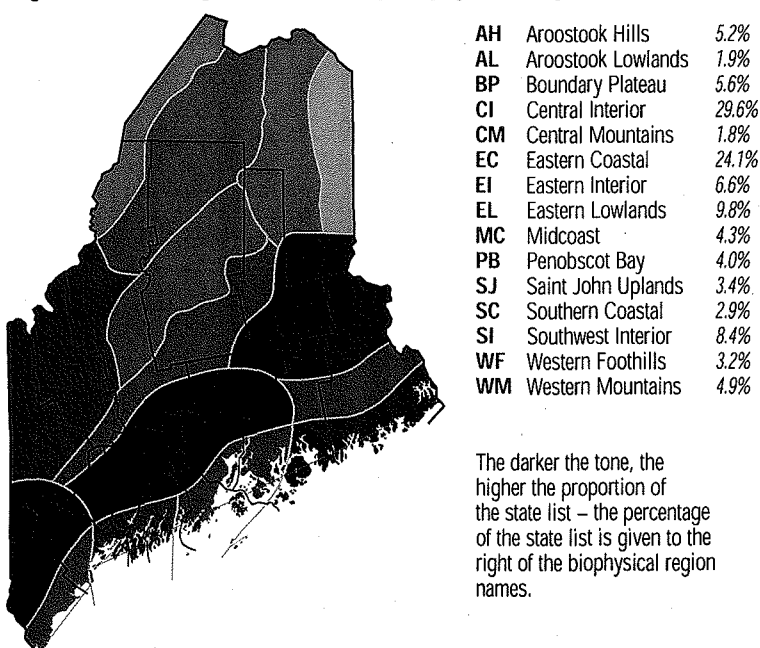


Figure 6: Percentage of State List by Biophysical Region



	1	2	3		2						
ZYGOPTERA				MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOV.							
Calopterygidae	A B C D E A B C D E A B C D E A B C D E A B C D E A B C D E A B C										
<i>Calopteryx aequabilis</i>	289	06.02		4 7 24 77 81	33 14 14 12 12 4 6 1						08.17
<i>C. amata</i>	134	06.03		1 2 8 41 35	17 9 5 6 7 3						08.06
<i>C. maculata</i>	429	06.01		8 7 17 67 95	52 26 22 25 34 12 14 16 12 12	3 3 1 2 1					09.27
<i>Hetaerina americana</i>	18	08.16				1 2 6 1	1 2 2 1 3				09.25
Lestidae	A B C D E A B C D E A B C D E A B C D E A B C D E A B C D E A B C										
<i>Lestes australis</i>	11	06.13		1 1 1 3 1 3	1						08.04
<i>L. congener</i>	291	06.30		1 3 4 4 4 11	2 10 21 22 34	27 26 26 17 21	22 15 7 3 3	5 3			11.12
<i>L. disjunctus</i>	461	06.21		1 4 21 12 9	25 53 38 51 63 62 54	22 17 12 10 5 2				10.03	
<i>L. dryas</i>	100	06.01		2 1 2 8 19	19 10 5 11 9 2 3	6 2 1				09.03	
<i>L. eurinus</i>	61	06.02		3 2 3 6 11	11 4 10 6 1 1 1 1 1					08.19	
<i>L. forcipatus</i>	114	06.12		1 1 1 5 3 4 7	13 10 12 7 9 21	6 3 4 1 4 2				10.05	
<i>L. inaequalis</i>	128	06.05		3 5 10 19 24	27 12 12 10 3 1	2				08.17	
<i>L. rectangularis</i>	313	06.01		2 1 7 4 12 5	12 14 17 12 17 36 43 40	16 29 20 8 10 5 2 1				10.14	
<i>L. unguiculatus</i>	98	06.13		1 5 8 5 11	15 14 7 7 7 4 2 9	2 1				09.24	
<i>L. virgillax</i>	350	06.04		1 1 6 15 30	27 34 42 33 31 16 30 27 24 15	7 5 2 3 1				10.05	
Coenagrionidae	A B C D E A B C D E A B C D E A B C D E A B C D E A B C D E A B C										
<i>Amphiagron saucium</i>	14	05.08		1 1 3 3	2 3 1						07.21
<i>Argia f. violacea</i>	427	06.05		1 1 10 25 35	38 29 37 30 41 20 35 29 22 26	11 16 9 5 6 1				10.05	
<i>A. moesta</i>	239	06.15		5 28 40	26 9 14 16 31 9 17 16 9 9	2 3 3 1 1				09.25	
<i>A. translata</i>	17	07.11			1 2 1 2 2 3 2 2	2				09.12	
<i>Chromagrion conditum</i>	232	05.19		6 11 8 18 29 45 47	28 18 9 9 4					07.31	
<i>Coenagrion interrogatum</i>	19	06.13		6 2 4 2 2 1 2						07.21	
<i>C. resolutum</i>	48	06.03		3 6 11 12 10	2 2 2					07.18	
<i>Enallagma annexum</i>	120	05.12		2 5 1 13 14 19 24 11 4	8 3 7 3 2 3 1					08.07	
<i>E. aspersum</i>	164	06.15		1 2 3 7	20 21 16 9 11 18 18 20 8	4 1 2 1 1 1				10.09	
<i>E. boreale</i>	159	05.17		1 6 13 17 23 24 25 26	5 2 3 4 2 2 3 2 1					08.24	
<i>E. carunculatum</i>	4	08.14				2 1 1				08.27	
<i>E. civile</i>	255	06.16		1 5 13	10 10 8 18 11 18 31 29 22 17	16 9 16 8 9 1 2 1				10.17	
<i>E. divagans</i>	33	06.13		6 9 8 3	2 1 1 1 1	1				09.01	
<i>E. durum</i>	3	07.02			1 1 1					08.18	
<i>E. ebrium</i>	357	06.03		1 2 10 31 57	40 32 47 47 28 17 11 16 10 6	2				09.05	
<i>E. exsulans</i>	197	06.14		7 15 31	20 17 13 18 23 8 9 10 7 6	2 3 3 2 3				09.30	
<i>E. geminatum</i>	141	06.18		1 6 10 11 15 15 14 19 10 11 7 9 7	2 3					10.01	
<i>E. hageni</i>	712	05.16		1 18 11 14 34 80 124 88	50 68 49 62 33 24 22 22 9	2 1				09.18	
<i>E. laterale</i>	44	06.07		5 13 16 5 3	1 1					07.19	
<i>E. minusculum</i>	141	06.13		5 12 19	19 11 18 15 11 9 13 7 1 1					08.27	
<i>E</i>											

ANISOPTERA

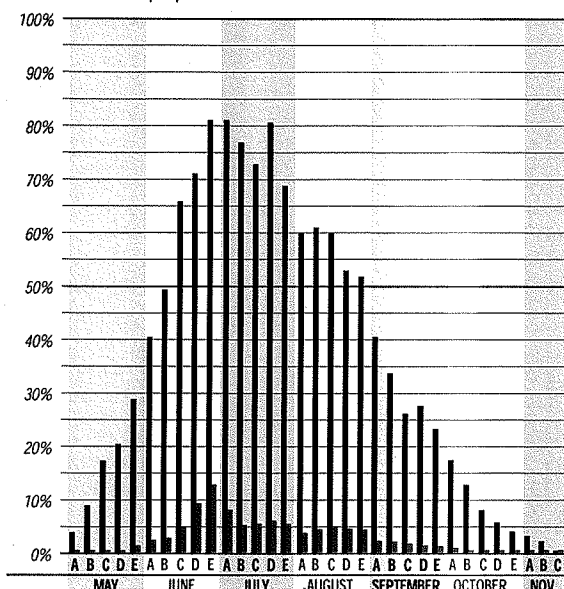
ANISOPTERA			MAY			JUNE			JULY			AUGUST			SEPTEMBER			OCTOBER			NOV.										
			A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C						
<i>Aeshnidae</i>																															
<i>Aeshna canadensis</i>	448	06.11						1		13	6	17	27	27	28	39	54	58	65	39	19	15	11	14	4	5	10.12				
<i>A. clepsydra</i>	102	07.21											2	1	2	7	17	8	16	10	13	7	6	8	4	1	10.13				
<i>A. constricta</i>	104	08.08											1		2	9	10	13	15	13	15	13	6	4	1	1	1	10.19			
<i>A. eremita</i>	153	05.27				E		E	1	7	7		8	7	13	9	6	7	19	21	8	8	7	10	11	3	1	10.15			
<i>A. i. interrupta</i>	169	06.22						E	1	1	1		7	6	20	17	23	23	24	11	13	8	6	4	2	2	10.12				
<i>A. juncea</i>	1	07.18										1															07.18				
<i>A. sitchensis</i>	41	06.25								4	2	2	1	4	1	5	5	8	6	3								08.30			
<i>A. subarctica</i>	30	07.22											1	1	1	3	7	8	6	1	1		1					09.23			
<i>A. tuberculifera</i>	173	06.26						E	E	2	1	11	8	9	19	23	26	22	10	14	8	8	4	4	3	1		10.14			
<i>A. u. umbrosa</i>	358	06.14						1	3	4	1	3	4	11	25	22	19	31	28	44	28	33	23	14	23	19	11	10.08			
<i>A. verticalis</i>	80	07.02										4	1	2	4	2	2	9	8	12	12	8	4	3	5	1	2	1	10.10		
<i>Anax junius</i>	357	05.04	3	8	3	2	7	6	7	18	31	49	27	16	25	17	9	15	20	25	23	13	6	3	7	5	8	2	2	10.12	
<i>A. longipes</i>	3	06.13						1	1		1																	07.10			
<i>Basiaeschna janata</i>	280	05.12	1	6	8	14	23	19	38	70	59	24	7	6	3		1	1											08.08		
<i>Boyeria grafiana</i>	57	06.19							5	3	5	3	2	5	8	4	3	6	1	5	4	1		2					09.23		
<i>B. vinosa</i>	153	05.27				E	1		1	2	3		7	12	4	15	12	18	25	13	13	15	4	3	3	1			11.22		
<i>Epiaeschna heros</i>	16	06.18						2	3	4	3	2							1	1									09.01		
<i>Gomphaeschna furcillata</i>	35	05.12	1		1	2	4	3	5	10	8	1																	07.11		
<i>Nasiaeschna pentacantha</i>	26	06.10						1	8	7	6	1	3																07.11		
<i>Rhionaeschna mutata</i>	2	06.20											2																06.21		
<i>Gomphidae</i>			A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	
<i>Arigomphus furcifer</i>	8	06.01					3			4	1																			06.25	
<i>A. villosipes</i>	23	06.18						1	2	9	5	1	1	2	2															07.31	
<i>Dromogomphus spinosus</i>	161	06.08					2	5	12	15	12	6	6	14	7	10	11	12	17	9	10	8	4	1						09.20	
<i>Gomphus abbreviatus</i>	18	05.25				3	3	3	1	3	3	1		1																07.24	
<i>G. adelphus</i>	120	05.30				1	4	7	9	40	30	12	5	2	8		1	1												07.21	
<i>G. borealis</i>	83	05.17		1		4	7	2	12	17	21	11	3	1	2	2														07.26	
<i>G. descriptus</i>	44	06.03				1	4	19	10	7			2	1																07.23	
<i>G. exilis</i>	393	05.17		1	1	11	20	32	34	57	80	57	26	19	20	11	7	9	4	3	1									08.27	
<i>G. quadricolor</i>	4 E	06.17					E																							06.18	
<i>G. spicatus</i>	197	04.18		1	3	14	23	26	31	28	35	19	6	4	4	2														07.26	
<i>G. vastus</i>	2	06.24								2																				06.24	
<i>Hagenius brevistylus</i>	213	06.05				E	E	4	14	30	19	7	20	22	30	16	13	13	13	9	3									09.06	
<i>Lanthus parvulus</i>	33	06.13						3	9	6	1	7		5	2															07.29	
<i>L. vernalis</i>	27	06.11					1	3	2	5	4	3	2	4	3															07.30	
<i>Ophiogomphus anomalus</i>	45	05.25				E		4	12	13	8		3	3	1	1														07.26	
<i>O. aspersus</i>	29	06.12					E	1	9	5	2	2	1	5			1	1	2											08.27	
<i>O. carolus</i>	98	06.06				3	3	8	29	24	8	6	9	6	3			1	1											08.24	
<i>O. colubrinus</i>	3	06.23						1					1	1																07.25	
<i>O. howei</i>	13	05.25				E		1	8	2	1	1																		06.07	
<i>O. mainensis</i>	63	05.17		1		1	4	10	19	8	9	4	2	3	2															07.28	
<i>O. rupinsulensis</i>	69	06.13						3	18	14	10	4	6	3	4	3	1	1		2										08.31	
<i>Progomphus obscurus</i>	8	06.26							3	1		2	1				1													08.19	
<i>Stylogomphus albistylus</i>	100	05.29				E		3	15	16	12	7	7	14	14	5	2	2		2	1									09.02	
<i>Stylurus scudleri</i>	14	07.02							E			1		3		1	5	3				1								09.25	
<i>S. spiniceps</i>	1	09.11								E									1											09.11	
<i>Cordulegastridae</i>			A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	
<i>Cordulegaster diastolops</i>	88	06.02						1	4	8	16	17	16	9	4	9	3														07.29
<i>C. maculata</i>	154	05.15		1			1	5	18	55	33	13	16	3	7	2															07.28
<i>C. obliqua</i>	8	06.18						1	1	2		2	2																		07.16

Table 4: *continued*

ANISOPTERA			MAY					JUNE					JULY					AUGUST					SEPTEMBER					OCTOBER					NOV.			
Macromiidae			A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	
<i>Didymops transversa</i>	174	05.01	1	1	3	8	7	21	27	25	34	26	11	3	3	3	1																		07.31	
<i>Macromia i. illinoensis</i>	194	05.29					E	1	2	12	41	63	20	10	13	11	4	7	2	4	2	1	1												09.12	
Corduliidae			A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	
<i>Cordulia shurtleffii</i>	259	05.12	1	6	13	14	26	33	24	43	45	23	6	9	11	3	1					1													08.31	
<i>Dorocordulia lepida</i>	129	06.03					2	3	2	13	23	15	10	12	10	4	5	11	13	5	1														08.31	
<i>D. libera</i>	197	05.19				1	9	8	14	39	54	17	8	9	19	12	4	2	1																08.17	
<i>Epitheca canis</i>	258	05.05	1	8	9	18	25	33	25	33	50	32	15	4	1	4																			07.21	
<i>E. cynosura</i>	145	05.22				1	4	9	11	19	34	45	19	1		1	1																		07.29	
<i>E. princeps</i>	146	06.04					E		8	32	59	22	9	4	8		2	1				1													09.24	
<i>E. semiaquea</i>	78	05.15		1		3	8	9	13	13	15	7	7	1	1																				07.19	
<i>E. spinigera</i>	193	05.15		1	2	14	20	26	25	28	43	22	7	3	2																				07.21	
<i>Helocordulia uhleri</i>	181	05.13		6	6	9	18	19	30	44	38	7	3		1																				07.20	
<i>Neurocordulia michaeli</i>	13	06.07					1	1	4	6		1																							07.16	
<i>N. obsoleta</i>	23	06.04					E	4	9	2	1		1					3	1			1	1												09.19	
<i>N. yamaskanensis</i>	8	06.08					1	1	4	1	1																								07.06	
<i>Somatochlora albicincta</i>	8	07.04										2	1		2	1	2																		08.06	
<i>S. brevicincta</i>	7	06.25									3	1	3																							07.12
<i>S. cingulata</i>	30	06.09											1	1	4		6	10	5	1		1			1										09.12	
<i>S. elongata</i>	67	06.08					1	1	1	8	8	1	6	10	4	6	6	5	6	3		1														09.08
<i>S. forcipata</i>	43	05.29				1	1	4	7	8	5	1	1	3	6		1	2	1		1	1													09.10	
<i>S. franklini</i>	55	06.02				2	1	7	5	16	9	2	2	4	4	2	1																			08.07
<i>S. incurvata</i>	48	06.26								1				1	3	1	8	13	8	7	2	2	1	1											10.01	
<i>S. kennedyi</i>	59	06.01					4	6	9	9	11	13	5	1		1																			07.28	
<i>S. minor</i>	48	06.19							9	7	15	9	1	2	3		1	1																	08.14	
<i>S. tenebrosa</i>	23	06.20							1	2		1	1	3	4	2	4	2	2		1														09.06	
<i>S. walshii</i>	89	06.08					1	1	5	7	8	5	4	8	15	10	7	8	6	3	1															09.03
<i>S. williamsoni</i>	65	06.25									5	4	2	3	7	8	7	4	10	9	4	2													09.09	
<i>Williamsonia fletcheri</i>	57	05.06	E	4	15	14	4	8	1	3	5	2	1																						07.02	
<i>W. lintneri</i>	54	04.27	8	10	15	9	6	4	1																										06.11	
Libellulidae			A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	
<i>Cellithemis elisa</i>	331	05.24				E		2	3	14	31	54	37	26	26	27	21	17	24	17	18	11	2	1											09.09	
<i>C. eponina</i>	80	06.25									2	5	4	8	8	6	14	6	4	9	10	2	2												09.11	
<i>C. martha</i>	67	07.01										2	4	4	5	6	5	12	12	10	6	1													09.06	
<i>Erythemis simplicicollis</i>	56	06.21								3	5	7	2	8	4	5	4	2	4	5	3	2		1	1										09.21	
<i>Erythroneura berenice</i>	34	06.13							2	6		2	3	3	5	4	3	5				1													08.31	
<i>Ladona exusta</i>	138	05.17		2	1	9	10	6	11	17	28	17	13	5	5	5	3	2	2	1	1														08.31	
<i>L. julia</i>	535	05.13		4	4	22	39	51	54	80	116	65	28	21	23	13	9	2	1		3														08.31	
<i>Leucorrhinia frigida</i>	354	05.19			3	7	15	10	18	33	51	37	24	29	41	29	14	16	18	6	3														08.28	
<i>L. glacialis</i>	149	05.19				3	5	7	11	14	17	18	10	5	8	14	9	8	7	7	4	1													10.14	
<i>L. hudsonica</i>	230	05.06	1	10	14	20	26	18	18	21	19	33	18	11	7	7	2	2	1	1	1														08.20	
<i>L. intacta</i>	356	05.17			2	4	19	33	33	36	48	72	37	15	23	16	10	4	3																10.14	
<i>L. patricia</i>	1	06.18								1																										06.18
<i>L. proxima</i>	191	05.12		1		2	5	5	11	16	30	42	21	13	7	19	12	3	3	1															08.14	

ANISOPTERA			MAY				JUNE				JULY				AUGUST				SEPTEMBER				OCTOBER				NOV.					
			A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C		
<i>Aeshnidae</i>																																
<i>Libellula cyanea</i>	49	06.21									4	10	5	4	7	9	3	3														
<i>L. incesta</i>	464	06.15									6	14	56	43	40	44	49	42	26	31	30	25	29	10	9	3	6	1				
<i>L. luctuosa</i>	112	06.03					2			1	3	10	15	15	15	9	8	8	5	4	7	2	2	2	1	1	2					
<i>L. needhami</i>	1	06.26									1																					
<i>L. pulchella</i>	211	06.07									2	1	6	32	19	12	17	19	14	18	23	24	8	9	3	1	1	2				
<i>L. quadrimaculata</i>	403	05.15				4	5	17	22	32	26	67	98	43	23	14	26	10	6	2	4	3	1									
<i>L. semifasciata</i>	14	05.15				1				1	2	2	1	2	3	1	1															
<i>Nannothemis bella</i>	60	05.25					3	4	5	9	8	13	5	2	1	3	1	2		1	3											
<i>Pachydiplax longipennis</i>	147	06.11								1		17	8	12	21	9	9	4	6	13	15	14	5	6	1	3		2	1			
<i>Pantala flavescens</i>	67	06.30									2	1	2		1	1	2	7	14	8	11	6	3	4	2	3						
<i>P. hymenaea</i>	23	05.19					2				3	5	3	3	2			3	2													
<i>Perithemis tenera</i>	106	06.21									1	1	1	5	9	13	7	7	13	10	13	13	6	1	3	3						
<i>Plathemis lydia</i>	314	05.23				1	1	15	10	19	35	57	38	15	23	21	21	12	8	15	8	8	3	3	1							
<i>Sympetrum corruptum</i>	2	07.14												1				1														
<i>S. costiferum</i>	156	06.30									1		1		2	6	8	22	22	15	25	7	10	4	9	9	5	2	3	2	1	1
<i>S. danae</i>	27	06.18								1			1		2	2	2	1	3	3	2	4	1	1	2	1			1			
<i>S. internum</i>	586	06.18									1	4	12	8	17	28	45	46	29	53	55	53	62	40	45	27	16	20	13	11		1
<i>S. janeae</i>	9	06.26									8	1																				
<i>S. obtrusum</i>	330	05.24					1				1	3	4	1	5	10	33	24	17	24	37	42	21	28	18	19	17	11	5	4	3	2
<i>S. rubicundulum</i>	96	06.28									3	2</																				

Black bars are the proportion (%) of the state list of species which are flying during the period.
Red bars are the proportion of the state's dated records which have been taken during the period.



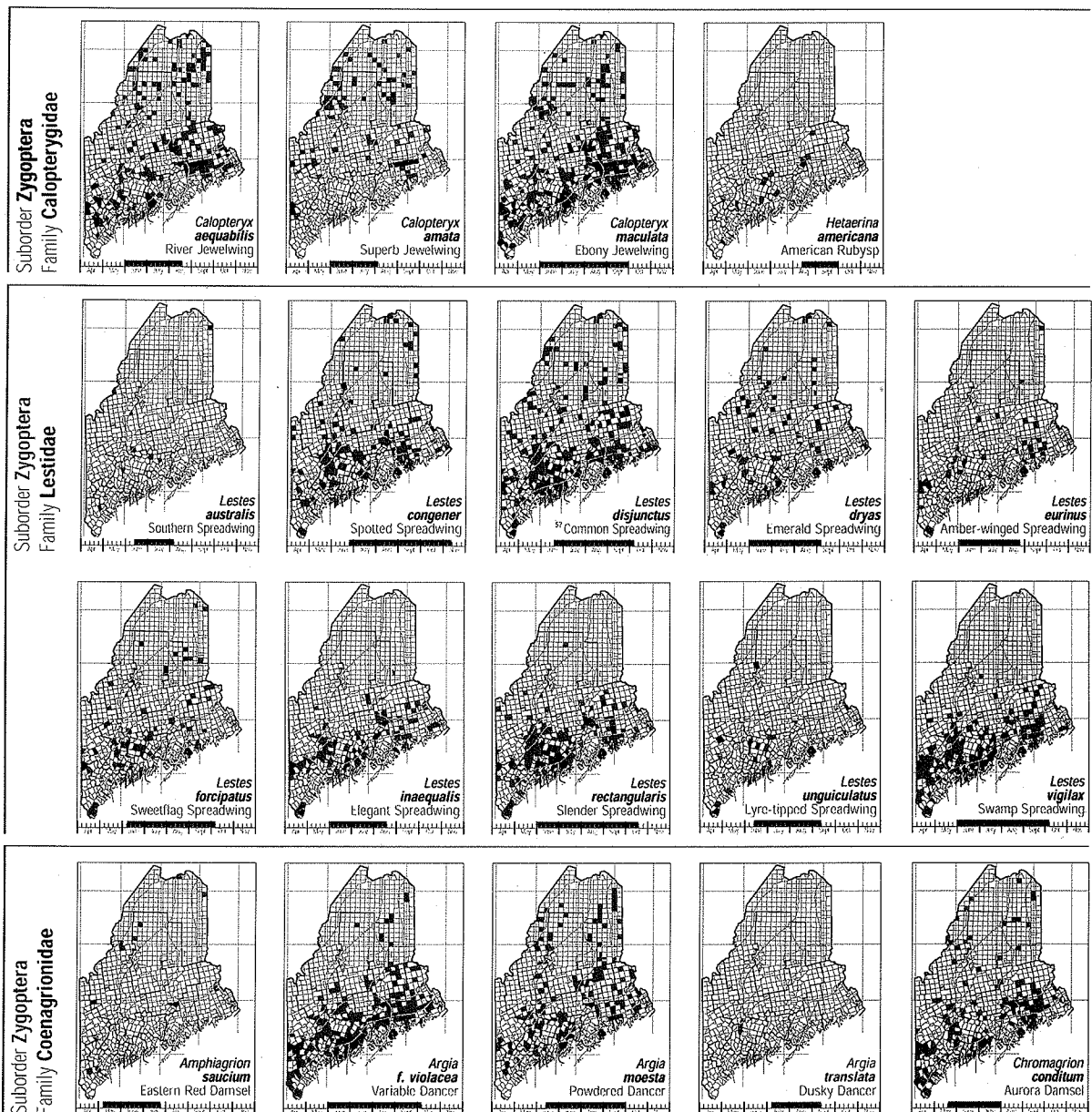
- 1 **Dated Records:** column 2 of the table gives the total number of records from Maine for each species, where a date is known.
- 2 **First and Last Flight Records:** at the left side of the month columns is the first day on which adults or exuviae of the species have been taken in Maine, on the right side the last date on which adults have been recorded. Where known flight begins with exuvia(e) collection, this is indicated by ϵ in the first known quint. There are a few records falling outside the flight range shown in the table.
There is one very early record of an adult *Gomphus spicatus* on April 19 1939, J.F. Hanson, MDDS Record 174370, deposited at the International Odonate Research Institute, Gainesville, Florida; but it has not been confirmed – it seems likely that this was a label or transcription error.
Boyeria vinosa is the latest flying species in the state, November 22 2001, M.I. Tuley, MDDS Record 122086 – definitely a disjunct flight record for this species.
- 3 **Divisions of Flight Period:** each month has been divided into 5 segments;
A is days 1–6, **B** 7–12, **C** 13–18, **D** 19–24, and **E** is day 25 to the end the month.
In each of the columns is the number of dated records for that period, indicating frequency of encounter and hence a perspective on abundance.

Species Distribution

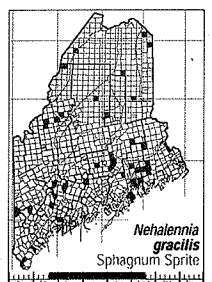
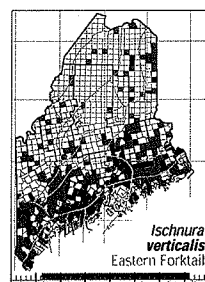
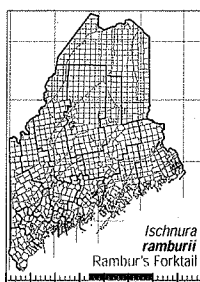
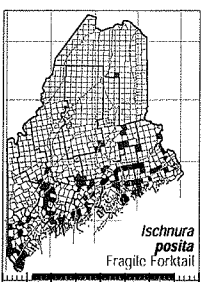
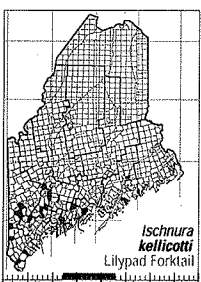
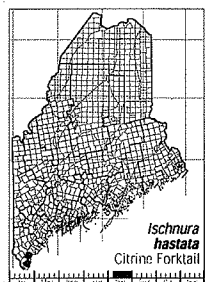
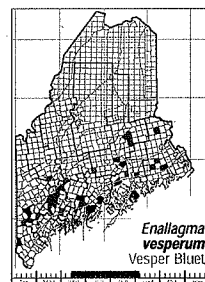
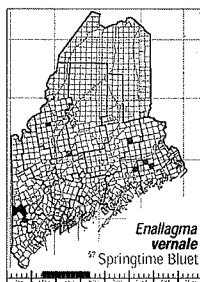
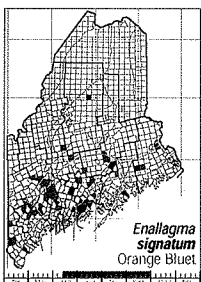
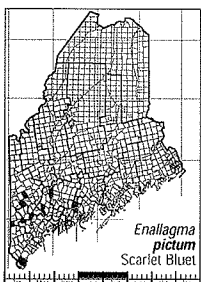
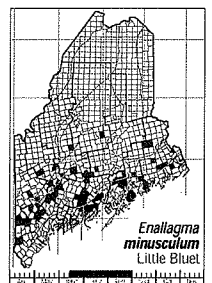
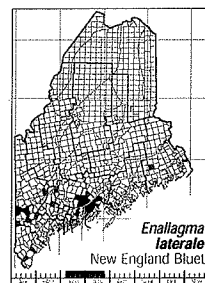
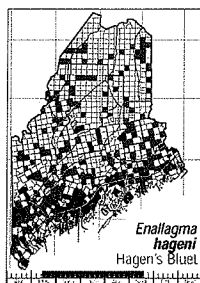
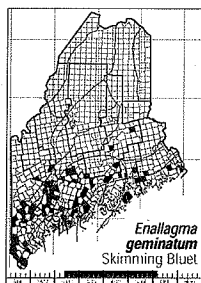
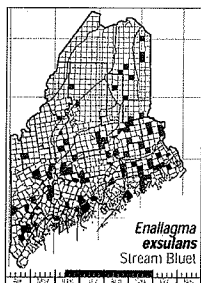
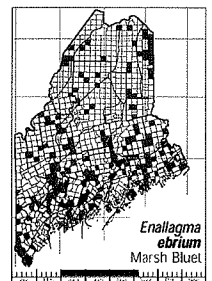
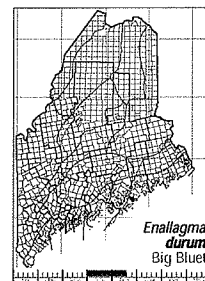
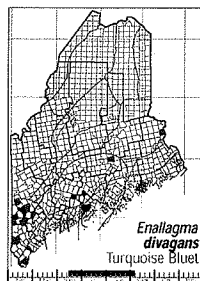
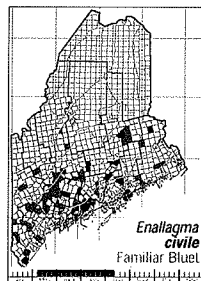
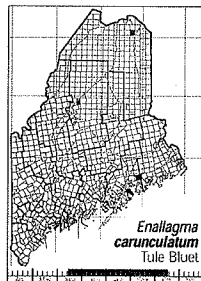
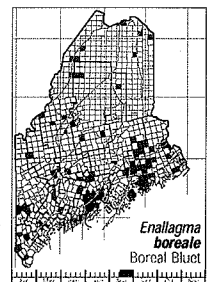
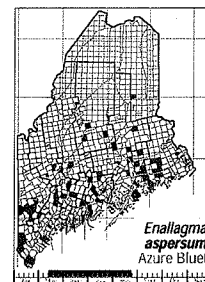
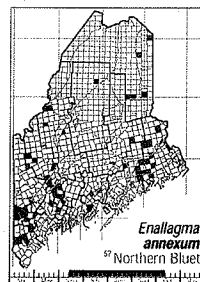
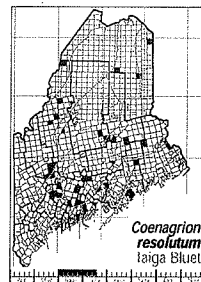
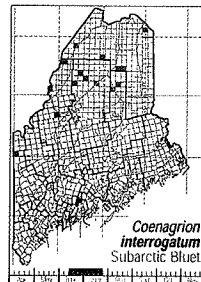
Distribution is shown in the following maps based on townships of the state – biophysical regions and counties are indicated.

Black townships are those where data was held for the species in 1998, essentially before MDDS. Red townships are where data on the species has only been discovered since the formal start of MDDS in 1999. See Figure 1, page 3, for further information on dates of township survey.

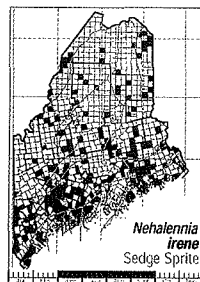
At the bottom of each species map is a green bar depicting known adult flight (see note 3, Table 4, page 21 for an explanation).



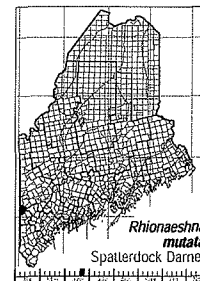
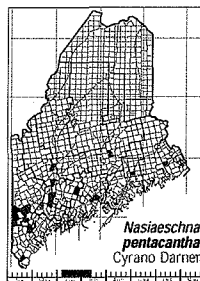
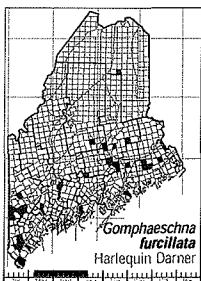
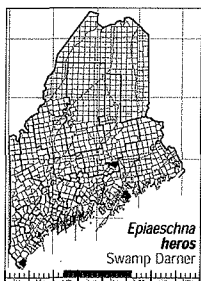
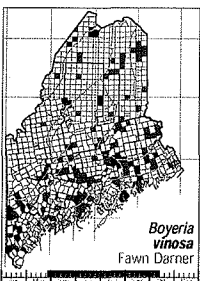
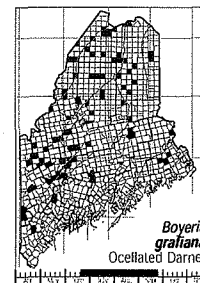
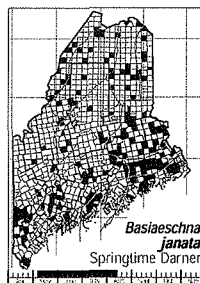
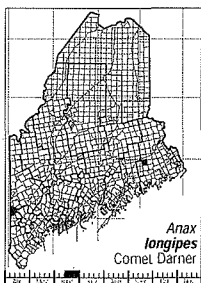
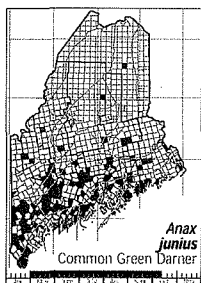
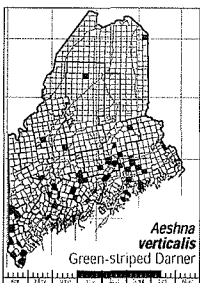
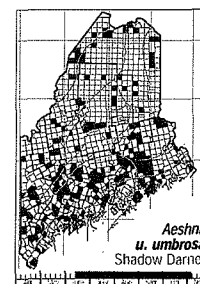
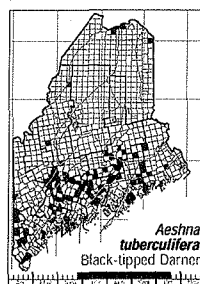
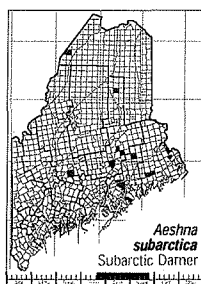
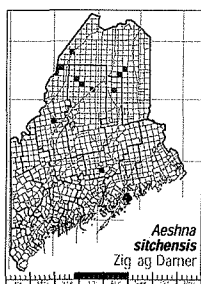
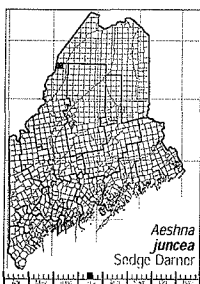
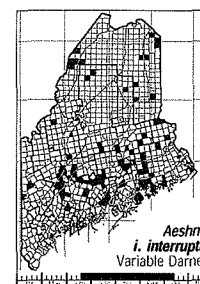
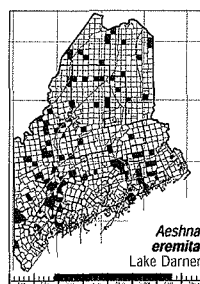
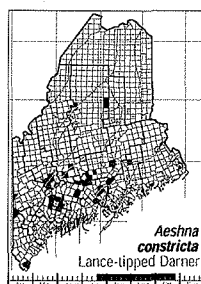
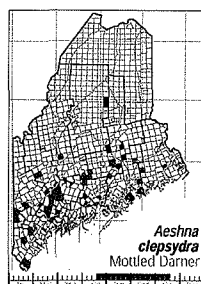
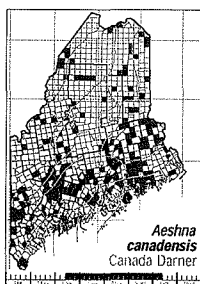
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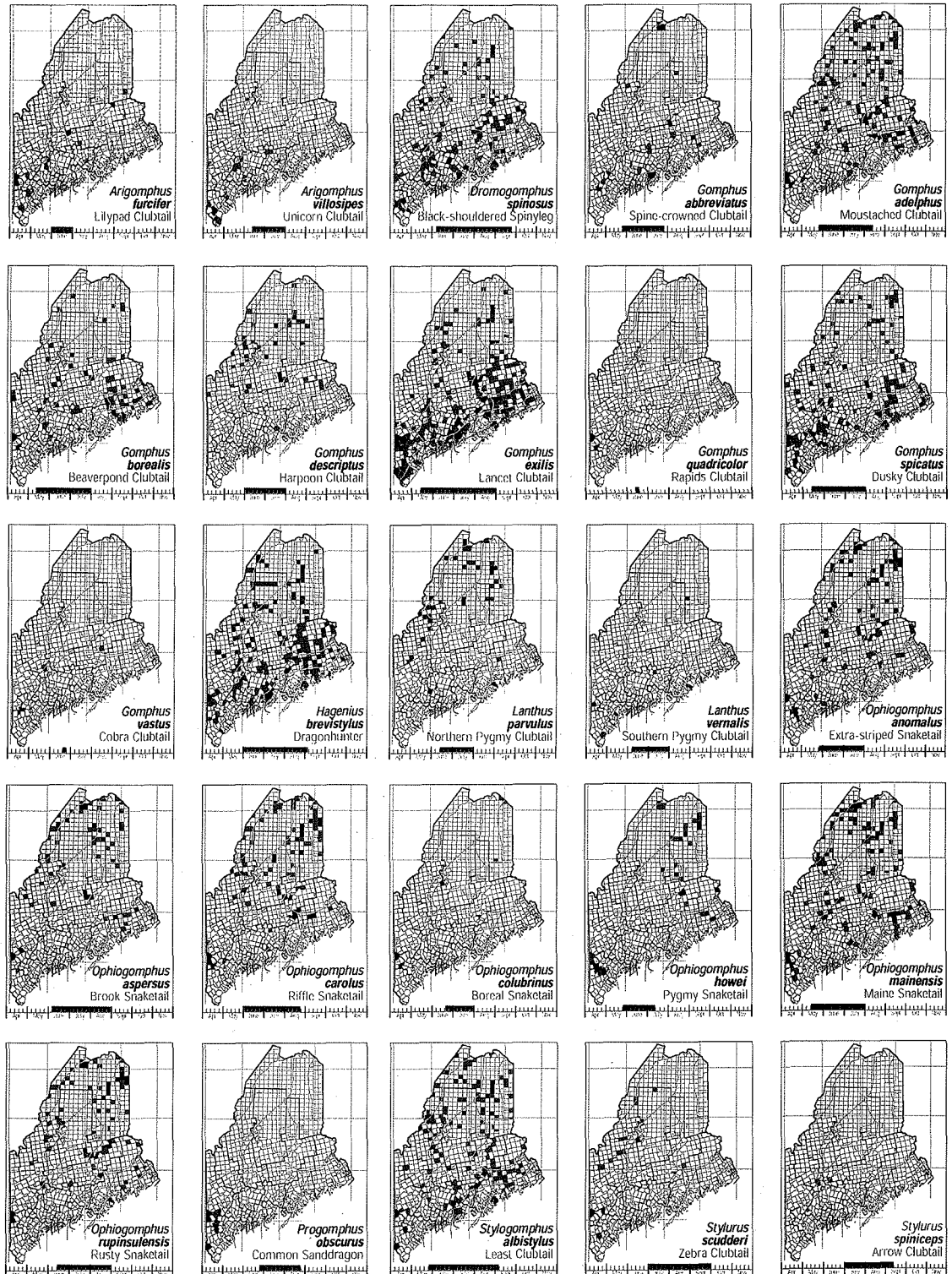
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Family Coenagrionidae *continued*

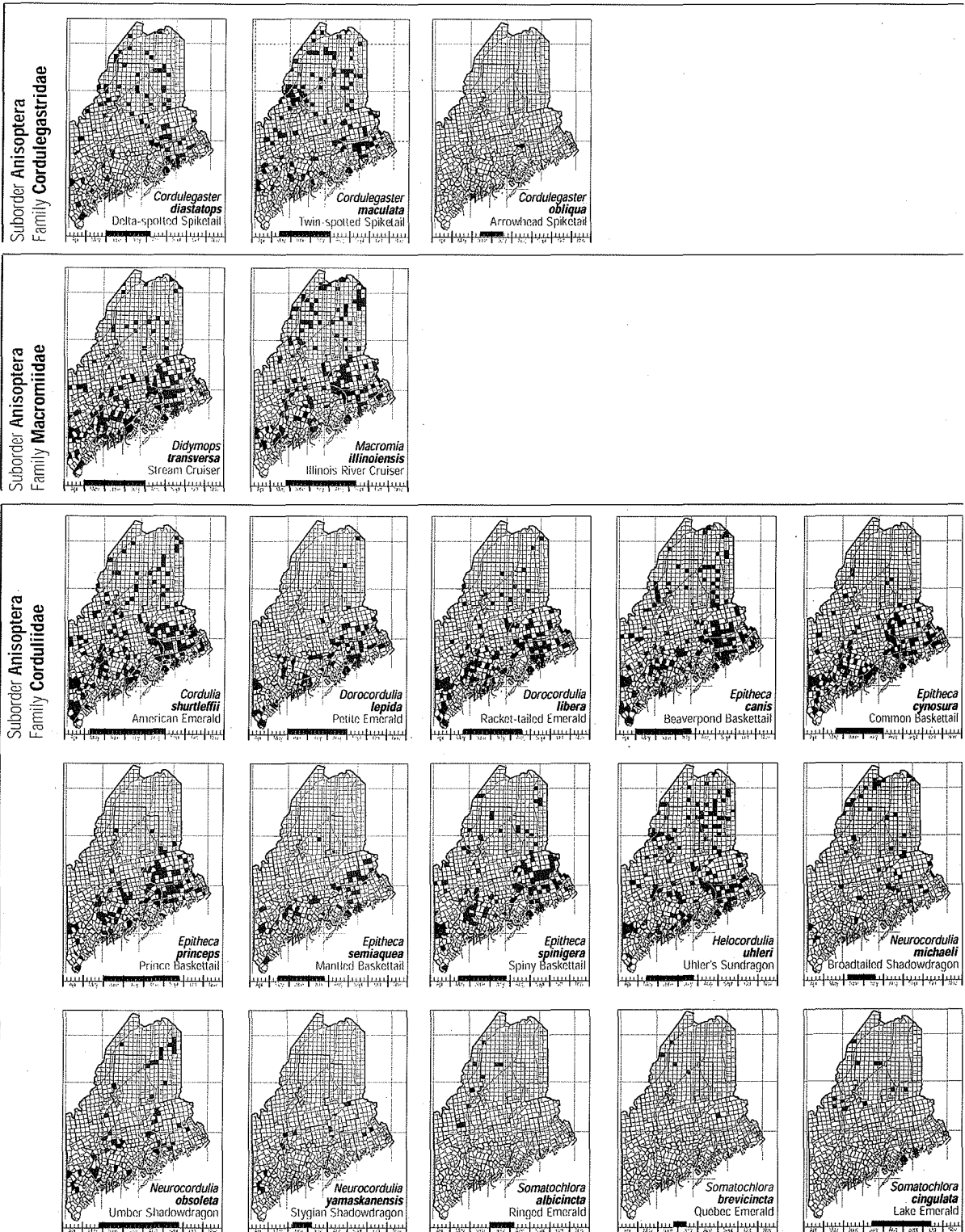


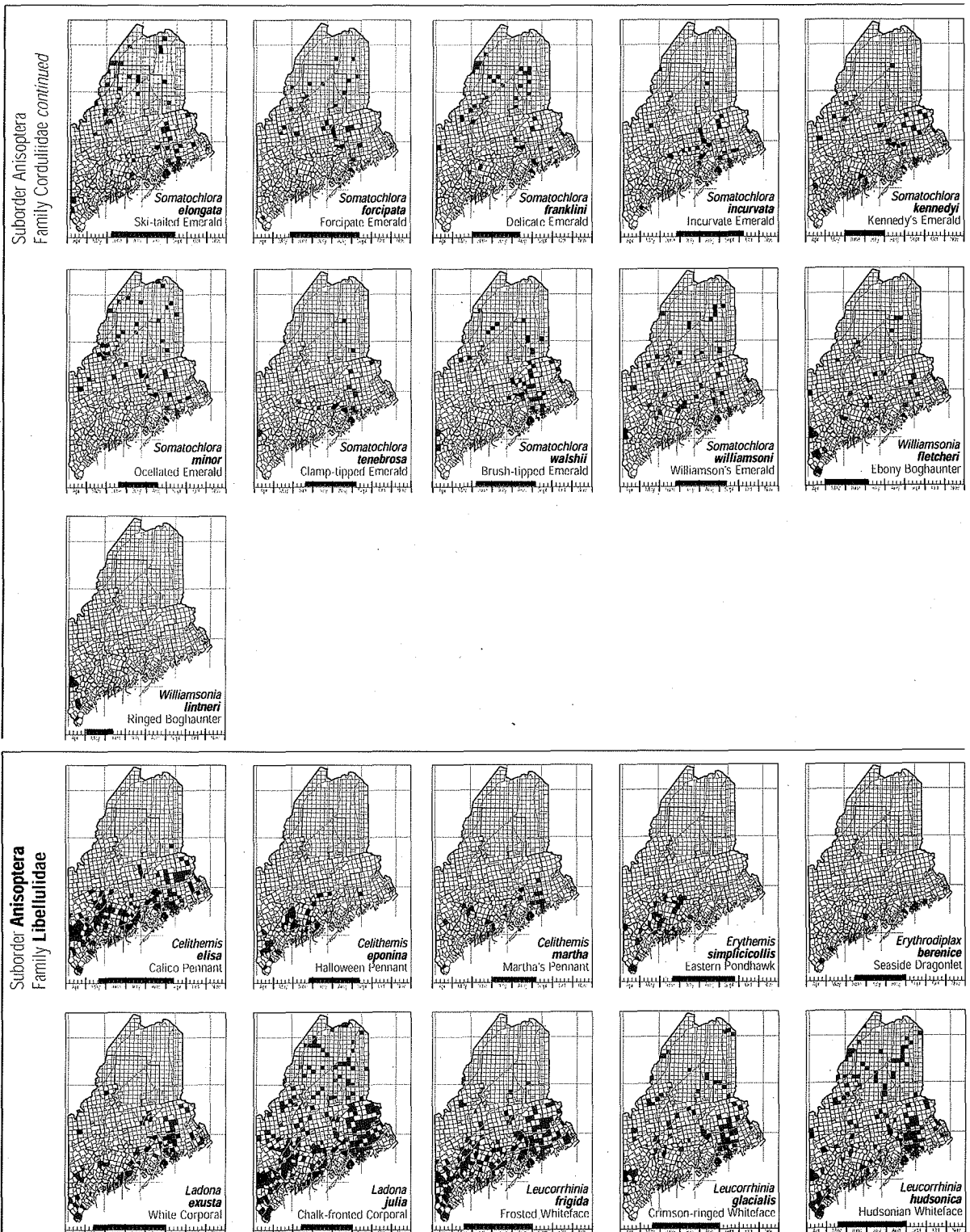
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Family Aeshnidae

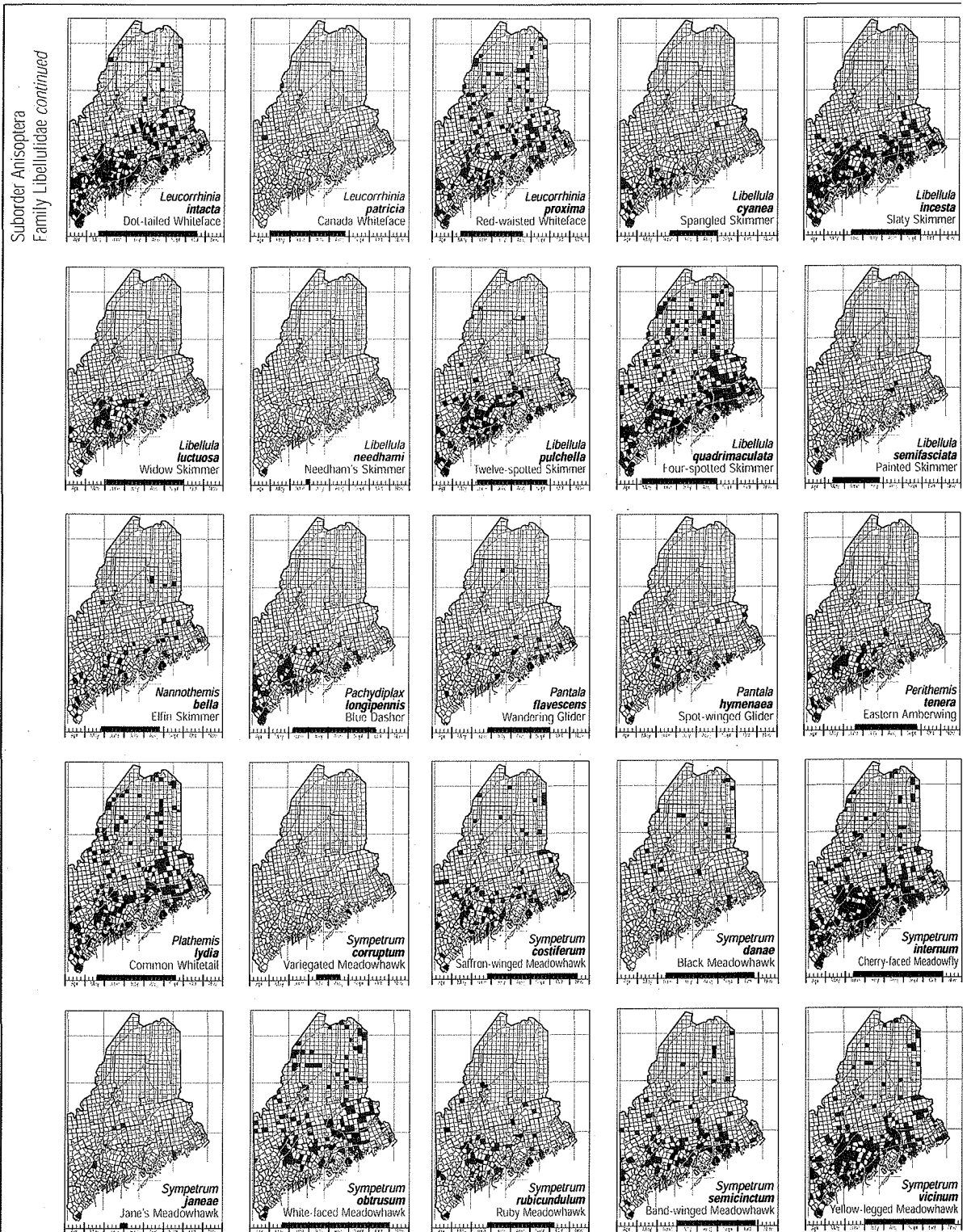


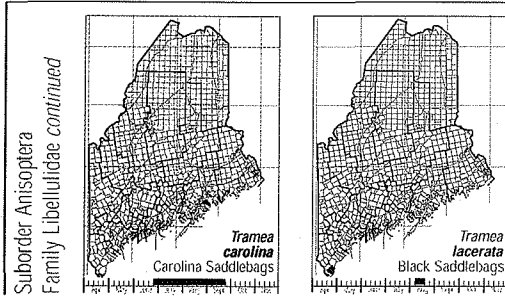
Suborder Anisoptera
Family Gomphidae











Acknowledgments

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MDIFW is grateful to Dr. Mark McCollough (USFWS) for initial conception and support of the MDDS project, and to Dr. Ronald Butler for design and management of the MDDS website and coordination of post-MDDS protocols.

Finally, this project would not have been possible without the volunteer participation of citizen scientists, too numerous to mention, from across Maine and New England.

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