

# DATA AND LITERATURE COMPILATION

## Iowa Skipper

*Atrytone arogos iowa* (Scudder)  
(Lepidoptera: Hesperiiidae)

Arkansas, Colorado, Illinois, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska,  
North Dakota, Oklahoma, South Dakota, Texas, and Wyoming

Submitted  
to

U.S. Fish & Wildlife Service  
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## I. Introduction

This report provides a comprehensive annotated compilation of data and literature for the Iowa skipper (*Atrytone arogos iowa*). Sources reviewed included publications, unpublished reports, Internet resources, consultation with experts (e.g. regional butterfly experts and State Natural Heritage Program personnel), and personal knowledge and experience. The Iowa skipper is a western subspecies of the Arogos skipper (*A. arogos*) and is associated primarily with mixed- and tallgrass native prairie in the Great Plains. Populations eastward to the coastal states are recognized as the Arogos skipper subspecies (*A. arogos arogos*). A general overview of species and subspecies information is also included at the beginning of this report to familiarize readers with the subspecies. It includes classification and nomenclature, a general description of the adult and immature life stages, summaries of habitat requirements, biology and ecology, and distribution and status.

## II. Subspecies Information Summary

### A. Classification and Nomenclature

Class:	Insecta (Insects)
Order:	Lepidoptera (Butterflies and Moths)
Superfamily	Hesperioidea (Skippers)
Family:	Hesperiidae (Skippers)
Subfamily:	Hesperiinae (Grass or Branded skippers)
Genus:	<i>Atrytone</i> (Scudder, 1872)
Species:	<i>arogos</i> (Boisduval & Le Conte, [1834])
Subspecies:	<i>a. iowa</i> (Scudder, 1869) <i>a. arogos</i> (Boisduval & Le Conte, [1834])
Scientific and Common Names:	
Species:	<i>Atrytone arogos</i> = <b>Arogos skipper</b>
Subspecies:	<i>Atrytone a. arogos</i> = <b>Arogos skipper</b> <i>Atrytone a. iowa</i> = <b>Iowa skipper</b>
Controversial or Unresolved Taxonomy:	NONE

The genus *Atrytone* Scudder was revised fairly recently based on a review of genitalic characters by Burns (1994). *Atrytone* was restricted to a single species (*Atrytone arogos*), and the other species in the genus (e.g. *A. logan*, *A. mazai*, *A. barbara* and *A. flavens*) were moved to the resurrected genus *Anatrytone* Dyar. These revisions have been adopted by most authorities in recent publications (e.g. Brock and Kauffman 2003; NABA 2001; Opler and Warren 2003).

### Synonyms used in the literature:

*Papilio vitellius* Abbott & Smith (1797) (Worthington 1880)  
*Hesperia arogos* Boisduval & Le Conte (1833)  
*Hesperia iowa* Scudder (1868)  
*Hesperia mutius* Plotz (1883)  
*Pamphila iowa* Scudder Barber (1894)  
*Atrytone vitellius* Holland (1898)  
*Phycanassa arogos* Boisduval & Le Conte (Lindsey 1917)  
*Atrytone arogos* (Lindsey 1922; Klots 1951)

## **B. General Description of the Species**

Iowa skippers are medium-sized stout bodied skippers with a wingspan ranging from 2.8 to 3.2 cm (1.1 to 1.24 inches). The upper wing surface of males is buff to yellow-orange with a broad dark border and lacks a stigma (specialized sex scales). In females, the dark margin of the upper wing surface is broader and diffuses into the buff areas and is so broad on the hindwings that the buff color is almost entirely obscured. The lower wing surface is bright orange in both sexes. The Iowa skipper is most easily confused with the Delaware skipper (*Anatrytone logan*), which is brighter orange above with more defined dark margins and distinctive darkening of the vein. [adapted from Royer and Marrone 1992]

## **C. Summary of Habitat, Biology, and Ecology**

Northern populations of the Iowa skipper are univoltine (having a single flight per year), but southern populations are bivoltine (having two flights per year). The adult flight is from about the middle of June through the end of July for univoltine populations and from June and mid-August into September for bivoltine populations. The actual flight period varies somewhat across their range and can also vary significantly from year-to-year depending on weather patterns. Females emerge slightly later than males. Where they co-occur with species like the Dakota skipper (*Hesperia dacotae*), regal fritillary (*Speyeria idalia*), and wood nymph (*Cercyonis pegala*), they tend to emerge about one week after those species.

Iowa skippers are generally associated with mixed- and tallgrass native prairie in the Great Plains (see Figure 1 for county distribution map). Larval food plants include big bluestem (*Andropogon gerardii*) and little bluestem (*Schizachyrium scoparium*). Larvae construct shelters along the sides or near the tips of the grass blades and also pupate in shelters near the top of the leaves (Heitzman 1966). The bivoltine populations studied by Heitzman either entered diapause in their leaf shelters as 4<sup>th</sup> instars, or completed development and emerged as adults in September. The relatively exposed shelters used by the larvae and pupae could place the immature stages of the Iowa skipper at greater risk from fire, grazing or extreme weather than species that construct shelters at or below the ground surface. Purple coneflowers (*Echinacea* spp.) are favorite nectar plants, but the later emergence of Iowa skippers can make it necessary to shift to other nectar sources as the coneflowers start to senesce (pers. obs.).

## D. Distribution and Status of the Species

Table 1. Natural Heritage Program Global, National and State/Province Status Ranks and legal protection status for the Arogos and Iowa skippers (Adapted from NatureServe 2005).

	Status Rank	Protection Status	
<b><i>Atrytone arogos iowa</i> (Iowa Skipper)</b>			
<b>Global</b>	G3G4T3T4	--	
<b>USA (National)</b>	N3N4	--	<b><u>Status Rank Definitions</u></b>
<b>USA (State)</b>			<b>G1/N1/S1/T1</b> = Critically imperiled
Arkansas	SNR	--	<b>G2/N2/S2/T2</b> = Imperiled
Colorado*	S2	--	<b>G3/N3/S3/T3</b> = Vulnerable
Illinois*	S1	--	<b>G4/N4/S4/T4</b> = Apparently Secure
Iowa*	S2	SC	<b>G</b> → Global Rank
Kansas	S3	--	<b>N</b> → National Rank
Minnesota	S3	SC	<b>S</b> → State Rank
Missouri	S2?	--	<b>T</b> → Subspecies Rank
Montana	SNR	--	<b>SA</b> = Accidental or casual
Nebraska	SNR	--	<b>SH</b> = Possibly extirpated
North Dakota*	SU	--	<b>SN</b> = Regular migrant
Ohio**	SR	--	<b>SR</b> = Unverified reports
Oklahoma	SNR	--	<b>SU</b> = Status uncertain
South Dakota	S2	--	<b>SX</b> = Presumed extirpated
Texas	SNR	--	<b>SNR</b> = Not ranked
Wisconsin**	SA	--	
Wyoming	SNR	--	
<b><i>Atrytone arogos arogos</i> (Arogos Skipper)</b>			
<b>Global</b>	G3G4T1T2	--	<b><u>Protection Status Definitions</u></b>
<b>USA (National)</b>	N1N2	--	<b>E</b> = Endangered
<b>USA (State)</b>			<b>T</b> = Threatened
Alabama	S1	--	<b>SC</b> = State Special Concern
Florida	S2	--	<b>SR</b> = State Significantly Rare
Georgia	SH	--	
Louisiana	SU	--	<b>*Subspecies not specified</b>
Mississippi	S2S3	--	<b>**Not included in NatureServe</b>
New Jersey	S1	--	
New York	SH	E	
North Carolina	S1	SR	
Pennsylvania	SX	--	
South Carolina	SH	SC	
Virginia	SH	--	

### III. Annotated Bibliography

#### A. Published Sources

**Allen, T.J. 1997.** The butterflies of West Virginia and their caterpillars. University of Pittsburgh Press, Pittsburgh, PA. 388 pp.

A regional reference that would have relevance to the eastern *Arogos* subspecies, but not the Iowa skipper.

**Barber, H.G. 1894.** A list of Nebraska butterflies. Proc. Nebr. Acad. Sci. 4:16-22.

This checklist of Nebraska butterflies includes 137 species. It is based primarily on the University of Nebraska collection, but also includes species “reported” to occur in the state. The Iowa skipper is included on the list as *Pamphila iowa* Scudder and is reported to occur in Dodge County (Dodge) and the cities of Lincoln, and West Point.

**Barnes, Wm. and J. McDunnough. 1917.** Check list of the Lepidoptera of boreal America. Herald Press, Decatur, IL. 392 pp.

This checklist was a standard for butterfly taxonomy and nomenclature used by many early lepidopterists. I have not had a chance to review it directly.

**Berry, G.H. 1914.** A list of the Lepidoptera of Linn County, Iowa. Proc. Iowa Acad. Sci. 21:279-316.

The *Arogos* skipper is **not** included in this list.

**Boisduval and Le Conte. 1834.** Histoire générale et iconographie des lépidoptères et des chenilles de l’Amérique Septentrionale. pl. 76, fig 3-5.

This reference is the citation for authorship of the *Arogos* skipper species (*Atrytone arogos*) and the eastern subspecies (*Atrytone arogos arogos*). It consists of three color illustrations (male and female upper surface and a general lower surface).

**Bouseman, J.K. and J.G. Sternburg. 2001.** Field guide to butterflies of Illinois. Illinois Natural History Survey, Champaign, IL. 264 pp.

This is an excellent recent field guide to Illinois butterflies, but it does **not** include skippers.

**Brock, J.P. and K. Kaufman. 2003.** Butterflies of North America. Houghton Mifflin, New York, N.Y. 383 pp.

This is a recent field guide to North American butterflies. It includes general information about the *Arogos* skipper (*Atrytone arogos*) including a description of the adults, color illustrations, habitat, food plants, and a general distribution map. There is no mention of the subspecies.

**Brown, F.M., J.D. Eff and B. Rotger. 1957.** Colorado butterflies. Denver Museum of Natural History, Denver, CO.

I have not had a chance to review this text. It would likely be a good source for information on the distribution and status of the Iowa skipper in Colorado at the time it was published.

**Brown, F.M. and L.D. Miller. 1980.** The Types of the Hesperiid butterflies named by William Henry Edwards 2. HesperIIDae HesperIIDinae Section II. Transactions of the American Entomological Society, Philadelphia. 106(1):43-88.

The Arogos skipper (*Atrytone arogos*) is not included, since it was not named by Edwards, but under the discussion of *Atrytone logan logan* Edwards, the Iowa skipper is mentioned as the type species (*Hesperia iowa*) used by Scudder (1872) to establish *Atrytone* as a valid genus.

**Burns, J.M. 1994.** Genitalia at the generic level: *Atrytone* restricted, *Anatrytone* resurrected, new genus *Quasimellana*-and yes. We have no *Mellanas* (HesperIIDae). Journal of the Lepidopterists' Society. 48(4):273-337.

The author recommends major revisions to the genus *Atrytone* Scudder and elimination of the genus *Mellana* Hayward based on a review of genitalic characters. *Atrytone* is restricted to a single species (*Atrytone arogos*), and the remaining species in the genus (e.g. *A. logan*, *A. mazai*, *A. barbara* and *A. flavens*) and four species from the genus *Mellana* are placed in the resurrected genus *Anatrytone* Dyar. Other species from *Mellana* are transferred to a proposed new genus *Quasimellana*. These proposed revisions have been adopted by many authorities (e.g. Brock and Kauffman 2003; NABA 2001; Opler and Warren 2003).

**Cassel A. 1894.** Butterflies of eastern Nebraska. Proc. Nebr. Acad. Sci. 4:14-15.

This checklist of eastern Nebraska butterflies is based on collections by the author and deposited in the collection at Doane College. It does **not** include any Iowa skipper records.

**Christenson, M.C. 1971.** An annotated checklist of the butterflies of Iowa. M.A. Thesis. University of Northern Iowa, Cedar Falls. 134 pp.

This annotated checklist of Iowa butterflies includes basic taxonomic information (e.g. historic nomenclature and synonymy), county records, and a general description of the distribution and status of each species in the state. The Arogos [Iowa] skipper is shown to have records from five Iowa counties (Boone, Crawford, Dickinson, Greene and Woodbury). He states that most Iowa records are from before 1936, with the exception of 1960/1961 records from Ledges State Park in Boone County and a 1970 record from Cayler Prairie in Dickinson County.

**Clark, A.H. and L.F. Clark.** The butterflies of Virginia. Smithsonian Miscellaneous collection No. 116:1-239.

This is a regional reference that would have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**Dana, R.P. 1985.** Effects of prescribed burning on two prairie-obligate skippers, *Hesperia dacotae* Skinner and *H. ottoe* Edwards (Lepidoptera, Hesperidae). p. 15 in Ninth North American prairie conference abstracts of contributed papers. Moorhead State University, Moorhead, Minn.

The research summarized was conducted with Dakota and Ottoe skippers, but the management applications are applicable to other prairie species such as the Iowa skipper.

**Dana, R.P. 1986.** Habitat management and the Dakota skipper. Nature Conservancy News. 36(3):24-26.

The management principles presented for the Dakota skipper are also applicable to other prairie species such as the Iowa skipper.

**Dana, R.P. 1991.** Conservation management of the prairie skippers *Hesperia dacotae* and *Hesperia ottoe*: basic biology and threat of mortality during prescribed burning in spring. Minnesota Agric. Exp. Sta. Bull. 594-1991. St. Paul, MN. 63 pp.

This is the published version of the dissertation research by Robert Dana (1989, see Unpublished Sources below).

**Dankert, N., H. Nagel and T. Nightengale.** 1993. Butterfly distribution maps – Nebraska. University of Nebraska, Kearney, NE.

These are an updated version of the maps by Rosche (1986). I have not had a chance to review them. The maps by Spomer (2004) would be more up-to-date, but Spomer (pers. comm. 2005) suggested that Dankert has more complete documentation for individual records.

**Dole, J.M. 2004.** Butterflies of Oklahoma, Kansas, and North Texas. University of Oklahoma Press, Norman, OK. 282 pp.

This is a recent regional field guide focused on Oklahoma, Kansas, and northern Texas. It includes general information about the Arogos [Iowa] skipper (*Atrytone arogos*) including a description of the adults, a color photograph, habitat, food plants, phenology, abundance, and a map showing county records for the three states. Subspecies are not mentioned, but the range covered by this field guide would only include the Iowa subspecies. The book also includes a section on butterfly hotspots and the Arogos skipper is included on three of the checklists. It is listed as rare at Tallgrass Prairie Preserve, Pawhuska, Oklahoma, common at Pontotoc Ridge Preserve, Ada, Oklahoma, and common at sites in Tarrant County, Texas, including Fort Worth Nature Center and Fort Worth Botanical Garden. The conservation section of the book mentions the decline and extirpation of the eastern subspecies populations throughout most of their range.



**dos Passos, C.F. 1964.** A synonymic list of the Nearctic Rhopalocera. Lepidopterists' Society Memoir. 1:1-145.

Several historic synonyms used for the genus (*Atrytone*) and species (*arogos*) are given.

**Dyar, H.G. 1902.** A list of North American Lepidoptera. U.S. Nat. Mus., Government Printing Office, Washington. XIX+723 pp.

This list was the standard for butterfly nomenclature cited in many of the earlier works.

**Dyar, H.G. 1905.** A review of the Hesperiidae of the United States. Journal of the New York Entomological Society. 13:111-141.

This reference is the citation for authorship of the genus *Anatrytone*.

**Ebner, J.A. 1970.** Butterflies of Wisconsin. Milwaukee Public Museum Popular Science Handbook No. 12.

The Arogos [Iowa] skipper (*Atrytone arogos*) is included under questionable skipper records. The dubious historic records are based on three specimens reportedly collected by Hoy (1883). At the time of this publication there were no additional reports from the state. Black and white plates (Florida specimens), and general descriptions and distribution information are included.

**Edwards, W.H. 1872.** Synopsis of North American butterflies. Mid-continent Lepidoptera series no. 30. The American Entomological Society, Philadelphia, PA. 52 pp.

I have not had a chance to review this text. It would provide a good source for the systematics and taxonomy of North American butterflies at the time of publication.

**Elrod, M.J. 1906.** The butterflies of Montana. Bulletin of the University of Montana. 30:1-174.

The Arogos skipper (*Atrytone arogos*) is **not** included in this early synopsis of the butterflies of Montana.

**Ely, C., M.D. Schwilling and M.E. Rolfs. 1986.** An annotated list of the butterflies of Kansas. Fort Hays Studies (Science) 7, Fort Hays State University, Fort Hays, KS.

This is still one of the principal texts on the distribution and status of Kansas butterflies. It includes a species checklist, brief species accounts, and county distribution maps. County records are based on collections by the authors starting in 1979 (mapped with solid dots), or reports/specimens by other collectors (mapped with circles and cited in the text). The Arogos skipper (*Atrytone arogos*) was documented from 36 counties (27 based on their collections; 9 based on other documentation). They describe it as “uncommon and local statewide”.

**Ferris, C.D., 1971a.** A key to the Rhopalocera (butterflies) of Wyoming. University of Wyoming Agriculture Experiment Station Science Monograph 21:1-64.

This is a companion key to the checklist for Wyoming butterflies (Ferris 1971b). It does not include the Iowa skipper because of an incorrect identification of Iowa skipper specimens from Crook County as *A. lagus*. This is corrected in Ferris (1971b).

**Ferris, C.D., 1971b.** An annotated checklist of the Rhopalocera (butterflies) of Wyoming. University of Wyoming Agriculture Experiment Station Science Monograph 23:1-75.

For each species listed, this checklist for Wyoming butterflies includes name and author, type localities, counties from which they are recorded, ecological zones with additional notes, flight span, larval food plant, and additional pertinent information. The Iowa skipper (*Atrytone arogos iowa*) is listed as occurring in a single county (Crook County). It had been omitted from the key (Ferris 1971a) because of an incorrect identification of the Crook County specimens as *A. lagus*, so it is also portrayed (black and white images of male and female upper surface) in Appendix II of this publication.

**Ferris, C.D. 1989.** Supplement to: a catalogue/checklist of the butterflies of America north of Mexico. Lepidopterists' Society Memoir. 3:1-103.

This text provides updates to nomenclature and corrections to errors in the catalogue/checklist by Miller and Brown (1981) and had replaced it as the generally accepted standard for butterfly nomenclature until recently. Two species (*A. mazai* and *A. potosiensis*) are added to the genus *Atrytone*, but there are no changes affecting the Arogos skipper or its subspecies.

**Ferris, C.D. and F.M. Brown. 1981.** Butterflies of the Rocky Mountain States. University of Oklahoma Press, Norman, OK.

This text provides information on the distribution and status of butterfly species in the Rocky Mountain States at the time it was published. It includes black and white illustrations, detailed descriptions of the adults and larvae, general range and habitat information for the species, more specific range, habitat and general life history information for the Iowa subspecies in the Rocky Mountain States, and county dot distribution maps. They show records for the Iowa skipper from five counties in Colorado, three counties in South Dakota (west end only), two counties in Kansas (west end only), and two counties in Wyoming.

**Field, W.D. 1940.** A manual of the butterflies and skippers of Kansas (Lepidoptera, Rhopalocera). Bulletin University of Kansas. 39(10)[1938]:1-327. 1 map, 1 plate.

This is one of the earlier standard sources for information on Kansas butterflies. Ely et al. (1986) cite it for six Arogos skipper (*Atrytone arogos*) county records (Douglas, Grove, Logan, Rawlins, Scott and Sheridan).

**Field, W.D., C.F. dos Passos, and J.H. Masters. 1974.** A bibliography of the catalogs, lists, faunal and other papers on the butterflies of North America north of Mexico arranged by state and province (Lepidoptera: Rhopalocera). *Smithsonian Contr. Zool.* 157:1-104.

This text provides a good resource for compiling a preliminary list of historic butterfly papers that have been published for a given state.

**Freeman, H.A. 1951.** Ecological and systematic study of the Hesperioidea of Texas. *Southern Methodist University Studies.* 6:1-67.

The Iowa skipper (*Atrytone arogos iowa*) is included based on reports from Dallas by Jacob Boll (1875). Freeman indicates that he has not seen it in Texas, but that he has seen specimens from Oklahoma. A very brief description of both subspecies is included.

**French, G.H. 1879.** Analytical tables of the butterflies of Illinois, p. 30-42. *In* Fifth Annual Report of the Principal of the Southern Illinois Normal University, with accompanying reports of several professors. Observer Print, Carbondale, IL.

Nomenclature used for the Arogos skipper is *Pamphila vitellius*. He states “*P. Vitellius* is reported from Iowa, but I do not know of it being found in Illinois.” [Quote from Irwin and Downey 1973]

**Gerberg, E.J. and R.H. Arnett, Jr. 1989.** Florida butterflies. Natural Science Publications, Inc., Baltimore, MD. 90 pp.

This is a regional reference that would have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**Glassberg, J. 1993.** Butterflies through binoculars: a field guide to butterflies in the Boston-New York-Washington region. Oxford University Press, New York, NY. 160 pp.

This is a regional reference that would have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**Glassberg, J. 1999.** Butterflies through binoculars: the East. Oxford University Press, New York, NY. 242 pp.

This is a field guide to eastern North American butterflies. It includes fairly detailed information about the Arogos skipper (*Atrytone arogos*) including a description of the adults, color plates, habitat, food plants, phenology, conservation status (especially eastern subspecies), and a general distribution map for eastern North American. Subspecies are mentioned with respect to their distribution and phenology.

**Glassberg, J. 2001.** Butterflies through binoculars: the West: a field guide to the butterflies of western North America. Oxford University Press, New York, NY. 374 pp.

This is a field guide to western North American butterflies. It includes very general information about the Arogos skipper (*Atrytone arogos*) including a description of the adults, color plates,

habitat, food plants, phenology, and a map of western North America showing the western portion of its range. Subspecies are not mentioned, but the range covered by this field guide would only include the Iowa subspecies.

**Gochfeld, M, and J. Burger. 1997.** Butterflies of New Jersey – A guide to their status, distribution, conservation, and appreciation. Rutgers University Press, New Brunswick, NJ. 327 pp.

This is a regional reference, with good information on the eastern Arogos subspecies, but is not relevant for the Iowa skipper.

**Harris, L. 1972.** Butterflies of Georgia. University of Oklahoma Press, Norman, OK. 326 pp.

This is a regional reference, with good information on the eastern Arogos subspecies and black and white plates. Life history information from Heitzman (1966), which is based on the Iowa subspecies, is included. Otherwise it is not relevant for the Iowa skipper.

**Heitzman, J.R. 1966.** The life history of *Atrytone arogos* (Hesperiidae). Journal of the Lepidopterists' Society. 20:177-181.

This is the only published paper detailing the complete life history of the Arogos [Iowa] skipper. It is based on general observations of adults and more detailed observations of eggs and larvae reared from a single female collected near Lawrence, Kansas. The eggs, each larval stage and the pupae are described in detail. Populations from this area can have two broods. Four of the thirteen larvae reared completed development and adults emerged in September. The others entered diapause as 4<sup>th</sup> instars, completed development the following spring, and emerged as adults in June of the next year. The paper also includes good illustrations for each of the life history stages. Studies need to be done in other portions of the range for each subspecies to determine how representative these observations are for the different subspecies and for univoltine vs. bivoltine populations.

**Heitzman, J.R. and J.E. Heitzman. 1987.** Butterflies and moths of Missouri. Missouri Department of Conservation, Jefferson City, MO. 385 pp.

This field guide includes all documented butterflies and selected moth species for the state of Missouri. For each species there are good color plates and a description of the status, food plants, larvae, and other general information about the species. The Arogos [Iowa] skipper (*Atrytone arogos iowa*) is described as an extremely local breeding resident limited to a few scattered prairie remnants in southwestern Missouri. Missouri populations have two broods per year (June and mid-August into September) and the first brood is the most abundant.

**Holland, W.J. 1905.** The butterfly book: a popular guide to a knowledge of the butterflies of North America. Doubleday, Page & Company, New York, NY. 382 pp.

A general description of the Arogos skipper, its distribution, and a color plate of a male are included. The binomial nomenclature used is *Atrytone vitellius* Smith and Abbot and the common name used is Iowa skipper.

**Holland, W.J. 1931.** The butterfly book. Revised Edition. Doubleday, Doran & Company, Inc., Garden City, NY. 424 pp.

This is a revision of Holland (1905). I have not reviewed it, but it is likely similar to the earlier version with updated nomenclature.

**Howe, W.H. 1975.** The butterflies of North America. Doubleday & Company, Inc., Garden City, NY. 633 pp. + 97 color plates.

This is a good general text on the butterflies of North America with excellent color plates. Plate 87 is cited by Ely et al. (1986) as the source for their Shawnee County, Kansas record for the Arogos skipper (*Atrytone arogos*). Unfortunately this text is out of print.

**Hoy, P.R. 1883.** List of lepidopterous insects. Geology of Wisconsin. 1873-79. 1(1):23-25.

Three specimens of the Arogos [Iowa] skipper are reported to have been taken near Racine, Wisconsin. Ebner (1970) states that these have not been reported since and includes these records under “questionable skippers”.

**Hoying, L.A. 1975.** A list of west central Ohio butterflies. News of the Lepidopterists' Society. No. 2/3:4.

Includes erroneous report of the Arogos [Iowa] skipper from Auglaize County, Ohio. Based on specimens in the Hoying collection that turned out to be *Thymelicus lineola* (Iftner et al. 1992).

**Huber, R.L. 1981.** An updated checklist of Minnesota butterflies. Minnesota Entomological Association Newsletter. 14(3):15.

This is an update to a previous Minnesota butterfly checklist (Huber et al. 1966), and includes the addition of 24 species. It includes a total of 164 species (51 skippers and 113 butterflies).

**Huber, R.L., J.S. Nordin and O.R. Taylor, Jr. 1966.** A systematic checklist of Minnesota Rhopalocera (butterflies and skippers). The Science Museum, St. Paul, Minnesota. 9 pp.

This is the original version of the Minnesota butterfly checklist updated by Huber (1981).

**Iftner, D.C. and D.M. Wright. 1996.** Atlas of New Jersey butterflies. Special Private Publication, Sparta, NJ. 28 pp.

A regional reference that would have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**Iftner, D.C., J.A. Shuey and J.V. Calhoun. 1992.** Butterflies and skippers of Ohio. Bulletin of the Ohio Biological Survey. (New Series) 9:1-212.

The Arogos [Iowa] skipper (*Atrytone arogos iowa*) is included on a list of “species of possible occurrence in Ohio”, but historic records are identified as either erroneous or unsubstantiated. Reports from Auglaize County, Ohio (Hoying 1975) turned out to be *Thymelicus lineola* and another report of specimens taken in central Ohio (Price 1970) is not documented. Despite the

lack of documented occurrences of the Iowa skipper in or near Ohio, they suggest the possibility that it could occur in western Ohio on larger less disturbed bluestem prairies.

**Irwin, R.R., and J.C. Downey. 1973.** Annotated checklist of the butterflies of Illinois. Illinois Natural History Survey, Biological Notes, No. 81 60 pp.

The Arogos [Iowa] skipper is listed as a butterfly that might occur in Illinois, possibly as the Iowa subspecies.

**Johnson, K. 1972 (1973).** The butterflies of Nebraska. Journal of Research on the Lepidoptera. 11(1):1-64.

This paper includes a literature review, annotated checklist, general review of the distribution, status and ecology of Nebraska butterflies, checklist, county distribution maps for selected species, and photographic plates for selected species. The Arogos [Iowa] skipper is included in the checklists, and is mentioned briefly in the discussion of rare or declining species. It is among skipper species for which he states eastern Nebraska niches appear to have disappeared. He cites reports of Iowa skippers from a total of six counties. Leussler (1939) reported records from four counties (Douglas, Cuming, Red Willow and Custer), Klots (1951) included a single county record (Dakota), and Johnson recorded it from Thayer County in 1965. There is **no** distribution map or illustration for the Iowa Skipper.

**Klots, A.B. 1951.** A field guide to the butterflies of North America, east of the Great Plains. Houghton Mifflin Co., Boston, MA. 349 pp.

This is the original version of the Peterson field guide to eastern North American butterflies. For the Arogos skipper (*Atrytone arogos*) it includes detailed descriptions of the adults, the general distribution for the species, and the distribution and distinguishing characters of the subspecies. The Iowa subspecies is illustrated with a black and white plate and the Arogos subspecies is illustrated with a color plate.

**Klots, A.B. 1986.** Butterflies of North America, east of the Great Plains. Easton Press, Norwalk, Conn. 349 pp.

This is probably an updated version of Klots (1951), but I have not had a chance to review it

**Lambremont, E.N. 1954.** The butterflies and skippers of Louisiana. Tulane Studies in Zoology. 1:127-164.

This is a regional reference that would have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**Layberry, R.A., P.W. Hall and J.D. Lafontaine. 1998.** The Butterflies of Canada. University of Toronto Press, Toronto, Canada. 280 pp.

The Arogos [Iowa] skipper has not been documented from Canada. The only mention of it in this book is in the description of the Delaware skipper (*Anatrytone logan*) under the discussion of revisions to the genus *Atrytone* based on the paper by Burns (1994). The genus has been

restricted to the species *arogos* and the other species (e.g. *logan*) have been transferred to the genus *Anatrytone*.

**Leussler, R.A. 1913.** The butterflies of Omaha, Nebraska (Lepid.: Rhopalocera). Entomological News 24(8):344-352.

I have not reviewed this paper and do not know if it includes Iowa skipper records.

**Leussler, R.A. 1939.** An annotated list of the butterflies of Nebraska, with the description of a new species (Lepid.: Rhopalocera). Entomological News 50:34-39.

Leussler reports Iowa skipper records from four counties (Douglas, Cuming, Red Willow and Custer) in Nebraska (cited in Johnson 1972 [1973]).

**Leussler, R.A. 1972.** An annotated list of the butterflies of Nebraska, with the description of a new species. Mid-Continent Lepidoptera Series. 4(56):1-[25]. [This a reprint of a series of papers by Leussler in 1938 and 1939, including the 1939 paper cited above.]

**Lindsey, A.W. 1915.** The butterflies of Woodbury County. Proc. Iowa Acad. Sci. 21:341-346.

This list does not include skippers.

**Lindsey, A.W. 1917.** A list of the butterflies of Iowa. Entomological News. 28:327-353.

The Arogos [Iowa] skipper is included on the list under the name *Phycanassa arogos*. It is described as fairly common and found throughout the state. Nomenclature follows Dyar (1902).

**Lindsey, A.W. 1920.** Some Iowa records of Lepidoptera. Proc. Iowa Acad. Sci. 27:319-335.

This list is an update of Lindsay (1917) and includes additional Sioux City records made since its publication and a few corrections. It does **not** include any Iowa skippers. Nomenclature follows Barnes and McDunnough (1917).

**Lindsey, A.W. 1922.** The Hesperioidea of America north of Mexico. University of Iowa Studies in Natural History. 9(2):1-114.

This paper provides a historical review and proposed revisions to the taxonomy of North American Hesperioidea, and a synopsis of the species. It includes keys to the proposed subfamilies, groups, genera and species and a listing species including synonyms, descriptions, and general species information. The Arogos skipper (*Atrytone arogos*) is listed, along with the historic usage of various synonyms, phenology for representative locations, and a general description of the adults. There is no reference to the subspecies.

**Lindsey, A.W., E.L. Bell and R.C. Williams, Jr. 1931.** The Hesperioidea of North America. Denison University Bulletin. 36:1-142.

I have not reviewed this paper. It is likely a taxonomic update of Lindsey (1922).

**Marrone, Gary M. 2002.** Field Guide to Butterflies of South Dakota. South Dakota Dept. of Game, Fish, and Parks, Pierre, SD.

This recently published field guide provides up-to-date information for South Dakota butterflies. For each species it includes good color plates, county distribution maps, descriptions of adults, and larvae, distribution, habitat, food plants, phenology, and other general information. The Arogos [Iowa] skipper (*Atrytone arogos iowa*) is described as “local and occasionally common throughout South Dakota” and is shown to occur in eighteen counties.

**Mather, B. and K. Mather. 1958.** The butterflies of Mississippi. Tulane studies in zoology. 6:63-109.

This is a regional reference that would have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**McCabe, T.L., and R.L. Post. 1977.** Skippers (Hesperioidea) of North Dakota. North Dakota Insects pub. No. 11. Fargo: North Dakota State University, Agricultural Experimental Station. 70 pp., 6 pls.

General information about the Iowa skipper is provided including descriptions of the adults and larvae, drawings of genitalia, habitat, food plants, taxonomic issues (e.g. validity of subspecies), general distribution, North Dakota distribution, and conservation status in North Dakota. It is shown to occur in one county in North Dakota (Ransom County).

**Miller, J.Y. (Ed.). 1992.** The Common Names of North American Butterflies. Smithsonian Institution Press, Washington. 177 pp.

The author lists a “preferred” common name along with alternate published names and their sources for each species. For *Atrytone arogos*, the preferred common name is **Arogos skipper** (Klots 1951; Opler and Malikul 1992; Opler and Krizek 1984; Tilden and Smith 1986). Other names listed for the species include Beard-grass skipper (Pyle 1981) and Brown-rim skipper (Scott 1986). Common names listed for the *A. a. iowa* subspecies include Iowa skipper (Tilden and Smith 1986) and Arogos.

**Miller, L.D. and F.M. Brown. 1981.** A catalogue/checklist of the butterflies of America north of Mexico. Lepidopterists' Society Memoir. 2:1-280.

This text, along with the supplement to it (Ferris 1989), has been the generally accepted standard for butterfly nomenclature until recently. It provides a good historical synopsis of the taxonomy of each genus, species and subspecies. The genus *Atrytone* includes *A. arogos* and *A. logan*, and the taxonomy of the subspecies for both of those species is also described.

**Neck, R.W. 1996.** A field guide to butterflies of Texas. Gulf Publishing Co., Houston, Texas.

I have not reviewed this book. It would likely provide updated information on the distribution, status and biology of the Iowa skipper in Texas.



**Opler, P.A. 1981.** Management of prairie habitats for insect conservation. *Natural Areas Journal*. 1:3-6.

This was one of the earlier papers addressing general issues of insect conservation and prairie management and lays out some good general guidelines that are applicable to prairie butterflies.

**Opler, P.A. 1995.** *Lepidoptera of North America: 2. Distribution of the butterflies (Papilionoidea and Hesperioidea) of the eastern United States.* Contributions of the C.P. Gillette Museum of Insect Biodiversity. Colorado State University, Fort Collins, Colo. Unpaginated.

I have not reviewed this text. It is likely similar to the atlas for western butterflies published by Stanford and Opler (1993).

**Opler, P.A. and A.B Wright. 1999.** Peterson field guide to western butterflies, revised edition. Houghton Mifflin Co., Boston, Mass. 540 pp.

This is a revised version of the Peterson field guide to western North American butterflies by Tilden (1986). It includes general information about the Arogos skipper (*Atrytone arogos*) including a description of the adults and larvae, color illustration, habitat, food plants, and a distribution map for the full range of the species. It includes updated nomenclature (e.g. revisions to the genus *Atrytone* proposed by Burns (1994), but there is no mention of the subspecies.

**Opler, P.A. and G.O. Krizek. 1984.** Butterflies east of the Great Plains. Johns Hopkins University Press, Baltimore. 294 pp.

This is a field guide to eastern North American butterflies. It includes general information about the Arogos skipper (*Atrytone arogos*) including a description of the adults and larvae, color illustrations, habitat, food plants, and a general distribution map. There is no mention of the subspecies.

**Opler, P.A. and V. Malikul. 1992.** Peterson field guide to eastern butterflies. Houghton Mifflin Co., Boston. 396 pp.

This is an updated version of the original Peterson field guide to eastern North American butterflies (Klotz 1951). It includes general information about the Arogos skipper (*Atrytone arogos*) including a description of the adults and larvae, color illustration, habitat, food plants, and a general distribution map. There is no mention of the subspecies.

**Opler, P.A. and V. Malikul. 1998.** Peterson field guide to eastern butterflies, revised format. Houghton Mifflin Co., Boston, Mass. 540 pp.

This is an updated version of the 1992 Peterson field guide to eastern North American butterflies by the authors. There are format changes and updated nomenclature [e.g., revisions to the genus *Atrytone* proposed by Burns (1994)].

**Orwig, T, and D. Schlicht. 1999.** The last of the Iowa skippers. *American Butterflies*. 7:4-12.

This paper chronicles the loss of prairie habitat and subsequent loss of prairie butterflies in Iowa, and also discusses the various threats, including management, to butterflies on the few remaining

prairie remnants. There are several references to Arogos [Iowa] skipper occurrences, including a site that has been lost (a prairie remnant in Sioux City, Woodbury County) and a site that has been protected (Cayler Prairie in Dickinson County) but where management (e.g., excessive use of fire) could be a threat to the species. There is a strong push for more prudent use of fire.

**Osburn, H. 1891.** Butterflies in Iowa. *American Entomologist*. 1 (New Series):226.

I have not reviewed this text.

**Panzer, R. 1985.** Insular Biogeography and the conservation of prairie and wetland animals in Illinois. Paper presented at the Seventh Annual Northern Illinois Prairie Workshop.

**Panzer, R. 1988.** Managing prairie remnants for insect conservation. *Natural Areas Journal*. 8:83-90.

This paper provides a good overview of insect conservation and prairie management issues and lays out good general guidelines for prairie management that are applicable to prairie butterflies.

**Panzer, R. 1998.** Insect conservation within the severely fragmented eastern tallgrass prairie landscape. PhD dissertation, University of Illinois, Urbana-Champaign.

This dissertation research included examination of fire impacts on invertebrates across a broad range of taxa. General conclusions were that there are fire negative species, but if unburned refugia are left, most species will recover within one to two years and that burn frequencies of two-three years should be “safe” for most prairie invertebrates. The study did not include some of the more sensitive prairie butterflies (e.g. Iowa, Dakota, and Ottoe skippers and Poweshiek skipperling) so a more conservative approach may be warranted for these species.

**Panzer, R. 2002.** Compatibility of prescribed burning with the conservation of insects in small, isolated prairie reserves. *Conservation Biology*. 16:1296-1307.

This is the published paper based on the chapter in the dissertation by Panzer (2002) dealing with fire management (see Panzer 2002 for summary).

**Price, H.F. 1970.** Butterflies of northwestern Ohio. *Mid-Continent Lepidoptera Series*. No. 14, St. Paul, MN 16 pp.

States that the Arogos [Iowa] skipper “has been taken in central Ohio”, but does not provide any documentation (Iftner et al. 1992).

**Pyle, R.M. 1981.** The Audubon Society field guide to North American butterflies. A.A. Knopf, Inc., New York, NY. 916 pp.

This is an early edition of a popular field guide to North American butterflies, with photographs of butterflies in nature, rather than preserved specimens. I seen the field guide, but have not had a chance to look at it recently. It does not likely add to what is in some of the other guides.

**Pyle, R.M. 2000.** National Audubon Society field guide to North American butterflies. A.A. Knopf, New York. 924 pp.

This is an updated edition of Pyle (2000).

**Royer, R.A. 1988.** Butterflies of North Dakota: An atlas and guide. Minot State University Science Monograph Number One.

General information about the Arogos [Iowa] skipper is provided including a description of the adults, color plates, habitat, food plants, and distribution and conservation status in North Dakota. It is shown to occur in two counties in North Dakota (Ransom and Ward Counties).

**Royer, R.A. 1990.** The North Dakota Butterfly Fauna. Proceedings ND Academy Science 44.

This publication was not available for review. It is unlikely to add significantly to information in Royer (1988, 2003).

**Royer, R.A. 2003.** Butterflies of North Dakota: an atlas and guide. 2<sup>nd</sup> Edition. Minot State University Science Monograph Number Two.

This is an updated revision of Royer (1988). General information about the Arogos [Iowa] skipper is provided including a description of the adults, color plates, habitat, food plants, and distribution and conservation status in North Dakota. It is shown to occur in three counties in North Dakota (Ransom, Richland and Ward Counties).

**Schlicht, D.W. 2001.** The decline of the Arogos skipper (*Atrytone arogos*) at Prairie Coteau in Pipestone County, Minnesota. Journal of the Iowa Academy of Science. 17(Special Issue): Proceedings of the 17<sup>th</sup> North American Prairie Conference.

This paper documents an apparent decline in the Arogos [Iowa] skipper population at Prairie Coteau in Pipestone County, Minnesota. Data presented are from 1988-1990 surveys by Selby (1989, 1990) and 1995-1996 surveys by Schlicht (1997a). Data from surveys conducted along similar routes are compared for similar calendar dates. There does appear to be a significant decline from the surveys conducted by Selby to those conducted by Schlicht, but it would be helpful to do a comparison of data based on phenological (e.g. degree-days) rather than calendar dates. Schlicht expresses concerns about changes in management (e.g. grazing to fire) that might have contributed to the declines.

**Scott, J.A. 1986.** The butterflies of North America. Stanford University Press, Stanford, Calif. 583 pp.

This is one of the standard texts on the butterflies of North America, with complete descriptions and color plates for each of the species.

**Scudder, S.H. 1869.** A preliminary list of the butterflies of Iowa. Transactions Chicago Academy of Sciences. 1(2):326-337.

This list is based on collections and field observations of J.A. Allen during surveys in Iowa and northern Illinois in 1867. The Iowa skipper is described as a new species (*Hesperia iowa*) and this reference is the citation for the authorship of the Iowa subspecies (*A. a. iowa*). A detailed description of the adults is given and he states that the Iowa skipper is "... one of the most abundant Hesperians seen in Iowa; it occurred almost exclusively on flowers of *Echinacea angustifolia* D.C., which grew in knolls on the open prairie." First observations were in early

July and specimens were collected in the middle of July at Dennison and in late July near New Jefferson.

**Scudder, S.H. 1872.** A systematic revision of some of the American butterflies, with brief notes on those known to occur in Essex County, Mass. Peabody Academy of Sciences Annual Report. 4:24-83.

This reference is the citation for authorship of the genus *Atrytone* (see p. 77).

**Sedman, Y, and D.F. Hess. 1985.** The butterflies of west central Illinois. Series in the biological sciences no. 11, Western Illinois University, Macomb, IL. 118 pp.

The Arogos [Iowa] skipper is listed from a single site (Reavis Hill Prairie) in Mason County, Illinois, where its discovery in 1980 was the first documented record for the state. It is described as “intensely local”, occurring on relatively undisturbed loess hill prairie and as being threatened or vulnerable in Illinois.

**Shapiro, A.M. 1966.** Butterflies of the Delaware Valley. American Entomological Society Special Publication, Philadelphia, PA. 79 pp.

A regional reference that would have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**Shapiro, A.M. 1974.** Butterflies and skippers of New York State. Cornell University Agricultural Experimental Station, Ithaca, NY. Search 4:1-60.

A regional reference that would have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**Shull, E.M. 1987.** The Butterflies of Indiana. Indiana Academy of Science, Indiana University Press, Bloomington & Indianapolis. 262 pp.

The Arogos skipper (*Atrytone arogos*) is included on a list of “hypothetical” species for Indiana. He states that it could eventually be found as a “casual” in Indiana.

**Stallings, D.B. and J.R. Turner. 1942.** Butterflies records for Kansas. Journal of the Kansas Entomological Society. 15(1):12.

This source is cited by Ely et al. (1986) for their Sumner County, Kansas record for the Arogos skipper (*Atrytone arogos*).

**Stanford, R.E. and P.A. Opler. 1993.** Atlas of western USA butterflies, including adjacent parts of Canada and Mexico. Published by authors. Denver, Colorado. 275pp.

This publication includes dot distribution maps for county records of butterflies in western North America.

**Swengel, A.B. 1996.** Effects of fire and hay management on abundance of prairie butterflies. *Biological Conservation*. 76:73-85.

This paper uses butterfly survey data from 1988-1993 surveys at 86 native prairies in Illinois, Iowa, Minnesota, Missouri, and Wisconsin to examine management impacts on prairie butterflies. Swengel examined the relative magnitudes of butterfly observations among several burn age classes (e.g., 0, 1, 2, 3, 4+ years since last burn) and also examined results from paired adjacent units with similar vegetation and topography, but contrasting burn histories. Results from these analyses suggested strong and significant adverse effects of the fire management for all prairie specialist butterflies and that the most fire-negative species in her study included the Poweshiek skipperling, Arogos skipper, Dakota skipper, Ottoe skipper, and regal fritillary. She also noted that the negative effects persisted for three to five years or more and recommended that no more than 20% of the habitat be burned in any year.

**Swengel, A.B. 1998.** Effects of management on butterfly abundance in tallgrass prairie and pine barrens. *Biological Conservation*. 83:77-89.

This paper uses butterfly survey data from 1987-1995 surveys at 104 native prairies and open savannas in Illinois, Iowa, Minnesota, Missouri, North Dakota, and Wisconsin to examine management impacts on prairie butterflies. Swengel examined various pairs of management classes (e.g. more vs. less recent burning; burning vs. idling; burning vs. haying/mowing; management type vs. age class) and found that rotational burning was generally less favorable than other management types. The Arogos [Iowa] skipper is included in their analyses of data from the western states in the study, but the numbers were generally low and it was only present in a couple management classes.

**Swengel, A.B. 2001.** A literature review of insect responses to fire, compared to other conservation managements of open habitat. *Biodiversity and Conservation*. 10(7):1141-1169.

This publication provides a good review of literature on prairie management, with an emphasis on impacts on prairie invertebrates.

**Swengel, A.B. and S.R. Swengel. 1997.** Co-occurrence of prairie and barrens butterflies: applications to ecosystem conservation. *Journal of Insect Conservation*. 1:131-144.

This paper uses butterfly survey data from Illinois, Iowa, Minnesota, Missouri, North Dakota, and Wisconsin to examine the degree to which species of conservation concern co-occur. The regal fritillary and Arogos [Iowa] skipper were among the species that showed the most significant interspecific correlations. Various management types and habitat patch size were also examined to determine the extent to which they explained patterns of co-occurrence.

**Swengel, A.B. and S.R. Swengel. 1999.** Observations of prairie skippers (*Oarisma poweshiek*, *Hesperia dacotae*, *H. ottoe*, *H. leonardus pawnee*, and *Atrytone arogos iowa*) (Lepidoptera: Hesperidae) in Iowa, Minnesota, and North Dakota during 1988-1997. *Great Lakes Entomologist*. 32(4):267-292.

This paper uses butterfly survey data from 1988-1997 at 40 native prairies in Iowa, Minnesota, and North Dakota. Analyses included phenology, geography (latitude, longitude), diurnal timing, weather, sex ratios, habitat, and nectar visits and reproductive behavior. A total of 81 Arogos [Iowa] skippers were recorded at nine sites in all three states during this study.

**Swengel, A.B. and S.R. Swengel. 2001.** Effects of prairie and barrens management on butterfly faunal composition. *Biodiversity and Conservation*. 10:1757-1785.

This paper uses butterfly survey data from 1990-1997 surveys at 106 native prairies in six states and 125 pine-oak barrens in northern Wisconsin to examine management impacts on prairie butterflies. The prairie sites were grouped into three prairie subregions: Eastern Upper Midwest (northern Illinois, eastern Iowa, southern Wisconsin); Western Upper Midwest (western Iowa, western Minnesota, southeastern North Dakota); and Western Missouri. Butterfly species were also grouped based on habitat specialization (e.g. specialist, grassland, generalist) for the analyses. Various pairs of management classes were examined (e.g. more vs. less recent burning; burning vs. idling; burning vs. haying/mowing; management type vs. age class). They found that impacts varied by subregion and species group. Their results showed that burning was not generally preferable to other management types for specialist (or total) butterflies, but that no single alternate management type was consistently favored over the others in each subregion. Arogos [Iowa] skipper data were probably included, but the presentation of data was by species group, not individual species.

**Tietz, H.M. 1952.** The Lepidoptera of Pennsylvania. The Pennsylvania State College School of Agriculture Agricultural Experiment Station, State College, PA. 194 pp.

This is a regional reference that might be expected to have relevance to the eastern Arogos subspecies, but does not include *Atrytone arogos*.

**Tilden, J.W. and A.C. Smith. 1986.** A field guide to western butterflies. Houghton-Mifflin Co., Boston, Mass. 370 pp. 23 color plates.

This is the original Peterson field guide to western North American butterflies. It was intended to compliment the eastern field guide by Klots (1951) and has a similar organization. It includes general information about the Arogos skipper (*Atrytone arogos*), including a description of the adults and larvae, their habitat, food plants, general distribution, and a black and white illustration. It includes a brief description of each subspecies.

**Tveten, J. and G. Tveten. 1996.** Butterflies of Houston & Southeast Texas. University of Texas Press, Austin, TX. 292 pp.

I have not reviewed this book. It would likely provide updated information on the distribution, status and biology of the Iowa skipper in that portion of Texas.

**Worthington, C.E. 1880.** A list of diurnal Lepidoptera inhabiting the state of Illinois. Canadian Entomologist. 12:46-50.

The Arogos [Iowa] skipper is included on this list of Illinois butterflies, but Irwin and Downey (1973) state that it is the only species included on that list that has not subsequently either been confirmed or determined to be improbable. Nomenclature used for the Arogos skipper is *Pamphila vitellius*.

**Wright, D.M. 1995.** Atlas of Pennsylvania butterflies. Special Private Publication, Lansdale, PA 22 pp.

This is a regional reference that might have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**Wright, V.F., R.L. Huber and C.L. Huber. 2003.** Butterflies (Lepidoptera) of Konza Prairie Biological Station: An Annotated Checklist. Journal of the Kansas Entomological Society. 76(3):469-476.

This paper summarizes the results of butterfly surveys at Konza Prairie Biological Station in Kansas. Surveys were conducted throughout the flight period each year over a three-year period from 1977-1979. Seventy-eight species were documented, including the Iowa skipper. Iowa skipper is described as a resident at Konza Prairie in Riley and Geary Counties.

## B. Unpublished Sources

**Cochrane, J.F., and P. Delphey. 2002.** Status assessment and conservation guidelines. Dakota skipper, *Hesperia dacotae* (Skinner) (Lepidoptera: Hesperidae), Iowa, Minnesota, North Dakota, South Dakota, Manitoba, and Saskatchewan. Department of the Interior, U.S. Fish & Wildlife Service. April 2002. 77 pp.

This publication provides a detailed synopsis of the taxonomy, life history, ecology, distribution, status, threats, conservation, and management of the Dakota skipper. It does not deal directly with the Iowa skipper, but the information on ecology, threats, conservation and management is relevant to Iowa skipper conservation.

**Cuthrell, D.L. 1991.** The butterflies of Kittson and Roseau Counties, Minnesota, with special emphasis on the Dakota Skipper *Hesperia dacotae* (Skinner). Unpublished report, Minnesota Department of Natural Resources, Natural Heritage and Nongame Research Program, St. Paul, MN. December 30, 1991. 48+pp.

The objective of this project was to locate butterfly species listed as endangered, threatened, or special concern in northwest Minnesota's Kittson and Roseau Counties, with a focus on the Dakota skipper. Surveys were conducted from 14 May to 11 August in 1991. These counties are over 170 km north of the nearest Iowa skipper population, so the Iowa skipper was not a target, and **no** Iowa skippers were seen during the study.

**Dana, R.P. 1989.** Biologies of the prairie skippers *Hesperia dacotae* and *H. ottoe* (Lepidoptera: Hesperidae), and factors affecting mortality in prescribed burning of their habitat in spring. Ph.D. dissertation, University of Minnesota. 201 pp.

This dissertation includes detailed life history information and experimental management data for the Dakota and Ottoe skippers. It does not include information on the Iowa skipper, but the applications to the conservation and management of prairie butterflies would be applicable. Much of this information was published in Dana (1991, see Published Sources above).

**Essington, K.D., S.M. Kettler, S.E. Simonson, C.A. Pague, J.S. Sanderson, P.M. Pineda, and A.R. Ellingson. 1996.** Natural heritage resources of the Rocky Flats Environmental Technology Site and their conservation. Phase II: The buffer zone. Final Report, final rev.

Produced by staff at the Colorado Natural Heritage Program CNHP). It summarizes the results of 1994-1995 natural history surveys at the Rocky Flats Environmental Technology Site (RFETS) in northern Jefferson County, Colorado. It presents proposed conservation plans for the area based on those surveys. They identify two conservation sites at RFETS: Rocky Flats Conservation Site and Walnut Creek Conservation Site. The Arogos [Iowa] skipper was documented at the Rocky Flats Conservation Site. CNHP believes that this site has “. . . the largest example of xeric tallgrass prairie [*Andropogon gerardii-Schizachyrium scoparium*] remaining in Colorado, and perhaps in North America.” This is critical habitat for species such as the Iowa and Ottoe skippers in Colorado and therefore this is an important site for their conservation in this portion of their range.



**Fritz, M.I. 1997.** Survey report for two rare invertebrate species; the tawny crescent (*Phyciodes batesii*) and the regal fritillary (*Speyeria idalia*) on the Nebraska National Forest, U.S. Forest Service. Unpublished report to the Nebraska National Forest, U.S. Forest Service, Chadron, NE. 15+ pp.

The report summarizes the results of 1995 butterfly surveys conducted by James Reiser and Steve Spomer on portions of the Nebraska National Forest and McKelvie National Forest in Nebraska. The focus of the surveys was on documenting the presence of the tawny crescent (*Phyciodes batesii*) and the regal fritillary (*Speyeria idalia*), but complete species lists were compiled for each site surveyed. One site was noted as having suitable habitat for the Ottoe skipper, but **no** Iowa or Ottoe skippers were recorded during the surveys.

**Hall, S.P. 1999.** A rangewide status survey of the eastern arogos skipper, *Atrytone arogos arogos* (Lepidoptera: HesperIIDae). Report to US Fish and Wildlife Service Region 6 Endangered Species Field Office, 160 Zillicoa Street, Asheville NC 28801.

The survey results reported here have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**Marrone, G.M. 2002.** A butterfly survey at Grand River National Grassland, Corson and Perkins Counties, South Dakota. Report submitted to the United States Department of Agriculture, Forest Service, Dakota Prairie Grasslands, Bismarck, North Dakota. 20 pp.

This report summarizes the results for butterfly surveys of the east portion of the Grand River National Grassland (GRNG) in 2002. Target species included Arogos [Iowa], Dakota and Ottoe skippers, regal fritillary, and tawny crescent. The only target species documented were the Ottoe skipper and regal fritillary. Iowa skippers were not found, but they were considered a possible occurrence based on the presence of suitable habitat at the site. The other targets were unlikely due to a lack of suitable habitat for them.

**Marrone, G.M. 2003.** A butterfly survey at the western portion of Grand River National Grassland, Perkins County, South Dakota. Report submitted to the United States Department of Agriculture, Forest Service, Dakota Prairie Grasslands, Bismarck, North Dakota. 18 pp.

This report summarizes the results for butterfly surveys of the west portion of the Grand River National Grassland (GRNG) in 2003. Target species included Arogos [Iowa], Dakota and Ottoe skippers, regal fritillary, and tawny crescent. The only target species documented were the Ottoe skipper and regal fritillary. Iowa skippers were not found, but they were considered a possible occurrence based on the presence of suitable habitat at the site. The other targets were unlikely due to a lack of suitable habitat for them.

**Moffat, M. and N. McPhillips. 1993.** Management for butterflies in the northern Great Plains: A literature review and guidebook for land managers. U.S. Fish and Wildlife Service, Pierre, South Dakota. 19 pp.

This publication provides a good review of literature and guidelines for managing prairie butterflies.

**Nekola, Jeffrey C. 1995a.** County distribution maps of Iowa butterflies and skippers. Department of Natural and Applied Sciences, University of Wisconsin, Green Bay, WI. 30 pp.

This publication provides checklists, county distribution maps and phenological timelines for Iowa butterfly records. Records are based on data compiled by John Downey and Dennis Schlicht and maintained by Dennis Schlicht. This is a companion publication to Nekola (1995b).

**Nekola, Jeffrey C. 1995b.** Iowa butterfly and skipper county checklists. Department of Natural and Applied Sciences, University of Wisconsin, Green Bay, WI. 30 pp.

This publication summarizes county butterfly records for Iowa as a series of county checklists, along with the year for the most recent collection for each species. It also includes lists of potential species for each county based on their probability of being found there (e.g. “most likely”, “likely” or “may”). Records are based on data compiled by John Downey and Dennis Schlicht and maintained by Dennis Schlicht. This is a companion publication to Nekola (1995a). Nomenclature follows Miller and Brown (1981).

**Opler, P.A. 1993.** Conservation and Management of Butterfly Diversity in North America. Office of Information Transfer, U.S. Fish and Wildlife Service. Fort Collins, Colorado.

I have not reviewed this text. It is likely to provide a good overview of butterfly conservation and management issues and principles.

**Opler, P.A. 1994.** County Atlas for Eastern United States Butterflies. National Biological Service. Fort Collins, Colorado.

I have not reviewed this text. It is likely similar to the atlas for western butterflies published by Stanford and Opler (1993).

**Orwig, T. 1994.** Report of a 1994 butterfly survey of Cross Ranch Preserve, Hensler, North Dakota. Unpublished report, The Nature Conservancy, Bismarck, ND. November 1994. 5 pp.

No Arogos records

The objectives of this project were to map populations of the Dakota skipper at the Cross Ranch Preserve, and to compile a list of butterfly species, especially uncommon ones, for the site. **No** Iowa skippers were seen during the study.

**Orwig, T. 1995.** Butterfly surveys in North Dakota: 1995. Unpublished report, The Nature Conservancy, Bismarck, ND. November 1995. 13+pp.

The primary objective of this study was to survey for butterflies at prairie and wetland sites in North Dakota, with a focus on documenting the distribution and abundance of the Dakota skipper, Ottoo skipper, Poweshiek skipperling, and regal fritillary. Surveys were conducted in 1995 in Oliver, Ransom, Richland, Sargent, and Sheridan Counties. **No** Iowa skippers were seen during these surveys.

**Orwig, T. 1996.** Butterfly surveys in southeastern North Dakota: 1996. Unpublished report, U.S. Fish and Wildlife Service, Tewaukon National Wildlife Refuge, Cayuga, ND. 14+pp.

The primary objective of this study was to survey for butterflies at prairie and wetland sites in southeastern North Dakota, with a focus on documenting the distribution and abundance of the Dakota skipper, Poweshiek skipperling and regal fritillary. Surveys were conducted in 1996 on Fish and Wildlife Service properties in Ransom, Richland, and Sargent Counties. **No** Iowa skippers were seen during these surveys.

**Orwig, T. 1997.** Butterfly surveys in southeastern North Dakota: 1997. Unpublished report, U.S. Fish and Wildlife Service, Tewaukon National Wildlife Refuge, Cayuga, ND. 14+pp.

The primary objective of this study was to survey for butterflies at prairie and wetland sites in southeastern North Dakota, with a focus on documenting the distribution and abundance of the Dakota skipper, Poweshiek skipperling, and regal fritillary. Surveys were conducted in 1997 on Fish and Wildlife Service properties in Ransom, Richland,, and Sargent Counties. **No** Iowa skippers were seen during these surveys.

**Pavulaan, H. and P.A. Opler. 1995.** Atlas of eastern butterflies. Unpublished information.

I have not reviewed this text. It is likely similar to Stanford and Opler (1993), which consists of dot distribution maps for county records of butterflies in eastern North America.

**Pineda, P.M. and A.R. Ellingson. 1998.** A systematic inventory for rare and imperiled butterflies on the City of Boulder Open Space and Mountain Parks. Unpublished Report to the City of Boulder Open Space and City of Boulder Mountain Parks. 95 pp.

This report summarizes the results of 1996-1997 butterfly surveys conducted by the Colorado Natural Heritage Program (CNHP) on the City of Boulder Open Space and Mountain Parks properties in Boulder County, Colorado. Five potential conservation sites were identified based on information collected during these surveys and pre-existing information. The Arogos [Iowa] skipper was documented at 17 of the 42 “targeted inventory areas”, including four of the five conservation sites. The report also includes a “characterization abstract” for the Iowa skipper and each of the other target elements.

**Reiser, J.M. 1997.** A survey of 19 Nature Conservancy preserves to determine butterfly species composition and the presence or absence of five target species; *Hesperia dacotae*, *Hesperia ottoe*, *Oarisma poweshiek*, *Poanes viator*, and *Speyeria idalia* in 1995 and 1996. Unpublished report. April 1997.

The primary objectives of this study were to determine the presence of selected prairie obligate butterfly species, establish baseline data for butterfly species composition, and implement a monitoring system at each of nineteen Nature Conservancy preserves in Iowa, Minnesota, and South Dakota. Target species included the broad-winged skipper, Dakota skipper, Ottoe skipper, Poweshiek skipperling, and regal fritillary. Surveys were conducted in 1995 and 1996 from mid-June through July. The Iowa skipper was not a target, but occurrences were documented as part of the study. Three new South Dakota county records were documented in 1995 at Makoce Washte in Minnehaha County, Sioux Prairie in Moody County and Vermillion Prairie in Clay County. Additional Iowa skipper observations were from Minnesota in 1996 at Hole-in-the-

Mountain Prairie in Lincoln County, Red Rock Prairie in Cottonwood County, and R.J. Traeger Preserve in Jackson County.

**Rosche, R.C. 1986.** Nebraska butterfly distribution maps. Published by Author. 27 pp.

This paper was published as an attempt to update the distributional data and county maps for Nebraska butterflies as presented by Johnson (1972[1973]). It includes a brief introduction with general background information, and then consists of county distribution maps for each species. *Atrytone arogos* is shown to occur in eighteen Nebraska counties scattered throughout the state.

**Royer, R.A. 2002.** On the status of five sensitive butterfly species in McKenzie District Pastures 12, 13, and 14, McKenzie County, North Dakota. Dakota Prairie Grasslands (USDA Forest Service).

No Iowa skipper records

Surveys were focused on determining the distribution and abundance of five USDA-FS “sensitive” butterfly species in the study area. Target species included Arogos [Iowa] skipper (*Atrytone arogos iowa*), Dakota skipper (*Hesperia dacotae*), Ottoo skipper (*Hesperia ottoe*), regal fritillary (*Speyeria idalia*), and tawny crescent (*Phyciodes batesii lakota*). The Dakota and Ottoo skippers, regal fritillary, and tawny crescent were documented in the study area, and the dates and locations (UTM coordinates) for individual observations are given. The Iowa skipper was not seen during the study and is not thought to breed as far north or west as the study area.

**Royer, R.A. 2003.** On the status of five sensitive butterfly species in McKenzie District Pasture 7, McKenzie County, North Dakota. Dakota Prairie Grasslands (USDA Forest Service).

No Iowa skipper records

Surveys were focused on determining the distribution and abundance of five USDA-FS “sensitive” butterfly species in the study area. Target species included Arogos [Iowa] skipper (*Atrytone arogos iowa*), Dakota skipper (*Hesperia dacotae*), Ottoo skipper (*Hesperia ottoe*), regal fritillary (*Speyeria idalia*), and tawny crescent (*Phyciodes batesii lakota*). The Ottoo skipper, regal fritillary, and tawny crescent were documented in the study area; the dates and locations (UTM coordinates) for individual observations are given. The Iowa and Dakota skippers were not seen during the study and are not thought to breed anywhere in the study area.

**Royer, R.A. and G. M. Marrone. 1992.** Conservation status of the Arogos skipper (*Atrytone arogos*) in North and South Dakota. Unpublished Report. U.S. Fish and Wildlife Service, Denver, CO. 29+pp.

This conservation assessment for the Arogos [Iowa] skipper is focused on populations in North and South Dakota. It includes detailed information on the taxonomy, general and technical descriptions of the adults, eggs, and larvae, geographic distribution of the species, and more detailed descriptions of the distribution and status in North and South Dakota. The status of populations at each of the known sites in the two states is summarized, and the distribution of those sites is illustrated in a map. The assessment also summarizes environmental and habitat

characteristics, population biology and ecology, land ownership, management issues, and threats. It concludes with status recommendations

**Saunders, M.R. 1994.** Species status report for the Dakota skipper (*Hesperia dacotae*) and the Poweshiek skipperling (*Oarisma poweshiek*) in Iowa: the 1993 field season. Unpublished report, Iowa State University Honors Program, Ames, IA and Iowa Department of Natural Resources, Des Moines, IA. January 21, 1994. 21+pp.

This report summarizes the results from the first year (1993) of a two-year study focused on documenting the status of the Dakota skipper and Poweshiek skipperling in Iowa. The study included sites throughout northern Iowa with known or potential occurrences for those species. Data for other butterfly species were also collected and the Iowa skipper was documented at ten sites in five counties in northwest Iowa.

**Saunders, M.R. 1995.** Species status report for the Dakota skipper (*Hesperia dacotae*) and the Poweshiek skipperling (*Oarisma poweshiek*) in Iowa. Unpublished report, Iowa Nongame Wildlife Program and Iowa Department of Natural Resources, Des Moines, IA. February 25, 1995. 21+pp.

This final report summarizes the results from a two-year study (1993 and 1994) focused on documenting the status of the Dakota skipper and Poweshiek skipperling in Iowa. The study included sites throughout northern Iowa with known or potential occurrences for those species. Data for other butterfly species were also collected and the Iowa skipper was documented at fifteen sites (ten in 1993 and five in 1994) in seven counties in northwest Iowa.

**Schlicht, D.W. 1997a.** Population monitoring for prairie butterflies in Minnesota. Unpublished report, Minnesota Department of Natural Resources, Natural Heritage and Nongame Research Program, St. Paul, MN. March 30, 1997. 26+pp.

The purpose of this study was to implement a butterfly monitoring protocol at six Minnesota prairie preserves focused on three prairie butterflies (Dakota skipper, Poweshiek skipperling, and regal fritillary). Each site was visited three times each year during the 1995 and 1996 flights for those species. The Arogos [Iowa] skipper was seen at four of the sites, with the highest number at Glacial Lakes State Park in Pope County, and greatly reduced numbers (compared to Selby 1989, 1990) at Prairie Coteau SNA in Pipestone County). The other two sites are not named in the report, but Heritage records indicate they were likely Chippewa Prairie in Chippewa/Swift Counties and Hole-in-the-Mountain Preserve in Lincoln County.

**Schlicht, D.W. 1997b.** Surveys for the Dakota skipper in Minnesota. Unpublished report, Minnesota Department of Natural Resources, Natural Heritage and Nongame Research Program, St. Paul, MN. November 30, 1997. 10+pp.

This study was focused on determining the presence of the Dakota skipper at sites in three areas of Minnesota (upper Minnesota River Valley; Glacial Lakes State Park in Pope County; and Chanarambie Creek near Chandler in Murray County). Other target species included the Iowa skipper, Poweshiek skipperling, and regal fritillary. Surveys were conducted during the first two weeks of July in 1997. The only Iowa skipper records were from two sites in the Chanarambie Creek area.

**Schlicht, D.W. 2001.** Surveys of Lepidoptera in the Glacial Lakes/Ordway landscape, Minnesota 2001. Unpublished Report, Iowa Lepidoptera Project, Center Point, IA. 1 p.

This report was not reviewed, but there are no Iowa skipper Heritage records for this year, so it probably was not observed during the study.

**Schlicht, D.W. and M.R. Saunders. 1993.** Status surveys for the Dakota skipper (*Hesperia dacotae*) and the Poweshiek skipper (*Oarisma poweshiek*) in Minnesota (with additional data on the regal fritillary (*Speyeria idalia*)). Unpublished report, Minnesota Department of Natural Resources, Natural Heritage and Nongame Research Program, St. Paul, MN. December 28, 1993. 22+pp.

This report summarizes the results from the first year (1993) of a two-year study focused on the Dakota skipper, Poweshiek skipperling, and regal fritillary in Iowa. Surveys were conducted at 54 prairie sites from June through July in 1993. **No** Iowa skipper observations were reported.

**Schlicht, D. and M.R. Saunders. 1995.** Completion of status surveys for the Dakota skipper (*Hesperia dacotae*) and the Poweshiek skipper (*Oarisma poweshiek*) in Minnesota (with additional data on the regal fritillary (*Speyeria idalia*)). Unpublished report, Minnesota Department of Natural Resources, Natural Heritage and Nongame Research Program, St. Paul, MN. January 28, 1995. 22+pp.

This final report summarizes the results from a two-year study focused on the Dakota skipper, Poweshiek skipperling, and regal fritillary in Iowa. Surveys were conducted at 60 prairie sites from June through July in 1993 and 1994. The need to do similar surveys for the Iowa and Ottoo skippers is mentioned, but **no** Iowa skipper observations are included in the report.

**Schweitzer, D.F. and A. Windisch. September 14, 2000.** The 1999 field survey for ATRYTONE AROGOS AROGOS in southern New Jersey, with selected observations from other years. Prepared for Annette Scherer, US Fish and Wildlife Service Ecological Services Field Office, 927 North Main St. Building D Pleasantville, NJ 08232.

The survey results reported here have relevance to the eastern Arogos subspecies, but not the Iowa skipper.

**Selby, G.L. 1991.** Investigator's Annual Report – 1990: An inventory of prairie-obligate butterflies at Pipestone National Monument. Unpublished report, Pipestone National Monument, Pipestone, MN. 3 pp.

This report summarizes the results of general butterfly surveys conducted in 1990 at Pipestone National Monument in Pipestone County, Minnesota. **No** Iowa skippers were observed during those surveys.

**Selby, Gerald. 1992.** Dispersal and recolonization capabilities in the Ottoo skipper (*Hesperia ottoe*) in the Loess Hills. Final report to The Nature Conservancy in Iowa. 22+ pp.

This was an intensive ten-day mark and recapture study focused on the Ottoo skipper and regal fritillary at Five Ridge Prairie State Preserve, Plymouth County, IA. Complete species list were

kept each day, but **no** Iowa skippers were recorded during the study. The Iowa skipper does occur at the site and might have been expected to show up near the end of the study.

**Selby, G.L. 2000.** Population assessment and management recommendations for the Dakota skipper (*Hesperia dacotae*) at Cayler Prairie State Preserve, and inventory for new populations along the Little Sioux River. Unpublished report, Iowa State Preserves Board and Iowa Department of Natural Resources, Des Moines, IA. December 29, 2000. 28+pp.

This study was focused on redocumenting the occurrence of the Dakota skipper at Cayler Prairie State Preserve, Dickinson County, Iowa and attempting to locate new populations at other sites in northwest Iowa. Iowa skippers were found at Cayler Prairie, Glacial Hills Site in Buena Vista County, and in and near the Bertram Reservation in Clay County.

**Selby, G.L. 2003a.** A Survey of Prairie Butterflies at Selected Sites in the Loess Hills of Western Iowa. Unpublished report, Iowa Department of Natural Resources, Des Moines, IA. March 1, 2003. 20+pp.

This study involved surveys during each of the main flight periods in 2002 at selected sites throughout the Loess Hills of western Iowa. There was an unconfirmed sighting of the Iowa skipper at the Preparation Canyon site in Monona County and confirmed observations at the Five Ridge Prairie State Preserve site in Plymouth County.

**Selby, G.L. 2003b.** Dakota skipper grazing project – phase 1 (research plan). Final report, Minnesota Department of Natural Resources, Natural Heritage and Nongame Research Program, St. Paul, MN. February 28, 2003. 18+pp.

This report developed a research plan for a grazing study in west-central Minnesota. The study was to be focused on impacts of grazing on the Dakota skipper, but other prairie butterflies were to be included as secondary targets. The selected study area was Glacial Lakes State Park, Pope County, MN and surrounding grazed prairie pastures. Iowa skippers have been recorded from this area and were therefore secondary targets in the study.

**Selby, G.L. 2003c.** Effect of grazing on the Dakota skipper butterfly. Annual progress report, Minnesota Department of Natural Resources, Natural Heritage and Nongame Research Program, St. Paul, MN. December 31, 2003. 14+pp.

This report summarizes the results from the first year of the grazing study developed in Selby (2003b). Numbers for Dakota skippers were down (54 total observed), Poweshiek skipperling numbers were very low (4 total observed), and **no** Iowa skippers were observed.

**Selby, G.L. 2004.** A census and inventory for populations of the Dakota skipper (*Hesperia dacotae*) and associated prairie obligate butterflies at priority sites in northwest Iowa. Unpublished report, The Nature Conservancy of Iowa and Iowa Department of Natural Resources, Des Moines, IA. November 30, 2004. 13+pp.

This study was focused on redocumenting the occurrence of the Dakota skipper at Cayler Prairie State Preserve in Dickinson County, Iowa, attempting to locate new populations at other sites in northwest Iowa, and documenting the status and distribution of other prairie butterflies at the sites surveyed. Iowa skippers were found near the Bertram Reservation in Clay County where

they had been found in 2000 (Selby (2000)), but they were not found at other sites where they had been documented during those surveys (e.g. Cayler Prairie or the Glacial Hills Site in Buena Vista County). Other sites surveyed with historic Iowa skipper records included Anderson Prairie in Emmet County, and Gitchie Manitou State Preserve and Hidden Bridge Site in Lyon County. It was not observed at any of those properties in 2004.

**Selby, G.L. 2004.** Effects of grazing on the Dakota skipper butterfly. Annual progress report, Minnesota Department of Natural Resources, Natural Heritage and Nongame Research Program, St. Paul, MN. December 31, 2004. 17+pp.

This report summarizes the results from the second year of the grazing study developed in Selby (2003b). Numbers for Dakota skippers still were down (42 total observed) and **no** Poweshiek skipperlings or Iowa skippers were observed.

**Selby, G.L. and D.C. Glenn-Lewin. 1989a.** An ecological study of rare butterflies in the Loess Hills of western Iowa and their response to prescribed burning. Unpublished report, Iowa Department of Natural Resources, Des Moines, IA. December 1989. 23+pp.

This project included mark, release, and recapture studies of the dusted and Ottoe skippers at Mount Talbot State Preserve in Stone State Park and general butterfly surveys at selected sites throughout the Loess Hills conducted during the 1990 field season. The Iowa skipper was documented at Mount Talbot State Preserve. It was not found at any other sites, but those surveys were conducted early in the Ottoe skipper flight and were probably too early for the Iowa skipper.

**Selby, G.L. and D.C. Glenn-Lewin. 1989b.** A systematic inventory, population monitoring program, and ecological study of rare Lepidoptera at the Prairie Coteau Scientific and Natural Area (SNA), Pipestone County, Minnesota. Unpublished report, Minnesota Department of Natural Resources, St. Paul, MN, and The Nature Conservancy of Minnesota, Minneapolis, MN. December 1989. 48+pp.

The research is part of Selby's dissertation research and involved the collection of extensive data on the distribution and abundance of prairie butterflies at Prairie Coteau SNA. The Dakota skipper was the focus of the study, but data on other prairie butterflies were also collected. The Iowa skipper was present at the site and distribution and abundance data were collected for it.

**Selby, G.L. and D.C. Glenn-Lewin. 1990a.** An ecological study of the plant/butterfly associations and their response to management, at the Prairie Coteau Scientific and Natural Area (SNA), Pipestone County, Minnesota. Unpublished report, Minnesota Department of Natural Resources, St. Paul, MN, and The Nature Conservancy of Minnesota, Minneapolis, MN. December 1990. 30+pp.

This research is part of Selby's dissertation research and involved the collection of extensive data on the distribution and abundance of prairie butterflies at Prairie Coteau SNA in Pipestone County, Minnesota. The Dakota skipper was the focus of the study, but data on other prairie butterflies were also collected. The Iowa skipper was present at the site and distribution and abundance data were collected for it. The results of general surveys in 1990 at additional sites in southwest Minnesota are also included in this report. Iowa skippers were documented at Blue



Mound State Park in Rock County, Hole-in-the-Mountain Preserve in Lincoln County, and at several locations in the Chanarambie Creek site in Murray County.

**Selby, G.L. and D.C. Glenn-Lewin. 1990b.** Population monitoring for rare butterflies at Mount Talbot State Preserve in Stone State Park. Unpublished report, Iowa Department of Natural Resources, Des Moines, IA. December 1990. 21+pp.

This project included the design and implementation of a butterfly monitoring protocol for the Mount Talbot State Preserve portion of Stone State Park and general butterfly surveys in other portions of the park in Plymouth and Woodbury Counties, IA. Surveys were conducted in 1990 during each of four principal flight periods and population and distribution data were collected for all prairie-obligate butterfly species. The Iowa skipper was documented in the Plymouth County portion of the State Preserve and also in the Woodbury County portion of the State Park, but the numbers were never high (2 observed in each area).

**Skadsen, D.R. 1997.** A report on the results of a survey for Dakota skipper [*Hesperia dacotae* (Skinner 1911)] in northeast South Dakota during the 1996 and 1997 flight periods. Unpublished report, South Dakota Department of Game, Fish and Parks, Pierre, SD. December 31 1997. 34+pp.

Not reviewed.

**Skadsen, D.R. 1998.** A report on the results of a survey for Dakota skipper [*Hesperia dacotae* (Skinner 1911)] in northeast South Dakota, 1998 flight period. Unpublished report, South Dakota Department of Game, Fish and Parks, Pierre, SD. March 25 1998. 12+pp.

Not reviewed.

**Skadsen, D.R. 1999a.** Addendum to: A report on the results of a survey for Dakota skipper [*Hesperia dacotae* (Skinner 1911)] in northeast South Dakota, 1998 flight period. Unpublished report, South Dakota Department of Game, Fish and Parks, Pierre, SD. 12 pp.

Not reviewed.

**Skadsen, D.R. 1999b.** Dakota skipper [*Hesperia dacotae* (Skinner 1911)]; Surveys at Big Stone National Wildlife Refuge, Minnesota. Unpublished Report, 19 pp.

The primary objective of these surveys was to locate Dakota skipper populations at Big Stone National Wildlife Refuge in Big Stone and Lac Qui Parle Counties of west central Minnesota. Other target species included *Atrytone arogos iowa*, *Hesperia comma assiniboia*, *Hesperia ottoe*, *Oarisma poweshiek* and *Speyeria idalia*. Iowa skippers were **not** seen in the study area, but he did observe fresh Iowa skippers at Hartford Beach State Park, SD on July 10, 1999.

**Skadsen, D.R. 2001a.** Additional surveys for the Dakota skipper [*Hesperia dacotae* (Skinner 1911)] at Big Stone National Wildlife Refuge, Minnesota. Unpublished Report, 11 pp.

These surveys were conducted in 2000 and were a continuation of the 1999 project (Skadsen 1999b). The primary objectives were to determine the status of the Dakota skipper at Big Stone National Wildlife Refuge and to try to locate additional populations on remaining areas of Big Stone National Wildlife Refuge and Prairie Waterfowl Production Area in Big Stone and Lac

Qui Parle Counties of west central Minnesota. Other target species included *Atrytone arogos iowa*, *Hesperia comma assiniboia*, *Hesperia ottoe*, *Oarisma poweshiek* and *Speyeria idalia*. No Iowa skippers were seen in the study area.

**Skadsen, D.R. 2001b.** A survey of prairie Lepidoptera in southwestern Minnesota State Parks. Unpublished Report, Minnesota Department of Natural Resources, Division of Parks and Recreation, St. Paul, MN. 61 pp.

These surveys were conducted in 2001 during the middle (mid-June to mid-July) and late (August) flight periods at five State Parks in southwestern Minnesota. Survey sites included Blue Mounds State Park in Rock County, Camden State Park in Lyon County, Glacial Lakes State Park in Pope County, Sibley State Park in Kandiyohi County, and Split Rock Creek State Park in Pipestone County. Additional surveys were conducted in August at Anderson Prairie, a private site just east of Glacial Lakes State Park. The objective was to document all butterfly species observed, with special emphasis on *Atrytone arogos iowa*, *Hesperia comma assiniboia*, *H. dacotae*, *H. ottoe*, *Oarisma poweshiek*, *Speyeria idalia*, and *Schinia indiana*. There were **no** confirmed sightings of Iowa skippers during these surveys. Two possible Iowa skippers were observed at Glacial Lakes State Park, but they were not confirmed. Skadsen states that Iowa skippers had been documented at the park as late as 1996 by Robert Dana.

**Skadsen, D.R. 2002.** Dakota skipper population surveys for CCAA development for the state of South Dakota. Unpublished progress report, South Dakota Department of Game, Fish and Parks, Pierre, SD. 1 October 2002. 41+pp.

The objective of these surveys was to determine the status of Dakota skippers at existing and potential South Dakota sites for the development of Candidate Conservation Agreements with Assurances (CCAA). Other species of concern for which data were recorded included *Atrytone arogos iowa*, *Hesperia ottoe*, *Oarisma poweshiek* and *Speyeria idalia*. Fifty-one sites in seven counties were surveyed in 2002 by the author and Gary Marrone. The Iowa skipper was observed at two sites in two counties (Hartford Beach State Park in Roberts County and Newton Hills State Park in Lincoln County).

**Skadsen, D.R. 2003.** Dakota skipper population surveys for CCAA development in the state of South Dakota. Unpublished report, South Dakota Department of Game, Fish and Parks, Pierre, SD. 56+pp.

This was the second year of a study to determine the status of Dakota skippers at existing and potential South Dakota sites for the development of Candidate Conservation Agreements with Assurances (CCAA). Other species of concern for which data were recorded included *Atrytone arogos iowa*, *Hesperia ottoe*, *Oarisma poweshiek*, and *Speyeria idalia*. Seventy-five sites in thirteen counties were surveyed during the two-year study. The Iowa skipper was observed at two sites in two counties (Hartford Beach State Park in Roberts County and Newton Hills State Park in Lincoln County) during the 2002 surveys.

**Skadsen, D.R. 2004.** 2004 surveys for the Dakota skipper (*Hesperia dacotae*) in northeast South Dakota. Unpublished report, South Dakota Department of Game, Fish and Parks, Pierre, SD. 31 December 2004. 18 pp.

The objective of these surveys was to obtain additional information on the distribution of Dakota skippers in South Dakota. Surveys were concentrated in the Crandall/Crocker Hills of Day and Clark Counties, Orient Hills of Faulk County, and Deuel County. Other species of concern for which data were recorded included *Atrytone arogos iowa*, *Hesperia ottoe*, *Oarisma poweshiek*, and *Speyeria idalia*. Nineteen sites in seven counties were surveyed in 2004. The Iowa skipper was **not** observed at Hartford Beach State Park in Roberts County, where it had been recorded in 2002 (Skadsen 2002, 2003). It was recorded as “still present” in small numbers at Pickerel Lake State Recreation Area – East Unit in Day County.

**Spomer, S.M. 2001.** Butterfly and skipper survey, Dakota Prairie National Grassland, Ransom and Richland Counties, ND. U.S. Forest Service, Custer National Forest, Billings, MT. 19 pp.

This report summarizes results from the first year in a three-year study to determine the location, distribution, and relative abundance of butterflies in the Sheyenne National Grassland. Species targeted included *Atrytone arogos iowa*, *Hesperia dacotae*, *H. ottoe*, *Oarisma poweshiek*, *Phyciodes batesii* Lakota, and *Speyeria idalia*. Three of the target species were found (*Hesperia dacotae*, *Oarisma poweshiek*, and *Speyeria idalia*). The Iowa skipper was **not** observed during these surveys.

**Spomer, S.M. 2002.** Butterfly and skipper survey, Dakota Prairie National Grassland, Ransom and Richland Counties, ND. U.S. Forest Service, Billings, MT. 18 pp.

This report summarizes results from the second year in a three-year study to determine the location, distribution, and relative abundance of butterflies in the Sheyenne National Grassland. Species targeted included *Atrytone arogos iowa*, *Hesperia dacotae*, *H. ottoe*, *Oarisma poweshiek*, *Phyciodes batesii* Lakota, and *Speyeria idalia*. Two of the target species were found (*Hesperia dacotae* and *Speyeria idalia*). The Poweshiek skipperling was not relocated at the site where it was found in 2001 and the Iowa skipper was **not** observed during these surveys.

**Spomer, S.M. 2004.** Nebraska butterfly county distribution maps. Unpublished working copy.

These are unpublished county distribution maps for Nebraska butterflies maintained by Steve Spomer and are up-to-date through the 2004 field season. The maps do not provide detailed documentation for individual records, but general information for year and collector is provided.

**Swengel, A.B. 1990.** Habitat use by several prairie butterflies and skippers. Unpublished report, Baraboo, Wisconsin.

I have not reviewed this report. It would likely be useful for getting updated information on Wisconsin species, but is not likely to have any Iowa skipper records because it has not been recorded from that part of the state.

**Swengel, A.B. 1991.** Butterflies of southwestern Wisconsin. Madison Audubon Society, Madison, Wisconsin. 29 pp.

I have not reviewed this report. It would likely be useful for getting updated information on Wisconsin species, but is not likely to have any Iowa skipper records because it has not been recorded from that part of the state.

**Swengel, A.B. 1991.** Occurrence and behavior of the regal fritillary and prairie skippers in the upper Midwest, 1990-91 research. Unpublished report, Baraboo, Wisconsin. 19+pp.

I have not reviewed this report. It would likely be useful for getting updated information on Wisconsin species, but is not likely to have any Iowa skipper records because it has not been recorded from that part of the state.

**Swengel, A.B. 1993.** Research on the community of tallgrass prairie butterflies 1988-1993. Unpublished report. 72+pp.

This is an early report on data included later in various published papers. It is useful for getting background information on those publications, but does not add significantly to them.

**Yahner, R.H. 1996.** Biodiversity conservation of butterflies and skippers in agricultural landscapes of Pennsylvania. Final report to Wild Res. Cons. Fund, Harrisburg, Pa. 70pp.

This is a regional reference, with good information on the eastern *Arogos* subspecies, but is not relevant for the Iowa skipper.

### **C. Internet Sources**

**Beccaloni, G. W., Scoble, M. J., Robinson, G. S. & Pitkin, B. (Editors). 2003.** *The Global Lepidoptera Names Index (LepIndex)*. World Wide Web electronic publication.

<http://www.nhm.ac.uk/entomology/lepindex> [accessed Day Month Year]

This Web site is a good source of taxonomic information for genera and species. Information includes authorship for the taxon, type species for each genus, and original and current genus species combinations. Taxonomy for the genus *Atrytone* does **not** reflect changes proposed by Burns (1994).

**Ferge, L.A. 2002.** Wisconsin Entomological Society Special Publication No. 5. Checklist of Wisconsin Butterflies. <http://www.entomology.wisc.edu/wes/pubs/bflylist.html> (Accessed 06 May 2005).

This butterfly checklist for the state of Wisconsin provides general information about the range, habitat, flight time, and status of each species. It is an update of a previous 1990 checklist by the author. The Arogos skipper (*Atrytone arogos*) is included as a historic record from dry prairie in southeastern Wisconsin in early July.

**IUCN 2004.** 2004 IUCN Red List of Threatened Species. [www.redlist.org](http://www.redlist.org) (Accessed 06 May 2005).

The Arogos skipper and its subspecies are **not** included on this list.

**NatureServe. 2003.** Downloadable animal data sets. NatureServe Central Databases. Available from: <http://www.natureserve.org/getData/vertinvertdata.jsp> (Accessed 06 May 2005).

This Web site provides access to data sets for vertebrate and selected invertebrate groups in the United States and Canada. Each group's lists include basic taxonomic and conservation status information. The Arogos skipper (*Atrytone arogos*) is included on the USA list, but not on the Canadian list, where it has never been documented. Nomenclature for the genus reflects changes proposed by Burns (1994). The Delaware skipper (*A. logan*) is placed in the genus *Anatrytone*, and is the only species listed for this genus on either list).

#### **Checklists for butterflies and skippers:**

United States (<http://www.natureserve.org/getData/dataSets/animalDataSets/lepsus.htm>)

Canada (<http://www.natureserve.org/getData/dataSets/animalDataSets/lepsca.htm>)

**NatureServe. 2005.** NatureServe Explorer: An online encyclopedia of life [web application].

Version 4.4. NatureServe, Arlington, Virginia. Available

<http://www.natureserve.org/explorer> (Accessed 06 May 2005).

NatureServe Explorer provides online access to an "encyclopedia" of information on species and ecosystems in the natural heritage database. Comprehensive reports are available at this Web site for the Arogos skipper (*Atrytone arogos*) and each of its subspecies (*A. a. arogos* and *A. a. iowa*). These reports provide a fairly thorough review of information about the species and subspecies, including taxonomy, conservation status (including trends and threats), distribution, ecology, and life history.

**North American Butterfly Association (NABA). 1995.** English names of North American butterflies occurring north of Mexico. <http://www.naba.org/pubs/enames.html>

This was a first attempt by NABA to establish a standardized list of common names for North American butterflies. The common name used for the *Atrytone arogos* is Arogos skipper.

Subspecies are not included in this list. Nomenclature for the genus follows Burns (1994), and *A. logan* (Delaware skipper), and *A. mazai* (common name still to be assigned) are placed in the genus *Anatrytone*.

**North American Butterfly Association (NABA). 2001.** Checklist & English names of North American butterflies (2<sup>nd</sup> edition).

Checklist: <http://www.naba.org/pubs/enames2.html>

Introduction & Comments: <http://www.naba.org/ftp/check2com.pdf>

This is an update of the original attempt by NABA to establish a standardized list of common names for North American butterflies (NABA 1995). The first link is for the updated checklist and the second link is for the Introduction & Comments section in which they explain the basis for changes that are made. There are no changes affecting *Atrytone arogos*. Its common name is still Arogos skipper and subspecies are still not included in this list. Nomenclature for the genus follows Burns (1994), and *A. logan* (Delaware skipper) and *A. mazai* (glowing skipper – newly assigned name) are placed in the genus *Anatrytone*.

**Opler, P.A., H. Pavulaan and R.E. Stanford (coordinators). 1995.** Butterflies of North America. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page.

<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/bflyusa.htm> (Version 12DEC2003).

This Web site provides descriptions, images, general species information, and distribution maps the United States (county records) and Mexico (state records). Distribution and species data can be accessed for the conterminous U.S. and northern Mexico or for individual states. Data for each state are coordinated and verified by various Lepidoptera authorities. This Web site provides a good starting point for obtaining butterfly distribution data, but the data are often incomplete or not up to date, and documentation for questionable records is sometimes difficult to track down. Subspecies are not included, so the Arogos skipper is simply listed as *Atrytone arogos*.

**Opler, P.A., H. Pavulaan and R.E. Stanford (coordinators). 2000.** Butterflies and skippers of North America. Nearctica.com, Inc. <http://www.nearctica.com/butter/index.htm> (Copyright 2000).

This Web site is a modified version the Butterflies of North America (BNA) Web site (Opler et al. 1995), designed to be more like an online version of a traditional field guide. It is operated in cooperation with staff of Nearctica.com and the Northern Prairie Wildlife Research Center. Species from Canada and Alaska have been added, but otherwise most of the species accounts are from the original BNA site. The distribution maps are also from that site and were prepared by their staff, but the county records sometimes differ significantly from the BNA distribution maps. There are major changes to the format and the species are illustrated with excellent color photographs of mounted specimens. The link for the Arogos skipper (*Atrytone arogos*) is <http://www.nearctica.com/butter/plate29/Aarogos.htm>.

**Opler, P. A. and A. D. Warren. 2003.** Butterflies of North America. 2. Scientific names list for butterfly species of North America, north of Mexico.

[http://www.biology.ualberta.ca/old\\_site/uasm//Opler&Warren.pdf](http://www.biology.ualberta.ca/old_site/uasm//Opler&Warren.pdf)

This Web site provides updated nomenclature for the classification and scientific names of butterflies and has gained general acceptance and usage among lepidopterists. Subspecies are not included, so the Arogos skipper is simply listed as *Atrytone arogos*. *A. logan*, *A. mazai*, and *A. potosiensis* are placed in the genus *Anatrytone* based on Burns (1994). This list does not include common names.

**Pavulaan, H. 2004.** Taxonomically Correct – Index of Scientific Butterfly Names (TC-ISBN). The International Lepidoptera Survey. <http://tils-ttr.org/tc-isbn/index.html>. [accessed Day Month Year]

This Web site provides an index to the classification and scientific names for butterflies. The Lepidopterists' Society Memoir No. 3 – "Supplement to: A Catalogue/Checklist of the Butterflies of America North of Mexico" (Ferris 1989) provides the taxonomic baseline for the index and any changes are based on published studies. The two Arogos skipper subspecies (*A. a. arogos* and *A. a. iowa*) are recognized. *A. logan*, *A. mazai*, and *A. potosiensis* are still retained in the genus *Atrytone*, despite the published basis for placing them in the genus *Anatrytone* (Burns 1994) and general acceptance of that change (NABA 2001; Opler and Warren 2003).

**Royer, Ronald A. 2004.** Atlas of North Dakota Butterflies. Jamestown ND: Northern Prairie Wildlife Research Center Online.

<http://www.npwrc.usgs.gov/resource/distr/lepid/bflynd/bflynd.htm> (Version 29MAR2004). General information about the Arogos [Iowa] skipper is provided including color plates, habitat, food plants, and distribution in North Dakota. It is shown to occur in three counties in North Dakota (Ransom, Richland and Ward Counties). This atlas is updated at the end of each field season and is the most up-to-date source for North Dakota county atlas data.

**USDA Forest Service. 2004.** Forest Service sensitive species that are not listed or proposed under the ESA. Unpublished Report. December 1, 2004.

[http://www.fs.fed.us/biology/resources/pubs/tes/fs\\_ss\\_1dec04.pdf](http://www.fs.fed.us/biology/resources/pubs/tes/fs_ss_1dec04.pdf) (Accessed: May 2005). The Arogos skipper is included on this list as a USDA Forest Service "sensitive" species in Regions 1 and 8. Subspecies are not specified, but occurrences in Region 1 would be the Iowa subspecies, and occurrences in Region 8 could include either subspecies (Iowa in the west, and Arogos in the east).

**Wisconsin Department of Natural Resources. 2004.** The Natural Heritage Inventory working list: elements not actively tracked, but data are being collected (updated January 2004).

[http://dnr.wi.gov/org/land/er/working\\_list/taxalists/nottracked.htm](http://dnr.wi.gov/org/land/er/working_list/taxalists/nottracked.htm) (Accessed: 4 May 2005). The Iowa skipper is included on this list of species that are not actively tracked, but for which data are being collected. It is given a state rank of SNA, suggesting that occurrences in the state are regular migrants to Wisconsin where they reproduce, but then completely die out every year with no return (SN), or are accidental or casual (SA).

**Wisconsin Department of Natural Resources. 2004.** The Natural Heritage Inventory working list key (updated January 2004). [http://dnr.wi.gov/org/land/er/working\\_list/taxalists/key.htm](http://dnr.wi.gov/org/land/er/working_list/taxalists/key.htm) (Accessed: 4 May 2005).

This Web page provides descriptions of the fields in the Wisconsin Natural Heritage Inventory working list, and an explanation of global, national and state ranking and protection status codes.

#### **D. Experts/Contacts**

**Beauvais, Gary.** Director, Wyoming Natural Diversity Database, University of Wyoming, Dept. 3381, 1000 E. University Ave., Laramie, WY 82071.

**Cuthrell, David.** Associate Program Leader – Zoology, Michigan Natural Features Inventory, PO Box 30444, Lansing, MI 48909-7944.

**Dana, Robert.** Minnesota Department of Natural Resources, 500 Lafayette Rd., Box 25, St. Paul, MN 55155.

**Delisle, Jennifer.** Information Manager, Kansas Natural Heritage Inventory, Kansas Biological Survey, 2101 Constant Ave., Takeru Higuchi Bldg., Lawrence, KS 66047

**Heitzman, J. Richard.** Missouri butterfly expert and author, 3112 Harris Ave., Independence, Missouri 64052-2732.

Richard is the co-author for the book on Missouri butterflies and moths and the author for the paper on the life history of the Arogos skipper. Ely et al. (1986) cite him for their Johnson County, KS record for the Arogos skipper (*Atrytone arogos*).

**Koenig, Phil.** Missouri butterfly expert and records coordinator, 823 Laurale Drive, O'Fallon, MO 63366

Phil is computerizing the butterfly records for Missouri, plus a few records for nearby states (e.g. Kansas and Oklahoma). He shows Iowa skipper records from three Missouri counties (Barton, Newton, and Saint), four Kansas counties (Barber, Chase, Douglas, and Johnson), and one Oklahoma county (Craig).

**Marrone, Gary M.** South Dakota butterflies expert and author, 108 Colony Loop, Fort Pierre, SD 57532-2224.

**Olsen, Frank.** Iowa Lepidopterist, 1513 Parkwood Ln NE, Cedar Rapids, IA 52402-1027.

**Orwig, Tim.** 421a Grafton St, Worcester, MA 01604-3801.

**Royer, Ronald.** Division of Science, Minot State University, 500 University Avenue West, Minot, ND 58707.

**Schlicht, Dennis W.** Iowa butterfly expert and records coordinator, 1108 1st Ave, Center Point, IA 52213-9668

**Shuey, John.** The Nature Conservancy in Indiana, 1505 N. Delaware Street, Suite 200, Indianapolis, IN 46202.

**Skadsen, Dennis.** Natural History Investigations, 1017 Outlet Road, Grenville, SD 57239-8350.

**Spomer, Stephen M.** Research Technologist, University of Nebraska, Lincoln, Entomology, 208 PI, Lincoln, NE 68583-0816

**Swengel, Ann and Scott.** 909 Birch Street, Baraboo, WI 53913.



**USGS, Northern Prairie Wildlife Research Center**

**Butterflies of North America (State Butterfly Coordinators)**

<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/coord.htm> (accessed 9 May 2005)

***Atrytone arogos iowa* (Iowa Skipper)**

Arkansas	Harry Pavulaan
Colorado	no state coordinator listed
Illinois	Doug Taron
<b>Indiana</b>	John Shuey
Iowa	Harry Pavulaan
Kansas	no state coordinator listed
<b>Michigan</b>	Mogens ('Mo') C. Nielsen Steve Mueller
Minnesota	Harry Pavulaan
Missouri	Harry Pavulaan
Montana	no state coordinator listed
Nebraska	no state coordinator listed
North Dakota	no state coordinator listed
<b>Ohio</b>	John Shuey
Oklahoma	Nick Grishin
South Dakota	Gary Marrone
Texas	Nick Grishin
<b>Wisconsin</b>	Mike Reese ( <a href="http://www.wisconsinbutterflies.org/">http://www.wisconsinbutterflies.org/</a> )
Wyoming	no state coordinator listed

***Atrytone arogos arogos* (Arogos Skipper)**

Alabama	Harry Pavulaan
Florida	John Calhoun
Georgia	William Russell
Louisiana	Nick Grishin
Mississippi	Ricky Patterson
New Jersey	David Iftner Jim Springer
New York	Harry Pavulaan
North Carolina	Harry LeGrand Steve Hall
Pennsylvania	David Wright
South Carolina	Harry Pavulaan
Virginia	Harry Pavulaan

## **E. Natural Heritage Programs (Data and Resources)**

### **NatureServe Local Program Websites (<http://www.natureserve.org/visitLocal/index.jsp>)**

This website provides links to each of the Natural Heritage Programs associated with NatureServe. Links, data available, and contact information for relevant programs are summarized below.

### **Colorado Natural Heritage Program (<http://www.cnhp.colostate.edu/>)**

Colorado tracking list available online and for download. The Arogos [Iowa] skipper is tracked.

*Atrytone arogos* (Arogos Skipper) (G3G4/S2)

Data are available online as statewide, county, and USGS 7.5 minute quadrangles

Element occurrence data and an element state rank report were obtained from the Colorado Natural Heritage Program in Fort Collins, CO in February 2005.

### **Illinois Natural Heritage Program**

(<http://dnr.state.il.us/conservation/naturalheritage/index.htm>)

### **Illinois Natural Heritage Database (<http://dnr.state.il.us/conservation/naturalheritage/inhd.htm>)**

Includes description of program and how to order data

Does not include downloadable data or lists

### **Illinois T&E list (<http://dnr.state.il.us/ESPB/DATELISTprint.html>)**

### **Illinois Natural History Survey (<http://www.inhs.uiuc.edu/>)**

Includes access to publication lists and how to order data

### **Iowa Natural Areas Inventory (Natural Heritage Program)**

(<http://www.iowadnr.com/other/inventory.html>)

List of Iowa's Threatened & Endangered Species

*Atrytone arogos* (Beardgrass Skipper) Special concern

Heritage database

*Atrytone arogos* (Arogos Skipper) (G3G4/S2/SC)

Element occurrence data for selected records, including the Iowa skipper, were obtained from the Iowa Natural Heritage Program in Des Moines, IA in February 2005.

### **Iowa DNR Interactive Mapping – Species-At-Risk**

([http://igsims.igsb.uiowa.edu/website/species\\_risk/viewer.htm](http://igsims.igsb.uiowa.edu/website/species_risk/viewer.htm))

Interactive map generates county lists for “species-at-risk”

List includes link to species fact sheet with a county distribution map

([http://igsims.igsb.uiowa.edu/website/species\\_risk/links/species/arogos\\_skipper.pdf](http://igsims.igsb.uiowa.edu/website/species_risk/links/species/arogos_skipper.pdf))

### **Kansas Biological Survey (<http://www.kbs.ku.edu/index.htm>)**

No direct links to actual data

### **Kansas Natural Heritage Inventory (<http://www.ksnhi.ku.edu/>)**

Lists and GIS data are available, but do not include Arogos records

The Arogos [Iowa] skipper is not tracked by the Kansas Natural Heritage Program

### **Minnesota Natural Heritage Program**

([http://www.dnr.state.mn.us/ecological\\_services/nhnrp/index.html](http://www.dnr.state.mn.us/ecological_services/nhnrp/index.html))

Endangered, threatened and special concern element lists are available online

*Atrytone arogos* (Arogos Skipper) Special concern

Element occurrence data were received from the Minnesota Natural Heritage Program, St Paul, MN. February 2003.

Research reports are available online at the following link:

([http://www.dnr.state.mn.us/ecological\\_services/nongame/projects/research\\_reports/index.html](http://www.dnr.state.mn.us/ecological_services/nongame/projects/research_reports/index.html))

**Missouri Natural Heritage Program**

(<http://www.conservation.state.mo.us/nathis/heritage.html>)

Rare and endangered species checklists are available online, but do not include the Iowa skipper  
Interactive map generates county checklists

**Montana Natural Heritage Program** (<http://nhp.nris.state.mt.us/>)

Endangered, threatened and special concern element lists are available, but do not include the Iowa skipper

**Nebraska Natural Heritage Program** (<http://www.natureserve.org/nhp/us/ne/index.htm>)

Endangered, threatened and special concern element lists are available, but do not include the Iowa skipper

**North Dakota State Nature Preserve Program**

(<http://www.ndparks.com/Nature/Preserves.htm>)

NO rare element lists or data access

**Ohio Division of Natural Areas and Preserves** (<http://www.dnr.state.oh.us/dnap/default.htm>)

Heritage data access only includes plants

Butterfly checklist available (<http://www.ohiolepidopterists.org/bflymonitoring/checklist.pdf>)

Does not include Arogos skipper

**Oklahoma Natural Heritage Inventory** (<http://www.biosurvey.ou.edu/heritage/onhi.html>)

Working list of rare invertebrates available online

(<ftp://www.biosurvey.ou.edu/pub/inverts0503.pdf>)

*Atrytone arogos* (Arogos Skipper) (G3G4/S?)

*Atrytone arogos iowa* (Iowa Skipper) (G3G4T3T4/S?)

**South Dakota Wildlife Diversity Program**

(<http://www.sdgifp.info/wildlife/diversity/Index.htm>)

Rare, threatened and endangered tracked species list available online

(<http://www.sdgifp.info/Wildlife/Diversity/RareAnimal.htm>)

**Texas Conservation Data Center**

(<http://nature.org/wherewework/northamerica/states/texas/science/art6069.html>)

Animal tracking list available online (does not include Arogos skipper)

**Wisconsin Natural Heritage Inventory** (<http://www.dnr.state.wi.us/org/land/er/nhi/index.htm>)

Working list available online

Arogos is on list for species not actively tracked, but for data are collected

*Atrytone arogos iowa* (Iowa Skipper) G3G4T3T4 SNA

**Wyoming Natural Diversity Database** (<http://uwadmnweb.uwyo.edu/WYNDD/>)

The Wyoming Natural Diversity Program does not track invertebrates at this time

## Authorship

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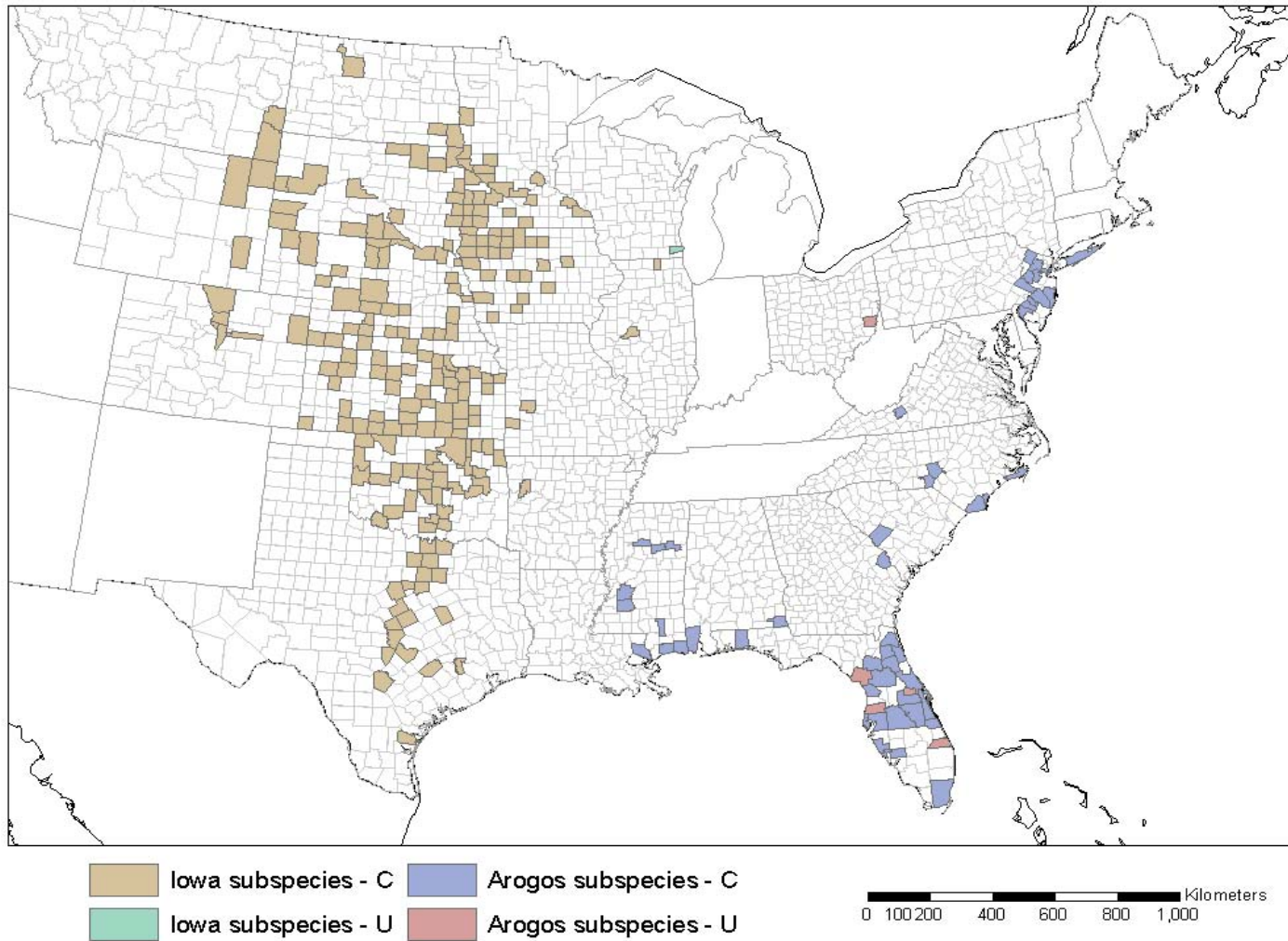
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Prepared: 31 January 2005 (draft)



**Figure 1.** Adapted from the Arogos skipper (*Atrytone arogos*) distribution map developed by Opler, PA. et al. [1995. *Butterflies of North America*. Jamestown, ND: Northern Prairie Wildlife Research Center (<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/usa/450.htm>)], with updates based on references cited in this document.