

CANDIDATE ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Sistrurus catenatus catenatus*

COMMON NAME: Eastern massasauga

LEAD REGION: Region 3

INFORMATION CURRENT AS OF: January 2003

STATUS/ACTION (Check all that apply):

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: _____

90-day positive - FR date: _____

12-month warranted but precluded - FR date: _____

Is the petition requesting a reclassification of a listed species?

Listing priority change

Former LP: _____

New LP: _____

Latest Date species first became a Candidate: October 25 1999

Candidate removal: Former LP: _____ (Check only one reason)

A - Taxon more abundant or widespread than previously believed or not subject to a degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

F - Range is no longer a U.S. territory.

M - Taxon mistakenly included in past notice of review.

N - Taxon may not meet the Act's definition of *A*species.@

X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Reptiles

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Wisconsin, and Ontario

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:

Illinois - Clinton, Cook, Fayette, Knox, Lake, Madison, Piatt, Warren, and Will counties.

Indiana - Allen, Carroll, Elkhart, Fulton, Kosciuscko, Lagrange, LaPorte, Marshall, Noble, Porter, Pulaski, St. Joseph, Steuben, and Tippecanoe counties

Iowa - Black Hawk, Bremer, Buchanan, Chickasaw, Clinton, Louisa, Muscatine, Pottawattamie, and Scott counties

Michigan - Alcona, Allegan, Alpena, Arenac, Barry, Berrien, Calhoun, Cass, Cheboygan,

Clinton, Crawford, Eaton, Genesee, Grand Traverse, Hillsdale, Iosco, Jackson, Kalamazoo, Kalkaska, Kent, Lapeer, Lake, Lenawee, Livingston, Mackinac, Macomb, Manistee, Mason, Midland, Missaukee, Montcalm, Muskegon, Newaygo, Oakland, Presque Isle, Roscommon, Saginaw, St. Joseph, Van Buren, Washtenaw, and Wayne counties

Minnesota - Goodhue, Houston, Wabasha, and Winona counties

Missouri - Chariton, Holt, Linn, and Livingston counties

New York - Genesee and Onondago counties

Ohio - Ashtabula, Champaign, Clark, Erie, Fairfield, Greene, Licking, Montgomery, Trumbull, Warren, Wayne, and Wyandot counties

Ontario - Bruce, Essex, Grey, Manitoulin, Middlesex, Muskoka, Niagara, Parry Sound, Simcoe, and Sudbury districts

Pennsylvania - Butler, Mercer, and Venango counties

Wisconsin - Buffalo, Chippewa, Columbia, Crawford, Jackson, Juneau, LaCrosse, Monroe, Pepin, Rock, Trempealeau, Walworth, and Wood counties

LEAD REGION CONTACT: Jennifer Szymanski 612/713-5342

LEAD FIELD OFFICE CONTACT: Bloomington, IN Field Office, Andy King, 812/334-4261 x216

BIOLOGICAL INFORMATION (Describe habitat, historic vs. current range, historic vs. current population estimates (# populations, #individuals/population), etc.):

See 1998 Status Assessment for further information (available on the Web at: <http://midwest.fws.gov/endangered/reptiles/mass.pdf>)

Habitat

S. c. catenatus occupies shallow wetlands and adjacent upland habitat. Suitable wetland habitat includes peatlands, marshes, sedge meadows, and swamp forest; typical upland habitat includes open savannas, prairies, and old fields. Seasonal use of these habitats varies across the range of the subspecies.

Historic vs. Current Range

Although the current range of *S. c. catenatus* resembles the subspecies= historical range, the geographic distribution has been restricted by the loss of the subspecies from much of the area within the boundaries of that range. Approximately 40 percent of the counties that were

historically occupied by *S. c. catenatus* no longer support the subspecies. *S. c. catenatus* is currently considered imperiled in every state and province it occupies. Recent information indicates that *S. c. catenatus*= range extends throughout all of Missouri and likely Iowa, too. This is evidence that the previously published accounts of the subspecies= range, which identified an intergradation zone in Missouri and Iowa, are not accurate.

Population Estimates

Complete demographic information is not available across the range of the subspecies; however, information regarding the historical and current number of populations, recruitment potential, distribution and proximity of subpopulations, and quantity and quality of habitat provide indices of the subspecies= long-term viability. Each state and Canadian province across the range of *S. c. catenatus* has lost more than 30 percent, and for the majority more than 50 percent, of their historical populations. Furthermore, less than 35 percent of the remaining populations are considered secure.

THREATS (Describe threats in terms of the five factors in section 4 of the ESA providing specific, substantive information. If this is a removal of a species from candidate status or a change in listing priority, explain reasons for change):

See 1998 Status Assessment for further information

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

Habitat loss is an important factor in the decline of *S. c. catenatus*. The effects of past, widespread wetland loss continue to impact *S. c. catenatus* populations. Development and agriculture practices continue to perpetuate habitat loss, although to a lesser degree than in the past. Habitat loss increases the distance between populations and can isolate seasonally used habitats within individual populations. Consequently, *S. c. catenatus* populations become more susceptible to road mortality, predation, and persecution as snakes disperse from populations or make their seasonal movements between habitat types.

Destruction or modification of habitat is affecting at least 50 populations rangewide. A few examples are as follows. In Illinois, the Des Plaines River Valley population continues to be fragmented into smaller subpopulations isolated by development or otherwise unsuitable habitat (Mierzwa 1993). In Michigan, a major residential development, at the Green/Union Lakes site in Oakland County, Michigan, recently eliminated much of the existing habitat and severely degraded the remaining habitat (Legge 1996). At Wixom, Michigan, both wetland and upland habitat were recently degraded by agricultural practices and highway construction (Legge 1996). Similarly, in Bremer County, Iowa, a golf course is encroaching upon massasauga habitat (Christiansen 1993). In Wisconsin, cranberry operations are potential threats to massasauga populations (Cathy Carnes, U.S. Fish and Wildlife Service, in litt. 1997). In Pennsylvania, four companies within the last year have applied for sand and gravel mining permits in areas supporting massasauga populations (Andrew Shiels, Pennsylvania Fish & Boat Commission, in

litt. 1997). One of Ohio=s largest populations (Killdeer Plains) was bulldozed and plowed under in 1994.

In addition, urban encroachment has disrupted the natural disturbance processes (such as hydrological cycles and fire frequency), and subsequently, changes in habitat structure and vegetative composition have occurred. For example, in Pennsylvania increasing woody vegetation was cited as a threat at 75 percent of the massasauga sites surveyed (Reinert and Bushar 1993).

B. Overutilization for commercial, recreational, scientific, or educational purposes.

The over-harvesting of massasaugas is well documented, and the pernicious effects of past anti-rattlesnake campaigns are still visible today. Several populations have been harvested beyond a recoverable threshold, and thus, are functionally extinct. Intentional killing and illegal collection continue. Recent law enforcement actions involving individuals from several states revealed the immediacy and magnitude of this threat. An Indiana Department of Natural Resources law enforcement investigation in 1998 uncovered a well-organized, multi-state effort to launder State-protected reptile species (including eastern massasauga). The investigation concluded with the indictment of 40 defendants.

C. Disease or predation.

Predation under natural conditions is not a notable threat for *S. c. catenatus*. However, due to habitat loss as described under Factor A, *S. c. catenatus* populations are extremely vulnerable to predators and as a result they experience abnormally high predation rates. Further, the biology of the species makes the female cohort most susceptible, which exacerbates the impacts of predation.

D. The inadequacy of existing regulatory mechanisms.

S. c. catenatus is listed as endangered in Illinois, Indiana, Iowa, Minnesota, Missouri, New York, Ohio, Pennsylvania, and Wisconsin; as threatened in Ontario; and as special concern in Michigan. Although the species is afforded some level of state protection across the range of the subspecies, protection of its habitat is nearly nonexistent. Given the significance and pervasiveness of habitat loss, the decline of *S. c. catenatus* will continue unabated without additional protections.

E. Other natural or manmade factors affecting its continued existence.

The thermo-regulatory needs of the gravid cohort render female massasaugas most vulnerable to collection and predation. This implies that *S. c. catenatus* populations occurring at low densities are particularly sensitive to collection or predation (i.e., predation/collection of just a few individuals could greatly diminish the population=s reproductive potential). Similarly, a Population Viability Analysis (PVA) indicated that *S. c. catenatus* populations are most sensitive

to adult mortality. Given the species= low biological replacement rate, even small increases in adult mortality can precipitate irreversible declines. These biological traits and the threat factors identified above interact synergistically, which exacerbates the effect of individual factors and can lead to an extinction vortex for those populations affected by one or more factors.

BRIEF SUMMARY OF REASONS FOR REMOVAL OR LISTING PRIORITY CHANGE:

FOR RECYCLED PETITIONS:

- a. Is listing still warranted? ____
- b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? ____
- c. Is a proposal to list the species as threatened or endangered in preparation? ____
- d. If the answer to c. above is no, provide an explanation of why the action is still precluded.

LAND OWNERSHIP (Percentage Federal/state/private, identify non-private owners):

Sistrurus catenatus catenatus, throughout the range of the subspecies, is found on both public and private land (~59% of the populations occur wholly or in part on public land). The majority of public land is State managed, although populations also occur on county and U.S. Army Corps of Engineers lands. Squaw Creek NWR, Swan Lake NWR, Trempealeau NWR, and possibly the LaCrosse District of the Upper Mississippi National Wildlife and Fish Refuge support massasauga populations. Necedah NWR is conducting a study of reintroduction techniques.

PRELISTING (Describe status of conservation agreements or other conservation activities):

Management and monitoring guidelines for *S. c. catenatus* were developed under Region 3 guidance (The eastern Massasauga: Handbook for Land Managers 2000). This handbook was broadly distributed and is being used by public land managers to develop conservation agreements for massasauga. As population data are limited at most sites, these conservation efforts are in the initial stages of information gathering. In Wisconsin, for example, limited resources were dedicated to completing exhaustive surveys at one site. Continued survey efforts are planned at this site and others. Within the next year, we expect to garner status information at several priority sites rangewide and efforts will focus on developing and implementing Candidate Conservation Agreements (CCAs) for these populations. State-wide and/or site-specific CCAs and Candidate Conservation Agreements with Assurances (CCAAs) are being developed in Iowa, Illinois, Michigan, Missouri, Ohio, and Wisconsin. These CCAs will be implemented in 2003-2005.

COORDINATION (Describe coordination with other Regional Offices, Migratory Bird Management, Fisheries, Refuges, other Federal agencies, Native American Tribes, Natural Heritage Programs & other state agencies, foreign governments, private organizations, & private landowners):

Region 3 has coordinated with Region 5, as well as with numerous state & provincial biologists and state endangered species programs throughout the range of the subspecies. See *Sistrurus c. catenatus* Rangewide Status Assessment (1998) for a list of individuals contacted.

REFERENCES (Identify primary sources of information (e.g., status reports, petitions, journal publications, unpublished data from species experts) using formal citation format):

Szymanski, J. 1998. Rangewide Status Assessment. Unpublished report for U.S. Fish and Wildlife Service, Region 3, Fort Snelling, MN.

See literature cited within above referenced rangewide status assessment.

LISTING PRIORITY (place * after number)

Note: Listing Priority Number is unchanged from previous submission and 2002 CNOR.

THREAT

Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9*
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: The magnitude of threats are considered as moderate at this time. About 59% of populations occur wholly or in part on public lands, many of which are currently preparing CCAs. As land managers are becoming better educated, management practices that conflict with massasauga conservation are being addressed.

Imminence: Threats of habitat loss/degradation are still imminent for many remaining populations, particularly to those occurring on private lands.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all additions of species to the candidate list, removal of candidates, and listing priority changes.

Approve: Marvin Moriarty 03/13/2003
Acting Regional Director, Fish and Wildlife Service Date

Concur: _____
Director, Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

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Date of annual review: 01/06/03

Conducted by: Jennifer Szymanski

Comments:

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