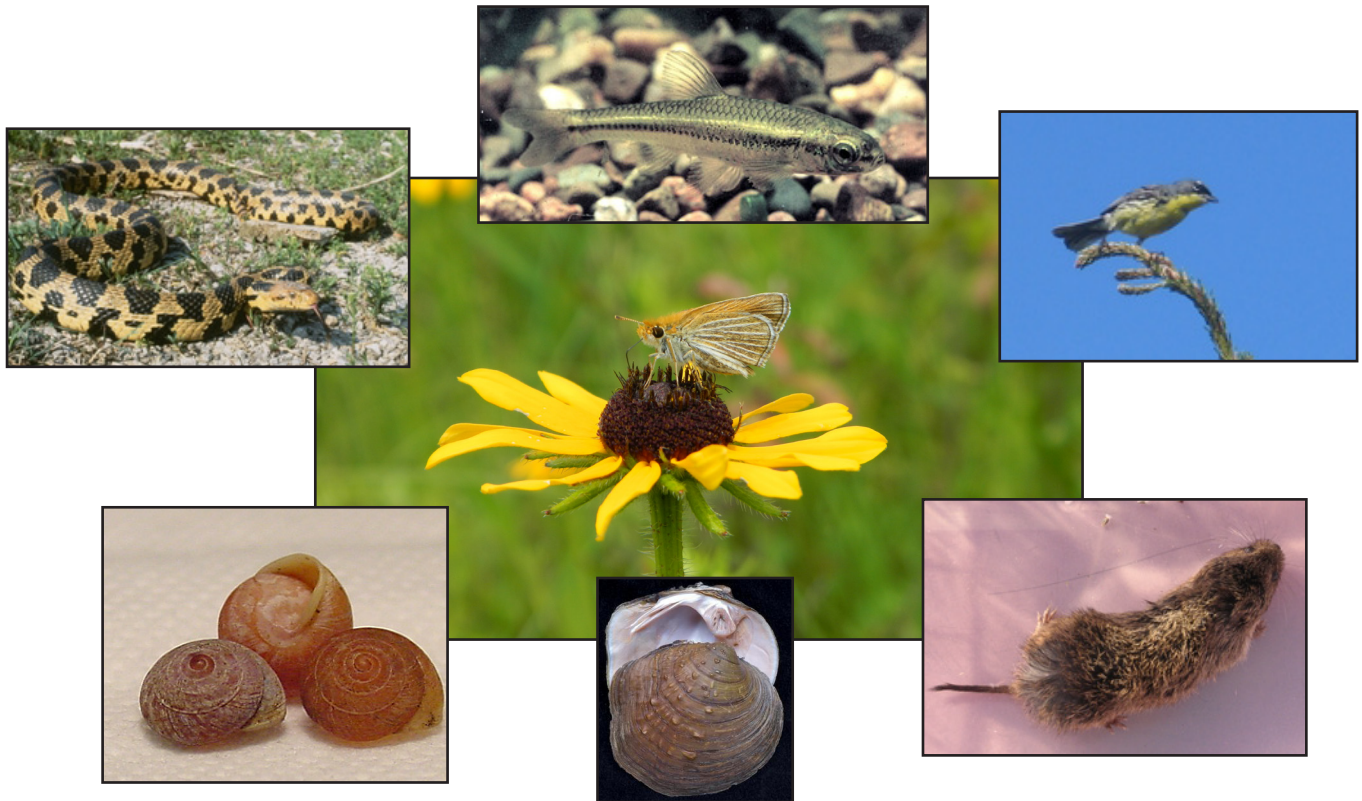


# Conservation Status Assessments of Michigan's Species of Greatest Conservation Need



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## Introduction

NatureServe and its member programs use a suite of factors to assess the extinction or extirpation (regional extinction) risk of plants, animals, and ecosystems. By researching and recording information on a set of conservation status factors, biologists assign Conservation Status Ranks to these elements at both global (G-rank) and state/provincial scales (S-rank). The current protocol for assigning conservation status ranks is based on scoring ten conservation status factors, which are grouped into three categories: rarity (six factors), trends (two factors), and threats (two factors). Ratings within this protocol have been standardized with International Union for the Conservation of Nature (IUCN) assessment methodology to facilitate the sharing of information among organizations and countries. The conservation status factors that comprise each category help guide the assessment process to be consistent and objective, as well as document the rationale for assigned Conservation State Ranks.

It has been over a decade since any of the animal groups in Michigan have been thoroughly and systematically evaluated in terms of their conservation status. Some of the animals that were listed in the Wildlife Action Plan may have made their way onto the Species of Greatest Conservation Need list because they did not have status ranks, or their ranks were outdated. Over the last several years Michigan Natural Features Inventory (MNFI) has acquired new information on the distribution and status of many animal species through MNFI field surveys as well as outside data sources including other experts and museum records. Occurrences of newly discovered species in the state have been documented in addition to many new occurrences.

In 2013 and 2014, MNFI assessed the Conservation Status Ranks (S-ranks) of Michigan's 404 Species of Greatest Conservation Need (SGCN). The results of this assessment can help inform the Wildlife Action Plan revision, especially in determining which species should be included on the updated list of SGCN and providing documented rationale for those decisions. Additionally, the information gathered on rarity, trends, and threats, is being used by the Technical Advisory Committees in Michigan Department of Natural Resources' review of Michigan's Threatened and Endangered species list. This will be a valuable source of information in determining if these species should be recommended for state endangered or threatened listing, or be considered species of special concern. The newly assigned S-ranks will be available to conservation partners and the public through the rare species explorer on MNFI's website.

## Methods

We calculated conservation status ranks (S-ranks) for all 404 animals on the State of Michigan Species of Greatest Conservation Need list (Eagle et al. 2005). Four additional species were assigned S-ranks because they have emerging conservation concerns or were only recently discovered in the state. Two unionid mussel species were assessed in addition to the 28 mussel SGCN due to their rarity and threats (Deertoe, *Truncilla truncata* and Paper pondshell, *Utterbackia imbecillis*). The Little Brown bat (*Myotis lucifugus*) was assessed due to the emerging threat of White-Nose Syndrome. The Piglet bug (*Fitchiella robinsoni*) was only recently discovered in Michigan during 2011 surveys and is a globally rare grassland species.

The S-ranks were calculated using NatureServe's Element Rank Calculator, version 3.1 (NatureServe 2012). The rank calculator is a spreadsheet into which the biologist inputs information on rarity, trends, and threats, each of which has several additional subcategories (e.g., range extent, area of occupancy, population size, number of occurrences, short and long term trends and overall threat impacts). The calculator then performs a series of algorithms based on pre-defined or user-defined parameter weights to generate an S-rank. The calculator was built to accommodate missing data and to accept a great deal of uncertainty, which is important when assessing groups such as invertebrates that may have low survey effort and/or a shortage of occurrence data historically. The strengths of the calculator are that it standardizes the assessment process, is easily replicated, and records all the assessment fields (including author and date) so one can quickly review or revise fields as additional information becomes available. For a more detailed look at the process and metrics please refer to Master et al. (2012) and Faber-Langendoen et al. (2012).

We used the MNFI Biotics data base as the "foundation" for assessing S-ranks, especially in estimating species range and number of populations. For some groups, additional data bases or data sets were examined to fill in data gaps. This was especially true of species that are not tracked in the database (i.e. not endangered, threatened, or special concern). These supplemental data sources are listed in the Data Sources section of this report. For many species vulnerability to climate change was considered when assessing threats. Climate Change Vulnerability Index scores for each species (Hoving et al. 2013) were used to help quantify and score that threat sub-factor.

### Subnational Conservation Status Ranks (S-ranks) and Definitions

Conservation Status Ranks for species known to occur in the state range from S1 to S5, with S5 being the most

secure and S1 being the most at-risk of extirpation. To denote some uncertainty about an S-rank, a “?” is added (e.g., S3?). When uncertainty is great enough to span multiple ranks, a range rank is used (e.g., S2S3). Special ranks apply to species that are known only from historic occurrences (SH) or are thought to be extirpated from the state (SX).

Species that cannot be ranked, due to lack of, or conflicting information are considered unrankable (SU). Those that have not yet had their conservation status rank assessed are designated by SNR. Occasionally a species is not considered a suitable target for conservation efforts, even though it occurs in the state. Examples of unrankable species are long-distance migrants that are transitory and occur in an irregular and dispersed manner (e.g., some birds, bats, and butterflies). These are considered not applicable (SNA) to the conservation status rank process.

Parallel rankings exist at the national (N-rank) and global (G-rank) levels. These larger geographic scale rankings are typically assessed by NatureServe staff. Conservation Status Ranks are comparable to those used by IUCN and COSWIC See Table 1. from Master et al. (2012). See below for detailed definitions of each state level Conservation Status Rank, or S-rank.

**S1 - Critically Imperiled:** At very high risk of extirpation in the state due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

**S2 - Imperiled:** At high risk of extirpation in the state due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

**S3 - Vulnerable:** At moderate risk of extirpation in the state due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

**S4 - Apparently Secure:** At a fairly low risk of extirpation in the state due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

**S5 - Secure:** At very low or no risk of extirpation in the state due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

**S#S# - Range Rank:** A numeric range rank (e.g., S2S3 or S1S3) is used to indicate any range of uncertainty about the status of the species or ecosystem. Ranges cannot skip more than two ranks (e.g., SU is used rather than S1S4).

**S#? - Inexact Numeric Rank—**Denotes inexact numeric rank; this should not be used with any of the Variant Subnational Conservation Status Ranks, or SX or SH.

**SX - Presumed Extirpated:** Species or ecosystem is believed to be extirpated from the state. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered. [Equivalent to “Regionally Extinct” in IUCN Red List terminology]

**SH - Possibly Extirpated:** Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the state, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the state.

**SU - Unrankable:** Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

**SNR - Unranked:** State level conservation status not yet assessed.

**SNA - Not Applicable:** A Conservation Status Rank is not applicable because the species or ecosystem is not a suitable target for conservation activities.

## Results

Of the 408 species assigned S-ranks in this project, 71 were considered SNR previously, i.e., had not been assessed at the state level. As a result of this project, no SGCN are currently considered SNR (Table 2). The number of SGCN that were unrankable (SU) previously was 16. Eight of these have now been assessed and assigned S-ranks. This is due in most part to an increase in availability of documented occurrence data and survey effort since they were previously assessed. The remaining species considered SU cannot yet be accurately assessed and ranked due to a lack of occurrence data/survey effort.

Eight species were determined to not be suitable targets for conservation activities and assigned a rank of SNA. Five of these are long distance migrant birds, where it is not possible to identify discrete areas to manage for conservation and the risk of extinction is dependent on conservation of their primary habitats and breeding grounds (American white pelican, Chuck-will’s-widow, Kentucky warbler, northern shrike, and worm-eating warbler). The remaining

three are insects. Two of which have questionable taxonomic status (the mayfly *Epeorus suffusus*, and the caddisfly *Rhyacophila sp.*), and one, which was misidentified and does not actually occur in Michigan (spinyleg willowfly, *Taeniopteryx maura*) (Grubbs et al. 2012). Based on this information, we suggest these three species be removed from the SGCN list. Overall, the number of S1 and S2 species generally increased in all taxa groups except birds and insects, where there was a slight reduction (Table 3).

We recommend that conservation status assessments (S-ranks) of SGCN be reviewed at minimum, approximately one year before each review of Michigan's state threatened and endangered species list. The information gathered and resulting S-ranks help to provide the Technical Advisory Committees with needed information on rarity, threats, and trends. In addition, the conservation status rank for any given species, including non-SGCN should be reviewed and revised whenever a substantial amount of occurrence data/survey effort becomes available, especially for S1, S2, SH, or SU species. Many native Michigan species not currently considered SGCN (especially insects and mollusks that are not state listed and have not been tracked in the Natural Heritage Database) have not been ranked and are in need of conservation status assessments.

#### Survey Effort

A number of species that are currently known from relatively few occurrences may turn out to be more abundant than previously thought if a targeted survey effort is made. Most insects known only from historical records (SH) have had very little survey effort targeting them. Tamarack tree cricket, *Oecanthus laricis*, is an example of one species that was once known from only a few occurrences in the state, but whose known range has been greatly expanded with recent surveys (Cuthrell and Kost 2001). As a result its S-rank has changed from S1S2 to S3.

Gastropods as a group are in great need of survey effort. Aside from the recent surveys of Nekola (1998, 2003) sampling terrestrial species in the Niagara escarpment of the UP and far northern LP, few documented surveys exist. Many occurrences recorded by Burch (1982), Burch and Jung (1988 and 1992), Goodrich (1932), Pilsbry (1939-1948), and Berry (1943) have not been resurveyed since they were first documented. Historical (SH) ranks for insect and gastropod species can be a reflection of a lack of survey effort as much as true rarity in the state. Crayfish as a group have seen very little documented survey effort since Lippson's statewide effort described in a Ph.D dissertation in 1975, and even in that study the methods used under sampled burrowing species.

Eastern elliptio (*Elliptio complanata*) is a unionid mussel that is fairly common along the east coast of the U.S. and eastern Great Lakes. It is thought to be secure (S5) in several states, however it has been documented in relatively few sites in Michigan. It only occurs in the UP where relatively little survey effort has been spent. Targeted surveys might reveal it to be more common than currently thought. Some unionid mussel species can be difficult to detect due to their small size. Targeted surveys for these species may reveal previously unknown populations: rayed bean (*Villosa fabalis*), salamander mussel (*Simpsonaias ambigua*), lilliput (*Toxolasma parvus*), purple lilliput (*Toxolasma lividus*), fawnsfoot (*Truncilla donaciformis*), and slippershell (*Alasmidonta viridis*). In addition, salamander mussel is most often found in specialized habitats (under large flat rocks with co-occurring mudpuppy populations) and slippershell can be found in far headwater habitats where few mussel surveys have typically taken place.

The following herp species have received low survey effort in the past and could be more common than currently thought if targeted surveys are conducted: Queen Snake (*Regina septemvittata*), Kirtland's Snake (*Clonophis kirtlandii*), Gray Ratsnake (*Pantherophis spiloides*), Northern Ring-necked Snake (*Diadophis punctatus edwardsii*), and Smooth Green Snake (*Opheodrys / Liochlorophis vernalis*). In addition, Western Lesser Siren (*Siren intermedia nettingi*) and Marbled Salamander (*Ambystoma opacum*) have not been documented/confirmed in the state since the 1980's. Targeted surveys are needed to determine if these species still occur in the state and evaluate their status. Some surveys have been conducted for the following herp species, but additional targeted surveys are needed to give us better information to determine their status in the state and assess their abundance and distribution: Six-lined Racerunner (*Aspidoscelis sexlineata*), Smallmouth Salamander (*Ambystoma texanum*), Boreal Chorus Frog (*Pseudacris triseriata maculata*), Eastern Foxsnake (*Pantherophis gloydi*), Copperbelly Watersnake (*Nerodia erythrogaster neglecta*), and Mudpuppy (*Necturus maculosus*).

Prairie vole (*Microtus ochrogaster*) has probably expanded over the last decade or two, and may be found to be more common than currently thought if targeted surveys are performed. Additional surveys for smoky shrew (*Sorex fumeus*) are currently underway, which could lead to this species being more secure in Michigan than currently documented.

See Appendix for the full list of all 408 species assessed. Spreadsheets with detailed assessments of each species, including scores for each factor relating to rarity, threats, and trends, and comments on ranking factors, are available electronically.

Table 1. A comparison of NatureServe’s national/subnational status ranks with those of the International Union for Conservation of Nature (IUCN) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

NatureServe National/Subnational Status	IUCN Regional Red List Status	COSEWIC Status <sup>1</sup>
Presumed Extirpated (NX/SX and GX)	Extinct (EX)	Extinct (X)
Presumed Extirpated (NX/SX and not GX)	Regionally Extinct (RE)	Extirpated (XT)
Possibly Extirpated (NH/SH)	Critically Endangered (CR) (possibly extinct)	Endangered (EN)
Critically Imperiled (N1/S1)	Critically Endangered (CR)	Endangered (EN)
Critically Imperiled (N1/S1)	Endangered (EN)	Endangered (EN)
Imperiled (N2/S2)	Vulnerable (VU)	Threatened (T)
Vulnerable (N3/S3)	Near Threatened (NT)	Special Concern (SC)
Apparently Secure (N4/S4)	Least Concern (LC)	Not At Risk (NAR)
Secure (N5/S5)	Least Concern (LC)	Not At Risk (NAR)
Unrankable (NU/SU)	Data Deficient (DD)	Data Deficient (DD)

<sup>1</sup> COSEWIC status (aside from Extinct) applies only within Canada, and thus, is equivalent to the national rankings of NatureServe or the regional IUCN Red List status.

Table 2. The numbers of species in each S-rank before and after Conservation Status Assessment. The total number of species assessed in each taxa group are given in the last row.

	Crayfish		Fish		Gastropods		Unionid Mussels	
	Previous	New	Previous	New	Previous	New	Previous	New
	S-ranks	S-ranks	S-ranks	S-ranks	S-ranks	S-ranks	S-ranks	S-ranks
S1			9	14	8	12	8	11
S1S2			4	3		2		2
S1S3								
S2			4	9	5	6	1	5
S2S3			3	7		2	7	3
S3			8	8	4	2		7
S3S4						1		
S4	1	2	8	1				
S4S5	1							
S5			8					
SH				2	2	9	1	1
SX					1	1		1
SU					13	2	1	
SNR					4		12	
SNA								
Total		2		44		37		30

Table 2. Cont.

	Herps		Birds		Insects		Mammals	
	Previous	New	Previous	New	Previous	New	Previous	New
	S-ranks	S-ranks	S-ranks	S-ranks	S-ranks	S-ranks	S-ranks	S-ranks
S1	5	6	10	3	10	17	4	7
S1S2			3		39	11	1	1
S1S3					9	10		
S2	2	3	9	15	2	11	1	1
S2S3	3	5	5		25	30		
S3	2	2	11	35	2	20	2	2
S3S4	3	7	9	1	2	9	2	4
S4	1	5	16	29	2	2	2	4
S4S5								1
S5	10	1	24	9	3		12	7
SH	1	1			5	20		
SX				1		1		
SU	1				1	5		1
SNR	2		11		39		3	
SNA				5		3	1	
<b>Total</b>		<b>30</b>		<b>98</b>		<b>139</b>		<b>28</b>



Tables 3a-g. Species assessed as critically imperiled (S1), imperiled (S2), or possibly extirpated (SH) for each taxa group. The range rank of S1S2 is also included. Neither crayfish Species of Greatest Conservation Need are S1, S2, or SH. (<sup>1</sup> Federally listed species; red = status changed to less secure; green = status changed to more secure)

Table 3a. Fish assessed as S1, S2, or SH.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S1		S1	<i>Coregonus hubbsi</i>	Ives lake cisco
S1S2	E	<b>S1</b>	<i>Erimyzon claviformis</i>	Creek chubsucker
S4		<b>S1</b>	<i>Etheostoma flabellare lineolatum</i>	Fantail Darter (Striped)
S3		<b>S1</b>	<i>Etheostoma spectabile</i>	Orangethroat darter
S1		S1	<i>Etheostoma zonale</i>	Banded darter
S2	SC	<b>S1</b>	<i>Fundulus dispar</i>	Starhead topminnow
S2	T	<b>S1</b>	<i>Hiodon tergisus</i>	Mooneye
S2S3	SC	<b>S1</b>	<i>Macrhybopsis storeriana</i>	Silver chub
S1	E	S1	<i>Notropis photogenis</i>	Silver shiner
S1	E	S1	<i>Noturus stigmosus</i>	Northern madtom
S1	E	S1	<i>Opsopoeodus emiliae</i>	Pugnose minnow
S1S2	E	<b>S1</b>	<i>Percina copelandi</i>	Channel darter
S1	E	S1	<i>Percina shumardi</i>	River darter
S1	T	S1	<i>Sander canadensis</i>	Sauger
S1S2	T	S1S2	<i>Ammocrypta pellucida</i>	Eastern sand darter
S3	SC	<b>S1S2</b>	<i>Cottus ricei</i>	Spoonhead sculpin
S3	E	<b>S1S2</b>	<i>Notropis anogenus</i>	Pugnose shiner
S2	T	S2	<i>Acipenser fulvescens</i>	Lake sturgeon
S1S2	E	<b>S2</b>	<i>Clinostomus elongatus</i>	Redside dace
S2	T	S2	<i>Coregonus zenithicus</i>	Shortjaw cisco
S3		<b>S2</b>	<i>Minytrema melanops</i>	Spotted Sucker
S1	T	<b>S2</b>	<i>Moxostoma carinatum</i>	River redhorse
S3		<b>S2</b>	<i>Moxostoma duquesnei</i>	Black Redhorse
S4	SC	<b>S2</b>	<i>Notropis dorsalis</i>	Bigmouth shiner
S2S3	SC	<b>S2</b>	<i>Noturus miurus</i>	Brindled madtom
S5		<b>S2</b>	<i>Phoxinus neogaeus</i>	Finescale Dace
S1	E	<b>SH</b>	<i>Phoxinus erythrogaster</i> (now Chrosomus)	Southern redbelly dace
S4		<b>SH</b>	<i>Prosopium coulteri</i>	Pygmy Whitefish

Table 3b. Gastropods assessed as S1, S2, or SH.

<b>State Rank (2012)</b>	<b>Current State Status</b>	<b>New Assigned Rank (2014)</b>	<b>Scientific Name</b>	<b>Common Name</b>
SU	SC	S1	<i>Anguispira kochi</i>	Banded globe
SU	SC	S1	<i>Appalachina sayanus</i>	Spike-lip crater
SU	T	S1	<i>Catinella exile</i>	Pleistocene catinella
S1	E	S1	<i>Gastrocopta holzingeri</i>	Lambda snaggletooth
S1	E	S1	<i>Guppya sterkii</i>	Sterki's granule
S1	T	S1	<i>Hendersonia occulta</i>	Cherrystone drop
SU	SC	S1	<i>Mesomphix cupreus</i>	Copper button
SNR	T	S1	<i>Pallifera fosteri</i>	Foster mantleslug
S1	E	S1	<i>Vertigo modesta modesta</i>	A land snail (no common name)
S1	E	S1	<i>Vertigo modesta parietalis</i>	A land snail (no common name)
S2	E	<b>S1?</b>	<i>Vertigo morsei</i>	Six-whorl vertigo
S1	E	S1?	<i>Vertigo nylanderi</i>	Deep-throat vertigo
SU	SC	S1S2	<i>Discus patulus</i>	Domed disc
SU	SC	S1S2	<i>Vertigo pygmaea</i>	Crested vertigo
S2	T	S2	<i>Euconulus alderi</i>	A land snail (no common name)
SU	SC	S2	<i>Philomycus carolinianus</i>	Carolina mantleslug
SU	SC	S2	<i>Pupilla muscorum</i>	Widespread column
S1	E	<b>S2</b>	<i>Vallonia gracilicosta albula</i>	A land snail (no common name)
S2	T	S2	<i>Vertigo bollesiana</i>	Delicate vertigo
S2	E	S2	<i>Vertigo hubrichti</i>	Hubricht's vertigo
S3	SC	<b>SH</b>	<i>Acella haldemani</i>	Spindle lymnaea
SH	SC	SH	<i>Birgella subglobosus</i>	Globe siltsnail
SU	T	SH	<i>Mesodon elevatus</i>	Proud globe
S2	E	<b>SH</b>	<i>Planorbella smithi</i>	An aquatic snail (no common name)
SU	SC	SH	<i>Pomatiopsis cincinnatiensis</i>	Brown walker
SU	SC	SH	<i>Pyrgulopsis letsoni</i>	Gravel pyrg
S1	E	<b>SH</b>	<i>Stagnicola contracta</i>	Deepwater pondsnail
SH	E	SH	<i>Stagnicola petoskeyensis</i>	Petoskey pondsnail
SU	SC	SH	<i>Xolotrema denotata</i>	Velvet wedge

Table 3c. Unionid mussels assessed as S1, S2, or SH.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S1	E	S1	<i>Epioblasma torulosa rangiana</i> <sup>1</sup>	Northern riffleshell <sup>1</sup>
SNR	E	S1	<i>Obliquaria reflexa</i>	Threehorn wartyback
S2S3	E	<b>S1</b>	<i>Obovaria olivaria</i>	Hickorynut
S1	E	S1	<i>Obovaria subrotunda</i>	Round hickorynut
S1	<b>E</b>	S1	<i>Pleurobema clava</i> <sup>1</sup>	Clubshell <sup>1</sup>
S1	T	S1	<i>Pyganodon subgibbosa</i>	Round lake floater
S1	E	S1	<i>Simpsonaias ambigua</i>	Salamander mussel
S1	E	S1	<i>Toxolasma lividus</i>	Purple lilliput
SNR	E	S1	<i>Toxolasma parvus</i>	Lilliput
SNR	T	S1	<i>Truncilla donaciformis</i>	Fawnsfoot
SNR	E	S1?	<i>Ligumia recta</i>	Black sandshell
S1	E	<b>S1S2</b>	<i>Epioblasma triquetra</i> <sup>1</sup>	Snuffbox <sup>1</sup>
S1	E	<b>S1S2</b>	<i>Villosa fabalis</i> <sup>1</sup>	Rayed bean <sup>1</sup>
S2S3	T	<b>S2</b>	<i>Cyclonaias tuberculata</i>	Purple wartyback
SNR		S2	<i>Elliptio complanata</i>	Eastern Elliptio
S2	T	S2	<i>Lampsilis fasciola</i>	Wavy-rayed lampmussel
SNR	E	S2	<i>Ligumia nasuta</i>	Eastern pondmussel
SNR	SC	S2	<i>Ptychobranhus fasciolaris</i>	Kidney shell
SH	E	SH	<i>Epioblasma obliquata perobliqua</i> <sup>1</sup>	White catspaw <sup>1</sup>

Table 3d. Herps assessed as S1, S2, or SH.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S1	E	S1	<i>Ambystoma opacum</i>	Marbled salamander
S1	E	S1	<i>Ambystoma texanum</i>	Smallmouth salamander
SU	T	S1	<i>Aspidoscelis sexlineata</i>	Six-lined racerunner
S1	E	S1	<i>Clonophis kirtlandii</i>	Kirtland's snake
S1	E	S1	<i>Nerodia erythrogaster neglecta</i> <sup>1</sup>	Copperbelly water snake <sup>1</sup>
S1	SC	S1	<i>Pseudacris triseriata maculata</i>	Boreal chorus frog
S2	T	S2	<i>Clemmys guttata</i>	Spotted turtle
S2S3	SC	<b>S2</b>	<i>Glyptemys insculpta</i>	Wood turtle
S2	T	S2	<i>Pantherophis gloydi</i>	Eastern fox snake
SH		SH	<i>Siren intermedia nettingi</i>	Western lesser siren

Table 3e. Birds assessed as S1, S2, or SH.

<b>State Rank (2012)</b>	<b>Current State Status</b>	<b>New Assigned Rank (2014)</b>	<b>Scientific Name</b>	<b>Common Name</b>
S1	E	S1	<i>Asio flammeus</i>	Short-eared owl
S2	T	S1	<i>Asio otus</i>	Long-eared owl
S1	E	S1	<i>Lanius ludovicianus migrans</i>	Migrant loggerhead shrike
S1	E	S2	<i>Charadrius melodus</i> <sup>1</sup>	Piping plover <sup>1</sup>
S3	SC	S2	<i>Chlidonias niger</i>	Black tern
S5		S2	<i>Coccothraustes vespertinus</i>	Evening Grosbeak
S4		S2	<i>Colinus virginianus</i>	Northern Bobwhite
S1S2	T	S2	<i>Coturnicops noveboracensis</i>	Yellow rail
S2S3	SC	S2	<i>Falcapennis canadensis</i>	Spruce grouse
SNR		S2	<i>Icteria virens</i>	Yellow-breasted Chat
S2	SC	S2	<i>Picoides arcticus</i>	Black-backed woodpecker
S3S4		S2	<i>Poecile hudsonica</i>	Boreal Chickadee
S1	E	S2	<i>Rallus elegans</i>	King rail
S2S3	T	S2	<i>Seiurus motacilla</i>	Louisiana waterthrush
S2	T	S2	<i>Sterna caspia</i>	Caspian tern
S2	T	S2	<i>Sterna forsteri</i>	Forster's tern
S2	T	S2	<i>Sterna hirundo</i>	Common tern
S4	SC	S2	<i>Sturnella neglecta</i>	Western meadowlark

Table 3f. Insects assessed as S1, S2, or SH.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S1	E	S1	<i>Brychius hungerfordi</i> <sup>1</sup>	Hungerford's crawling water beetle <sup>1</sup>
S1S2	SC	<b>S1</b>	<i>Calephelis mutica</i>	Swamp metalmark
S1	E	S1	<i>Catocala amestris</i>	Three-staff underwing
S1	T	S1	<i>Flexamia huroni</i>	Huron River leafhopper
S1	SC	S1	<i>Flexamia reflexus</i>	Leafhopper
S1S2	T	<b>S1</b>	<i>Hesperia ottoe</i>	Ottoe skipper
S1	E	S1	<i>Neonympha mitchellii mitchellii</i>	Mitchell's satyr
S1S2	T	<b>S1</b>	<i>Oarisma poweshiek</i>	Poweshiek skipperling
S1	T	S1	<i>Ophiogomphus howei</i>	Pygmy snaketail
SH	SC	<b>S1</b>	<i>Papaipema aweme</i>	Aweme borer
S1S2	T	<b>S1</b>	<i>Papaipema silphii</i>	Silphium borer moth
S1S2	SC	<b>S1</b>	<i>Schinia indiana</i>	Phlox moth
S1	E	S1	<i>Schinia lucens</i>	Leadplant moth
SNR		S1	<i>Siphloplecton basale</i>	A Mayfly
S1S2	SC	<b>S1</b>	<i>Stylurus plagiatus</i>	Russet-tipped clubtail
S1S3	T	<b>S1</b>	<i>Tachopteryx thoreyi</i>	Grey petaltail
			<i>Arcynopteryx compacta</i> now = <i>A. dichroa</i>	
SNR		S1S2	<i>dichroa</i>	Arctic Sprintfly
S1S2	SC	S1S2	<i>Basilodes pepita</i>	Gold moth
S1S2	SC	S1S2	<i>Heterocampa subrotata</i>	Small heterocampa
S1S2	SC	S1S2	<i>Heteropacha rileyana</i>	Riley's lappet moth
SNR		S1S2	<i>Isogenoides doratus</i>	A stonefly
S1S3	SC	<b>S1S2</b>	<i>Neoconocephalus retusus</i>	Conehead grasshopper
SNR		S1S2	<i>Nigronia fasciatus</i>	A Dobsonfly
S2S3	SC	<b>S1S2</b>	<i>Proserpinus flavofasciata</i>	Yellow-banded day-sphinx
S1S2	SC	S1S2	<i>Pyrgus wyandot</i>	Grizzled skipper
S1S2	SC	S1S2	<i>Stylurus notatus</i>	Elusive snaketail
S2S3	SC	<b>S2</b>	<i>Appalachia arcana</i>	Secretive locust
S3S4	SC	<b>S2</b>	<i>Boloria frigga</i>	Frigga fritillary
S1	T	<b>S2</b>	<i>Euphyes dukesi</i>	Dukes' skipper
S2	T	S2	<i>Lycaeides idas nabokovi</i>	Northern blue
S2	T	S2	<i>Lycaeides melissa samuelis</i> <sup>1</sup>	Karner blue <sup>1</sup>
S1S3	SC	S2	<i>Melanoplus flavidus</i>	Blue-legged locust
S1S2	SC	<b>S2</b>	<i>Papaipema beeriana</i>	Blazing star borer
S1S2	SC	<b>S2</b>	<i>Papaipema cerina</i>	Golden borer
S1S2	SC	<b>S2</b>	<i>Papaipema maritima</i>	Maritime sunflower borer
SNR		S2?	<i>Fitchiella robertsonii</i>	Robertson's Flightless Planthopper
SNR		SH	<i>Aeshna subarctica</i>	Muskeg Darner
SNR		SH	<i>Boyeria grafiana</i>	Ocellated Darner
SNR		SH	<i>Brachycentrus fuliginosus</i>	A caddisfly
S2S3	SC	<b>SH</b>	<i>Catocala robinsoni</i>	Robinson's underwing

Table 3f. Cont.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
SH	T	SH	<i>Dryobius sexnotatus</i>	Six-banded longhorn beetle
S2S3	SC	SH	<i>Erora laeta</i>	Early hairstreak
S1S2	SC	SH	<i>Euchloe ausonides</i>	Large marble
S1	SC	SH	<i>Fixsenia favonius ontario</i>	Northern hairstreak
SNR		SH	<i>Habrophlebiodes americana</i>	A mayfly
S1S3	SC	SH	<i>Liodessus cantralli</i>	Cantrall's bog beetle
SH	SC	SH	<i>Lordithon niger</i>	Black lordithon rove beetle
SNR	SC	SH	<i>Neohermes concolor</i>	A fishfly
SH	X	SH	<i>Nicrophorus americanus</i> <sup>1</sup>	American burying beetle <sup>1</sup>
S2S3	SC	SH	<i>Oeneis macounii</i>	Macoun's arctic
S3	SC	SH	<i>Polygonia gracilis</i>	Hoary comma

Table 3g. Mammals assessed as S1, S2, or SH.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
SH	E	S1	<i>Felis concolor</i>	Cougar
S1	E	S1	<i>Lynx canadensis</i> <sup>1</sup>	Lynx <sup>1</sup>
SNR		S1	<i>Myotis lucifugus</i>	Little brown bat
SNR		S1	<i>Myotis septentrionalis</i>	Northern Bat or Northern Myotis
S1	E	S1	<i>Myotis sodalis</i> <sup>1</sup>	Indiana bat <sup>1</sup>
S2	SC	S1	<i>Pipistrellus subflavus</i>	Eastern pipistrelle
S1	T	S1	<i>Sorex fumeus</i>	Smoky shrew
S1S2	T	S1S2	<i>Cryptotis parva</i>	Least shrew
SNA	T	S2	<i>Nycticeius humeralis</i>	Evening bat

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Appendices A-H. Newly assigned Conservation Status Ranks for the 408 species assessed in 2013-2014. Previous ranks (2012) and current state status are also given. Spreadsheets with detailed assessments of each species, including scores for each factor relating to rarity, threats, and trends, and comments on ranking factors, are available electronically. (<sup>1</sup> Federally listed species; red = status changed to less secure; green = status changed to more secure)

Appendix A. Crayfish.

<b>State Rank (2012)</b>	<b>Current State Status</b>	<b>New Assigned Rank (2014)</b>	<b>Scientific Name</b>	<b>Common Name</b>
S4		S4	<i>Cambarus diogenes</i>	Devil Crayfish
S4S5		<b>S4</b>	<i>Fallicambarus fodiens</i>	Digger Crayfish

## Appendix B. Fish.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S2	T	S2	<i>Acipenser fulvescens</i>	Lake sturgeon
S1S2	T	S1S2	<i>Ammocrypta pellucida</i>	Eastern sand darter
S1S2	E	<b>S2</b>	<i>Clinostomus elongatus</i>	Redside dace
S3	T	S3	<i>Coregonus artedi</i>	Lake herring or Cisco
S1		S1	<i>Coregonus hubbsi</i>	Ives lake cisco
S3	SC	<b>S2S3</b>	<i>Coregonus kiyi</i>	Kiyi
S2	T	S2	<i>Coregonus zenithicus</i>	Shortjaw cisco
S3	SC	<b>S1S2</b>	<i>Cottus ricei</i>	Spoonhead sculpin
S1S2	E	<b>S1</b>	<i>Erimyzon claviformis</i>	Creek chubsucker
S4		<b>S2S3</b>	<i>Erimyzon sucetta</i>	Lake Chubsucker
S5		<b>S4</b>	<i>Esox americanus</i>	Grass Pickerel
S4		<b>S3?</b>	<i>Etheostoma flabellare flabellare</i>	Fantail Darter (Banded)
S4		<b>S1</b>	<i>Etheostoma flabellare lineolatum</i>	Fantail Darter (Striped)
S5		<b>S2S3</b>	<i>Etheostoma microperca</i>	Least Darter
S3		<b>S1</b>	<i>Etheostoma spectabile</i>	Orangethroat darter
S1		S1	<i>Etheostoma zonale</i>	Banded darter
S2	SC	<b>S1</b>	<i>Fundulus dispar</i>	Starhead topminnow
S2	T	<b>S1</b>	<i>Hiodon tergisus</i>	Mooneye
S5		<b>S2S3</b>	<i>Hybognathus hankinsoni</i>	Brassy Minnow
S5		<b>S2S3</b>	<i>Ictalurus nebulosus</i>	Brown Bullhead
S3		S3	<i>Ictiobus niger (Introduced)</i>	Black buffalo
S2S3	SC	S2S3	<i>Lepisosteus oculatus</i>	Spotted gar
S2S3	SC	<b>S1</b>	<i>Machyobopsis storeriana</i>	Silver chub
S3		<b>S2</b>	<i>Minytrema melanops</i>	Spotted Sucker
S1	T	<b>S2</b>	<i>Moxostoma carinatum</i>	River redhorse
S3		<b>S2</b>	<i>Moxostoma duquesnei</i>	Black Redhorse
S4		<b>S2S3</b>	<i>Moxostoma erythrurum</i>	Golden Redhorse
S5		<b>S3</b>	<i>Myoxocephalus thompsoni</i>	Deepwater Sculpin
S4		<b>S3</b>	<i>Nocomis micropogon</i>	River Chub
S3	E	<b>S1S2</b>	<i>Notropis anogenus</i>	Pugnose shiner
S5		<b>S3</b>	<i>Notropis chrysocephalus</i>	Striped Shiner
S4	SC	<b>S2</b>	<i>Notropis dorsalis</i>	Bigmouth shiner
S1	E	S1	<i>Notropis photogenis</i>	Silver shiner
S4		<b>S3?</b>	<i>Noturus flavus</i>	Stonecat
S5		<b>S3</b>	<i>Noturus gyrinus</i>	Tadpole Madtom
S2S3	SC	<b>S2</b>	<i>Noturus miurus</i>	Brindled madtom
S1	E	S1	<i>Noturus stigmosus</i>	Northern madtom
S1	E	S1	<i>Opsopoeodus emiliae</i>	Pugnose minnow
S1S2	E	<b>S1</b>	<i>Percina copelandi</i>	Channel darter
S1	E	S1	<i>Percina shumardi</i>	River darter
S1	E	<b>SH</b>	<i>Phoxinus erythrogaster</i> (now Chrosomus)	Southern redbelly dace

Appendix B. Fish cont.

<b>State Rank (2012)</b>	<b>Current State Status</b>	<b>New Assigned Rank (2014)</b>	<b>Scientific Name</b>	<b>Common Name</b>
S5		<b>S2</b>	<i>Phoxinus neogaeus</i>	Finescale Dace
S4		<b>SH</b>	<i>Prosopium coulteri</i>	Pygmy Whitefish
S1	T	S1	<i>Sander canadensis</i>	Sauger

Appendix C. Gastropods.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S3	SC	SH	<i>Acella haldemani</i>	Spindle lymnaea
SU	SC	S1	<i>Anguispira kochi</i>	Banded globe
SU	SC	S1	<i>Appalachina sayanus</i>	Spike-lip crater
SH	SC	SH	<i>Birgella subglobosus</i>	Globe siltsnail
SU	T	S1	<i>Catinella exile</i>	Pleistocene catinella
SNR	SC	S3	<i>Cincinnatia cincinnatiensis</i>	Campeloma spire snail
SU	SC	S1S2	<i>Discus patulus</i>	Domed disc
S2	T	S2	<i>Euconulus alderi</i>	A land snail (no common name)
SU	SC	S2S3	<i>Fontigens nickliniana</i>	Watercress snail
S1	E	S1	<i>Gastrocopta holzingeri</i>	Lambda snaggletooth
S1	E	S1	<i>Guppya sterkii</i>	Sterki's granule
S1	T	S1	<i>Hendersonia occulta</i>	Cherrystone drop
SU	T	SH	<i>Mesodon elevatus</i>	Proud globe
SU	SC	S1	<i>Mesomphix cupreus</i>	Copper button
SNR		SU	<i>Pallifera dorsalis</i>	A land snail (no common name)
SNR	T	S1	<i>Pallifera fosteri</i>	Foster mantleslug
SNR		SU	<i>Pallifera ohioensis</i>	Redfoot mantleslug
SU	SC	S2	<i>Philomycus carolinianus</i>	Carolina mantleslug
S3	SC	S2S3	<i>Planogyra asteriscus</i>	Eastern flat-whorl
SX	E	SX	<i>Planorbella multivolvis</i>	Acorn ramshorn
S2	E	SH	<i>Planorbella smithi</i>	An aquatic snail (no common name)
SU	SC	SH	<i>Pomatiopsis cincinnatiensis</i>	Brown walker
SU	SC	S2	<i>Pupilla muscorum</i>	Widespread column
SU	SC	SH	<i>Pyrgulopsis letsoni</i>	Gravel pyrg
S1	E	SH	<i>Stagnicola contracta</i>	Deepwater pondsnail
SH	E	SH	<i>Stagnicola petoskeyensis</i>	Petoskey pondsnail
S1	E	S2	<i>Vallonia gracilicosta albula</i>	A land snail (no common name)
S2	T	S2	<i>Vertigo bollesiana</i>	Delicate vertigo
S3	SC	S3	<i>Vertigo elatior</i>	Tapered vertigo
S2	E	S2	<i>Vertigo hubrichti</i>	Hubricht's vertigo
S1	E	S1	<i>Vertigo modesta modesta</i>	A land snail (no common name)
S1	E	S1	<i>Vertigo modesta parietalis</i>	A land snail (no common name)
S2	E	S1?	<i>Vertigo morsei</i>	Six-whorl vertigo
S1	E	S1?	<i>Vertigo nylanderi</i>	Deep-throat vertigo
S3	SC	S3S4	<i>Vertigo paradoxa</i>	Mystery vertigo
SU	SC	S1S2	<i>Vertigo pygmaea</i>	Crested vertigo
SU	SC	SH	<i>Xolotrema denotata</i>	Velvet wedge

Appendix D. Unionid mussels.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S2S3	SC	S3?	<i>Alasmidonta marginata</i>	Elktoe
S2S3	T	S2S3	<i>Alasmidonta viridis</i>	Slippershell
SNR		S3	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell
S2S3	T	S2	<i>Cyclonaias tuberculata</i>	Purple wartyback
SNR		S2	<i>Elliptio complanata</i>	Eastern Elliptio
SH	E	SH	<i>Epioblasma obliquata perobliqua</i> <sup>1</sup>	White catspaw <sup>1</sup>
S1	E	S1	<i>Epioblasma torulosa rangiana</i> <sup>1</sup>	Northern riffleshell <sup>1</sup>
S1	E	S1S2	<i>Epioblasma triquetra</i> <sup>1</sup>	Snuffbox <sup>1</sup>
S2	T	S2	<i>Lampsilis fasciola</i>	Wavy-rayed lampmussel
SNR		S3	<i>Lasmigona compressa</i>	Creek Heelsplitter
SU	E	SX	<i>Leptodea leptodon</i> <sup>1</sup>	Scaleshell <sup>1</sup>
SNR	E	S2	<i>Ligumia nasuta</i>	Eastern pondmussel
SNR	E	S1?	<i>Ligumia recta</i>	Black sandshell
SNR	E	S1	<i>Obliquaria reflexa</i>	Threehorn wartyback
S2S3	E	S1	<i>Obovaria olivaria</i>	Hickorynut
S1	E	S1	<i>Obovaria subrotunda</i>	Round hickorynut
S1	E	S1	<i>Pleurobema clava</i> <sup>1</sup>	Clubshell <sup>1</sup>
S2S3	SC	S3	<i>Pleurobema sintoxia</i>	Round pigtoe
SNR	SC	S2	<i>Ptychobranthus fasciolaris</i>	Kidney shell
S1	T	S1	<i>Pyganodon subgibbosa</i>	Round lake floater
SNR		S3	<i>Quadrula pustulosa</i>	Pimpleback
S1	E	S1	<i>Simpsonaias ambigua</i>	Salamander mussel
S1	E	S1	<i>Toxolasma lividus</i>	Purple lilliput
SNR	E	S1	<i>Toxolasma parvus</i>	Lilliput
SNR	T	S1	<i>Truncilla donaciformis</i>	Fawnsfoot
SNR	SC	S2S3	<i>Truncilla truncata</i>	Deertoe
SNR	SC	S2S3	<i>Utterbackia imbecillis</i>	Paper pondshell
S2S3	SC	S3	<i>Venustaconcha ellipsiformis</i>	Ellipse
S1	E	S1S2	<i>Villosa fabalis</i> <sup>1</sup>	Rayed bean <sup>1</sup>
S2S3	SC	S3	<i>Villosa iris</i>	Rainbow

Appendix E. Herps.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S2S3	T	S2S3	<i>Acris crepitans blanchardi</i>	Blanchard's cricket frog
S3	SC	<b>S2S3</b>	<i>Emydoidea blandingii</i>	Blanding's turtle
SNR		S3S4	<i>Coluber constrictor foxii</i>	Blue racer
S5		<b>S4</b>	<i>Ambystoma laterale</i>	Blue-spotted Salamander
S1	SC	S1	<i>Pseudacris triseriata maculata</i>	Boreal chorus frog
S1	E	S1	<i>Nerodia erythrogaster neglecta</i> <sup>1</sup>	Copperbelly water snake <sup>1</sup>
S2S3	SC	S2S3	<i>Terrapene carolina carolina</i>	Eastern box turtle
S2	T	S2	<i>Pantherophis gloydi</i>	Eastern fox snake
S3S4		S3S4	<i>Heterodon platirhinos</i>	Eastern Hognose Snake
S3S4	SC	<b>S3</b>	<i>Sistrurus catenatus catenatus</i>	Eastern massasauga
S5		<b>S4</b>	<i>Hemidactylium scutatum</i>	Four-toed Salamander
S5		<b>S3S4</b>	<i>Anaxyrus fowleri</i>	Fowler's Toad
S3	SC	<b>S2S3</b>	<i>Pantherophis spiloides</i>	Gray ratsnake
S1	E	S1	<i>Clonophis kirtlandii</i>	Kirtland's snake
S1	E	S1	<i>Ambystoma opacum</i>	Marbled salamander
S5		<b>S3S4</b>	<i>Necturus maculosus</i>	Mudpuppy
S5		<b>S4</b>	<i>Lithobates pipiens</i>	Northern leopard frog
SNR		S3S4	<i>Diadophis punctatus edwardsii</i>	Northern ring-necked snake
S5		<b>S3S4</b>	<i>Lithobates palustris</i>	Pickerel frog
S4	SC	<b>S2S3</b>	<i>Regina septemvittata</i>	Queen snake
SU	T	S1	<i>Aspidoscelis sexlineata</i>	Six-lined racerunner
S1	E	S1	<i>Ambystoma texanum</i>	Smallmouth salamander
S5		<b>S3</b>	<i>Opheodrys / Liochlorophis vernalis</i>	Smooth Green Snake
S5		<b>S4</b>	<i>Ambystoma maculatum</i>	Spotted Salamander
S2	T	S2	<i>Clemmys guttata</i>	Spotted turtle
S3S4		S3S4	<i>Ambystoma tigrinum</i>	Tiger Salamander
S5		S5	<i>Pseudacris triseriata triseriata</i>	Western Chorus Frog
S5		<b>S4</b>	<i>Pantherophis vulpina</i>	Western Fox Snake
SH		SH	<i>Siren intermedia nettingi</i>	Western lesser siren
S2S3	SC	<b>S2</b>	<i>Glyptemys insculpta</i>	Wood turtle

## Appendix F. Birds.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S3S4		S4	<i>Empidonax virescens</i>	Acadian Flycatcher
S3S4	SC	S3	<i>Botaurus lentiginosus</i>	American bittern
S3		S4	<i>Anas rubripes</i>	American Black Duck
SNR		S3	<i>Fulica americana</i>	American Coot
SNR		SNA	<i>Pelecanus erythrorhynchos</i>	American White Pelican
SNR		S4	<i>Scolopax minor</i>	American Woodcock
S4	SC	S4	<i>Haliaeetus leucocephalus</i>	Bald eagle
S1	E	SX	<i>Tyto alba</i>	Barn owl
S3	SC	S2	<i>Chlidonias niger</i>	Black tern
S2	SC	S2	<i>Picoides arcticus</i>	Black-backed woodpecker
S5		S4	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo
S5		S5	<i>Dendroica fusca</i>	Blackburnian Warbler
S2S3	SC	S3	<i>Nycticorax nycticorax</i>	Black-crowned night-heron
S4		S5	<i>Dendroica caerulescens</i>	Black-throated Blue Warbler
S5		S3	<i>Anas discors</i>	Blue-winged Teal
S5		S4	<i>Vermivora pinus</i>	Blue-winged Warbler
S5		S4	<i>Dolichonyx oryzivorus</i>	Bobolink
S3S4		S2	<i>Poecile hudsonica</i>	Boreal Chickadee
S5		S4	<i>Toxostoma rufum</i>	Brown Thrasher
S5		S4	<i>Wilsonia canadensis</i>	Canada Warbler
S2	T	S2	<i>Sterna caspia</i>	Caspian tern
S3	T	S3	<i>Dendroica cerulea</i>	Cerulean warbler
SNR		SNA	<i>Caprimulgus carolinensis</i>	Chuck-will's-widow
S3S4	T	S3	<i>Gavia immer</i>	Common loon
S3	T	S3	<i>Gallinula chloropus</i>	Common moorhen
S5		S3	<i>Chordeiles minor</i>	Common Nighthawk
SNR		S4	<i>Gallinago delicata</i>	Common Snipe
S2	T	S2	<i>Sterna hirundo</i>	Common tern
S2S3		S3	<i>Oporornis agilis</i>	Connecticut Warbler
S3S4		S4	<i>Accipiter cooperii</i>	Cooper's hawk
S3	SC	S3	<i>Spiza americana</i>	Dickcissel
S5		S4	<i>Tyrannus tyrannus</i>	Eastern Kingbird
S5		S4	<i>Sturnella magna</i>	Eastern Meadowlark
S5		S5	<i>Pipilo erythrophthalmus</i>	Eastern Towhee
S5		S2	<i>Coccothraustes vespertinus</i>	Evening Grosbeak
S5		S5	<i>Spizella pusilla</i>	Field Sparrow
S2	T	S2	<i>Sterna forsteri</i>	Forster's tern
S5		S3	<i>Vermivora chrysoptera</i>	Golden-winged Warbler
S3S4	SC	S4	<i>Ammodramus savannarum</i>	Grasshopper sparrow
S4		S4	<i>Perisoreus canadensis</i>	Gray Jay
S5		S5	<i>Ardea herodias</i>	Great Blue Heron



## Appendix F. Birds cont.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S5		S4	<i>Butorides virescens</i>	Green Heron
S2S3	E	S3	<i>Ammodramus henslowii</i>	Henslow's sparrow
S3	SC	S3	<i>Wilsonia citrina</i>	Hooded warbler
SNR		SNA	<i>Oporornis formosus</i>	Kentucky Warbler
SNR		S5	<i>Charadrius vociferus</i>	Killdeer
S1	E	S2	<i>Rallus elegans</i>	King rail
S1	E	S3	<i>Dendroica kirtlandii</i> <sup>1</sup>	Kirtland's warbler <sup>1</sup>
S1		S3	<i>Ammodramus leconteii</i>	Le Conte's Sparrow
S2	T	S3	<i>Ixobrychus exilis</i>	Least bittern
S5		S4	<i>Empidonax minimus</i>	Least Flycatcher
S2	T	S1	<i>Asio otus</i>	Long-eared owl
S2S3	T	S2	<i>Seiurus motacilla</i>	Louisiana waterthrush
S3S4	SC	S3	<i>Cistothorus palustris</i>	Marsh wren
S1S2	T	S3	<i>Falco columbarius</i>	Merlin
S1	E	S1	<i>Lanius ludovicianus migrans</i>	Migrant loggerhead shrike
S4		S2	<i>Colinus virginianus</i>	Northern Bobwhite
S5		S5	<i>Colaptes auratus</i>	Northern Flicker
S3	SC	S3	<i>Accipiter gentilis</i>	Northern goshawk
S3	SC	S4	<i>Circus cyaneus</i>	Northern harrier
S4		S3	<i>Mimus polyglottos</i>	Northern Mockingbird
S4		S5	<i>Parula americana</i>	Northern Parula
SNR		SNA	<i>Lanius excubitor</i>	Northern Shrike
S4		S3	<i>Contopus cooperi</i>	Olive-sided Flycatcher
S4	SC	S4	<i>Pandion haliaetus</i>	Osprey
S1S2		S4	<i>Dendroica palmarum</i>	Palm Warbler
S1	E	S3	<i>Falco peregrinus</i>	Peregrine falcon
S4		S4	<i>Podilymbus podiceps</i>	Pied-billed Grebe
S1	E	S2	<i>Charadrius melodus</i> <sup>1</sup>	Piping plover <sup>1</sup>
S1	E	S3	<i>Dendroica discolor</i>	Prairie warbler
S3	SC	S3	<i>Protonotaria citrea</i>	Prothonotary warbler
S5		S3	<i>Progne subis</i>	Purple Martin
S3		S4	<i>Loxia curvirostra</i>	Red Crossbill
S5		S3	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
S3S4	T	S4	<i>Buteo lineatus</i>	Red-shouldered hawk
S4		S3	<i>Regulus calendula</i>	Ruby-crowned Kinglet
S5		S4	<i>Passerculus sandwichensis</i>	Savannah Sparrow
S4		S3	<i>Cistothorus platensis</i>	Sedge Wren
S3S4	SC	S3S4	<i>Tympanuchus phasianellus</i>	Sharp-tailed grouse
S1	E	S1	<i>Asio flammeus</i>	Short-eared owl
S4		S4	<i>Porzana carolina</i>	Sora
SNR		S4	<i>Actitis macularia</i>	Spotted Sandpiper
S2S3	SC	S2	<i>Falci pennis canadensis</i>	Spruce grouse
S3	T	S3	<i>Cygnus buccinator</i>	Trumpeter Swan

Appendix F. Birds cont.

<b>State Rank (2012)</b>	<b>Current State Status</b>	<b>New Assigned Rank (2014)</b>	<b>Scientific Name</b>	<b>Common Name</b>
S4		<b>S3</b>	<i>Bartramia longicauda</i>	Upland Sandpiper
S5		<b>S4</b>	<i>Pooecetes gramineus</i>	Vesper Sparrow
S3S4		<b>S4</b>	<i>Rallus limicola</i>	Virginia Rail
S4	SC	<b>S2</b>	<i>Sturnella neglecta</i>	Western meadowlark
S5		<b>S3</b>	<i>Caprimulgus vociferus</i>	Whip-poor-will
S4		<b>S3</b>	<i>Vireo griseus</i>	White-eyed Vireo
S2		<b>S4</b>	<i>Loxia leucoptera</i>	White-winged Crossbill
S2	SC	<b>S3</b>	<i>Phalaropus tricolor</i>	Wilson's phalarope
S4		S4	<i>Hylocichla mustelina</i>	Wood Thrush
SNR		SNA	<i>Helmitheros vermivorus</i>	Worm-eating Warbler
S1S2	T	<b>S2</b>	<i>Coturnicops noveboracensis</i>	Yellow rail
S5		S5	<i>Coccyzus americanus</i>	Yellow-billed Cuckoo
SNR		S2	<i>Icteria virens</i>	Yellow-breasted Chat
S2	SC	<b>S3</b>	<i>Xanthocephalus xanthocephalus</i>	Yellow-headed blackbird
S1		<b>S3</b>	<i>Dendroica dominica</i>	Yellow-throated warbler

## Appendix G. Insects.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S2S3	SC	S2S3	<i>Acronicta falcata</i>	Corylus dagger moth
SNR		S2S3	<i>Aeshna juncea</i>	Sedge Darner
SNR		S3S4	<i>Aeshna mutata</i>	Spatterdock Darner
SNR		S3	<i>Aeshna sitchensis</i>	Zigzag Darner
SNR		SH	<i>Aeshna subarctica</i>	Muskeg Darner
SU		SU	<i>Ameletus lineatus</i>	A mayfly
S2S3	SC	<b>S2</b>	<i>Appalachia arcana</i>	Secretive locust
			<i>Arcynopteryx compacta</i> now = <i>A. dichroa</i>	
SNR		S1S2	<i>dichroa</i>	Arctic Sprintfly
S2S3	SC	S2S3	<i>Atlanticus davisii</i>	Davis's shield-bearer
S2S3	SC	<b>S3</b>	<i>Atrytonopsis hianna</i>	Dusted skipper
S1S2	SC	S1S2	<i>Basilodes pepita</i>	Gold moth
S1S2	SC	<b>S2S3</b>	<i>Battus philenor</i>	Pipevine swallowtail
SNR		SU	<i>Belostoma lutarium</i>	A belostoman bug
SNR		SU	<i>Blepharicera tenuipes</i>	A net-winged midge
S3S4	SC	S3S4	<i>Boloria freija</i>	Freija fritillary
S3S4	SC	<b>S2</b>	<i>Boloria frigga</i>	Frigga fritillary
SNR		SH	<i>Boyeria grafiana</i>	Ocellated Darner
S1S2	SC	<b>S2S3</b>	<i>Brachionycha borealis</i>	Boreal brachionyncha
SNR		SH	<i>Brachycentrus fuliginosus</i>	A caddisfly
S1	E	S1	<i>Brychius hungerfordi</i> <sup>1</sup>	Hungerford's crawling water beetle <sup>1</sup>
S1S2	SC	<b>S1</b>	<i>Calephelis mutica</i>	Swamp metalmark
SNR		S2S3	<i>Capnia vernalis</i>	Canadian willowfly
S1	E	S1	<i>Catocala amestris</i>	Three-staff underwing
S1S2	SC	<b>S2S3</b>	<i>Catocala dulciola</i>	Quiet underwing
S2S3	SC	S2S3	<i>Catocala illecta</i>	Magdalen underwing
S2S3	SC	<b>SH</b>	<i>Catocala robinsoni</i>	Robinson's underwing
SNR		S1S3	<i>Ceuthophilus silvestris</i>	Woodland Camel Cricket
SNR		S1S3	<i>Ceuthophilus uhleri</i>	Woodland Camel Cricket
S2S3	SC	<b>SH</b>	<i>Chlosyne gorgone carlota</i>	Gorgone checkerspot
S5		<b>S2</b>	<i>Cicindela hirticollis rhodensis</i>	Hairy-necked Tiger Beetle
S4		<b>SH</b>	<i>Cicindela lepida</i>	Ghost Tiger Beetle
S5		<b>S3</b>	<i>Cicindela limbalis</i>	Common Claybank Tiger Beetle
S5		<b>SH</b>	<i>Cicindela macra</i>	Sandy Stream Tiger Beetle
SNR		S3S4	<i>Coenagrion interrogatum</i>	Subarctic Bluet
SNR		S2S3	<i>Conocephalus nemoralis</i>	Woodland meadow katydid
S1S2	SC	<b>SH</b>	<i>Cordulegaster erronea</i>	Tiger spiketail
SNR		S3S4	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail
SNR		S3S4	<i>Dendrotettix quercus</i>	Post-oak grasshopper
S1S2	SC	<b>S3</b>	<i>Dorydiella kansana</i>	Leafhopper
SH	T	SH	<i>Dryobius sexnotatus</i>	Six-banded longhorn beetle

## Appendix G. Insects cont.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S2S3	SC	S2S3	<i>Eacles imperialis pini</i>	Pine imperial moth
SNR		SNA	<i>Epeorus suffusus</i>	A Mayfly
S2S3	SC	S2S3	<i>Erebia discoidalis</i>	Red-disked alpine
S2S3	SC	SH	<i>Erora laeta</i>	Early hairstreak
S2S3	SC	S3	<i>Erynnis baptisiae</i>	Wild indigo duskywing
S3	T	S3	<i>Erynnis persius persius</i>	Persius dusky wing
S1S2	SC	SH	<i>Euchloe ausonides</i>	Large marble
SNR		S1S3	<i>Eunemobius melodius</i>	Melodious ground cricket
S1	T	S2	<i>Euphyes dukesi</i>	Dukes' skipper
S1S2	SC	S2S3	<i>Euxoa aurulenta</i>	Dune cutworm
SNR		S2?	<i>Fitchiella robertsonii</i>	Robertson's Flightless Planthopper
S1	SC	SH	<i>Fixsenia favonius ontario</i>	Northern hairstreak
S1S2	SC	S3	<i>Flexamia delongi</i>	Leafhopper
S1	T	S1	<i>Flexamia huroni</i>	Huron River leafhopper
S1	SC	S1	<i>Flexamia reflexus</i>	Leafhopper
S2S3	SC	S3	<i>Gomphus lineatifrons</i>	Splendid clubtail
S2S3	SC	S3	<i>Gomphus quadricolor</i>	Rapids clubtail
SNR		SH	<i>Habrophlebiodes americana</i>	A mayfly
SNR		SX	<i>Helopicus nalatus</i>	A stonefly
S2S3	SC	S2S3	<i>Hemileuca maia</i>	Barrens buckmoth
S1S2	T	S1	<i>Hesperia ottoe</i>	Ottoe skipper
SNR	SC	S4	<i>Hetaerina titia</i>	Smokey rubyspot
S1S2	SC	S1S2	<i>Heterocampa subrotata</i>	Small heterocampa
S1S2	SC	S1S2	<i>Heteropacha rileyana</i>	Riley's lappet moth
S2S3	T	S2S3	<i>Incisalia henrici</i>	Henry's elfin
S2S3	T	S2S3	<i>Incisalia irus</i>	Frosted elfin
SNR		S1S2	<i>Isogenoides doratus</i>	A stonefly
S1S2	SC	S3	<i>Lepyronia angulifera</i>	Angular spittlebug
S1S2	SC	S3	<i>Lepyronia gibbosa</i>	Great Plains spittlebug
SNR	SC	SU	<i>Limnephilus pallens</i>	A caddisfly
S1S3	SC	SH	<i>Liodessus cantralli</i>	Cantrall's bog beetle
SH	SC	SH	<i>Lordithon niger</i>	Black lordithon rove beetle
S2	T	S2	<i>Lycaeides idas nabokovi</i>	Northern blue
S2	T	S2	<i>Lycaeides melissa samuelis</i> <sup>1</sup>	Karner blue <sup>1</sup>
SNR		S2S3	<i>Melanoplus eurycercus</i>	Hebard's Green-legged Locust
S1S3	SC	S2	<i>Melanoplus flavidus</i>	Blue-legged locust
SNR		S1S3	<i>Melanoplus viridipes</i>	Hebard's green-legged locust
S1S2	SC	S2S3	<i>Merolonche dolli</i>	Doll's merolonche
S1S2	SC	S2S3	<i>Meropleon ambifusca</i>	Newman's brocade
S1S3	SC	S1S3	<i>Neoconocephalus lyristes</i>	Bog conehead
S1S3	SC	S1S2	<i>Neoconocephalus retusus</i>	Conehead grasshopper
SNR	SC	SH	<i>Neohermes concolor</i>	A fishfly
S1	E	S1	<i>Neonympha mitchellii mitchellii</i>	Mitchell's satyr

## Appendix G. Insects cont.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
SNR		S2S3	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon
SH	X	SH	<i>Nicrophorus americanus</i> <sup>1</sup>	American burying beetle <sup>1</sup>
SNR		S1S2	<i>Nigronia fasciatus</i>	A Dobsonfly
S1S2	T	<b>S1</b>	<i>Oarisma poweshiek</i>	Poweshiek skipperling
S1S2	SC	<b>S3</b>	<i>Oecanthus laricus</i>	Tamarack tree cricket
S1S2	SC	<b>S3</b>	<i>Oecanthus pini</i>	Pinetree cricket
SNR		S3	<i>Oemopteryx glacialis</i>	A Stonefly
S2S3	SC	<b>SH</b>	<i>Oeneis macounii</i>	Macoun's arctic
S1S2	SC	<b>S2S3</b>	<i>Oncocnemis piffardi</i>	3-striped oncocnemis
S1S2	SC	<b>S2S3</b>	<i>Ophiogomphus anomalus</i>	Extra-striped snaketail
S1	T	S1	<i>Ophiogomphus howei</i>	Pygmy snaketail
S2S3	SC	S2S3	<i>Orchelimum concinnum</i>	Red-faced meadow katydid
S1S3	SC	S1S3	<i>Orchelimum delicatum</i>	Delicate meadow katydid
S1S3	SC	<b>S2S3</b>	<i>Orphulella pelidna</i>	Green desert grasshopper
SNR		S2S3	<i>Ostrocerca albidipennis</i>	Whitetailed Forestfly
S1S2	SC	<b>S1S3</b>	<i>Pachypolia atricornis</i>	Three-horned moth
SH	SC	<b>S1</b>	<i>Papaipema aweme</i>	Aweme borer
S1S2	SC	<b>S2</b>	<i>Papaipema beeriana</i>	Blazing star borer
S1S2	SC	<b>S2</b>	<i>Papaipema cerina</i>	Golden borer
S1S2	SC	<b>S2</b>	<i>Papaipema maritima</i>	Maritime sunflower borer
S2S3	SC	<b>S3</b>	<i>Papaipema sciata</i>	Culvers root borer
S1S2	T	<b>S1</b>	<i>Papaipema silphii</i>	Silphium borer moth
S2S3	SC	S2S3	<i>Papaipema speciosissima</i>	Regal fern borer
SNR		S2S3	<i>Paracapnia opis</i>	Northeastern snowfly
S2S3	SC	<b>S1S3</b>	<i>Paroxya hoosieri</i>	Hoosier locust
SNR		S3S4	<i>Perlesta shubuta</i> <b>now = P. ephelida</b>	Cloudy stone
S1S2		<b>S3S4</b>	<i>Philaenarcys killa</i>	Spittlebug
S4	SC	<b>S3</b>	<i>Phyciodes batesii</i>	Tawny crescent
S3	SC	<b>SH</b>	<i>Polygonia gracilis</i>	Hoary comma
S2S3	SC	<b>S3S4</b>	<i>Prosapia ignipectus</i>	Red-legged spittlebug
S2S3	SC	<b>S1S2</b>	<i>Proserpinus flavofasciata</i>	Yellow-banded day-sphinx
S1S3	SC	S1S3	<i>Psinidia fenestralis</i>	Atlantic-coast locust
S2S3	SC	S2S3	<i>Pygarctia spraguei</i>	Sprague's pygarctia
S1S2	SC	S1S2	<i>Pyrgus wyandot</i>	Grizzled skipper
SNR		SNA	<i>Rhyacophila sp.?</i>	A caddisfly
S1S2	SC	<b>S1</b>	<i>Schinia indiana</i>	Phlox moth
S1	E	S1	<i>Schinia lucens</i>	Leadplant moth
S1S3	SC	S1S3	<i>Scudderia fasciata</i>	Pine katydid
SNR		S1	<i>Siphloplecton basale</i>	A Mayfly
SNR		S3	<i>Somatochlora cingulata</i>	Lake Emerald
S1	E	S1	<i>Somatochlora hineana</i>	Hine's emerald dragonfly

Appendix G. Insects cont.

<b>State Rank (2012)</b>	<b>Current State Status</b>	<b>New Assigned Rank (2014)</b>	<b>Scientific Name</b>	<b>Common Name</b>
S1S2	SC	<b>S3S4</b>	<i>Somatochlora incurvata</i>	Incurvate emerald
S1S2	SC	<b>S2S3</b>	<i>Spartiniphaga inops</i>	Spartina moth
	SH	SH	<i>Speyeria idalia</i>	Regal fritillary
S1S2	SC	S1S2	<i>Stenelmis douglasensis</i>	Douglas stenelmis riffle beetle
S1S2	SC	<b>S2S3</b>	<i>Stylurus amnicola</i>	Riverine snaketail
S1S2	SC	<b>S3</b>	<i>Stylurus laurae</i>	Laura's snaketail
S1S2	SC	S1S2	<i>Stylurus notatus</i>	Elusive snaketail
S1S2	SC	<b>S1</b>	<i>Stylurus plagiatus</i>	Russet-tipped clubtail
S1S3	T	<b>S1</b>	<i>Tachopteryx thoreyi</i>	Grey petaltail
SNR		S4	<i>Taeniopteryx burksi</i>	Eastern Willowfly
SNR		SNA	<i>Taeniopteryx maura</i>	Spinyleg willowfly
S2S3	T	S2S3	<i>Trimerotropis huroniana</i>	Lake Huron locust
S1S2	SC	<b>S3</b>	<i>Williamsonia fletcheri</i>	Ebony boghaunter
S1S2	SC	<b>S3</b>	<i>Williamsonia lintneri</i>	Ringed boghaunter
SNR		SU	<i>Wormaldia moesta</i>	A caddisfly

Appendix H. Mammals.

State Rank (2012)	Current State Status	New Assigned Rank (2014)	Scientific Name	Common Name
S4	SC	S4	<i>Alces americanus</i>	Moose
S3	SC	<b>S4</b>	<i>Canis lupus</i>	Gray Wolf
S5		<b>S3S4</b>	<i>Clethrionomys gapperi</i>	Southern Red-backed Vole
S1S2	T	S1S2	<i>Cryptotis parva</i>	Least shrew
SH	E	<b>S1</b>	<i>Felis concolor</i>	Cougar
S5		S5	<i>Glaucomys sabrinus</i>	Northern flying squirrel
S4		<b>S5</b>	<i>Lasionycteris noctivagans</i>	Silver-haired Bat
S5		S5	<i>Lasiurus borealis</i>	Red Bat
S3S4		<b>S5</b>	<i>Lasiurus cinereus</i>	Hoary Bat
S5		<b>S4S5</b>	<i>Lepus americanus</i>	Snowshoe Hare
S1	E	S1	<i>Lynx canadensis</i>	Lynx
S3		S3	<i>Martes americana</i>	American Marten
S1	E	<b>S3</b>	<i>Microtus ochrogaster</i>	Prairie vole
S3S4	SC	S3S4	<i>Microtus pinetorum</i>	Woodland vole
S5		S5	<i>Mustela nivalis</i>	Least Weasel
SNR		S1	<i>Myotis lucifugus</i>	Little brown bat
SNR		S1	<i>Myotis septentrionalis</i>	Northern Bat or Northern Myotis
S1	E	S1	<i>Myotis sodalis</i>	Indiana bat
S5		<b>S3S4</b>	<i>Napaeozapus insignis</i>	Woodland Jumping Mouse
SNA	T	S2	<i>Nycticeius humeralis</i>	Evening bat
S5		<b>S4</b>	<i>Peromyscus maniculatus</i>	Deer Mouse
S2	SC	<b>S1</b>	<i>Pipistrellus subflavus</i>	Eastern pipistrelle
S5		S5	<i>Sorex arcticus</i>	Arctic Shrew
S1	T	S1	<i>Sorex fumeus</i>	Smoky shrew
S5		SU	<i>Sorex hoyi</i>	Pygmy Shrew
S5		<b>S4</b>	<i>Sorex palustris</i>	Water Shrew
S5		S5	<i>Synaptomys cooperi</i>	Southern Bog Lemming
S5		<b>S3S4</b>	<i>Tamias minimus</i>	Least Chipmunk