ILLINOIS NATURAL HISTORY SURVEY
PRAIRIE RESEARCH INSTITUTE

Status Revision and Update for Illinois' Fish Species in Greatest Need of Conservation

Annual Project Report

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(1 January 2011 – 31 December 2011)

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PROJECT TITLE: Status Update and Revision for Illinois' Fish Species in Greatest Need of Conservation.

Summary:

Work during this reporting period focused on gathering fisheries data relevant to distribution, abundance and ecological characteristics of fish in Illinois and summarizing those data to reevaluate portions of the Illinois Comprehensive Wildlife Conservation Plan and Strategy (IWAP). Fisheries databases and museum collections from seven sources along with surveys of Illinois fisheries experts have been utilized to conduct a comprehensive quantitative and qualitative assessment of Illinois fish Species in Greatest Need of Conservation (SGNC) to assist with updating and revising Appendix I and II of the IWAP. This annual progress report summarizes work conducted for the period 1 January 2011 – 31 December 2011.

Job 1: Reevaluate fish species using the eight criteria established in the IWAP (Appendix I).

The Illinois Wildlife Action Plan contains 80 SGNC which are comprised of both Threatened and Endangered (T&E) species and other species identified as in need of conservation action. We have reevaluated each of these species with newly available information and additional analysis based on the same eight criteria that were used to establish the initial SGNC listing. Five additional game species were also included in our evaluation to assess some sport fish populations.

Appendix I reevaluation required both analysis of fisheries data and summarization of expert opinion as the eight listing criteria in this Appendix are based on both quantitative analyses and qualitative assessments. Fisheries data were collected from seven sources: IDNR FAS streams and lakes databases, the INHS Fish Collections database, the IDNR Natural Heritage Division BIOTICS database, University of Michigan Museum of Zoology (UMMZ) collections, the large river Long-Term Electrofishing (LTEF) program, and the Upper Mississippi River Long-Term Monitoring Program (LTRMP). Each source contained a different combination of data (Table 1) and each analysis was completed using those sources with appropriate information. For instance, mapping for distribution analysis required data sources with georeferenced location (or the ability to extrapolate this information) and sample date. Additional sources used to complete reevaluation of Appendix I include Illinois Endangered Species Protection Board publications (ISPB 2011, Nyboer *et al* 2006) and NatureServe Explorer (2011).

Criteria 1 and 2 of Appendix I identify the State or Federal threatened or endangered (T&E) status (criterion 1) and the global conservations rank (criterion 2) of the species and this information was simply transcribed into the revised draft of Appendix I. Criteria 5 and 6 (disjunct populations and relative global abundance in Illinois) were assessed using NatureServe Explorer (2011) maps. Disjunction was evaluated by examining distribution maps for spatial separation of Illinois populations from other regional populations, while proportion of the global population in Illinois was determined by observing global distribution patterns. Criterion 3 (distribution and abundance assessment) was evaluated using information from the seven fisheries data sources (Table 1). Distributional status was assessed by calculating temporal change (historic time periods relative to 2000-2010) in distribution at multiple spatial scales. Abundance was assessed by calculating

statewide and intrasite temporal change in CPUE density. Criterion 8 was evaluated by assessing the level of detail and amount of available literature for a species.

An online survey of fisheries professionals was created to provide a consensus on those Appendix parameters that could not be inferred from the databases, primarily habitat associations and Criteria 4 and 7 of Appendix I, and stressor evaluations in Appendix II. Participants (experts) included members of the Wildlife Action Team, State agency professionals, academics, and others with fisheries/aquatics knowledge. SurveyMonkey (www.surveymonkey.com) was used to create and distribute surveys to targeted experts and 31 participants contributed to some degree. Each survey component (question) represented a portion of an Appendix (e.g., a listing criterion, stressor evaluation) and selectable responses to those questions were based on information included in the Appendices. In Job 1, habitat associations (Appendix I) for each species were based on consensus of surveyed experts and were comprised of physical components identified by as critical to a species' ecological needs. Criteria 4 and 7 were evaluated by determining a consensus regarding whether these conditions (needs rare or vulnerable habitat and is a community representative, respectively) are met by each species.

Some criteria reevaluations for T&E species differed from those methods listed above. As detailed information was available for many T&E species, criteria 4 and 7 and habitat associations were determined through review of available literature. Illinois Endangered Species Protection Board publications (ISPB 2011, Nyboer *et al* 2006), NatureServe Explorer (2011) and The Fishes of Illinois (Smith 1979) were the primary sources used to evaluate habitat associations and determine status under criteria 4 and 7 for these species.

As part of determination of distribution, location data for each species were joined with our existing GIS data to create distribution maps. Two maps have been created for each species, one indicating data source for each point (database or museum collection) and one displaying location record time period (≥2000, 1977-1999, 1950-1976, ≤1949). Time period maps allow for interpretation of temporal changes in distribution. These maps have been used during reevaluation of Appendix I (criterion 3), and each will be included with the final report. An example map (Figure 1) has been included in this annual report.

Criteria assessments have been completed for draft revision of Appendix I during this reporting period (Appendix I). Creation of report quality maps continues, as does QA/QC of those maps and associated data.

Job 2: Update the Status, Objectives, and Stresses to Illinois' Wildlife and Habitat Resources for fish and aquatic habitats (Appendix II).

Appendix II is primarily an evaluation of which stressors influence the distribution and abundance of fish SGNC. This information is not available in any quantitative form (i.e., from the databases or museum collections), so expert opinion, collected through online surveys, was once again used (see survey methods in Job 1). Survey participants were asked whether a particular stressor influenced a species, and at what time scale (past, present, future) that stressor is relevant. For non-T&E species, the proportion of yeses (affirmations that a stressor is relevant) for each stressor was averaged across all time periods. If that mean value was greater than or equal to 50%, that stressor was

included as an influence on the species in Appendix II. For T&E species, available literature was once again reviewed, and known stressors were indicated as such in the revised Appendix. Remaining stressors were categorized in to two groups: Stressors that were similar or analogous to requirements for that species were indicated as non-stressors, while stressors that were not mentioned in literature (insufficient evidence to conclude either way) were marked as inconclusive.

Draft Appendix II revisions have been completed during this reporting period (Appendix II).

Work on fragmentation and isolation assessments for SGNC has begun by collecting IDNR Office of Water Resources information pertaining to location of dams and other instream structures. A georeferenced datalayer of Illinois instream structures has been created and used to identify impediments to fish dispersal. This data layer is based on the National Inventory of Dams (NID) and is currently the best available statewide information. We are also investigating ways to incorporate data layers being developed by the National Fish Habitat Partnership (NFHP) Database Management Team at Michigan State University (Dr. Dana Infante, MSU). These NFHP data layers are also based on the NID but each instream structure has been individually validated by comparing the point location with remote sensing data (satellite and aerial photography) to address some of the known issues with the georeferencing of the NID. Regardless of data origin, ArcHydro will be used to assess connectivity of SGNC populations by determining number of structures between populations. Large rivers will also be included as isolating factors for fish species associated with streams. Ultimately, the goal will be to quantify degree of isolation in fragmented population. Work on this task is ongoing.

Job 3: Provide a final report that includes documentation and draft updates of the fish Species in Greatest Need of Conservation (Appendix I) and their Status, Objectives, and Stresses (Appendix II).

Draft revisions of Appendix I and II have been completed. Work on a written report containing evaluation methods and results has begun. Preliminary procedures and results of this study have been presented at the 2011 and 2012 Illinois Chapter of the American Fisheries Society annual conference (Hinz, Jr. and Metzke 2011, Metzke and Hinz, Jr. 2012). Work for Job 3 is ongoing.

Literature Cited

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Table 1. Characteristics of fishery collection databases used for this study. Check-marks indicate this item is present in the database, 'P' indicates items are partially (imcompletely) present.

Database Name	Waterbody Type(s)	Collection Date	Abundance	Georeferenced Location	Verbal or Site Location	Collection Effort (time)	Collection Method	Date Range
IDNR Streams	streams, large rivers	√	√		√	√	√	1952-2009
IDNR Lakes	lakes	√	√		√	√	√	1982-2010
INHS Collections	all	√	P	√	√			1897-2007, 1873-2010
BIOTICS	all	√	P	√				1935-2010
LTRMP	large rivers	√	√	√	√	√	√	1989-2010
LTEF	large rivers	√	√		√	√	√	1957-2010
UMMZ Collections	all	√			√		P	1852-2001

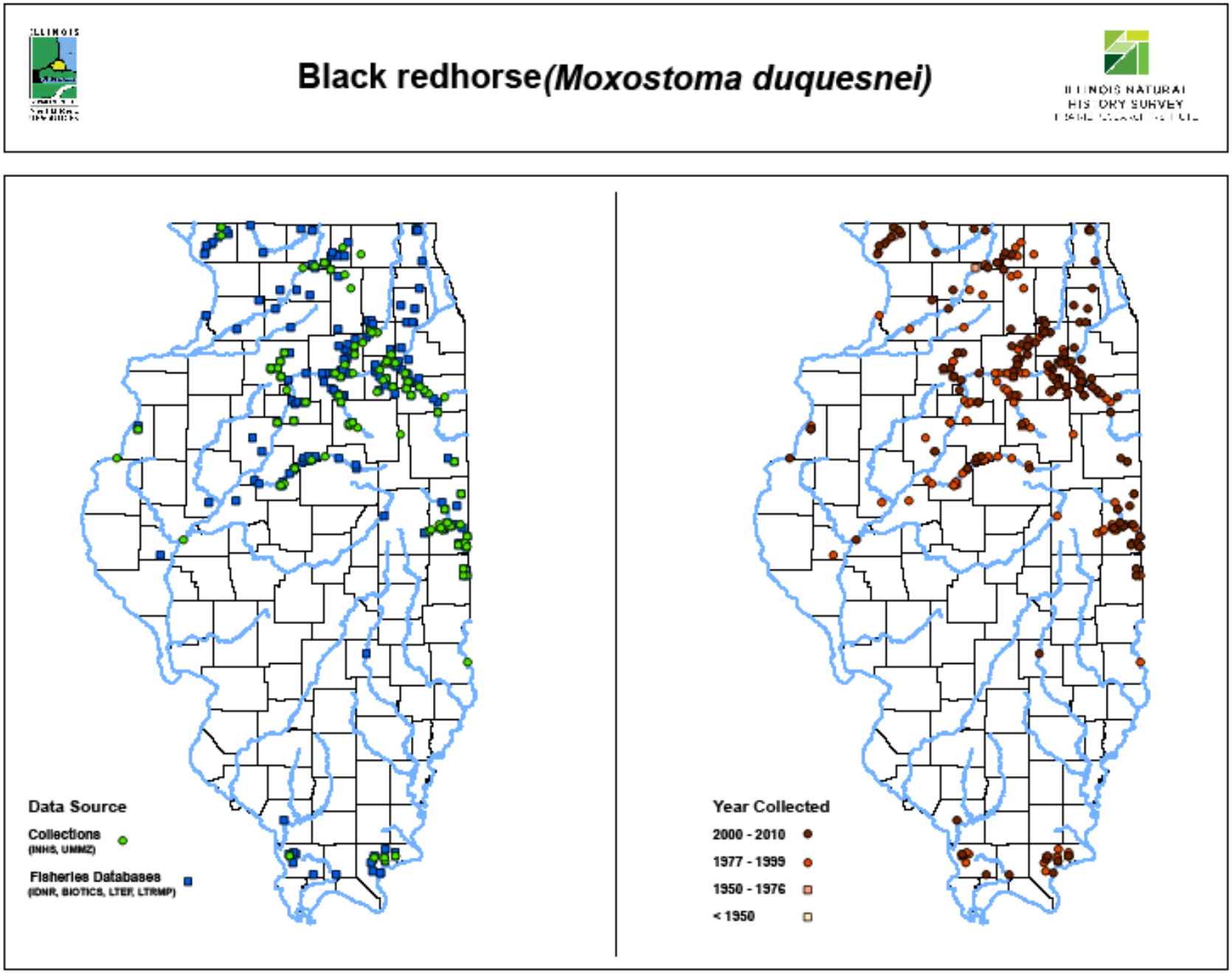

Figure 1. Example distribution map using black redhorse.

Appendix I. Draft revision of Species in Greatest Need of Conservation for Illinois as identified by eight criteria.

Criteria:

1. State and Federal threatened or endangered status.
2. Global conservation rank (NatureServe).
3. Rare (R) or has significantly declined (D) in abundance or distribution from historic levels.
4. Dependent upon rare or vulnerable habitat.
5. Endemic to Illinois, or Illinois population is disjunct.
6. Illinois population is significant proportion of global population.
7. Representative of a broad array of other species for a particular habitat.
8. Status is poorly known.

		Criteria (#'s 3-8, 1=meets criterion, 0=does not meet criterion)							
Common Name	Habitat Association	1	2	3	4	5	6	7	8
Non-T&E SGNC and Game Species:									
American eel	Pools of rivers and streams	0	G4	1, R&D	1	0	0	0	0
Brown bullhead	Still pools of lakes, backwaters, swamps with silt and vegetation	0	G5	1, R	1	1	0	1	0
Largescale stoneroller	High-gradient riffles and runs of streams with gravel, rock and stable flow	0	G5	1, R	1	0	0	1	0
Highfin carpsucker	High-gradient riffles and runs of streams with sand and gravel	0	G4, G5	0	0	0	0	1	0
Flier	Still, low-gradient pools if streams, backwaters and swamps with vegetation	0	G5	1, R	1	0	0	1	0
Lake whitefish	Lake Michigan	0	G5	1, R	0	0	0	1	1
Mottled sculpin	Lake Michigan or high-gradient riffles in coolwater streams with gravel	0	G5	1, R	1	0	0	1	0
Banded sculpin	High-gradient riffles in streams with gravel, rock and stable flow	0	G5	1, R	1	0	0	1	0
Lake chub	Lake Michigan over sand and gravel	0	G5	1, R	1	0	0	1	0
Crystal darter	Riffles and runs in rivers and streams	0	G3	1, R	0	0	0	0	1
Brook stickleback	Pools of coolwater streams with silt and vegetation	0	G5	1, R	1	0	0	1	0
Blue sucker	High-gradient riffles and runs of rivers with sand, gravel and rock	0	G3, G4	1, R	1	0	0	1	0
Blacktail shiner	High-gradient runs and pools of streams with stable flow and sand	0	G5	1, R	1	0	0	0	0
Banded pygmy sunfish	Low-gradient or still pools of backwaters and swamps with silt and vegetation	0	G5	1, R	1	0	0	1	0
Lake chubsucker	Lakes and still pools of streams with sand, silt and vegetation	0	G5	1, R	1	0	0	1	0
Northern pike	Lakes and low-gradient or still pools of backwaters, streams and rivers with vegetation	0	G5	1, D	1	0	0	1	0
Muskellunge	Lakes and still rivers with sand, gravel, rock, wood and vegetation	0	G5	1, R	1	0	0	1	0
Bluntnose darter	Low-gradient pools of streams, backwaters and swamps with silt and stable flow	0	G5	1, R	1	0	0	1	0
Fringed darter	Riffles and runs of streams with gravel, rock and stable flow	0	G5	1, R&D	0	0	0	0	1
Cypress darter	Low-gradient or still pools of streams and swamps with silt and vegetation	0	G5	1, R&D	1	0	0	0	1
Spottail darter	Riffles, runs and pools of streams with rock and stable flow	0	G4, G5	1, R	1	0	0	1	1
Spring cavefish	Coolwater caves with gravel, rock and stable flow	0	G4, G5	1, R&D	1	1	0	1	0
Silver lamprey	Riffles of rivers and streams with sand and gravel	0	G5	1, R&D	0	0	0	0	1
American brook lamprey	Riffles, runs and pools of streams with sand, gravel and rock	0	G4	1, R&D	0	0	0	0	1
Ribbon shiner	Low-gradient pools of streams with sand, silt and vegetation	0	G5	1, R	1	0	0	1	1
Sicklefin chub	Turbid riffles of rivers with sand, gravel and stable flow	0	G3	1, R&D	1	0	0	0	0
Largemouth bass	Pools of lakes and low-gradient or still rivers and backwaters with sand, gravel, wood, silt and stable flow	0	G5	0	0	0	0	1	0
Smallmouth bass	Runs and pools of high-gradient rivers and streams with gravel, rock and wood	0	G5	0	1	0	0	1	0
Spotted bass	Runs and pools of rivers and streams with gravel and stable flow	0	G5	0	1	0	0	0	0
Black redhorse	High-gradient of riffles and runs of rivers and streams with sand and gravel	0	G5	0	1	0	0	1	0
Fourhorn sculpin	Sand, gravel and rock in Lake Michigan	0	G5	1, R	0	0	0	0	1
Ghost shiner	Low-gradient or still pools of rivers with sand, gravel and silt	0	G5	1, R&D	0	0	0	0	1
Ozark minnow	Riffles, runs and pools of high-gradient streams with gravel	0	G5	1, R	1	0	0	1	0
Rosyface shiner	Runs and pools of high-gradient streams with sand, gravel and stable flow	0	G5	0	1	0	0	1	0
Silverband shiner	High-gradient rivers with sand, gravel and stable flow	0	G5	1, R	1	0	0	0	1
Mountain madtom	High-gradient riffles in rivers and streams with sand, gravel and vegetation	0	G4	1, R	0	0	0	0	1
Slender madtom	High-gradient riffles in streams with gravel, rock and stable flow	0	G5	1, R	1	0	0	1	0
Pugnose minnow	Low-gradient or still pools of rivers, streams, backwaters and swamps with silt and vegetation	0	G5	1, R	1	0	0	1	1
Yellow perch	Lake Michigan, lakes or low-gradient or still pools of rivers with sand, gravel, rock, silt and vegetation	0	G5	1, R&D	1	0	0	1	0
Trout-perch	Lake Michigan and low-gradient or still rivers with gravel, wood and stable flow	0	G5	1, R&D	0	0	0	0	1

Common Name	Habitat Association	1	2	3	4	5	6	7	8
Southern redbelly dace	Runs and pools of high-gradient streams with sand, gravel and stable flow	0	G5	0	1	0	0	1	0
North American paddlefish	Low-gradient rivers with sand, gravel and silt	0	G4	1, R&D	1	0	0	1	0
Blacknose dace	Riffles, runs and pools of high-gradient streams with sand, gravel and stable flow	0	G5	0	1	0	0	1	0
Longnose dace	Lake Michigan or riffles in high-gradient streams with sand, gravel, rock and stable flow	0	G5	1, R	1	0	0	1	0
Brook trout	Lake Michigan or coolwater streams with gravel	0	G5	1, R&D	0	0	0	1	0
Lake trout	Lake Michigan	0	G5	1, R	0	0	0	1	0
Shovelnose sturgeon	Riffles and runs of rivers with sand and gravel	0	G4	1, R	1	0	0	1	0
Sauger	Low-gradient runs and pools of rivers with sand, gravel and rock	0	G5	0	1	0	0	1	0
Walleye	Lakes or runs and pools of rivers with sand, gravel and rock	0	G5	1, D	1	0	0	1	0
Central mudminnow	Low-gradient or still pools streams, backwaters and swamps with silt and vegetation	0	G5	1, R	1	0	0	1	0
Channel catfish	Lakes or low-gradient or still runs and pools of rivers and streams with sand, gravel, rock, wood and stable flow	0	G5	0	0	0	0	0	0
Redear sunfish	Lakes or low-gradient or still pools of rivers and streams with sand, gravel, silt, wood and vegetation	0	G5	0	1	0	0	1	0
White crappie	Lakes and low-gradient or still pools of backwaters and rivers with vegetation	0	G5	1, D	1	0	0	0	0
Black crappie	Lakes and low-gradient or still pools of backwaters and rivers with sand, gravel, wood, silt, and vegetation	0	G5	1, D	1	0	0	1	0
T&E SGNC:									
Lake Sturgeon	Lakes and rivers with gravel and rock	SE	G3, G4	1, R	1	0	0	1	1
Western sand darter	Low-gradient rivers with sand	SE	G3	1, R	1	0	0	1	0
Eastern sand darter	Rivers with sand	ST	G4	1, R	1	0	0	1	0
Longnose sucker	Lakes, Lake Michigan streams	ST	G5	1, R	1	0	0	1	0
Cisco	Lake Michigan	ST	G5	1, R&D	0	0	0	1	0
Gravel chub	Rivers with sand and gravel	ST	G4	1, R&D	1	0	0	1	1
Bluebreast darter	High-gradient riffles in rivers and streams with rock	SE	G4	1, R	1	0	0	1	0
Iowa darter	Lakes, streams, backwaters and swamps with vegetation	ST	G5	1, R&D	1	0	0	1	0
Harlequin darter	High-gradient rivers and streams with gravel and wood	SE	G5	1, R&D	1	1	0	1	1
Banded killifish	Lakes with sand, gravel and vegetation	ST	G5	1, R	1	0	0	1	1
Starhead topminnow	Lakes, backwaters and swamps with vegetation	ST	G4	1, R&D	1	1	1	1	1
Cypress minnow	Lakes, swamps, backwaters and streams with sand and silt	SE	G5	1, R&D	1	0	0	0	1
Bigeye chub	streams with sand and gravel, vegetation	SE	G5	1, R	1	0	0	1	1
Pallid shiner	Pools of rivers with sand	SE	G4	1, R&D	1	1	0	0	1
Northern brook lamprey	Streams and rivers with sand and gravel	SE	G4	1, R&D	0	0	0	0	1
Least brook lamprey	Riffles with gravel in rivers and streams	ST	G5	1, R	1	0	0	0	0
Redspotted sunfish	Backwaters, swamps and low-gradient streams with vegetation	SE	G5	1, R	1	1	0	1	0
Bantam sunfish	Backwaters, swamps and lakes with vegetation	ST	G5	1, R&D	1	0	0	1	1
Sturgeon chub	Turbid rivers with sand	SE	G3	1, R	1	0	0	1	1
River redhorse	High-gradient rivers with gravel	ST	G4	1, R&D	1	0	0	1	1
Greater redhorse	Rivers and lakes with sand, gravel and rock	SE	G4	1, R	1	0	0	0	1
River chub	High-gradient rivers and streams with gravel and rock	SE	G5	1, R	1	0	0	1	1
Pugnose shiner	Lakes and low-gradient streams with vegetation	SE	G3	1, R&D	1	0	0	1	0
Bigeye shiner	Streams with sand, gravel and vegetation	SE	G5	1, R	1	0	0	1	1
Ironcolor shiner	Streams and swamps with sand and vegetation	ST	G4	1, R	1	1	0	1	1
Blackchin shiner	Lakes and streams with vegetation	ST	G5	1, R	1	0	0	1	0
Blacknose shiner	Lakes and streams with sand and vegetation	SE	G4	1, R	1	0	0	1	1
Tailight shiner	Backwaters, lakes, streams and swamps with vegetation	SE	G5	1, R&D	1	0	0	0	1
Weed shiner	Streams with sand and vegetation	SE	G5	1, R	1	1	0	1	0
Northern madtom	High-gradient streams and rivers with sand	SE	G3	1, R&D	1	1	0	0	1
Pallid sturgeon	Turbid rivers with sand and gravel	SE, FE	G2	1, R	1	0	0	1	1

Appendix II. Draft revision of Stresses to Illinois' Wildlife.

Stressor categories (non-T&E SGNC and game species):
1 = ≥ 50% expert consensus
0 = < 50% expert consensus

Stressor categories:
1 = recognized (published) stressor to species
0 = not a stressor to species (i.e. stressor is a requirement of this species, or stressor does not exist for this species)
S = insufficient evidence to make determination (published information is not available or clear for this stressor)

	Habitat Stresses							Community Stresses				Population Stresses				Human Stresses	
Common Name	*Extent*	*Fragmentation*	*Composition-Structure*	*Disturbance/Hydrology*	*Invasives/Exotics*	*Chemical Pollutants*	*Sedimentation*	*Competitors*	*Predators*	*Parasites-Disease*	*Prey-Food*	*Genetics*	*Dispersal*	*Recruitment*	*Mortality*	*Structures*	*Climate Change*
Non-T&E SGNC and Game Species:																	
American eel	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
brown bullhead	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
largescale stoneroller	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
highfin carpsucker	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
flier	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
lake whitefish	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
mottled sculpin	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
banded sculpin	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
lake chub	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
crystal darter	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
brook stickleback	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
blue sucker	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
blacktail shiner	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
banded pygmy sunfish	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
lake chubsucker	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
northern pike	1	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0
muskellunge	1	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
bluntnose darter	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
fringed darter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cypress darter	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
spottail darter	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
spring cavefish	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
silver lamprey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
American brook lamprey	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0
ribbon shiner	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
sicklefin chub	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	1	0
largemouth bass	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
smallmouth bass	1	1	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0
spotted bass	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
black redhorse	1	1	1	0	0	1	1	0	0	0	0	0	1	0	0	0	0
fourhorn sculpin	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
ghost shiner	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ozark minnow	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
rosyface shiner	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
silverband shiner	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	1	0
mountain madtom	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0

	Habitat Stresses							Community Stresses				Population Stresses				Human Stresses	
Common Name	Extent	Fragmentation	Composition-Structure	Disturbance/Hydrology	Invasives/Exotics	Chemical Pollutants	Sedimentation	Competitors	Predators	Parasites-Disease	Prey-Food	Genetics	Dispersal	Recruitment	Mortality	Structures	Climate Change
pugnose minnow	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
yellow perch	1	0	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0
trout-perch	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
southern redbelly dace	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0
North American paddlefish	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0
blacknose dace	1	1	1	1	0	0	1	0	0	0	0	0	25	0	0	0	0
longnose dace	1	1	1	1	0	1	1	0	0	0	0	0	1	0	0	1	0
brook trout	1	1	1	0	1	0	1	1	1	0	1	1	1	1	0	1	0
lake trout	0	0	0	0	1	0	0	1	1	0	1	0	0	1	1	0	0
shovelnose sturgeon	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
sauger	1	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0
walleye	1	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0
central mudminnow	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
channel catfish	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
redear sunfish	1	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0
white crappie	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0
black crappie	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0
T&E SGNC:																	
lake sturgeon	S	S	1	1	S	1	1	S	S	S	S	S	S	S	1	1	S
western sand darter	S	S	1	1	S	1	1	S	S	S	S	S	S	S	S	1	S
eastern sand darter	1	S	S	S	S	1	1	S	S	S	S	S	S	S	S	1	S
longnose sucker	0	0	0	S	1	1	0	S	S	S	S	S	1	S	S	1	S
cisco	0	0	0	S	1	1	0	1	1	S	S	S	S	S	1	0	S
gravel chub	S	S	S	S	S	S	1	S	S	S	S	S	S	S	S	1	S
bluebreast darter	S	S	S	S	S	1	1	S	S	S	S	S	S	S	S	1	S
Iowa darter	1	1	1	1	1	1	0	S	S	S	S	S	S	S	S	S	S
harlequin darter	1	S	1	1	S	1	1	S	S	S	S	S	S	S	S	1	S
banded killifish	1	S	1	S	S	1	0	S	1	S	S	S	S	S	S	S	S
starhead topminnow	1	S	1	1	S	1	1	S	1	S	S	S	S	S	S	S	S
cypress minnow	1	S	1	1	S	1	1	S	S	S	S	S	S	S	S	1	S
bigeye chub	1	S	1	1	S	1	1	S	S	S	S	S	S	1	S	1	S
pallid shiner	S	S	S	S	S	S	1	S	S	S	S	S	S	S	S	1	S
northern brook lamprey	S	S	S	S	S	1	S	S	S	S	S	S	S	S	S	1	S
least brook lamprey	S	S	S	S	S	S	1	S	S	S	S	S	S	S	S	1	S
redspotted sunfish	1	S	1	1	S	1	0	S	S	S	S	S	S	S	S	S	S
bantam sunfish	1	1	1	S	S	1	0	S	S	S	S	S	S	S	S	S	S
sturgeon chub	1	1	1	1	1	S	1	S	S	S	S	S	S	S	S	1	S
river redhorse	S	S	S	1	S	1	1	S	S	S	S	S	S	S	S	S	S
greater redhorse	S	S	S	1	S	1	1	S	S	S	S	S	S	S	S	1	S
river chub	S	S	1	1	S	S	1	S	S	S	S	S	S	S	S	1	S
pugnose shiner	1	S	1	1	S	1	1	S	1	S	S	S	S	S	S	1	S
bigeye shiner	S	S	S	1	S	S	1	S	S	S	S	S	S	S	S	1	S
ironcolor shiner	S	1	S	S	S	1	1	S	S	S	S	S	S	S	S	S	S
blackchin shiner	1	S	1	S	S	1	1	S	1	S	S	S	S	S	S	S	S
blacknose shiner	1	S	1	S	S	S	1	S	S	S	S	S	S	S	S	S	S
taillight shiner	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
weed shiner	S	S	S	S	S	1	1	S	S	S	S	S	S	S	S	S	S
northern madtom	1	S	1	1	S	1	1	S	S	S	S	S	S	S	S	S	S
pallid sturgeon	1	S	1	1	S	S	S	S	S	S	S	1	1	1	1	1	S