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## Current status of native fish species in Kansas

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A re-evaluation of the status of fishes in Kansas suggests that 54 of the 116 native species should be assigned special conservation status due to substantial declines in distribution or abundance and/or their rarity in the state. Nine species are recommended for retention in their existing status of endangered, threatened, or species in need of conservation. We recommend elevated conservation status for 44 additional species, and provide information on trends in distribution and abundance for these taxa. A single species, the Arkansas River Shiner, *Notropis girardi*, is considered to be extirpated recently from Kansas.

*Keywords:* fishes, endangered, threatened, conservation, Kansas.

### INTRODUCTION

Thirty-two years ago, Platt et al. (1973) published a summary of rare, endangered, and extirpated species of native fishes in Kansas. The current listing of endangered species (E), threatened species (T), and species in need of conservation (SINC) used by the Kansas Department of Wildlife and Parks (K.A.R. 115-15-1 and 115-15-2) is largely based upon recommendations presented in that paper.

Since that time, the distribution and abundance of many native species of fishes in Kansas have changed substantially. Many of these changes are a result of continuing human alteration of aquatic systems in this region (Cross and Moss 1987; Fausch and Bestgen 1997; Dodds et al. 2004). The magnitude of these changes across the entire state warrants a comprehensive re-evaluation of the status of native fish species.

The state of Kansas defines “endangered species” as any species of wildlife whose continued existence as a viable component of the state’s wild fauna is determined to be in jeopardy [K.S.A. 32-958 (c)]; “threatened species” as any species of wildlife that appears likely, within the foreseeable future, to become an endangered species [K.S.A. 32-958 (f)]; and “species in need of conservation” as nongame species for which population, distribution, habitat needs, limiting factors and other biological and ecological data suggest the species is in need of conservation [K.S.A. 32-959].

Based on information from 801 stream surveys conducted by the Kansas Department of Wildlife and Parks (KDWP) throughout the state since 1994, data from the museums at the University of Kansas (KU) and Fort Hays State University (MHP), published studies, unpublished data from reliable sources (e.g. Frank Cross, pers.

com., research reports prepared for KDWP), and personal experience with and knowledge of these species, we summarize the current status of 44 native species of fishes which are at risk of extirpation or have experienced a substantial decline in distribution or abundance in Kansas (Table 1).

Information of earlier distributions is based largely on the summary provided by Cross (1967). Current status (KDWP and U.S. Fish and Wildlife Service [USFWS] lists of protected species) and recommendations for conservation status (E, T, or SINC) of fish species in Kansas also are presented.

Species are listed by family in the sequence used by Cross and Collins (1995) and listed alphabetically within each family (except for some minnows and darters, which are grouped by similarities in habitats and distribution). Names used follow Haslouer (2004).

The following species, some of which are also on the federal list of endangered and threatened species, are recommended for retention in their existing conservation status in Kansas: Pallid Sturgeon, *Scaphirhynchus albus* (state E; federal E); Sicklefins Chub, *Macrhybopsis meeki* (state E); Peppered Chub, *Macrhybopsis tetranema* (state E); Topeka Shiner, *Notropis topeka* (state T; federal E); Blue Sucker, *Cycleptus elongatus* (SINC); Spotted Sucker, *Minytrema melanops* (SINC); Tadpole Madtom, *Noturus gyrinus* (SINC); Neosho Madtom, *Noturus placidus* (state T; federal T); Arkansas Darter, *Etheostoma cragini* (state T).

#### PETROMYZONTIDAE—LAMPREYS

**Chestnut Lamprey, *Ichthyomyzon castaneus*.** **Current status: T. Proposed status: E.** The last documented specimen from Kansas (KU 22374) is from 1989. Prior to this collection, the most recently documented records are from 1965 (KU 11091, 21360). This species formerly inhabited the Kansas, Marais des Cygnes, and Neosho river basins in the eastern third of the state

(Cross 1967). Dewatering and scouring of sediments in rearing habitats of small streams probably account for the loss of the Chestnut Lamprey from these basins (Cross and Collins 1995). This species was included in a 1998 list believed by Frank Cross (unpub. observ.) to be “extirpated (or nearly so)” in Kansas. The Kansas Natural Heritage Inventory (KNHI) lists this taxon as “possibly extirpated” in Kansas (NatureServe 2004).

#### ACIPENSERIDAE—STURGEONS

**Lake Sturgeon, *Acipenser fulvescens*.** **Current status: not listed. Proposed status: E.** One specimen (KU 27324) of this species from Kansas was taken from the lower Kansas River in 1997. Another recent specimen was caught and released from the Missouri River in 1988 (Cross and Collins 1995). This taxon has undergone a widespread decline in abundance (Cross and Collins 1995) and was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “extirpated (or nearly so)” in Kansas. The KNHI lists this species as “possibly extirpated” in Kansas (NatureServe 2004).

**Shovelnose Sturgeon, *Scaphirhynchus platyrhynchus*.** **Current status: not listed. Proposed status: SINC.** This species has been described in recent publications as no longer occurring in large parts of Kansas where it was once abundant (Hesse and Carreiro 1997; Keenlyne 1997). Historically, it was known to occur throughout the Missouri and Kansas rivers, as well as the lower portions of the Republican, Blue, Smoky Hill, and Arkansas rivers (Cross and Collins 1995). Possible factors leading to its decline in Kansas include the changing nature of riverine habitat caused by dams and other flow alterations, channel modifications, changes in substrate composition, and increased water clarity.

The current status of Shovelnose Sturgeon in Kansas is not well known. Few systematic surveys have been conducted on Kansas streams

Table 1. Summary of rationale for recommending conservation status of fishes in Kansas, including current status listed by the Kansas Department of Wildlife and Parks, status recommended by the National Heritage

Species	Current status <sup>1</sup>	Proposed status <sup>1</sup>	Cross 1998 <sup>2</sup>	NHI status <sup>3</sup>	Rationale <sup>4</sup>
Chestnut Lamprey	T	E	EXN	SH	2/3
Lake Sturgeon	NL	E	EXN	SH	2/3
Shovelnose Sturgeon	NL	SINC	-	S3	2/3
Goldeye	NL	SINC	-	S4	2/3
American Eel	NL	E	SR	S2	2/3
Western Silvery Minnow	T	E	EXN	S2	2/3
Plains Minnow	SINC	E	SR	S2	2/3
Sturgeon Chub	T	E	EXN	S1	2/3
Shoal Chub	NL	T	SR	S4	2/3
Silver Chub	NL	E	SR	S3	2/3
River Shiner	SINC	E	-	S3	2/3
Silverband Shiner	T	E	EXN	SH	2/3
Flathead Chub	T	E	EXN	S1	2/3
Spotfin Shiner	SINC	E	-	S1	2/4
Gravel Chub	SINC	E	-	S2	2/3
Cardinal Shiner	NL	SINC	-	S3	3/4
Striped Shiner	NL	E	-	S1	1/3/4
Redspot Chub	T	E	SR	S1	2/3
Bigeye Shiner	NL	T	-	S3	1/3
Ozark Minnow	SINC	E	-	S1	3/4
Brassy Minnow	SINC	T	SR	S1	2/4
Common Shiner	NL	T	SR	S4	2/3/4
Hornyhead Chub	T	E	SR	S1	2/3
Southern Redbelly Dace	NL	T	-	S2	2/4
Western Blacknose Dace	SINC	E	-	S1	1/3/4
Highfin Carpsucker	SINC	E	SR	S2	2/3
Northern Hog Sucker	SINC	E	SR	S1	2/3?
River Redhorse	SINC	E	EXN	S1	2/3
Black Redhorse	SINC	E	-	S1	1/3
Blue Catfish	NL	SINC	-	S4	3
Bridled Madtom	NL	E	-	S2	2/3
Northern Plains Killifish	NL	SINC	SR	S3	2/3
Banded Sculpin	SINC	E	SR	SH	1/3
Greenside Darter	SINC	T	-	S2	2/3
Bluntnose Darter	SINC	T	-	S2	1/3
Fantail Darter	NL	SINC	-	S3	1/3
Slough Darter	SINC	E	-	S1	1/3
Stippled Darter	SINC	E	-	S1	1/3
Speckled Darter	SINC	E	-	S1	1/3
Redfin Darter	NL	T	-	S3	1/3
Banded Darter	SINC	T	SR	S3	2/3
River Darter	SINC	T	-	S1	1/3
Johnny Darter	NL	T	-	S3	2/3
Blackside Darter	T	E	-	S1	1/3

Inventory, and personal evaluation by the late Frank B. Cross.

<sup>1</sup> NL—Not Listed; SINC—Species In Need of Conservation; T—Threatened; E—Endangered.

<sup>2</sup> Frank Cross, personal communication (EXN—Extirpated or nearly so; SR—Significantly reduced in range or abundance).

<sup>3</sup> National Heritage Inventory ranking: S1=Critically Imperiled; S2=Imperiled; S3=Vulnerable; S4=Apparently Secure; SH=Possibly Extirpated.

<sup>4</sup> 1—Range has not declined, but overall is restricted in KS, and therefore species is vulnerable; 2—Range has constricted and there are known extirpations; 3—Range encompasses habitats that have had, or are currently undergoing, major changes; 4—Part of a distinctive and important fish fauna that is rare throughout Kansas.

that historically supported it. The most recently catalogued specimen from Kansas (KU 22662) was collected in 1990 from the lower Kansas River (Wyandotte County). In the 1990s, the species was collected from the Republican River (V. Tabor USFWS, pers. com.), the lower Smoky Hill River, and the Kansas and Missouri rivers (Wenke, Ernsting and Eberle 1993; Wenke 1995; Quist and Guy 1999).

Our recommendation to list the Shovelnose Sturgeon is based largely on the changing nature of the riverine habitat it historically occupied. This species is an obligate “large river” fish, and many of the characteristics of large rivers in Kansas have undergone substantial changes since 1950 (Cross and Moss 1987; Sanders, Huggins and Cross 1993). This species requires a comparatively long time (5–7 years) to gain reproductive maturity (Keenlyne 1997), and excessive harvest or mortality of sexually immature individuals can pose a risk to it in Kansas. Other threats to this taxon include exposure to anthropogenic influences, which could potentially affect reproductive viability due to pharmaceutically induced hermaphroditism (Moos 1978; Carlson et al. 1985), and excessive harvest of the species for roe for the caviar trade (Williamson 2003).

**HIODONTIDAE—MOONEYES**

**Goldeye, *Hiodon alosoides*. Current status: not listed. Proposed status: SINC.** Historically the Goldeye inhabited the Missouri, Kansas, lower Arkansas, and Marais des Cygnes river basins (Cross and Collins 1995). Comparatively recent records (within the last 25 years) for this species exist only from the lower Republican River (and a tributary), Milford Reservoir, the lower Kansas River, the lower Smoky Hill River, and a tributary of the Missouri River (KDWP unpub. data, KU catalogue).

Although this taxon is apparently stable in Milford Reservoir, it is considered “scarce” throughout much of its former documented range (Cross and Collins 1995) and has never been represented by more than a single specimen in recent riverine collections.

**ANGUILLIDAE—FRESHWATER EELS**

**American Eel, *Anguilla rostrata*. Current status: not listed. Proposed status: E.** Formerly ranging nearly statewide as migrants from the Gulf of Mexico, the last catalogued specimen of an American Eel from Kansas in the KU collection (KU 18680) is from 1979. Cross and Collins (1995) also noted a non-vouchered specimen taken in the Kansas River in 1987. Dams and flow diversions have rendered a good deal of the formerly documented range of this species inaccessible during its migrations. This taxon was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “significantly reduced in range or abundance” in Kansas. The KNHI lists this species as “imperiled” in Kansas (NatureServe 2004).

**CYPRINIDAE—MINNOWS****Minnows of the large rivers**

Streamflow modifications (e.g., dewatering, reduction of peak flows, and elevation of base flows), compaction of sand substrates, increased water clarity, and establishment of sight-feeding predators and competitors all pose a serious risk

for the future of the following eight species of minnows uniquely adapted to the larger rivers in Kansas (Cross and Moss 1987). Declines in these species have been most dramatic since the 1950s, following a period of increased irrigation withdrawals and construction of mainstem reservoirs and other water retention structures (Cross and Moss 1987).

**Western Silvery Minnow, *Hybognathus argyritis*. Current status: T. Proposed status: E.** This species formerly occurred in the lower Kansas River (Cross and Collins 1995), but it has not been documented from this area in the last 20 years. Pflieger (1997) showed the taxon as occurring in the Missouri River along the Kansas border, where it was considered rare. This minnow was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “extirpated (or nearly so)” in Kansas. The KNHI lists this species as “imperiled” in Kansas (NatureServe 2004).

**Plains Minnow, *Hybognathus placitus*. Current status: SINC. Proposed status: E.** The Plains Minnow formerly occurred in suitable habitat statewide, but its distribution in Kansas has declined dramatically (Eberle, Wenke and Welker 1997). Cross (1967, p. 147) wrote, “The plains minnow abounds in all large streams of Kansas that have broad beds of sand and shallow, braided flow.” Twenty-eight years later, Cross and Collins (1995, p. 67) wrote “...it has declined precipitously over most of its range in the state. It has not been found at all in the lower Kansas River in recent years, although it was abundant there until the 1970s.” Although three specimens were collected from this river segment in the 1990s (KU 27336, 27110), the magnitude of the decline of this taxon is apparent.

The Plains Minnow recently has been collected from rivers and tributaries in the Arkansas River system, the lower Republican River (and a few of its tributaries), a small segment of the upper Smoky Hill River (Logan and Gove counties), and a few minor tributaries of the Missouri River. It occasionally has been collected in

moderate numbers, but it usually has not been abundant in recent collections. This species was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “significantly reduced in range or abundance” in Kansas. The KNHI lists this taxon as “imperiled” in Kansas (NatureServe 2004).

**Sturgeon Chub, *Macrhybopsis gelida*. Current status: T. Proposed status: E.** This species formerly occurred in the lower Smoky Hill and Kansas rivers (Cross and Collins 1995), but none has been taken from these rivers in the last 25 years. Recent collections of Sturgeon Chubs have been made in the Missouri River along the Kansas/Missouri border (Wenke 1995). This taxon was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “extirpated (or nearly so)” in Kansas. The KNHI lists this species as “critically imperiled” in Kansas (NatureServe 2004).

**Shoal Chub, *Macrhybopsis hyostoma*. Current status: not listed. Proposed status: T.** The Shoal Chub was previously considered conspecific with *Macrhybopsis tetranema* (Peppered Chub) as *Macrhybopsis (Extrarius) aestivalis* (Eisenhour 1999). This species has been extirpated from the Big Blue River drainage in Kansas (Gido et al. 2002) and was collected rarely in the Kansas River, where it was once abundant (Metcalf 1966), during a 1992 survey targeting small minnows (Wenke 1995). Recently vouchered collections (throughout the 1990s) of this taxon exist from the Republican River (MHP). This chub was included in a 1998 list of fishes believed by Frank Cross to have been “significantly reduced in range or abundance” in Kansas.

**Silver Chub, *Macrhybopsis storeriana*. Current status: not listed. Proposed status: E.** Although once common in the Kansas River (Cross 1967), no collections of the Silver Chub from that river have been catalogued at KU since 1980. This species is represented by recent collections only from the lower Arkansas River, lower Ninescah River, South Fork Ninescah

River, and a direct tributary to the Missouri River in Doniphan County (KDWP unpub. data). It was not abundant in any of those recent collections. The Silver Chub apparently has been extirpated from a substantial portion of its previous range in Kansas (the Kansas River basin). This taxon was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to have been “significantly reduced in range or abundance” in Kansas.

**River Shiner, *Notropis blennioides*. Current status: SINC. Proposed status: E.** Documented collections of the River Shiner indicate it once had a more widespread distribution in Kansas, including the Kansas, Missouri, Smoky Hill, South Fork Republican, Arkansas, and South Fork Ninescah rivers (Cross 1967). The most recent collection of this taxon at KU is from the Kansas River at Lawrence in 1997 (KU 27109), the first catalogued from Kansas since 1981 (Kansas River, Wyandotte Co., KU 18961, 21260). The most recent collection at KU of this species from the Arkansas River drainage in Kansas is from 1967 (KU 12191). Cross, Moss and Collins (1985) suggested this shiner had disappeared from the Arkansas basin in Kansas. The KNHI lists this species as “vulnerable” in Kansas (NatureServe 2004).

**Silverband Shiner, *Notropis shumardi*. Current status: T. Proposed status: E.** “Extensive modification of the Missouri River for navigation has eliminated most sandbar habitat” occupied by this species in Kansas (Cross and Collins 1995, p. 98). The last vouchered specimen of this taxon from Kansas was from 1957 (KU 3846). Silverband Shiners are rare in the Missouri River (Pflieger 1997). This species was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “extirpated (or nearly so)” in Kansas. The KNHI lists this shiner as “possibly extirpated” in Kansas (NatureServe 2004).

**Flathead Chub, *Platygobio gracilis*. Current status: T. Proposed status: E.** This species previously inhabited the upper Arkansas,

Cimarron, upper Republican, Kansas, Nemaha and Missouri rivers (Cross and Collins 1995), but no specimens of this taxon from Kansas have been cataloged at KU since 1977 (KU 17146). The Flathead Chub was recently reported from the Arkansas River near the Colorado border (R. Waters KDWP, pers. com.) where water for surface irrigation maintains streamflow in the river. This species was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “extirpated (or nearly so)” in Kansas. The KNHI lists this taxon as “critically imperiled” in Kansas (NatureServe 2004).

### Minnows of southeastern Kansas

Streams in southeastern Kansas, especially those in the Ozark Highlands in Cherokee County, contain the greatest diversity of fishes (and other aquatic organisms) in the state (Cross and Collins 1995). Most of the fish diversity is represented by minnows and darters. Impoundments, flow diversions, increased turbidity, stream sedimentation, and industrial, municipal, and mining pollutants are all factors in the reduction in range and abundance of species in this region, including the seven species of minnows listed below, as well as several species of suckers, madtoms, darters, and a sculpin (all discussed elsewhere in this summary). Substantial urban development has occurred in the vicinity of Joplin, Missouri, during the last 10 years and is continuing, so increased urban runoff and associated general decline in water quality can be expected, placing increased stress on fishes in the Spring River basin.

**Spotfin Shiner, *Cyprinella spiloptera*. Current status: SINC. Proposed status: E.** This species once occurred much more widely throughout southeastern Kansas. Historical records for this taxon exist from the Neosho and Verdigris basins in Lyon and Greenwood counties (Cross 1967). In the last 50 years, the Spotfin Shiner has been collected only in the Spring River and a few of its tributaries in Cherokee County, and

has never been abundant (KDWP unpub. data, KU catalogue). The KNHI lists this fish as “critically imperiled” in Kansas (NatureServe 2004).

**Gravel Chub, *Erimystax x-punctatus*. Current status: SINC. Proposed status: E.** The Gravel Chub historically occurred throughout most of the Neosho River mainstem. Vouchered collections as far upstream as the confluence with the Cottonwood River (as well as records from the Cottonwood and South Fork Cottonwood rivers 50 km west of the confluence) indicate a much wider former distribution of the species than recent records substantiate (Cross 1967). Recent collections of this fish in Kansas are only from a few sites in the lower Neosho and Spring rivers and in Shoal Creek (KDWP unpub. data, KU catalogue). Annual fixed-site sampling for this taxon in the Neosho River has shown a decrease in the number observed and locations of occurrence since 1996 (KDWP unpub. data). This chub has mostly been found in low numbers in recent collections. The KNHI lists this species as “imperiled” in Kansas (NatureServe 2004).

**Cardinal Shiner, *Luxilus cardinalis*. Current status: not listed. Proposed status: SINC.** This species, although sometimes locally abundant, primarily occurs in Kansas as a disjunct relict population in a small portion of the upper Neosho basin. It also occurs in the Spring River and its tributaries in extreme southeastern Kansas, and a few older records exist from the uppermost Verdigris River (Cross 1967).

It is not apparent that distribution or numbers of this shiner have changed significantly during its recorded history in Kansas; however, its range is restricted to only a few streams in Kansas, indicating a precarious distribution. While the Cardinal Shiner can be the predominant cyprinid in occupied streams (KDWP unpub. data), most recorded localities in the state are in close proximity, raising the possibility that a single abiotic or biotic event could affect the

viability of numerous known populations of the species. The KNHI lists this taxon as “vulnerable” in Kansas (NatureServe 2004).

**Striped Shiner, *Luxilus chrysocephalus*.**

**Current status: not listed. Proposed status: E.**

Branson captured this species in the Spring River prior to the mid-1960s (pers. com. in Cross 1967). Platt et al. (1973) considered this fish to have a peripheral population in Kansas, and Cross and Collins (1975, 1995) considered it rare in the state, given its limited distribution. Sixty specimens of the Striped Shiner are catalogued at KU from five collections from Shoal Creek from 1970 to 1980. Two specimens were captured in the Spring River in the mid-1990s (Edds and Dorlac 1995; Wilkinson and Edds 1996). The KNHI lists this taxon as “critically imperiled” in Kansas (NatureServe 2004).

**Redspot Chub, *Nocomis asper*. Current status:**

**T. Proposed status: E.** This fish previously occurred more widely through the Neosho River basin in Kansas (Cross 1967). Recent records of the Redspot Chub exist only from the Spring River and Shoal Creek, Cherokee County, and it has not been abundant in recent collections (KDWP unpub. data, KU catalogue). Recent surveys of upper Cottonwood River tributaries (KDWP unpub. data) support the observation of Deacon (1961) that the taxon is likely extirpated from this basin. This chub was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “significantly reduced in range or abundance” in Kansas. The KNHI lists this species as “critically imperiled” in Kansas (NatureServe 2004).

**Bigeye Shiner, *Notropis boops*. Current**

**status: not listed. Proposed status: T.** This fish is restricted to three stream systems in Kansas: 1) the Spring River and tributaries in extreme southeastern Kansas, 2) Grouse Creek and its tributaries (Cowley County), and 3) the Elk and Caney rivers and tributaries in the Verdigris basin (Metcalf 1959; Cross and Collins 1995). It is not apparent that the distribution of this

species has changed significantly during its recorded history in Kansas; however, its range is restricted to only a few streams in southeastern Kansas, indicating a precarious distribution. Recent population trends for this taxon in Kansas are not known with certainty.

The Bigeye Shiner is included in this list not because of declining numbers or dwindling range, but because of the extraordinary threat it faces due to its peculiar pattern of distribution in the state. As an indication of the vulnerability of this shiner in Kansas, construction of a single, recently proposed recreational lake on Grouse Creek would result in the extirpation of this fish from an entire drainage basin (approximately 30% of its current range in Kansas). The KNHI lists this species as “imperiled” in Kansas (NatureServe 2004).

**Ozark Minnow, *Notropis nubilus*. Current**

**status: SINC. Proposed status: E.** It is not apparent that the distribution of this fish has changed significantly in Kansas; however, its range is restricted to Shoal Creek in southeastern Kansas (Cross and Collins 1995), indicating a precarious distribution. The extremely localized occurrence of this species raises the possibility that a single abiotic or biotic event could affect its viability in Kansas. The KNHI lists this taxon as “critically imperiled” in Kansas (NatureServe 2004).

**Other species of minnows**

Of the five remaining species of minnows, the Brassy Minnow, Common Shiner, and Hornyhead Chub (along with the Johnny Darter discussed later) comprise a group of fishes that was once characteristic of small, clear streams in northern Kansas. However, these species have been extirpated from much of this region, especially the Republican and Smoky Hill river basins of northwestern Kansas. Reasons for this decline apparently are related to increased turbidity and dewatering of these streams (Cross and Moss 1987; Cross and Collins 1995). The same is true for the federally endangered Topeka

Shiner, which once occurred over a wider portion of the state.

**Brassy Minnow**, *Hybognathus hankinsoni*.

**Current status:** SINC. **Proposed status:** T.

Recent records of small numbers of individuals of this species in Kansas exist only from a few sites in the South Fork Republican, Republican, and Smoky Hill river basins in northwestern Kansas and from the Missouri River (MHP catalogue). Cross and Collins (1995, p. 64) suggested that this minnow previously occurred more widely in Kansas. Brassy Minnows were included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “significantly reduced in range or abundance” in Kansas. The KNHI lists this taxon as “critically imperiled” in Kansas (NatureServe 2004).

**Common Shiner**, *Luxilus cornutus*. **Current**

**status:** not listed. **Proposed status:** T. This fish has experienced a substantial reduction in its historic range in Kansas. As with the Topeka Shiner and Johnny Darter, it once occurred through much of northern Kansas, in tributaries of both the Kansas and Missouri rivers (Hay 1887; Cross and Collins 1995). Most collections of this species in recent years have come from streams in the Flint Hills (Kansas River basin), and several collections have been taken from small streams in the glaciated region of northeastern Kansas. This shiner was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to have been “significantly reduced in range or abundance” in Kansas.

**Hornyhead Chub**, *Nocomis biguttatus*.

**Current status:** T. **Proposed status:** E. This species has experienced a substantial reduction in its historic range in Kansas (Mammoliti 2002). Once known to occur “over most of northern Kansas” (Cross and Collins 1995, p. 80), the taxon recently has been collected (in low numbers) from only a few sites in the Marais des Cygnes River basin (KDWP unpub. data in Mammoliti 2002). This chub was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to have been

“significantly reduced in range or abundance” in Kansas. The KNHI lists this fish as “critically imperiled” in Kansas (NatureServe 2004).

**Southern Redbelly Dace**, *Phoxinus*

*erythrogaster*. **Current status:** not listed.

**Proposed status:** T. This fish has experienced a substantial reduction in its historic range in Kansas. Older records of this species from the upper Solomon, upper Arkansas, and Marais des Cygnes river basins indicate a much wider historical distribution (Cross and Collins 1995). This taxon currently is known only from three population centers in Kansas: 1) northern Flint Hills (the Kansas and upper Neosho river basins), 2) headwaters of the Medicine Lodge and Ninnescah rivers in south-central Kansas, and 3) the Spring River system in the Ozark Plateau (KDWP unpub. data, KU catalogue). Although sometimes locally numerous and relatively widespread in the northern Flint Hills, the Southern Redbelly Dace has not been collected recently from many sites outside this area. The KNHI lists this species as “imperiled” in Kansas (NatureServe 2004).

**Western Blacknose Dace**, *Rhinichthys obtusus*.

**Current status:** SINC. **Proposed status:** E. A previously unknown population of this species, possibly a relict from glacial times, was discovered in Kansas by Stark (1990).

Population trends are not known. This taxon apparently is confined to three spring-fed streams in the upper Nemaha River basin in northeastern Kansas. The extremely localized populations raise the possibility that a single abiotic or biotic event could affect the viability of the Western Blacknose Dace in Kansas. The KNHI lists this fish as “critically imperiled” in Kansas (NatureServe 2004). This species was until recently considered conspecific with the Eastern Blacknose Dace, *Rhinichthys atratulus* (Nelson et al. 2004).

**CATOSTOMIDAE—SUCKERS**

**Highfin Carpsucker**, *Carpionodes velifer*.

**Current status:** SINC. **Proposed status:** E.

Although it previously occupied much of the eastern third of the state in the Kansas, Marais des Cygnes, and Neosho river basins (Cross and Collins 1995), the most recent vouchered record for the Highfin Carpsucker in Kansas is from 1976 from the Elk River in Montgomery County (KU 17228). Reasons for the decline of this taxon are unknown, but the timing of its demise suggests changes in stream characteristics associated with agricultural development are at least partly responsible. This fish is less tolerant of high turbidity than other species in the genus (Pflieger 1997). This carpsucker was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to have been “significantly reduced in range or abundance” in Kansas. The KNHI lists this species as “imperiled” in Kansas (NatureServe 2004).

**Northern Hog Sucker, *Hypentelium nigricans*.**

**Current status: SINC. Proposed status: E.**

Historical changes in the distribution of the Northern Hog Sucker in Kansas have been dramatic. Once inhabiting the Neosho, Marais des Cygnes, and Osage river basins in Kansas (Cross 1967, Cross and Collins 1995), this taxon now occurs at only a few sites in the Spring River and a few of its tributaries in Cherokee County (KDWP unpub. data, KU catalogue). It has never been abundant in collections.

The extremely localized populations of this species raise the possibility that a single abiotic or biotic event could affect the viability of the species in Kansas. This fish was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to have been “significantly reduced in range or abundance” in Kansas. The KNHI lists this sucker as “critically imperiled” in Kansas (NatureServe 2004).

**River Redhorse, *Moxostoma carinatum*.**

**Current status: SINC. Proposed status: E.**

Formerly occurring in larger streams throughout the eastern portion of the state in the Kansas, Osage, and Arkansas river systems (Cross and Collins 1995), only one specimen of the River

Redhorse has been documented recently in Kansas (KDWP unpub. data, 1997, from the Spring River, Cherokee County). This species is listed as “critically imperiled” in Kansas by the KNHI (NatureServe 2004) and was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “extirpated (or nearly so)” in Kansas.

**Black Redhorse, *Moxostoma duquesnei*.**

**Current status: SINC. Proposed status: E.**

Although the distribution of this fish apparently has not changed significantly, its range is restricted to the Spring River (Silovsky and Triplett 1991; Edds and Dorlac 1995; Wilkinson and Edds 1996) and Shoal Creek (Wilkinson and Edds 1996) in southeastern Kansas, indicating a precarious distribution. The recorded localities for this taxon are in close proximity, raising the possibility that a single abiotic or biotic event could affect the viability of the species in Kansas. The KNHI lists the Black Redhorse as “critically imperiled” in Kansas (NatureServe 2004).

**ICTALURIDAE—NORTH AMERICAN CATFISHES**

**Blue Catfish, *Ictalurus furcatus*. Current status: not listed. Proposed status: SINC.**

Blue Catfish live in the main channels of large rivers, but also occur in reservoirs (Cross and Collins 1995). The current distribution and abundance of this species in rivers is not well known. Few systematic surveys have been conducted on streams in Kansas supporting this taxon. Recorded collections of indigenous (non-introduced) populations of these catfish exist only from the lower Kansas River, Missouri River, and lower Marais des Cygnes River. Cross (1967) considered this taxon to be formerly more abundant in Kansas rivers.

Most recent records (Cross and Collins 1995) of the Blue Catfish are the result of introductions to impoundments. Although reproduction in an introduced population in Milford Reservoir has recently been documented (Goeckler et al. 2003), it is not known whether these

introductions will result in establishment of self-sustaining populations or whether they will spread into rivers. The changing nature of the riverine habitat historically occupied by this catfish is unlikely to be undone, including the effects of dams, channel modifications, altered flow regimes, changes in substrate composition, and increased water clarity.

Our recommendation to list the Blue Catfish is based largely on the dearth of recently catalogued specimens, its apparent reduction in abundance, and the changing nature of the riverine habitat it has historically occupied. This species is an obligate “large river” fish, and many of the characteristics of large rivers in Kansas have undergone fundamental changes over the last 50 years (Cross and Moss 1987; Sanders, Huggins and Cross 1993).

**Brindled Madtom**, *Noturus miurus*. **Current status: not listed. Proposed status: E.** The range of this small fish in Kansas has declined substantially. Older records for it exist from the headwaters of the Verdigris and Caney drainages (Cross and Collins 1995), but this species now is known only in the Spring River (Silovsky and Triplett 1991; Edds and Dorlac 1995; Wilkinson and Edds 1996) and Cedar Creek (Cottonwood River basin). This taxon has never been abundant in reported collections. Cross (1967) noted this madtom to be intolerant of intermittency, high turbidity, and siltation. Construction of impoundments on Cedar Creek or in the Cedar Creek watershed would inundate potential stream habitat of the Brindled Madtom and could result in establishment of predatory species. Agricultural or other watershed development activities resulting in increased turbidity would have a negative impact on this fish. The KNHI lists this species as “imperiled” in Kansas (NatureServe 2004).

#### FUNDULIDAE—TOPMINNOWS

**Northern Plains Killifish**, *Fundulus kansae*. **Current status: not listed. Proposed status: SINC.** Although once seemingly ubiquitous

throughout western and central Kansas (Cross 1967), the distribution and abundance of this killifish have been reduced following widespread dewatering and changes in water quality (e.g. reduced salinity) that allow greater numbers of competitive species to become established (Cross and Collins 1995). This taxon was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “significantly reduced in range or abundance” in Kansas. The KNHI lists this fish as “vulnerable” in Kansas (NatureServe 2004). This species was until recently considered conspecific with the Plains Killifish, *Fundulus zebrinus* (Nelson et al. 2004).

#### COTTIDAE—SCULPINS

**Banded Sculpin**, *Cottus carolinae*. **Current status: SINC. Proposed status: E.** The distribution of this species in Kansas apparently has not changed significantly. However, its range is restricted to Shoal Creek in southeastern Kansas (Cross and Collins 1995), indicating a precarious distribution. Although population trends in Kansas are not known, the Banded Sculpin has not been abundant in recent collections. As noted above, streams in southeastern Kansas (especially Ozarkian streams) face a number of threats. This taxon was included in a 1998 list of fishes believed by Frank Cross (unpub. observ.) to be “significantly reduced in range or abundance” in Kansas. The KNHI lists this fish as “possibly extirpated” in Kansas (NatureServe 2004).

#### PERCIDAE—PERCHES

##### **Darters of southeastern Kansas**

As noted above, streams in southeastern Kansas contain the greatest diversity of fishes in the state, and minnows and darters represent much of this diversity. The distribution and abundance of some species of darters have declined, and other species are naturally not abundant in Kansas, occurring in only a few streams. They are important components of a unique fauna in

the state, and they could easily be extirpated from Kansas. The threats discussed above also have the potential to impact these nine species of darters.

**Greenside Darter**, *Etheostoma blennioides*.

**Current status: SINC. Proposed status: T.**

This fish “originally occupied streams in the Kansas River basin as far west as Manhattan, and probably occurred more widely in the Osage and Arkansas river systems than it does now” (Cross and Collins 1995, p. 219). Recent records of this species exist from only a few sites in the Little Osage, Marmaton, and Spring rivers or their tributaries (KDWP unpub. data, KU catalogue). One recent collection from the Spring River to the contrary (KDWP, unpub. data, collected in 1997), this darter usually has been found in low numbers in recent collections. The KNHI lists this taxon as “imperiled” in Kansas (NatureServe 2004).

Although we have considered the Greenside Darter as a single species, the *E. blennioides* complex has recently been revised based on DNA analysis (Piller 2001). Although not yet published, this revision will present evidence that the two former subspecies in Kansas, *E. b. pholidotum* and *E. b. newmani* (Cross 1967), are distinct species. The former (*E. pholidotum*) occupies the Osage River basin and the latter (*E. newmani*) occurs in the Spring River basin. Consequently, the distribution and abundance of each of the resulting two species will be less than if they were considered a single species (as we have done).

**Bluntnose Darter**, *Etheostoma chlorosoma*.

**Current status: SINC. Proposed status: T.**

Although the distribution of this species apparently has not changed significantly in Kansas, its range is restricted to only a few sites in the Spring and Neosho river basins in southeastern Kansas (Cross and Collins 1995). This darter is usually rare in reported collections, although recent population trends in Kansas are not known to a certainty. The KNHI lists this taxon as “imperiled” in Kansas (NatureServe 2004).

**Fantail Darter**, *Etheostoma flabellare*.

**Current status: not listed. Proposed status:**

**SINC.** Confined to four small disjunct areas in the Spring, Marais des Cygnes, and Cottonwood-Neosho river basins (Cross 1967), the distribution of this darter apparently has not changed significantly in Kansas. However, most recorded localities within each disjunct area are in close proximity, raising the possibility that a single abiotic or biotic event could affect the viability of the species in Kansas. The reproductive success of this taxon is particularly susceptible to disruption by stream intermittency (Cross 1967). The KNHI lists the Fantail Darter as “vulnerable” in Kansas (NatureServe 2004).

**Slough Darter**, *Etheostoma gracile*. **Current**

**status: SINC. Proposed status: E.** Although

the distribution of this species apparently has not changed significantly in Kansas, its range is restricted to only a few sites in the lower Neosho and Spring river basins in southeastern Kansas (Cross and Collins 1995). This taxon has never been abundant in reported collections (KDWP unpub. data). The KNHI lists the Slough Darter as “critically imperiled” in Kansas (NatureServe 2004).

**Stippled Darter**, *Etheostoma punctulatum*.

**Current status: SINC. Proposed status: E.**

Although the distribution of this darter apparently has not changed significantly in Kansas, its range is restricted to only a few sites in the Spring River basin in southeastern Kansas (Cross and Collins 1995). This species has never been abundant in reported collections. The KNHI lists this taxon as “critically imperiled” in Kansas (NatureServe 2004). Page and Burr (1991) indicated that the Kansas population of this fish is actually the “Sunburst Darter,” an undescribed species. When formally described, the global distribution of this new fish species would be greatly reduced, compared to that of the more widely distributed Stippled Darter.

**Speckled Darter**, *Etheostoma stigmaeum*.

**Current status: SINC. Proposed status: E.**

Although the distribution of this darter

apparently has not changed significantly in Kansas, its range is restricted to only a few sites in the Spring River basin in southeastern Kansas (Cross and Collins 1995, KU catalogue). This species is never abundant in reported collections. The KNHI lists this taxon as “critically imperiled” in Kansas (NatureServe 2004).

**Redfin Darter, *Etheostoma whipplei*. Current status: not listed. Proposed status: T.** Although the distribution of this darter apparently has not changed significantly in Kansas, its range is restricted to only a few counties in the Neosho and Spring river basins in southeastern Kansas, and it has never been abundant in reported collections (Cross and Collins 1995). The state of Missouri, faced with similar patterns of distribution and abundance (Pflieger 1997), has proactively chosen to list this species as endangered. The KNHI lists this taxon as “vulnerable” in Kansas (NatureServe 2004).

**Banded Darter, *Etheostoma zonale*. Current status: SINC. Proposed status: T.** This species occurs in the Spring River basin in extreme southeastern Kansas and a small area of the Fall River in the lower Verdigris River basin (Cross 1967). It ranges in abundance from rare to common in the Spring River basin and is not abundant in the Fall River (Cross and Collins 1995). Most recorded localities for this taxon are in close proximity, raising the possibility that a single abiotic or biotic event could affect the viability of the Banded Darter in Kansas. This species was described by Frank Cross (unpub. observ.) as “significantly reduced in range or abundance” in Kansas. The KNHI lists this darter as “vulnerable” in Kansas (NatureServe 2004).

**River Darter, *Percina shumardi*. Current status: SINC. Proposed status: T.** Although the distribution of the River Darter apparently has not changed significantly in Kansas, its range is restricted to only a few sites in the lower Neosho (Labette County) and Spring (Cherokee County) river systems (Cross and Collins 1995). Recent collections have been few and the species has

not been abundant in those collections (KDWP unpub. data, KU catalogue). The KNHI lists this taxon as “critically imperiled” in Kansas (NatureServe 2004).

### Other species of darters

**Johnny Darter, *Etheostoma nigrum*. Current status: not listed. Proposed status: T.** This species has experienced a substantial reduction in its historic range in Kansas. As with the Topeka Shiner and Common Shiner, it once occurred through much of northern Kansas (Hay, 1887; Gilbert 1889). Most collections of this fish in recent years have come from streams in the Flint Hills in the Kansas River basin. Collections of the Johnny Darter also have been made in small streams in the Marais des Cygnes, Little Osage, lower Kansas, and Spring river basins, but it is unlikely that these sites account for a substantial percentage of the overall population of this species in Kansas. Seldom is the Johnny Darter numerous. Changed stream-flow regimes, stream sedimentation, and increased turbidity are all likely factors in the reduction in range and numbers of this species. The KNHI lists this taxon as “vulnerable” in Kansas (NatureServe 2004).

**Blackside Darter, *Percina maculata*. Current status: T. Proposed status: E.** The Blackside Darter occurs in Kansas only as a relict population in the main branch of Mill Creek, Wabaunsee County (Cross and Collins 1995). Neither distribution nor abundance changes for this species in Kansas are known during the last 100 years; however, it has never been abundant in recent collections. The extremely localized occurrence of this darter raises the possibility that a single abiotic or biotic event could result in the extirpation of the species in Kansas. The KNHI lists this taxon as “critically imperiled” in Kansas (NatureServe 2004).

### EXTIRPATED SPECIES

Platt et al. (1973) considered the following

species as extirpated: Bigeye Chub, *Hybopsis amblops*; Pugnose Minnow (Shiner), *Opsopoeodus emiliae*; Blacknose Shiner, *Notropis heterolepis*; Trout-perch, *Percopsis omiscomaycus*; Western Sand Darter, *Ammocrypta clara*; and Iowa Darter, *Etheostoma exile*. We have found no evidence that their status has changed in the last 30 years, and support that conclusion.

Due to the lengthy absence of reported collections of the Arkansas River Shiner, *Notropis girardi*, from Kansas (and the attendant lack of probability of reproductive populations), we propose its addition to the list of extirpated fishes in Kansas.

The Highfin Carpsucker, *Carpionodes velifer*, should probably be judged as extirpated along with the species listed above. Given the species' superficial resemblance to the widely occurring River Carpsucker, *Carpionodes carpio*, however, it is possible that the species still occurs as misidentified specimens.

Little evidence exists that the following species currently sustain reproductively viable populations in Kansas: Chestnut Lamprey, *Ichthyomyzon castaneus*; Lake Sturgeon, *Acipenser fulvescens*; Western Silvery Minnow, *Hybognathus argyritis*; Sturgeon Chub, *Macrhybopsis gelida*; Sicklefin Chub, *Macrhybopsis meeki*; Silverband Shiner, *Notropis shumardi*; and Flathead Chub, *Platygobio gracilis*. However, we are reluctant to declare them "extirpated" because of the lack of targeted surveys for the species.

#### OTHER SPECIES

We consider several species included in Cross and Collins (1995) as "waif" or "erratic" species, found either as wayfarers or by chance in Kansas streams. Reproductive populations of these species are not known to occur in Kansas: Bowfin, *Amia calva*; Skipjack Herring, *Alosa chrysochloris*; Rainbow Smelt, *Osmerus mordax*; Burbot, *Lota lota*; Northern Studfish,

*Fundulus catenatus*; Plains Topminnow, *Fundulus sciadicus*; and Least Darter, *Etheostoma microperca*.

#### SUMMARY

This re-evaluation of the status of fishes native to Kansas streams suggests that 17 previously unlisted species should be considered for protection as endangered, threatened, or in need of conservation. The other 37 species are already listed as protected species by KDWP, although a change in status is suggested for 28 species.

The proposed listing of species which are not abundant in Kansas, but whose historical distribution and abundance have not undergone documented changes, as endangered, threatened, or in need of conservation, recognizes their grave vulnerability to future reductions in distribution and abundance, or even extirpation from the state.

Some of these rare species in Kansas are at the periphery of their range. Peripheral species, nonetheless, are unique elements of the Kansas fauna, and there is a strong possibility that the Kansas populations of at least some of these species possess unique genetic attributes that are not present in populations living elsewhere. Until we have better information on the genetics of our populations, we should not risk the loss of genetic diversity that might someday be critical to the survival of the species throughout its range.

In this summary, we have listed a diversity of species from many different aquatic habitats in Kansas. Although we tend to focus our conservation efforts on protected species, they are often just the focal points of entire ecosystems that have been degraded. We have too often pursued a costly policy of recovery when a proactive policy of conservation would be a more economical means of ensuring that these species, their habitats, and associated species are protected from negative impacts of human activities.

Negative impacts on streams, such as dewatering or pollution, affect not only the fishes, but also harm many other species in the same streams, and they potentially affect the people who depend on those streams for water or recreation.

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