Kentucky's Species of Greatest Conservation Need and their statuses.

Common name	Scientific name	Federal	Heritage	GRank	SRank
Actinopterygii (9 species).					
Black Buffalo	*Ictiobus niger*	N	S	G5	S3
Blacktail Shiner	*Cyprinella venusta*	N	S	G5	S3
Burbot	*Lota lota*	N	S	G5	N
Paddlefish	*Polyodon spathula*	N	N	G4	S4
Pallid Shiner	*Hybopsis amnis*	N	X	G4	N
Redside Dace	*Clinostomus elongatus*	N	N	G4	S3
Sicklefin Chub	*Macrhybopsis meeki*	N	H	G3	N
Spring Cavefish	*Forbesichthys agassizii*	N	N	G4	S4
Sturgeon Chub	*Macrhybopsis gelida*	N	H	G3	N

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CLASS Actinopterygii

Black Buffalo ***Ictiobus niger***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G5	S3	G5	S3

G-Trend Unknown

G-Trend Comment Throughout its range, the black buffalo appears to be less common than the other species of buffalo (Etnier and Starnes 1993). Some authorities regard this species to be inadequately diagnosed and its taxonomic status uncertain (Burr and Warren 1986, Robison and Buchanan 1988). This has led to uncertainty regarding its distributional status in several states and speculation about misidentifications. The species is generally treated as vulnerable to imperiled in most of the upper Mississippi River basin and Ohio River drainage. It is

considered secure in only a few states in the middle and lower Mississippi River basin, although records in the Gulf Slope drainages in Texas and New Mexico are thought to potentially be based on misidentifications or introductions (Etnier and Starnes 1993, Natureserve 2008, Shute 1980).

S-Trend Unknown

S-Trend Comment Burr and Warren (1986) regarded this species as sporadic and rare in rivers and reservoirs in western Kentucky, and sporadic in the main channels of the Mississippi and Ohio rivers. In the Ohio River, Pearson and Krumholz (1984) reported the distribution of the black buffalo to be nearly identical to that of the smallmouth buffalo, but much less common. Since 1986, many additional records have been reported for the middle and lower Ohio River, and relatively few from the Mississippi River and minor tributaries in western Kentucky; however, many of these records are not tied to vouchered specimens and need to be confirmed. The black buffalo is listed as a species of Special Concern by the Kentucky State Nature Preserves Commission (2005).

Habitat / Life History In Kentucky, the black buffalo occurs in pools and backwaters of streams and larger rivers, but can also be found in reservoirs, oxbows, and other lentic environments (Burr and Warren 1986). The species has also been reported to prefer stronger currents of rivers and reservoirs (Pfleiger 1997, Robison and Buchanan 1988). The black buffalo is a bottom feeder consuming benthic macroinvertebrates, with mollusks such as the introduced Asian Clam (Corbicula)

being a large dietary component (Becker 1983, Minckley et al. 1970). Spawning has been reported to occur during April and May, during which fish congregate in large numbers in shallow water broadcasting eggs over a variety of hard substrates from bedrock to gravel (Piller et al. 2003). Piller et al. (2003) observed spawning fish that had migrated into a small stream from a reservoir, but suggested the possibility that black buffalo may be adaptable to other habitats for spawning, such as shallow areas of reservoirs.

Key Habitat

Most occurrence records available for this species are from the Middle and Lower Ohio River, including the following HUC8 units: 05090103 Little Scioto-Tygarts (1 record, 2006), 05090201 Ohio Brush-Whiteoak (11 records, 1988-2007), 05090203 Middle Ohio-Laughery (3 records, 1988-2005) 05140101 Silver-Little Kentucky (1973-2007, 5 records), 05140104 Blue-Sinking (1976-2005, 2 records), 05140201 Lower Ohio-Little Pigeon (1976-2008, 10 records), 05140202 Highland-Pigeon (2008, 1 record), 05140203 Lower Ohio-Bay (1997-2008, 17 records), 05140206 Lower Ohio (1996-2008, 13 records). Although the Ohio River has been assessed and found to fully support aquatic life (ORSANCO 2008), the entire river has been impounded by a series of navigation locks and dams, which has also diminished natural variation flow conditions in the lower reaches of tributaries. Various sources of industrial and domestic pollution severely degraded water quality during the first half of the 20th century, with some improvements made following the establishment of regulatory measures such as the Federal Water Pollution Control Act Amendments of 1972 (Pearson and Krumholz 1984).

The species has not been reported from the Green River basin since 1983, and only a few records exist in the following HUC8 units: 05110006 Pond (1982, 1 record), 05110003 Middle Green (1983, 1 record), 05110004 Rough (1959-1961, 2 records). Habitat conditions were found to be fully supporting of aquatic life use in 28% of wadeable streams based on probabilistic (random) surveys in the

Green-Tradewater Basin Management Unit. This level of support was higher in comparison to the upper Cumberland River and Four Rivers basins (Kentucky Division of Water 2008).

The Lower Tennessee (HUC8 06040006) and Lower Cumberland (HUC8 05130205) each have relatively recent records (1997-2006) below Kentucky and Barkley dams; no recent records are available for Kentucky or Barkley reservoirs. Most records available for the Jackson Purchase area, including the Lower Mississippi-Memphis (HUC8 08010100) and Bayou du Chien-Mayfield (HUC8 08010201) were collected prior to 1986; only two records were reported since 2000. Habitat conditions fully supporting aquatic life in the Four Rivers basins based on a probability biosurvey and analysis were 17% of wadeable streams were fully supporting of aquatic life use (Kentucky Division of Water 2008). The mainstem Mississippi River, like the Ohio, has been altered by channel modifications to accommodate barge traffic, which has deteriorated conditions to fully support aquatic life.

Guilds Large rivers in slackwater.

Statewide Black_Buffalo.pdf

Map

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

2E Stream channelization/ditching

2J Alteration of surface runoff patterns (flow/temp regimes)

Biological/ consumptive uses

5J Incidental mortality due to commercial fishing/musseling (mortality and overharvest)

5K Lack of suitable habitat for spawning, nesting, or breeding

CLASS Actinopterygii

Blacktail Shiner ***Cyprinella venusta***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G5	S3	G5	S3

G-Trend Stable

G-Trend Comment This species occurs in the Gulf Coastal Plain from the Suwannee River system in Florida to the Rio Grande in Texas, where it is generally abundant (Etnier and Starnes, 1993), and in the Mississippi basin north to central Missouri and extreme southern Illinois (Boschung and Mayden 2004). Most populations are considered to be stable, having experienced declines and fluctuations over a small portion (approximately 10%) of the species' range (Natureserve 2008). Kristmundsdottir and Gold (1996) identified four groups (clades) based on geographic variation in mtDNA (Choctawatchee, Apalachicola, Mobile, and Western) that could potentially be recognized as distinct species, although additional study is needed.

S-Trend Unknown

S-Trend Comment Although it is considered to be stable throughout most of its range, the blacktail shiner is considered vulnerable to critically imperiled at the northern periphery of its range in western Kentucky and southern Illinois, where it faces threats of

habitat loss and hybridization with the invasive red shiner (Smith 1979, Burr and Warren 1986). This species needs regular periodic surveys to monitor long-term trends in distributional status and abundance. It is listed as Special Concern by the Kentucky State Nature Preserves Commission (2005).

Habitat / Life History

In Kentucky, the blacktail shiner mostly occurs in small Coastal Plain streams over firm sand/gravel substrates in riffles, raceways, or along undercut banks and around submerged logs and stumps. Less frequently, or more sporadically, it is found along shorelines of the Mississippi and lower Ohio rivers over firm sand or gravel in current (Burr and Warren 1986). The blackfin shiner is a schooling species feeding primarily aquatic insect larvae, terrestrial insects, and small seeds (Robison and Buchanan 1988, Ross 2001). In Tennessee, the spawning period has been estimated to occur from mid-May through August, based on observations of males in breeding condition (Etnier and Starnes 1993). Eggs are deposited by females in crevices of submerged objects occupied and defended by breeding males (Heins 1990, Pfleiger 1997, Boschung and Mayden 2004).

Key Habitat

This species is restricted to extreme western Kentucky, where it occurs in Terrapin Creek (Obion River HUC8 08010202), Lower Ohio (HUC8 05140206), Lower Mississippi-Memphis (HUC8 08010100), and Bayou De Chien-Mayfield (08010100) watersheds. These watersheds are located primarily within the Mississippi Loess Plains in the Jackson Purchase area and small sections of the Interior River Valleys and Hills (along the lower Ohio River) and Mississippi Alluvial Plain (along the Mississippi River). Forested wetlands that were once extensive have been replaced by cropland and pastureland. Streams typically have low gradients with gravel and sand substrates. Nearly all of the major stream systems containing blacktail shiner populations have been channelized to some degree (Burr and Warren 1986, Woods et al. 2002).

Guilds

Large rivers in current, Lowland Streams in riffles, Lowland Streams in slackwater.

Statewide Map

Blacktail_Shiner.pdf

Conservation Issues

Aquatic habitat degradation

- 2E Stream channelization/ditching
- 2F Riparian zone removal (Agriculture/development)
- 2H Wetland loss/drainage/alteration

Biological/ consumptive uses

5D Competition from introduced/invasive or native species

5E Hybridization with closely related species

Siltation and increased turbidity

1B Agriculture

CLASS Actinopterygii

Burbot ***Lota lota***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G5	SU	G5	N

G-Trend Stable

G-Trend Comment Globally, the burbot is widely distributed in both hemispheres south to about 40 degrees N (Lee and Gilbert 1980). In the eastern hemisphere, it occurs throughout Canada, Alaska, and northern United States south to Pennsylvania, Kentucky, Missouri, Wyoming, and Oregon (Page and Burr 1991). The species is secure (often cited as common) throughout Cananda and Alaska, and the Great Lakes drainages; however, it is uncommon in the Mississippi River basin (Becker 1983), which represents the southern periphery of its North American range.

S-Trend Unknown

S-Trend Comment The status of the burbot in Kentucky has been in question since the earliest reported records from the Ohio River in the late 1800s (Clay 1975, Burr and Warren 1986). This species is infrequently caught, usually accidentally, by anglers and commercial fishermen. There is no evidence that reproduction occurs anywhere in Kentucky (Clay 1975), and it is uncertain whether occasionally captured individuals represent escapees from stocked fishing lakes in Indiana, Kentucky, or Ohio, or are evidence of a sparse, but naturally

reproducing population. The latter possibility is the reason it has been listed as a species of Special Concern by the Kentucky State Nature Preserves Commission (2005). Additional research is needed to clarify the status of this species in the Ohio River.

Habitat / Life History

Habitat preferences for this species in Kentucky are poorly known; most individuals have been captured by commercial or sport fishermen from large rivers. In northern areas, the species prefers bottoms of cold lakes and streams in depths greater than 1.5 m with substrates of rock, sand, and mud (Burr and Warren 1986). The burbot is nocturnal in both its reproductive and feeding habits (Lee and Gilbert 1980, Becker 1983). In the Great Lakes and areas to the north, spawning occurs in mid-winter, from January to March, usually in shallow bays over and or on gravel shoals (Becker 1983, Holm et al. 2009). In rivers, spawning has been reported in areas of low current velocity in main channels or side channels behind deposition bars (U.S. Fish and Wildlife Service 2003). The burbot has a voracious appetite, foraging on the bottom at night for wide variety of fishes, crustaceans, and other benthic macroinvertebrates (Scott and Crossman 1973, Holm et al. 2009).

Key Habitat

The only records available for this species are from the Ohio, Kentucky, and Licking rivers. In the Ohio River, the burbot has been reported from the following HUC8 units: 05090201 Ohio Brush-Whiteoak, 05090203 Middle Ohio-Laughery, 05140101 Silver-Little Kentucky, 05140104 Blue-Sinking, 05140203

Lower Ohio-Bay, and 05140206 Lower Ohio. Pre-1967 records are available for the Lower Kentucky River (05100205) and Licking River (05100101). The most recent records are from the Ohio River: 05140203 Lower Ohio-Bay (2002, photo record), 05140104 Blue-Sinking (1993, specimen record), and 05090201 Ohio Brush-Whiteoak (1993, photo record) (Compton et al. 2004). Although the Ohio River has been assessed and found to fully support aquatic life (ORSANCO 2008), the entire river has been impounded by a series of navigation locks and dams, which has also diminished natural variation flow conditions in the lower reaches of tributaries. Various sources of industrial and domestic pollution severely degraded water quality during the first half of the 20th century, with some improvements made following the establishment of regulatory measures such as the Federal Water Pollution Control Act Amendments of 1972 (Pearson and Krumholz 1984).

Guilds Large rivers in slackwater.

Statewide Map Burbot.pdf

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

2E Stream channelization/ditching

2J Alteration of surface runoff patterns (flow/temp regimes)

Biological/ consumptive uses

5F Low population densities

5J Incidental mortality due to commercial fishing/musseling (mortality and overharvest)

5K Lack of suitable habitat for spawning, nesting, or breeding

CLASS Actinopterygii

Paddlefish ***Polyodon spathula***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	N	G4	S4	G4	S4

G-Trend Stable

G-Trend Comment The Paddlefish is a wide-ranging species in central and eastern North America, once common throughout much of the Mississippi River Basin, Gulf Coastal drainages, and formerly in Lake Erie (Etnier and Starnes 1993). Because the Paddlefish is common in the international caviar trade, in 1992 the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) adopted a U.S. proposal to regulate trade in this species under CITES Appendix II (Rasmussen and Graham 1998). Although it is considered apparently secure by NatureServe (2008), the Paddlefish is listed as vulnerable on the American Fisheries Society list of imperiled freshwater and diadromous fishes of North America due to 1) present or threatened destruction, modification, or reduction of the species' habitat or range, and 2) over-exploitation for commercial, recreational, scientific, or educational purposes including intentional eradication or indirect impacts of fishing (Jelks et al. 2008).

S-Trend Unknown

S-Trend Comment

Burr and Warren (1986) considered this species to be occasional in the Mississippi, Ohio, Tennessee, Cumberland, Green, Salt, Kentucky, and Licking rivers and lower Bayou du Chien. It was initially assigned to a conservation status category of special concern in a list of state endangered, threatened, or rare fishes (Branson et al. 1981), but was later removed because it was thought to be more common that previously believed (Burr and Warren 1986). Although assigned a status of S4 (Apparently Secure) by NatureServe (2008), Kentucky currently lacks solid information on the status of populations within the state. There is ample evidence in most states that illegal harvest of Paddlefish for eggs continues to be a problem that may lead to depleted stocks. Because Paddlefish move freely through large rivers in the Mississippi River Basin, the Mississippi Interstate Cooperative Resource Association (MICRA) was established in 1991, to provide an interjurisdictional fishery management framework and conduct cooperative basinwide stock assessments (Rasmussen and Graham 1998).

Habitat / Life History

In Kentucky, the Paddlefish inhabits quiet or slow-moving waters of large and medium-sized rivers, oxbows, backwaters, and impoundments rich in zooplankton on which it feeds. Adults must have access to gravel bars subject to sustained flooding during spring months for spawning (Burr and Warren 1986). The species prefers depths greater than 1.5 m, seeking deeper water in late fall and winter (Burkhead and Jenkins 1991). Individuals may congregate near artificial structures (e.g., below dams) that create eddies and reduce current

velocity (Southall and Hubert 1984). Paddlefish have been reported to spawn in fast shallow water over gravel bars, including significant tail water sections below upstream impoundments (e.g., Stancill et al. 2002). In the lower Cumberland and Tennessee rivers, larvae have been reported to drift from Reservoir to reservoir (Wallus 1986).

Key Habitat

Numerous occurrence records available for this species are from the Ohio River, including the following HUC8 units: Little Scioto-Tygarts (05090103), Ohio Brush-Whiteoak (05090201), Middle Ohio-Laughery (05090203), Silver-Little Kentucky (05140101), Blue-Sinking (05140104), Lower Ohio-Little Pigeon (05140201), Highland-Pigeon (05140202), Lower Ohio-Bay (05140203), and Lower Ohio (05140206). Although the Ohio River has been assessed and found to fully support aquatic life (ORSANCO 2008), the entire river has been impounded by a series of navigation locks and dams, which has also diminished natural variation flow conditions in the lower reaches of tributaries. Various sources of industrial and domestic pollution severely degraded water quality during the first half of the 20th century, with some improvements made following the establishment of regulatory measures such as the Federal Water Pollution Control Act Amendments of 1972 (Pearson and Krumholz 1984).

Records for this species are also available for the Lower Mississippi-Memphis (08010100), and Bayou du Chien-Mayfield (08010201) watershed units. Sections

of the Mississippi River where this species has been found are impacted by channel modifications made to enhance barge traffic. No reach of the Mississippi River or its tributaries in western Kentucky are rated as fully supporting aquatic life. Most (64%) offer only partial support, while 36% are considered non-supportive (Kentucky Division of Water 2002).

Several records are available for the Lower Cumberland River (05130205), Kentucky Lake (06040005), and Lower Tennessee River (06040006). Habitat conditions fully supporting aquatic life in the Four Rivers basins based on a probability biosurvey and analysis were 17% of wadeable streams were fully supporting of aquatic life use (Kentucky Division of Water 2008).

Two records exist for the Rough River (05110004) and Middle Green River (05110003). Habitat conditions were found to be fully supporting of aquatic life use in 28% of wadeable streams based on probabilistic (random) surveys in the Green-Tradewater Basin Management Unit. This level of support was higher in comparison to the upper Cumberland River and Four Rivers basins (Kentucky Division of Water 2008).

Several records are available for the Lower Kentucky River (05100205). The mainstem Kentucky River is impounded by a series of locks and dams extending from the mouth upstream to the confluence of the South Fork. The resultant

pooling of the mainstem has resulted in the loss of Paddlefish spawning habitat and prevents long-range movements that may be required to maintain populations (Dillard et al. 1986).

Three records are available for the Licking River (05100101). The Licking River is free-flowing below Cave Run Lake and has a significant portion of outstanding resource waters (Kentucky Division of Water 2002); however, much of the middle and lower sections of the watershed has been subjected to excessive siltation from poor agricultural practices as well as sewage pollution (Burr and Warren 1986).

Gilds Large rivers in current, Large rivers in slackwater.

Statewide Map Paddlefish.pdf

Conservation Issues

Aquatic habitat degradation

2A Navigational dredging/Commercial dredging

2C Construction/Operation of impoundments (migration barrier)

2G Water level fluctuations

Biological/ consumptive uses

5P Market hunting for human consumption

Terrestrial habitat degradation

3H Habitat loss outside of Kentucky

CLASS Actinopterygii

Pallid Shiner ***Hybopsis amnis***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	X	G4	S1	G4	N

G-Trend Decreasing

G-Trend Comment The pallid shiner occurs in the Mississippi River from Wisconsin and Minnesota, south to Louisiana and west to the Guadaloupe River in Texas (Clemmer 1980). Population declines have been documented over the past three decades, particularly in the northern portions of its range (Clemmer 1980, Becker 1983, Skelly and Sule 1983, Warren and Burr 1988, Kwak 1991, Pflieger 1997). Currently, the species is uncommon throughout the northern extent of its range and stable in portions of the south, where it has been reported to be fairly common (Natureserve 2008). Recently, the pallid shiner was added to the American Fisheries Society list of imperiled freshwater and diadromous fishes of North America based on present or threatened destruction, modification, or reduction of the species' habitat or range (Jelks et al. 2008).

S-Trend Unknown

S-Trend Comment The pallid shiner is known from only six localities in the lower Tennessee, Green, and upper Cumberland basins in Kentucky (Burr and Warren 1986). Until

rediscovered in the South Fork Cumberland River in 2005 (Thomas 2006), the pallid shiner was on the list of plants and animals presumed extinct or extirpated from Kentucky (Kentucky State Nature Preserves Commission 2005); the last previous record was from Wolf Lick Creek (Middle Green River drainage) in 1970. The species was collected again in the South Fork Cumberland River in 2006. The pallid shiner is a species that potentially could have been overlooked in recent collections because of its close similarity to other minnows (e.g., bigeye chub and mimic shiner). Additional sampling at other known historic localities is needed to determine the status of this species within the state.

Habitat / Life History

Habitat preferences for this species in Kentucky are poorly known (Burr and Warren 1986). In the South Fork Cumberland River, 17 individuals were collected along the margin of the stream lined with water willow (Justicia sp.); substrate was a mixture of medium- to large-sized cobble, mixed with gravel and sand (Thomas 2006). In more southern parts of its range, the pallid shiner has been reported to occur in medium to large streams and rivers in quite water at the lower ends of sand bars over soft sand/silt substrates (Clemmer 1980, Burr and Warren 1986). Biology and life history of populations in Kentucky are unknown. In the south, the species has been reported to spawn during late winter and early spring; adults in reproductive condition have been observed during March in Arkansas (Clemmer 1980), and during May in western Tennesee (Etnier and Starnes 1993).

Key Habitat

Because this species has not been collected recently anywhere outside of the South Fork Cumberland River, this watershed may currently provide the best suitable habitat for this species in Kentucky. In the South Fork Cumberland River, habitat conditions fully supporting aquatic life include 90% of the 75.5 miles of stream assessed within the watershed, and 52.3 stream miles are considered outstanding resource water (Kentucky Division of Water 2002). Other watersheds containing historic records are more impaired. Habitat conditions in these watersheds fully supporting aquatic life range from 49% in the Middle Green River (HUC8 05110003) to 75% in the Lower Tennessee-Kentucky Lake (HUC8 06040006) (Kentucky Division of Water 2004).

Guilds Medium to large streams, Upland streams in pools.

Statewide Map Pallid_Shiner.pdf

Conservation Issues

Aquatic habitat degradation

- 2B Gravel/sand removal or quarrying (e.g., mineral excavation)
- 2C Construction/Operation of impoundments (migration barrier)
- 2E Stream channelization/ditching
- 2G Water level fluctuations
- 2J Alteration of surface runoff patterns (flow/temp regimes)

Siltation and increased turbidity

1A Coal mining

1B Agriculture

1D Urbanization/Development General Construction

1E Silviculture

CLASS Actinopterygii

Redside Dace ***Clinostomus elongatus***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	N	G4	S3S4	G4	S3

G-Trend Decreasing

G-Trend Comment The redside dace currently occupies a discontinuous distribution from the upper Susquehanna River drainage of New York and Pennsylvania, west through the lower Great Lakes, Ohio, and upper Mississippi River basins to Iowa (now extirpated) and Minnesota. Disjunct populations have disappeared or are declining in the eastern portion of its range and it is localized and very rare in the west (Gilbert 1980, Page and Burr 1991, Natureserve 2008). In Canada, it occurs in only a few streams draining into Lake Ontario, Lake Erie and Lake Huron in southern Ontario (Parker et al. 1988, Natureserve 2008). Recently, the redside dace was added to the American Fisheries Society list of imperiled freshwater and diadromous fishes of North America based on present or threatened destruction, modification, or reduction of the species' habitat or range (Jelks et al. 2008).

S-Trend Stable

S-Trend The redside dace reaches the southern extent of its range on the Western

Comment Allegheny Plateau of northeastern Kentucky, where it is occasional to locally common in several tributaries of the North Fork of Licking River, Beaver Creek, and Red River (Burr and Warren 1986, Meade et al. 1986). Although these small, isolated populations currently appear to be stable, lack of adequate protection makes them vulnerable to habitat loss and degradation. In Wisconsin, Lyons et al. (2000) associated extirpation of redside dace populations with introductions and population expansions of the piscivorous brown trout into headwater habitats used by the dace. In Kentucky, several streams supporting redside dace are stocked with rainbow and/or brown trout.

Habitat / Life History Habitat requirements for this species are narrow and specific. Streams supporting populations share certain physiochemical characteristics, including cool and clear water of near neutral pH in forested watersheds with good canopy cover. Forest cover usually includes eastern hemlock and white laurel. Individuals are typically found in pools less than 2 m deep, in moderate current, with gravel and sandy substrates, and minimal siltation (Burr and Warren 1986, Meade et al. 1986). The redside dace often spawns over gravel/pebble nests constructed by other minnows, such as the creek chub. Spawning occurs during spring when water temperatures exceed 18 degrees Celsius (Koster, 1939). Based on field and aquarium observations, the species has a habitat of jumping several centimeters out of the water to catch insects; therefore, a large portion of its diet consists of terrestrial insects (Schwartz and Norvell 1958).

Key Habitat

This species currently persists in limited sections of the Licking River (HUC8 05100101) and Upper Kentucky (HUC8 05100204) watersheds. In the Licking River drainage, historic and recent records are available for ten streams distributed along the Northern Forested Plateau Escarpment ecoregion near the northwestern margin of the Allegheny Plateau. Streams in this area are cool, clear, and typically have moderate to high gradients with rocky substrates. Logging and recreation are important land uses in this region (Woods et al. 2002). This portion of the Licking River drainage has not been as severely impacted as the lower basin below Cave Run Lake, which has been subjected to excessive siltation from poor agricultural practices as well as sewage pollution (Burr and Warren 1986).

In the Red River drainage (Upper Kentucky), the species has been documented in seven streams, all of which are generally are of high quality and were rated as fully supporting of aquatic life by the Kentucky Division of Water (2000). Land within these watersheds is mostly rural and wooded; two-thirds of the Red River drainage is managed by the U.S. Forest Service as part of the Daniel Boone National Forest (Kentucky Water Research Institute 2001).

Because of the cool, high gradient character of streams containing redside dace, they are also regarded as suitable waters for trout introduction. Trout that have been (and continue to be) stocked in several of these streams could potentially

diminish or extirpate redside dace populations through predation.

Guilds Upland headwater streams in pools.

Statewide Redside_Dace.pdf

Map

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2F Riparian zone removal (Agriculture/development)

2J Alteration of surface runoff patterns (flow/temp regimes)

2K Transportation routes (fords and crossings)

Biological/ consumptive uses

5A Predation from introduced species. This has been linked to extirpation in other states (see comments and citation above).

5H Isolated populations (low gene flow)

5O Bait collection. A potential threat due to the colorful appearance of this minnow.

Siltation and increased turbidity

1C Road construction

1E Silviculture

1F Recreational activities (atv, horseback riding)

CLASS Actinopterygii

Sicklefin Chub ***Macrhybopsis meeki***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	H	G3	S1	G3	N

G-Trend Decreasing

G-Trend Comment The range of the sicklefin chub is confined to the Missouri River and Mississippi River below the Missouri River confluence (Pflieger 1997). The species has been reported to be relatively abundant in portions of the Missouri River, but much less common in the Mississippi River (Pflieger 1997, Etnier and Starnes 1993). In the Mississippi River, it occurs primarily from western Kentucky (below mouth of Ohio River) north to the mouth of the Missouri River. Records are rare in the lower Mississippi River and are thought to be accidental occurrences (Ross 2001). With the exception of Missouri, the sicklefin chub is listed as imperiled to critically imperiled in states throughout its range (Natureserve 2008). It was listed as a federal candidate species in 1995 (U.S. Fish and Wildlife Service 1995), and is listed as Endangered by the Kentucky State Nature Preserves Commission (2005). The American Fisheries Society lists the species as vulnerable based on present or threatened destruction, modification, or reduction of the species' habitat or range (Jelks et al. 2008).

S-Trend Decreasing

S-Trend Comment Very few records are available for this species in the Mississippi River in western Kentucky. This has been due mostly to difficulties with capturing small benthic fishes in large river habitats. Etnier and Starnes (1993) suggested that the species is probably more common in the Mississippi River than records indicate. Results of recent surveys using benthic trawls in the Mississippi River support this premise to some extent, but additional data are needed to assess long-term population trends; short-term data suggest that this species is uncommon and may be declining (Herzog 2004).

Habitat / Life History This is a small, benthic minnow limited to the turbid waters of the main channel of the Mississippi River in western Kentucky. Recent benthic trawl surveys (2000-2001) produced individuals at a single location at Wolf Island (Herzog 2004). According to Herzog (2004), sicklefin and sturgeon chubs generally utilize similar habitats during particular times of the year (e.g., Febrary-March), but partition themselves by age class, size, and species at other times. The sicklefin chub apparently occupies deeper and swifter water than the sturgeon chub. Like the sturgeon chub, it has characteristics typical of fishes adapted to low light conditions of large turbid rivers, including reduced eyes partially covered by skin and well-developed external taste buds. The food habits of the sicklefin chub are poorly known, but it is probably a bottom feeder relying on taste to locate its food (Pflieger 1997). Other aspects of its biology are unknown, but it is thought to spawn in the spring based on young-of-year

individuals in collections taken during July from the Missouri River (Etnier and Starnes 1993, Pflieger 1997).

Key Habitat

Records for this species are available for the Lower Mississippi-Memphis (HUC8 08010100) and Lower Ohio (05140206) watershed units; in the latter unit, two historic records are available, including one from the lower Ohio and one from the Mississippi River at Cairo, Illinois (Burr and Warren 1986). Sections of the Mississippi River where this species has been found are impacted by channel modifications made to enhance barge traffic. No reach of the Mississippi River or its tributaries in western Kentucky are rated as fully supporting aquatic life. Most (64%) offer only partial support, while 36% are considered non-supportive (Kentucky Division of Water 2002).

Guilds

Large rivers in current.

Statewide Map

Sicklefin_Chub.pdf

Conservation Issues

Aquatic habitat degradation

- 2A Navigational dredging/Commercial dredging
- 2B Gravel/sand removal or quarrying (e.g., mineral excavation)
- 2C Construction/Operation of impoundments (migration barrier)
- 2G Water level fluctuations

2J Alteration of surface runoff patterns (flow/temp regimes)

CLASS Actinopterygii

Spring Cavefish ***Forbesichthys agassizii***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	N	G4G5	S4S5	G4	S4

G-Trend Decreasing

G-Trend Comment The spring cavefish has a localized distribution, occurring in springs and caves from the Highland Rim of the Tennessee River drainage in Tennessee, middle and lower Cumberland drainage, upper Barren Green drainages of Kentucky, Ohio and Mississippi River tributaries near their junction in western Kentucky and southern Illinois, and a single population west of the Mississippi River in Missouri (Etnier and Starnes 1993, Pfleiger 1997). Some populations are now considered threatened or vulnerable, prompting the American Fisheries Society to add this species to its list of imperiled freshwater and diadromous fishes of North America (Jelks et al. 2008). It is critically imperiled in Missouri and Illinois along the northern and western periphery of its range (Natureserve 2008).

S-Trend Unknown

S-Trend Comment The spring cavefish has been reported to be occasional and at times abundant in caves, springs, and spring-fed streams near the Ohio River, Livingston County,

through Land Between the Lakes, Red River (Cumberland River drainage), and the Barren River drainage to Mammoth Cave; it is uncommon in the Pond and Middle Green River drainages (Burr and Warren 1986). Most known occurrences are on private land. A comprehensive survey of this species in Kentucky needs to be conducted to identify and protect critical habitat.

Habitat / Life History

This species is a facultative cave dweller of the Highland Rim and Shawnee Hills physiographic areas. It occurs in cave streams and occasionally around the mouths of springs and in spring-fed swamps and small streams (Burr and Warren 1986). Most known life history information is based on populations in southern Illinois. Adults apparently spawn in subterranean habitats during late winter (Smith and Welch 1978). Fecundity averages about 100 ova per female, and sexual maturity is reached at age 1 (Poulson 1963); maximum life span is estimated at 3 years (Smith and Welch 1978). Hill (1968) reported a diet of midge larvae, tiny worms, and microcrustaceans. This study also documented cannibalism among individuals when residing in subterranean habitats.

Key Habitat

This species is known from caves, springs, and spring-fed streams in the following HUC8 watersheds: Lower Ohio-Bay (05140203), Tradewater (05140205), Lower Cumberland (05130205), Kentucky Lake (06040005), Pond (05110006), Middle Green (05110003), Red (05130206), and Barren (05110002). Habitat conditions fully supporting aquatic life range from 20% in the Pond River drainage to 93% in the Barren River drainage. Apart from caves and

springs contained within the boundaries of Mammoth Cave National Park and Land Between the Lakes National Recreation Area, most habitats supporting populations of this species are on private land.

Guilds Cave streams, Lowland Streams in slackwater.

Statewide Map Spring_Cavefish.pdf

Conservation Issues

Aquatic habitat degradation

- 2H Wetland loss/drainage/alteration
- 2I Periodic cessation or removal of spring flows or seeps
- 2J Alteration of surface runoff patterns (flow/temp regimes)

Biological/ consumptive uses

- 5H Isolated populations (low gene flow)

Point and non-point source pollution

- 4B Waste water discharge (e.g., sewage treatment)
- 4E Agricultural runoff – including fertilizers/animal waste, herbicides, pesticides
- 4G Chemical spills and contaminants (applied and accidental)
- 4H Confined animal operations

Siltation and increased turbidity

- 1D Urbanization/Development General Construction

CLASS Actinopterygii

Sturgeon Chub ***Macrhybopsis gelida***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	H	G3	S1	G3	N

G-Trend Unknown

G-Trend Comment The sturgeon chub occurs in the Missouri River drainage and the main channel of the Mississippi River below the confluence of the Missouri River (Pflieger 1997). It is more widespread in the Missouri River drainage than the sicklefin chub (Etnier and Starnes 1993, Jenkins 1980). Like the sicklefin chub, it has been reported to be relatively abundant in portions of the Missouri River, but much less common in the Mississippi River (Pflieger 1997, Etnier and Starnes 1993). The species is rare in the lower Mississippi River below the confluence of the Missouri River south to Louisiana (Etnier and Starnes 1993, Burr and Warren 1986, Robison and Buchanan 1988). The sturgeon chub is listed as critically imperiled in states east of the Mississippi River (Illinois, Kentucky, and Tennessee), vulnerable in Missouri, possibly extirpated in Iowa, and imperiled to critically imperiled in states containing the upper Missouri River drainage (Natureserve 2008). It was listed as a federal candidate species in 1995 (U.S. Fish and Wildlife Service 1995), and is listed as Endangered by the Kentucky State Nature Preserves Commission (2005). The American Fisheries Society lists

the species as vulnerable based on present or threatened destruction, modification, or reduction of the species' habitat or range (Jelks et al. 2008).

S-Trend Unknown

S-Trend Comment Like the sicklefin chub, very few records are available for this species in the Mississippi River in western Kentucky (Burr and Warren 1986, Herzog 2004). This has been due mostly to difficulties with capturing small benthic fishes in large river habitats. The species was captured recently along with the sicklefin chub in benthic trawl samples in the Mississippi River at Wolf Island in western Kentucky; short-term data suggest that this species is uncommon, but not rare, and that its numbers are stable (Herzog 2004).

Habitat / Life History This is a small, benthic minnow limited to the turbid waters of the main channel of the Mississippi River in western Kentucky. Recent benthic trawl surveys (2000-2001) produced sturgeon and sicklefin chubs at a single location at Wolf Island (Herzog 2004). According to Herzog (2004), both species generally utilize similar habitats during particular times of the year (e.g., February-March), but partition themselves by age class, size, and species at other times. The sturgeon chub apparently occupies shallower depths (68% captured at less than 2 m) than the sicklefin chub (69% captured at greater than 4 m). Like the sicklefin chub, it has characteristics typical of fishes adapted to low light conditions of large turbid rivers, including reduced eyes partially covered by skin and numerous taste buds covering the head, body, and fins; in addition, the sturgeon chub has peculiar

keeled dorsolateral scales (Etnier and Starnes; Pflieger 1997). The food habits of the sicklefin chub are poorly known, but it is probably a bottom feeder relying on taste to locate its food (Pflieger 1997). Pflieger (1997) surmised that the spawning habits of this species are probably like those of the speckled chub (eggs deposited in deep water in swift current), since the two species are known to hybridize. Spawning is thought to occur in late spring or early summer, based on tubercled males taken in May and late June (Robison and Buchanan 1988).

Key Habitat

Records for this species are available for the Lower Mississippi-Memphis (HUC8 08010100) and Lower Ohio (05140206) watershed units; the latter record is actually from the Mississippi River at Cairo, Illinois (Burr and Warren 1986). Sections of the Mississippi River where this species has been found are impacted by channel modifications made to enhance barge traffic. No reach of the Mississippi River or its tributaries in western Kentucky are rated as fully supporting aquatic life. Most (64%) offer only partial support, while 36% are considered non-supportive (Kentucky Division of Water 2002).

Guilds

Large rivers in current.

Statewide Map

Sturgeon_Chub.pdf

Conservation Issues

Aquatic habitat degradation

2A Navigational dredging/Commercial dredging

2B Gravel/sand removal or quarrying (e.g., mineral excavation)

2C Construction/Operation of impoundments (migration barrier)

2G Water level fluctuations

2J Alteration of surface runoff patterns (flow/temp regimes)

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