Fish and Lamprey CWCS Species (68 species)

Common name	Scientific name
Alabama Shad	*Alosa alabamae*
Alligator Gar	*Atractosteus spatula*
Ashy Darter	*Etheostoma cinereum*
Black Buffalo	*Ictiobus niger*
Blackfin Sucker	*Thoburnia atripinnis*
Blackside Dace	*Phoxinus cumberlandensis*
Blacktail Redhorse	*Moxostoma poecilurum*
Blacktail Shiner	*Cyprinella venusta*
Bloodfin Darter	*Etheostoma sanguifluum*
Blotched Chub	*Erimystax insignis*
Bluntface Shiner	*Cyprinella camura*
Brighteye Darter	*Etheostoma lynceum*
Brown Madtom	*Noturus phaeus*
Burbot	*Lota lota*
Central Mudminnow	*Umbra limi*
Cumberland Arrow Darter	*Etheostoma sagitta sagitta*
Cumberland Johnny Darter	*Etheostoma susanae*
Cypress Darter	*Etheostoma proeliare*
Cypress Minnow	*Hybognathus hayi*
Dollar Sunfish	*Lepomis marginatus*
Duskytail Darter	*Etheostoma percnurum*
Emerald Darter	*Etheostoma baileyi*
Firebelly Darter	*Etheostoma pyrrhogaster*
Flathead Chub	*Platygobio gracilis*
Frecklebelly Darter	*Percina stictogaster*
Golden Topminnow	*Fundulus chrysotus*
Goldstripe Darter	*Etheostoma parvipinne*
Gulf Darter	*Etheostoma swaini*
Highland Rim Darter	*Etheostoma kantuckeense*
Inland Silverside	*Menidia beryllina*

Kentucky Arrow Darter	*Etheostoma sagitta spilotum*
Kentucky Darter	*Etheostoma rafinesquei*
Lake Chubsucker	*Erimyzon sucetta*
Lake Sturgeon	*Acipenser fulvescens*
Least Madtom	*Noturus hildebrandi*
Longhead Darter	*Percina macrocephala*
Northern Cavefish	*Amblyopsis spelaea*
Northern Madtom	*Noturus stigmosus*
Olive Darter	*Percina squamata*
Paddlefish	*Polyodon spathula*
Palezone Shiner	*Notropis albizonatus*
Pallid Shiner	*Hybopsis amnis*
Pallid Sturgeon	*Scaphirhynchus albus*
Plains Minnow	*Hybognathus placitus*
Redside Dace	*Clinostomus elongatus*
Redspotted Sunfish	*Lepomis miniatus*
Relict Darter	*Etheostoma chienense*
Sawfin Shiner	*Notropis sp. 4*
Shawnee Darter	*Etheostoma tecumsehi*
Sicklefin Chub	*Macrhybopsis meeki*
Slender Madtom	*Noturus exilis*
Smallscale Darter	*Etheostoma microlepidum*
Southern Cavefish	*Typhlichthys subterraneus*
Splendid Darter	*Etheostoma barrenense*
Spotted Darter	*Etheostoma maculatum*
Spring Cavefish	*Forbesichthys agassizii*
Stargazing Minnow	*Phenacobius uranops*
Starhead Topminnow	*Fundulus dispar*
Stone Darter	*Etheostoma derivativum*
Striped Darter	*Etheostoma virgatum*
Sturgeon Chub	*Macrhybopsis gelida*
Swamp Darter	*Etheostoma fusiforme*
Taillight Shiner	*Notropis maculatus*
Western Sand Darter	*Ammocrypta clara*
American Brook Lamprey	*Lampetra appendix*

Chestnut Lamprey	*Ichthyomyzon castaneus*
Mountain Brook Lamprey	*Ichthyomyzon greeleyi*
Northern Brook Lamprey	*Ichthyomyzon fossor*

CLASS ACTINOPTERYGII

Alabama Shad ***Alosa alabamae***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
C	E	G3	S1	G3	S1

G-Trend Decreasing

G-Trend Comment Formerly distributed throughout the eastern Gulf Coastal drainages from Suwannee River, Florida to the Mississippi River (Etnier and Starnes 1993). However, populations have greatly declined in the past 50 years. According to NatureServe (2004), the species currently has a very limited distribution through the Gulf of Mexico tributaries. In the Mississippi River basin, populations there are small and are very rare (Etnier and Starnes 1993, Pflieger 1975). In Tennessee, this species was known from the Clinch and Stones Rivers and was apparently widespread in Tennessee during pre-impoundment days, but no recent records have been reported in Tennessee (Etnier and Starnes 1993).

S-Trend Decreasing

S-Trend Formerly abundant in the Mississippi and Ohio rivers and probably only

Comment enters Kentucky's waters during the spawning run (Burr and Warren 1986). Limited commercial fishing for this species has occurred in the Ohio River, with the harvest of several thousand pounds per year (NatureServe 2004). Burr and Warren (1986) reported only one recent record is available from the Mississippi River near New Madrid, Missouri; other records for Kentucky waters predate 1900. The most recent record in Kentucky was a large adult specimen collected in July 1986 from the Tennessee River just below Kentucky Dam in Marshall County (Etnier and Starnes 1993).

Habitat / Life History This species is anadromous, with adults appearing in large spawning rivers from January-March. Eggs are deposited over coarse sand and gravel substrates swept by moderate currents at temperatures of 19-22 C during April (Etnier and Starnes 1993). After spawning, adults migrate downstream with young appearing in the Mississippi River in Missouri between mid-July and early October (Pflieger 1975). Juveniles stay in fresh water for 6-8 months before leaving the rivers by winter and generally return to spawn when 3-4 years old (NatureServe 2004).

Key Habitat The most recent records are from the lower Tennessee (Kentucky Lake HUC 06040005) and Mississippi (HUC 08010100) River drainages. Habitat conditions for the lower Tennessee are considered fully supporting of aquatic life for just over 50% of stream miles surveyed and only 32% are fully supporting in the Mississippi (Kentucky Division of Water 2002).

CLASS ACTINOPTERYGII

Alabama Shad ***Alosa alabamae***

Guilds Large rivers in current.

Statewide AlabamaShad.pdf

Map

Conservation Issues

Aquatic habitat degradation

2A Navigational dredging/Commercial dredging

2C Construction/Operation of impoundments (migration barrier)

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

4F Urban runoff

4G Chemical spills and contaminants (applied and accidental)

4K Industrial waste discharge/runoff

Siltation and increased turbidity

1B Agriculture

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Alligator Gar ***Atractosteus spatula***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G3G4	S1	G3	S1

G-Trend Decreasing

G-Trend Comment Historically, this species ranged from southwest Ohio, southern Indiana, and southern Illinois to the Gulf of Mexico in the Mississippi River Basin. Currently, it occurs along the Gulf Coastal Plain from the Florida panhandle to Veracruz, Mexico. The species is now extirpated or very rare in the northern portion of its range, and appears to be declining in the southern portions. Once occurring in 13 states, this species is considered extirpated in three, imperiled or critically imperiled in six, vulnerable three states, and apparently secure in only one state. Most of the decline appears to be related to habitat alterations and commercial fishing. However, some populations of Alligator gar still support fisheries in Arkansas and Louisiana (Etnier and Starnes 1993).

S-Trend Decreasing

S-Trend Comment Historically occurring in Kentucky as far up the Ohio River as Bracken County near Maysville (Trautman 1981). J. P. Kirtland noted this species

being captured in the early 1800's above Cincinnati. Although Trautman did not examine any specimens, he reported anecdotal evidence that the species was present in the northern Kentucky area during the 1920's through the 1940's. The species has not been documented in Kentucky since the late 1970's. The most recent records include one from the lower Cumberland River, two from the Ohio River at or below Paducah, and one from the mouth of Bayou Du Chien (Fulton County) as it enters the Mississippi River (Burr and Warren 1986). The Kentucky State Nature Preserves Commission (2004) recommends a conservation status of endangered for this species within the state.

Habitat / Life History

This species is one of the largest freshwater fishes in the U.S.. The largest known gar collected in Louisiana was 9 feet 8.5 inches and weighed 302 pounds (NatureServe 2004). These fish inhabits sluggish pools of large rivers and their bayous, oxbows, and backwaters. The have been known to occur in brackish water and rarely in coastal marine waters. Spawning can occur from January through September depending on the latitude. These fish spawn over vegetation and appear to require some flowing water during spawning (NatureServe 2004). Their resiliency appears low, as any given population has been estimated to need >14 years in order to double in size (Froese and Pauly 2004). Alligator gars are considered to be

CLASS ACTINOPTERYGII

Alligator Gar ***Atractosteus spatula***

carnivores/piscivores. Although they eat mainly fish and crabs, food habit studies have shown them to also consume turtles, waterfowl and other birds, small mammals and are believed to scavenge (Etnier and Starnes 1993).

Key Habitat

The most recent records are from near the mouth of the Ohio River and in the Mississippi River bordering Kentucky. These include the lower Cumberland River (HUC 05130205; 1 record), Kentucky Lake (HUC 06040005; 1 record), lower Ohio River (HUC 05140206; 2 records), and lower Mississippi (HUC 08010100; 1 record). Habitat conditions fully supporting aquatic life ranges from 32% (Mississippi HUC) to 75% (Kentucky Lake HUC) of stream miles surveyed within these watersheds. Historically, this species occurred in the Middle Ohio-Laughery HUC (05090203) between 1830 and 1840, Silver-Little Kentucky River HUC (05140101) in the early 1800's, and Ohio Brush-Whiteoak HUC (05090201) between 1920 and 1940. No reports of Alligator gar have subsequently been reported and it is thought the fish no longer exists in this portion of the river.

Guilds

Large rivers in slackwater.

Statewide AlligatorGar.pdf

Map

Conservation Issues

Aquatic habitat degradation

- 2C Construction/Operation of impoundments (migration barrier)
- 2E Stream channelization/ditching
- 2H Wetland loss/drainage/alteration
- 2L Levee construction

Biological/ consumptive uses

- 5F Low population densities
- 5J Incidental mortality due to commercial fishing/musseling (mortality and overharvest)

Point and non-point source pollution

- 4J Barge traffic

Terrestrial habitat degradation

- 3R Habitat and/or Population Fragmentation

CLASS ACTINOPTERYGII

Ashy Darter ***Etheostoma cinereum***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G2G3	S3	G2	S3

G-Trend Decreasing

G-Trend Comment The ashy darter is distributed sporadically in the Tennessee and Cumberland river drainages in Kentucky and Tennessee (NatureServe 2004). This species has been extirpated from margins of its range in Georgia and Alabama, and apparently in Virginia. It is a threatened species in Tennessee (Etnier and Starnes 1993).

S-Trend Stable

S-Trend Comment This species occurs in the Little South Fork Cumberland River, South Fork Cumberland River, and Rockcastle River in Kentucky (Burr and Warren 1986). It is possibly extirpated from the Red River (Logan County), but was recently rediscovered in Buck Creek, Pulaski County (Compton and Moeykens 2001).

Habitat / Life History The ashy darter inhabits clear upland streams and rivers in slow to moderate current below and above riffles and in pools up to 1.75 meters deep (Burr and Warren 1986). This species is usually associated with sand and gravel substrates and boulders, tree snags, or water willow as cover. Spawning is

from late January to early April near boulders and water willow (Etnier and Starnes 1993).

Key Habitat

Currently known to occur in the Rockcastle River (HUC 05130102), Upper Cumberland – Lake Cumberland (HUC 05130103), and South Fork Cumberland (HUC 05130104) watersheds. Habitat conditions fully supporting aquatic life ranges from 51.5% to 90.0% of stream miles surveyed within these watersheds, all of which contain outstanding resource waters (Kentucky Division of Water 2002).

Guilds

Upland streams in pools.

Statewide Map

AshyDarter.pdf

CLASS ACTINOPTERYGII

Ashy Darter ***Etheostoma cinereum***

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

Siltation and increased turbidity

1A Coal mining

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

Blackfin Sucker ***Thoburnia atripinnis***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G2	S2	G2	S2

G-Trend Stable

G-Trend Comment The blackfin sucker is endemic to the Barren River drainage basin. The Tennessee Valley Authority has documented 13 locality records from the Tennessee portion of the Barren River (NatureServe 2004). The status of these populations is unknown. Kentucky has documented 33 records for this species from the 1940's to the present. The status of these populations is considered stable, although no current population data is available. The American Fisheries Society lists the Blackfin sucker as a species of special concern, while NatureServe (2004) lists it as imperiled in Kentucky and critically imperiled in Tennessee.

S-Trend Stable

S-Trend Comment This species is endemic to the Barren River drainage in southern Kentucky and a portion of northern Tennessee (Etnier and Starnes 1993). In Kentucky, this small sucker (maximum length is 6 inches) resides in the

headwater streams of Allen, Barren, Metcalf, and Monroe counties. The Blackfin sucker can be considered common in a drainage, although their distribution may be very localized (Burr and Warren 1986). These fish inhabit small to medium size upland headwater streams along the Highland Rim in the southwestern portion of the state. The Kentucky State Nature Preserves Commission has listed the Blackfin sucker as threatened and recommended it be labeled as a species of special concern in Kentucky (NatureServe 2004).

Habitat / Life History Inhabits pool and riffle areas in clear water with moderate current and gravel or rubble substrates in creeks and medium sized rivers (NatureServe 2004). They are benthic living on or near the bottom of the stream, and seek shelter along shorelines with overhanging brush, near boulders, or in rock crevices (Burr and Warren 1986). Diet consists primarily of microcrustacea and insect larvae. Spawning occurs in shallow, swift water over riffles in the early spring (March and April). After hatching, the young are found in pools with moderate flow and in smaller tributaries over fine gravel (Etnier and Starnes 1993).

Key Habitat Currently exists only in the upper Barren River (HUC 05110002). Nearly 93% of the stream miles surveyed within this watershed have habitat conditions fully supporting aquatic life and 14.7 miles of stream have been deemed outstanding resource waters (Kentucky Division of Water 2004).

CLASS ACTINOPTERYGII

Blackfin Sucker ***Thoburnia atripinnis***

Guilds Upland streams in pools.

Statewide BlackfinSucker.pdf

Map

Conservation Issues

Aquatic habitat degradation

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

2E Stream channelization/ditching

Biological/ consumptive uses

5F Low population densities

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

4G Chemical spills and contaminants (applied and accidental)

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Blackside Dace ***Phoxinus cumberlandensis***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
LT	T	G2	S2	G2	S2

G-Trend Decreasing

G-Trend Comment The blackside dace are restricted to the Cumberland Plateau portion of the upper Cumberland drainage and are found above and below Cumberland Falls in Kentucky and Tennessee (Etnier and Starnes 1993).

S-Trend Decreasing

S-Trend Comment Populations of the blackside dace in Kentucky are believed to be stable to slightly declining with the complete loss of several populations in Bell County probably as a result of logging and urban sprawl rather than from mining activities (David Eisenhour, Morehead State University, personnel communications). In Kentucky, the blackside dace is known from 91 streams with only 22 streams supported excellent or good populations; most populations were very small and near extirpation (NatureServe 2004). Kentucky streams that receive a high degree of protection include the Bad Branch, Eagle Creek, Watts Creek, Beaver Creek and associated tributaries, and Davis Branch. The blackside dace also occurs in several streams on Daniel Boone National Forest, but these do not receive the same high degree

of protection as the previously mentioned streams; Cannon Creek also have blackside dace populations and is protected to some degree by being designated as unsuitable for mining (NatureServe 2004).

Habitat / Life History

Confined to small upland creeks, usually 300-500 m in elevation, and are 2-5 m in width (Burr and Warren 1986). Typically found in sluggish pools of shaded and cool streams that have a riffle to pool ratio that approaches 60:40 (Burr and Warren 1986). This species is usually also associated with lush riparian vegetation, canopy cover greater than 70%, and unsilted conditions and apparently can recolonize areas when water quality or habitat conditions become more favorable if suitable dispersal corridors exist (NatureServe 2004).

Key Habitat

Currently exists in the South Fork Cumberland (HUC 05130104), Upper Cumberland (HUC 05130101), Rockcastle River (HUC 05130102), and Upper Cumberland Lake Cumberland (HUC 05130103) watersheds. The Upper Cumberland (HUC 05130101) contains the majority of these records. Habitat conditions fully supporting aquatic life ranges from 67% (Upper Cumberland-Lake Cumberland HUC) to 90% (South Fork Cumberland HUC) of stream miles surveyed within these watersheds. All

CLASS ACTINOPTERYGII

Blackside Dace ***Phoxinus cumberlandensis***

contain outstanding resource waters (Kentucky Division of Water 2002).

Guilds Upland headwater streams in pools.

Statewide BlacksideDace.pdf

Map

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

2E Stream channelization/ditching

Biological/ consumptive uses

5A Predation from introduced species

5D Competition from introduced/invasive or native species

Point and non-point source pollution

4A Acid mine drainage other coal mining impacts

Siltation and increased turbidity

1A Coal mining

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

1E Silviculture

CLASS ACTINOPTERYGII

Blacktail Redhorse ***Moxostoma poecilurum***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G5	S1	G5	S1

G-Trend Stable

G-Trend Gulf Slope drainages from Galveston Bay tributaries, Texas, to

Comment Choctawhatchee River drainage, Alabama and Florida; Mississippi River tributaries from southern Kentucky and southern Arkansas south to Louisiana. Found only in the states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee, and Texas. This species is broadly distributed in the southeastern U.S. and often abundant in rivers, reservoirs, small to large streams, swamps, and the Mobile Delta (Mettee et al. 1996). According to NatureServe (2004), this species is locally common, but rare in Kentucky and Tennessee. It is considered secure (S5) or apparently secure (S4) in Louisiana, Mississippi, Tennessee, Texas and Tennessee; vulnerable (S3) in Georgia; imperiled in Arkansas; and critically imperiled (S1) in Kentucky.

S-Trend Unknown

S-Trend This species reaches the northernmost limit of its range in in the

Comment	southwestern corner of the state, where it occurs only in Terrapin Creek, Graves County (Burr and Warrren 1986). It is considered critically imperiled (S1) in Kentucky (NatureServe 2004).
Habitat / Life History	Little is known about the biology of this species. Spawning occurs in mid- to late spring in shoal areas of small streams (Etnier and Starnes 1993). In Terrapin Creek, both adults and juveniles have been collected from sandy bottomed pools; however, the closest reproducing population known occurs downstream in the Obion River in Tennessee (Burr and Carney 1984).
Key Habitat	Occurs only in Obion Creek HUC8 (08010202). Habitat conditions fully supporting aquatic life is about 28% of the stream miles surveyed in this watershed, with a total of 1.7 stream miles considered outstanding resource water (Kentucky Division of Water 2002).
Guilds	Lowland Streams in slackwater.
Statewide Map	BlacktailRedhorse.pdf

CLASS ACTINOPTERYGII

Blacktail Redhorse ***Moxostoma poecilurum***

Conservation Issues

Aquatic habitat degradation

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

2C Construction/Operation of impoundments (migration barrier)

Siltation and increased turbidity

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

1E Silviculture

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

Bloodfin Darter ***Etheostoma sanguifluum***

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

G-Trend Stable

G-Trend Comment The bloodfin darter occurs in the middle Cumberland River drainage, from Caney Fork, Tennessee, to Rockcastle River, Kentucky (Natureserve 2004).

S-Trend Stable

S-Trend Comment In Kentucky, this species is restricted to the middle Cumberland River where it is generally distributed and common in the Rockcastle River, Big and Little South Forks, and Buck Creek (Burr and Warren 1986).

Habitat / Life History Occurs in small to medium upland streams and rivers along or near the Pottsville Escarpment and the easternmost region of the Highland Rim. Inhabits moderate to rapid currents or riffles with substrates of boulder, cobble, and pebble. Spawning and nest-building occur in the interspaces

between the substrate and overlying rocks (Burr and Warren 1986).

Key Habitat Currently known to occur in the Rockcastle River HUC8 (05130102), Upper Cumberland – Lake Cumberland HUC8 (05130103), South Fork Cumberland HUC8 (05130104). Habitat conditions fully supporting aquatic life range from 67.3% (Upper Cumberland – Lake Cumberland HUC8) to 90.0% (South Fork Cumberland HUC8) of stream miles surveyed within these watersheds, all of which contain outstanding resource waters (Kentucky Division of Water 2002).

Guilds Upland streams in riffles.

Statewide Map BloodfinDarter.pdf

CLASS ACTINOPTERYGII

Bloodfin Darter ***Etheostoma sanguifluum***

Conservation Issues

Point and non-point source pollution

4A Acid mine drainage other coal mining impacts

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

4F Urban runoff

Siltation and increased turbidity

1A Coal mining

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

1E Silviculture

CLASS ACTINOPTERYGII

Blotched Chub ***Erimystax insignis***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G3G4	S1	G3	S1

G-Trend Stable

G-Trend Comment The blotched chub occurs in the Cumberland and Tennessee river drainages of southern Kentucky, Tennessee, western Virginia, western North Carolina, northern Georgia, and northern Alabama. (Natureserve 2004).

S-Trend Decreasing

S-Trend Comment In Kentucky, this species is sporadic and uncommon in the upper Cumberland River (below the falls) where it is known from five localities. It was collected in the Red River (of the middle Cumberland) by Kentucky State Nature Preserves Commission in the early 1980's (Burr and Warren 1986). Reports of this species in the Green and Kentucky River systems are based on the superficially similar streamline chub (Burr and Warren 1986)

Habitat / Life History Occurs in riffle areas in medium to large-size streams and rivers, where there is continuous flow, clear, and gravel or rocky bottom (Burr and Warren 1986). Its habitat is similar to those of the streamline chub, however this species prefers slightly coarser substrates and tolerating much smaller

streams (Etnier and Starnes 1993). Spawning occurs in mid-April through early May as water temperature approaches 15 C (60F). Sexual maturity is reached at age-1. Life span is 2.5 years. Food consists of about half periphyton and half aquatic insect larvae dominated by dipterans and mayflies. Maximum total length is 100 mm SL (Etnier and Starnes 1993).

Key Habitat

Although known historically from four HUC8 watershed units in Kentucky, the only recent records (post-1984) are from the Red River (of the Cumberland) HUC (05130206). Habitat conditions in the Red River HUC8 are good as 73.1% of assessed streams were found to be fully supporting aquatic life. A total of 43.7 miles of streams in this HUC8 are considered outstanding resource waters (Kentucky Division of Water 2002).

Guilds

Upland streams in pools.

Statewide Map

BlotchedChub.pdf

CLASS ACTINOPTERYGII

Blotched Chub ***Erimystax insignis***

Conservation Issues

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

4F Urban runoff

Siltation and increased turbidity

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

1E Silviculture

CLASS ACTINOPTERYGII

Bluntface Shiner ***Cyprinella camura***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G5	S1	G5	S1

G-Trend Stable

G-Trend Comment The bluntface shiner is common in eastern tributaries to the lower Mississippi River from Obion Creek south (Etnier and Starnes 1993). It also occurs in a few southwestern tributaries to the Tennessee River and the Central Arkansas River drainage.

S-Trend Stable

S-Trend Comment In Kentucky, this species is known to occur only in Terrapin Creek in Graves County and Obion Creek in Hickman County (Burr and Warren 1986). It is considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History The bluntface shiner is restricted to small sand or gravel-bottomed streams in raceways and riffles on the Coastal Plain (Burr and Warren 1986). This species is normally near submerged logs. Spawning may occur from May through August (Etnier and Starnes 1993).

Key Currently known to occur in the Bayou du Chien – Mayfield (HUC

Habitat	08010201) and Obion Creek (HUC 08010202) watersheds. Habitat conditions in these watersheds considered fully supporting of aquatic life include 27.8% (Bayou du Chien-Mayfield HUC8) and 37.0% (Obion Creek HUC8) of stream miles surveyed within these watersheds. Both contain outstanding resource waters (Kentucky Division of Water, 2002).
Guilds	Lowland Streams in riffles.
Statewide Map	BluntfaceShiner.pdf

CLASS ACTINOPTERYGII

Bluntface Shiner ***Cyprinella camura***

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching. Burr and Warren (1986)

2F Riparian zone removal (Agriculture/development). Burr and Warren (1986)

2H Wetland loss/drainage/alteration . Burr and Warren (1986)

Biological/ consumptive uses

5D Competition from introduced/invasive or native species. Burr and Warren (1986)

5E Hybridization with closely related species. Burr and Warren (1986)

Siltation and increased turbidity

1B Agriculture. Burr and Warren (1986)

CLASS ACTINOPTERYGII

Brighteye Darter ***Etheostoma lynceum***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G5	S1	G5	S1

G-Trend Stable

G-Trend Comment Formerly considered a subspecies of the banded darter, the brighteye darter was elevated to species status by Etnier and Starnes (1986). This species is distributed throughout the upper Coastal Plain east of the Mississippi River from the Obion River system in Tennessee and Kentucky south and east through Pascagoula River drainage of Mississippi and western Alabama (Etnier and Starnes, 1993). Although species continues to be common in better quality streams within its range, some populations have likely been eliminated by channelization (Etnier and Starnes, 1993).

S-Trend Unknown

S-Trend Comment In Kentucky, this species is confined to Terrapin Creek in Graves County. It is considered critically imperiled in Kentucky (NatureServe, 2004 and endangered by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History Occurs in Coastal Plain streams with noticeable flow over a substrate of gravel riffles or an accumulation of detrital material, often where rooted

aquatic vegetation is present (Etnier and Starnes, 1993). Bell and Timmons (1991) documented the species occurring in dense tree roots around undercut banks during the winter and in fast flowing, shallow gravel riffles during the summer. Diet consisted mainly of midge larvae (Chironomidae). Reproduction occurred from April to June, with fecundity estimates ranging from 33-116 to 65-201 mature ova per age-1 female. Although Bell and Timmons (1991) did not observe spawning activity in the field or lab, it is probably similar to that of the banded [personal communication, L. Kornman] in which the female attaches eggs to filamentous algae and aquatic mosses attached to rocks and other submerged objects. Eggs are deposited a few at a time as the male mounts the female and fertilized the eggs (Pflieger, 1977 citing Walters, 1994).

Key Habitat

Currently known to occur only in the Obion Creek (HUC 08010202) watershed (Terrapin Creek, Graves County). Habitat conditions fully supporting of aquatic life include 27.8% of stream miles surveyed within this watershed. It contains 1.7 stream miles regarded as outstanding resource water (Kentucky Division of Water, 2002).

CLASS ACTINOPTERYGII

Brighteye Darter ***Etheostoma lynceum***

Guilds Lowland Streams in riffles.

Statewide BrighteyeDarter.pdf

Map

Conservation Issues

Aquatic habitat degradation

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

2D Woody debris removal

2E Stream channelization/ditching

2F Riparian zone removal (Agriculture/development)

Miscellaneous Mortality Factors

6G Stochastic events (droughts, unusual weather, pine beetle damage, flooding etc.)

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Brown Madtom ***Noturus phaeus***

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

G-Trend Stable

G-Trend Comment The brown madtom occurs in Mississippi River tributaries in southwestern Kentucky, western Tennessee, northern Mississippi, and northwestern Alabama; and disjunctly in southern Arkansas, Louisiana, and southwestern Mississippi; Tennessee River tributaries in western Tennessee and northwestern Alabama; Gulf Slope in Sabine River and Bayou Teche drainages (Natureserve 2004). Although only a few are collected at a time at any given locality, they are considered locally common (Natureserve 2004).

S-Trend Stable

S-Trend Comment In Kentucky, this species is known to occur only in Terrapin and Powell creeks, Graves County (Burr and Warren 1986). Within Terrapin Creek, it is locally common. No observations have been made in Powell Creek since 1984 (Burr and Warren 1986, D. Eisenhour, Morehead State University, personal communication). It is considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History Occurs in permanent springs and small streams with vegetation in moderate to fast current (NatureServe 2004). Specific habitat includes sand-gravel riffles and runs among debris, rocks, and undercut banks of springs, creeks, and small rivers (NatureServe 2004). In northern Mississippi, woody debris and undercut banks were primary daytime microhabitats, and individuals most often were in areas with complex (varying) flow; none were found in the absence of debris, aquatic vegetation, or undercut banks (NatureServe 2004). Diet of the brown madtom consists primarily of dipteran and trichopteran larvae and crayfishes (NatureServe 2004).

Key Habitat Currently known to occur only in the Obion Creek (HUC 08010202) watershed (Terrapin Creek, Graves County). Habitat conditions fully supporting of aquatic life include 27.8% of stream miles surveyed within this watershed. It contains 1.7 stream miles regarded as outstanding resource water (Kentucky Division of Water, 2002).

Guilds Lowland Streams in riffles.

CLASS ACTINOPTERYGII

Brown Madtom ***Noturus phaeus***

Statewide BrownMadtom.pdf

Map

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

Biological/ consumptive uses

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

Siltation and increased turbidity

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

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

Central Mudminnow ***Umbra limi***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	T	G5	S2S3	G5	S2

G-Trend Stable

G-Trend Comment The central mudminnow occurs in north central North America in the St. Lawrence-Great Lakes, Hudson Bay (Red River), and Mississippi River basins from Quebec to Manitoba and south to central Ohio, western Tennessee, and northeastern Arkansas; Hudson River drainage (Atlantic Slope), New York; isolated populations occur in the Missouri River drainage of east-central South Dakota and western Iowa (NatureServe 2004). It is common in northern glacial regions but uncommon southward. The Coastal Plain of western Tennessee and northern Arkansas mark the

southernmost distribution of this species (Etnier and Starnes 1993).

S-Trend Decreasing

S-Trend Comment In Kentucky, this species is at the southern most edge of its range, where populations seem to be stable to slightly declining (D. Eisenhour, Morehead State University, personal communication). It is occasional to locally common in the Clarks and Blood River drainages, and Terrapin Creek and Running Slough, Fulton County (Burr and Warren 1986). It is considered imperiled in Kentucky (NatureServe, 2004) and threatened by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History Inhabits dense beds of submergent vegetation or piles of organic debris in spring-fed wetlands, ditches, or shallow margins of lowland lakes in the Coastal Plain (Clay 1975). This species usually prefers non-turbid water over substrates of sand, mud, and organic debris. Spawning occurs in shallow water during the spring water temperatures reach 13° C (55° F). Eggs are adhesive and deposited on vegetation. Life span has been reported to range between 4 and 9 years (Etnier and Starnes 1993).

Key Habitat Currently known to occur in four HUC8 watersheds: Kentucky Lake (HUC 06040005; 3 records), Lower Tennessee River (HUC 06040006; 8 records), Bayou De Chien-Mayfield (HUC 08010201; 2 records), and Obion Creek (HUC 08010202; 19 records). Habitat conditions fully supporting aquatic life range from 27% (Obion Creek HUC) to 74.9%

(Kentucky Lake HUC) of stream miles surveyed within these watersheds. Number of stream miles considered outstanding resource waters range from none (Kentucky Lake HUC) to 124.4 (Bayou du Chien-Mayfield Creek HUC) (Kentucky Division of Water 2002).

CLASS ACTINOPTERYGII

Central Mudminnow ***Umbra limi***

Guilds Lowland Streams in slackwater.

Statewide CentralMudminnow.pdf

Map

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2F Riparian zone removal (Agriculture/development)

2I Periodic cessation or removal of spring flows or seeps

Biological/ consumptive uses

5F Low population densities

Siltation and increased turbidity

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Cumberland Arrow Darter ***Etheostoma sagitta sagitta***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	N	G3G4 T3T4	S4	G3	S4

G-Trend Unknown

G-Trend Comment This subspecies of the arrow darter is an inhabitant of the Cumberland Plateau physiographic province (Etnier and Starnes 1993). It ranges from eastern tributaries to the Big South Fork of the Cumberland River System in Kentucky and Tennessee (Etnier and Starnes 1993). Global trend data is unknown.

S-Trend Stable

S-Trend Comment In Kentucky, the Cumberland arrow darter is endemic to the Cumberland River Drainage (Burr and Warren 1986). It has been collected both above and below the Cumberland Falls (Etnier and Starnes 1993). The Cumberland arrow darter is considered secure in Kentucky and populations are currently stable (D. Eisenhour, Morehead State University, personal communication; Natureserve 2004).

Habitat / Generally inhabits headwater creeks, but juveniles and occasionally adults

Life History may be taken in medium sized streams (Burr and Warren 1986). It occurs in sluggish pools or areas above and below riffles over substrates of bedrock, cobble, and pebble (Burr and Warren 1986), and is commonly found associated with large, flat stones (Page 1983). Spawning takes place in April when water temperatures are around 13° C. (Etnier and Starnes 1993). Common food items include mayflies, midges, and stoneflies (Page 1983). This species is moderately tolerant to siltation (Etnier and Starnes 1993).

Key Habitat Currently known to occur in the Upper Cumberland (HUC 05130101), Upper Cumberland-Lake Cumberland (HUC 05130103), and South Fork Cumberland (HUC8 051301014) watersheds. Habitat conditions fully supporting aquatic life range from 67% (Upper Cumberland-Lake Cumberland) to 90% (South Fork Cumberland) of stream miles surveyed within these watersheds. Most records lie within the Upper Cumberland HUC, which contains 404.4 stream miles considered outstanding resource water (Kentucky Division of Water 2002).

Guilds Upland headwater streams in pools.

CLASS ACTINOPTERYGII

Cumberland Arrow Darter ***Etheostoma sagitta sagitta***

Statewide CumberlandArrowDarter.pdf

Map

Conservation Issues

Point and non-point source pollution

4A Acid mine drainage other coal mining impacts

Siltation and increased turbidity

1A Coal mining

CLASS ACTINOPTERYGII

Cumberland Johnny Darter ***Etheostoma susanae***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
C	E	G2	S1	G2	S1

G-Trend	Decreasing
G-Trend Comment	The Cumberland johnny darter is found in the Cumberland River drainage above Cumberland Falls in eastern Kentucky and adjacent Tennessee (NatureServe 2004).
S-Trend	Decreasing
S-Trend Comment	This species is found only in tributaries to the Cumberland River drainage above Cumberland Falls (NatureServe 2004).
Habitat / Life History	Inhabits shallow water in low velocity shoals and backwater areas of moderate gradient streams with sand or sandy gravel substrate (NatureServe 2004). Spawning occurs in April and May.
Key	Restricted to the Upper Cumberland River (HUC 05130101) drainage.
Habitat	Habitat conditions fully supporting aquatic life include 70.3% of stream miles surveyed within this watershed, in which 404.4 stream miles are considered outstanding resource waters (Kentucky Division of Water 2002).
Guilds	Upland headwater streams in pools.

Statewide CumberlandJohnnyDarter.pdf

Map

Conservation Issues

Siltation and increased turbidity

1A Coal mining

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

1E Silviculture

CLASS ACTINOPTERYGII

Cypress Darter ***Etheostoma proeliare***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	T	G5	S2	G5	S2

G-Trend Stable

G-Trend Comment The cypress darter ranges from the Choctawhatchee River in Florida to the San Jacinto River in Texas, north through the Mississippi Valley to southern Illinois and eastern Oklahoma (Page 1983, Etnier and Starnes 1993, Natureserve 2004).

S-Trend Unknown

S-Trend Comment In Kentucky, this species is sporadic and rare in creeks, streams, sloughs, and oxbows that border the Mississippi and lower Ohio Rivers, and the lower Cumberland and Tennessee River drainages (Burr and Warren 1986). It is considered imperiled in Kentucky (NatureServe, 2004) and threatened by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History Inhabits lowland creeks, oxbow lakes, and wetland flood plains of the Ohio, Mississippi, lower Tennessee, and lower Cumberland Rivers. This species is generally associated with leaf-laden and/or vegetated water bodies in sluggish current, pools, or shorelines of lakes. Tree roots along undercut banks may also harbor the species if other cover is absent (Burr and Warren

1986). Sexual maturity is reached at one year of age. Spawning occurs from mid-March to early June. Females contain 26-116 eggs and deposit them on dead leaves, twigs, rock and filamentous algae. Eggs are not guarded and hatch in 5-13 days based on temperature. Life span is 1.5 years. Principal food items are midge larvae and microcrusteaceans (Page 1983, Etnier and Starnes 1993).

Key Habitat

Currently known to occur in eight HUC8 watersheds: Lower Cumberland (HUC 05130205), Lower Ohio - Bay (HUC 05140203), Lower Ohio (HUC 05140206), Kentucky Lake (HUC 06040005), Lower Tennessee (HUC 06040006), Lower Mississippi – Memphis (HUC 08010100), Bayou De Chien – Mayfield (HUC 08010201), and Obion Creek (HUC 08010202). Habitat conditions fully supporting aquatic life range from 0% (Lower Mississippi – Memphis HUC) to 74.9% (Lower Tennessee-Kentucky Lake HUC) of stream miles surveyed, of which 154.6 are considered outstanding resource waters (Kentucky Division of Water 2002 and 2004).

Guilds

Lowland Streams in slackwater.

CLASS ACTINOPTERYGII

Cypress Darter ***Etheostoma proeliare***

Statewide CypressDarter.pdf

Map

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2H Wetland loss/drainage/alteration

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Cypress Minnow ***Hybognathus hayi***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G5	S1	G5	S1

G-Trend Stable

G-Trend Comment The cypress minnow occurs in the Ohio and Mississippi Basins from southeastern Missouri, southern Illinois and southwestern Indiana downstream to the Gulf Coast, where it extends from the panhandle of Florida west to the Sabine River drainage in Louisiana and Texas. The range includes the lower Tennessee River drainage upstream through central Alabama (Etnier and Starnes 1993). Formerly known from southeast Missouri and southern Illinois. Page and Burr (1991) reported that the species was locally common, but apparently, the species is disappearing from the northern part of the range (Missouri and Illinois).

S-Trend Decreasing

S-Trend Comment In Kentucky, this species is sporadic and rare in direct Mississippi River tributaries of extreme western Kentucky and oxbow lakes of the Ohio River. Also found in the West Fork Clarks River, Panther Creek in Daviess County and Long Pond in Hopkins County. The latter two are the

easternmost records from the state (Burr and Warren 1986). It is considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History

Inhabits sloughs, swamps, oxbows and backwaters and pools of slow moving creeks usually over mud, silt, sand and detritus (Page and Burr 1991). It can often be found in association with the central silvery minnow (Pflieger 1975). Occasionally is associated with submerged aquatic vegetation and other cover (Burr and Warren 1986).

Key Habitat

Currently known to occur in six HUC8 watersheds, although most of these records predate 1984. The Bayou du Chien-Mayfield (HUC 08010201) contains the largest number of records (17), only one of which is post-1984. Nine records are known from the remaining five watersheds: Lower Green (HUC 05110005), Pond River (HUC 05110006), Lower Ohio (HUC 05140206), Lower Tennessee-Kentucky Lake (HUC 06040006), and Lower Mississippi-Memphis (HUC 08010100). Habitat conditions fully supporting aquatic life range from 0% to 52% of stream miles surveyed within these watersheds. Although the Bayou du Chien-Mayfield HUC has over 124 stream miles considered outstanding resource water, most of the other watersheds have fewer than ten (Kentucky Division of Water 2002, 2004).

CLASS ACTINOPTERYGII

Cypress Minnow ***Hybognathus hayi***

Guilds Lowland Streams in slackwater.

Statewide CypressMinnow.pdf

Map

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2F Riparian zone removal (Agriculture/development)

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Dollar Sunfish ***Lepomis marginatus***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G5	S1	G5	S1

G-Trend Unknown

G-Trend Comment The dollar sunfish occurs in the Atlantic and Gulf coastal drainages, mostly below the Fall line, from Pamlico Sound, North Carolina, through the Brazos River, Texas (Etnier and Starnes 1993). Current distribution also extends up through western Tennessee and Kentucky in the former Mississippi Embayment (Natureserve 2004). This species has been confused with similar-appearing young longear sunfish, resulting in uncertainties concerning the distribution of populations in certain portions of its range (Etnier and Starnes 1993).

S-Trend Stable

S-Trend Comment In Kentucky, this species is known only from Murphy Pond, Hickman County, where it is uncommon; Terrapin Creek, Graves County, where it is common; and the Clarks River system, where it is uncommon (Burr and Warren 1986). Populations of the dollar sunfish in Kentucky are considered stable, although restricted to the western portion of the state (D. Eisenhour, Morehead State University, personal communication). It is

considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History The dollar sunfish is restricted to relatively clean, spring fed wetlands, streams, and sloughs (Burr and Warren 1986). It occurs over substrates of sand or clay overlain with silt and organic debris (Burr and Warren 1986). This species is often associated with submerged aquatic vegetation, hydrophytes, and overhanging vegetation along undercut banks (Burr and Warren 1986). Spawning occurs from April to August in Alabama (Mettee et al. 1996) and April to September in Florida (NatureServe 2004). Nest sites are constructed on hard sand substrates (Etnier and Starnes 1993). Growth is fairly slow and lifespan is approximately six years (Mettee et al. 1996). Common food items include detritus, filamentous algae, and terrestrial insects (Mettee et al. 1996).

Key Habitat Currently known to occur in the Obion Creek (HUC 08010202), Lower Tennessee-Kentucky Lake (HUC 06040006), and Bayou de Chien-Mayfield (HUC 08010201) watersheds. Habitat conditions fully supporting aquatic life ranges from 28% (Obion Creek HUC) to 50% (Lower Tennessee-Kentucky Lake HUC) of stream miles surveyed within these watersheds. Although the Bayou du Chien-Mayfield HUC has over

CLASS ACTINOPTERYGII

Dollar Sunfish ***Lepomis marginatus***

124 stream miles considered outstanding resource water, the other two watersheds have fewer than ten (Kentucky Division of Water 2002, 2004).

Guilds Lowland Streams in slackwater.

Statewide Map DollarSunfish.pdf

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2H Wetland loss/drainage/alteration

CLASS ACTINOPTERYGII

Duskytail Darter ***Etheostoma percnurum***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
LE, PXN	E	G1	S1	G1	S1

G-Trend Unknown

G-Trend Comment Page and Burr (1991), prior to the species being officially described, presented the known range for duskytail darter to be Big South Fork Cumberland River, Tennessee, and upper Tennessee River drainage, Virginia and Tennessee and the fish to be rare and extremely localized. Jenkins, in Jenkins and Burkhead (1993), first described Etheostoma percnurum. Jenkins described the duskytail darter from two streams in Virginia and five streams in Tennessee. Jenkins and Burkhead (1993) considered the duskytail darter endemic to the upper Tennessee and middle Cumberland River drainage and reported on several relic populations. The duskytail darter is presented in Etnier and Starnes (1993) as Etheostoma sp. (this darter was officially describes after their book went to press). At that time they reported only four known locations for this species in Tennessee.

S-Trend Unknown

S-Trend Comment The duskytail darter had not been found in Kentucky prior to 1995 when Burr and Eisenhour (1997) were contracted by the Kentucky Department of Fish and Wildlife Resources to find this federally endangered darter in the Big South Fork (Cumberland River) portion within Kentucky. At that time they discovered Etheostoma percnurum in five of eight sample sites from the Kentucky portion of the Big South Fork and were most abundant near the mouth of Troublesome Creek. At that time, they considered the range of the duskytail darter to be confined to 4.3 stream miles of the Big South Fork in McCreary County, Kentucky (approximately 12 miles including those recovered form the Tennessee portion of Big South Fork). Eisenhour and Burr (2000), when they first published this data added to the above reported findings. Based on their findings and extensive sampling by other individuals, the known range of the duskytail darter was considered to be 13.6 miles of the Big South Fork Cumberland River, six sites in Tennessee and six sites in Kentucky. Unfortunately, after more extensive and intensive surveys, ninety percent of the known range of the duskytail darter in Kentucky was only about a 4.8-mile reach between the mouth Troublesome Creek (the majority) and the mouth of Oil Well Branch. The population of Etheostoma percnurum in the Big South Fork is the only known population in the Cumberland River drainage. This darter is listed as Endangered on both the Kentucky and Federal Endangered Species list (Kentucky State Nature Preserves Commission, 2004).

CLASS ACTINOPTERYGII

Duskytail Darter ***Etheostoma percnurum***

Habitat / Life History

In Tennessee, Etnier and Starnes (1993) thought the, then undescribed, duskytail darter was found in habitats different than other closely related members of the darters within the subgenus Catonotus. The duskytail darter was found to inhabit major streams ranging from large creeks to moderately large rivers. They were usually found in gently flowing pools, generally in the vicinity of riffles. The substrate where duskytail darters were most apt to be found was large rocks strewn over bedrock or sand and gravel. Layman (1991), again prior to official species status, provided a complete life history of the duskytail darter. He found spawning, as with all species within the subgenus Catonotus (see Etheostoma virgatum as well) occurred under slab shaped stones during April-June. Eggs are laid in a single layer on the underside of these stones that had been chosen and guarded by a male. Simon and Layman (1995) provided additional life history information for the species when they discussed egg and larval development. Food habit findings provided by Layman (1991) showed that the duskytail darter was primarily an insectivore. Smaller duskytail darters consumed microcrustaceans and chironomid larvae as well as an occasional heptageniid nymph. The diet of larger duskytail darters was chironomid

larvae (primarily), ephemeropteran nymphs, microcrustaceans, and trichopteran larvae, with fish eggs present in some stomachs. Eisenhour and Burr (2000), because their findings included waters in Kentucky, provided important life history and other pertinent information. They confirmed the duskytail darter preferred habitat to be clear, silt-free pools immediately above riffles where they find cover and shelter under cobble and slab rocks. On 26 May 1998 they observed male duskytail darters guarding slab rocks with complement of eggs ranging from 79-103 per "nest rock". These nests were in 20-28 inches of water. After examining morphological and other evidence from Etheostoma percnurum across its range, Eisenhour and Burr (2002) concluded that the Big South Fork population of the duskytail darter to be an independent evolutionary unit.

Key Habitat

Currently known to occur only in the Big South Fork Cumberland River (HUC 05130104) in McCreary County. Habitat conditions fully supporting aquatic life include 90.0% of the 75.5 miles of stream assessed within this watershed, and 52.3 stream miles are considered outstanding resource water. This is a very important watershed unit to protect.

CLASS ACTINOPTERYGII

Duskytail Darter ***Etheostoma percnurum***

Guilds Upland streams in pools.

Statewide DuskytailDarter.pdf

Map

Conservation Issues

Aquatic habitat degradation

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

2F Riparian zone removal (Agriculture/development)

Biological/ consumptive uses

5F Low population densities

5H Isolated populations (low gene flow)

Miscellaneous Mortality Factors

6G Stochastic events (droughts, unusual weather, pine beetle damage, flooding etc.)

Point and non-point source pollution

4A Acid mine drainage other coal mining impacts

4B Waste water discharge (e.g., sewage treatment)

Siltation and increased turbidity

1A Coal mining

1E Silviculture

CLASS ACTINOPTERYGII

Emerald Darter ***Etheostoma baileyi***

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

G-Trend Stable

G-Trend Comment The emerald darter is common in the upper Kentucky and Rockcastle rivers, present in the middle Cumberland River and becoming less common in the upper Cumberland River above Cumberland Falls (Burr and Warren 1986). This species is less common in the South Fork Cumberland River drainage in Tennessee (Etnier and Starnes 1993), where it has declined due to stream degradation from mining.

S-Trend Stable

S-Trend Comment This species is generally distributed in the middle Cumberland River drainage from Rockcastle River upstream and upper Kentucky River drainage from Red River upstream (Burr and Warren 1986). It is common in both the upper Kentucky and Rockcastle rivers, but less common above Cumberland Falls.

Habitat / Life History Occurs in rocky pools and runs of creeks and small rivers (Etnier and Starnes 1993). Spawning occurs from April to June at temperatures of about 18-20°C in gravel-cobble raceways. This species may be an

	important intermediate host for several mussel species.
Key Habitat	Currently known to occur in seven HUC8 watersheds in the upper Kentucky and Cumberland River drainages. Habitat conditions fully supporting aquatic life ranges from 48.4% to 90.0% of streams surveyed within these watersheds, in which up to 404.4 stream miles have been recognized as outstanding resource waters (Kentucky Division of Water 2002).
Guilds	Upland streams in pools.
Statewide Map	EmeraldDarter.pdf

CLASS ACTINOPTERYGII

Emerald Darter ***Etheostoma baileyi***

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier). Burr and Warren (1986)

Point and non-point source pollution

4A Acid mine drainage other coal mining impacts . Burr and Warren (1986)

4B Waste water discharge (e.g., sewage treatment). Burr and Warren (1986)

4D Oil and gas drilling operations associated runoff. Burr and Warren (1986)

4E Agricultural runoff – including fertilizers/animal waste, herbicides, pesticides. Burr and Warren (1986)

4G Chemical spills and contaminants (applied and accidental). Burr and Warren (1986)

4K Industrial waste discharge/runoff. Burr and Warren (1986)

Siltation and increased turbidity

1A Coal mining. Burr and Warren (1986)

1B Agriculture. Burr and Warren (1986)

1E Silviculture. Burr and Warren (1986)

CLASS ACTINOPTERYGII

Firebelly Darter ***Etheostoma pyrrhogaster***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G2	S1	G2	S1

G-Trend Unknown

G-Trend Comment The firebelly darter occurs in the Obion River drainage in northwestern Tennessee and a small area of adjacent southwestern Kentucky (Natureserve 2004).

S-Trend Stable

S-Trend Comment In Kentucky, this species is occasional and uncommon in Terrapin Creek, Graves County (Burr and Warren 1986). It is considered critically imperiled in Kentucky (NatureServe, 2004 and endangered by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History Inhabits sand- and gravel-bottomed pools of headwaters, creeks, and small rivers. It is common in swifter currents with fine gravel substrate, but can also be found in pools adjacent to habitat. Eggs are thought be to attached to submerged logs and snags. Spawning generally occurs in April and May. Age range of breeding females is 1-2 years (NatureServe 2004). Eggs are laid singly on horizontal and vertical surface and they hatch in 6 – 8 days. Life span is 3 years. Diet consists primarily of midge larvae (Etnier and Starnes

1993).

Key Habitat Currently known to occur only in the Obion Creek (HUC 08010202) watershed (Terrapin Creek, Graves County). Habitat conditions fully supporting of aquatic life include 27.8% of stream miles surveyed within this watershed. It contains 1.7 stream miles regarded as outstanding resource water (Kentucky Division of Water, 2002).

Guilds Lowland Streams in riffles.

Statewide Map FirebellyDarter.pdf

CLASS ACTINOPTERYGII

Firebelly Darter ***Etheostoma pyrrhogaster***

Conservation Issues

Aquatic habitat degradation

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

2E Stream channelization/ditching

2F Riparian zone removal (Agriculture/development)

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1B Agriculture

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Flathead Chub ***Platygobio gracilis***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G5	S1	G5	S1

G-Trend Decreasing

G-Trend Comment The flathead chub is found in the Mackenzie and Saskatchewan river drainages, and Lake Winnipeg drainage, in Yukon, Northwest Territories, Manitoba, Saskatchewan, Alberta, and British Columbia in Canada and in 17 states in the U.S. (NatureServe 2004). Over its range it is common and secure in the north (S4 and S5) and declining in the southern margin of its range due to impacts of dams/reservoirs and stream channelization. It is listed as an S1 in Iowa, Kansas, Kentucky, Mississippi, Missouri, and Oklahoma. The flathead chub's distribution in the southern part of it range is restricted to Mississippi River proper from Illinois south and is localized in Arkansas River drainage in Oklahoma, Texas, and New Mexico (NatureServe 2004).

S-Trend Decreasing

S-Trend Comment This species is know from only one locality in extreme western Kentucky in the Mississippi River at Cairo, Illinois (Burr and Warren 1986). Burr and Warren (1986) stated that additional attempts to collect this species farther

south in the Kentucky portion of the Mississippi River have been unsuccessful.). It is considered critically imperiled in Kentucky (NatureServe, 2004).

Habitat / Life History

Very little is known on the spawning habits of the flathead chub but information indicate that spawning takes place during the summer (Scott and Crossman 1973; Pflieger 1975). It relies on flood flows to spawn successfully with spawning occurring after rivers have subsided following peak flows, when the temperature is warmer and the bottom is more stable. The flathead chub occurs in the turbid swift flowing main channels of large rivers over bottoms composed of sand and fine gravel and sometimes moves into smaller streams to spawn (Scott and Crossman 1973; Pflieger 1975).

Key Habitat

The only records for this species predate 1984, which include one from the Lower Mississippi Memphis (HUC 08010100) and two from the Lower Ohio (HUC 05140206). Habitat conditions fully supporting aquatic life range from 0% (Lower Mississippi Memphis HUC) to 52% (Lower Ohio HUC) of stream miles surveyed within these watersheds. Both contain limited sections regarded as outstanding resource water (Kentucky Division of Water 2002).

CLASS ACTINOPTERYGII

Flathead Chub ***Platygobio gracilis***

Guilds Large rivers in current.

Statewide FlatheadChub.pdf

Map

Conservation Issues

Aquatic habitat degradation

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

CLASS ACTINOPTERYGII

Frecklebelly Darter ***Percina stictogaster***

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

G-Trend Stable

G-Trend Comment The Frecklebelly darter is endemic to eastern and central Kentucky and a small portion of north-central Tennessee. In Kentucky, it is considered stable, however in Tennessee it is considered critically imperiled (NatureServe 2004). This darter inhabits upland streams of the Cumberland Plateau and central portions of the Highland Rim.

S-Trend Stable

S-Trend Comment Fairly common in the upper Kentucky River, including portions of the Red River, and the south fork of the Kentucky River (NatureServe 2004). It is uncommon and very localized in distribution in the upper Green River. Known to occur above the confluence of the Green and Little Barren rivers, as well as the Barren River upstream of the confluence with Drakes Creek.

Habitat / Life History Occurs in 3rd to 5th order creeks and medium sized rivers with moderate gradients (NatureServe 2004). Inhabits quiet water areas, especially slow flowing pools, backwaters, and along vegetated riffle margins. Although benthic in nature, this darter often swims in the mid-water portion of the

water column instead of near the bottom. It is commonly associtated with submerged root masses along the shore. In the winter individuals may be found in accumulations of dead leaves on the bottom. This species is insectivorous and probably lives up to 3 years. Spawning occurs in the spring and peaks from mid-March through mid-April. This species may be an important intermediate host for several mussel species.

Key Habitat

Known to occur in four HUC8 watersheds in the upper Green, Barren, and Kentucky River drainages. Habitat conditions for most streams surveyed in the upper Kentucky and South Fork HUCs are fully supporting of aquatic life (88.5% and 81.8%, respectively), but with no outstanding resource waters. Habitat conditions fully supporting aquatic life in the Green and Barren River drainages are 80.0% and 92.6% (respectively) of stream miles surveyed within these watersheds. Approximately 113 miles of the upper Green River and 14.7 miles in the Barren River are considered outstanding resource waters (Kentucky Division of Water 2000, 2004).

Guilds

Upland streams in riffles.

CLASS ACTINOPTERYGII

Frecklebelly Darter ***Percina stictogaster***

Statewide FrecklebellyDarter.pdf

Map

Conservation Issues

Aquatic habitat degradation

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

2E Stream channelization/ditching

Biological/ consumptive uses

5F Low population densities

Point and non-point source pollution

4A Acid mine drainage other coal mining impacts

Siltation and increased turbidity

1B Agriculture

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Golden Topminnow ***Fundulus chrysotus***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G5	S1	G5	S1

G-Trend Stable

G-Trend Comment Coastal Plain (Atlantic and Gulf) from Santee River drainage, South Carolina to Trinity R. dr., Texas; former Mississippi Embayment north to Kentucky and Missouri. East of the Mississippi R., mostly restricted to the lower Coastal Plain. Common in Florida, localized and uncommon elsewhere (Page and Burr 1991). As the golden topminnow is secure in most of its range, NatureServe indicates G5 as its global status. However, since the species is only localized and uncommon in Kentucky, Tennessee, Missouri and Oklahoma they designated a status of S1 for the golden topminnow populations in Kentucky.

Etnier and Starnes (1993) stated that the golden topminnow is the only fish species of the Reelfoot Fauna not found elsewhere in Tennessee. They thought this might indicate that the species was not formerly present in Tennessee and invaded the state from Missouri swamplands via Reelfoot Lakes formation during the New Madrid earthquake in 1812. It has not been collected in Missouri since 1946 despite repeated attempts (Pflieger,

1997).

S-Trend Unknown

S-Trend The first golden topminnows documented in Kentucky were collected in

Comment 1970 from Reelfoot Lake, (Sisk 1973). The first notable population samples reported outside Reelfoot Lake were collected in 1973 when Sisk (1973) reported a series of 14 (each date) from Open Pond, Fulton County. In 1982, Warren and Cicerello (1983) attempted to collect it in the Open Pond area, but found it and the surrounding area drained, cleared, and the land being used for agricultural practices. After extensive sampling in the area the only population they found (24 June) was in Running Slough at Ledford, Fulton County, Kentucky. Based on their limited findings they recommended the species be listed in the states endangered species category. Prior to that time, golden topminnows had been listed in the special concern category (Branson et al. 1981). Both Open Fork and Running Slough are within the Reelfoot Lake drainage. Since 1984 (personal communication with Ron Cicerello-Kentucky State Nature Preserves Commission) the golden topminnow has only been collected from Fish Pond (in 1985 by Kentucky State Nature Preserves Commission personnel) and again at Running Slough (in 2000 by Kentucky Division of Water-Mike Compton). Burr and Warren (1986) commented that the species probably re-invades other areas adjacent to Reelfoot Lake following periods

CLASS ACTINOPTERYGII

Golden Topminnow ***Fundulus chrysotus***

of drought. The Kentucky State Nature Preserves Commission (2000) currently considers the golden topminnow endangered in Kentucky.

Habitat / Life History

In Kentucky the golden topminnow is restricted to floodplain lakes, wetlands, sloughs, and ditches of the Mississippi Alluvial Plain where it was found associated with submerged beds of aquatic plants near the shoreline (Burr and Warren 1986). As are most Fundulus, the golden topminnow is a surface dweller. Etnier and Starnes (1993) report it to inhabit clear vegetated swamps and lakes and mentioned it was less associated with vegetation than is the starhead topminnow. They reported that spawning had not yet been documented, but indicated that eggs were deposited on vegetation and other underwater objects. They also cited information relating to food habits, which is primarily insects taken from the surface. Other aspects relating to the biology of the golden topminnow are not known. Etnier and Starnes (1993) also indicated that the maximum lengths of known Tennessee specimens of golden topminnows averaged smaller than the maximum lengths given for the species in other parts of its range. Page and Burr (1991) indicated the habitat for the species (general, entire range) as swamps, sloughs, vegetated pools and backwaters of

sluggish creeks and small to medium rivers.

Key Habitat

All known populations, pre and post 1984, of the golden topminnow in Kentucky (HUC-8) are located within HUC 08010202 (Obion Creek). Of the 28.7 miles of stream assessed within this HUC, 27.8% of the waters were fully supporting, 56.0% partially supporting, 16.2% not supporting, and 1.7 miles were designated as Outstanding Resource Waters (Kentucky Division of Water 2002). However, one of the current and primary known locations for the golden topminnow is Running Slough which was assessed by the Kentucky Division of Water (2002, Figure 3) as Partially Supporting. This slough flows into the Reelfoot National Wildlife Refuge (pg. 74, Kentucky Atlas and Gazetteer, 1997). This refuge should help protect Reelfoot Lake, its surrounding wetlands, and hopefully the native plant and animal life found therein.

Guilds

Lowland Streams in slackwater.

Statewide Map

GoldenTopminnow.pdf

CLASS ACTINOPTERYGII

Golden Topminnow ***Fundulus chrysotus***

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2F Riparian zone removal (Agriculture/development)

2H Wetland loss/drainage/alteration

Biological/ consumptive uses

5F Low population densities

Miscellaneous Mortality Factors

6G Stochastic events (droughts, unusual weather, pine beetle damage, flooding etc.)

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Goldstripe Darter ***Etheostoma parvipinne***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G4G5	S1	G4	S1

G-Trend Stable

G-Trend Comment The goldstripe darter occurs in 11 southern states, ranging from the Colorado River drainage (Alum Creek) in Texas to the Flint River in Georgia, extending northward in the Mississippi River drainage to southeastern Missouri and western Kentucky. Populations also occur in the Altahama River (Atlantic Slope) drainage in Georgia, the only population occurring above the Fall Line. It is reported to be C\common in western part of range, but less common and spotty in eastern part (Natureserve 2004).

S-Trend Decreasing

S-Trend Comment In Kentucky, this species is sporadic and seasonally rare. Its known distribution in the state includes Terrapin and Powell creeks in Graves County and Sugar Creek and Billie Branch in Calloway County (Burr and Warren 1986). It is considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History	Restricted to small lowland creeks, ditches, and wetlands. In small gravel and sand-bottomed creeks, individuals generally occur in shallow sluggish to stagnant waters along undercut banks, tree roots, and piles of organic debris. In ditches and wetlands, individuals are generally associated with soft mud or silt substrates in beds of submergent aquatic plants (Burr and Warren 1986).
Key Habitat	Currently known to occur in the Kentucky Lake (HUC 06040006) and the Obion Creek (HUC 08010202) watersheds. Habitat conditions fully supporting aquatic life include 27.8% (Obion Creek HUC) and 56.0% (Lower Tennessee HUC) of streams surveyed in these watersheds. Both contain limited sections regarded as outstanding resource water (Kentucky Division of Water 2002).
Guilds	Lowland Streams in slackwater.
Statewide Map	GoldstripeDarter.pdf

CLASS ACTINOPTERYGII

Goldstripe Darter ***Etheostoma parvipinne***

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

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Gulf Darter ***Etheostoma swaini***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G5	S1	G5	S1

G-Trend Stable

G-Trend Comment The gulf darter is distributed throughout the Gulf Coastal drainages from Lake Pontchartrain, Louisiana to Ochlockonee drainage, Florida and many eastern tributaries to Mississippi River from Buffalo Bayou, Mississippi, north to Obion system, Tennessee and Kentucky (Starnes 1980. It is generally distributed in the Coastal Plain of western Tennessee (Etnier and Starnes 1993), but reaches its northernmost distributional limit in Kentucky, where it is confined to Terrapin and Powell Creeks of the Obion River system (Burr and Warren, 1986).

S-Trend Unknown

S-Trend Comment This species was first recorded in Kentucky by Bauer and Branson (1979) from Terrapin Creek in Graves County. Burr and Mayden (1979) reported additional records from Powell and Terrapin creeks, where it remains occasionally to generally distributed and uncommon (Burr and Warren, 1986). It is considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission

(2004).

Habitat / Life History Burr and Mayden (1979) collected specimens from small to medium-size creeks over sand and sometimes gravel bottom in riffles, and in areas contained sticks, logs, and other debris. Spawning occurs primarily in March and April. Females require clean-swept gravel in which to bury their eggs. Diet consists of an array of microcrustacea and aquatic insects (Etnier and Starnes, 1993).

Key Habitat Currently known to occur only in the Obion Creek (HUC 08010202) watershed (Terrapin Creek, Graves County). Habitat conditions fully supporting of aquatic life include 27.8% of stream miles surveyed within this watershed. It contains 1.7 stream miles regarded as outstanding resource water (Kentucky Division of Water, 2002).

Guilds Lowland Streams in riffles.

Statewide Map GulfDarter.pdf

CLASS ACTINOPTERYGII

Gulf Darter ***Etheostoma swaini***

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2F Riparian zone removal (Agriculture/development)

2H Wetland loss/drainage/alteration

Biological/ consumptive uses

5F Low population densities

Miscellaneous Mortality Factors

6G Stochastic events (droughts, unusual weather, pine beetle damage, flooding etc.)

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Highland Rim Darter ***Etheostoma kantuckeense***

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

G-Trend Stable

G-Trend Comment This species is a member of the orangethroat darter complex distributed over a large part of the central United States. Recently recognized as a distinct species, the Highland Rim darter is one of three species endemic to the upper Barren River (Ceas and Page 1997).

S-Trend Stable

S-Trend Comment Restricted to the upper Barren River system, where it currently appears to be stable. However, like other narrow-range endemics in the orangethroat darter complex, it is particularly vulnerable to habitat degradation and pollution (Ceas and Burr 2002).

Habitat / Life History This and other orangethroat darter group species occur in small (first to fourth order) upland streams over gravel and cobble subtrates in swift flowing riffles and runs. During periods of low water, when riffles and runs become dry, individuals will concentrate in isolated pools where they can survive for extended periods of time, so long as the water does not become stagnant. Spawning occurs in early spring in sections of riffles or runs with

large expanses of loose, fine gravel. Streams impacted by erosion and sedimentation that have more imbedded or compacted substrates support fewer individuals (Ceas and Burr, 2002).

Key Habitat Known to occur only in the Barren River (HUC 05110002). Habitat conditions fully supporting aquatic life include 92.7% of stream miles surveyed within this watershed. Nearly 15 stream miles in the Barren River HUC are considered outstanding resource water (Kentucky Division of Water 2004).

Guilds Upland headwater streams in pools.

Statewide Map HighlandRimDarter.pdf

CLASS ACTINOPTERYGII

Highland Rim Darter ***Etheostoma kantuckeense***

Conservation Issues

Aquatic habitat degradation

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

2C Construction/Operation of impoundments (migration barrier)

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

4F Urban runoff

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Inland Silverside ***Menidia beryllina***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	T	G5	S2	G5	S2

G-Trend Stable

G-Trend Comment The inland silverside is a euryhaline species occurring in both brackish and freshwater rivers and lakes along the Atlantic and Gulf Coasts from Massachusetts to Veracruz, Mexico, northward through the Mississippi River and major tributaries (mainly Arkansas and Red rivers) to southern Illinois and eastern Oklahoma. Some inland populations in California, Oklahoma, and Missouri likely introduced. Also introduced in Pecos River drainage, New Mexico (NatureServe 2004).

S-Trend Stable

S-Trend Comment Prior to 1984, this species was limited to the Mississippi River (Pflieger 1975) and adjacent floodplain lakes, most notably Reelfoot Lake (Burr and Warren 1986). Since 1984, new observations have been recorded for Kentucky and Barkley Lakes (lower Tennessee and Cumberland Rivers) in western Kentucky (Etnier and Starnes 1993).

Habitat / Life History The inland silverside is a schooling, surface species of large, moderately clear rivers and reservoirs. It apparently moves into quiet inshore areas

over sand and gravel during the night, returning to open water during the day (Page and Burr 1991; Pflieger 1975). Spawning occurs during late spring and summer. Eggs have been found attached to algae growth on the stems of emergent vegetation and hatch in 4-30 days at temperatures of 13-34 C. Most spawn and die following their 2nd summer of life, but a few survive through their second winter (Pflieger 1975).

Key Habitat Currently known from five HUC watersheds along the Mississippi, Ohio, and lower Tennessee and Cumberland River drainages. Habitat conditions fully supporting aquatic life range from 0 to 52% of stream miles surveyed within these watersheds, which contain limited sections considered outstanding resource waters (Kentucky Division of Water 2002).

Guilds Large rivers in slackwater.

Statewide Map InlandSilverside.pdf

CLASS ACTINOPTERYGII

Inland Silverside ***Menidia beryllina***

Conservation Issues

Biological/ consumptive uses

5B Predation from native species

CLASS ACTINOPTERYGII

Kentucky Arrow Darter ***Etheostoma sagitta spilotum***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	N	G3G4 T3T4	S4	G3	S4

G-Trend Decreasing

G-Trend Comment The Kentucky arrow darter is endemic to the upper Kentucky River system (Burr and Warren 1986).

S-Trend Decreasing

S-Trend Comment This species is endemic to the upper Kentucky River system. It is occasional to locally common in headwater streams in the North, Middle and South Forks of the Kentucky River (Burr and Warren 1986).

Habitat / Life History Generally occurs in headwater creeks, but juveniles and occasionally adults may be taken in streams. This species usually occupies sluggish pools and areas above or below riffles over substrates of bedrock, cobble, and pebble; individuals tend to avoid fast currents (Burr and Warren 1986). Spawning occurs principally during April when water temperatures are near 13C. Sexual maturity is reached at age 1. Females contain 67-265 mature eggs. Spawning occurs beneath or near rocks where males have fanned out a

depression in the substrate; males defend the nests. Diet includes mayflies, dipterans, caddisflies, stoneflies, and beetle larvae (Etnier and Starnes 1993).

Key Habitat

Known to occur in four HUC8 watersheds in the upper Kentucky River basin. Habitat conditions fully supporting aquatic life range from 48.4% (North Fork Kentucky River HUC 05100201) to 88.5% (Upper Kentucky River HUC 05100204) of stream miles surveyed within these watersheds, none of which contain outstanding resource waters (Kentucky Division of Water 2002).

Guilds

Upland headwater streams in pools.

Statewide Map

KentuckyArrowDarter.pdf

CLASS ACTINOPTERYGII

Kentucky Arrow Darter ***Etheostoma sagitta spilotum***

Conservation Issues

Point and non-point source pollution

4A Acid mine drainage other coal mining impacts

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

4F Urban runoff

Siltation and increased turbidity

1A Coal mining

1C Road construction

1D Urbanization/Development General Construction

1E Silviculture

CLASS ACTINOPTERYGII

Kentucky Darter ***Etheostoma rafinesquei***

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

G-Trend Stable

G-Trend Comment The Kentucky darter is endemic to the upper Green River and lower Barren River (Burr and Warren 1986).

S-Trend Stable

S-Trend Comment This species occurs in the upper Green and Gasper River (Barren River tributary), Kentucky. In the upper Green River drainage, it is common in tributaries of the Nolin and Little Barren Rivers, and Russell, Brush, Pitman, and Goose Creeks. In the Gasper River drainage, it is most common in headwater tributaries (Natureserve 2004).

Habitat / Life History Inhabits upland creeks and streams primarily in the Highland Rim. This species prefers rocky bottomed pools and pool margins, but during fall and spring may be found at the margins of riffles associated with emergent vegetation (Burr and Warren 1986). Spawning occurs during late March-early May. Females produce several hundred eggs divided among multiple clutches. Spawning can be negatively impacted by high discharge and

stream temperatures above about 21.5 C (NatureServe 2004).

Key Habitat

Known to occur primarily in the Upper Green (HUC 05110001), with a few records also in the Barren River (HUC 05110002). Habitat conditions fully supporting aquatic life range include 55.8% of stream miles surveyed in the Upper Green River and 92.6% in the Barren River watersheds. Number of stream miles recognized as outstanding resource waters include 113.1 in the The Upper Green and 14.7 for the Barren River drainages (Kentucky Division of Water 2004).

Guilds

Upland headwater streams in pools.

Statewide Map

KentuckyDarter.pdf

CLASS ACTINOPTERYGII

Kentucky Darter ***Etheostoma rafinesquei***

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

4F Urban runoff

Siltation and increased turbidity

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

1E Silviculture

CLASS ACTINOPTERYGII

Lake Chubsucker ***Erimyzon sucetta***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	T	G5	S2	G5	S2

G-Trend Decreasing

G-Trend Comment The lake chubsucker occurs from southeastern Virginia to southern Florida to the Guadalupe River in Texas, and northward through the Mississippi Valley and Great Lakes. This species is sporadic in the North and common on the lower Coastal Plain (NatureServe 2004).

S-Trend Decreasing

S-Trend Comment In Kentucky, this species is sporadic and rare in the lower Green River, Tradewater River, Bayou du Chien, Mayfield Creek, Obion Creek, and Ohio River near Paducah (Burr and Warren 1986). It is considered imperiled in Kentucky (NatureServe, 2004) and threatened by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History Generally associated with lentic, lowland habitats such as floodplain lakes and wetlands, in dense beds of submergent and floating aquatic plants; rarely enters creeks, streams, or rivers (Burr and Warren 1986). Spawning occurs over gravel areas in streams or in still water over vegetation from March through July depending on latitude. Fecundity ranges from 3,000 to

20,000 eggs per female. Food consists of microcrustacea and midge larva. Life span is 5 or 6 years. Maximum size to 394 mm (15.5 inches) total length and nearly 1 kg (2.2 lbs) (Etnier and Starnes 1993).

Key Habitat

Currently known to occur in nine HUC8 watersheds: Rough River (HUC 05110004), Lower Green (HUC 05110005), Pond River (HUC 05110006), Lower Cumberland (HUC 05130205), Lower Ohio - Bay (HUC 05140203), Lower Ohio (HUC 05140206), Lower Tennessee-Kentucky Lake (HUC 06040006), Lower Mississippi – Memphis (HUC 08010100), and the Bayou De Chien – Mayfield (HUC 08010201). Habitat conditions fully supporting aquatic life range from 0% (Lower Mississippi – Memphis HUC) to 74.9% (Lower Tennessee-Kentucky Lake HUC) of stream miles surveyed within these watersheds. A total of 154.6 miles of stream surveyed within these watersheds are considered outstanding resource waters (Kentucky Division of Water 2002 and 2004).

Guilds

Lowland Streams in slackwater.

CLASS ACTINOPTERYGII

Lake Chubsucker ***Erimyzon sucetta***

Statewide LakeChubsucker.pdf

Map

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2H Wetland loss/drainage/alteration

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

4F Urban runoff

Siltation and increased turbidity

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Lake Sturgeon ***Acipenser fulvescens***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G3G4	S1	G3	S1

G-Trend Decreasing

G-Trend Comment Prior to 1900, the Lake sturgeon was abundant and fairly widespread in rivers and lakes from southern Canada to the southeastern U.S. (NatureServe 2004). It inhabits large river and lake systems primarily in the Mississippi River, Hudson Bay and Great Lakes basins. By the early 1900's populations had been greatly reduced as a result of over-fishing, habitat loss, construction of dams, and pollution. Over the years, this species has undergone substantial population declines througout its range and may be in serious trouble if over-fishing and habitat destruction continues. It is currently listed as threatened or endangered in 19 of 20 states within its original range (http://midwest.fws.gov/alpena/sturgeon.htm). It is now believed to be extirpated in six states, critically imperiled in ten, imperiled in three and vulnerable in two.

S-Trend Decreasing

S-Trend This species formerly occurred in the main channels of the Ohio,

Comment Mississippi, Cumberland, and Tennessee Rivers (Burr and Warren 1986). Clay (1975) indicated that this sturgeon was probably found throughout most of Kentucky's larger rivers. Today no permanent populations exist in Kentucky, only transients (Burr and Warren 1986). The placement of navigation dams in the Ohio River essentially rendered habitat unsuitable for the Lake sturgeon (Trautman 1981). Burr and Warren (1986) reported eight pre-1950 records and 12 post-1950 records (Ohio River, 8; Mississippi River, 3; Cumberland River, 1) for this species in Kentucky. Since 1984, four records have been reported for the Ohio River. The Kentucky State Nature Preserves Commission (2004) recognizes this species as endangered.

Habitat / Life History This species inhabits the bottoms of large clean rivers and lakes, and prefers deep mid-river areas and pools with water depth ranging between 13 and 30 feet over firm sand, gravel, or rock (Pflieger 1975). The oldest individual was reported to be 154 years of age and weighing 207 pounds. . Spawning occurs from late April to mid-May with water temperatures ranging between 55 and 73°F (NatureServe 2004). Males and females congregate on outside bends over rocks/boulders in water between 1 and 15 feet in depth. Eggs are broadcast over the substrate adhering to the rocks. One female can lay between 50,000 and 700,000 eggs that hatch in 5 to 8 days depending on the water temperature. Young fish feed mainly on insect larvae whereas

CLASS ACTINOPTERYGII

Lake Sturgeon ***Acipenser fulvescens***

adult fish have been known to add crayfish, snails, clams, leeches, and occasionally small fish to their diet (http://midwest.fws.gov/alpena/sturgeon.htm). Like other sturgeons, the lake sturgeon is late to mature, slow growing, and has a low reproductive rate. Males typically spawn for the first time at age 13 and females at 19 years of age. Males may spawn once every two years and females every 4 to 8. It could take up to 14 years for a population to double in size (Froese and Pauly 2004). These reproductive characteristics make the lake sturgeon extremely vulnerable to over exploitation.

Key Habitat

Since 1984, four records for this species have been reported from the Ohio River that lie within four different HUC8 units. The most recent record is from the Ohio Brush-Whiteoak (HUC 05090201) watershed, in which nearly 83% of the streams surveyed were fully supporting of aquatic life. The other three records further downstream in the Ohio River include the Lower Ohio-Bay (HUC 05140203), Lower Ohio (HUC 05140206), and Highland-Pigeon (HUC 05010202) watersheds. Habitat conditions fully supporting aquatic life range from none (Highland-Pigeon HUC) to 51.5% (Lower Ohio HUC). All contain limited sections regarded as outstanding

resource water (Kentucky Division of Water 2002, 2004).

Guilds Large rivers in current.

Statewide LakeSturgeon.pdf

Map

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

2F Riparian zone removal (Agriculture/development)

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

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Least Madtom ***Noturus hildebrandi***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G5	S1	G5	S1

G-Trend Stable

G-Trend Comment The least madtom is found in tributaries of the Mississippi River from the Homochitto River, southern Mississippi, to Terrapin Creek, southwestern Kentucky (Natureserve 2004). Populations are considered abundant and stable (Natureserve 2004), although the Kentucky population is confined to a small range (D. Eisenhour, Morehead State University, personal communication).

S-Trend Stable

S-Trend Comment Found in Terrapin Creek, Graves County, where it occurs as a waif from a larger population in the North Fork Obion River in adjacent Tennessee (Burr and Warren 1986). The least madtom is abundant and stable in Terrapin Creek, although confined to a small range (D. Eisenhour, Morehead State University, personal communication). It is considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History Occurs in lowland creeks and small rivers across its range (NatureServe). In the south, it occupies relatively shallow, clear riffles with moderate current. In the north, it is found in moderately deep streams with a slow current over bottoms of shifting sand (NatureServe 2004). This species typically associates with submerged brush or logs (NatureServe 2004). Spawning occurs from mid-June through early-July (Etnier and Starnes 1993). Females may spawn more than once per year. Males build nests under snags or similar organic cover (Etnier and Starnes 1993). If available, they will also use slabrock, mussel shells, or discarded beverage containers (Etnier and Starnes 1993). Food items primarily consist of midge and caddis larvae as well as mayfly and stonefly nymphs (Etnier and Starnes 1993).

Key Habitat Currently known to occur only in the Obion Creek (HUC 08010202) watershed (Terrapin Creek, Graves County). Habitat conditions fully supporting of aquatic life include 27.8% of stream miles surveyed within this watershed. It contains 1.7 stream miles regarded as outstanding resource water (Kentucky Division of Water, 2002).

Guilds Lowland Streams in riffles.

CLASS ACTINOPTERYGII

Least Madtom ***Noturus hildebrandi***

Statewide LeastMadtom.pdf

Map

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

Biological/ consumptive uses

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

Siltation and increased turbidity

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Longhead Darter ***Percina macrocephala***

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

G-Trend Stable

G-Trend Comment The longhead darter is rare and highly localized across its range and may show a cyclic abundance pattern (Natureserve 2004). This range has included eight states along the Ohio River Basin (Kentucky, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia) but populations may be extirpated in North Carolina and Ohio (Natureserve 2004). The longhead darter is considered common in New York, Pennsylvania, and West Virginia. Populations are stable in Kentucky, but may be declining in Virginia and Tennessee (Etnier and Starnes 1993; Natureserve 2004). In the southern part of its range, there have been few areas where range or abundance has improved in recent years (Natureserve 2004). Some northern populations, however, may be more abundant than previously thought (Natureserve 2004). It appears that general fish surveys may be missing this species due to sampling methods. Concerted effort to collect the longhead darter in recent years has been more successful in collecting individuals (Natureserve 2004).

S-Trend Stable

S-Trend Comment This species is considered sporadic and rare in the upper Barren and upper Green rivers. It is probably the most common in the upper Barren River and Kinniconick Creek (Burr and Warren 1986). The Cumberland and Kentucky rivers have each produced a single record of this species but these populations are considered extirpated at this time. Populations are considered stable in Kentucky, but extremely rare (D. Eisenhour, Morehead State University, personal communication).

Habitat / Life History Inhabits warm, clear, and relatively deep upland streams and rivers (Burr and Warren 1986; Jenkins and Burkhead 1993; NatureServe 2004). Primary habitat is gently flowing pools with brush, aquatic vegetation, or boulders (NatureServe 2004). Individuals live mostly suspended in the water column and are associated with different types of structure (Jenkins and Burkhead 1993; NatureServe 2004). It is generally intolerant of low water quality, and most often found in streams with low turbidity and minimal siltation (Etnier and Starnes 1993). Spawning occurs in shallow, gravel/cobble riffles where eggs can be buried in the gravel/cobble substrate (NatureServe 2004). During the winter, individuals will move into deeper pools (Etnier and Starnes 1993). Diet consists primarily of crayfish and insect larvae.

CLASS ACTINOPTERYGII

Longhead Darter ***Percina macrocephala***

Lifespan is 3 to 4 years (Jenkins and Burkhead 1993).

Key Currently known to occur only in the Upper Green (HUC 05110001) and

Habitat Barren River (HUC 05110002) watersheds. Habitat conditions fully supporting aquatic life range include 55.8% of stream miles surveyed in the Upper Green River and 92.6% in the Barren River watersheds. Number of stream miles recognized as outstanding resource waters include 113.1 in the The Upper Green and 14.7 for the Barren River drainages (Kentucky Division of Water 2004).

Guilds Upland streams in pools.

Statewide LongheadDarter.pdf

Map

Conservation Issues

Aquatic habitat degradation

2D Woody debris removal

2E Stream channelization/ditching

Siltation and increased turbidity

1A Coal mining

1B Agriculture

CLASS ACTINOPTERYGII

Northern Cavefish ***Amblyopsis spelaea***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G3	S3	G3	S3

G-Trend Stable

G-Trend Comment The northern cavefish is restricted to limestone composite subterranean waters and has been found in approximately 62 sites from the Mammoth Cave region of Kentucky north to southern Indiana (NatureServe 2004). All of the Kentucky sites are cave streams while 11 of the 45 Indiana sites were springs and/or spring basins with the rest being cave streams (NatureServe 2004). Population estimates predict at least 5600 individuals between the Kentucky and Indiana populations but limited habitat accessibility makes these estimates conservative (NatureServe 2004). Restriction to such a limited habitat makes the northern cavefish highly vulnerable to human and natural events that affect ground water (NatureServe 2004). Although information is limited, the global trend in northern cavefish distribution appears to be stable.

S-Trend Stable

S-Trend In Kentucky, the northern cavefish occurs from Mammoth Cave, Edmonson

Comment County, north to caves in Hardin, Meade, and Breckenridge Counties (Burr and Warren 1986). Distribution may be limited by competition with the southern cavefish (Froese and Pauly 2004). Distribution trends within Kentucky appear to be stable or slightly declining with similar locations found between pre-1984 and post-1984 data (D. Eisenhour, Morehead State University, personal communication).

Habitat / Life History The northern cavefish is an obligate cave dweller, inhabiting cool (8-17 ° C) hypogean streams with mixed mud/rock substrates in shoals and mixed sand/silt substrates in pools (Burr and Warren 1986). Such habitats are highly vulnerable to human and natural disturbances. The northern cavefish is a branchial brooder with low reproductive capacity (NatureServe 2004). Breeding occurs during high water periods from February through April. Eggs and young are carried in the gill chamber for 4 to 5 months. Only 10% of the females breed per year (NatureServe 2004). Northern cavefish feed primarily on copepods, gammarids, and isopods (Clay 1975).

Key Habitat Known to occur only in Blue-Sinking (HUC 05140104), Upper Green (HUC 05110001), and Rough River (HUC 05110004) drainages. Habitat conditions fully supporting aquatic life range include 54% of stream miles surveyed in the Blue-Sinking, 80% in the Upper Green River, and 79% in

CLASS ACTINOPTERYGII

Northern Cavefish ***Amblyopsis spelaea***

the Barren River watersheds. Number of stream miles recognized as outstanding resource waters include 113.1 in the Upper Green River drainage (Kentucky Division of Water 2004).

Guilds Cave streams.

Statewide NorthernCavefish.pdf

Map

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

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

Biological/ consumptive uses

5B Predation from native species

Point and non-point source pollution

4H Confined animal operations

Siltation and increased turbidity

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Northern Madtom ***Noturus stigmosus***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G3	S2S3	G3	S2

G-Trend Decreasing

G-Trend Comment The northern madtom is known to occur in the Ohio River basin in Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virgina and in tributaries of western Lake Erie drainage in Michigan and Ontario. This species is sporadic and uncommon, disappearing at the margins of its range and is rare in main channels of the Mississippi and Ohio rivers (Page and Burr 1991, Thomas and Burr 2004).

S-Trend Stable

S-Trend Comment In Kentucky, the northern madtom is sporadic and uncommon in the upper Kentucky and upper Big Sandy River drainages. It is occasional and locally common in the Salt and Licking River drainages. A few records exist from the mainstem of the Ohio River (Burr and Warren 1986). Extensive statewide surveys conducted in the 1980's and 1990's led to the conclusion that in general populations were in fair to good condition (NatureServe 2004), with good populations in the Licking River (D. Eisenhour, Morehead State University, personal communication).

Habitat / Life History	The northern madtom can be found in large streams to big rivers where it favors gravel and cobble substrates swept clean by moderate to swift current. It avoids areas that have been affected by extreme siltation (NatureServe 2004). Like other catfishes, the northern madtom is a cavity nester, preferring to lay eggs under flat stones in current but will use accumulated unnatural debris such as cans and small boxes (Taylor 1969).
Key Habitat	Currently known to occur in seven HUC8 units in the Ohio, Salt, upper Kentucky, Licking, and upper Big Sandy River drainages. Habitat conditions fully supporting aquatic life range from 20% (Levisa Fork HUC 05070202) to 71% (Rolling Fork HUC 05140103) of streams surveyed within these watersheds. The Licking River drainage is the only one with a significant portion of outstanding resource waters (Kentucky Division of Water 2002).
Guilds	Medium to large streams.
Statewide Map	NorthernMadtom.pdf

CLASS ACTINOPTERYGII

Northern Madtom ***Noturus stigmosus***

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1B Agriculture

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Olive Darter ***Percina squamata***

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

G-Trend Decreasing

G-Trend Comment The olive darter is restricted to upland rivers primarily in the Blue Ridge and Cumberland Plateau portions of the upper Tennessee and Cumberland River drainages (Etnier and Starnes 1993). This species has been collected in Kentucky, Georgia, North Carolina, and Tennessee. The olive darter once inhabited the lower reaches of these river systems, but due to river maturation, it is now limited to the upper reaches (Etnier and Starnes 1993). Although this species can be locally common, populations in general are declining globally (NatureServe 2004). Due to a preference for swift current, sampling is difficult much of the known distributional information is dated and difficult to access. Past collections show eight documented occurrences in Kentucky (only two stream systems), 18 in North Carolina, and a total of 30 for Tennessee, Georgia, and North Carolina (Natureserve 2004). The olive darter is presumed extirpated from several North Carolina streams (Natureserve 2004).

S-Trend	Decreasing
S-Trend Comment	In Kentucky, this species has been collected only in the Rockcastle and Big South Fork of the Cumberland River drainage. (Burr and Warren 1986; Natureserve 2004). Extensive recent collecting activity in the Rockcastle River has turned up only two specimens (M. Compton, KY Division of Water, personal communication), supporting suspicions that populations persist in low densities.
Habitat / Life History	The olive darter inhabits rocky areas with swift current in small to medium upland river systems (Burr and Warren 1986; NatureServe 2004). Typical habitat includes strong chutes with rubble and boulders in high gradient streams, or in deeper downstream portions of gravel riffles in streams of moderate gradient (Burr and Warren 1986; NatureServe 2004). Individuals have also been found in shallow pools with gravel or rocky bottoms (NatureServe 2004). These narrow habitat requirements may contribute to low vagility. Areas of low gradient runs, pools, or impoundments may hinder distribution (NatureServe 2004). Spawning occurs from mid-May to late-July (Etnier and Starnes 1993). Lifespan is approximately 4 years. Principal food items include microcrustacea and aquatic insect larvae (Etnier and Starnes 1993). This species is particularly vulnerable to pollution and siltation (NatureServe 2004).

CLASS ACTINOPTERYGII

Olive Darter ***Percina squamata***

Key	Recently collected only from the Rockcastle River (HUC 05130102).
Habitat	Habitat conditions fully supporting aquatic life include 82% of stream miles surveyed within this watershed, which contains 121.4 stream miles recognized as outstanding resource waters (Kentucky Division of Water 2004).
Guilds	Upland streams in riffles.
Statewide Map	OliveDarter.pdf

Conservation Issues

Aquatic habitat degradation

- 2C Construction/Operation of impoundments (migration barrier)
- 2E Stream channelization/ditching

Point and non-point source pollution

- 4E Agricultural runoff – including fertilizers/animal waste, herbicides,
- 4F Urban runoff

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

Palezone Shiner ***Notropis albizonatus***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
LE	E	G2	S1	G2	S1

G-Trend Decreasing

G-Trend Comment Two extant populations of the palezone shiner occur in the Paint Rock River (a Tennessee River tributary), Alabama and the Little South Fork of the Cumberland River, Kentucky (Natureserve 2004). Two other historical populations have been extirpated. Palezone shiner populations have primarily been fragmented through impoundment (Natureserve 2004). Distributions have also been reduced from stream channelization and general deterioration of water quality from siltation and other pollutants (Natureserve 2004). Limited distribution makes this species vulnerable to continued extirpation (Natureserve 2004).

S-Trend Stable

S-Trend Comment In Kentucky, this species is known only from the Little South Fork Cumberland River in Wayne County. It was judged to be most abundant in a 6-mile reach of the Little South Fork (U.S. Fish and Wildlife Service

1997). Past collections found the species in Marrowbone Creek, Cumberland County, but this population is considered extirpated (Burr and Warren 1986). Within the Little South Fork Cumberland River, populations appear to be stable with decent abundance (D. Eisenhour, Morehead State University, personal communication).

Habitat / Life History The palezone shiner occurs in flowing pools and runs of upland streams that have permanent flow; clear, clean water; and substrates of bedrock, cobble, pebble, and gravel mixed with clean sand (U.S. Fish and Wildlife Service 1997). Peak spawning occurs from June to early July (U.S. Fish and Wildlife Service 1997). Although ichthyologists have known about the palezone shiner for 20 years, very little is known about its biology (U.S. Fish and Wildlife Service 1997).

Key Habitat Currently known to occur only in the Little South Fork Cumberland River in the South Fork Cumberland (HUC 0513014) watershed, Wayne County. Habitat conditions fully supporting aquatic life include 90% of the streams surveyed within this watershed, and 52.3 stream miles are considered outstanding resource water (Kentucky Division of Water 2002). This is a very important watershed unit to protect.

Guilds Upland streams in pools.

CLASS ACTINOPTERYGII

Palezone Shiner ***Notropis albizonatus***

Statewide PalezoneShiner.pdf

Map

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

2E Stream channelization/ditching

Point and non-point source pollution

4A Acid mine drainage other coal mining impacts

4B Waste water discharge (e.g., sewage treatment)

4D Oil and gas drilling operations associated runoff

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 The pallid shiner is known from only six localities in the lower Tennessee, Green,

Comment 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

Pallid Sturgeon ***Scaphirhynchus albus***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
LE	E	G1	S1	G1	S1

G-Trend Decreasing

G-Trend Comment The range of the pallid sturgeon is restricted to the main channels of the Missouri and lower Mississippi rivers from Montana to Louisiana (Froese and Pauly 2004). It is considered to be critically imperiled in 13 states as its numbers are extremely low throughout this range (NatureServe 2004). It was placed on the Endangered Species Act list on September 6, 1990 (http://midwest.fws.gov/endangered/fishes/pallid_fc.html). In the late 1990's, the population size of pallid sturgeon was estimated to be between 6,000 and 16,000 individuals, with 2,000-6,000 fish in the Missouri River and its tributaries (NatureServe 2004). The single largest concentration of non-hybridized pallid sturgeon is thought to be no more than 250 fish in the Missouri and Yellowstone rivers in Montana and North Dakota.

S-Trend Unknown

S-Trend There is only one substantiated record for the pallid sturgeon in Kentucky.

Comment Burr and Warren (1986) report it to be sporadic and rare in the main channel of the Mississippi River. They report a single specimen caught in the Mississippi River during November 1985 from Hickman County, Kentucky. . It is considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History The Pallid sturgeon is a large species (up to 6 feet in length and weighing 80 pounds) with a large flat shovel-like snout (NatureServe 2004). It inhabits large turbid rivers with low to moderate gradients and strong free-flowing currents. It occurs over firm gravel or sandy substrates, and are adapted to living close to the bottom substrate in areas with a diversity of depths and velocities (http://midwest.fws.gov/endangered/fishes/pallid_fc.html). Specific habitats utilized include braided channels, sand bars and flats, and gravel bars. The estimated time of maturity for males is 7-9 years, with a 2-3 year pause between spawning runs. Females do not spawn for the first time until 7-15 years of age, with periods of up to 10 years between spawning runs. Life span has been estimated to be up to 50 years. The oldest individual to-date was a 41-year-old female weighing 37.5 pounds and containing 170,000 eggs. Diet includes aquatic insects, crustaceans, mollusks, annelids, eggs of other fishes, and other fishes (NatureServe 2004).

CLASS ACTINOPTERYGII

Pallid Sturgeon ***Scaphirhynchus albus***

Key	Currently known from a single specimen record in the Lower Mississippi-
Habitat	Memphis HUC (08010100). Due to channel modifications made to enhance barge traffic, the ability of streams to support life in this HUC has been greatly diminished. No reach of the Mississippi River or its tributaries within this HUC is able to fully support aquatic life. Most (64.2%) can only partially support aquatic life, while 35.8% are considered to be non-supportive (Kentucky Division of Water 2002). Only about 4 miles of stream are considered to be outstanding resource waters.
Guilds	Large rivers in current.
Statewide Map	PallidSturgeon.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

5E Hybridization with closely related species

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

Plains Minnow ***Hybognathus placitus***

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

G-Trend Decreasing

G-Trend Comment Moderately widespread in streams in central North America. The species has suffered substantial declines in some areas (Kansas, Nebraska, Missouri, and portions of Oklahoma) in abundance and distribution. It is declining in the southern half of its range and is apparently stable in the northern portions of the range. If northern populations begin to decline the rank should be reevaluated (NatureServe 2004).

S-Trend Unknown

S-Trend Comment Three records for this species prior to 1984 are from near the mouth of the Ohio River and further south along the Kentucky portion of the Mississippi River. Recent reports are that it is not threatened and possibly stable (NatureServe 2004). However, Etnier and Starnes (1993) reported it to be uncommon in the Mississippi River main channel below the mouth of the Missouri River.

Habitat / Life History The plains minnow is most common in shallow runs and pools of creeks and small to large rivers. It is common and can be very abundant in the

Great Plains (Page and Burr 1991). It lives in schools near the bottom and can often be found in association with the western silvery minnow, silver and flathead chubs, and the red, sand and emerald shiners (Pflieger 1975). In Kentucky, this species is restricted to the turbid main channel of the Mississippi River, occurring over sandy bottom areas with current (Burr and Warren 1986).

Little life history information is know about the plains minnow, however it is thought to be a communal spawner during periods of high flow. Individuals are short-lived with most reproducing and dying during their second summer (NatureServe 2004).

Key Habitat

The only records for this species predate 1984, which include two from the Lower Mississippi Memphis (HUC 08010100) and one from the Lower Ohio (HUC 05140206). Habitat conditions fully supporting aquatic life range from 0% (Lower Mississippi Memphis HUC) to 52% (Lower Ohio HUC) of stream miles surveyed within these watersheds. Both contain limited sections regarded as outstanding resource water (Kentucky Division of Water 2002).

CLASS ACTINOPTERYGII

Plains Minnow ***Hybognathus placitus***

Guilds Large rivers in current.

Statewide PlainsMinnow.pdf

Map

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

2G Water level fluctuations

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

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

4F Urban runoff

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

Redspotted Sunfish ***Lepomis miniatus***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	T	G5	S2	G5	S2

G-Trend Stable

G-Trend Comment Formerly recognized as a subspecies of the spotted sunfish (Warren (1992), the redspotted sunfish ranges from the Mobile Basin west to the Rio Grande and north through the Mississippi Basin in Illinois, including the lowermost Ohio Basin. It is common in many areas, but may have declined in the northern part of its range due to deterioration of water quality and loss of habitat (Natureserve 2004).

S-Trend Stable

S-Trend Comment Restricted to the western third of the state, where it is sporadic and uncommon in the lower Green River drainage (Pond and Mud Rivers) and minor tributaries and oxbows along the lower Ohio and Mississippi Rivers (Burr and Warren 1986). It is considered imperiled in Kentucky (NatureServe, 2004) and threatened by the Kentucky State Nature Preserves Commission (2004).

Habitat / Inhabits lowland streams, oxbow lakes, and wetlands typically over

Life History	substrates of sand and mud overlain with organic debris. In streams it occurs in backwater and pool habitats and in wetlands and oxbow lakes along vegetated shorelines (Burr and Warren 1986). Spawning occurs from May through July, during which males construct single or colonial nests in shallow water. Diet consists primarily of insect larvae and microcrustacea (Etnier and Starnes 1993).
Key Habitat	Although records exist in eight HUC watersheds, it is most common in the Middle Green (HUC 05110003) and Bayou De Chien-Mayfield Creek (HUC 08010201). Habitat conditions fully supporting aquatic life in include 49% (Middle Green HUC) and 30% (Bayou du Chien-Mayfield Creek HUC) of stream miles surveyed within these watersheds. In the Bayou du Chien-Mayfield Creek HUC, 124.4 stream miles are considered outstanding resource waters (Kentucky Division of Water 2002).
Guilds	Lowland Streams in slackwater.
Statewide Map	RedspottedSunfish.pdf

CLASS ACTINOPTERYGII

Redspotted Sunfish ***Lepomis miniatus***

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2H Wetland loss/drainage/alteration

2M Valley fills

Biological/ consumptive uses

5E Hybridization with closely related species

Siltation and increased turbidity

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Relict Darter ***Etheostoma chienense***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
LE	E	G1	S1	G1	S1

G-Trend Stable

G-Trend Comment The relict darter is found only in Bayou du Chien Creek in Kentucky (NatureServe 2004). This species is federally listed as endangered.

S-Trend Stable

S-Trend Comment The relict darter is endemic to Bayou du Chien Creek in Kentucky (NatureServe 2004).). It is considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission (2004). Although populations appear to be currently stable, limited distribution of this species makes it vulnerable to any pollution event or landscape disturbance (NatureServe, 2004).

Habitat / Life History Inhabits small creeks over gravel, sand, and leaf litter substrates near fallen branches, undercut banks, or over hanging vegetation (NatureServe 2004). Spawning has been reported to occur in only one tributary to Bayou du Chien.

Key Restricted to the Bayou du Chien (HUC 08010201) watershed. Habitat

Habitat conditions fully supporting aquatic life include only 30.2% of all streams surveyed in this watershed, while 37.0% is partially supportive (Kentucky Division of Water 2002). Almost one-third (32.8%) of all surveyed streams are rated as non-supportive. Bayou du Chien Creek drainage has 124.4 miles of streams designated as outstanding resource water due to the presence of this federally listed endangered species.

Guilds Lowland Streams in riffles.

Statewide Map RelictDarter.pdf

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2F Riparian zone removal (Agriculture/development)

CLASS ACTINOPTERYGII

Sawfin Shiner ***Notropis sp. 4***

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

G-Trend Unknown

G-Trend Comment The sawfin shiner has a spotty distribution in the upper Tennessee and Cumberland River drainages in Alabama, Tennessee, Virginia, and Kentucky (Natureserve 2004). It is locally common and its distribution trend is stable or unknown in different areas (Natureserve 2004). Although this species is not very threatened, it is negatively affected by impoundments and reduced water quality (Natureserve 2004).

S-Trend Unknown

S-Trend Comment In Kentucky, this species is known only from the Big South Fork Cumberland River (Rock Creek), McCreary County; Pitman Creek, Pulaski County; and Little South Fork Cumberland River, Wayne County (Burr and Warren 1986). It is locally common in the Little South Fork Cumberland River, but rare elsewhere (Burr and Warren 1986). This species was extensively surveyed in the 1980's and 1990's, but it is difficult to collect and identify (Natureserve 2004). Its distribution trend is unknown (D. Eisenhour, Morehead State University, personal communication).

Habitat / Life History

The sawfin shiner inhabits cool, clear upland streams on the eastern edge of the highland rim and Cumberland Plateau (Burr and Warren). Within these streams, it can be found in quiet or gently flowing pools, backwaters, or moderate runs over clean gravel and rubble as well as somewhat silted substrates (Burr and Warren 1986; Etnier and Starnes 1993; NatureServe 2004). Spawning probably occurs from mid-May to at least early June in upper Tennessee (NatureServe 2004). Diet includes immature aquatic insects such as midges, caddisflies, mayflies, and beetles (NatureServe 2004). This species feeds on the bottom and in midwater (NatureServe 2004).

Key Habitat

Currently known to occur in the South Fork Cumberland (HUC 05130104) and Upper Cumberland-Lake Cumberland (HUC 05130101) watersheds. Habitat conditions fully supporting aquatic life includes 90% of stream miles surveyed in the South Fork Cumberland watershed, and 67% of stream miles surveyed in the Upper Cumberland-Lake Cumberland watershed. Both watersheds contain extensive sections considered outstanding resouce waters ((Kentucky Division of Water 2002).

CLASS ACTINOPTERYGII

Sawfin Shiner ***Notropis sp. 4***

Guilds Upland streams in pools.

Statewide SawfinShiner.pdf

Map

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

Point and non-point source pollution

4A Acid mine drainage other coal mining impacts

Siltation and increased turbidity

1A Coal mining

1B Agriculture

1E Silviculture

CLASS ACTINOPTERYGII

Shawnee Darter ***Etheostoma tecumsehi***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	N	G1	S4	G1	S4

G-Trend Decreasing

G-Trend Comment This species is a member of the orangethroat darter complex distributed over a large part of the central United States. Recently recognized as a distinct species, the Shawnee darter is restricted to the headwaters of the Pond River (Green River Basin, Kentucky) encompassing an area of 450 sq km (Ceas and Page 1997).

S-Trend Stable

S-Trend Comment Restricted to the Pond River drainage in Christian, Todd and extreme southeastern Hopkins Counties in Kentucky. A fuel spill and construction of impoundments in this drainage have been attributed to declines in some populations (Ceas and Page 1997).

Habitat / Life History This and other orangethroat darter group species occur in small (first to fourth order) upland streams over gravel and cobble subtrates in swift flowing riffles and runs. During periods of low water, when riffles and runs become dry, individuals will concentrate in isolated pools where they can survive for extended periods of time, so long as the water does not become

stagnant. Spawning occurs in early spring in sections of riffles or runs with large expanses of loose, fine gravel. Streams impacted by erosion and sedimentation that have more imbedded or compacted substrates support fewer individuals (Ceas and Burr, 2002).

Key Habitat Known to occur only in the Pond River (HUC 05110006) drainage. Habitat conditions fully supporting aquatic life include only 20.1% of stream miles surveyed within this watershed, none of which contain outstanding resource waters (Kentucky Division of Water 2004).

Guilds Lowland Streams in riffles.

Statewide Map ShawneeDarter.pdf

CLASS ACTINOPTERYGII

Shawnee Darter ***Etheostoma tecumsehi***

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

Biological/ consumptive uses

5F Low population densities

Point and non-point source pollution

4G Chemical spills and contaminants (applied and accidental)

Siltation and increased turbidity

1D Urbanization/Development General Construction

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

Slender Madtom ***Noturus exilis***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G5	S1	G5	S1

G-Trend Unknown

G-Trend Comment The slender madtom is found in 13 states along the Green, Cumberland, Mississippi, and Tennessee river drainages (Natureserve 2004). This species is considered vulnerable or imperiled in eight of these states and secure in the other five (Natureserve 2004). Global distribution trend data is unknown.

S-Trend Stable

S-Trend Comment Known from ten localities in Kentucky. It is sporadic and uncommon in the lower Cumberland, upper Green, and Barren Rivers (Burr and Warren 1986). Prior to 1984, records were documented from four different HUC8 watersheds, but has since been observed in only one. Although a long-term decline in distribution is evident in Kentucky, the short-term trend may have stabilized, but this remains uncertain. (D. Eisenhour, Morehead State

University, personal communication).

Habitat / Life History Inhabits riffles and flowing pools of small to medium-size clear streams and rivers over pebble and gravel bottoms (Burr and Warren 1986). This species may also occur along wave-swept margins of large reservoirs among rocks and other cover (Burr and Warren 1986). Individuals will hide beneath rocks during the day and forage at night (Pflieger 1975). Common food items are aquatic insects and small crustaceans (Mettee et al. 1996). Spawning may occur as early as late spring and extend through July and August (NatureServe 2004). Compact clusters of eggs are deposited in shallow excavations beneath rocks (Pflieger 1975). Lifespan is approximately five years (Mettee et al. 1996).

Key Habitat Currently known to occur in only in the Lower Cumberland (HUC 05130205) and South Fork Licking (HUC 05100102) River drainages. Habitat conditions fully supporting aquatic life in include 23% (Lower Cumberland HUC) and 34% (South Fork Licking HUC) of stream miles surveyed within these watersheds. Neither HUC contains outstanding resource waters (Kentucky Division of Water 2002).

Guilds Upland streams in riffles.

CLASS ACTINOPTERYGII

Slender Madtom ***Noturus exilis***

Statewide SlenderMadtom.pdf

Map

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier)

Biological/ consumptive uses

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

Siltation and increased turbidity

1B Agriculture

1C Road construction

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Smallscale Darter ***Etheostoma microlepidum***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G2G3	S1	G2	S1

G-Trend Decreasing

G-Trend Comment The smallscale darter occurs the lower Cumberland River drainage in western Kentucky and north central Tennessee. Localized and common (Page and Burr, 1991). Raney and Zorach (1967) described the species from East Fork of Stones River (Cumberland River drainage), Rutherford County, Tennessee. Other than Tennessee, Kentucky is the only other state in which it occurs. Impoundments likely continue to negatively impact this species (NatureServe 2004).

S-Trend Decreasing

S-Trend Comment The distribution of this species in Kentucky has changed very little since Burr and Warren (1986). Endemic populations persist in the lower Cumberland (Little and Red Rivers), where it remains sporadic and rare (M. Compton, KY Division of Water, personal communication). It is considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History	Restricted to upland streams and rivers on the Pennyroyal Plain of the Highland Rim. Typically occurs in moderate to fast flowing riffles over cobble and pebble substrates (Burr and Warren 1986). Life history information for Kentucky populations is lacking. Etnier and Starnes 1993). Spawning behavior has been reported to be similar to other species of the spotted darter group, in which eggs are attached to the underside of a large rock in a single layer mass during late spring (Page et al. 1982). Juveniles are often taken in gravel riffles (Etnier and Starnes 1993). Other life history aspects are unknown.
Key Habitat	Occurs only in the Lower Cumberland (HUC 05130205) and Red River (HUC 05130206) drainages. Habitat conditions fully supporting aquatic life in include 23% (Lower Cumberland HUC) and 73.1% (Red River HUC) of stream miles surveyed within these watersheds. Neither HUC contains outstanding resource waters (Kentucky Division of Water 2002).
Guilds	Upland streams in riffles.
Statewide Map	SmallscaleDarter.pdf

CLASS ACTINOPTERYGII

Smallscale Darter ***Etheostoma microlepidum***

Conservation Issues

Aquatic habitat degradation

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

2C Construction/Operation of impoundments (migration barrier)

2F Riparian zone removal (Agriculture/development)

Biological/ consumptive uses

5F Low population densities

5H Isolated populations (low gene flow)

Miscellaneous Mortality Factors

6G Stochastic events (droughts, unusual weather, pine beetle damage, flooding etc.)

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Southern Cavefish ***Typhlichthys subterraneus***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G4	S2S3	G4	S2

G-Trend Stable

G-Trend Comment The southern cavefish is a troglobitic species occurring in disjunct populations in the Ozark Plateau of southern Missouri and northeastern Arkansas; and the Cumberland and Interior Plateaus of northern Alabama, northwestern Georgia, central Tennessee, Kentucky, and extreme southern Indiana. Complete population census information is lacking and it is uncertain whether populations are adequately protected (NatureServe 2004).

S-Trend Unknown

S-Trend Comment Populations in Kentucky are small and limited to the karst region of the Shawnee Hills and Highland Rim areas (Burr and Warren 1986). Individuals have been found in several caves in five Kentucky counties (Clay 1975). Populations exist in Barren (Cave City, Mitchells Cave, and Crystal Cave), Edmonson (Mammoth Cave and Stillhouse Hollow Caves), Hart (Horse and Hidden River Caves), and Warren (Bowling Green and Rich Pond) Counties. It is considered imperiled in Kentucky (NatureServe, 2004) and a

species of special concern by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History

This species is an obligate cave dweller occurring in the karst regions of Kentucky. It inhabits cool (10-14°C), lentic cave water but is attracted to point sources of water entering its underground habitat (Burr and Warren 1986). Individuals have been found over several substrates including gravel, sand, or mud. Reproductive potential is very low. The minimum population doubling time has been estimated to be between 1.4 and 4.4 years (Froese and Pauly 2004). The number of eggs per female is typically <50 and only 50% of the adult female population may breed in any one year. Spawning occurs during the spring (March/April). Females incubate eggs in their gill chambers (branchial brooding) for up to four or five months before hatching (NatureServe 2004). Sexual maturity is reached at age two and the maximum reported age is four years (Etnier and Starnes 1993). Diet consists of small crustaceans including amphipods, isopods, and copepods. Dispersal of populations is thought to occur through the ground water table (Clay 1975).

CLASS ACTINOPTERYGII

Southern Cavefish ***Typhlichthys subterraneus***

Key Currently known to occur only in the Upper Green (HUC 05110001) and

Habitat Barren River (HUC 05110002) watersheds. Habitat conditions fully supporting aquatic life range include 55.8% of stream miles surveyed in the Upper Green River and 92.6% in the Barren River watersheds. Number of stream miles recognized as outstanding resource waters include 113.1 in the The Upper Green and 14.7 for the Barren River drainages (Kentucky Division of Water 2004).

Guilds Cave streams.

Statewide SouthernCavefish.pdf

Map

Conservation Issues

Biological/ consumptive uses

5F Low population densities

5H Isolated populations (low gene flow)

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment)

4H Confined animal operations

Siltation and increased turbidity

1C Road construction

1D Urbanization/Development General Construction

CLASS ACTINOPTERYGII

Splendid Darter ***Etheostoma barrenense***

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

G-Trend Stable

G-Trend Comment The splendid darter is endemic to the upper Barren River drainage in Kentucky and Tennessee, where it is common (Etnier and Starnes 1993). This species is on Tennessee's list of rare vertebrates due to its restricted range.

S-Trend Stable

S-Trend Comment The splendid darter is generally distributed in the upper Barren River drainage, where it is endemic (Burr and Warren 1986).

Habitat / Life History Occurs in pools and occasionally is found along the margins of riffles over rocky substrate on upland headwater creeks, streams, and rivers (Burr and Warren 1986). Spawning occurs from early April through Mid-May over boulders in flowing pools or gently flowing riffles (Etnier and Starnes 1993).

Key Habitat Known to occur only in the Barren River (HUC 05110002). Habitat conditions fully supporting aquatic life include 92.7% of stream miles surveyed within this watershed. Nearly 15 stream miles in the Barren River

HUC are considered outstanding resource water (Kentucky Division of Water 2004).

Guilds Upland streams in pools.

Statewide Map SplendidDarter.pdf

CLASS ACTINOPTERYGII

Splendid Darter ***Etheostoma barrenense***

Conservation Issues

Aquatic habitat degradation

2C Construction/Operation of impoundments (migration barrier). Burr and Warren (1986)

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment). Burr and Warren (1986)

4D Oil and gas drilling operations associated runoff. Burr and Warren (1986)

4E Agricultural runoff – including fertilizers/animal waste, herbicides, pesticides. Burr and Warren (1986)

Siltation and increased turbidity

1B Agriculture. Burr and Warren (1986)

CLASS ACTINOPTERYGII

Spotted Darter ***Etheostoma maculatum***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	T	G2	S2	G2	S2

G-Trend Unknown

G-Trend Comment The spotted darter exhibits a relict distribution pattern in the Ohio River basin, from northeast Pennsylvania, southwest New York, central Ohio, north central Indiana (probably extirpated) to Kentucky (Lee et al. (1980)). This species is declining throughout its range. Population levels have been observed to undergo extreme fluctuation in short time periods. Habitat loss, siltation, and water pollution have likely had severe impacts. This species is considered critically imperiled throughout most of its range (NatureServe 2004).

S-Trend Stable

S-Trend Comment Once having a more extensive distribution in the state, currently populations are known to occur only in the upper Green and Barren River drainages (Burr and Warren 1986). It is considered imperiled in Kentucky (NatureServe, 2004) and threatened by the Kentucky State Nature Preserves Commission (2004).

Habitat / Optimal habitat conditions for this species include long riffles with rapid

Life History	flow over substrates of pebble, cobble, and slab boulders. The spotted darter, like other members of the boulder darter group, feeds on larvae of different aquatic insect taxa, which varies according to season (Kessler, 1994). Spawning occurs from late May to late June and individuals become sexually mature at two years of age (about 40-45 mm SL; Raney and Lachner, 1939).
Key Habitat	Currently known to occur only in the Upper Green (HUC 05110001) and Barren River (HUC 05110002) watersheds. Habitat conditions fully supporting aquatic life range include 55.8% of stream miles surveyed in the Upper Green River and 92.6% in the Barren River watersheds. Number of stream miles recognized as outstanding resource waters include 113.1 in the The Upper Green and 14.7 for the Barren River drainages (Kentucky Division of Water 2004).
Guilds	Upland streams in riffles.
Statewide Map	SpottedDarter.pdf

CLASS ACTINOPTERYGII

Spotted Darter ***Etheostoma maculatum***

Conservation Issues

Aquatic habitat degradation

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

2C Construction/Operation of impoundments (migration barrier). Green/Barren River populations; 7; North Fork Kentucky River populations

2F Riparian zone removal (Agriculture/development). Both populations

Biological/ consumptive uses

5F Low population densities. North Fork Kentucky River populations

5H Isolated populations (low gene flow). North Fork Kentucky River populations

Miscellaneous Mortality Factors

6G Stochastic events (droughts, unusual weather, pine beetle damage, flooding etc.). Green/Barren River populations; 8; North Fork Kentucky River populations

Point and non-point source pollution

4A Acid mine drainage other coal mining impacts . North Fork Kentucky River populations

4B Waste water discharge (e.g., sewage treatment). Both populations

Siltation and increased turbidity

1A Coal mining. North Fork Kentucky River populations

1B Agriculture. Green/Barren River populations

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

Stargazing Minnow ***Phenacobius uranops***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G4	S2S3	G4	S2

G-Trend Decreasing

G-Trend Comment The stargazing minnow occurs in the Tennessee, Cumberland, and Green River drainages in the states of Alabama, Georgia, Kentucky, Tennessee, and (NatureServe 2004). This species is common only in the upper Tennessee and Green River drainages (NatureServe 2004). It is considered vulnerable (S3) in Virginia, apparently secure (S4) in Tennessee, imperiled (S2S3) in Kentucky, and critically imperiled (S1) in Alabama and Georgia.

S-Trend Decreasing

S-Trend Comment Occasional and locally common in the upper Green and Barren River drainages; sporadic and rare (possibly extirpated) in the Cumberland River drainage (Burr and Warren 1986). It is considered imperiled in Kentucky (NatureServe, 2004) and treated as a species of special concern by the Kentucky State Nature Preserves Commission (2004).

Habitat / Life History Inhabits streams of moderate to high gradient in swift clear riffles and runs over clean gravel and pebble substrates (Burr and Warren 1986; NatureServe

2004). Jenkins and Burkhead (1993) usually found it associated with riffles and runs in 15-50 depths (Jenkins and Burkhead 1993). Adults and juveniles are nearly always found over clean gravel and small to medium rubble. Spawning occurs during April through June. Sexual maturity is reached at age 1 and life span is typically less than three years. Feeding schools of 10-20 individuals have been observed, often mixed with streamline chubs. Diet consists primarily of midge and caddisfly larvae (Etnier and Starnes 1993).

Key Habitat Currently known to occur only in the Upper Green (HUC 05110001) and Barren River (HUC 05110002) watersheds. Habitat conditions fully supporting aquatic life range include 55.8% of stream miles surveyed in the Upper Green River and 92.6% in the Barren River watersheds. Number of stream miles recognized as outstanding resource waters include 113.1 in the The Upper Green and 14.7 for the Barren River drainages (Kentucky Division of Water 2004).

Guilds Upland streams in riffles.

Statewide Map StargazingMinnow.pdf

CLASS ACTINOPTERYGII

Stargazing Minnow ***Phenacobius uranops***

Conservation Issues

Aquatic habitat degradation

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

2C Construction/Operation of impoundments (migration barrier)

Siltation and increased turbidity

1A Coal mining

1B Agriculture

1D Urbanization/Development General Construction

1E Silviculture

CLASS ACTINOPTERYGII

Starhead Topminnow ***Fundulus dispar***

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

G-Trend Stable

G-Trend Comment Early works (including Branson 1972; Sisk 1973; Clay 1975; Rice et al. 1983) referred to the starhead topminnow as Fundulus notti, a freshwater species group made up of five species having the presence of a suborbital teardrop (Wiley 1977). According to Wiley (1977), Hubbs and Allen (1943) first referred to F. dispar (northern starhead topminnow) as a distinct species. Others failed to acknowledge this as well as Wiley's (1977) work describing the species found in Kentucky as F. dispar; previously considered a subspecies of F. notti- northern starhead topminnow. Recent American Fisheries Society (Nelson et al. 2004) names list refers to F. dispar as starhead topminnow. Previous works referred to it as northern starhead topminnow. Wiley (1977) gives the range for starhead topminnow as from the Ouachita R. dr., Louisiana, north to (Lake Michigan) southern Michigan (and Wisconsin), east to the upper Tombigbee R. dr., Alabama; and Mississippi River basin (Page and Burr 1991). Page and Burr (1991) deemed the species to be locally common but

becoming less so as wetlands are drained. Following are starhead topminnow population information from states adjacent to Kentucky.

Illinois (S2): Smith (1979) gave reasons for its decline as oil pollution and drainage of flood plain habitat. It was put on their watch list by Illinois Endangered Species Technical Advisory Committee on fishes (Burr 1991). Taylor et al. (1994) verified (as northern) starhead topminnow from only four of 23 historical locations and one new locale and concluded the range had been significantly reduced since Smith's (1979) statewide survey (1950-1978).

Indiana (S4): no information.

Missouri (S2): Currently known from three counties. One of the habitats it was once found but no longer exists was heavily vegetated lowland ditches with no obvious flow (Pflieger 1997).

Tennessee (S3): Fairly abundant in suitable habitat around Reelfoot Lake with scattered populations in vegetated overflow swamps of the Mississippi drainage and south and in the Big Sandy System of lower Tennessee River drainage. They declared channelization has eliminated much of its former habitat.

S-Trend Decreasing

CLASS ACTINOPTERYGII

Starhead Topminnow ***Fundulus dispar***

S-Trend Comment

Pre 1984: The first documented presence of the starhead topminnow in Kentucky waters was by Branson (1972). Two specimens were collected (by two Eastern Kentucky University professors in 1971) from borrow ditches draining into Murphy's Pond, Hickman County. Sisk (1973) reported four specimens collect in Oct. 1973 from Open Pond, Fulton Co. (again as F. notti), however, Warren and Cicerello (1983) found Open Pond eliminated and converted to agricultural landClay (1975) sites the northern starhead topminnow as the commonest cyprinodont in Reelfoot Lake, Tennessee, and taken from swamps of Union County in southern Illinois. The only known population he cited for the species in Kentucky at the time was Branson (1972). Rice et al. (1983) reported taking the starhead topminnow (as F. notti) from two locations in the Reelfoot Lake dr. basin and from a small stream draining Blue Pond into Running Slough; both sites in Fulton County. They also reported Cicerello and Warren (personal communication 1983) sampled individuals (June 1982) from Running Slough at Ledford in Fulton County. These sites are located in the Mississippi Alluvial and Eastern Gulf Coastal Plain of the Coastal Plain Province.

Post 1984: Ron Cicerello (pers. comm., 18 NOV 04) reported he was not aware of any recent locality records for this species. The Kentucky State Nature

PreservesCommission (2004) currently considers the starhead topminnow, F. dispar, an Endangered species in Kentucky.

Habitat/ Life History

Burr and Warren (1986) indicate the starhead topminnow is a surface dweller that often cruises in pairs in close association with luxuriant beds of aquatic plants along shoreline areas and that the topminnow is associated with floodplain lakes and oxbows and wetland subsystems. Page and Burr (1991) indicated this topminnow preferred vegetated standing water bodies, quiet pools and backwater streams. Etnier and Starnes (1993) stated the starhead topminnow were associated with vegetated swamps and lakes of the Mississippi Valley. They provided citations alluding to their food habits that included terrestrial insects, snails, small crustaceans and some algae. When conducting stomach analysis, Etnier and Starnes (1993) primarily found their food to be terrestrial insects. Pflieger (1997) observed some aspects of their reproduction while visiting a swamp (Mingo) in Missouri during May of 1987. Specimens he relocated to a pond indicated that they spawned over a period of time and possibly spawn during the first summer of life. NatureServe citing a study by Taylor and Burr (1997) in southern Illinois found the starhead topminnow primarily reproduces in mid April-mid July at water temperatures of 17-30oC, females produce multiple clutches and spawned at one year of age and eggs hatched in 9-11 days at water temperatures about 25oC. Spawning takes place in dense beds of (aquatic) vegetation (Smith 1979).

CLASS ACTINOPTERYGII

Starhead Topminnow ***Fundulus dispar***

Key Habitat

According to the information provided and available there are no post-1984 records of F. dispar having been collected in Kentucky. Pre-1984 records are discussed below. One record (1971) was from Murphy's Pond, Obion Creek drainage, Hickman County. R. Cicerello (pers. comm., 18 NOV 04) indicated that over the years he and others had looked for F. dispar at Murphy's Pond without success. This area of Hickman County falls within HUC 08010201 (Kentucky Division of Water 2002). Several locality records for the starhead topminnow fall within HUC 08010202. One site, in the later HUC, Open pond, no longer exists (Warren and Cicerello 1983). Within HUC 08010201(Bayou De Chien-Mayfield, which should include Obion) 182.5 miles of stream were assessed. Of this 124.4 miles were rated as Outstanding Resource Waters. Of the remaining stream miles, 30.2% were fully, 37.0% were partially, and 32.8% were not supporting aquatic life resources. No locality records for the starhead topminnow exist with the areas designated as Outstanding Resource Waters. Within HUC 08010202 (Obion Creek-which should be Reelfoot Lake-Obion River drainage, Tennessee), 28.7 stream miles were assessed, with 27.8% fully, 56.0% partially, 16.2% not supporting aquatic life resources and 1.7 miles of stream designated as Outstanding Resource Waters (Kentucky Division of Water 2002).

Guilds Lowland Streams in slackwater.

Statewide StarheadTopminnow.pdf

Map

CLASS ACTINOPTERYGII

Starhead Topminnow ***Fundulus dispar***

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2F Riparian zone removal (Agriculture/development)

2H Wetland loss/drainage/alteration

Biological/ consumptive uses

5F Low population densities

5H Isolated populations (low gene flow)

Miscellaneous Mortality Factors

6G Stochastic events (droughts, unusual weather, pine beetle damage, flooding etc.)

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

CLASS ACTINOPTERYGII

Stone Darter ***Etheostoma derivativum***

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

G-Trend Stable

G-Trend Comment The stone darter (Etheostoma derivativum) was recently described as a new species by Page et al. (2003). Previously regarded as the striped darter (E. virgatum), this species occurs in tributaries of the lower Cumberland River drainage in west-central Kentucky and Tennessee from the Red River to the Stones River systems (Page et al. 2003). The most recent reports on the status of E. derivativum (reported as lower Cumberland populations of E. virgatum) indicate the species to be moderately common in Cumberland River tributaries in the western Highland Rim of Tennessee (Etnier and Starnes 1993; Page et al. 2003), but sporadic and uncommon in tributaries of the Red River in Kentucky (Burr and Warren 1986).

S-Trend Unknown

S-Trend Comment In Kentucky, this species is confined to the Red River drainage in Todd and Logan Counties, where it is sporadic and uncommon (Burr and Warren 1986). All state collection records for this species pre-date 1984.

Habitat / Life History

This species inhabits headwater creeks and streams (second- to fourth-order) in the Western Pennyroyal Karst Plain of the Interior Plateau. It occurs primarily in shallow (less than 0.5m) pools, at the bases or margins of (seldom within) riffles, or along rocky banks, over gravel and sand substrates laden with slab rocks (Kuehne and Barbour 1983; Burr and Warren 1986). No life history study has been conducted for E. derivativum, but because of its close relationship to other barcheek species of the subgenus Catonotus occurring in slab pools (e.g., E. smithi, E. barbouri, E. obeyense, E. virgatum), it likely has similar reproductive, diet, and growth characteristics. All Catonotus species lay (attach) their eggs on the undersides of flat rocks and are guarded by the adult male until they hatch (Page 1983). Most of the barcheek species spawn between April and June and have a maximum life span of two to three years (Etnier and Starnes 1993).

Key Habitat

Prior to 1984, the stone darter has been reported from one HUC8 (05130206) in Kentucky, which contains the Red River (lower Cumberland drainage). Within this HUC, water quality conditions were assesssed in 85.3 miles of stream by Kentucky Divison of Water (2002). Among the streams suveyed, 73.1% were identified as fully supportive, 17.6% as partially supportive, and 9.4% as not supportive of aquatic life.

CLASS ACTINOPTERYGII

Stone Darter ***Etheostoma derivativum***

Guilds Upland streams in riffles.

Statewide StoneDarter.pdf

Map

Conservation Issues

Aquatic habitat degradation

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

2F Riparian zone removal (Agriculture/development)

Biological/ consumptive uses

5F Low population densities

5H Isolated populations (low gene flow)

Miscellaneous Mortality Factors

6G Stochastic events (droughts, unusual weather, pine beetle damage, flooding etc.)

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Striped Darter ***Etheostoma virgatum***

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

G-Trend Stable

G-Trend Comment Jordan (1880) first described the striped darter as Poecilichthys virgatus from specimens collected from the Rock Castle River at Livingston, Kentucky. In 1896, Jordan and Evermann gave the known range of Etheostoma virgatum as Rock Castle River and Round Stone River, tributaries of Cumberland River in Rock Castle and Laurel counties, Kentucky. They described the species as not common. Burr and Warren (1986) show Kentucky's striped darter distribution only in the Cumberland River drainage below "the falls" [primarily Buck and Rockcastle creek drainages] where it was common; also a few uncommon localities in the Red River drainage, Todd and Logan counties, Kentucky. Etnier and Starnes (1993) presented the distribution of the striped darter as moderately common in three disjunct portions of the Cumberland River drainage that made up their range in Kentucky and Tennessee. Populations are found in Rockcastle River and adjacent stream systems in Kentucky and the upper Caney Fork system in Tennessee and in the Red River dr., Todd and Logan

counties, Kentucky. However, recently Page et al. (2003) described each of these disjunct populations as separate species. The population of striped darters in the eastern Highland Rim (Kentucky) remained Etheostoma virgatum (striped darter). Doing so made this species endemic to Kentucky. Those found in the upper Caney Fork system in the Highland Rim of central Tennessee were described as E. basilare (corrugated darter), none of which are found in Kentucky. And those populations located in the western Rim, lower Cumberland River (which include that population in Todd and Logan Counties, Kentucky) are now known as E. derivativum (stone darter).

S-Trend Unknown

S-Trend Comment Page et al. (2003) described two of the three somewhat disjunct populations of E. virgatum found within the Cumberland River drainage as new species. Based on their conclusions, the striped darter (E. virgatum) populations are those occuring below the falls in the Cumberland River drainage. They are known from the Rockcastle, Buck and Beaver creek systems and are locally common. Based on their finding the striped darter can currently be considered endemic to Kentucky. Habitat is probably their most limiting factor regarding distribution. In Kentucky, striped darters are limited by Lake Cumberland (downstream), “the falls” (upstream) and Laurel River Lake and tailwaters (cold water temperatures of the tailwaters). To date

CLASS ACTINOPTERYGII

Striped Darter ***Etheostoma virgatum***

there are no records from Laurel River. Eisenhour (pers. comm.) thought that the population in the middle Cumberland River was stable and needed no intensive management. However, that was prior to much of that population being re-described as E. basilare by Page et al. (2003).

Habitat / Life History

This species generally prefers clear, shallow, slightly flowing headwater streams with numerous shallow riffles and runs. Etheostoma virgatum, striped darter, belongs to the subgenus Catonotus, the barcheek darters. One of the common life history aspects of Catonotus is their spawning habit. Darters within this subgenus spawn on the underside of a stone (rock). During breeding season the male attracts a female to his "nest rock" (they only spawn with one female at a time). Under this rock he has cleared out an area large enough for turning and spawning (not much deeper than his body including his erect fins) and an area on the underside of his nest rock. Here the attracted female inverts and deposits eggs that adhere to the nest rock and the male subsequently inverts to fertilize these eggs. The female then leaves and the male guards the eggs until they hatch. The male spawns with numerous females until no more females are attracted or the available area on the underside of the nest rock is filled. Kornman (1980)

found that the striped darter made upstream migrations to spawn. He counted up to 774 eggs adhered to the underside of one nest rock. Most of the nest rocks were flat, although he did find a nest on the underside of a geode. He offers an in depth account pertaining to life history and meristics of E. virgatum from Clear Creek a tributary to Rockcastle River, Kentucky. Most of the year in Clear Creek he found that the striped darter preferred the slack water to the sides and downstream ends of gentle riffle/runs or located on the downstream end of rocks found within a riffle/run. The darters backed off into deeper water as cooler weather arrived. Striped darters preferred a bottom of sand and gravel, mixed with large pebbles and small rock. They were rarely found in areas of steeper gradient, exposed bedrock, and swifter and/or deeper water. The striped darter also showed a dislike for benthic habitats comprised of silt and/or organic debris.

Key Habitat

Currently the striped darter is only recognized from the Cumberland River system in Kentucky from Rockcastle, Buck, and Beaver Creek drainages within HUC 05130101 (Upper Cumberland), HUC 05130102 (Rockcastle River), and HUC 05130103 Upper Cumberland/Lake Cumberland). In each of the three HUC8 watersheds, water quality appears to be good as 67 to 82% of the streams surveyed are fully supporting of aquatic life and 11 to 13% are partially supportive. However, 18% of the surveyed waters in the

Upper Cumberland/Lake Cumberland HUC are listed as threatened and 19%

of those in the Upper Cumberland are non-supportive of aquatic life.

CLASS ACTINOPTERYGII

Striped Darter ***Etheostoma virgatum***

Guilds Upland streams in riffles.

Statewide StripedDarter.pdf

Map

Conservation Issues

Aquatic habitat degradation

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

2F Riparian zone removal (Agriculture/development)

Miscellaneous Mortality Factors

6G Stochastic events (droughts, unusual weather, pine beetle damage, flooding etc.)

Point and non-point source pollution

4B Waste water discharge (e.g., sewage treatment)

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

Siltation and increased turbidity

1D Urbanization/Development General Construction

1E Silviculture

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)

CLASS ACTINOPTERYGII

Swamp Darter ***Etheostoma fusiforme***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	E	G5	S1	G5	S1

G-Trend Stable

G-Trend Comment The swamp darter ranges from southwestern Missouri, District of Columbia, Pennsylvania, and New York south along the Atlantic coastal states to southern Florida, then west through the gulf coast states to Texas and north through Oklahoma, Arkansas, Tennessee, and Missouri, and Kentucky (NatureServe 2004).

S-Trend Unknown

S-Trend Comment Known only from two locations in the Reelfoot Lake drainage in Fulton County where the species is rare (Burr and Warren 1986). This location is

	at the northern margin of its range in the Mississippi River drainage. It is considered critically imperiled in Kentucky (NatureServe, 2004) and endangered by the Kentucky State Nature Preserves Commission (2004).
Habitat / Life History	Inhabits ditches and oxbow lakes (Etnier and Starnes 1993). In Kentucky, this species is found only in sloughs, ditches, wetlands, and lakes of the Reelfoot Lake drainage on the Mississippi Alluvial Plain in beds of submerged aquatic plants or detritus piles. Spawning likely occurs in May.
Key Habitat	Currently known to occur only in the Obion Creek (HUC 08010202) watershed. Habitat conditions fully supporting aquatic life include 27.8% of the streams surveyed within this watershed, and 1.7 stream miles are considered outstanding resource water (Kentucky Division of Water 2002).
Guilds	Lowland Streams in slackwater.
Statewide Map	SwampDarter.pdf

CLASS ACTINOPTERYGII

Swamp Darter ***Etheostoma fusiforme***

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

2H Wetland loss/drainage/alteration

Siltation and increased turbidity

1B Agriculture

CLASS ACTINOPTERYGII

Taillight Shiner ***Notropis maculatus***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	T	G5	S2S3	G5	S2

G-Trend Unknown

G-Trend Comment The taillight shiner is found in 14 states in the Atlantic, Gulf, and Mississippi River basins (Froese and Pauly 2004). It is considered vulnerable to imperiled in eight of these states (Natureserve 2004). It is locally common in the southeastern U.S. and uncommon in the Mississippi basin (Etnier and Starnes 1993). Channelization has probably extirpated several populations in Tennessee (Etnier and Starnes 1993).

S-Trend Stable

S-Trend Comment In Kentucky, this species is occasionally and seasonally common in oxbow lakes of the lower Ohio and Mississippi Rivers (Burr and Warren 1986). It is sporadic and rare in Bayou de Chien and Obion Creeks (Burr and Warren 1986). Populations in Kentucky are considered stable or slightly increasing, although some of this may be due to increased sampling efforts (D. Eisenhour, Morehead State University, personal communication).

Habitat / Restricted to coffee-stained waters of low gradient streams, oxbow lakes,

Life History and sloughs that border river systems (Burr and Warren 1986). The acidity (PH) of such waters is typically 6.1-6.9 (Etnier and Starnes 1993). This species is generally found around cypress knees near the shallow margins of lakes or backwaters over soft substrates of mud or detritus near or among vegetation (Burr and Warren 1986). Spawning occurs from March to May in Kentucky and March to October in Florida (Etnier and Starnes 1993). Lifespan is slightly longer than one year (Etnier and Starnes 1993). Preferred food items include microcrustaceans, rotifers, unicellular algae, and small dipteran larvae (Etnier and Starnes 1993).

Key Habitat Currently known to occur in four HUC8 watersheds, including Bayou du Chien-Mayfield (HUC 08010201), Lower Ohio (HUC 05140206), Lower Tennessee-Kentucky Lake (HUC 06040006), and Lower Mississippi-Memphis (HUC 08010100). Habitat conditions fully supporting aquatic life range from 0% to 52% of stream miles surveyed within these watersheds. Although the Bayou du Chien-Mayfield HUC has over 124 stream miles considered outstanding resource water, most of the other watersheds have fewer than ten (Kentucky Division of Water 2002, 2004).

CLASS ACTINOPTERYGII

Taillight Shiner ***Notropis maculatus***

Guilds Lowland Streams in slackwater.

Statewide TaillightShiner.pdf

Map

Conservation Issues

Aquatic habitat degradation

2E Stream channelization/ditching

CLASS ACTINOPTERYGII

Western Sand Darter ***Ammocrypta clara***

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

G-Trend Decreasing

G-Trend Comment The western sand darter has a widespread, but spotty distribution in larger streams of the Mississippi River basin from Texas and Mississippi, north to Minnesota and Wisconsin (Etnier and Starnes 1993). Populations are declining in several regions due to habitat loss and siltation (Natureserve 2004). Western sand darter populations tend to fluctuate widely, apparently more abundant in the northern part of the range than farther south (Williams 1975). Abundance estimates may be conservative due to the cryptic nature of this species. Population declines have been noted in Missouri, Illinois, Wisconsin, and Kentucky (Natureserve 2004).

S-Trend Decreasing

S-Trend Comment In Kentucky, this species was originally reported from the Green River (Green County), Wolf Creek (Martin County), and the Cumberland River (Wayne County) (Burr and Warren 1986). More recent collections have shown possible extirpation from both the Cumberland River and Wolf

Creek (Burr and Warren 1986). Two individuals been collected from the Kentucky River since 1984.

Habitat / Life History Inhabits medium to large streams and rivers with low to moderate gradients but has also been found in quiet margins of drainage canals and shallow backwaters (NatureServe 2004). It typically prefers sandy substrates, but may also be found in gravel/cobble areas associated with pools and riffles (Jenkins and Burkhead 1993; NatureServe 2004). Because this buries itself in sand for protection, stabilization, and cover when ambushing prey, this substrate is critical to its survival (Etnier and Starnes 1993; Page 1983). Spawning occurs during summer months in shallow riffles (Jenkins and Burkhead 1993). Diet consists primarily of larval aquatic insects (NatureServe 2004).

Key Habitat Currently known to occur only in the Upper Green (HUC 05110001) and the North Fork Kentucky (HUC 05100201) River drainages. Habitat conditions fully supporting aquatic life range include 55.8% of stream miles surveyed in the Upper Green River and 49% in the North Fork Kentucky River watersheds. Number of stream miles recognized as outstanding resource waters include 113.1 in the The Upper Green but none in the North Fork Kentucky River (Kentucky Division of Water 2004).

CLASS ACTINOPTERYGII

Western Sand Darter ***Ammocrypta clara***

Guilds Medium to large streams.

Statewide WesternSandDarter.pdf

Map

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

Siltation and increased turbidity

1A Coal mining

CLASS CEPHALASPIDOMORPHI

American Brook Lamprey ***Lampetra appendix***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	T	G4	S2	G4	S2

G-Trend Decreasing

G-Trend Comment Widespread, but with a fragmented distribution throughout the northeastern U.S. and Canada. Populations occur primarily in historically glaciated areas, and are sporadically distributed elsewhere (Trautman 1981). Most populations in the Ohio and lower Mississippi basins are considered imperiled, and Atlantic Coastal populations are considered critically imperiled (NatureServe 2004). The most secure or stable populations appear to occur in the Great Lakes drainages (NatureServe 2004) and uplands of east Tennessee (Etnier and Starnes 1993).

S-Trend Decreasing

S-Trend Comment This species is sporadic and rare in the Kentucky with records from the Licking, Little Sandy, Big Sandy, Upper Cumberland, upper Kentucky and the upper Green River watersheds. It is listed as Threatened by the Kentucky State Nature Preserves Commission (2004).

Habitat / This is a non-parasitic species, considered to be derived from a parasitic

Life History ancestor. Juveniles are filter feeders for at least 5 years before metamorphosis into sexually mature adults. Larvae prefer pools and backwater areas with sediment in which they can bury themselves. Following larval transformation, adults do not feed and die soon after spawning (Pflieger 1997). Spawning occurs in fast moving riffles of high to medium-gradient streams over rocky substrates (Etnier and Starnes 1993).

Key Habitat Current distribution includes the upper Kentucky River (HUC05100201 and HUC05100204) and upper Green River (HUC05110001). Habitat conditions in the upper Kentucky HUC8's are considered fully supporting of aquatic life in 75% of stream miles surveyed. The upper Green HUC8 contains 113.1 miles of outstanding resource waters with habitat conditions considered to be fully supporting of aquatic life in 80% of stream miles surveyed (Kentucky Division of Water 2004). Historically in Kentucky, the American brook lamprey has been collected in 11 HUC8 watersheds.

Guilds Medium to large streams.

CLASS CEPHALASPIDOMORPHI

American Brook Lamprey ***Lampetra appendix***

Statewide AmericanBrookLamprey.pdf

Map

Conservation Issues

Aquatic habitat degradation

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

2C Construction/Operation of impoundments (migration barrier)

2F Riparian zone removal (Agriculture/development)

Biological/ consumptive uses

5A Predation from introduced species

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

CLASS CEPHALASPIDOMORPHI

Chestnut Lamprey ***Ichthyomyzon castaneus***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	S	G4	S2	G4	S2

G-Trend Decreasing

G-Trend Comment Widely distributed throughout the northeastern U.S. and Canada and occurs in more than 20 states and provinces. Subnational ranks range from S1 to S4 with a global rank of G4 (NatureServe 2004). They are critically imperiled in Nebraska and possibly extirpated in Kansas.

S-Trend Decreasing

S-Trend Comment Sporadic and rare in Kentucky with records mainly from the western third of the state. Large numbers occur in the spring below Kentucky Lake Dam. (Burr and Warren 1986). It is reported from the Middle Green River, Rough River, Red River, Lower Cumberland, Lower Ohio and Lower Mississippi watersheds. Since 1984, it has only been reported from the Lower Cumberland and the Lower Mississippi watersheds

Habitat / Life History This species is parasitic and is the largest lamprey found in the state. Juveniles are filter feeders for 5-7 years after which they metamorphose into adults. Adults attach themselves to other fishes using their sucker-like

mouths and drain blood and fluids from the fish. The adult stage typically lasts two years after which the adults spawn and die. Larvae prefer pools and backwater areas with sediment in which they can bury themselves. Adults spawn in fast moving riffles of high to mid-gradient streams. Ideal habitat consists of rocky riffles for spawning adults in combination with pools containing mixed sand and organic debris for the larvae (Trautman 1982). This species also requires a healthy population of an appropriate host fish species.

Key Habitat

Although known from seven HUC8 watershed units in Kentucky, Chestnut lampreys have recently been collected only in the lower Tennessee (Kentucky Lake HUC 06040005) and Mississippi (HUC 08010100) River drainages. Habitat conditions for the lower Tennessee are considered fully supporting of aquatic life for just over 50% of stream miles surveyed and only 32% are fully supporting in the Mississippi.

Guilds

Medium to large streams.

CLASS CEPHALASPIDOMORPHI

Chestnut Lamprey ***Ichthyomyzon castaneus***

Statewide ChestnutLamprey.pdf

Map

Conservation Issues

Aquatic habitat degradation

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

2C Construction/Operation of impoundments (migration barrier)

2F Riparian zone removal (Agriculture/development)

Biological/ consumptive uses

5A Predation from introduced species

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

CLASS CEPHALASPIDOMORPHI

Mountain Brook Lamprey ***Ichthyomyzon greeleyi***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	T	G3G4	S2	G3	S2

G-Trend Decreasing

G-Trend Comment Widely distributed throughout the Ohio River basin and reported from 10 states. NatureServe 2004 lists them as vulnerable to critically imperiled with a global rank of G3/G4. Isolated populations exist primarily in areas where there have not been major alterations that restrict upstream movement such as dams and lakes. Etnier and Starnes (1993) state that adults are available for only a brief period in spring; hence collections probably underestimate abundance.

S-Trend Stable

S-Trend Comment Sporadic and rare in the state with records from the eastern third of the state. (Burr and Warren 1986). It is reported from the Upper Cumberland, Rockcastle River, Barren River and the Upper Green River watersheds.

Habitat / Life History This is a non-parasitic species believed to be derived from the parasitic Ohio Lamprey. Like other lampreys, the life cycle consists of a larval and adult stage. Larvae may spend live five to seven years before transforming into adults. Upon adult transformation, spawning occurs during late spring

on riffles in slow to moderate current in upland creeks and rivers. Several nests may be built within close proximity to one another, over which many adults may be congregated (Etnier and Starnes 1993).

Key Habitat

Currently known to occur in the Rockcastle River (HUC05130102), Big South Fork of the Cumberland River (HUC05130104), and upper Green River (HUC05110001). Habitat conditions considered fully supporting of aquatic life range from 80 to 90% of stream miles surveyed within these watersheds. All contain outstanding resource water (Kentucky Division of Water 2002).

Guilds

Upland streams in riffles.

Statewide Map

MountainBrookLamprey.pdf

CLASS CEPHALASPIDOMORPHI

Mountain Brook Lamprey ***Ichthyomyzon greeleyi***

Conservation Issues

Aquatic habitat degradation

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

2C Construction/Operation of impoundments (migration barrier)

2F Riparian zone removal (Agriculture/development)

Biological/ consumptive uses

5A Predation from introduced species

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

CLASS CEPHALASPIDOMORPHI

Northern Brook Lamprey ***Ichthyomyzon fossor***

Federal Status	Heritage Status	GRank	SRank	GRank (Simplified)	SRank (Simplified)
N	T	G4	S2	G4	S2

G-Trend Decreasing

G-Trend Comment Widely distributed throughout the northeastern U.S. and Canada. Subnational ranks range from S1 to S4 with a global rank of G4 (NatureServe 2004).

S-Trend Decreasing

S-Trend Comment Sporadic and rare with records from the eastern third of the state. It is reported from the Licking, Little Sandy, Big Sandy and Upper Kentucky watersheds (Burr and Warren 1986).

Habitat / Life History This is a non-parasitic species believed to be derived from the parasitic Silver Lamprey. Like other lampreys, the life cycle consists of a larval and adult stage. Larvae spend three to six years partially buried in soft-bottomed areas of streams where the feed on microscopic organisms and organic particles from bottom sediments (Pflieger 1997). Upon adult transformation, individuals migrate short distances upstream in small gravelly creeks to spawn. Adults do not feed, and die shortly after spawning (Smith 1979).

Key	The most recent records are from the upper Kentucky River (HUC
Habitat	05100204), lower Levisa Fork (HUC 05070203), Big Sandy (HUC 05070204) and Little Sandy (HUC 05090104). Habitat conditions fully supporting aquatic life ranges from 20% (lower Levisa Fork HUC) to 80% (upper Kentucky River HUC) of stream miles surveyed within these watersheds. Most records are from the upper Kentucky River drainage. None of these watersheds contain outstanding resource waters (Kentucky Division of water 2000, 2004).
Guilds	Upland streams in riffles.
Statewide Map	NorthernBrookLamprey.pdf

CLASS CEPHALASPIDOMORPHI

Northern Brook Lamprey ***Ichthyomyzon fossor***

Conservation Issues

Aquatic habitat degradation

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

2C Construction/Operation of impoundments (migration barrier)

2F Riparian zone removal (Agriculture/development)

Biological/ consumptive uses

5A Predation from introduced species

Point and non-point source pollution

4E Agricultural runoff – including fertilizers/animal waste, herbicides,

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