Sheepnose
(*Plethobasus cyphyus*)

Status Review:
Summary and Evaluation


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U.S. Fish and Wildlife Service, Midwest Region
Illinois-Iowa Ecological Services Field Office
Moline, Illinois

November 19, 2025

STATUS REVIEW
Sheepnose (*Plethobasus cyphyus*)

GENERAL INFORMATION

Species: Sheepnose (*Plethobasus cyphyus*)

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Date of listing publication: March 13, 2012

Federal Register citation(s) for listing: 77 FR 14914

Classification: Endangered Species

Critical habitat/4(d) rule/Experimental population designation/Similarity of appearance listing: Critical habitat was proposed for the species on December 13, 2024 (89 FR 101100). The Service has a court-approved settlement agreement to submit the final rule to the Office of the Federal Register (OFR) by November 30, 2025.

Methodology used to complete the review: Public notice was given in the *Federal Register* (89 FR 804-806) requesting new scientific or commercial data and information that may have a bearing on the sheepnose classification of endangered status. Pertinent data were obtained from recent reports of freshwater mussel surveys, from the prior 5-year review, from the recently completed Species Status Assessment Report (SSA), and from data submitted by U.S. Fish and Wildlife Service Field Offices, State natural resource agencies within the range of the species, and other private entities. This 5-year review was completed by Sara Schmuecker, Deputy Field Supervisor with the Illinois-Iowa Ecological Services Field Office. The focus of this 5-year review is to summarize new information regarding the status of the sheepnose.

In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status

has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants. The Service evaluated the biology and status of the sheepnose to inform this status review.

A team of Service biologists recently developed an SSA (USFWS 2022). The SSA represents our evaluation of the best available scientific information, including the resource needs and the current and future condition of the species. We developed future scenarios utilizing the current demographic condition as a baseline and projected forward the risk factor level to discuss the viability of the species into the foreseeable future (2020-2070). Independent peer reviewers and partner representatives reviewed the SSA prior to its serving as the scientific basis to support our status review decision-making process. Due to the limited amount of time since the SSA was completed, we determined that new data would not result in a meaningful reassessment of the status of individual populations range-wide at this time. Therefore, this review carries forward the population conditions summarized within the SSA and focuses on compiling and documenting new information on the species since the SSA was completed.

FR Notice citation announcing the species is under active review: January 3, 2025; 90 FR 327

Review History:

- Original Listing: April 12, 2012
    - FR notice: 77 FR 14914
    - Entity listed: Sheepnose (*Plethobasus cyphyus*); Species
    - Classification: Endangered
- Initial 5-year Review: August 27, 2020
    - No change recommended to Endangered classification status
- Species Status Assessment: June 2022

REVIEW ANALYSIS

Recovery Criteria:
Recovery Plan or Outline:

U.S. Fish and Wildlife Service (USFWS). 2024. Recovery Plan for Four Species of Freshwater Mussels: Rayed Bean (*Villosa fabalis*), Sheepnose (*Plethobasus cyphyus*), Snuffbox (*Epioblasma triquetra*), and Spectaclecase (*Cumberlandia monodonta*). Bloomington, Minnesota. 16 pp.

The Recovery Plan document is available online at https://ecos.fws.gov/ecp/species/6903.

The recovery plan and related criteria were finalized in September of 2024. None of the recovery criteria have been met to-date and there is no new information to indicate that the recovery criteria need to be reevaluated. Populations are evaluated based on condition (e.g., population extent, reproduction/recruitment, last known record of individuals within a population, and population size) and risk factors affecting sheepnose (e.g., water quality, hydrological regime, landscape, connectivity, and invasive species). As outlined in the recovery plan, sheepnose may be considered for delisting when there are 32 populations (i.e., HUC 8 watersheds) range-wide in high condition with moderate or low risk, or in moderate condition with low risk (conditions and risk categories are defined in the SSA, USFWS 2022) distributed throughout four of the five historically occupied river basins (i.e., HUC 2 watersheds). There are currently two populations in one (Ohio River Basin) of the five basins that meet the recovery criteria.

The Recovery Implementation Strategy (RIS, version 1.1) was released in September 2025, and was developed with a voluntary team comprised of federal, state, academic, and private entity participants. The

RIS includes recovery activities which are specific, on-the-ground recovery efforts and includes information about how the Service and our recovery partners will complete the recovery actions contained in the Recovery Plan. The RIS document is available online at https://ecos.fws.gov/docs/recovery_plan/20250903_4MusselRIS_v1.1_3.pdf.

Updated Information Relevant to the Current Species' Status:
A Species Status Assessment (SSA) was finalized for this species in June of 2022 (USFWS 2022). The SSA report is available online at https://ecos.fws.gov/ecp/species/6903. A summary of notable updates since the completion of the 2022 SSA, include:

1. The Service has provided funds to the Illinois Department of Natural Resources (ILDNR) under Section 6 of the Endangered Species Act in recent years to conduct a multi-phase freshwater mussel assessment of the Kankakee River within the Upper Mississippi River basin. Collections to-date have resulted in an increase of the known extant range of the Kankakee population (HUC-8 ID 07120001).

2. A 2024 survey on the Green River at the confluence with the Barren River resulted in the collection of a juvenile sheepnose within the Upper Green (HUC-8 ID 05110001) population. This collection extends the known range of the species within the Green River downstream and into a new HUC-8 (Middle Green, HUC-8 ID 05110003) where historical records have not previously documented the species. Since listing, the known extent of this population has increased more than 65-miles (105-kilometers (km) within the Green River, which is expected to continue to increase following the recent dam removals of Lock and Dams 6 and 5 in 2017 and 2021, respectively.

3. A survey in 2024 resulted in the identification of a more robust sheepnose population within the Muskingum (HUC-8 ID 05040004, Muskingum River) population of the Ohio River basin than previously estimated (USFWS 2022).

4. A single adult sheepnose shell was collected within the Kentucky River (Upper Kentucky, HUC-8 ID 05100204) of the Ohio River basin, downstream of Lock and Dam 11, during a survey in 2024 (T. Fagin, USFWS, personal communication, 2024). The shell was categorized as weathered dead but appeared to be in good condition (BioSurvey Group 2024a; T. Fagin, USFWS, personal communication, 2024). This is the first record of sheepnose within the Upper Kentucky and only the second record of sheepnose in the Kentucky River system, following the collection of a fresh dead specimen in the Lower Kentucky (HUC-8 ID 05100205) in the 1990s. This record is not indicative of an expansion to the current extant or historical range; however, a survey at this location is anticipated, with the potential to encounter additional individuals and provide further insight into whether an extant population may be present within the Kentucky River system.

5. A survey in 2022 resulted in the collection of a juvenile sheepnose within the Powell River (Powell, HUC-8 ID 06010206) of the Tennessee River basin, documenting the first juvenile collected within the population since a single juvenile was collected during an extensive survey effort between 2008 and 2009 (A. Ford, USFWS, personal communication, 2025).

6. A survey in 2024 resulted in the collection of a single adult sheepnose individual within the Tennessee River (Lower Tennessee Beech, HUC-8 ID 06040001) of the Tennessee River basin, expanding the known occupied extent of the Lower Tennessee Beech population.

7. A systemic survey of the Big Sunflower (HUC-8 ID 08030207, Big Sunflower River) population within the Lower Mississippi River basin in 2024 resulted in the identification of a more robust sheepnose population than previously estimated (USFWS 2022, MDWFP 2024) and an upstream expansion to the species' known extant range. An additional survey within the Big Sunflower River

in 2024 resulted in the collection of a juvenile sheepnose (A. Seagroves Ruppel, USFWS, personal communication, 2024), documenting the first juvenile collected within the population since the shell of a fresh dead juvenile was collected in 2003.

Biology and Habitat

Sheepnose is a medium-sized species, that is thick-shelled and reaches nearly 5.5 inches in length. There is a row of large, broad tubercular swellings on the center of the shell extending from the beak to the ventral margin and the periostracum (external shell surface) is light yellow to dull yellowish brown in color. The species is generally found in medium to large stream systems, typically within shallow shoal habitats with moderate to swift currents over mixtures of coarse sand, gravel, and clay (Oesch 1995, p. 121; Ortman 1919, p. 68; Jones et al. 2019, p. 205; Cummings and Mayer 1992, p. 50; Parmalee and Bogan 1998, p. 177). Evidence suggests individuals may occur in aquatic areas ranging from riffles of a few inches in depth to runs that exceed six meters in larger rivers (Ortman 1919, p. 68; Parmalee and Bogan 1998, p. 77; Williams et al. 2008, p. 498).

Sheepnose has been reported to have an approximate life span extending up to at least 30 years (Stansbury 1961, p. 16; Watters et al. 2009, p. 221; Hove et al. 2015, pp. 2, 5, 15). Age of sexual maturity for sheepnose is unknown. However, based on estimated longevity, it is suggested it may take place after a few years. Hove et al. (2015, p. 5) documented gravid females ranging from five to 26 years of age (Hove et al. 2015, p. 5). As with most freshwater mussels, a host-fish is required for transformation of larva (known as glochidia) into juvenile mussels and dispersal. Mimic shiner (*Paranotropis volucellus*) is the only documented natural host fish for sheepnose. However, natural infestation has been observed on sauger (*Sander canadensis*) and laboratory transformations have occurred on additional species. To-date, more than 30 species have been identified as suitable host-fish for sheepnose through laboratory trials (Jones et al. 2019, p. 205; Surber 1913, p. 110; Watters et al. 2005, p. 11; Hove et al. 2015, pp. 6-8).

Range and Distribution

This species is known from the Mississippi, Ohio, Cumberland, Tennessee, and Ohio River mainstems, and scores of tributary streams range-wide. Sheepnose was historically known from 79 streams (including one canal) in 14 states. These include, by stream system (with tributaries), the following:

- Upper Mississippi River system
    - Mississippi River mainstem and the following tributaries: Minnesota (Cottonwood River), St. Croix, Chippewa (Flambeau River), Wisconsin, Rock, Iowa (Cedar River), Des Moines, Illinois (Des Plaines, Kankakee, Fox, Mackinaw, Salt, Skunk, Spoon, Sangamon (Salt Creek) Rivers; Quiver Creek; Illinois and Michigan Canal), Meramec (Bourbeuse, Big Rivers), Kaskaskia, Upper Castor, Upper Whitewater Rivers; Saline Creek.

- Lower Missouri River system
    - Little Sioux, Little Blue, and Gasconade (Osage Fork) Rivers.

- Ohio River system
    - Ohio River mainstem and the following tributaries: Allegheny, Monongahela, Beaver, Muskingum (Tuscarawas, Walhonding (Mohican River), Otter Fork Licking Rivers), Kanawha, Scioto, Little Miami, Licking, Kentucky, Green (Barren River), Wabash (Mississinewa, Eel, Tippecanoe, Vermillion, Embarras, White (East, West Forks White River) Rivers) Rivers; Duck Creek.

- Cumberland River system

    - Cumberland River mainstem and the following tributaries: Obey, Harpeth Rivers; Caney Fork.

- Tennessee River system
    - Tennessee River mainstem and the following tributaries: Holston (North Fork Holston River), French Broad (Little Pigeon River), Little Tennessee, Clinch (North Fork Clinch, Powell Rivers), Hiwassee, Duck Rivers.

- Lower Mississippi River system
    - Hatchie, Yazoo (Big Sunflower, Tallahatchie Rivers), Big Black Rivers.

Currently, sheepnose occurs in all 14 states of its historical range (Alabama, Illinois, Indiana, Iowa, Kentucky, Minnesota, Mississippi, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and Wisconsin), but the species' distribution has decreased over time. According to Parmalee and Bogan (1998, p. 177) and Neves (1991, pp. 280-281), sheepnose has been extirpated throughout much of its former range or reduced to isolated populations. The only records known from some streams are archaeological specimens (77 FR 14923).

Within the SSA (USFWS 2022), sheepnose was considered extant within 37 HUC-8 watersheds across four major river basins (Table 1), though it was historically found in 89 (conservative estimate) HUC-8 watersheds across five major river basins (Figure 1). New data assessed throughout this review has resulted in the identification of one additional extant watershed: the Middle Green (HUC-8 ID 05110003).

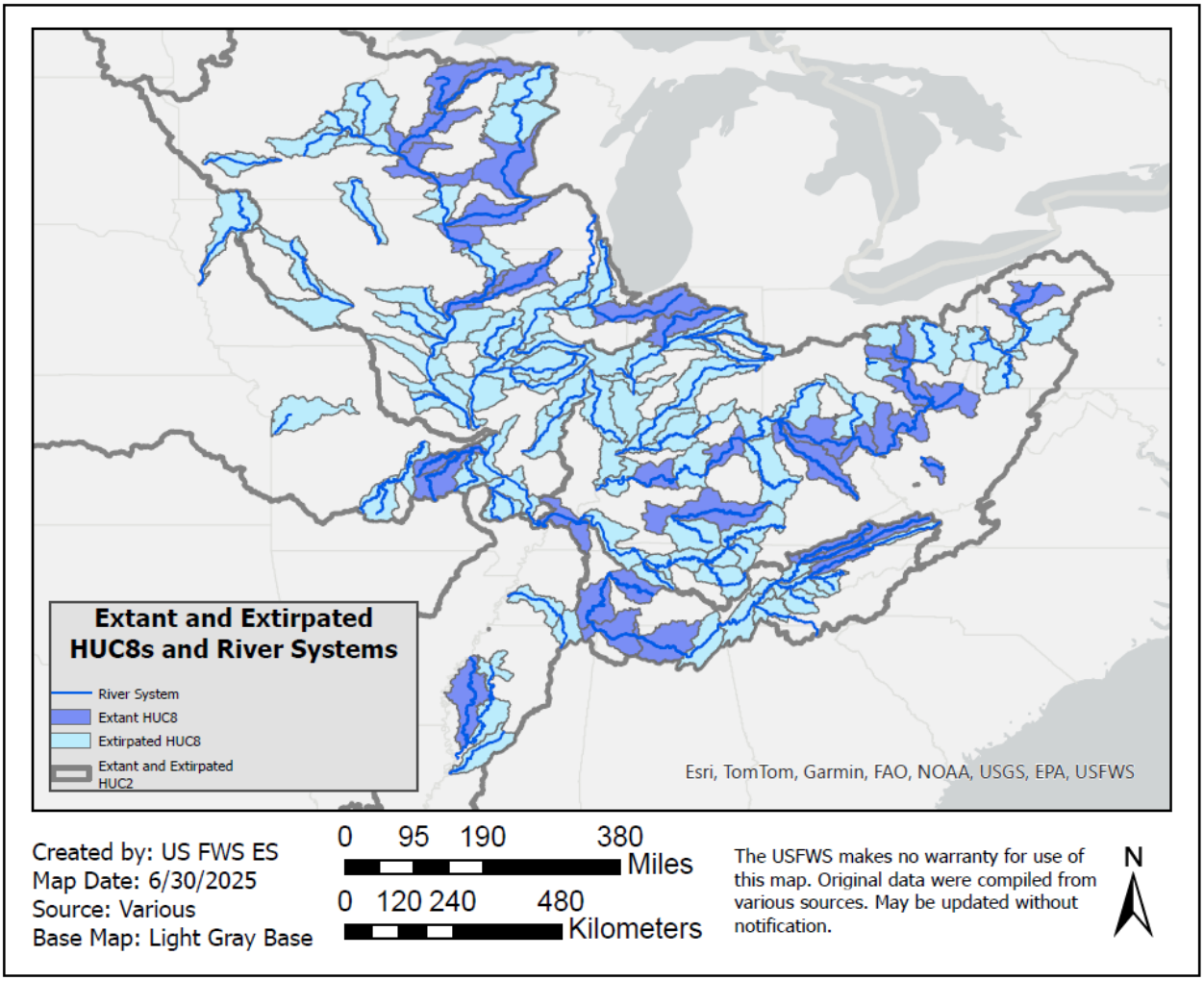

Figure 1. Sheepnose current and historical range.

Table 1. Known extant sheepnose populations. Populations and condition categories (year of last observation, population distribution, estimated population size, known reproduction, and overall risk) are defined in the SSA (USFWS 2022) and are based on HUC8 watershed boundaries. The demographic condition categories (year of last observation, population distribution, estimated population size, and known reproduction) have been updated to reflect new available information since completion of the SSA (USFWS 2022). Where new information suggests a more robust population than assessed through available data at the time of the 2022 SSA, the estimated population size has been revised and denoted by a plus sign (+). The 2012 and 2020 status categories are based on the time of listing in 2012 (77 FR 14914) and the prior 5-year review (USFWS 2020) for the species, respectively, and are provided for comparison to the most current status information. The 2022 population statuses are based on demographic condition categories defined in the SSA (USFWS 2022). Populations that are assumed to be functionally extirpated based on available data are abbreviated as "Fx". Population statuses that were summarized at the stream level are denoted by an asterisk (*). The Middle Green population is contiguous with the sheepnose population within the Upper Green population and represents a range expansion from the species' status summarized within the SSA (USFWS 2022).

Major River Basin Representation Unit	Stream	Population	HUC8 ID	Year of Last Observation	Population Distribution (Estimated Number of Occupied River Miles)	Estimated Population Size	Known Reproduction (Year of Last Juvenile Detection)	Overall Risk	2012 Listing Status	2020 5–Year Review Status	2022 SSA Status
Upper Mississippi River	Mississippi River	Buffalo–Whitewater	07040003	2009	10 – 30	Low	No	High	Declining*	Declining	Low
Upper Mississippi River	Mississippi River	La Crosse–Pine	07040006	2001	<1	Fx	Yes (2001)	High	Declining*	Unknown	Fx
Upper Mississippi River	Mississippi River	Grant–Little Maquoketa	07060003	2012	<1	Fx	No	High	Declining*	Unknown	Fx
Upper Mississippi River	Mississippi River	Copperas–Duck	07080101	2024	30+	High	Yes (2022)	High	Declining*	Pool 14: Declining Pool 15: Stable to Declining Pools 16 & 17: Unknown	Moderate
Upper Mississippi River	Chippewa River	Upper Chippewa	07050001	2017	30+	Moderate	No	Moderate	Stable*	Stable	Low
Upper Mississippi River	Chippewa River	Lower Chippewa	07050005	2020	10–30	High	Yes (2016/2017)	High	Stable*	Stable	High
Upper Mississippi River	Flambeau River	Flambeau	07050002	2017	1–10	Moderate	No	High	Stable	Stable	Low
Upper Mississippi River	Wisconsin River	Castle Rock	07070003	2017	10–30	Low	No	High	Declining*	Declining	Low
Upper Mississippi River	Wisconsin River	Lower Wisconsin	07070005	2016	10–30	Moderate	No	High	Declining*	Declining	Low
Upper Mississippi River	Rock River	Lower Rock	07090005	2007	<1	Fx	No	High	Unknown	Unknown	Fx
Upper Mississippi River	Kankakee River	Kankakee	07120001	2024	30+	High+	Yes (2004)	High	Stable	Stable	High
Upper Mississippi River	Bourbeuse River	Bourbeuse	07140103	2023	30+	Moderate	Yes (2006)	High	Declining	Unknown	Moderate

Major River Basin Representation Unit	Stream	Population	HUC8 ID	Year of Last Observation	Population Distribution (Estimated Number of Occupied River Miles)	Estimated Population Size	Known Reproduction (Year of Last Juvenile Detection)	Overall Risk	2012 Listing Status	2020 5–Year Review Status	2022 SSA Status
Upper Mississippi River	Meramec River	Meramec	07140102	2024	30+	Moderate	Yes (2019)	High	Stable	Stable	High
Ohio River	Ohio River	Lower Ohio	05140206	2015	30+	Low	No	High	Stable*	Olmsted Pool: Unknown	Low
Ohio River	Ohio River	Lower Ohio–Little Pigeon	05140201	2018	30+	Moderate	No	High	Stable*	J.T. Myers Pool: Unknown Newburgh Pool: Increasing	Moderate
Ohio River	Ohio River	Silver–Little Kentucky	05140101	2019	30+	Fx	No	High	Stable*	McAlpine Pool: Increasing	Low
Ohio River	Ohio River	Ohio Brush–Whiteoak	05090201	2020	10–30	Moderate	Yes (2014)	High	Stable*	Markland Pool: Stable to Increasing Meldahl Pool: Unknown	Moderate
Ohio River	Ohio River	Little Scioto–Tygarts	05090103	2019	1–10	Low	No	High	Stable*	Meldahl Pool: Unknown Greenup: Stable	Low
Ohio River	Ohio River	Raccoon–Symmes	05090101	2019	30+	Moderate	No	High	Stable*	Greenup: Stable	Low
Ohio River	Ohio River	Upper Ohio–Shade	05030202	2019	30+	Low	No	High	Stable*	Racine: Unknown	Low
Ohio River	Ohio River	Little Muskingum–Middle Island	05030201	2020	10–30	Low	No	High	Stable*	Belleville: Stable	Low
Ohio River	Allegheny River	Middle Allegheny–Tionesta	05010003	2010	10–30	High	Yes (2006-2008)	High	Increasing	Unknown	Moderate
Ohio River	Green River	Upper Green	05110001	2019	30+	High	Yes (2019)	Moderate	Increasing	Stable to Increasing	High
Ohio River	Green River	Middle Green	05110003	2024	<1	Fx	Yes (2024)	N/A	N/A	N/A	N/A
Ohio River	Kanawha River	Upper Kanawha	05050006	2017/2019	<1	Moderate	Yes (2017)	High	Stable	Stable	Moderate
Ohio River	Licking River	Licking	05100101	2007	30+	Low	No	Moderate	Declining	Unknown	Low
Ohio River	Muskingum River	Muskingum	05040004	2024	<1	Low+	No	High	Unknown	Unknown	Fx
Ohio River	Walhonding River	Walhonding	05040003	2020	1–10	High	Yes (2020)	Moderate	Unknown	Stable	Moderate
Ohio River	Tippecanoe River	Tippecanoe	05120106	2018	30+	High	Yes (2018)	Moderate	Stable	Stable	High

Major River Basin Representation Unit	Stream	Population	HUC8 ID	Year of Last Observation	Population Distribution (Estimated Number of Occupied River Miles)	Estimated Population Size	Known Reproduction (Year of Last Juvenile Detection)	Overall Risk	2012 Listing Status	2020 5–Year Review Status	2022 SSA Status
Tennessee River	Tennessee River	Lower Tennessee	06040006	2017	10–30	Moderate	Yes (2005)	High	Stable*	Unknown, likely declining*	Moderate
Tennessee River	Tennessee River	Lower Tennessee–Beech	06040001	2024	10–30	Low	Yes (2005?)	High	Stable*	Unknown, likely declining*	Low
Tennessee River	Tennessee River	Pickwick Lake	06030005	2024	1–10	Low	Yes (2005)	Moderate	Stable*	Unknown, likely declining*	Low
Tennessee River	Tennessee River	Wheeler Lake	06030002	2004	1–10	Low	No	Moderate	Stable*	Unknown, likely declining*	Fx
Tennessee River	Clinch River	Upper Clinch. Tennessee, Virginia	06010205	2024	30+	High	Yes (2019)	High	Stable	Stable	High
Tennessee River	Duck River	Lower Duck	06040003	2003	<1	Fx	No	High	Unknown	Unknown	Fx
Tennessee River	Holston River	Holston	06010104	2024 (approx.)	10–30	High	No	High	Declining	Unknown	Low
Tennessee River	Powell River	Powell	06010206	2022	10–30	High	Yes (2022)	High	Stable	Declining	Moderate
Lower Mississippi River	Big Sunflower River	Big Sunflower	08030207	2024	10–30	Low+	Yes (2024)	High	Declining	Unknown	Low

Population demographics
The Service completed a SSA Report for sheepnose in 2022 (USFWS 2022), summarizing available data on the species from 2000-2020. The following is an overview of findings from the SSA.

Historically, sheepnose have been known to occur in at least 79 streams, including one canal, with the species considered extant in 25 streams at the time of listing (2012). Assessing data over the most recent 20-year period (2000-2020), the SSA estimated the current range of sheepnose to span 22 streams, comprised of 37 populations (based on HUC-8 watersheds). Overall, sheepnose mussel populations have decreased by an estimated 71 percent from historical numbers range-wide (USFWS 2022). The number of populations is estimated to have declined by more than or equal to 50 percent of the historical range throughout each of the extant HUC-2 river basins: Ohio River, Upper Mississippi River, Lower Mississippi River, and Tennessee River (Figure 1). Aside from the now extirpated Lower Missouri River basin, the Lower Mississippi River basin has experienced the greatest proportional decline (estimated 83 percent), with only one population persisting. Sheepnose has not been observed within the Lower Missouri River basin in the last two decades (last observed in 1999, Figure 1). However, the lack of new sheepnose records and resulting decrease in known extant populations over time could be at least partially attributed to a lack of survey effort in some systems.

Of the 37 known extant populations of sheepnose, approximately 41 percent are categorized to be in either moderate or high demographic condition (15 populations, USFWS 2022). These populations are distributed throughout the extant river basins unevenly. The Upper Mississippi River basin contains 13 populations (five in moderate or high condition), the Ohio River basin contains 15 populations (five in moderate or high condition), the Tennessee River basin contains eight populations (three in moderate or high condition), and the Lower Mississippi River basin contains one population in low demographic condition (Table 1). The estimated number of extirpated populations by basin is: Upper Mississippi (36), Ohio (36), Tennessee (8), Lower Mississippi (5), and Lower Missouri (4) (Figure 1). Given the current status encompasses 37 populations throughout its range and all basins except one have more than one population, the species currently retains some level of redundancy for withstanding and surviving potential catastrophic events. However, it is important to note that a high percentage (81 percent) are currently categorized as being at high risk from threats (USFWS 2022). Additionally, any assumed redundancy presumes that populations within a basin are connected such that individuals can recolonize extirpated localities. However, a combination of historical landscape, climatic, and anthropogenic (dams, stream channelizations, habitat fragmentation) stressors have disrupted this connectivity over time. One available study suggests that low levels of genetic migration may be occurring within basins (roughly HUC-2 scale), but not between, with each basin being comprised of multiple genetically distinct populations and sub-populations (Schwarz and Roe 2022, pp. 5-6, 8). Further, the authors found genetic migration to primarily occur in only one direction (Schwarz and Roe 2022, pp. 7, 9). Although this study found limited evidence of genetic bottlenecks, likely attributed to the long lifespan of sheepnose and population sizes, continued and compounding habitat fragmentation is likely a threat to the continued persistence of the species (Schwarz and Roe 2022).

Overall, the species has decreased redundancy and representation across its range compared to its historical range due to the extirpation of 89 populations (71 percent). Nearly half of the remaining populations (46 percent, 17 populations) are estimated to have a “low” population size or are considered functionally extirpated based on the number of live individual detections in recent years (less than 20 individuals collected since 2020, Table 1). The limited number of individuals in these extant populations increases the likelihood of extirpation from catastrophic and stochastic events.

Updates to the species range and population demographics since completion of the SSA (USFWS 2022), include:

Upper Mississippi River Basin

- Copperas-Duck (HUC-8 ID 07080101, Mississippi River)

  - Two live adult sheepnose were collected in 2021 at one site in Pool 15 of the Upper Mississippi River near Bettendorf, Scott County, Iowa (EnviroScience 2023).

  - One juvenile sheepnose individual was collected at one site within Pool 15 of the Upper Mississippi River near Bettendorf, Scott County, Iowa (EcoAnaylsts 2022). This specimen comprised 0.3 percent of the overall abundance and measured approximately 38 mm in length. This accounts for the third juvenile documented within the Mississippi River in the last 25 years. Previous records include one approximately four-year-old juvenile collected in Pool 15 in 2016 and an approximately three-year-old individual collected from Pool 7 in 2001.

  - As discussed in the SSA (USFWS 2022), post-construction monitoring continues associated with the replacement of the Interstate 74 Bridge between Bettendorf, Scott County, Iowa, and Moline, Rock Island County, Illinois, within Pool 15 of the Upper Mississippi River. Mussels were relocated from the proposed pier construction areas associated with the new bridge alignment between 2016-2017. Previous monitoring of the relocation recipient sites was conducted in Years 1 (2017), 2 (2018), and 4 (2020) post-construction. Year 7 post-construction monitoring of the relocation recipient sites was completed in 2024 (originally scheduled for 2023). The sampling design was modified in 2024 to increase the detection rate of relocated individuals. A total of 15 (28.3 percent) and five (8.2 percent) relocated sheepnose were recovered from each of the two relocation recipient sites located upstream of the Interstate 74 bridge in Pool 15; mortality of sheepnose was not observed at either site in 2024 (BioSurvey Group 2025). Of significant note, several of the relocated mussels recovered in 2024 had not been collected during prior monitoring events (including intensive qualitative sampling in 2017) since their initial placement (BioSurvey Group 2025). This finding suggests sheepnose may burrow and/or move around laterally, or that the position of the study grids may shift when reconstructed for each monitoring event (BioSurvey Group 2025). One additional monitoring event is scheduled for Year 10 (2026).

  - A mussel survey was conducted in 2021 at one site within Pool 16 of the Upper Mississippi River, near Buffalo, Scott County, Iowa (EnviroScience 2021). An exposed sand bar and boulder/cobble substrate were identified near the upstream portion of the survey area. One live adult sheepnose was collected in this area, comprising 0.2 percent of the mussel community. This is the first live collection of the species within Pool 16 since 2015. Additionally, three fresh dead sheepnose individuals were collected.

- Kankakee (HUC-8 ID 07120001, Kankakee River)

  - The Service has provided funds to the ILDNR under Section 6 of the Endangered Species Act in recent years to conduct a multi-phase freshwater mussel assessment of the Kankakee River. As part of Phase I, the ILDNR contracted a qualitative survey of 35 locations on the Kankakee River within Illinois and Indiana in 2023 with a goal of identifying locations of federally listed species (LEC 2024b, Edge 2025). A total of nine live sheepnose were collected across five of the sites, with a relative abundance of 0.07 percent (LEC 2024b). Estimated ages ranged from nine to 13 years (LEC 2024b). These collections resulted in an increase of the known extant range within the Kankakee River by approximately five miles upstream.

Survey efforts associated with Phase II of the study were conducted in 2024, with a goal of characterizing population demographics within areas where federally listed species were encountered during Phase I (Edge 2025). Thirty-one sites were assessed, and a total of 46 live sheepnose specimens were collected across 16 sites, comprising 0.2 percent of the relative abundance (Edge 2025). Estimated ages ranged from seven to 22 years (Edge 2025). Refer to the "Culture Activities" discussion regarding future population augmentations proposed at a subset of these sites.

- An additional six live adult sheepnose individuals were collected as part of a post-construction monitoring survey in 2024 near Custer Park, Will County, Illinois (Arcadis 2024). One individual was located within the area of direct impact and five within the relocation recipient site (Arcadis 2024). Four additional monitoring events are scheduled at this site over the next eight years.

- Bourbeuse (HUC-8 ID 07140103, Bourbeuse River)

  - One adult sheepnose was collected during a site visit looking for *Quadrula fragosa* in 2023, in Franklin County, Missouri. Information was not collected regarding the age or length of this individual (J. Hundley, USFWS, personal communication, 2025).

- Meramec (HUC-8 ID 07140102, Meramec River)

  - Six live sheepnose were collected in 2024 at one site in St. Louis County, Missouri, with a relative abundance of 2.8 percent. Their lengths ranged from 87mm to 108mm (J. Hundley, USFWS, personal communication, 2025).

Ohio River Basin

- Upper Green (HUC-8 ID 05110001, Green River) and
  Middle Green (HUC-8 ID 05110003)

  - Previously, the extant sheepnose population was documented to span a distribution of more than 90 miles within the Upper Green HUC-8 of the Green River. Recently, a survey conducted at the confluence with the Barren River identified a live juvenile sheepnose specimen, estimated to be 5 years of age and measuring 65 mm in length in an area of stable sand and gravel (LEC 2024a; T. Fagin, USFWS, personal communication, 2025). This individual accounted for 0.07 percent of the relative abundance (LEC 2024a). This represents a downstream expansion of the known occupied range within the Green River of approximately 3 miles. Further, this record is located within the Middle Green HUC-8 (not included in Figure 1 or Table 1), resulting in the addition of a new extant HUC-8 to the species' range where historical records have not previously documented sheepnose. Local expertise suggests this population may extend further downstream to Morgantown, Kentucky (T. Fagin, USFWS, personal communication, 2025).

- Upper Kentucky (HUC-8 ID 05100204, Kentucky River)

  - A single adult sheepnose shell was collected downstream of Lock and Dam 11 located in Estill County, Kentucky during a survey in 2024 (T. Fagin, USFWS, personal communication, 2024). The shell was categorized as weathered dead but appeared to be in good condition (BioSurvey Group 2024a; T. Fagin, USFWS, personal communication, 2024).

This is the first record of sheepnose within the Upper Kentucky and only the second record of sheepnose in the Kentucky River system, following the collection of a fresh dead specimen near High Bridge in the 1990s, three pools downstream from the 2024 collection (Lower Kentucky, HUC-8 ID 05100205). This record is not indicative of an expansion to the current extant or historical range; however, a relocation survey at this location is anticipated, with the potential to encounter additional individuals and provide further insight into whether an extant population may be present within the Kentucky River system.

- Muskingum (HUC-8 ID 05040004, Muskingum River)

  - Eight live adult sheepnose were collected as part of a 2024 survey to assess a 2010 translocation of fanshell mussels (*Cyprogenia stegaria*) below the Devola Lock and Dam in Washington County, Ohio (BioSurvey Group, 2024b). These individuals ranged in length from 111 to 124 mm and comprised 0.2 percent of the relative abundance (BioSurvey Group, 2024b). These records indicate a more robust population than was previously estimated within the Muskingum River (USFWS 2022).

- Raccoon Symmes (HUC-8 ID 05090101, Ohio River)

  - Within the Raccoon Symmes, sheepnose are currently considered extant from locations below the R.C. Byrd Lock and Dam (K. Eliason, West Virginia Department of Natural Resources (WVDNR), personal communication, 2025). WVDNR conducts long-term monitoring on a five-year rotation near river mile 284 of the Ohio River near Mason County, West Virginia. Collective data of the monitoring site at river mile 284 has documented this site to be, *"…the second most abundant and diverse in the state only behind Kanawha Falls*" (K. Eliason, WVDNR, personal communication, 2025). Mussel densities have been observed to increase overtime from 8.2 mussels per square meter in 2016 to 9.9 mussels per square meter in 2023 (K. Eliason, WVDNR personal communication, 2025). Should current trends continue, WVDNR expects this to become the highest abundance mussel bed in the State.

  - New records were provided for the Raccoon Symmes population that were not previously accounted for within the 2022 SSA (K. Eliason, WVDNR, personal communication, 2025):
    - Three live sheepnose were collected in each 2016 and 2023 as part of WVDNR's long-term monitoring activities at Ohio River mile 284, Mason County, West Virginia. All remaining sheepnose collections resulting from WVDNR's long-term monitoring activities were included within the SSA (USFWS 2022).
    - Nine individuals were collected in 2020 between Eureka and Crown City, Gallia County, Ohio, with a relative abundance of 0.20 percent in 2020 (M. Kriege, Current Hydro, personal communication). One of the individuals collected in 2020 measured 67.6 mm, indicative of a younger age class (J. Miller, Edge, personal communication).
    - Additional records resulting from various efforts include 14 individuals collected between Ohio River miles 280 and 308 throughout the years of 2002 (1), 2003 (4), 2009 (1), 2013 (2), 2016 (1), 2021 (1), and 2022 (4).

- Upper Ohio-Shade (HUC-8 ID 05030202, Ohio River)

  - Three individuals were collected in 2022, near Ohio River mile 175.5, Boaz, Wood County, West Virginia (K. Eliason, WVDRN, personal communication, 2025). Information was not provided regarding the age of these individuals.

- Ohio Brush-Whiteoak (HUC-8 ID 05090201, Ohio River)

- As discussed in the SSA (USFWS 2022), a survey was conducted within the Markland Pool in 2014, resulting in the collection of nearly 50 live sheepnose. A localized population estimate was generated from these data (ESII 2017). The model resulted in a population estimate within the Markland Pool of over 10,000 individuals (Pr=60 percent) (ESII 2017). Of particular note, all individuals were collected from locations more than 30 meters from shore (ESII 2017; J. Spaeth, Edge, personal communication, 2025). Such distances from shore are not sampled in typical mussel surveys, which are generally tied to shoreline development activities. Additional investigation in areas >30 meters from shore may be warranted to inform population status and potential recovery actions.

- One adult sheepnose was collected during *Lampsilis abrupta* population monitoring in 2022 near Eightmile, Hamilton County, Ohio. This individual measured 84.9 mm in length (J. Speath, Edge, personal communication, 2025).

- Twenty-nine sheepnose individuals were collected during a survey in 2024 near Moscow, Clermont County, Ohio (BioSurvey Group, 2024c). Individuals ranged in length from 82 to 102 mm. Evidence of recent recruitment was not detected. Sheepnose comprised 1.5 percent relative abundance.

- A mussel survey conducted in 2024, near Salem Heights, Hamilton County, Ohio, resulted in the collection of three live adult sheepnose. These individuals measured in length between 73 to 90 mm in length and comprised 0.7 percent relative abundance of the mussel community (Edge 2024).

- Upper Kanawha (HUC-8 ID 05050006, Kanahwa River)

  - Four individuals were collected near Kanawha Falls, Fayette County, West Virginia, in 2022, and an additional two individuals were collected near Deepwater, Fayette County, West Virginia, in 2023 (K. Eliason, WVDNR, personal communication, 2025). Information was not provided regarding the age of these individuals.

Tennessee River Basin

- Upper Clinch. Tennessee, Virginia (HUC-8 ID 06010205, Clinch River) and Powell (HUC-8 ID 06010206 Powell River)

  - Various monitoring efforts have been conducted throughout the Clinch and Powell Rivers in Tennessee and Virginia since the late 1970s. Between 2004-2014 annual monitoring occurred across 18 sites of the Clinch River, including three long-term monitoring sites (Wallen Bend, Frost Ford, and Swan Island) (Virginia Tech Conservation Management Institute and Daguna Consulting 2024). These efforts were paused for two years between 2014 to 2016 due to a lack of funding. A suspected *Ortmanniana pectorosa* die-off in the Clinch River in 2016 spurred a reinitiation. Long-term monitoring was resumed on the Clinch and Powell Rivers in 2017 with the goals of the study being "*…to reassess the status and distribution of mussel species, fill gaps in knowledge, and assist partners with the collection of essential demographic data…for informing and assessing recovery efforts*" (Virginia Tech Conservation Management Institute and Daguna Consulting 2024). Monitoring has been conducted annually between 2017-2023, including quantitative sampling at three long-term monitoring sites (Wallen Bend, Frost Ford, Swan Island, and Kyles Ford) throughout the Clinch River in Tennessee, an additional 17 quantitative study sites throughout the Clinch

River in Virginia and Tennessee, and a combination of qualitative and semi-quantitative surveys across 17 sites in the Clinch River and six sites in the Powell River (Virginia Tech Conservation Management Institute and Daguna Consulting 2024).

New data from the Clinch River long-term monitoring sites located in Tennessee that was not previously included within the SSA (USFWS 2022) includes the collection of 15 live sheepnose individuals in 2020, 17 individuals in 2021, 14 individuals in 2022, and 16 individuals in 2023 (A. Ford, USFWS, personal communication and unpublished data, 2024). These sites were sampled again in 2024; however, the final report is pending, and associated data were not readily available for incorporation into this review. Monitoring is anticipated to continue for an additional four years. Additionally, five sheepnose were collected from the Fletcher Ford and Upper sites within the Powell River in 2022, ranging in size from 57 to 91 mm (the length of one individual was not reported; A. Ford, USFWS, personal communication, 2025). These individuals were encountered during qualitative sampling and comprised 0.5 percent relative abundance. The individual measuring 57 mm represents the first juvenile detection within the Powell River since an extensive survey effort conducted between 2008 and 2009.

Further, monitoring efforts have shown some evidence that reintroduction, translocation, and augmentation restoration efforts throughout the Clinch and Powell River systems over the past 20+ years have resulted in settlement and survival of placed individuals and limited evidence of recruitment (Virginia Tech Conservation Management Institute and Daguna Consulting 2024).

- Lower Tennessee (HUC-8 ID 06040006, Tennessee River)
  - Seven sheepnose individuals were collected in 2024 during a mussel survey between Tennessee River miles (TRM) 13.4-14.0 near Calvert City, Marshall County, Kentucky (T. Fagin, USFWS, personal communication, 2024). Information was not provided regarding the age of these individuals.
- Lower Tennessee Beech (HUC-8 ID 06040001, Tennessee River)
  - One sheepnose individual was collected in 2024 near TRM 154.5, between Wayne and Decatur Counties, Tennessee. This individual was estimated to be 12 years of age, measured 102 mm in length, and comprised 0.01 percent of the relative abundance. This collection extends the known occupied extent within the Lower Tennessee Beach downstream approximately 36 miles.
- Pickwick Lake (HUC-8 ID 06030005, Tennessee River)
  - One sheepnose individual was found in the Sevenmile Island secondary channel at TRM 248.9, between Colbert and Lauderdale Counties, Alabama by the Alabama Department of Conservation and Natural Resources in 2024 (B. Barker-Jones, USFWS, personal communication, 2025).
- Holston (HUC-8 ID 06010104, Holston River)
  - Based on personal observation, sheepnose still seem to be widespread throughout the Holston River (H. Faust, Dinkins Environmental, personal communication, 2024); however, the population is now represented by very old individuals (A. Ford, USFWS, personal

communication, 2025). Very little recruitment occurs in the lower Holston due to hydropeaking generation and cold-water releases from the Cherokee Dam. Prior to the dam installation, the lower Holston River was one of the most diverse rivers in the world (A. Ford, USFWS, personal communication, 2025). A study from the early 1990's translocated non-reproducing *Megalonaias nervosa* from a similar impounded system and introduced them into an environment with a natural water temperature regime for the species, where they began recruiting again (Heinricher and Layzer, 1998). This indicates that future conservation measures for this population could include laboratory propagation to maintain any unique genetics properties and/or warming of the tailwaters may encourage natural sheepnose reproduction (H. Faust, Dinkins Environmental, personal communication, 2024; A. Ford, USFWS, personal communication, 2025).

Lower Mississippi River Basin

- Big Sunflower (HUC-8 ID 08030207, Big Sunflower River)

  - The Mississippi Department of Wildlife, Fisheries, and Parks conducted a large-scale survey of the Big Sunflower River during 2023 (MDWFP 2024). A total of 82 sites were sampled along the Big Sunflower River mainstem, with sheepnose encountered at three of the sites. Seven live adult sheepnose specimens were collected with a catch per unit effort of 0.03 individuals per hour and a relative abundance of 0.03 (MDWFP 2024). Two of the three live collections were located near Dockery, Sunflower County, Mississippi, extending the species' known extant range upstream approximately five miles. Evidence of recent recruitment was not detected; however, varying age classes have been detected over time indicating that some low level of recruitment is occurring. Genetic tissue samples were taken from two of the individuals collected near Indianola, Sunflower County, Mississippi (MDWFP 2024). The withdrawal of surface and ground water and the resulting lowering of the water table continues to be a stressor for this system, as evidenced by the collection of one sheepnose individual from a shallow, unconnected pool during the 2023 survey (MDWFP 2024).

  - An additional five live individuals were collected by the Service as part of a host fish passage study in 2024, from two sites located slightly upstream from Indianola, Sunflower County, Mississippi (A. Seagroves Ruppel, USFWS, personal communication, 2024). These individuals measured between 49-92 mm in length. The individual measuring 49 mm documents the first juvenile collected from the Big Sunflower River since the shell of a fresh dead juvenile was collected in 2003.

Genetics
While limited genetic work is available for sheepnose, one study compared historical and present population dynamics, connectivity, and distribution of genetic diversity across the species' range (Schwarz and Roe 2022), as described in the Population Demographics section, above. Additional genetics work on sheepnose is currently being conducted under research biologist Kentaro Inoue at the Shedd Aquarium in Chicago, Illinois.

Threats Analysis (threats, conservation measures, and regulatory mechanisms):
Sheepnose populations are influenced by various natural factors and anthropogenic stressors occurring within their watersheds. These stressors can influence one or more of the individual and population needs. Stressors can vary by degree of impact across the range of the species. The habitat risk factors represent these stressors. Habitat risk factors influence the demographics of a population, such as survival, reproduction, recruitment, and genetic diversity. Populations with healthy demographics can offset some effects of these stressors. In the SSA (USFWS 2022) we identified contaminant, hydrological regime,

landscape alteration, lack of connectivity, and invasive species as the primary risk factors influencing the resources upon which sheepnose relies, either directly or indirectly. Commercial harvest is no longer a significant threat for sheepnose and scientific recovery permits regulate overutilization. We also considered direct threats to the mussel, including the influence of mussel disease and the effect of catastrophic events (i.e. coal mining, oil and gas exploration and extraction). An overview of risk factors influencing past, current, and future population condition is available in Appendix B of the 2022 SSA (USFWS 2022). New threats have not been identified since the last 5-year review in 2020 or the SSA in 2022.

Through the SSA (USFWS 2022), a risk assessment was conducted for 37 of the 38 known extant populations presented in Table 1. Of the 37 populations, 30 were found to be at a high level of risk, seven were found to be at moderate levels of risk, and no populations were identified to be at low risk. Additionally, all populations were found to be at high risk from at least one identified type of catastrophic event risk. In accordance with the Recovery Plan (USFWS 2024), sheepnose may be considered for delisting when there are 32 populations (defined as HUC-8 watersheds) distributed throughout four representation units (HUC-2 watersheds) in High demographic condition with Moderate or Low risk or in Moderate demographic condition with Low risk. Currently, two populations meet these criteria, both within the Ohio River basin (Upper Green and Tippecanoe).

Although we used the best available information at the time of the SSA to define risk, the current demographic condition and historic population trends of several of the populations in relation to the assigned levels of risk suggest estimated risk categories may be on the conservative side and a more refined approach to risk designation may be appropriate. Combined with conducting systemic surveys throughout populations where little information has been collected in recent years, it is possible that some populations may be closer to achieving recovery criteria than previously estimated.

Conservation Measures:

Habitat Modifications

Recent and ongoing habitat modification projects are summarized in Appendices B and E of the SSA (USFWS 2022).

Forestry Best Management Practices

Landscape alteration was identified as one of the five primary threats influencing sheepnose viability, including, but not limited to, agriculture, mining, urbanization, and silviculture practices (USFWS 2022). The National Council for Air and Stream Improvement, Inc. (NCASI) provided a technical comment letter (NCASI 2025) identifying "*…numerous studies demonstrating state-approved forestry best management practices (BMPs) minimize risks to water quality from forest management and benefit aquatic species*." These BMPs may be referenced and considered for implementation in support of sheepnose mussel recovery efforts under the Recovery Implementation Strategy (RIS).

Culture Activities

A summary of ongoing culture activities to support the recovery of sheepnose is provided in Appendix B of the SSA (USFWS 2022).

Updates to the activities discussed within the SSA (USFWS 2022), include:

- The Tennessee Wildlife Resource Agency's (TWRA) Cumberland River Aquatic Center (C-RAC), located in Gaellatin, Tennessee has continued to produce additional sheepnose juveniles through in-vitro in 2022 and 2024 from broodstock collected from the Clinch River in Tennessee (TWRA 2024, p. 4).

- The Genoa National Fish Hatchery (GNFH) will collaborate with the Illinois Natural History Survey (INHS) to begin propagation work with the Kankakee (HUC-8 ID 07120001, Kankakee River) population. In 2025, INHS will try to collect brooding sheepnose to hand off to GNFH. If viable glochidia are received, fish will be infested and the females returned to the river. Juveniles that drop off will be split between laboratory culture and immediate stocking. Several cases of stocked new juveniles have proven successful in the upper Midwest (Snuffbox and Higgins Eye) suggesting that the barrier to recovery in some streams is sufficient natural juvenile transformation. Therefore, stocking newly transformed juveniles is again being tested alongside juvenile culture.

Host Fish

Summaries of known host fish species and associated research are provided in Sections 2.4 and 2.4.4 of the SSA (USFWS 2022).

In addition, the Service's Mississippi Ecological Services Field Office has initiated a host fish passage study (A. Seagroves Ruppel, USFWS, personal communication, 2024). The objective of the study is to determine swim speeds for host fish of listed mussels, including sheepnose in future years, within the Mississippi Delta (A. Seagroves Ruppel, USFWS, personal communication, 2024 and 2025). Results of this study will be utilized to inform future fish passage into control structure designs proposed for construction within the range of the species. As a precursor to this study, additional host fish trials may be conducted to test local species from the Mississippi Delta for sheepnose host suitability that have been omitted from previous trials.

Recommendations for future activities:

A RIS was recently developed for sheepnose, along with three other mussel species (USFWS 2025). The RIS is a way for local partners to implement measurable management activities based on the recovery criteria and recovery actions described in the Recovery Plan. The RIS identifies near-term (2025-2030) goals and measurable outcomes for identified actions. The identified recovery activities should be prioritized for the species over the next five years and will be evaluated in the next five-year status review. Along with the RIS, we recommend further refining the population risk designation methodology (USFWS 2022) combined with conducting systemic surveys throughout populations where little information has been collected in recent years to further inform the current status of the species towards achieving defined recovery criteria (USFWS 2024).

New data including the collection of a single adult sheepnose shell (reportedly in good condition) from the Kentucky River (HUC-8 ID 05100204, Upper Kentucky) suggests there may be a newly identified extant population within the Ohio River basin (T. Fagin, USFWS, personal communication, 2024). A relocation survey at this location is anticipated, with the potential to encounter additional individuals and provide further insight into whether an extant population may be present within the Kentucky River system. Additionally, the recent collection of one live individual within the Middle Green (HUC-8 ID 05110003) suggests a range expansion of the extant population within the Upper Green River, also within the Ohio River basin (T. Fagin, USFWS, personal communication, 2025). More surveys are recommended to verify the presence and abundance of sheepnose in these locations.

Additionally, data collected as part of an ongoing post-construction monitoring study of relocated sheepnose suggests that the species may burrow and/or move laterally, influencing their detection rate (BioSurvey Group 2025). Additional insight into sheepnose movement behaviors may allow for improved survey designs, detection rates, and monitoring protocols to more effectively assess the status of populations throughout the species' range in support of recovery actions.

Finally, survey information from the Ohio River suggests sheepnose may occupy habitats located more than 30 meters from shore (ESII 2017; J. Spaeth, Edge, personal communication, 2025). Such distances from shore are not sampled in typical mussel surveys, which are generally tied to shoreline development activities. Additional investigation in areas >30 meters from shore may be warranted to inform population status and potential recovery actions of the species in larger river systems

Synthesis:
The sheepnose historically occurred throughout much of the Upper Mississippi, Lower Mississippi, Lower Missouri, Ohio, Cumberland, and Tennessee River systems. An SSA was completed in 2022 to evaluate species condition and investigate natural factors and anthropogenic stressors that affect sheepnose demographics (e.g., survival, recruitment and abundance). The 2022 SSA evaluated the distribution of sheepnose in terms of watersheds occupied, delineated by major river basin (HUC-2, representation unit) and the HUC-8 sub-basins within (population). Population status was determined as extant or extirpated based on accessible survey data on the distribution of populations through time. The data assessed within the SSA (USFWS 2022) indicate that the number of sheepnose populations has decreased by roughly 71 percent from historical numbers range-wide, with the species currently ranging across four (Upper Mississippi River, Ohio River, Tennessee River, and Lower Mississippi River) of the five historical river basins. Within each of these basins, the number of populations is estimated to have declined by more than or equal to 50 percent of the historical range (Figure 1).

New data provided to inform this review support the addition of one extant HUC-8 to the species' range (Middle Green, HUC-8 ID 05110003) within the Ohio River basin, expanding the known distribution of the sheepnose within the Green River system in Kentucky. Further, new survey information suggests several populations may be at a higher demographic condition than previously assessed (USFWS 2022), moving all four extant basins closer to achieving identified recovery goals (USFWS 2024).

Following this review, sheepnose is now considered to encompass 38 populations (previously 37, at the time of the 2022 SSA) throughout its range. While all extant river basins except one (the Lower Mississippi River) have more than one population, only six populations throughout the range are in high demographic condition and nearly half of the currently extant populations (18 populations, 47 percent) are known from a very small number of records (less than 20 individuals collected over the past two decades). Further, a high percentage (81 percent) of all known extant populations are currently considered to be at high risk due to threats, with <60 percent estimated probability of persistence throughout the foreseeable future (USFWS 2022).

Currently, two populations, both in the Ohio River basin, meet the recovery criteria (USFWS 2024) and are considered secure with high demographic condition and moderate risk of extirpation. Multiple primary risk factors continue to impact the viability of the sheepnose range wide, including contaminants, hydrological regime, landscape alteration, lack of connectivity, and invasive species. These threats affect the habitat quality and resources availability that the species depends on for survival and reproduction. In addition, direct threats such as mussel disease and the effect of catastrophic events further affect the species. While the species retains some degree of redundancy necessary to withstand localized catastrophic events, this redundancy—as well as overall representation—has declined when compared to historical conditions and thus, is likely more susceptible to extirpation from catastrophic events. Although we used the best available information to define risk through the SSA (USFWS 2022), the current demographic condition and historic population trends of multiple populations in relation to the assigned levels of risk suggest estimated risk categories may be on the conservative side. Further refining the population risk designation methodology (USFWS 2022) combined with conducting systemic surveys throughout populations where little information has been collected in recent years will aid in further informing the current status of the species towards achieving defined recovery criteria (USFWS 2024).

After reviewing the best available scientific information, we conclude that sheepnose remains an endangered species at this time. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Act and analysis of the status of the species in our 2022 SSA (USFWS 2022) remains an accurate reflection of the species current status.

RESULTS

U.S. FISH AND WILDLIFE SERVICE
STATUS REVIEW of SHEEPNOSE

Current Classification: Endangered

Status Recommendation resulting from Status Review:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (Indicate reasons for delisting per 50 CFR 424.11):
____ The species is extinct
____The species does not meet the definition of an endangered or threatened species
____The listed entity does not meet the statutory definition of a species
_X_ No change needed

Lead Field Supervisor, Illinois-Iowa ES Field Office, Fish and Wildlife Service

Approve SARA SCHMUECKER Digitally signed by SARA SCHMUECKER Date: 2025.11.19 09:49:54 -06'00' Date _____

Sara Schmuecker, Deputy Field Supervisor, IL-IA FO

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