KANSAS DEPARTMENT OF WILDLIFE AND PARKS
Petition for Species Review (submission deadline: October 5, 2023)
Endangered/Threatened/Species-in-Need-of-Conservation Status

Kansas recognizes rare or declining species by state listing to categories of Endangered*, Threatened**, or Species-in-Need-of-Conservation (SINC)*** (K.A.R. 115-15-1 and 2). Every 5 years these lists are reviewed as required by statute (K.S.A. 32-960). A Threatened and Endangered Species Task Committee oversees the process and makes listing recommendations to the Secretary of Kansas Department of Wildlife and Parks (KDWP) based on best available science. Any changes to these lists must be approved by the KDWP Commission.

A review regarding a listing, delisting, uplisting or downlisting of Kansas wildlife regarding the above categories is initiated via a petitioning process. To submit a petition for review, please fully complete the requested information attached below. Petitioners are strongly encouraged to provide all substantive biological information with cited references to aid in the review. A completed petition is no guarantee that the listing request will occur. The scientific information in the petition determines whether or not the requested listing change will merit a full review.

At the request of the KDWP Secretary, the Threatened and Endangered Species Task Committee will evaluate all completed petitions and determine if there is sufficient information to justify a full review of the petitioned status change. If the species is accepted for further review, there will be public information meetings conducted in regard to the proposed listing change.

All petitioning documents pertaining to the species under full review will be made available to the public at the KDWP website (https://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife/2023Five-Year-Review). If a listing change is recommended, a notice of the proposed action will be sent to federal and state agencies and local and tribal governments that may be affected by the petitioned species, and to all individuals and organizations that have requested notification. KDWP will issue news releases concerning the proposed species listing change. In addition, individual petitions and substantiating data will be distributed to and evaluated by: 1) academia, 2) wildlife agency personnel, 3) other professionals, 4) other resource agencies (state and federal) and 5) nonprofessionals who have known expertise/experience with the petitioned species. This entire process, from petition to final vote by the commission, has taken as long as 18 months.

Questions concerning the petitioning and review process should be directed to Jordan Hofmeier, Assistant Director of Ecological Services, KDWP, 512 SE 25th Ave, Pratt, KS 67124 (Jordan.Hofmeier@ks.gov).

Completed "Petition for Species Review" pdf forms should be sent to kdwpt.ess@ks.gov or paper copies to KDWP, Attn: Ecological Services, 512 SE 25th Ave., Pratt, KS 67124-8174.

* Endangered Species: any species of wildlife whose continued existence as a viable component of the state's wild fauna is determined to be in jeopardy (KSA 32-958c).

**Threatened Species: any species of wildlife which appears likely, within the foreseeable future, to become an endangered species (KSA 32958f).

***Species-in-Need-of-Conservation: (SINC) any species which are highly specialized, whose habitat is very limited in Kansas, or shows a population decline that warrants data collection concerning its status in Kansas. Conservation efforts focused on this species can prevent future listing as threatened or endangered. This listing is not defined in the Kansas Statutes.

Species Common Name: ____Shoal Chub_____

Species Scientific Name: ____Macrhybopsis hyostoma_____

Currently listed as:
___ Endangered _X__ Threatened ___Species-In-Need-of-Conservation (SINC) ___ not listed
Petitioned to: ___ Endangered ___ Threatened _X__SINC ___ not listed

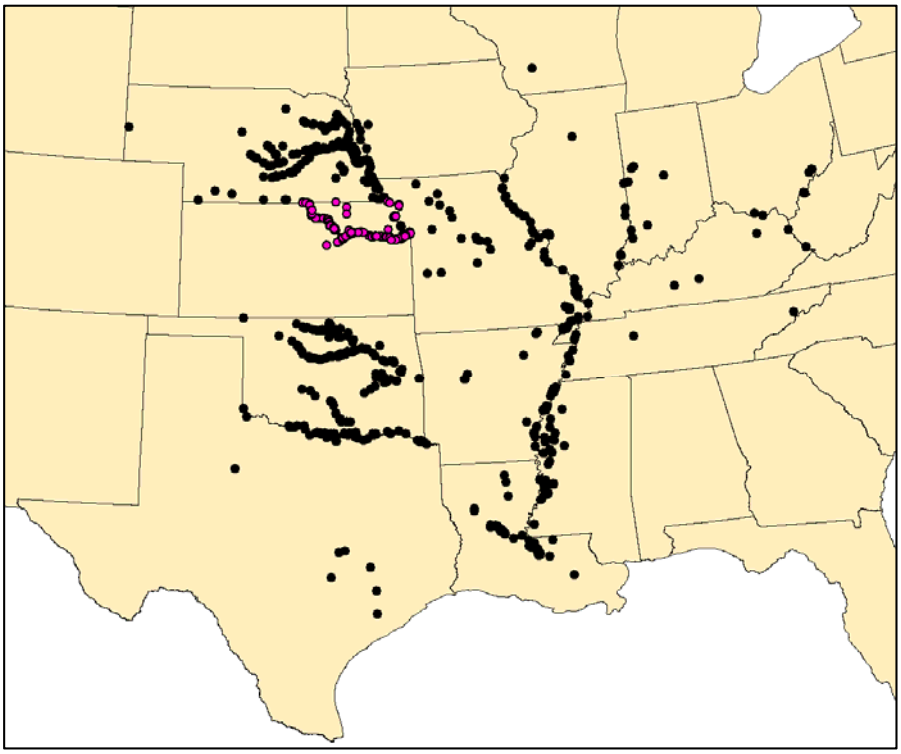
Note to petitioner: Feel free to expand the blanks below to add sufficient information. When completed, please convert Word document to a pdf prior to submitting.

1) List the survey/research information that has occurred since the last 5-year review (2018) that has prompted your petition to change the listing category of this species.

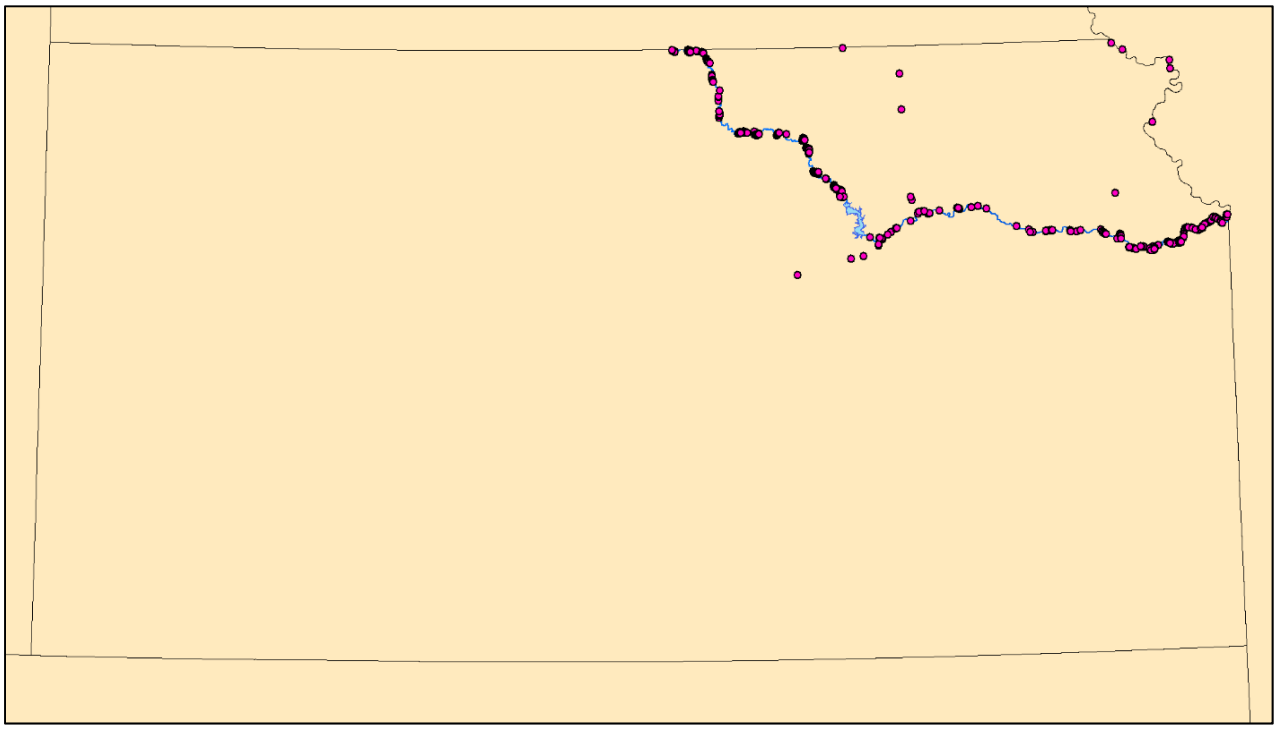
The past 10 years there has been an increase it big river surveys in Kansas by Missouri Department of Conservation, University Nebraska-Lincoln, Kansas State University, and Kansas Wildlife and Parks, all within the range of the Shoal Chub. In that time, well over 124 miles of the Kansas River and 174 miles of the Republican River fish community has been surveyed. In that time (10 years) a total of 6,827 known Shoal Chub have been observed.

2) a. Provide a map of the species' current distribution in Kansas and range wide.

Shoal Chub (*Macrhybopsis hyostoma*) Range Wide Distribution

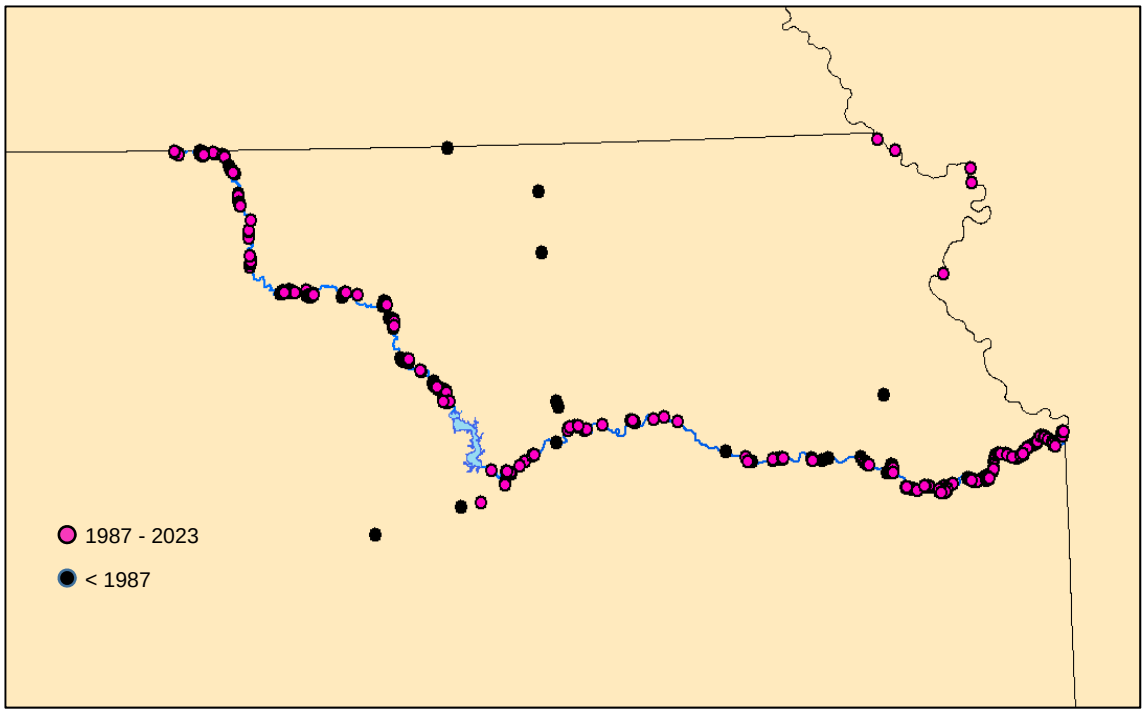


Shoal Chub (*Macrhybopsis hyostoma*) Kansas Distribution



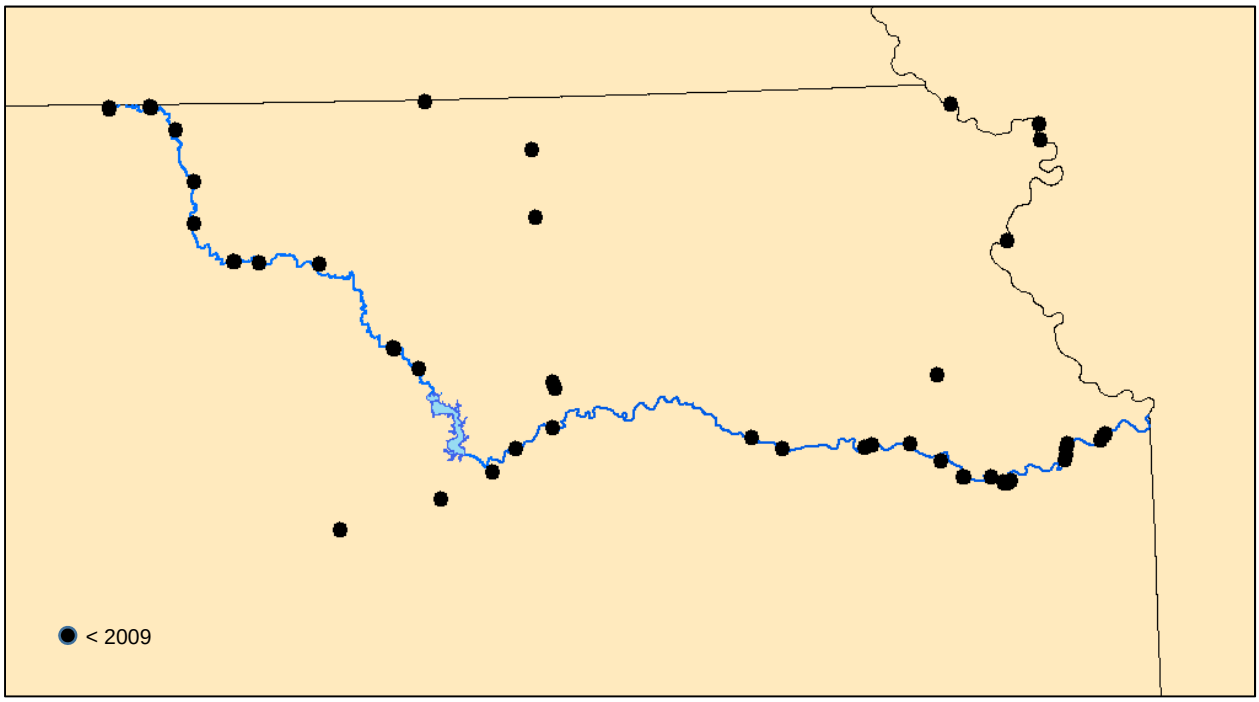
Shoal Chub (*Macrhybopsis hyostoma*) Kansas

Last 35 years occurrences 1987-2023



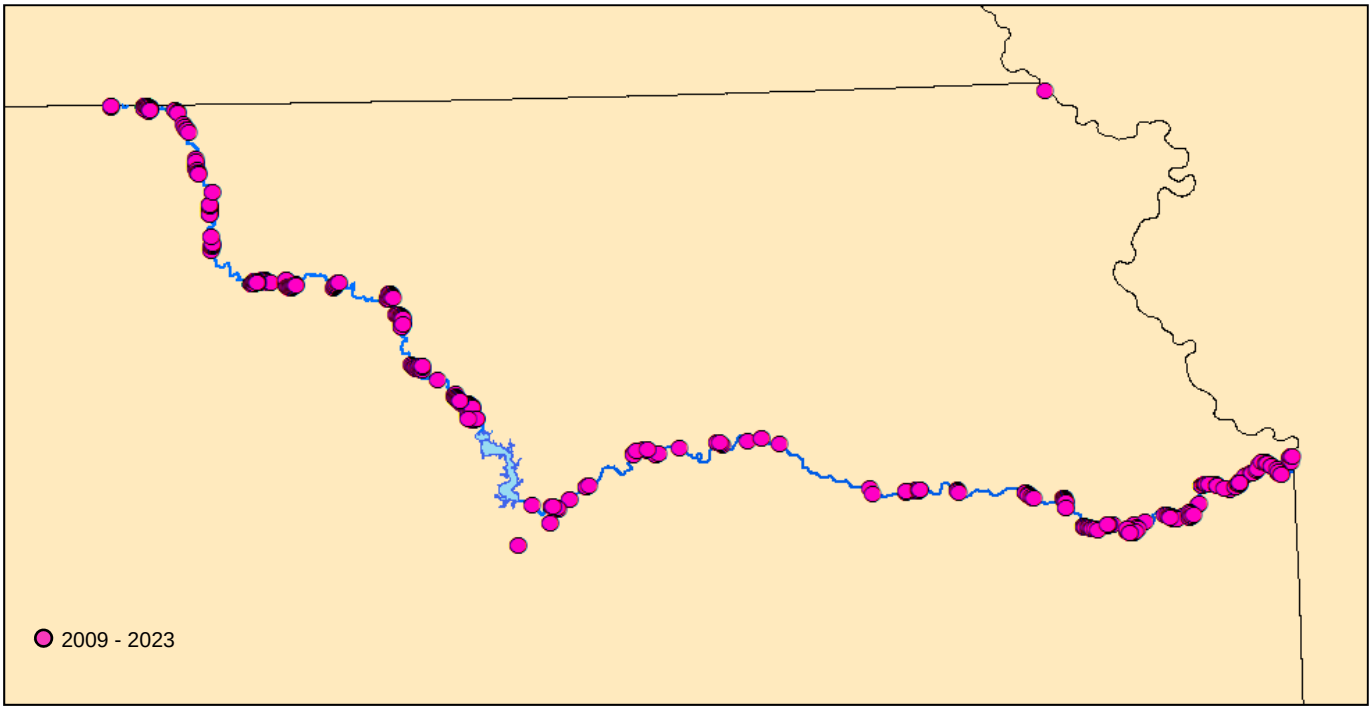
Shoal Chub (*Macrhybopsis hyostoma*) Kansas

Observations prior to listing as a threatened species 2009



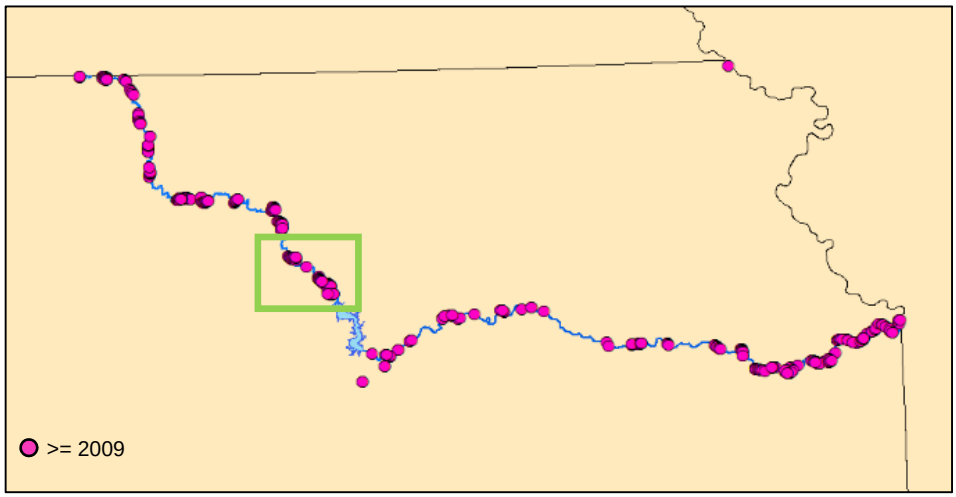
Shoal Chub (*Macrhybopsis hyostoma*) Kansas

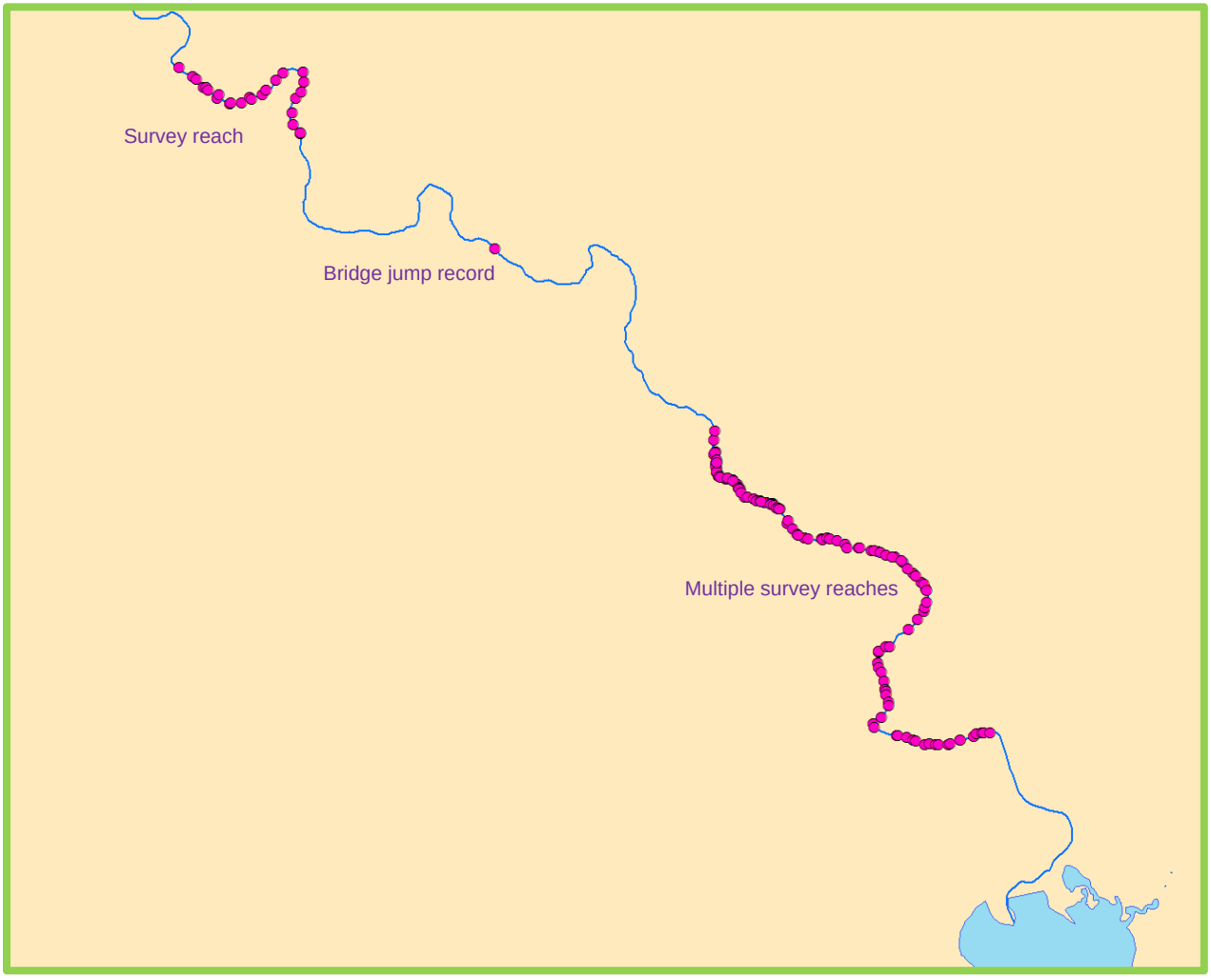
Observations since listing as a threatened species, 2009-2023



Shoal Chub (*Macrhybopsis hyostoma*) Kansas

Shoal Chub concentration within a river reach, each dot is a GPS recorded observed location





b. Is the Kansas population considered connected with the population in an adjoining state? Yes __X____ No _____ Don't know _____

c. If no, what is the distance to the nearest out-of-state population? _____

d. Is the Kansas population genetically distinct from the core population in other states? Yes _____ No _____ Don't know __X_____

population genomic analysis of Shoal Chub samples collected from the streams in three Midwest states (Illinois, Missouri, and Nebraska) found low genetic diversity among Shoal Chub. Therefore, Kansas is probably not genetically distinct, however low genetic diversity may be occurring.

Cite references:

-KDWP (Kansas Department of Wildlife and Parks). *Pelagic Survey Database*. Ecological Services Section. Pratt, KS.

-KDWP (Kansas Department of Wildlife and Parks). *Boat Survey Database*. Ecological Services Section. Pratt, KS.

- KDWP (Kansas Department of Wildlife and Parks). *2013-2023 Collection Permit Database*. Ecological Services Section. Pratt, KS.

-KDWPT (Kansas Department of Wildlife, Parks and Tourism). *1994-2022 Stream Survey and Assessment Program Database*. Ecological Services Section, Pratt, KS.

-Thad Huenemann, (Rivers and Streams Program Manager, Nebraska Game and Parks Commission), Nebraska Stream Fishes Database, Lincoln, NE.

-Trevor Starks, (former fisheries biologist, Streams Program, Oklahoma Department of Wildlife Conservation, Porter Office), Oklahoma Streams Program Database, Porter, OK

-Froese, R. and D. Pauly. Editors. 2022.FishBase.
World Wide Web electronic publication.
www.fishbase.org, (08/2022)

- Gaughan, S., Steffensen, K. & Lu, G. Habitat use and population structure of the shoal chub (*Macrhybopsis hyostoma*) in the upper Mississippi River basin. *Environ Biol Fish* **102**, 901–914 (2019). https://doi.org/10.1007/s10641-019-00878-3

3) How and to what magnitude has the species' distribution changed within Kansas during the past 35 years?

The current distribution of the Shoal Chub in Kansas has remained the same as its historical range. There is no increase or decrease in the range based on the last 35 years of data and surveys. Survey data within 35 years has filled in void areas of Shoal Chub collections within its range in Kansas. There is however data in the last 35 years indicating Shoal Chub range continues extending-utilizing the lower Smoky Hill River. Unknown presence is probably due to the lack of surveying the lower Smoky Hill River and surveying at the right time and under favorable flow conditions.

Globally?

Nebraska – distribution is maintaining upstream and often limited to irrigation diversion canal dams indicated by Nebraska Shoal Chub records. Harlan County Reservoir is the main limiting factor of upstream movement of Shoal Chub on the Republican River. There is a fairly recent record of a Shoal Chub upstream of the diversion dam near Guide Rock on the Republican River.

Oklahoma – Shoal Chub population has been re-established into the Cimarron River and is expanding upstream. Thought extinct in the 1970s and 80s due to drought conditions in the Cimarron River, presence is increasing and now found in 50% of its historical subunits.

Cite references:

KDWP (Kansas Department of Wildlife and Parks). *Pelagic Survey Database*. Ecological Services Section. Pratt, KS.

KDWP (Kansas Department of Wildlife and Parks). *Boat Survey Database*. Ecological Services Section. Pratt, KS.

KDWP (Kansas Department of Wildlife and Parks). *2013-2023 Collection Permit Database*. Ecological Services Section. Pratt, KS.

KDWPT (Kansas Department of Wildlife, Parks and Tourism). *1994-2022 Stream Survey and Assessment Program Database*. Ecological Services Section, Pratt, KS.

U.S. Fish and Wildlife Service. 2018. Species status assessment report for the Arkansas River shiner (*Notropis girardi*) and peppered chub (*Macrhybopsis tetranema*), version 1.0, with appendices. October 2018. Albuquerque, NM. 172 pp.

Luttrell, G.R., A.A. Echelle, W.L. Fisher, and D.J. Eisenhour. 1999. Declining status of two species of the *Macrhybopsis aestivalis* complex (Teleostei: Cyprinindae) in the Arkansas River Basin and related effects of reservoirs as barriers to dispersal. Copeia 1999:981-989.

4) Describe the species' population (not distribution) trend within Kansas during the past 35 years.

Prior to 1987 there were 69 known records of Shoal Chub (then known as *M. aestivalis*) in Kansas consisting of 759 individuals. Since 1987 there are 1,012 records, consisting of 7,138 individuals. When the Shoal Chub was listed as Threatened in 2009, 112 records consisting of 1,025 individuals. Since 2009, 987 records consisting of 6,872 individuals.

In the Kansas River, KDWP data indicated with "netted" sampling equipment, in a normal season, the Shoal Chub has consistently been the seventh frequently observed fish species in the Kansas River, out of 46 total netted collected species. Consistently making up 4% of total catch annually of Kansas River species.

In the Republican River (KDWP):
2018- Eighth most frequently observed native species out of 50 species, 740 seine hauls consisting of 124 miles of river. In 2018 the target species was the Plains Minnow, therefore we were concentrating more on Plains Minnow habitat and the Shoal Chub was by-catch.
2021- Fifth most frequency observed native species out of 26 species, 76 seine hauls consisting of seven miles of river. Shoal Chub was the target species, therefore effort was concentrated on Shoal Chub habitat.
2022- Fifth most frequently observed native species out of 31 species, 148 seine hauls consisting of 12 miles of river. Shoal Chub was the target species, therefore effort was concentrated on Shoal Chub habitat.

Globally?
Nebraska – populations on the Missouri River continue to fluctuate in the last 35 years and have been impacted due to loss of habitat (dams-weirs) prior to the last 35 years. Inland rivers, (tributaries) the populations fluctuate with drought conditions and timing of surveys, although tributary populations seem to remain stable. Trending increases in the last 5-8 years in the Missouri River.

Missouri – same description as Nebraska, Few recent collections on mainstem of the Missouri River with populations occurring in major tributaries to the Missouri River.

Oklahoma – undetected for 20 years, reintroduced Shoal Chub populations is persisting in the Cimarron River. Shoal Chub has replaced the extirpated Peppered Chub in the Salt Fork, Chikaskia, and Cimarron Rivers.

Cite references:
-KDWP (Kansas Department of Wildlife and Parks). *Pelagic Survey Database*. Ecological Services Section. Pratt, KS.

-KDWP (Kansas Department of Wildlife and Parks). *Boat Survey Database*. Ecological Services Section. Pratt, KS.

-KDWP (Kansas Department of Wildlife and Parks). *2013-2023 Collection Permit Database*. Ecological Services Section. Pratt, KS.

-KDWPT (Kansas Department of Wildlife, Parks and Tourism). *1994-2022 Stream Survey and Assessment Program Database*. Ecological Services Section, Pratt, KS.

-Thad Huenemann, Rivers and Streams Program Manager, Nebraska Game and Parks Commission

-Gaughan, S., Steffensen, K., & Lu, G. (2019). Habitat use and population structure of the shoal chub (Macrhybopsis hyostoma) in the upper Mississippi River basin. *Environmental Biology of Fishes*, *102*(6), 901-914. https://doi.org/10.1007/s10641-019-00878-3

-U.S. Fish and Wildlife Service. 2018. Species status assessment report for the Arkansas River shiner (*Notropis girardi*) and peppered chub (*Macrhybopsis tetranema*), version 1.0, with appendices. October 2018. Albuquerque, NM. 172 pp.

-Luttrell, G.R., A.A. Echelle, W.L. Fisher, and D.J. Eisenhour. 1999. Declining status of two species of the *Macrhybopsis aestivalis* complex (Teleostei: Cyprinindae) in the Arkansas River Basin and related effects of reservoirs as barriers to dispersal. Copeia 1999:981-989.

5) a. What is the Global Rank of this species from NatureServe? (http://natureserve.org/)
G5 Secure

b. What is species status and trend on IUCN Red List? (http://www.iucnredlist.org/)
Least Concern

c. What proportion of the species' global population is currently found within Kansas?
8.5% based on occupied HUC8 ranges of point map distribution

6) What is the species' current residency status within Kansas (vagrant, migrant, wintering, or year-round)? Year-round (there is a tendency for the Shoal Chub age-class populations to migrate upstream into Nebraska on the Republican River.)

7) Describe the species' current breeding status within Kansas.
Reach reproductive maturity at age 1 and capable of multiple spawns between late May and mid-June. Shoal Chub broadcasts semibuoyant nonadhesive eggs into the pelagic zones of the river.

Cite references:

-Kansas Fishes Committee. 2014. Kansas Fishes. University Press of Kansas, Lawrence

8) Describe the species' habitat requirements:

Flowing currents within wide shifting channels with substrates composed of sand and gravel that is moderately compacted.

In the Kansas River, Shoal Chub are readily collected in the crossover channel of the river (thalweg or part of river channel crosses over towards opposite bank). This run/glide type habitat often contains a steady velocity and a uniform depth with compact sand and gravel substrate.

In the Republican River the Shoal Chub has regularly been collected in water depth of 50cm with highest numbers in a range of 30-60cm. Age-0 Shoal Chub have been found more frequently in the lower end of the range usually in slower velocities and occasional side channels. Substrate consisted mostly of sand with patches of compacted gravel. The bottom or leeward side of submerged undulating sand dunes that contained a patch of gravel at the proper depth, would often contain a Shoal Chub. Any random patches of gravel that were found within the 30-60cm water depth range would often contain a Shoal Chub. A very clear, 30cm depth, gravel, side channel contained 30 age-0 Shoal Chub in one seine haul.

Cite references:

-Kansas Fishes Committee. 2014. Kansas Fishes. University Press of Kansas, Lawrence

-Jeff Seim, former KDWP biologist, personal communication

-KDWP (Kansas Department of Wildlife and Parks). *Pelagic Survey Database*. Ecological Services Section. Pratt, KS.

-Gaughan, S., Steffensen, K., & Lu, G. (2019). Habitat use and population structure of the shoal chub (Macrhybopsis hyostoma) in the upper Mississippi River basin. *Environmental Biology of Fishes*, *102*(6), 901-914. https://doi.org/10.1007/s10641-019-00878-3

9) Discuss the species' degree of specialization with regard to habitat, food, or other life history factors.

-Shoal Chub prefers longer stretches of natural fluvial river processes without barriers.
-Life cycles including spawning migrations or the act of spawning rely on natural flow peaks by bringing reproductive adults together and maximizing habitat conditions for larval fish survival

-One life history factor for this species is that most individuals do not survive their second summer (age-1), therefore, age-1 fish are responsible for reproduction.

Cite references:

-Anthony W. Rodger, Kevin B. Mayes & Kirk O. Winemiller (2016) Preliminary Findings for a Relationship between Instream Flow and Shoal Chub Recruitment in the Lower Brazos River, Texas, Transactions of the American Fisheries Society, 145:5, 943-950, DOI: 10.1080/00028487.2016.1173588

-Gaughan, S., Steffensen, K., & Lu, G. (2019). Habitat use and population structure of the shoal chub (Macrhybopsis hyostoma) in the upper Mississippi River basin. *Environmental Biology of Fishes*, *102*(6), 901-914. https://doi.org/10.1007/s10641-019-00878-3

10) Discuss the species' sensitivity to environmental contaminants and disease, if any, including known potential problems:

Unknown

Cite references: _____

11) To what degree is this species currently vulnerable to consumptive and/or commercial use in Kansas, and what relationship does that use have on its total population?

Unknown, likely none

Cite references: _____

12) What are the current and imminent threats to the species in Kansas? Please list in priority order with the highest-ranked threat first.

1. Instream structures (ex. dams) that restrict upstream movement during spawning events.
2. Non-native and native piscivorous predators that can prey on the Shoal Chub at different life stages
3. Dams that create a lentic habitat that removes the natural river fluvial process (habitat).
4. Dams that create a habitat for non-native species that accelerate an increase in their numbers that would impact the Shoal Chub by predation, diet, space competition, and altered behavior.

Cite references:

-U.S. Fish and Wildlife Service. 2018. Species status assessment report for the Arkansas River shiner (*Notropis girardi*) and peppered chub (*Macrhybopsis tetranema*), version 1.0, with appendices. October 2018. Albuquerque, NM. 172 pp.

-Ryan Waters personal observation, Republican River

13) a. What is the recovery potential of this species?

Excellent _____ Good ___**X**____ Fair _____ Poor _____ Unlikely _____

Explain

-Kansas has built the Kansas Aquatic Biodiversity Center, therefore propagation of this species is available if necessary.

-KDWP-Ecological Services Section is currently initiating a multi-staffed aquatic Species Recovery Program

-There are three basic existing populations of Shoal Chub in Kansas: Missouri River, Kansas River, and Republican River populations and at one time, before the building of Milford Reservoir, they were interconnecting populations. The Kansas and Republican River populations can be used as translocation populations in case one population becomes impacted to a non-recovery level. With the collapse of the Marysville dam on the Big Blue River in 2018, this may have opened enough river miles for the Shoal Chub to create a sustainable population that historically occupied this subbasin. Certain times of the year, age-0 Shoal Chub can be seined on Milford Wildlife Area on the Republican River in fairly high numbers. These age-0 Shoal Chub could be translocated 30 miles to the Big Blue River on the upper Tuttle Creek Wildlife Area to start their migration upstream in the Big and Little Blue Rivers and restore their historical range in this basin.

List any conservation actions that are currently addressing the needs of this species.

Occurred:

- Originally Listed as a Threatened Species in Kansas in 2009

- Critical Habitat Designation (DCH):

  The Republican River starting on the Nebraska-Kansas Border (Sec 01-T01S-R05W) (40.002260, -98.087269) downstream to Milford Reservoir

  The Kansas River starting at the confluence of the Republican and Smoky Hill Rivers downstream to the confluence of the Missouri River on the Kansas-Missouri border

  All reaches of the main stem Missouri River congruent with the Kansas-Missouri border

- Ecological Review of proposed projects for impacts to the Shoal Chub per the KNESCA (Kansas Nongame and Endangered Species Conservation Act) mentioned above, the department has provided recommendations or required permits to avoid, minimize, or mitigate any impacts to Shoal Chub critical habitat.

• Topeka Weir fish ladder (2021)

When the Topeka Weir was being renovated for water recreation safety improvements, KDWP partnered with the City of Topeka to provide funding and guidance for a fish passage structure through the existing weir to promote habitat-enhancing efforts on the Kansas River. A functional fish passage design was developed to allow passage of the Shoal Chub and 3 other state-listed fishes. Additionally, 11 other fish and 3 mussels listed as Species of Greatest Conservation Need (Kansas Wildlife Action Plan) could benefit from improved connectivity at the Topeka Weir.

• Ecological Services Biologist has tagged small-bodied minnow species below this new fish passage and has successfully recovered tagged small-bodied minnows upstream of the passage.

• State Wildlife Action Plan (SWAP) -2022

Within each ecoregion of the SWAP plan, geographically explicit areas have been defined to address conservation. These Ecological Focus Areas (EFA) represent landscapes that can be applied for maximum benefits to wildlife. These areas also contain aquatic habitats and includes all of the Shoal Chub range in Kansas.
The Shoal Chub is considered as a Tier I species in this action plan.

In Process:

A permit and review system is administered by the Kansas Department of Wildlife and Parks Ecological Services Section. This allows the critical review of projects potentially affecting Shoal Chub habitats and the project described in applications may be accepted, modified or revoked. The section provides recommendations or require permits to avoid, minimize, or mitigate any impacts to Shoal Chub critical habitat from publicly funded or permitted projects. Other actions may trigger various permit requirements of other agencies, especially actions allowing for discharge, dam construction, stream alteration or flood plain development. Most significant of agencies involved is the Division of Water Resources of the State Board of Agriculture. Permit applications through this office are sent out to be reviewed by KDWP as a result of the Water Projects Coordination Act, which was designed to simplify the state overall permitting systems and allow fish and wildlife interest review. Projects identified as potentially impacting a threatened or endangered species would require appropriate permits as well from KDWP.

Implementation and ongoing invasive carp removal program by KDWP Fisheries Section in the Kansas River.

Species Recovery Program developing within the Ecological Services Section, KDWP.

Continued big river fish community monitoring by staff of the Biodiversity Survey Program within the Ecological Services Section of KDWP.

Third year of a 10 year monitoring project by Kansas State University and KDWP to examine the effects of sediment release into the Kansas and Big Blue Rivers due to a future sediment release project in Tuttle Creek Reservoir.

KDWP has several MOU's with other agencies, notably the Kansas Department of Transportation, which aids in the identification of road and bridge projects in areas with threatened or endangered species.

An ongoing, thirty year stream survey and assessment program and stream survey database, big river boat survey and boat survey database, species specific pelagic surveys and pelagic survey database all with data within the Shoal Chub range in Kansas.

Planned:

•Species Recovery Program within the Ecological Services Section, KDWP

•Continued boat and other types of gear monitoring of the fish community within the Kansas River.

•Translocation of Shoal Chub from Republican River and Kansas Rivers to the Big Blue River with monitoring.

•2019 - acquired 33 miles of permission on private property to survey the lower Smoky Hill River for Shoal Chub presence. Project was not completed due to a historic high flow summer. Project may be implemented in the future under suitable conditions.

A synopsis of any standardized, or recent monitoring/sampling activities that occur on a periodic or occasional basis.

2018-2022 Kansas River fish community surveys by KDWP using electrofishing, push trawl, otter trawl, seining, and mini-fyke net sets resulted in 975 Shoal Chub observed. Shoal Chub and Shoal Chub habitat was not specifically targeted. September 1-2, 2020, boat survey conducted on the Republican River within the Milford Wildlife Area. Twenty-nine Shoal Chub were observed. A push trawl resulted in 11 out of 20 hauls (55%) collecting a Shoal Chub. Push trawl was used upstream of the last sandbar observed on the Republican River, upstream of the reservoir. In this area the Shoal Chub was the second most encountered fish species. Using an Otter trawl downstream of the last sandbar (lentic zone-habitat resulting from reservoir impact), two out of seven hauls (28%) collecting a Shoal Chub. This is not ideal habitat for Shoal Chub.

2016 and 2018 Pelagic Survey for Plains Minnows in Plains Minnow focused habitat on the Republic River that resulted in 1,868 Shoal Chub observed as by-catch.

2021 and 2022 Pelagic Species Survey targeting Shoal Chub in the Republican River. Four sites were selected from Nebraska border to Milford Reservoir to specifically target Shoal Chub habitat. In 2022 the same four survey sites in 2021 were repeated. A total of 1,080 Shoal Chub were observed.

Third year of a 10 year monitoring project by Kansas State University and KDWP to examine the effects of sediment release into the Kansas and Big Blue Rivers due to a future sediment release project in Tuttle Creek Reservoir.

Shoal Chub data available from scientific and educational collection reports submitted annually.

Anecdotal data collected from aquatic education classes and project site review assessments.

Three year basin studies in both the Kansas-Lower Republican River Basin (1997-1999) covered much of the Shoal Chub Range in Kansas. These surveys have a set REMAP protocols that are easily repeatable if need be. We are also able to determine population densities by a timed catch per unit effort or by densities per square meter catch per unit effort. These protocols also examine physical habitat, fish cover, water quality, and human disturbances.

2023 KDWP Shoal Chub collections (not formal surveys):
Republican River, Concordia- 60, average length 60mm, age-1
Republican River, Milford Wildlife Area- 1, 34mm individual, age-0, indicator of recruitment occurring
Missouri River, White Cloud- 3, average length 28mm, age-0, indicator of recruitment occurring
Kansas River, Ogden- 23, average length 62mm, age-1
Kansas River, Junction City- 6, average length 62mm, age-1
Smoky Hill River, Junction City- 13, average length 61mm, age-1

b. List any pending conservation actions that might improve the status of this species.
- trial propagation attempts of this species at the Kansas Aquatic Biodiversity Center

-translocation of individuals from Republican River and Kansas River to Big Blue River.

-translocate individuals to and from the Kansas and Republican Rivers to maintain genetic diversity due to Milford Reservoir as a barrier. Bowersock Dam? Also include translocation population into the Big Blue River due to loss of connectivity to original population in the Kansas River due to Rocky Ford Dam and Tuttle Creek Reservoir dam to maintain historic basin genetic diversity.

-river flow dependent and labor availability, further research of Shoal Chub utilization of the Smoky Hill River, non DCH area for the Shoal Chub.

-install base-flow fish ladders (3 locations)- potential Great Plains Fish Habitat Partnership projects:
Republican River, Guide Rock, Nebraska, 40.068426, -98.376883
Little Blue River, Fairbury, Nebraska, 40.131475, -97.183239
Big Blue River, Barneston, Nebraska, 40.052648, -96.588667

14) Summarize your reasons for requesting a review of this species:
Last 10 years there has been an increase in research being conducted in the Shoal Chub range of Kansas. The use of modern techniques of surveying these larger rivers (push trawl, otter trawl, bag seines, fyke nets) than was available and utilized prior to the initial listing in 2009 has enabled biologist to collect more big-river small-bodied fishes that are not as easily or consistently sampled with the traditional straight seine.

Prior to 1987 there were 69 known records of Shoal Chub (then known as *M. aestivalis*) in Kansas consisting of 759 individuals. Since 1987 there are 1,012 records, consisting of 7,138 individuals. When the Shoal Chub was listed as Threatened in 2009, then 112

records consisting of 1,025 individuals. Since 2009, 969 records consisting of 6,872 individuals.

Over the years, sampling long stretches of river during a season, biologists have gained knowledge that the majority of the Shoal Chub population may be in one reach of the river more consistently than the other. Example, mid-late summer, age-0 Shoal Chub will be further downstream where the eggs were hatched and developing in nursery areas in higher numbers. The adult Shoal Chub (naturally fewer in number) will be at the upper end of the river system. Depending on environmental conditions and flow conditions, therefore, collecting the Shoal Chub may be a matter of timing and location.

In the Republican River, surveys in late July and early August have observed the high numbers of age-0 Shoal Chub upstream of Milford Reservoir. Surveys in mid-September have barely caught the last majority of the migrating population of Shoal Chub at our upper survey site before they leave the state of Kansas into Nebraska.

Example, if you are seining in the spring on the Republican River on Milford Wildlife area on public property, you are probably not going to observe that many Shoal Chub. If you are seining in the late fall on public property on Milford Wildlife Area, you may have already missed the annual Shoal Chub hatch and most have already left the area and started their journey upstream.

Biologist have learned to observe what habitat the Shoal Chub are utilizing that day in the current conditions and then focus on sampling that habitat throughout the survey. Using this approach, biologist can get higher numbers or consistent collections of Shoal Chub individuals. Therefore, sometimes sampling for the entire fish community in a system is not the best way to conclude Shoal Chub presence.

Do you examine frequency or numbers? Shoal Chub has consistently been the seventh frequently observed species in the Kansas River, annually making up 4% of the total fish community. In the Republican River, the Shoal chub has consistency been the fifth frequently observed native species.

From 2016-2023 the KDWP Biodiversity Survey Program surveys alone have observed 4,199 Shoal Chub. These are significant numbers considering the immense size of the Kansas River and the respectable width of the Republican River.

The redundancy of the Shoal Chub is well characterized by having stable populations distributed across its native range (after 1962, building of Tuttle Creek Reservoir) in Kansas. Meaning if something happens to a localized population of Shoal Chub in Kansas, there are other populations available in Kansas to repopulate, maintain, and bolster the impacted population.

Shoal Chub data since its listing in 2009 has indicated consistent representation in its ability to adapt to short-term and long-term physical and biological environments throughout its range in Kansas. Meaning the current population has maintained its historical representation across its native range in Kansas (excluding Big Blue River basin, potential recovery is possible) due to environmental impacts. Recent data indicates representation (utilization) of the Lower Smoky Hill River. The representation of a Shoal Chub within the Republican River basin is an example of a long-term physical impact with Shoal Chub potentially using the slower river current (reservoir affect) created by Milford Reservoir as a nursery grow-out for recently hatched Shoal Chub that are continually carried downstream after hatching.

The Shoal Chub has shown resiliency and persistence in its ability to withstand environmental stochasticity periodic disturbances within the normal range of variation. Last 10 years biologist have surveyed the Shoal Chub in their Kansas range during and after drought conditions (2018,2022) and before and after historic flooding conditions (2019) and the Shoal Chub population presence has remained consistent and stable. The Shoal Chub has maintained resiliency by withstanding the environmental impacts, such as competition, with artificially increased numbers of Blue Catfish present now in the Kansas River and Republican River and the introduction of Bighead and Silver Carp in the Kansas River. Populations have persisted above and below Bowersock dam, a fish movement barrier, on the Kansas River since 1874 and have withstood sand dredging in the Kansas River since the early 1900s. Mortality and fecundity, as well as total population numbers, may reflect environmental events or conditions and will adjust until customary seasonal conditions exist.

Through the efforts of the Ecological Services Biodiversity Survey Program, universities, and other entities research and documentation, there is substantial scientific data which creates sufficient representation, redundancy, and resiliency for the Shoal Chub to no longer meet the definition of threatened in Kansas.

15) Describe your expertise/experience with the species you are petitioning.

KDWP has been actively surveying the Kansas and Republican River since 2018. Surveys were reduced due to the historic flooding in the Kansas and Republican Rivers for most of 2019. Ecological Services has been collecting data and databasing all work in Kansas streams and rivers involving Shoal Chub through collection permit reports since 2013. Ecological Services has also conducted the occasional stream survey on the Kansas, Republican, and Smoky Hill Rivers when conditions are favorable.

Ryan Waters has been part of the KDWP, now Biodiversity Survey Program, for 30 years surveying all species of fish statewide. In 2016 the Program started initiating species specific surveys (target species), therefore, he has gained the ability to recognize and become familiar with the species best, marginal, and worse habitats. He has been part of 32 of the 39 surveys conducted on the Republican River since 2016.

Of these 32 surveys, a total of 1,028 sein hauls and over 152 miles of river has been surveyed. With the help of a survey crew, he has quickly determined the habitat use of the Shoal Chub in that area of the Republican River and under the present river and weather conditions. He has been part of assisting with otter and push trawls, education events, and stream surveys on the Kansas River that has collected Shoal Chub. Furthermore, two stream surveys conducted on the Smoky Hill River that observed Shoal Chub collections. During his career he has either collected or been in direct association with the collection and observation of 3,345 Shoal Chub.

Note on citations: It is not necessary to provide extensive literature citations, however, any pertinent data is helpful in determining species status. Feel free to attach any information you may have pertaining to the status or biology of this species that will help in its review.

If there is insufficient space for your reply to any of the informational requests, attach extra sheets. Be sure to reference your attached material to the appropriate numbered questions.

The currently-listed Kansas species can be found at:

http://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife/Kansas-Threatened-andEndangered-Species-Statewide (Threatened and Endangered list)

http://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife (SINC list)

Petitioner(s):

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Send fully completed petition to (deadline is **October 5, 2023**): kdwpt.ess@ks.gov or

Kansas Department of Wildlife and Parks
Attn: Ecological Services
512 SE 25th Ave
Pratt, KS 67124-8174