MEMORANDUM

To: Industrial Economics, Incorporated

From: Virgil Lee Andrews, Jr.

Date: February 5, 2024

Subject: **Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Kentucky creekshell**

The purpose of this memorandum is to document the likely difference between conservation efforts that would be undertaken for the Kentucky creekshell with and without Critical Habitat designation. The information contained in this memorandum will be used as the basis and will identify the underlying assumptions for conducting an economic analysis for the proposed designation of Critical Habitat for the Kentucky creekshell. This memorandum focuses on understanding the likely outcomes of consultation for the Kentucky creekshell based on expert opinion, agency experience, consultation history, or proxy species. However, nothing in this memorandum is intended to pre-determine outcomes of specific consultations for the Kentucky creekshell, as these would be developed on a case-specific basis.

Section 4(b)(2) of the Endangered Species Act (Act) requires the Secretary of Interior (Secretary), and therefore by delegation the U.S. Fish and Wildlife Service (Service), to consider the economic, national security, and other impacts of designating a particular area as Critical Habitat. To comply with the requirement of the Act to consider economic impacts, the Service, often in conjunction with an economic contractor, prepares an economic analysis that describes and monetizes, where possible, the probable economic impacts of the proposed designation of Critical Habitat. The Secretary has discretion to exclude areas from a Critical Habitat designation as described in the second sentence of section 4(b)(2). The economic analysis may also be used to inform any discretionary balancing analysis the Secretary chooses to undertake.

I. EFFECTS OF CRITICAL HABITAT

Current regulations at 50 CFR 424.19 require the Service to use an incremental analysis when describing the probable economic impact of a Critical Habitat designation. Determining the economic impacts of a Critical Habitat designation involves evaluating the “without Critical Habitat” baseline versus the “with Critical Habitat” scenario in order to identify those effects expected to occur solely due to the Critical Habitat designation and not from the protections that are or would be in place due to the species being listed under the Act. Economic effects solely due to the Critical Habitat designation include both: (1) the costs of increased administrative efforts that result from the designation, and (2) the economic effects of changes in proposed actions that would be necessary to avoid destruction or adverse modification of Critical Habitat.

These changes can be thought of as "changes in behavior" or the "incremental effect" that would most likely result from the designation if finalized.[1] Specific measurable differences between the baseline (without Critical Habitat) and the designated Critical Habitat (with Critical Habitat) may include, but are not limited to: (1) the economic effects stemming from changes in land or resource use or extraction; (2) changes in environmental quality; or (3) time and effort expended on administrative and other activities by Federal landowners, Federal action agencies, and, in some instances, State and local governments or private third parties. Collectively, these types of effects are the incremental economic effects that serve as the basis for the economic analysis.

A primary purpose of this memorandum is to describe differences between actions that may be needed to avoid jeopardy to the species versus actions that may be needed to avoid destruction or adverse modification of Critical Habitat. Actions required to avoid jeopardy of a species are attributable solely to the listing of a species, whereas actions required to avoid destruction or adverse modification of a species' Critical Habitat are attributable solely to the designation of Critical Habitat for that species. In some instances, actions required to avoid destruction or adverse modification of a species' Critical Habitat may be the same as those to avoid jeopardy of a species. To get at this distinction, however, we need to make an informed decision as to whether destruction or adverse modification would occur based on whether the Federal agency's action is likely "to result in the destruction or adverse modification of habitat which is determined by the Secretary… to be critical." To do this, the Service considers how the proposed action is likely to affect the function of the Critical Habitat unit in serving its intended conservation role relative to the entire designation. The information provided below is intended to identify the possible differences for this species under the two different standards in section 7 of the Act: (1) jeopardy to the species and (2) adverse modification of Critical Habitat. Ultimately, however, a determination of whether an activity may result in the destruction or adverse modification of Critical Habitat is based on the effects of the action to the designated Critical Habitat in its entirety. The information provided below is intended to identify the possible differences for the Kentucky creekshell under the separate section 7 standards for jeopardy to the species and destruction or adverse modification of Critical Habitat.

Section 7 consultation is required whenever there is a discretionary Federal action that may affect listed species or designated Critical Habitat. Section 7(a)(3) states that a Federal agency shall consult with the Secretary on any prospective agency action at the request of, and in cooperation with, the prospective permit or license applicant if the applicant has reason to believe that an endangered species or a threatened species may be present in the area affected by his project and that implementation of such action will likely affect such species. The initiation of section 7 consultation under the jeopardy standard takes place if the species may be present

[1] Changes in behavior include any additional conservation efforts or activities that would be undertaken to project the species. For example, a change in behavior would include conducting a new consultation, relocating a project, or adding a particular conservation activity to the suite of conservation actions undertaken to protect a species.

and the action is likely to affect the species. Initiation of section 7 consultation under the adverse modification standard takes place if the action will likely affect Critical Habitat, and the species need not be present.

The Service recognizes the "geographical area occupied by the species" at the time of listing as stated under section 3(5)(A)(i) of the Act as the geographical area that may generally be delineated around the species' occurrences, as determined by the Secretary (i.e., current range). Such areas may include those areas used throughout all or part of the species' life cycle, even if not used on a regular basis (e.g., migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals). Because of the relatively coarse scale of analysis allowed by the definition of "Critical Habitat," the species may or may not be present within all portions of the "geographical area occupied by the species" or may be present only periodically. Therefore, at the time of any consultation under section 7, the species of interest may not be present within the action area for the purposes of the section 7 consultation, even if that action area is within the "geographical area occupied by the species."

In this memorandum, when we describe occupancy for purposes of estimating the potential economic costs of the Critical Habitat designation, we are referring to the occupancy status within the action area of a particular Federal action at the time of a consultation under section 7. The economic effects of the consultation would likely be considered incremental to Critical Habitat if a consultation would not have occurred absent the Critical Habitat designation, either because the area is unoccupied by the species or not known to be occupied, regardless of whether the area falls within the geographical area occupied by the species at the time of listing.

These incremental economic effects would derive both from changes in management, such as the added costs resulting from restrictions on development and other activities due solely to Critical Habitat, and changes in the scope of administrative review, such as the added costs of considering effects to Critical Habitat during consultation. Additional administrative costs would also occur in *occupied* areas (i.e., areas where the species is present) due to the need to analyze the potential destruction or adverse modification of Critical Habitat along with the potential jeopardy to the species.

II. DESCRIPTION OF SPECIES AND CRITICAL HABITAT

A. Kentucky creekshell

The Kentucky creekshell (*Leaunio ortmanni* [=*Villosa ortamnni*]) is a member of the Class Bivalvia, Order Unionodia, and Family Unionidae (ITIS 2023). It was described by Walker (1925) from specimens collected from the Green River at Mammoth Cave, Edmonson County, Kentucky, and from Sulphur Fork of Russell Creek, Adair County, Kentucky. The Kentucky creekshell adult shells are 2-3 inches in length with a greenish-yellow to tan color with numerous, fine green rays, mostly located on the posterior end of the shell (Watters

2018, p. 42). The species is considered relatively fast-growing and short-lived compared to some other mussel species. It occurs in medium-sized rivers to small streams and spring runs. The species can be found in riffles comprised of sand and gravel or found in adjacent depositional areas near shore (Haag and Cicerello 2016, p. 261). The species is often found in suitable habitat areas that are influenced by nearby springs due to the preferred habitat of its host fish, the banded sculpin.

The Kentucky creekshell is endemic to the Green River basin and found in 13 analytical units (HUC 10): Clifty Creek-Rough River, Ugly Creek-Green River (mainstem), Lower Nolin River Bays Fork-Barren River, Skaggs Creek, Little Muddy Creek-Barren River (mainstem) Middle Nolin River, Upper Nolin River, Russell Creek, East Fork Barren River-Barren River, Trammel Creek, Drakes Creek, and Gasper River (Figure 1). The Kentucky creekshell is presumed extirpated from 39% (4 of 13) of the historically occupied analytical units: Lower Nolin River, Bays Fork Barren River, Skaggs Creek, and Little Muddy Creek Barren River. We considered analytical units to be extant if they contained records after 2003 (Figure 2). We considered units with observations prior to 2003 as historical units. We considered analytical units to be extirpated if no individuals were detected since 1973, indicating a 50-year absence.

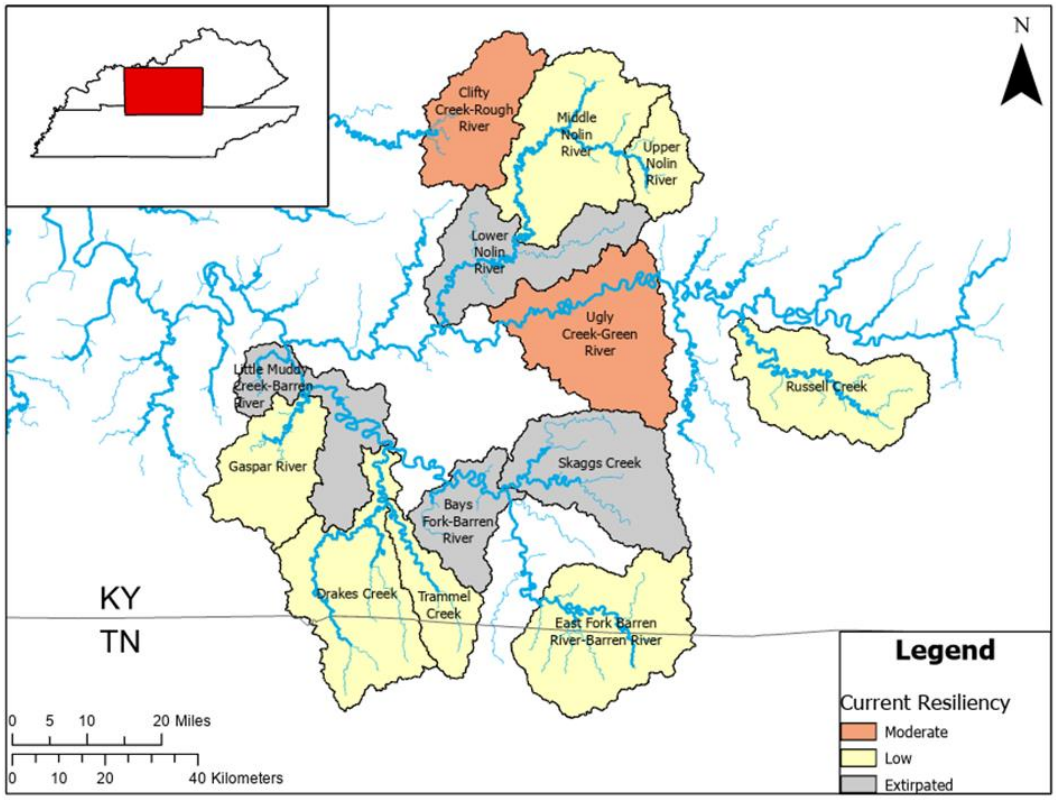

Figure 1. Analytical units and their resiliency within the Kentucky creekshell range.

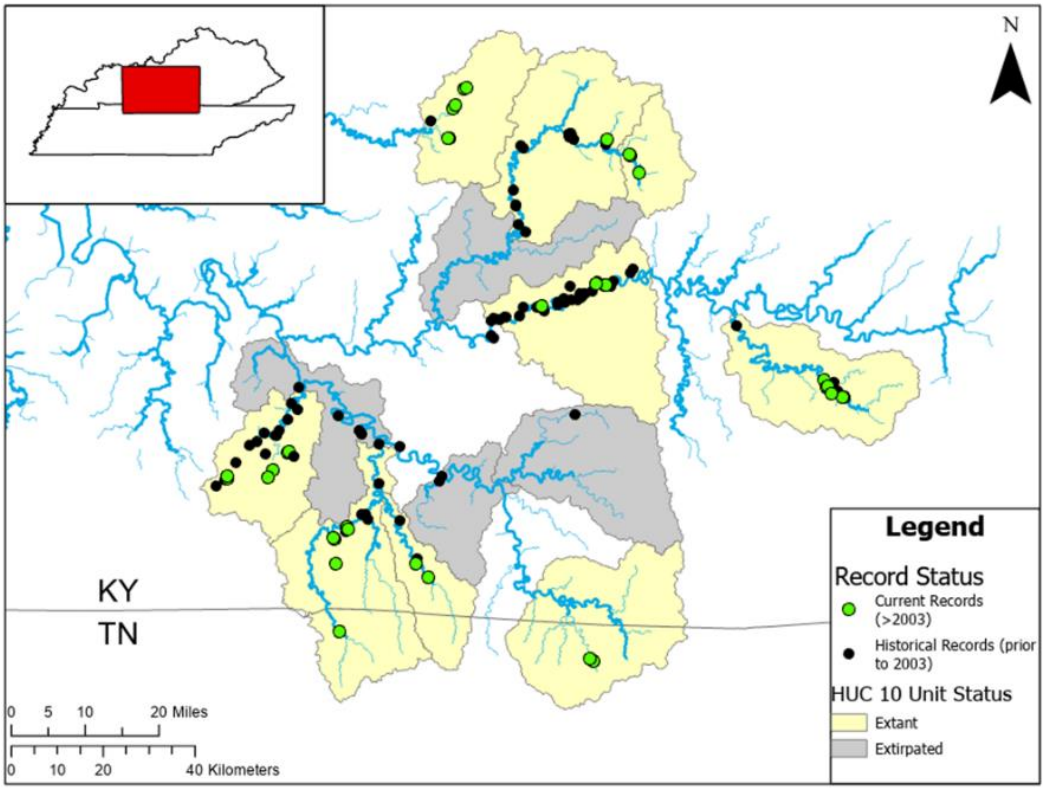

Figure 2. Current and historical occurrence records for the Kentucky creekshell.

Threats

- **Habitat loss and degradation –** Several potential threats that influence habitat loss and degradation have been identified, including the following:
    - Land Cover – Several land cover types which include "development", "cultivated crops", and "hay/pasture" have been correlated with degraded aquatic systems. These land cover types affect water quality, quantity, and temperature.
    - Siltation/Sedimentation – Siltation and sediment are known to affect 134 stream segments or 18% of assessed stream miles within the Green River basin and are knowns to affect mussel reproduction and feeding and substrate suitability.
    - Instream Gravel Mining – This mining has been documented across the Kentucky creekshell range and can destroy habitat for the species. Effects to the species include water quality modifications, including increased turbidity, reduced light penetration, increased temperature, substrate modification, increased sedimentation, and potential direct mortality of individuals.
    - Impoundment effects – Both large and small dams have caused significant widespread impacts across the species range. Impoundment effects include loss of connectivity between populations and disruption of natural flow regimes. Additionally, a few dams have recently been removed as part of conservation efforts for fish and mussel species.

- **Changing Climate Conditions –** are anticipated to lead to more frequent severe storms and droughts which can destabilize suitable habitat, dewater headwater streams occupied by the species, and negatively affect host fish distribution.
- **Enigmatic Population Declines –** This refers to a significant mussel decline that occurs in the absence of any obvious cause. Some experts suspect disease or the introduction of the invasive Asian Clam (*Corbicula fluminea*) as potential causes of these population declines. Enigmatic declines have occurred in the Nolin River, Drakes Creek, and Gasper River, all which have extant Kentucky creekshell populations.
- **Invasive Species –** pose a significant risk to many federally listed species. The Asian Clam is likely to affect the Kentucky creekshell as the species has been noted to dislodge juvenile and adult mussels as they compete for space, is a potential vector for disease, competes for food resources, affects water quality from periodic die-offs, and is likely competitively superior under changing climate conditions.

Special management considerations should prioritize the protection of springs and spring run habitat. This habitat is the preferred habitat of the Kentucky creekshell's host fish, the banded sculpin, and the Kentucky creekshell is often found in association with this habitat. Another management consideration is to devise ways to limit or otherwise minimize the destruction of aquatic habitat that occurs due to incompatible land uses that are known to degrade aquatic habitat. This would include impacts from development, cultivated cropland, hay/pasture, and instream gravel mining. These activities are likely some of the primary initiators of downstream impacts that contribute to habitat loss and degradation in the range of the species. The Kentucky creekshell is found in and generally prefers stable substrates that do not shift easily or regularly.

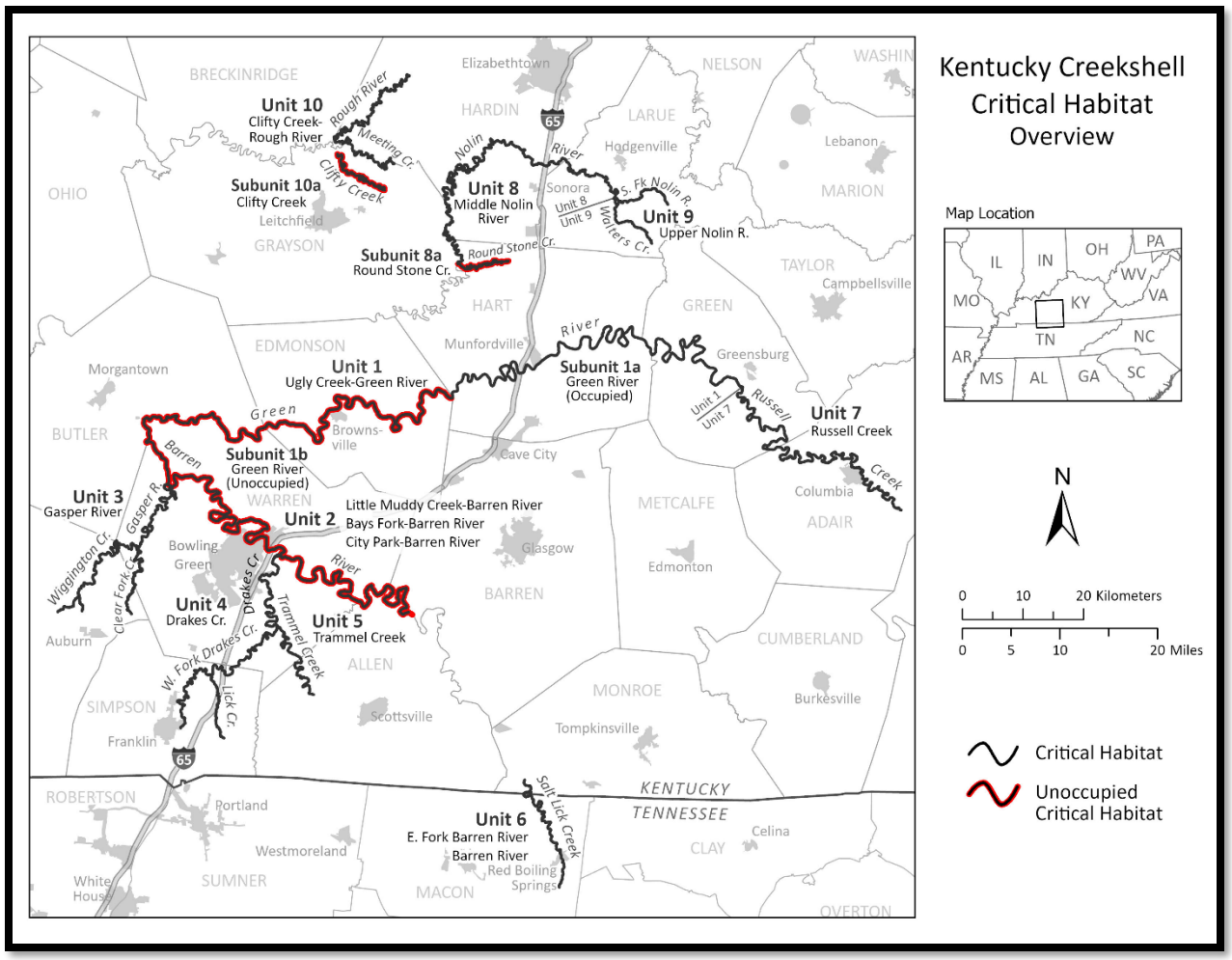

Figure 3. Proposed Critical Habitat for the Kentucky creekshell.

B. Critical Habitat Description

We have identified 10 Critical Habitat units comprised of 542.6 miles, of which 157.1 is considered unoccupied (i.e., the species is not present).

Table 1: Proposed Critical Habitat Units

Unit Number/Name	Length (miles)	Considered occupied for consultation purposes?	Landowner/ Land Manager(s)	Ongoing activities/potential threats
Unit 1 Ugly Creek-Green River (Subunit 1a)	73.0	Occupied	Private; National Park Service	Land use, Impoundment
Unit 1 Ugly Creek-Green River (Subunit 1b)	55.7	Unoccupied	Private; National Park Service	Land use, Impoundment

Unit 2 Little Muddy Creek-Barren River	79.9	Unoccupied	Private	Land use, Impoundment
Unit 3 Gasper River	52.8	Occupied	Private	Land use
Unit 4 Drakes Creek	55.1	Occupied	Private	Impoundment, Land use
Unit 5 Trammel Creek	15.9	Occupied	Private	Land use, Instream gravel mining
Unit 6 East Fork Barren River-Barren River	19.1	Occupied	Private	Land use, Instream gravel mining
Unit 7 Russell Creek	53.7	Occupied	Private	Land use, Instream gravel mining
Unit 8 Middle Nolin River (Subunit 1a)	54.5	Occupied	Private; USACE	Land use, Impoundment
Unit 8 Middle Nolin River (Subunit 1b)	9.9	Unoccupied	Private; USACE	Land use, Impoundment
Unit 9 Upper Nolin River	23.9	Occupied	Private	Land use, Impoundment
Unit 10 Clifty Creek-Rough River (Subunit 1a)	37.5	Occupied	Private; USACE	Land use, Impoundment
Unit 10 Clifty Creek-Rough River (Subunit 1b)	11.6	Unoccupied	Private; USACE	Land use, Impoundment

II. ANTICIPATED ACTIVITIES WITHIN OR WHICH MAY AFFECT PROPOSED CRITICAL HABITAT

A. Reasonably Foreseeable Activities that may be affected by the designation of Critical Habitat for the Kentucky creekshell.

Reasonably Foreseeable Activities that have the most likely chance to be affected by the designation of Critical Habitat for the Kentucky creekshell include development along the Interstate 65 corridor, installation of expanded broadband internet within the region, anticipated large solar projects, and bridge/road replacements/construction. Other projects have a reasonable chance to effect designated critical habitat; however, these projects have mostly terrestrial impacts and aquatic impacts can be easily mitigated such as residential and commercial developments and utility infrastructure.

Interstate I-65 is a large interstate system that connects the major cities of Louisville, Kentucky and Nashville, Tennessee and passes over Critical Habitat units 1, 2, 4, 5, and 8. Along this route and near Unit 8, two large battery manufacturing plants are currently being built that will employ approximately 5,000 people. Section 7 consultation has been completed for these manufacturing plants; however, additional development is projected to occur along the I-65 corridor as a result of increased employment opportunities from the manufacturing plants and due to other peripheral businesses, that will become established to support this infrastructure. Anticipated consultations are those related to general development such as new housing, retail, and utility infrastructure. This development is anticipated to gradually increase over the next decade.

Kentucky has been working to expand broadband internet throughout the commonwealth. The expanded installation of broadband internet services would include installation of new wireless towers, fiber optic cables, and improvements to existing infrastructure. The Kentucky Ecological Field Office will likely address most of the impacts associated with this work via programmatic consultation approaches, and, therefore, it is anticipated that this work will have very little effect on Kentucky creekshell Critical Habitat.

Solar energy development has the potential to expand in this area due to the increasing demand for clean renewable resources and the relatively flat agricultural land available in this area. The Kentucky Ecological Service Field office expects multiple large scale solar projects (capable of producing 10MW or greater) to occur in the area given the demand for energy and suitable landscape. Solar energy developers are selecting sites that are close to established infrastructure (main power lines) and have large tracts of relatively flat land (usually previous agriculture fields). Anticipated primary impacts from these projects include water quality degradation from sediment runoff due to construction disturbances. Many developers anticipate little to no tree clearing and are implementing best management practices (BMPs) to mitigate these impacts; however, no state standard BMPs has been developed and adopted as a requirement for solar development within Kentucky. Additionally, the Kentucky Energy and Environmental Cabinet has produced a Solar Site Suitability model to show the compatibility of solar projects throughout Kentucky. An interactive map showing the modeling results can be found here: Results | Solar Siting Potential in Kentucky (arcgis.com).

The Kentucky Transportation Cabinet (KYTC) does not project any major projects that would affect Kentucky creekshell designated Critical Habitat. KYTC is in the final stages of a multi-year bridge improvement effort that has replaced or rehabilitated approximately 1000 bridges across Kentucky. As a result, KYTC anticipates a sharp decline in overall bridge work and related stream disturbances in the short-term. Additionally, the Inflation Reduction Act (IRA) is funding multiple large projects in the state; however, none of these projects are within the identified Critical Habitat units.

B. Consultation History for the Species

Between 2007 and 2022, 924 projects have undergone section 7 consultations or Conservation and Planning Assistance Activities have consulted with the Kentucky Ecological Field Office within the Upper Green River basin and Barren River basin (i.e., Kentucky creekshell proposed Critical Habitat). This list includes all (terrestrial and aquatic) impacts within the Kentucky creekshell range. Example projects are given below, and a full list of projects is supplied with this memo.

The Kentucky creekshell is not yet listed; therefore, no consultation history exits. Furthermore, no suitable substitute species exists since this particular species is usually present in smaller streams compared to the majority of other listed aquatic species in its range. Furthermore, no suitable substitute species exists since this particular species is usually present in smaller streams compared to the listed aquatic species in its range. However, given a review of projects in or near the Critical Habitat units and involving federally listed mussel species, the most reasonable and foreseeable activities that would affect this species include pipeline maintenance projects, bridges/roads replacements and rehabilitations, water control plans, and solar installations. Other projects have a reasonable chance to effect designated critical habitat; however, these projects have mostly terrestrial impacts and aquatic impacts can be mitigated easily such as residential and commercial developments and utility infrastructure.

Example Projects
Pipeline: 2023-0040040
Bridge Rehabs: 04EK1000-2019-SLI-0808
Water Control Plans: 04EK1000-2021-SLI-0740
Solar Installations: 04EK1000-2021-SLI-0878 Larue Solar

IV. BASELINE ANALYSIS

In the following section, we describe conservation efforts and protections that are part of the baseline. In particular, we identify protections or efforts relevant to the known threats to the species that would provide some level of conservation for the Kentucky creekshell absent the proposed Critical Habitat designation.

A. ESA Protections for the species absent Critical Habitat designation

1. *Protections under the ESA for the Kentucky creekshell*

   Protection of the species that occurs as a result of the listing of the species is often the most substantial baseline protection provided to the species absent Critical Habitat designation. In particular, section 7 consultations and associated conservation efforts that would be taken to be protective of the species often provide baseline protections to Critical Habitat as well. The following section describes the expected ESA protections from threats identified in Section 1 for the Kentucky creekshell.

- **Section 7 protections**. Section 7 of the Act provides protections to the species following its listing. The consultation history for this species is described in Section III.B. These actions and associated conservation recommendations would be expected to occur even absent Critical Habitat for this species. For this species, the following types of conservation actions are typically recommended (or would be recommended for this species):
    - All projects should adhere to best erosion and sediment control practices.
    - Keep structures, equipment, and materials out of the stream as much as possible.
        - Bridges should span the stream entirely without supports in the stream.
        - Avoid using causeways.
        - Minimize stream crossings for pipelines.
        - Avoid equipment use in the stream during construction.
        - Refrain from placing material in the stream below the ordinary high-water mark.
    - When instream work is unavoidable, minimize disturbance to Kentucky creekshell and their habitat by:
        - Avoiding disturbance to higher quality habitat.
        - Minimizing the duration of instream activity.
        - Using cofferdams with intake and discharge water filtration.
        - Minimizing instream foot or equipment traffic.
        - Avoiding construction in and adjacent to streams during heavy rain.
        - Any piece of construction material should be removed from the stream as soon as possible and with as little disturbance as possible.
        - Implement biological monitoring, including onsite monitoring during the project, baseline and post-construction monitoring, and documentation/reporting of monitoring results.
        - Design features such as stream access points should be strategically placed in habitats that are currently degraded or do not have the species and in a way that minimizes potential sediment runoff during rain events.
    - Avoid and minimize riparian damage and disturbance, including:
        - Minimize grubbing and clearing staging areas in riparian buffers.
        - Locate the project footprint away from the riparian buffer area.
        - Replant vegetation post-project using native, woody, non-invasive species.
        - Implement invasive species control measures.
        - Direction drilling should minimize disturbance of riparian areas and be kept as far away from the stream as possible.

        - For vegetation control, manual or mechanical methods are recommended instead of chemical treatment.
        - If pesticide use is necessary, apply via "hack-and-squirt" methods instead of broadcast application.
        - Use aquatic-specific pesticides in and near Kentucky creekshell streams.
    - Avoid changes in natural flow regime:
        - Manage flow discharges from impoundments to mimic the natural flow regime and avoid deleterious water temperatures.
        - Dam maintenance recommendations should minimize deviations from the natural flow regime.

- **Habitat Conservation Plans or other ESA protections**. Following the listing of the species, the following habitat conservation plans (HCPs) have been developed or have incorporated consideration of the species: No HCPs have been developed for or have incorporated this species.

2. Other listed species protections, including other Critical Habitat designations

The Kentucky creekshell receives incidental protection under the Endangered Species Act because populations in portions of the Barren River and Green River share habitats with multiple federally listed mussels and Critical Habitat that has already been designated (Table 2)

Table 2: Unit and Co-occurring ESA-Listed Species or Existing Critical Habitats

Critical Habitat Unit	**Co-occurring Listed Species and/or Existing Critical Habitat for Other Listed Species?**	**Approximate Area of Overlap (acres or mi)**	**Does species have overlapping conservation requirements with subject species?**
Unit 1	Rabbitsfoot Critical Habitat/ Unit RF21	73.0 miles	Yes
Unit 1	Longsolid Critical Habitat/ Unit LS9	156 miles	Yes
Unit 1	Round Hickorynut Critical Habitat/ Unit RH11	98 miles	Yes
Unit 1 & 2	Clubshell	208.6 miles	Yes
Unit 1 & 2	Fanshell	208.6 miles	Yes
Unit 1 & 2	Longsolid	208.6 miles	Yes
Unit 1 & 2	Northern Riffleshell	153.6 miles	Yes
Unit 1 & 2	Pink Mucket	208.6 miles	Yes
Unit 1 & 2	Rabbitsfoot	208.6 miles	Yes
Unit 1 & 2	Rayed Bean	33.5 miles	Yes

Unit 1 & 2	Ring Pink	208.6 miles	Yes
Unit 1 & 2	Rough Pigtoe	208.6 miles	Yes
Unit 1 & 2	Round Hickorynut	130.0 miles	Yes
Unit 1 & 2	Sheepnose	91.0 miles	Yes
Unit 1 & 2	Snuffbox	91.0 miles	Yes
Unit 1 & 2	Spectaclecase	91.0 miles	Yes

B. Other regulatory mechanisms that provide protection to the Kentucky creekshell and its habitat even absent Critical Habitat designation

The following regulatory mechanisms are relevant to the analysis of potential impacts of Critical Habitat designation because they provide some conservation benefits to the species under the baseline for the threats and specific activities identified in section III of this memorandum. Such regulatory mechanisms may include Federal, state, or local laws, regulations, policies, or plans. Conservation actions under these regulatory mechanisms are considered part of the baseline because these benefits will continue with or without Critical Habitat designation.

The Kentucky creekshell and its habitats are afforded some protection from water quality and habitat degradation under the Clean Water Act (33U.S.C. §1251 et. seq (1972), Kentucky's Forest Conservation Act of 1998 (KRS §§149.330–355), Kentucky's Agriculture Water Quality Act of 1994 (KRS §§ 224.71–140) and the Tennessee Water Quality Control Act of 1971 (TN Code § 69-3-121). While it is clear that the protections afforded by these statutes and regulations are not directed specifically towards Kentucky creekshell and have not prevented the degradation of some habitats used by the Kentucky creekshell, the species undoubtedly benefited from certain improvements in water quality and habitat conditions stemming from these regulatory mechanisms.

In Kentucky, streams supporting federally threatened or endangered species receive additional protection under Kentucky's water quality standards. Pursuant to 401 KAR §§ 10:031, Section 8, the existing water quality and habitat of these Outstanding State Resource Waters (OSRWs) shall be maintained and protected, unless it can be demonstrated that lowering of water quality or a habitat modification will not have a harmful effect on the threatened or endangered species that the water supports. Kentucky Pollutant Discharge Elimination System (KPDES) permits associated with OSRWs typically contain additional requirements designed to protect waters supporting listed species.

V. INCREMENTAL IMPACTS ANALYSIS

A. Adverse modification analysis in occupied areas

Project modifications include avoiding stream impacts by horizontal directional drilling under the stream or spanning the stream via a bridge. Other activities that occur along the stream should implement BMPs for runoff and sediment capture. The streams in this area are very dynamic as wide streams move sediments along bedrock from sediment runoffs. Although it is now mostly comprised of forests and agricultural land, this region was once a vast grassland where native grasses with large and complex root structures held soil during rain events. The movement towards hay and agriculture has changed the landscape from native grasslands to monocultures of non-native grasses and crop species that have shallow roots and are typically subjected to yearly disturbances. This shift has increased the sediment load in the streams within the range of the species making them more unstable.

The designation of Critical Habitat for this species will lead to increased consultations in the area due to its presence in small headwater streams. Unlike most listed species, which are found in large to medium rivers, direct or indirect impacts on almost any stream in the area are likely to trigger consultations. Activities like pipeline maintenance, bridge/road work crossing smaller streams, water control plans, and solar installations will likely result in more consultations for these specific streams. Other projects have a reasonable chance to effect designated critical habitat; however, these projects have mostly terrestrial impacts and aquatic impacts can be mitigated easily such as residential and commercial developments and utility infrastructure.

B. Adverse modification analysis for unoccupied areas

Analysis would be similar to occupied areas.

C. New Information Provided by Critical Habitat

With the listing of the species, the Kentucky division of water could designate the proposed Critical Habitat as an Outstanding State Resource Water (OSRW) if the population is currently present (live individuals found within the last 20-30 years), and evidence supports the population is reproducing. OSRW's are updated every 3 years and the next time it will be updated will be 2024.

Land managers or project proponents would not know where Critical Habitat is located without a designation, as most project proponents get their information about listed species via the Service's Information for Planning and Consultation (IPaC) website.

D. Added Administrative Efforts

We are unsure about the level of additional administrative effort that will be required if critical habitat is designated for the Kentucky creekshell since this area already contains multiple other mussel species that currently require consultation.

VI. CONCLUSION

It is our position that there will not be any significant incremental effects of Critical Habitat designation for the Kentucky creekshell; although the listing of the species is anticipated to increase consultations in the area due to its presence in smaller streams where other listed mussels are not found. It is unlikely that on-the ground-implementation of actions to prevent or minimize adverse modification of mapped Critical Habitat containing the physical and biological features essential for conservation of the Kentucky creekshell will differ from actions taken to prevent or minimize take of the species because the habitat requirements of the Kentucky creekshell are closely linked to the survival, growth, and reproduction of these species. The only anticipated incremental impact of Critical Habitat designation is the administrative effort required during section 7 consultations to document the effects of the physical and biological features of Critical Habitat. Additionally, since unoccupied habitat is proposed, a finding of adverse modification of Critical Habitat will not necessarily constitute a jeopardy finding for the species.

REFERENCES CITED

Available upon request.