DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2021–0115; FF09E21000 FXES1111090FEDR 223]

RIN 1018–BG00

Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for Alligator Snapping Turtle

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce our 12-month finding on a petition to list the alligator snapping turtle (*Macrochelys temminckii*), North America's largest freshwater turtle species, as an endangered or threatened species under the Endangered Species Act of 1973, as amended (Act). After a review of the best available scientific and commercial information, we find that listing the species is warranted. Accordingly, we propose to list the alligator snapping turtle as a threatened species with a rule issued under section 4(d) of the Act (''4(d) rule''). If we finalize this rule as proposed, it will add the species to the List of Endangered and Threatened Wildlife and extend the Act's protections to the species.

DATES: We will accept comments received or postmarked on or before January 10, 2022. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. Eastern Time on the closing date. We must receive requests for public hearings, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by December 27, 2021.

Public informational meeting and public hearing: We will hold a public informational meeting on December 7, 2021, from 6:00 p.m. to 7:30 p.m. Central Time, followed by a public hearing from 7:30 p.m. to 8:30 p.m. Central Time.

ADDRESSES: You may submit comments by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal: *https://www.regulations.gov.* In the Search box, enter the docket number or RIN for this rulemaking (presented above in the document headings). For best results, do not copy and paste either number; instead, type the docket number or RIN into the Search box using hyphens. Then, click on the Search button. On the resulting page, in the Search panel on the left side of the screen, under the Document Type heading, check the Proposed Rule box to locate this document. You may submit a comment by clicking on ''Comment.''

(2) *By hard copy:* Submit by U.S. mail to: Public Comments Processing, Attn: FWS–R4–ES–2021–0115, U.S. Fish and Wildlife Service, MS: PRB/3W, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments only by the methods described above. We will post all comments on *https://www.regulations.gov.* This generally means that we will post any personal information you provide us (see Information Requested, below, for more information).

FOR FURTHER INFORMATION CONTACT: Brigette Firmin, Deputy Field Supervisor, U.S. Fish and Wildlife Service, Louisiana Ecological Services Field Office, 200 Dulles Drive, Lafayette, LA 70506; telephone 337–291–3108. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, if we determine that a species warrants listing, we are required to promptly publish a proposal in the **Federal Register,** unless doing so is precluded by higher-priority actions and expeditious progress is being made to add and remove qualified species to or from the List of Endangered and Threatened Wildlife and Plants. The Service will make a determination on our proposal within 1 year. If there is substantial disagreement regarding the sufficiency and accuracy of the available data relevant to the proposed listing, we may extend the final determination for not more than six months. To the maximum extent prudent and determinable, we must designate critical habitat for any species that we determine to be an endangered or threatened species under the Act. Listing a species as an endangered or threatened species and designating critical habitat can be completed only by issuing a rule.

What this document does. We propose to list the alligator snapping turtle as a threatened species with a rule issued under section 4(d) of the Act.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species because of any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that the primary threats acting on the alligator snapping turtle include habitat loss or modification (Factor A), harvest and collection (Factor B), nest predation (Factor C), and hook ingestion, entanglement, and drowning due to bycatch associated with freshwater fishing (Factor E). Existing regulatory mechanisms (Factor D) are not adequate to address these threats. Disease (Factor C), nest parasites (Factor C), and the effects of climate change (Factor E) may negatively influence the species, but the impacts of these threats on the species are uncertain based on current information.

Section 4(a)(3) of the Act requires the Secretary of the Interior (Secretary) to designate critical habitat concurrent with listing to the maximum extent prudent and determinable. Section 3(5)(A) of the Act defines critical habitat as (i) the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protections; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary that such areas are essential for the conservation of the species. Section 4(b)(2) of the Act states that the Secretary must make the designation on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts of specifying any particular area as critical habitat. We have determined that designation of critical habitat is not determinable at this time.

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other concerned governmental agencies, Native American Tribes, the scientific community, industry, or any other interested parties concerning this proposed rule.

We particularly seek comments concerning:

(1) The species' biology, range, and population trends, including:

(a) Biological or ecological requirements of the species, including habitat requirements for feeding, breeding, and sheltering;

(b) Genetics, taxonomy, and population structure;

(c) Historical and current range, including distribution patterns;

(d) Survival rates for adults, juveniles, hatchlings, or eggs;

(e) Historical and current population levels, and current and projected trends;

(f) Past and ongoing conservation measures for the species; and

(g) Tribal use or cultural significance of the species, including use of parts for ceremonial or traditional crafts.

(2) Information on threats to the species, particularly information on:

(a) Frequency of hook ingestion and entanglement associated with recreational or commercial fishing, effects on individual survival, and any population impacts;

(b) Magnitude of poaching and any population impacts from poaching; and

(c) Nest and hatchling predation rates and effects on recruitment and any population impacts.

(3) The spatial distribution and extent of threats to this species. Notably, we seek any information on areas within the species' range where these threats may overlap and potentially act synergistically or antagonistically as well as where there may be a complete absence of threats.

(4) The spatial variation in demographic rates related to reproduction, recruitment, and survival.

(5) Information regarding personal or commercial trade, not limited to the pet trade or breeding for personal collections.

(6) Information regarding habitat loss or degradation impacts to the species at the analysis unit level.

(7) Information, especially from the commercial and recreational fishing communities, about the design of a turtle escape or exclusion device, modified trot line techniques, or any other practices that would effectively eliminate or significantly reduce bycatch of alligator snapping turtles from recreational or commercial fishing.

(8) Information to address uncertainties regarding the future conditions analyses that informed the listing determination, including:

(a) Model input variables;

(b) Scientific or commercial information that would inform the model; and

(c) Treatment of uncertainty within the model.

(9) Information on regulations that are necessary and advisable to provide for the conservation of the alligator snapping turtle and that the Service can consider in developing a 4(d) rule for the species. In particular, we seek information concerning the extent to which we should include any of the Act's section 9 prohibitions in the 4(d) rule or whether we should consider any additional exceptions from the prohibitions in the 4(d) rule.

(10) Whether the measures outlined in the proposed 4(d) rule are necessary and advisable for the conservation and management of the alligator snapping turtle. We particularly seek comments concerning:

(a) Whether we should include a provision excepting incidental take resulting from legal recreational or commercial fishing activities for other targeted species, in compliance with State regulations. In addition, if we include such a provision, whether we should also include a requirement to report to the Service injured or dead turtles resulting from such legal fishing activities and how such reporting should be conducted;

(b) Whether the provision excepting activities such as take and interstate commerce for captive-bred specimens from State-approved captive breeding operations-should be revised or clarified regarding additional restrictions or requirements, or best management practices, or whether the Service should also except from the prohibited activities the foreign trade of live specimens from captive breeding operations;

(c) Whether the provisions excepting incidental take resulting from construction, operation, and maintenance activities; pesticide and herbicide application; and silviculture practices and forestry activities that follow best management practices should be revised or clarified to remove or add information, including spatial or temporal restrictions or deferments, or additional best management practices;

(d) Whether there are additional provisions the Service may wish to consider for the final 4(d) rule in order to conserve, recover, and manage the alligator snapping turtle, such as allowing take associated with certain infrastructure and other construction activities, riparian management activities, or wetland management activities;

(e) Methods for identifying, marking, and tracking captive brood-stock to differentiate them from wild-stock; and

(f) Whether there are any additional management activities not described within this proposed rule that contribute to the conservation of the alligator snapping turtle.

(11) The reasons why we should or should not designate habitat as ''critical habitat'' under section 4 of the Act (16 U.S.C. 1531 *et seq.*), including information to inform the following factors that the regulations identify as reasons why designation of critical habitat may be not prudent:

(a) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(b) The present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or threats to the species' habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(c) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States; or

(d) No areas meet the definition of critical habitat.

(12) Whether the designation of critical habitat is not prudent because it would more widely announce the exact locations of alligator snapping turtles and their highly suitable habitat which could facilitate poaching, exacerbating the existing threat of collection and contributing to further declines of the species' viability.

(13) Specific information on the possible risks or benefits of designating critical habitat, including risks associated with publication of maps designating any area on which this species may be located, now or in the future, as critical habitat. We specifically request information on the threats of taking or other human activity on the alligator snapping turtle and its habitat, and the extent to which designation might increase those threats, as well as the possible benefits of critical habitat designation to the species.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.

Please note that submissions merely stating support for, or opposition to, the actions under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act directs that determinations as to whether any species is an endangered or a threatened

species must be made ''solely on the basis of the best scientific and commercial data available.''

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

If you submit information via *https://www.regulations.gov,* your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on *https://www.regulations.gov.*

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on *https://www.regulations.gov.*

Because we will consider all comments and information we receive during the comment period, our final determinations may differ from this proposal. Based on the new information we receive (and any comments on that new information), we may conclude that the species is endangered instead of threatened, or we may conclude that the species does not warrant listing as either an endangered species or a threatened species. In addition, we may change the parameters of the prohibitions or the exceptions to those prohibitions in the 4(d) rule if we conclude it is appropriate in light of comments and new information we receive. For example, we may expand the prohibitions to include prohibiting additional activities if we conclude that those additional activities are not compatible with conservation of the species. Conversely, we may establish additional exceptions to the prohibitions in the final rule if we conclude that the activities would facilitate or are compatible with the conservation and recovery of the species.

Public Hearing

We are holding a public informational meeting followed by a public hearing on the date and at the time listed in **DATES**. We are holding the public informational meeting and public hearing via the Zoom online video platform and via teleconference so that participants can attend remotely. For security purposes, registration is required. All participants must register in order to listen and view the meeting and hearing via Zoom, listen to the meeting and hearing by telephone, or provide oral public comments at the public hearing by Zoom or telephone. For information on how to register, or if technical problems occur joining Zoom the day of the meeting, visit *https://www.fws.gov/southeast/lafayette/news/.* Registrants will receive the Zoom link and the telephone number for the public informational meeting and public hearing. If applicable, interested members of the public not familiar with the Zoom platform should view the Zoom video tutorials (*https://support.zoom.us/hc/en-us/articles/206618765-Zoom-video-tutorials*) prior to the public informational meeting and public hearing.

We are holding the public informational meeting to present information about the proposed rule to list the alligator snapping turtle as a threatened species and to provide interested parties an opportunity to ask questions about the proposed 4(d) rule. The public hearing will provide interested parties an opportunity to present verbal testimony (formal, oral comments) regarding the proposed rule to list the alligator snapping turtle as a threatened species and the proposed 4(d) rule. While the public informational meeting will be an opportunity for dialogue with the Service, the public hearing is not. The public hearing portion is a forum for accepting formal verbal testimony. In the event there is a large attendance, the time allotted for oral statements may be limited. Therefore, anyone wishing to make an oral statement at the public hearing for the record is encouraged to provide a prepared written copy of their statement to us through the Federal eRulemaking Portal, or U.S. mail (see **ADDRESSES**, above). There are no limits on the length of written comments submitted to us. Anyone wishing to make an oral statement at the public hearing must register before the hearing (*https://www.fws.gov/southeast/lafayette/news/*). The use of a virtual public hearing is consistent with our regulations at 50 CFR 424.16(c)(3).

Reasonable Accommodation

The Service is committed to providing access to the public informational meeting and public hearing for all participants. Closed captioning will be available during the public informational meeting and public hearing. Further, a full audio and video recording and transcript of the public hearing will be posted online at *https://www.fws.gov/southeast/lafayette/news/* after the hearing. Participants will also have access to live audio during the public informational meeting and public hearing via their telephone or computer speakers. Persons with disabilities requiring reasonable accommodations to participate in the meeting and/or hearing should contact the person listed under **FOR FURTHER INFORMATION CONTACT** at least 5 business days prior to the date of the meeting and hearing to help ensure accessibility. An accessible version of the Service's public informational meeting presentation will also be posted online at *https://www.fws.gov/southeast/lafayette/news/* prior to the meeting and hearing (see **DATES**, above). See *https://www.fws.gov/southeast/lafayette/news/* for more information about reasonable accommodation.

Previous Federal Actions

On July 11, 2012, the Service received a petition to list 53 amphibians and reptiles across the United States, including the alligator snapping turtle (*Macrochelys temminckii*), as endangered or threatened species. On July 1, 2015, we published a 90-day finding (80 FR 37568) that the petition contained substantial information indicating the alligator snapping turtle may warrant listing. On September 1, 2015, the petitioner submitted supplemental information to add to the petition that described new studies that could lead to taxonomic differentiation of the single *Macrochelys* species into multiple entities (Center for Biological Diversity 2015, entire). This information was considered and is described in further detail below in the Background discussion under I. Proposed Listing Determination in this document. New information since the time of the original petition, including that submitted to supplement the petition, provided sufficient evidence to support splitting the alligator snapping turtle (*M. temminckii*) into two separate species based on genetic and morphological differences as well as geographic isolation, resulting in alligator snapping turtle (*M. temminckii*) and Suwannee alligator snapping turtle (*M. suwanniensis*). This proposed rule serves as the 12-month finding for the alligator snapping turtle (*M. temminckii*).

Supporting Documents

A species status assessment (SSA) team prepared an SSA report for the alligator snapping turtle (Service 2021, entire). The SSA team was composed of Service biologists, in consultation with other species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of factors (both

negative and beneficial) affecting the species in the past, present, and future. In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review of listing actions under the Act, we sought the expert opinions of eight appropriate specialists regarding the SSA report and received three responses. We also requested review of the model that was used in the SSA analysis; we sent it to three reviewers and received two responses. We received review from 14 partners, most of which are State agencies. The SSA report and other materials relating to this proposal can be found at *https://www.regulations.gov* under Docket No. FWS.

I. Proposed Listing Determination

Background

A thorough review of the taxonomy, distribution, life history, and ecology of the alligator snapping turtle (*Macrochelys temminckii*) is presented in the SSA report (Service 2021, pp. 3–16); however, much of this information is based on the *Macrochelys* genus as a whole and is not specific to the alligator snapping turtle. Turtles in the genus *Macrochelys* are the largest species of freshwater turtle in North America, are highly aquatic, and are somewhat secretive. *Macrochelys* turtles are characterized as having a large head, a long tail, and an upper jaw with a strongly hooked beak. They have three raised keels with posterior elevations on the scutes of the carapace (upper shell), which is dark brown and often has algal growth that adds to their camouflage. The eyes are positioned on the side of the head and are surrounded by small, fleshy, pointed projections that are unique to the genus. The common name for *M. temminckii* is alligator snapping turtle, or occasionally, western alligator snapping turtle to differentiate between this species and Suwannee alligator snapping turtle.

Alligator snapping turtles are primarily freshwater turtles in freshwater bodies centralized in the southeastern United States and are confined to river systems that flow into the Gulf of Mexico, extending from the Apalachicola River in Florida to the San Jacinto and Trinity rivers in Texas. In the Mississippi Alluvial Valley, the species is widely distributed from the Gulf to as far north as Indiana, Illinois, southeastern Kansas, and eastern Oklahoma. In the Gulf Coastal Plain, the species' range extends from eastern Texas to southern Georgia and northern Florida. Historically, the alligator snapping turtle occurred over eastern Oklahoma, but today it is believed to be restricted to the east-central and southeastern portion of the State (Ernst and Lovich 2009, p. 139).

The historical range of alligator snapping turtles included 14 States: Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Oklahoma, Tennessee, and Texas. Currently, the species is known to occur in 12 States: Alabama, Arkansas, Florida, Georgia, Illinois, Kentucky, Louisiana, Missouri, Mississippi, Oklahoma, Tennessee, and Texas. This list includes all historically occupied States except for Indiana and Kansas, where occurrence is unknown. The range of the species has contracted in many areas of the historical distribution. The species once occupied eastern Oklahoma, but today it is believed to be restricted to the east-central and southeastern portion of the State (Ernst and Lovich 2009, p. 139). In Indiana, alligator snapping turtle eDNA (genetic material found within the environment) has been collected in the water, but presence has not been confirmed with trapping. In Kansas, the species has not been detected since a 1991 record in Montgomery County. Range contractions or declines in the species' abundance have occurred in several States along the northern extent of the species' distribution, including Illinois, Missouri, Tennessee. The physiography of the coastal plain, particularly in the States of Alabama, Mississippi, and Louisiana, provides good habitat conditions for the species and supports greater number of alligator snapping turtles than the northern fringe of the range. The estimated abundance of the species is around 360,000 individuals (Service 2021, p. 55).

The alligator snapping turtle is a member of the Family Chelydridae, Order Testudinata, Class Reptilia. The species was first described in 1789 as *Testudo planitia,* but it was placed in the genus *Macrochelys* in 1856 (Gray 1856, entire). Although subsequent authors referred to the genus as *Macrochelys,* this placement was refuted, and it was believed the alligator snapping turtle should be included in the genus *Macroclemys* (Smith 1955, p. 16). In 1995, Webb demonstrated that the genus *Macrochelys* has precedence over *Macroclemys,* and the Society for the Study of Amphibians and Reptiles adopted this revision in 2000 (Crother et al. 2000, p. 79). Accordingly, for the purpose of this proposed rule, we will use the taxonomic nomenclature, *Macrochelys,* as the genus for the alligator snapping turtle (*Macrochelys temminckii*).

The alligator snapping turtle (*Macrochelys temminckii*) was considered a single, wide-ranging species until a recent analysis of variation in morphology and genetic structure among *M. temminckii* specimens resulted in differentiation of three species of alligator snapping turtles: alligator snapping turtle (*M. temminckii*), Apalachicola alligator snapping turtle (*M. apalachicolae*), and Suwannee alligator snapping turtle (*M. suwanniensis*) (Thomas et al. 2014, entire). Subsequent morphological and genetic comparisons did not support distinguishing *M. apalachicolae* from *M. temminckii* (Folt and Guyer 2015, entire). The herpetology community, including the Society for the Study of Amphibians and Reptiles, recognizes two species of *Macrochelys:* (1) *M. temminckii* and (2) *M. suwanniensis* (Crother 2017, p. 88). The Turtle Taxonomy Working Group also concurs with the recognition of two species and provides evidence to support the distinction of *M. temminckii* (Rhodin et al. 2017, p. 26). According to the best available science, we consider *M. temminckii* and *M. suwanniensis* as the only two distinct species within the genus.

Throughout this document, we provide descriptions of alligator snapping turtle where the information is available specific to the species. We reference *Macrochelys* when describing the genus and *M. temminckii* when referring to the species, alligator snapping turtle. Since the taxonomic distinction of the two *Macrochelys* spp. is relatively recent, we may refer to the genus, or alligator snapping turtles in general, to describe life-history traits.

Summary of Biological Status and Threats

In this discussion, we review the biological condition of alligator snapping turtle and its resources, and the threats that influence the species' current and future conditions, in order to assess the species' overall viability and the risks to that viability. We provide the best available information on the species' life history and the threats acting on the species as provided in the SSA report (Service 2021, entire).

To assess the current condition and abundance levels to inform the current and future conditions, we compared the historical and current ranges of alligator snapping turtles by querying State biologists or those with access to the State's natural heritage program data. We sought expert estimates, using a 4-point elicitation procedure in a written

questionnaire (Speirs-Bridge et al. 2010, p. 515). Experts were asked to respond only for those analysis units for which they have experience or expertise. Experts were asked to provide what they estimated to be the lowest likely number, the highest likely number, and the most likely number of alligator snapping turtles in each analysis unit. They were then asked to report how confident they were that their interval (lowest estimate to highest estimate) captured the actual number of alligator snapping turtles (akin to a confidence interval). Finally, the experts were asked to describe how they generated their estimates (Service 2021, p. 51).

We also elicited information about the prevalence of negative and positive influences on alligator snapping turtles in each analysis unit. Using the same 4-point elicitation format, we asked the species experts to estimate the extent of occupied area in each analysis unit where alligator snapping turtles are exposed to each of the following threats: incidental hooking on trot and limb lines, commercial fishing bycatch, legal collection or harvest, illegal collection or harvest (poaching), and nest predation by subsidized or nonnative predators. In addition, we asked experts to describe and estimate the spatial extent of any other threats known to occur in their analysis units, as well as any conservation actions that are being implemented (Service 2021, pp. 51–52). In addition to soliciting information from the expert team about the spatial extent of different threats in each analysis unit, we also asked about the demographic impact of different threats rangewide. We used the 4-point elicitation to receive information regarding the effects that commercial bycatch, incidental hooking, hook ingestion, legal harvest, illegal harvest, and nest predation have on the survival of relevant life stages (adults, juveniles, hatchings, nests) in areas where the threat occurs. Given a lack of species-specific information in some places, we used this process to inform our analysis.

Biology

The alligator snapping turtle is found in a variety of habitats across its range. It typically uses fresh waterbodies; however, it can presumably tolerate some salinity and brackish waters, as barnacles have been found on the carapace of some turtles (Ernst and Lovich 2009, p. 141). The river systems within the species' range drain into the Gulf of Mexico, where there can be an increase in salinity near the mouths of the rivers. The species is generally found in deeper water of large rivers and their major tributaries; however, it is also found in a wide variety of habitats, including small streams, bayous, canals, swamps, lakes, reservoirs, ponds, and oxbows (a lake that forms when a meander of a river is cut off) (Ernst and Lovich 2009, p. 141).

The species is usually bottom-dwelling within the waterbodies it uses, but it surfaces periodically to breathe (Thomas 2014, p. 60). Adult females leave the water to nest on land. Beyond the nest, all life stages rely on submerged material (*i.e.,* deadhead logs and vegetation) as important structure for resting, foraging, and cover from predators (Enge et al. 2014, p. 39). Woody debris, undercut banks, and large rocks found throughout the rivers provide important habitat during low water levels (Enge et al. 2014, p. 10). The species selects areas with more aquatic structures (*e.g.,* tree root masses, stumps, submerged trees, etc.) than open water. Riparian canopy cover is also an important habitat feature, as alligator snapping turtles select sites with a high percentage of canopy cover (Howey and Dinkelacker 2009, p. 589).

The alligator snapping turtle is primarily carnivorous and forages on small fish and mussels; however, adults are opportunistic feeders and may also consume crayfish, mollusks, smaller turtles, insects, nutria, snakes, birds, and plant material such as acorns or other available vegetation (Elsey 2006, pp. 448–489). They have very fast reflexes and powerful jaws that aid in this type of foraging behavior where they sit and wait, then quickly strike, grasping the prey. *Macrochelys* turtles have a sublingual (under the tongue) feature that is unique to the genus and contributes to their predatory foraging strategy; it resembles a live, wiggling worm and serves as a lure to attract fish and other unsuspecting prey while the turtle is stationary with an open mouth. Both adults and juveniles use this lure to attract fish in striking range. The lure is white or pale pink in juveniles and mottled or gray in adults (Ernst and Lovich 2009, p. 147). The presence of this appendage indicates prey species that use visual cues, such as fish and aquatic crustaceans, and has contributed to the evolution of the alligator snapping turtle in developing this unique adaptation of the genus.

The general life stages of *Macrochelys* can be described as egg, hatchling (first year), juvenile (second year until age of sexual maturity), and adult (age of sexual maturity through death). Sexual maturity is achieved in 11 to 21 years for males and 13 to 21 years for females and may be dependent upon growth rate (Ernst and Lovich 2009, p. 144; Reed et al. 2002, p. 4). The size increases are greater when food resources and other environmental conditions are more favorable.

Each life stage has specific requirements in order to contribute to the productivity of the next life stage. Gravid (egg-bearing) females excavate nests in sandy soils or other dry substrate near freshwater sources that are within 8 to 656 feet (ft) (2.5 to 200 meters (m)) from the water's edge. The period for excavating, laying eggs, and covering the nest may take as long as 4 hours to complete (Ewert 1976, p. 153). The incubation period for alligator snapping turtle nests in Louisiana is between 98 to 121 days (Holcomb and Carr 2011, p. 225).

Nests require temperatures of 66 to 80 degrees Fahrenheit (°F) (19 to 26.5 degrees Celsius (°C)), increasing to 79 to 98 °F (26.1 to 36.5 °C) as the season progresses. The sex ratio of alligator snapping turtles in the nest is dependent on the temperature of the nest during embryonic development. The offspring's sex is influenced by the physiological mechanism—temperature-dependent sex determination—where more males are produced at intermediate incubation temperatures, and more females are produced at the two, warmer and cooler, temperature extremes (Ernst and Lovich 2009, pp. 16, 146). Alligator snapping turtles, in general, have a pivotal temperature range between 77 and 80.6 °F (25 and 27 °C) where more male hatchlings are produced than females (Ewert and Jackson 1994, pp. 12–13).

Once emerged from the nest, hatchlings need shallow water with riparian vegetative structure that provides canopy cover. Juveniles require small streams with mud and gravel bottoms that have submerged structures, such as tree root masses, stumps, and submerged live and dead trees, that allow for foraging and protection from predators. Juvenile survival rate is estimated at only about 5 percent, with most mortality occurring in the first 2 years of life (Ernst and Lovich 2009, p. 150).

Adult alligator snapping turtles require streams and rivers with submerged logs and undercut banks, clean water, and ample prey. Turtles found in higher quality habitat are more likely to become sexually mature at an earlier age and may also produce larger clutch sizes (Ernst and Lovich 2009, p. 145). Adult turtles require access to mates to fertilize eggs, with mating occurring underwater (Ernst and Lovich 2009, p. 144). Mating has been observed in captive alligator snapping turtles from February to October, but geographic variation within the wild

population is not well understood (Reed et al. 2002, p. 4). A gravid female will search for suitable nesting habitat on land to construct a nest, avoiding low forested areas with abundant leaf litter and root mats that may cause nesting obstructions. She will excavate a cavity, deposit the eggs, and bury the eggs at a depth of about 9.45 inches (in) (24 centimeters (cm)) in approximately 3.5 to 4 hours (Ewert 1976, p. 153; Powders 1978, p. 155; Thompson et al. 2016, entire). Once the female has completed the nest, she returns to the water, and there is no other parental care of the nest or offspring.

Female alligator snapping turtles may produce a single clutch once a year or every other year at most, even if the conditions are good (Reed et al. 2002, p. 4). Clutch size varies as reported from across the species' range with a mean clutch size of 27 eggs (Ernst and Lovich 2009, p. 145). Most nesting occurs from May to July (Reed et al. 2002, p. 4), but latitudinal differences are known to occur in turtle species (Moll 1979, entire).

Alligator snapping turtles are a long-lived species; provided suitable conditions, adults can reach carapace lengths of up to 29 in (74 cm) and 249 pounds (113 kilograms (kg)) for males, while females can reach lengths of 22 inches and 62 pounds. The oldest documented *Macrochelys* turtle in captivity survived to at least 80 years of age, but in the wild, the species may live longer (Ernst and Lovich 2009, p. 147). The generation time for the species is around 31 years (range = 28.6–34.0 years, 95 percent confidence interval; Folt et al. 2016, p. 27).

Threats

We provide information regarding past, present, and future influences, including both positive and negative, on the alligator snapping turtle's current and future viability including harvest/collection (Factor B), bycatch (Factor E), habitat degradation and loss (Factor A), nest predation (Factor C), and conservation measures that provide protections for the species. Existing regulatory mechanisms (Factor D) have not been adequate to reduce or ameliorate the identified threats. Additional threats such as historical commercial and recreational harvest targeting the species, disease, nest parasites, and climate change effects are described in the SSA report (Service 2021, pp. 17–27); these additional stressors may negatively affect individuals of the species or may have historically affected the species, particularly when compounded with other ongoing stressors or threats. However, based on the best available science, they do not currently pose a threat to the species' overall viability.

Harvest (Commercial, Recreational, and Poaching)

Commercial and Recreational Harvest—Past commercial and recreational turtle harvesting practices have resulted in a decline of the alligator snapping turtle across its range (Enge et al. 2014, p. 4; Huntzinger et al. 2019, p. 65). Commercial harvest of alligator snapping turtles reached its peak in the late 1960s and 1970s, when the meat was used for commercial turtle soup products and sold in large quantities for public consumption. In addition, many restaurants served turtle soup and purchased large quantities of alligator snapping turtles from trappers in the southeastern States (Reed et al. 2002, p. 5). In the 1970s, the demand for turtle meat was so high that as much as three to four tons of alligator snapping turtles were harvested from the Flint River in Georgia per day (Pritchard 1989, p. 76). Significant numbers of turtles were taken from the Apalachicola and Ochlocknee Rivers, presumably to be sent to restaurants in New Orleans and other destinations (Pritchard 1989, pp. 74–75). Commercial harvest of alligator snapping turtles is now prohibited in all States within the species' range, effective from 1975 in Kentucky to as recently as 2012 in Alabama (Service 2021, Appendix B). Despite the prohibitions on commercial harvest for the species, the impacts from historical removal of large turtles continue to affect the species due to its low fecundity, low juvenile survival, long lifespan, and delayed maturity. Commercial harvest is not currently a threat to the alligator snapping turtle, but the effects of historical, large-scale removal of large turtles are ongoing.

Recreational harvest includes trapping alligator snapping turtles for personal use. Recreational harvest is prohibited in every State except for Louisiana and Mississippi. In Louisiana, harvest of one alligator snapping turtle per day, per person, per vehicle/vessel is allowed with a fishing license; however, there are no reporting or tagging requirements, so the number of turtles harvested in Louisiana is unknown. In Mississippi, recreational harvest is allowed with size and seasonal limits that include the following: (1) Limited to one turtle per year, (2) prohibited between April 1 and June 30, and (3) limited only to individuals with a straight-line carapace length of 24 in (61 cm) or larger.

Illegal Harvest (Poaching)—There is an international and domestic demand for turtles for consumption as well as from enthusiasts who collect turtle species for pets (Stanford et al. 2020, entire). The alligator snapping turtle is no exception; hatchling alligator snapping turtles may be sold for up to $100 (U.S.) per turtle (Lejeune et al. 2020, p. 8; MorphMarket 2021, unpaginated). Illegal harvest, or poaching, of alligator snapping turtle may occur anywhere within the species' range for both the pet trade and turtle meat trade. The best available information regarding potential pressure from poaching comes from a documented report by law enforcement agencies and court cases. In a 2017 case, three men were convicted of collecting 60 large alligator snapping turtles in a single year in Texas and transporting them across State lines, violating the Lacey Act (18 U.S.C. 42; 16 U.S.C. 3371–3378) (Department of Justice 2017, entire).

Aside from the local and domestic use of turtles, the global demand for pet turtles and turtle meat continues. Many species of turtles are collected from the wild as well as bred in captivity and are sold domestically and exported internationally. Many species of turtles are regularly exported out of the United States to initiate brood stock for overseas turtle farms and for turtle collectors (Stanford et al. 2020, p. R725. In 2006, *Macrochelys temminckii* was listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as an Appendix III species to allow for better monitoring of exports. According to the Service's Law Enforcement Management Information System (LEMIS), which provides reports about the legal international wildlife trade, most shipments of live alligator snapping turtles exported from 2005 to 2018 consisted of small turtles destined mostly for Hong Kong and China (Service 2018, entire). Prior to 2006, up to 23,780 *M. temminckii* per year were exported from the United States (70 FR 74700; December 16, 2005).

Impacts of Harvest—The alligator snapping turtle's life history, with delayed maturity, long generation times, and relatively low reproductive output, means that the species must maintain relatively high adult survival rates (~98 percent), especially of adult females, to sustain a stable population (Reed et al. 2002, p. 11). Adult turtles do not reach sexual maturity until 11 to 21 years of age. A mature female typically produces a single clutch per year with a mean size of 27 eggs (range 9 to 61 eggs) (Ernst and Lovich 2009, p. 145). These turtles are characterized by low survivorship in early life stages, but surviving

individuals may live many decades once they reach maturity. The life-history traits of the species (low fecundity, late age of maturity, and low survival of nests and juveniles) contribute to the population's slow response in rebounding after historical over-exploitation. Therefore, population growth rates are extremely sensitive to the harvest of adult females. Adult female survivorship of less than 98 percent per year is considered unsustainable, and a further reduction of this adult survivorship will generally result in significant local population declines (Reed et al. 2002, p. 9), although dynamics likely vary across the species' range. These data underscore how influential adult female mortality is on the ability of the species to maintain viable populations.

Although regulatory harvest restrictions have reduced the number of alligator snapping turtles taken from wild populations, the populations have not necessarily increased in response. This lag in population response is likely due to the demography of the species—specifically delayed maturity, long generation times, and relatively low reproductive output.

Poaching also is an ongoing threat to the alligator snapping turtle because removing reproductively active adult turtles from the population lowers the viability of the species by reducing reproductive potential; in addition, the species is long-lived and slow to mature, and juvenile survival is very low, making it more difficult for the historically over-harvested population to recover.

Recreational and Commercial Fishing Bycatch

Alligator snapping turtles can be killed or harmed incidentally during fishing and other recreational activities. Some of these threats from recreational and commercial fishing for other species include fishhook ingestion; drowning when hooked on trotlines (a fishing line strung across a stream with multiple hooks set at intervals), limb lines, bush hooks (single hooks hung from branches), or jug lines (line with a hook affixed to a floating jug); and injuries and drowning when entangled in various types of nets and fishing line. Hoop nets are also used to capture catfish and baitfish and are made up of a series of hoops with netting and funnels where fish enter but are unable to escape through the narrow entry point. The baited nets are left submerged and may entrap alligator snapping turtles that enter the mouth of the traps and are unable to escape. Boats and boat propeller strikes may also injure or kill alligator snapping turtles; this effect is not limited to fishing boats.

Actively used or discarded fishing line and hooks pose harm to alligator snapping turtles. The turtles can ingest baited fishhooks and the attached fishing line that may cause internal injuries; depending on where ingested hooks and line lodge in the digestive tract, they can cause harm or death (Enge et al. 2014, pp. 40–41). For example, hooks and fishing lines can cause gastrointestinal tract blockages, and the hooks can puncture the digestive organs causing deadly injuries (Enge et al. 2014, pp. 40–41). Fishhooks have been found in the gastrointestinal tracts of many radiographed congener, Suwannee alligator snapping turtles (Enge et al. 2014, entire; Thomas 2014, pp. 42–43). It is reasonable to assume fishhooks also affect alligator snapping turtles because both species only differ with minor skull and shell morphologies.

Trotlines also negatively affect alligator snapping turtles. Trotlines are a series of submerged lines with hooks off a longer line. Trotline fishing involves leaving the lines unattended for extended periods, before returning to check them. Limblines and bush hooks are similar to trot lines in that they are typically set and left unattended; however, they only use a single hook. The turtles can become entangled in the lines and drown, as well as ingest the hooks and attached lines, also causing drowning or internal injuries.

Bycatch from trotlines that resulted in mortality of alligator snapping turtles has been well documented. Dead turtles have been found on lines that had been abandoned or left without being checked for catches (Huntzinger et al. 2019, p. 73; Moore et al. 2013, p. 145). The lines and hooks may also become dislodged from their place of attachment when left unattended, becoming aquatic debris that remains in the waterway for extended periods of time and may continue to be an entanglement hazard for many species, including alligator snapping turtles. Entanglement in lines can cause injury or death as lines may ensnare limbs or wrap around the body or head restricting movement. Some types of fishing line may remain in the environment for decades and possibly centuries; however, biodegradable lines are now available that break down faster over a period of a few years. The use of biodegradable fishing line will reduce the amount of excess discarded lines remaining in the environment and is an option to further reduce the threat of entanglement in fishing lines.

Habitat Degradation and Loss

Alligator snapping turtle aquatic and nesting habitats have been altered by natural and anthropogenic disturbances. Changes in the riparian or nearshore areas affect the amount of suitable soils for nesting sites because the species constructs nests on land near the water. Riparian cover is important, as it moderates instream water temperatures and dissolved oxygen levels. In addition to affecting the distribution and abundance of alligator snapping turtle prey species, these microhabitat conditions affect the snapping turtles directly. Moderate temperatures and sufficient dissolved oxygen levels allow the turtles to remain stationary on the stream bottom for longer periods, increasing the ambush foraging opportunities. Changes in the riparian structure may affect the microclimate and conditions of the associated water body, directly affecting the foraging success of the turtles.

Activities and processes that can alter habitat include dredging, deadhead logging (removal of submerged or partially submerged snags, woody debris, and other large vegetation for wood salvage), removal of riparian cover, channelization, stream bank erosion, siltation, and land use adjacent to rivers (*e.g.,* clearing land for agriculture). These activities negatively influence habitat suitability for alligator snapping turtles. Erosion can change the stream bank structure, affecting the substrate that may be suitable for nesting or accessing nesting sites. Siltation affects water quality and may reduce the health and availability of prey species. Channelization destroys the natural benthic habitat by affecting the water depth and normal flow. Submerged obstacles may be removed during the channelization, which affects the microhabitat dynamics within the waterway and removes important structures for alligator snapping turtles to use for resting, foraging, and cover from predators. Deadhead logs and fallen riparian woody debris, where present, provide refugia during low-water periods and resting areas for all life stages and support important feeding areas for hatchlings and juveniles (Enge et al. 2014, p. 40; Ewert et al. 2006, p. 62).

Alligator snapping turtle habitat is also influenced by water availability, quantity, and quality across the species' range. Groundwater withdrawals may increase in the future due to human population growth and needs. Water withdrawals may reduce flow in some rivers and streams, effectively isolating some turtles from the rest of the

population or making immature turtles more vulnerable to predators. Additionally, reduced water levels may impact prey abundance and distribution through restricting habitat connectivity, reducing dissolved oxygen levels, and increasing water temperatures. The species is not very agile on land as it spends most of its time in water. Moving from an area where water has been depleted may be difficult for some turtles, forcing them to cross roads, resulting in increased encounters with humans or predators.

Water quality may also be a factor for alligator snapping turtles as contaminants enter the aquatic systems through runoff. Runoff from agriculture and development degrade the water quality. Agricultural practices are the main source of nitrates, which specifically come from fertilizers and in some cases from manure and other waste products. They introduce nitrates to the river and groundwater (*i.e.,* springs) through surface runoff and groundwater seepage. Groundwater seepage transports nitrates to the aquifer, which then reemerge through springs and other groundwater discharge, especially during low flow periods (Pittman et al. 1997, entire; Katz et al. 1999, entire; Thom et al. 2015, p. 2).

Water quality is also affected by runoff from development and urban areas. The increase of impervious surfaces, such as building roofs, roads, parking lots, and sidewalks, results in pulses of contaminants washed into the river systems as stormwater runoff. Some of the pollutants that may flush into the aquatic system include petroleum products, pesticides, heavy metals, organic waste from pets and other animals, along with microorganisms, including viruses and bacteria.

The direct effects of water quality and water quantity on alligator snapping turtle have not been quantified; however, as the human population that relies on water systems in the species' range continues to increase, the indirect effects across the entire range, coupled with other stressors, are likely to further reduce the species' viability. Also, more development may result in an increase in contaminated runoff and declines in water quality.

Nest Predation

Nest predation rates for alligator snapping turtles are high. Raccoons (*Procyon lotor*) are common nest predators, but nine-banded armadillos (*Dasypus novemcinctus*), Virginia opossums (*Didelphis virginiana*), bobcats (*Lynx rufus*), crows (*Corvus* spp.), coyotes (*Canis latrans*), river otters (*Lontra canadensis*), and feral pigs (*Sus scrofa*) may also depredate nests (Ernst and Lovich 2009, p. 149; Ewert et al. 2006, p. 67; Holcomb and Carr 2013, p. 482). Additional nonnative species found within the species' range that may depredate nests include invasive imported fire ants (*Solenopsis invicta* and *S. richteri*) (Pritchard 1989, p. 69). Fire ants are prevalent in many areas of the southeastern United States, and predation by fire ants was the suspected culprit in the failure of alligator snapping turtle nests in Louisiana (Holcomb 2010, p. 51). Beyond nest failure, some hatchlings endured wounds inflicted by fire ants that led to the loss of a limb or tail, which reduced their mobility and, ultimately, their chance of survival (Holcomb 2010, p. 72).

The recovery of the species from historical overharvest depends on successful reproduction and survival of young. The degree of added threat from the newer, introduced nest predators is unknown, but we can conclude that the overall threat from nest predation is greater than it was in the past because of the introduced predators and densities of subsidized (anthropogenically influenced) nest predators increase in areas where resources have been altered by humans. Subsidized nest predators include, but are not limited to, feral hogs, raccoons, and red-imported fire ants; additional nest predators may also include Virginia opossums, crows, coyotes, dogs, and river otters. Many of these predators may also take small turtles once emerged from the nest; this predation influences the survival rate of the hatchling and juvenile life stage. Coupled with other threats, predation will continue to negatively affect the species' overall viability.

Other Stressors

Other stressors that may affect alligator snapping turtles include disease, nest parasites, and the effects of climate change, but none of these stressors are having population-level impacts. These stressors may act on individuals or have highly localized impacts. While each is relatively uncommon, these stressors may exacerbate the effects of other ongoing threats.

The effects of climate change may have direct and indirect impacts to the species and its habitat. Due to the proximity of the species to the Gulf of Mexico, loss of habitat due to saltwater intrusion from sea level rise may occur for the populations near coastal areas leading to a range contraction in the southern extent of the species' range. Additionally, increasing temperatures may lead to drought conditions and variable water availability, and physiological impacts on sex determination. In the southeastern United States, temperatures are predicted to warm by 4 to 8 °F (2.2 to 4.4 °C) by 2100 (Carter et al. 2014, p. 399). In the southern Great Plains (*e.g.,* Texas and Oklahoma), increased temperatures and longer dry spells are predicted (Shafer et al. 2014, p. 445). In the Midwest, the northernmost portion of the alligator snapping turtle's range, models predict warming of 5.6 to 8.5 °F (3.1 to 4.7 °C) by 2100, increased spring precipitation, and decreased summer precipitation (Pryor et al. 2014, pp. 420, 424).

Alligator snapping turtles exhibit temperature-dependent sex determination, whereby temperature influences sex determination of the developing embryos. Male-biased sex ratios are associated with cool nests, and warmer temperatures produce female-biased sex ratios (Ewert and Jackson 1994, entire). In addition to temperature effects on sex ratio, temperature has been associated with nest viability, with greatest success in nests with intermediate sex ratios (produced at intermediate temperatures) and lowest in nests with female-biased sex ratios (produced at warmer temperatures) (Ewert and Jackson 1994, p. 28–29). Thus, alligator snapping turtle nests with strongly female-biased sex ratios and declining viability may result from warming temperatures in the future.

Climate conditions also appear to limit the distribution of alligator snapping turtles. Their distribution appears to be limited by low precipitation on the western edge of the range, and by temperature along the northern edge of the range (Thompson et al. 2016, pp. 431–432). At these northern limits of the range, adult alligator snapping turtles can survive, but they face constraints on reproduction imposed by the influence of temperature on embryonic development (Thompson et al. 2016, pp. 431–432). Warmer conditions may shift the suitable range of the species farther north as northern latitudes become able to meet the incubation temperature ranges for viable nests.

Additional information on these stressors acting on the species, including a more detailed discussion of the historical and current threats that have caused and are causing a decline in the species' viability, is available in the species' SSA report under ''Factors Influencing Viability'' (Service 2021, pp.

17–27). The primary threats currently acting on the species include harvest/collection, nest predation, habitat loss and degradation, and bycatch (hook ingestion, entanglement, and drowning) due to recreational and commercial fishing. These primary threats are not only affecting the species now but are expected to continue impacting the species and are included in the species' future condition projections in the SSA (Service 2021, pp. 59–84).

Regulatory Protections

Several local, State, and Federal regulatory mechanisms offer some protections to the alligator snapping turtle and its habitat.

Federal Protections

Federal Lands—The species' range encompasses areas of public land. Many Federal lands are protected from future development and degradation. Many sites are managed for species conservation and preservation of habitat. Some of the Federal lands that fall within the species' range are managed by the Department of Agriculture (U.S. Forest Service), Department of Interior (National Park Service (NPS) and U.S. Fish and Wildlife Service), Department of Defense (U.S. Army, U.S. Navy, U.S. Air Force, and U.S. Army Corps of Engineers), and National Aeronautics and Space Administration (NASA).

Department of Agriculture—National Forests are managed by the U.S. Forest Service with the mission to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. Several National Forest lands are within the range of the alligator snapping turtle. Forestry activities on National Forests within the range of the alligator snapping turtle, including timber harvest and activities that may increase sedimentation or erosion when not following best management practices, could have adverse impacts on the species; however, when conducting any forestry activities, the U.S. Forest Service applies best management practices that reduce impacts to the species' aquatic and riparian habitats. The U.S. Forest Service also cooperates with State and local governments, forest industries, other private landowners and forest users in the management, protection, and development of forest land in non-Federal ownership. Activities include cooperation in urban interface fire management and urban forestry.

Department of Interior (National Park Service)—Alligator snapping turtle habitat extends across many NPS units in the Midwest, Intermountain, and Southeast regions. The species may occur in up to the following 11 units of the NPS or be found adjacent to those areas: Arkansas Post National Memorial, Big Thicket National Preserve, Buffalo National River, Cane River Creole National Historical Park, Gulf Islands National Seashore, Hot Springs National Park, Jean Lafitte National Historical Park and Preserve, Natchez Trace Parkway, Ozark National Scenic Riverways, Shiloh National Military Park, and Vicksburg National Military Park. Under the NPS' Organic Act (54 U.S.C. 100101 *et seq.*), the NPS promotes and regulates the use of Federal areas known as national parks, monuments, and reservations to conserve the scenery and the natural and historic objects and the wildlife and to provide for the enjoyment of future generations. The land within the NPS units is protected from future development and provides a level of protection to the species and its habitat.

Department of Interior (U.S. Fish and Wildlife Service)—National Wildlife Refuges are units managed by the Service's National Wildlife Refuge System (NWRS). The mission of the NWRS is to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. Each refuge is established to serve a statutory purpose that targets the conservation of native species dependent on its lands and waters. All activities on those acres are reviewed for compatibility with this statutory purpose.

There may be up to 50 National Wildlife Refuges with alligator snapping turtle occurrences. These lands are managed according to the designated purpose of the refuge and include conservation actions that reduce impacts from habitat loss, invasive species, pesticides and other contaminants, and climate change. These Federal lands are protected from future development and will continue contributing to the support of viable populations of alligator snapping turtles.

Department of Defense Lands—Alligator snapping turtles are found on many Department of Defense (DOD) military installations and lands across the species' range. The Sikes Act (16 U.S.C. 670 *et seq.*) requires DOD installations to conserve and protect the natural resources within their boundaries. Integrated natural resources management plans (INRMPs) are planning documents that outline how each military installation with significant natural resources will manage those resources, while ensuring no net loss in the capability of an installation to support its military testing and training mission for national security. While most INRMPs do not specifically manage for the alligator snapping turtle, some examples of management that provide for the conservation of the species on installations include INRMPs that incorporate guidance provided by the State wildlife action plan (*e.g.,* Ft. Chaffee Maneuver Training Center (Arkansas) INRMP, p. 12), direction to implement project design considering State-listed species with best management practices for all activities (*e.g.,* Red River Army Depot (Texas) INRMP, p. 48), and identifying alligator snapping turtle as a species of concern, with direction to apply management consistent with maintenance of reference stream conditions or offer direct measures to enhance habitat for this and other rare species (*e.g.,* Ft. Benning (Georgia) INRMP, pp. 28, 209–210).

Federal Laws

Clean Water Act (33 U.S.C. 1251 et seq.*)*—Section 401 of the Federal Clean Water Act (CWA) requires that an applicant for a Federal license or permit provide a certification that any discharges from the facility will not degrade water quality or violate water-quality standards, including State-established water quality standard requirements. Section 404 of the CWA establishes programs to regulate the discharge of dredged and fill material into waters of the United States.

Permits to fill wetlands; to install, replace, or remove culverts; to install, repair, replace, or remove bridges; or to realign streams or water features that are issued by the State or U.S. Army Corps of Engineers under nationwide, regional general permits or individual permits include:

- Nationwide permits for ''minor'' impacts to streams and wetlands that do not require an intense review process. The impacts allowed under nationwide permits usually include projects affecting stream reaches less than 150 ft (45.72 m) in length, and wetland fill projects up to 0.50 acres (ac) (0.2 hectare (ha)). Mitigation is usually provided for the same type of wetland or stream impacted and is usually at a 2:1 ratio to offset losses.
- Regional general permits for various specific types of impacts that are common to a particular region. These

permits will vary based on location in a certain region/State.

• Individual permits for larger, higher impact, and more complex projects. These require a complex permit process with multi-agency input and involvement. Impacts in these types of permits are reviewed individually, and the compensatory mitigation chosen may vary depending on the project and types of impacts.

CWA regulations ensure proper mitigation measures are applied to minimize the impact of activities occurring in streams and wetlands where the species occurs. These regulations contribute to the conservation of the species by minimizing or mitigating the effects of certain activities on alligator snapping turtles and their habitat.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)—The alligator snapping turtle is included in the CITES Appendix III species list (70 FR 74700; December 16, 2005). CITES requirements include permits for exports of Appendix III species, as well as annual reporting; annual reports must include the number of exported individuals of listed species. These requirements help control and document legal, international trade. Thus, Appendix-III listings lend additional support to State wildlife agencies in their efforts to regulate and manage these species, improve data gathering to increase knowledge of trade in the species, and strengthen State and Federal wildlife enforcement activities to prevent poaching and illegal trade.

While CITES reporting indicates the number of turtles exported with other relevant data, the information required for the export reports does not always accurately identify the source stock of the exported turtle(s). Most alligator snapping turtles that were exported between 2005 and 2018 were identified as ''wild'' individuals; however, there is uncertainty regarding whether the source of the turtles was farmed parental stock or wild-caught (Service 2018, entire). The discrepancy in reporting the actual source of the internationally exported turtles does not allow us to easily evaluate the impact of export on the alligator snapping turtle. Additionally, there are no reporting requirements to track domestically traded alligator snapping turtles, which are not included in CITES reporting.

State Protections

The alligator snapping turtle has regulatory protections in all States where the species occurs. The species is listed as a threatened species in Florida, Georgia, Kentucky, and Texas, and as an endangered species in Illinois and Indiana. Alabama identifies the species as a ''species of concern''; Kansas and Oklahoma list the species as a ''species of greatest conservation need''; Missouri lists the species as an ''imperiled species''; Tennessee lists the species as ''rare to very rare and imperiled.'' Louisiana lists the species as a species of conservation concern and allows legal take of up to one turtle per day, per person, per vehicle/vessel with a fishing license. Arkansas does not have a State list of protected species; however, it provides protections through the State's aquatic turtle regulations. Mississippi allows legal take; however, it restricts the take to one alligator snapping turtle no smaller than 24 in (61 cm) carapace length in a single year. Despite the likely extirpation of the species in Kansas, the species was originally listed as a threatened species in the State in 1978; then, due to lack of information on the species, the status was changed to ''species of greatest conservation need'' in 1987, when the species was still found in low numbers (Shipman et al. 1995, pp. 83–84). Although we have no information as to the effectiveness of these State regulations as they pertain to the conservation of the alligator snapping turtle, one benefit of being State-listed is to bring heightened public awareness of the species' need for protection.

Conservation Measures

Below, we describe conservation measures in place for the alligator snapping turtle. While many efforts are directed to *Macrochelys* in general, we describe those that affect only the alligator snapping turtle.

Surveys

Many State agencies are conducting surveys for alligator snapping turtles to better understand the species' status. Additionally, other organizations and universities are conducting monitoring and research projects that are ongoing or planned.

Captive Rearing and Release/Head-Starting

A captive breeding program at Tishomingo National Fish Hatchery in Oklahoma was initiated in 1999, to produce head-started alligator snapping turtles for reintroduction (Riedle et al. 2008a, p. 25). The program rears and releases small turtles to contribute to the conservation of the species by raising hatchling turtles to an age that increases their chance of survival. This program has successfully released alligator snapping turtles since 2002 to the present in areas where populations have been lost or are declining. Many of the turtles are monitored after release to provide information about the life history of the species. From 2008 to 2010, 246 head-started juveniles (3 to 7 years old) were released in the Caney River in northeastern Oklahoma and were monitored until 2012; 59 percent of released turtles survived (Anthony et al. 2015, pp. 44–47).

In 2007, 249 adult turtles (confiscated from a turtle farm in violation of its permits) and 16 juveniles (from Tishomingo National Fish Hatchery) were released into seven sites in southern Oklahoma, and follow-up monitoring occurred during May through August in 2007 and 2008 (Moore et al. 2013, p. 141). There were only seven confirmed instances of mortality, all within the first year after release, resulting from drowning on trotlines, a gunshot wound, and other suspicious circumstances (Moore et al. 2013, p. 144). When viable nests were found during follow-up surveys, they were covered with a mesh predator exclusion device. Only one viable nest was found during 2007 or 2008, while 25 depredated nests were found, which nevertheless indicates that released adults survived and were reproducing (Moore et al. 2013, p. 144). Mean annual survivorship post-release was estimated to be 59 percent, 70 percent, and 100 percent for turtles aged 3, 4, and 5 at release, respectively (older turtles were not included in analysis due to low sample sizes) (Anthony et al. 2015, p. 46).

Head-starting, reintroduction, and monitoring of alligator snapping turtles were conducted between 2014 and 2016 in Illinois, Louisiana, and Oklahoma (Dreslik et al. 2017, entire). Released turtles included head-started juveniles, confiscations by law enforcement, classroom turtle-rearing programs, and other captive breeding programs (Dreslik et al. 2017, pp. 6, 13). Across three States (one site each in Oklahoma and Illinois, two sites in Louisiana), 548 turtles were released, the majority of which (465) were head-started at the Tishomingo National Fish Hatchery in Tishomingo, Oklahoma, and 372 of these were tracked using radiotelemetry (Dreslik et al. 2017, p. 22). Between 21.7 percent and 28.8 percent of released juveniles were confirmed dead within the first year, primarily from predation by raccoons, while 35.6 percent to 54.2 percent experienced radio transmitter failures and could not successfully be tracked (Dreslik et al. 2017, p. 19). The greatest predictors of survival for released juveniles were size at release, age, and time of year. Larger, older

turtles had higher survival rates than smaller, younger turtles, and survival was lower over winter than other seasons (Dreslik et al. 2017, pp. 22–25).

Repatriation Efforts

Repatriation of wild turtles serves to return illegally poached turtles to wild populations from the areas of origin. In July 2021, 30 alligator snapping turtles that were confiscated in a law enforcement case were released into their river basins of origin in eastern Texas. The turtles were illegally poached from Texas and transported to Louisiana. Texas Game Wardens and the Service's Office of Law Enforcement investigated the poaching and seized the turtles in 2016. This release was a collaborative effort including many organizations and agencies including the Service, Texas Parks and Wildlife Department, Stephen F. Austin State University, Sabine River Authority, Northeast Texas Municipal Water District, the U.S. Army Corps of Engineers, Houston Zoo, and the Turtle Survival Alliance, among others. Repatriation efforts like this one not only provide for the survival of the confiscated turtles, but also contribute to public awareness of the species and its threats.

Farming

Alligator snapping turtles are bred and raised in farming facilities for the purpose of supplying small turtles to collectors in the United States and abroad. The farming operations are permitted and regulated by States. Export of turtles is regulated through CITES Appendix III, requiring information such as the source of the turtles and other relevant information. Farm-raised turtles supplement the demand for domestic pet trade and international trade (*i.e.,* turtle meat for consumption and the pet trade), which may alleviate harvest pressure on wild individuals.

State and Federal Stream Protections

Structural features within the water are important components of the habitat for alligator snapping turtles. Submerged and partially submerged vegetation provide feeding and sheltering areas for all age classes. The structural diversity and channel stabilization created by instream woody debris provides essential habitat for spawning and rearing aquatic species (Bilby 1984, p. 609; Bisson et al. 1987, p. 143). Snag or woody habitat was reported as the major stable substrate in southeastern Coastal Plain sandy-bottom streams and a site of high invertebrate diversity and productivity (Wallace and Benke 1984, p. 1651). Wood enhances the ability of a river or stream ecosystem to use the nutrient and energy inputs and has a major influence on the hydrodynamic behavior of the river (Wallace and Benke 1984, p. 1643). One component of this woody habitat is deadhead logs, which are sunken timbers from historical logging operations. Deadhead logging is the removal of submerged cut timber from a river or creek bed and banks. However, some State regulations minimize the impact of deadhead logging on alligator snapping turtle; for example, some States regulate deadhead logging and allow it with a permit with variable conditions (*e.g.,* Alabama, Florida, and Louisiana). The removal of submerged logs is costly, complicated, and impacted by the complexity of the permitting process; thus, the rate at which deadhead logging occurs is variable.

Buffers and Permits—A buffer such as a strip of trees, plants, or grass along a stream or wetland naturally filters out dirt and pollution from rainwater runoff before it enters rivers, streams, wetlands, and marshes. This vegetation not only serves as a filter for the aquatic system, but the riparian cover influences microhabitat conditions such as instream water temperature and dissolved oxygen levels. These habitat conditions influence the distribution and abundance of alligator snapping turtle prey species and also directly affect alligator snapping turtles. Moderate temperatures and sufficient dissolved oxygen levels allow the turtles to remain stationary on the stream bottom for longer periods, increasing their ambush foraging opportunities. Loss of riparian vegetation and canopy cover result in increased solar radiation, elevation of stream temperatures, loss of allochthonous (organic material originating from outside the channel) food material, and removal of submerged root systems that provide habitat for alligator snapping turtle prey species (Allan 2004, pp. 266–267).

Some State regulations provide protections against impacts to the aquatic environment, and additional activities may implement recommended best management practices (BMPs) to reduce impacts. For example, forestry BMPs are effective with a high compliance rate (often 90 percent or better) across many of the States within the species' range that provide protections for buffer zones and riparian areas (Cristan et al. 2016, p. 4). Another example includes nutrient-reduction strategies to improve water quality (Louisiana Nutrient Reduction and Management Strategy 2020, entire).

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an endangered species or a threatened species. The Act defines an ''endangered species'' as a species that is in danger of extinction throughout all or a significant portion of its range, and a ''threatened species'' as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an endangered species or a threatened species because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could influence a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term ''threat'' to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term ''threat'' includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term ''threat'' may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an ''endangered species'' or a ''threatened species.'' In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an

individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all the threats acting on the species. We also consider the cumulative effect of the threats as well as those actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an ''endangered species'' or a ''threatened species'' only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term ''foreseeable future,'' which appears in the statutory definition of ''threatened species.'' Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term foreseeable future extends only so far into the future as the Service can reasonably determine that both the future threats and the species' responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. ''Reliable'' does not mean ''certain''; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species (Service 2021, entire). The SSA report does not represent a decision by the Service on whether the species should be proposed for listing as an endangered or threatened species under the Act. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies. The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket FWS–R4–ES–2021–0115 on *https://www.regulations.gov.*

To assess the alligator snapping turtle's viability, we use the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency supports the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years), redundancy supports the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and representation supports the ability of the species to adapt over time to long-term changes in the environment. In general, the more resilient populations there are that are spread across the range, the more redundancy it provides to the species. The more representation it has, the more likely it is to sustain populations over time, even under changing environmental conditions. Using these principles, we identify the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and describe the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluate an individual species' life-history needs. The next stage involves an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involves making predictions about the species' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decisions.

Current Condition

To describe the species' current condition, we apply the conservation principles of resiliency, redundancy, and representation. Resiliency is measured at the population level to describe the ability to withstand stochastic disturbances. Delineating biological populations of the alligator snapping turtle is not feasible because of the large spatial extent of the geographic range and the patchy availability of relevant information across the entire range. In our analysis, we delineate the range of the species into seven individual analysis units as proxies for populations to describe variation in the resiliency component over time across the range for each unit. The seven analysis units are Alabama, Apalachicola, Northern Mississippi-East, Northern Mississippi-West, Southern Mississippi-East, Southern Mississippi-West, and Western.

The Alabama unit encompasses eastern Mississippi, western Alabama, and small parts of Louisiana and Florida. The main water bodies that currently support or historically supported alligator snapping turtles include, but are not limited to, the Alabama River, Pascagoula River, Pearl River, Jourdan River, Escambia River, and Perdido River.

The Apalachicola unit encompasses parts of the Florida panhandle, southeastern Alabama, and Georgia. The main water bodies that currently support or historically supported alligator snapping turtles include the Apalachicola River, Chipola River, Ochlockonee River, Flint River, Chattahoochee River, Choctawhatchee River, and associated permanent freshwater habitats.

Northern Mississippi-East unit encompasses parts of Missouri, Illinois, Indiana, Kentucky, and Tennessee. The main water bodies that currently support or historically supported alligator snapping turtles include the Mississippi River, Ohio River, Illinois River, and Tennessee River.

Northern Mississippi-West unit encompasses parts of Kansas, Oklahoma, Arkansas, and Missouri. The main water bodies that currently support or historically supported alligator snapping turtles include the Neosho River and Verdigris River.

The Southern Mississippi-East unit encompasses parts of Louisiana, Arkansas, Mississippi, Alabama, Tennessee, and Missouri. The main water bodies that currently support or historically supported alligator snapping turtles include the Mississippi River, Atchafalaya River, Red River, Ouachita River, Tensas River, Amite River, Tangipahoa River, and their affluents in Louisiana.

The Southern Mississippi-West unit encompasses parts of northeastern Texas, Oklahoma, Kansas, Missouri, Arkansas, and northwestern Louisiana. The main water bodies that currently support or historically supported alligator snapping turtles include the Arkansas River, Red River, Canadian

River, East Fork Cadron Creek, Black Lake Bayou, Cheechee Bay, Saline Bayou, Black Lake, Clear Lake, Saline Lake, Cane River Canal, Black River, Boggy Bayou, Grand Bayou, Crichton Lake, Coushatta Bayou, Smith Island Lake, Loggy Bayou, Bayou Pierre, Wallace Lake, Smithport Lake, and Bayou Lumbra.

The Western unit encompasses parts of eastern Texas and western Louisiana. The main water bodies that currently support or historically supported alligator snapping turtles include the Neches River, Red River, Sabine River, San Jacinto River, and Trinity River.

In analyzing the alligator snapping turtle's current condition, we evaluated the current abundance within each analysis unit as a measure for current resilience, along with information about current threats, conservation actions, and distribution serving as auxiliary information about the causes and effects of current versus historical abundances (Service 2021, pp. 32–59). In our efforts to obtain the best available scientific and commercial information for the SSA, we consulted species experts about current abundance, current threats, and a comparison of the current and historical distribution regarding areas for which they have knowledge and expertise. Despite the large amount of expertise in the expert team we queried, the responses indicate a high degree of uncertainty about current abundances in each analysis unit. The methods for collecting the information from the species' experts is provided in more detail in the SSA report (Service 2021, p. 32 and Appendix C).

The abundances, estimated densities, substantial threats, and distribution over time as depicted by range contraction are provided in Table 1, below.

TABLE 1—ALLIGATOR SNAPPING TURTLE ANALYSIS UNIT CURRENT RESILIENCY AS DESCRIBED BY ESTIMATED ABUNDANCE, PERCENTAGE OF ESTIMATED ABUNDANCE IN EACH UNIT, DENSITY EXPRESSED AS ESTIMATED ABUNDANCE PER 1,000 HECTARES OF OPEN WATER IN EACH UNIT, THREATS, AND STATES WITH RANGE CONTRACTION

Analysis unit	Estimated abundance (% total)	Density	Threats	Range contraction
Alabama	200,000 (55.37)	616.9	1. Adult harvest (legal and illegal)*. 2. Nest predation*. 3. Bycatch: Incidental hooking/hook ingestion*. 4. Habitat alteration.	
Apalachicola	45,000 (12.46)	281.3	1. Nest predation*. 2. Bycatch: Incidental hooking. 3. Habitat alteration. 4. Harvest (illegal).	
Northern Mississippi-East	212.5 (0.06)	1.0	1. Nest predation* 2. Habitat alteration.	Illinois, Tennessee, Kentucky, Missouri.
Northern Mississippi-West	500 (0.14)	4.7	1. Bycatch: Incidental hooking/hook ingestion* 2. Nest predation. 3. Habitat fragmentation. 4. Harvest (illegal).	Kansas.
Southern Mississippi-East	50,000 (13.84)	55.3	1. Harvest (legal and illegal)* 2. Nest predation*. 3. Bycatch: incidental hooking and drowning in nets. 4. Habitat fragmentation.	Tennessee.
Southern Mississippi-West	15,000 (4.15)	30.2	1. Bycatch: incidental hooking/hook ingestion* 2. Nest predation 3. Habitat fragmentation 4. Harvest (legal and illegal)*	Kansas, possibly Oklahoma.
Western	50,500 (13.98)	139.3	1. Nest predation*. 2. Bycatch: incidental hooking. 3. Habitat alteration. 4. Adult harvest (legal and illegal)*.	

*Denotes ''substantial'' threats, which refer to those threats estimated to reduce survival rates of an age class by 8 percent or more; legal and illegal harvest reduce adult survival, and nest predation reduces nest survival. To be considered substantial, the threat impacts more than 50 percent of the alligator snapping turtles in the unit. All information in the table was provided by experts with knowledge of the species and the area associated within the unit(s).

Our assessment of the current condition for alligator snapping turtle considers the current abundance, current threats, and conservation actions in the context of what is known about the species' historical range. To determine species-specific population and habitat factors along with threats and conservation actions acting on the species, data were available for some populations, and demographic parameters (*e.g.,* clutch size, survival of specific life stages) and threats from previous studies. Where data were unavailable to inform the model, species experts provided relevant information related to the analysis units for which each is familiar. To describe alligator snapping turtle's viability, we evaluated the ability of the populations within each unit to respond to stochastic events (resiliency) in each of the seven analysis units and the ability of the species to respond to catastrophic events (redundancy) and the adaptive capacity (representation) of the species as a whole.

We describe the species' resiliency of each analysis unit using the estimated abundances, distribution, and threats acting on the species (see Table 1, above). The abundance estimates presented were obtained from species experts with knowledge of the species in particular geographic areas; due to the wide range of the species and compiling information across the seven analysis units, there is a level of uncertainty with the precision of the estimates provided. Rangewide, the abundance of alligator snapping turtles is estimated to be between 68,154 and 1,436,825 (a range of 1,368,671 individuals). This enormous range in the estimated abundance illustrates the

high degree of uncertainty in abundances at local sites and the ability to extrapolate local abundance estimates to a much broader spatial scale. Within these bounds, the most likely estimate of rangewide alligator snapping turtle abundance is 361,213 turtles, with 55 percent of the turtles occurring in the Alabama analysis unit (Service 2021, pp. 47–48).

Just as the data to estimate current abundances are scarce, there is little information with which to make rigorous comparisons between current and historical abundances. Dramatic population depletions occurred in Louisiana, Alabama, Georgia, the Florida panhandle, and elsewhere in the range during the 1960s and 1970s, with information on the magnitude of changes coming from anecdotal observations by trappers (Pritchard 1989, pp. 74, 76, 80, 83). Since that time, commercial and recreational harvest has been banned in a large portion of the species' range (all States except Louisiana and Mississippi, where recreational harvest still occurs). There are limited data available describing how populations have responded to reduced harvest pressure. Population dynamics in Georgia, Arkansas, and Oklahoma suggest that the population in East Fork Cadron Creek, Arkansas (Howey et al. 2013, entire), and Big Vian Creek, Oklahoma (East et al. 2013, entire), are still in decline. Twenty-two years after commercial harvest ended, surveys conducted during 2014 and 2015 in Georgia's Flint River reveal no significant change in abundance since 1989 surveys (King et al. 2016, p. 583). A similar study in Missouri and Arkansas detected population declines between the initial survey period in 1993–1994 and repeated surveys in 2009, over a decade after State-level protections were implemented (Lescher et al. 2013, pp. 163–164). At Sequoyah National Wildlife Refuge in Oklahoma, an alligator snapping turtle population declined between 1997–2001 and 2010–2011 (Ligon et al. 2012, p. 40). However, an additional study in Arkansas spanning 20 years documents an increase in abundance of both adult male and female alligator snapping turtles within Salado Creek (Trauth et al. 2016, p. 242).

Because the size and amount of suitable habitat within each unit vary greatly, density is calculated using the estimated abundance and the area of open water within each analysis unit; this calculation results in the estimated number of turtles per 1,000 ha (2,471 ac) of open water in the unit (as delineated by the 2016 National Land Cover Database; Yang et al. 2018, entire) (see Table 1, above).

Note that these are rough densities meant only to correct abundances for analysis unit size so that units can be more appropriately compared relative to each other; they are not intended to serve as actual estimates of density in alligator snapping turtle habitat. Because of the variation in analysis unit size and limitations in calculating true densities of alligator snapping turtles within units, we refrained from leaning heavily on comparisons of abundance or density between analysis units to summarize resilience other than to highlight general patterns. Resilience inherently increases with abundance and density; where there are more individuals, populations will have a greater ability to withstand stochastic demographic and environmental changes. Thus, in terms of the density as a demographic factor, resilience is highest in the core of the species' range, and lowest in the northernmost analysis units at the edge of the range. The southern portion of the species range within the Alabama, Apalachicola, Southern Mississippi- East, and Western units constitute the core areas for the species according to the percentage of the species' estimated abundance (Table 1).

We also consider the threats acting on the species within each unit. The current major threats acting on the alligator snapping turtle include fishing bycatch (including incidental hooking, hook ingestion, and drowning), harvest/collection, habitat loss and degradation, and nest predation. Other stressors acting on the species include disease, nest parasites, and the effects of climate change. Experts were consulted regarding information about the prevalence of negative and positive influences on viability in each analysis unit and were asked to provide an extent of occupied area in each analysis unit where alligator snapping turtles may be exposed to incidental hooking on trot and limb lines, commercial fishing bycatch, legal collection or harvest, illegal collection or harvest (poaching), and nest predation by subsidized or nonnative predators. Experts also provided the best available information regarding the spatial extent of the different threats. This includes the effects that commercial fishing bycatch, incidental hooking, hook ingestion, legal harvest, illegal harvest, and nest predation have on the survival of relevant life stages (adults, juveniles, hatchings, nests) in areas where the threat occurs.

The historical, large-scale removal of large, reproductive turtles from the population for commercial harvest continues to affect the species and its ability to rebound. Therefore, due to the historical and current threats, as described above, the species currently has the highest resiliency at the core of the species' range, where there are higher abundances of turtles. Harvest, both legal and illegal, is estimated to have the highest impact on adult survival rates, with harvest causing reductions in survival of 18 percent (most likely estimate) in some units. Commercial and recreational bycatch and hook ingestion are estimated to have lower impacts on adult survival, with most likely reductions in survival of 7 to 9 percent. The estimated impacts of threats on juvenile survival are lower than impacts to adult survival with most likely impacts of a 6 to 8 percent reduction in survival where commercial bycatch, incidental hooking, and hook ingestion occur, and a 6 to 7 percent reduction in survival from legal and illegal harvest where they occur. Hatchlings are not estimated to be heavily impacted by any of the threats we explored. Nest survival is estimated to be heavily impacted by nest predation by subsidized or nonnative predators (*e.g.,* raccoons, fire ants), with a most likely estimate of 58 percent reduction in survival.

Another resiliency factor informing the species' current condition is the comparison between the historical range and the current range (year 2000 to 2019). We compared the historical and current ranges of alligator snapping turtles by querying State biologists or those with access to the State's natural heritage program data. For each county or parish in their State, we asked for the current and historical status, and the date of the last confirmed record of alligator snapping turtles. Due to historical overharvest, habitat degradation and loss, and other threats in some areas of the species' range, the range has contracted in Illinois, Kansas, Kentucky, Missouri, Tennessee, and possibly in Oklahoma. These States are all on the fringe of the range, where conditions are likely marginal and more dynamic. The units affected include Northern Mississippi-East, Northern Mississippi-West, Southern Mississippi-East, and Southern Mississippi-West. Additional information regarding current condition descriptions and methodology used in the analysis are included in the SSA report (Service 2021, pp. 32–59).

Redundancy refers to the number and distribution of sufficiently resilient populations across a species' range, which provides protection for the species against catastrophic events that

impact entire populations. Due to the wide range of the species, it is unlikely that a catastrophic event would affect the entire species. When considering changes from historical conditions to current conditions, none of the seven analysis units across the species' range that we identified has been lost. All units remain extant and provide the ability to withstand catastrophic events.

Although the number of analysis units has not changed, redundancy for alligator snapping turtles has been reduced in terms of the distribution within analysis units, with range contractions in the northern portions of the species' range (Oklahoma, Kansas, Missouri, Illinois, Kentucky, and Tennessee). Within the core of the species' range, however, alligator snapping turtles still seem to be widely distributed, although there are many gaps in the spatial extent of surveys. While the distribution of the species encompasses much of its historical range, resilience within that range has decreased, largely from historical harvest pressures. With the range contractions and decreases in abundance, the Northern Mississippi-East analysis unit has decreased in resilience such that it is not a robust contributor to redundancy (only 212.5 estimated abundance of turtles, influenced largely by introductions).

Representation refers to the breadth of diversity within and among populations of a species, which allow it to adapt to changing environmental conditions. Because of this mismatch in scale between analysis units and biological populations, representation is described in terms of representative units and the resiliency units within each, under the assumption that representative units with higher abundances will be more able to contribute to future adaptation than those with lower abundances.

No representative units have been lost compared to the historical distribution. The Northern Mississippi representative unit, which adds diversity in life-history strategies within the species, currently has very low abundance within its two constituent analysis units relative to the other representative units, with an estimated 712.5 alligator snapping turtles total and a shrinking range. However, alligator snapping turtles in Illinois have been introduced from Southern Mississippi breeding stock, diluting the presence of unique genetic characteristics in the Northern Mississippi representative unit.

In summary, the overall current condition of the species' viability is affected by the residual effects of historical overharvest, historical and ongoing impacts from incidental limb line/bush hook and recreational fishing bycatch and/or hook ingestion, harvest, nest predation, and the species' life history (*i.e.,* low annual recruitment and delayed sexual maturity). Because of these threats, and particularly the legacy effects of historical harvest, the overall current condition of the species is based on the resiliency of each analysis unit, the redundancy of these units across the range, and the representation across the range. Due to the variation in analysis unit size and limitations in calculating true densities of alligator snapping turtles within units, we refrain from leaning heavily on comparisons of abundance or density between analysis units to summarize resilience other than to highlight general patterns. Resilience increases with abundance and density; where there are more individuals, populations will have a greater ability to withstand stochastic demographic and environmental events. Thus, resilience is highest in the core of the species' range and lowest in the northernmost analysis units at the edge of the range. The trend in resiliency from historical to current conditions is declining because of the loss of reproductive females and the species' life history (long-lived, late age to sexual maturity, low intrinsic growth rate). With the reduction in available habitat in some areas of the range, redundancy has declined compared to historical conditions as the species has been extirpated in some counties or parishes. However, no representative units have been lost compared to the historical distribution, as the genetic lineages across the representative units are still represented across the species' range.

Future Condition

To evaluate the species' future viability, we constructed a stage-structured matrix population model to project the population dynamics into the future and incorporated information from the literature, as well as information elicited on current abundance and the threats acting on the species (described above). In that model, we apply six plausible scenarios that factor in the estimated abundance and threats acting on the species to project the future resiliency of the species. Three scenarios consider conservation actions to be implemented, while the remaining three scenarios project conditions with no conservation actions. No specific endpoint for modeling was chosen at the outset; rather, the endpoint was selected after trajectories were generated, and it became clear that extending the projection further was unnecessary because the species is extirpated under all scenarios at a certain point.

In developing the future conditions scenarios described above, we used the best available information from the literature to parameterize a population matrix and elicited data from species experts to quantify stage-specific initial abundance, the spatial extent of threats, and threat-specific percent reductions to survival. To account for potential uncertainty in the effects of each threat, the six future scenarios are divided along a spectrum: Threat-induced reductions to survival are decreased by 25 percent, are unaltered, or are increased by 25 percent. To simulate conservation actions, the spatial extent of each threat is either left the same or reduced by 25 percent. We used a fully stochastic projection model that accounted for uncertainty in demographic parameters to predict future conditions of the alligator snapping turtle units under the six different scenarios. We derived a series of summary statistics to evaluate population trends and identify potential variation among analysis units and alternative scenarios. We define an extirpation event as the total population (juveniles + adults) declining to zero individuals, whereas a decline to less than 5 percent of the starting population size is considered quasi-extirpation. We applied 5 percent because it accounts for the effects of small population size and it also represents the result of a potential catastrophic population decline (Service 2021, p. 163).

Experts provided information regarding the following threat-related quantities: Percent reduction to stage-specific survival rates attributed to each threat and the spatial extent of each threat within their analysis unit(s) of expertise. Thus, reductions in survival rates attributed to each threat are assumed to be the same across all analysis units, although the spatial extent of each threat (*i.e.,* the proportion of the alligator snapping turtles exposed to the threat) varies among analysis units. For example, ingesting a fishing hook would be expected to produce the same percent reduction in survival across the entire range, although the probability that an individual alligator snapping turtle encounters that threat would vary among analysis units. However, we determined that legal collection likely violated this assumption, as regulations for legal alligator snapping turtle collection differ among States (LDWF 2019a, unpaginated; MFWP 2019, unpaginated). Therefore, we decided to model the effects of legal collection as a direct reduction in juvenile and adult

abundances (Service 2021, Appendix E) that varied across analysis units, rather than a reduction to demographic parameters. For each analysis unit, we calculated threat-adjusted survival rates, accounting for reductions in stage-specific survival rates resulting from the percent reduction in survival expected from a given threat multiplied by the spatial extent of the threat, for each threat occurring in a given analysis unit. Lastly, to reflect spatial heterogeneity in threat occurrence and overlap within each analysis unit, we calculated a weighted average of each survival parameter, based on the probable occurrence and overlap of all possible threat combinations (Service 2021, Appendix E).

We built scenarios around the potential uncertainty regarding: (a) The magnitude of the impact of threats on survival rates, and (b) the presence or absence of conservation actions. To capture the variability in the potential input for each threat, uncertainty is considered and applied directly to the model. First, we define three different ''threat levels'' by adjusting the demographic effect of each threat (percent reduction in stage-specific survival) up and down 25 percent relative to the compiled expert elicitation responses. In addition to legal collection (as mentioned above), the only exceptions to this structure are subsidized nest predators, in which the percent reduction to nest survival remains the same across all threat levels. These three levels reflect that there is a great deal of uncertainty in the impact that each threat has on survival rates and allows us to explore what the future condition might be if the mean estimates of threat magnitude either underestimate or overestimate the true impacts by 25 percent.

Next, we defined conservation action either as absent or present in the future. Where present, conservation action is modeled to reduce the spatial extent of threats (proportion of analysis unit exposed to threat) by 25 percent. This led to six different scenarios of expert-elicited threats, decreased threats, or high threats, with conservation action absent or present. The conservation scenarios reduce the spatial extent of threats rather than their magnitude. For example, the ''Decreased Threats +'' scenario takes into consideration reduced survival rate impacts by 25 percent and also the spatial extent of threats decreasing by 25 percent compared to the conservation-absent scenario of each analysis unit, relative to the mean expert-elicited quantities. Also note that only the means for survival rate impacts and spatial extent of threats, and not the standard deviations, are adjusted across the different scenarios.

Conservation actions that could decrease the spatial extent of threats include, but are not limited to, increased enforcement or law enforcement presence to reduce poaching or bycatch on illegally set trot or limb lines, increasing the size of protected areas that prohibit recreational fishing or certain gear (*e.g.,* trotlines, hoopnets), additional harvest restrictions in some areas, and management actions that reduce the densities of nest predators. The actual amount that any of these actions would influence the prevalence of threats will depend on factors like the time, money, personnel, and conservation partners available, but we selected a 25 percent reduction in the spatial extent of threats to explore how much a change of that amount affected future population dynamics. Conservation scenario outcomes show us that conservation actions (if applied) do not alter the basic trajectory of the declines.

Note that the threat level scenarios (expert-elicited, decreased, increased) vary in the magnitude of the impact of threats on survival where they occur, reflecting uncertainty in their true values. Conversely, the conservation scenarios (absent or present) vary in the spatial extent (the proportion of the population within the analysis unit exposed to the threat) of threats rather than their magnitude. For example, in either ''Expert-Elicited Threats'' scenario, the survival rate where recreational bycatch occurs is expected to remain the same whether conservation actions are present or absent, but in the ''Expert-Elicited Threats +'' scenario, the spatial extent of any given analysis unit exposed to recreational bycatch is reduced by 25 percent compared to the conservation-absent scenario. Also note that only the means for survival rate impacts and spatial extent of threats, and not the standard deviations, are adjusted across the different scenarios.

Our modeling framework also incorporates three effects believed to influence alligator snapping turtle demography that are not incorporated into scenarios as described above: Legal collection, head-start and adult releases, and habitat loss. Unlike the threat-specific reductions in survival rates, these effects are consistent across all future condition scenarios, although they are subject to stochastic variation among iterations and time steps. The effects from legal collection and head-start releases are applied directly to the estimated stage-specific abundances at the beginning of each time step. Habitat loss is incorporated into the model through the adult fecundity element of the transition matrix where its effect depends on total abundance.

Legal Collection

Regulations for legal collection differ among States, which do not align with analysis units (LDFW 2019a, unpaginated; MFWP 2019, unpaginated). Therefore, we decided to model the effects of legal collection as an annual reduction in abundance that varies across analysis units, rather than a reduction in survival rates. Collection of alligator snapping turtles is legal only in Mississippi and Louisiana. Legal collection in Mississippi is not incorporated into the model because the harvest restrictions (>24 in (61 cm) carapace length) functionally exclude females, which typically do not exceed 19.7 in (50 cm) in carapace length (Folt et al. 2016, p. 24), and thus would have had no effect on our female-only population model. In Louisiana, current regulations allow for any angler with a freshwater fishing license to take one alligator snapping turtle of any size per day (LDWF 2019b, unpaginated). Within our modeling framework, we restrict the effects of legal collection to the two modeled analysis units that overlap geographically with Louisiana: Southern Mississippi-East and Alabama. The annual reduction in abundance due to legal collection in these analysis units is based on using freshwater fishing license and specialty permit sales for wire traps and hoopnets (often used to catch turtles) from 2012–2017 as an index of take (LDWF 2019b, unpaginated), and the proportion of each analysis unit that overlaps Louisiana (Service 2021, Appendix E).

Captive Breeding for Conservation/ Head-Starts and Adult Releases

Several States within the alligator snapping turtle's range have initiated head-start release programs, in which alligator snapping turtles are raised for several years in captivity and then released into the wild population as juveniles (Dreslik et al. 2017, p. 13). Similarly, States also opportunistically release adult alligator snapping turtles confiscated from illegal activities (*e.g.,* poaching) into wild populations. We include juvenile and adult releases within the model, but only for the first 10 time steps within an iteration, to avoid having alligator snapping turtle population persistence be contingent on head-start activities (*i.e.,* conservation-dependent). We parameterized the releases in the model based on statistics from Illinois (Dreslik et al. 2017, p. 13):

juvenile females: ~30 individuals/year; adult females: ~12 individuals/year. The mean number of releases does not vary among analysis units or scenarios, but because of the uncertainty and variability in the simulations, the specific value drawn for each year in each unit in each iteration varies. Specifically, for the first 10 time steps of each iteration, the number of released juveniles and adults are drawn from Poisson distributions that provide the probability of a certain event occurring over a fixed time or space.

Habitat Loss

We asked the species expert team to list habitat loss mechanisms within their analysis unit(s) of expertise. After adjusting for linguistic differences among responses (*e.g.,* ''desnagging'' and ''removal of large woody debris'' are two answers that reflect the same mechanism), we summarized the number of unique habitat loss mechanisms within each analysis unit and calculated the mean across experts. We imposed a population ceiling (*i.e.,* carrying capacity) that was annually reduced by a habitat loss rate, which equaled the mean number of unique threats in the unit, divided by 100. The initial population ceiling was determined based on the summarized expert elicitation values for the maximum possible number of alligator snapping turtles currently within the analysis unit, after adjusting for sex ratios and presence of hatchlings in the estimate. Thus, the population ceiling for each analysis unit at each time step was calculated deterministically and was not subject to stochastic variation across simulation iterations. To incorporate the effects of habitat loss on alligator snapping turtle demography within the model, we included a function that set adult fecundity to zero if total abundance (juveniles and adults) in any time step exceeded the population ceiling. While this function is included in the model, abundances are so far below population ceilings that the effect of habitat loss does not have an impact on modeling results (Service 2021, Appendix E).

Additional Model Descriptions

We must keep in mind the limitations of this model when interpreting the results. The precision and accuracy of model outputs depend heavily on the precision and accuracy of the information going into a model. In the case of the alligator snapping turtle, there is a large amount of uncertainty in the information that went into the model, including estimates of current abundance, age class proportions, impact of threats on stage-specific demographic rates, spatial extent of threats, and variability of these metrics across and within analysis units. We relied heavily on expert elicitation to obtain these values. Wherever possible, the uncertainty in these values is incorporated into the model structure itself, but others we were unable to address; for example, the assumptions we had to make that baseline demographic rates are largely uniform across the range of the species. Future modeling efforts would be greatly improved with further study into these aspects of the alligator snapping turtle's biology, demography, and response to (and prevalence of) threats, as well as how these threats vary across the range of the species.

We also acknowledge an ongoing concern raised with regard to the model used is that it does not match the published estimates of the population growth model (Folt et al. 2016, entire) and conflicts with the perceived stability of alligator snapping turtle populations from some catch-per-unit-effort studies for this species. First, Folt et al. (2016) resulted from a population without several of the threats explored in this model. In addition a few errors have been corrected since its publication which resulted in a change in the prediction of a population growing at 3% annually to one that was declining 3% annually. With regard to CPUE data, it is generally used for relative abundance and was not appropriate for use in this modeling effort. In addition, while there were published parameter estimates and data to inform survival, egg production and nest survival, modelers had to use expert elicitation to parameterize the spatial extent of threats and the effect of the threats on population demographics. However, estimates of variance for many elicited parameters are small, suggesting that the experts generally agree with each other, even though the values were elicited independently from each expert.

Below, Table 2 presents the six plausible scenarios that factored in the estimated abundance and threats acting on the alligator snapping turtle to project the future resiliency of the species. Tables 3 and 4 present the results of the model depicting the future condition of each of four analysis units; Table 3 shows conservation-absent scenarios, while Table 4 shows conservation-present scenarios. In both Tables 3 and 4, for each scenario, we calculated the probability of extirpation and quasi-extirpation as the proportion of the 500 replicates in which the total population (adults and juveniles) declined to zero or less than 5 percent of the starting population size, respectively. For only those replicates in which the population reached extirpation or quasi-extirpation, we then calculated the mean number of years until those thresholds were reached to represent the time to quasi-extirpation or time to extirpation, respectively. Mean quantities and their standard deviations are listed with the range (minimum and maximum quantity observed across all replicates) given in parentheses. An asterisk (*) indicates only a single simulation crossed the threshold, precluding a standard deviation calculation.

TABLE 2—DESCRIPTION OF SIX FUTURE SCENARIOS MODELED FOR THE ALLIGATOR SNAPPING TURTLE'S ANALYSIS UNITS

[Scenario names are given in quotation marks]

	Conservation absent	Conservation present
Decreased Threat Magnitude	''*Decreased Threats*'' Impact of threats: *Reduced 25 percent* Spatial extent of threats: *Expert-elicited.*	''*Decreased Threats +* '' Impact of threats: *Reduced 25 percent.* Spatial extent of threats: *Reduced 25 percent.*
Expert-Elicited Threat Magnitude	''*Expert-Elicited Threats*'' Impact of threats: *Expert-elicited.* Spatial extent of threats: *Expert-elicited.*	''*Expert-Elicited Threats +* '' Impact of threats: *Expert-elicited.* Spatial extent of threats: *Reduced 25 percent.*
Increased Threat Magnitude	''*Increased Threats*'' Impact of threats: *Increased 25 percent* Spatial extent of threats: *Expert-elicited.*	''*Increased Threats +* '' Impact of threats: *Increased 25 percent.* Spatial extent of threats: *Reduced 25 percent.*

TABLE 3—PROBABILITY AND TIME TO EXTIRPATION AND QUASI-EXTIRPATION FOR ALLIGATOR SNAPPING TURTLES FOR CONSERVATION-ABSENT SCENARIOS WITH THREE DIFFERENT THREAT LEVELS

(Decreased, expert-elicited, and increased)

Threat level	Probability of quasi-extirpation	Time to quasi-extirpation (years)	Probability of extirpation	Time to extirpation (years)
Conservation Absent				
Alabama Unit:				
Decreased	1	17.68 ± 2.27 (12, 29)	0.13	48.91 ± 2.09 (43, 51)
Expert-Elicited	1	14.20 ± 1.6 (10, 20)	0.846	45.64 ± 3.36 (36, 51)
Increased	1	12.11 ± 1.35 (8, 16)	1	40.19 ± 3.47 (30, 51)
Apalachicola Unit:				
Decreased	0.99	33.11 ± 6.09 (19, 51)	0.004	49.5 ± 0.71 (49, 50)
Expert-Elicited	1	26.28 ± 4.65 (16, 47)	0.124	49.02 ± 2.05 (44, 51)
Increased	1	21.21 ± 3.25	0.66	46.82 ± 3.15
Northern Mississippi-East Unit:				
Decreased	0.02	45.90 ± 4.01 (38, 51)	0	
Expert-Elicited	0.016	48.00 ± 4.11 (39, 51)	0	
Increased	0.024	45.42 ± 3.42 (41, 51)	0	
Southern Mississippi-East Unit:				
Decreased	1	17.69 ± 2.40 (11, 29)	0.434	49.45 ± 1.92 (43, 51)
Expert-Elicited	1	14.89 ± 1.75 (10, 22)	0.95	47.49 ± 2.84 (39, 51)
Increased	1	12.97 ± 1.39 (9, 18)	0.998	44.92 ± 3.87 (33, 51)

TABLE 4—PROBABILITY AND TIME TO EXTIRPATION AND QUASI-EXTIRPATION FOR ALLIGATOR SNAPPING TURTLES FOR CONSERVATION PRESENT SCENARIOS WITH THREE DIFFERENT THREAT LEVELS

[Decreased, expert-elicited, and increased]

Threat level	Probability of quasi-extirpation	Time to quasi-extirpation (years)	Probability of extirpation	Time to extirpation (years)
Conservation Present (+)				
Alabama Unit:				
Decreased	1	22.84 ± 3.20 (14, 33)	0.002	*51 ± (51, 51)
Expert-Elicited	1	17.91 ± 2.27 (13, 26)	0.114	49.14 ± 2.23 (40, 51)
Increased	1	15.11 ± 1.72 (12, 23)	0.658	47.21 ± 2.76 (40, 51)
Apalachicola Unit:				
Decreased	0.98	32.44 ± 6.1 (20, 51)	0	
Expert-Elicited	1	32.04 ± 5.79 (18, 51)	0.006	50.67 ± 0.58 (50, 51)
Increased	1	26.22 ± 4.75	0.052	48.92 ± 1.94
Northern Mississippi-East Unit:				
Decreased	0.038	48.21 ± 2.90 (42, 51)	0	.....
Expert-Elicited	0.036	46.72 ± 3.39 (39, 51)	0.002	*51.00 ± (51, 51)
Increased	0.02	46.60 ± 2.50 (42, 50)	0	.....
Southern Mississippi-East Unit:				
Decreased	1	20.9 ± 3.34 (14, 35)	0.058	49.45 ± 1.92 (43, 51)
Expert-Elicited	1	17.74 ± 2.34 (12, 26)	0.476	47.49 ± 2.84 (39, 51)
Increased	1	15.74 ± 1.98 (11, 25)	0.856	44.92 ± 3.87 (33, 51)

Alabama Analysis Unit

The Alabama analysis unit provides habitat for more than half (55.37 percent) of the entire estimated alligator snapping turtle abundance; however, the total abundance in the Alabama analysis unit is predicted to decline over the next 50 years in all scenarios. Predicted declines are more rapid the higher the threat level and are slightly mediated by conservation actions. Compared to initial abundances, after the first 10 years of the simulation, the mean abundance within the unit is predicted to decline by 75–83 percent under decreased threat scenarios, 83–90 percent under expert-elicited threat scenarios, and 88–93 percent under increased threat scenarios (see Tables 3 and 4, above). Halfway through the simulation, after 25 years, the mean abundance is predicted to decline by 97–100 percent compared to the initial abundance across all six scenarios, with declines of 100 percent (extirpation) after 50 years (Service 2021, Appendix E).

Although abundance declined in all scenarios, the probability of extirpation within 50 years depends heavily on the threat levels and presence or absence of conservation actions. Without conservation, the species is unlikely to be extirpated in this unit within 50 years under the ''Decreased Threats'' scenario, likely to be extirpated under the ''Expert-Elicited Threats'' scenario, and virtually certain to become extirpated under the ''Increased Threats'' scenario (see Table 3, above). With conservation, the species is exceptionally unlikely to be extirpated under the ''Decreased Threats +'' scenario, unlikely to be extirpated under the ''Expert-Elicited Threats +'' scenario, and about as likely as not to be extirpated under the ''Increased Threats +'' scenario (see Table 4, above). While the likelihood that the species will become extirpated from the Alabama analysis unit varies by scenario, quasi-extirpation where abundances fell below 5 percent of current levels is virtually certain in all

scenarios. In scenarios where the probability of extirpation is about as likely as not, extirpation occurs on average after 40–51 years, with quasi-extirpation occurring much sooner in 12–23 years. Predicted time to quasi-extirpation averages 18–22 years under the decreased threats scenarios, 14–18 years under the expert-elicited threats scenarios, and 12–15 years under the increased threats scenarios, with the upper bound of each time period range predicted when conservation actions are present.

Apalachicola Analysis Unit

The Apalachicola analysis unit is included in part of the species' core area and includes around 12 percent of the entire estimated abundance of the species; however, the total abundance in the Apalachicola analysis unit is predicted to decline over the next 50 years in all scenarios. Predicted declines are more rapid the higher the threat level and are slightly mediated by conservation actions (Service 2021, Appendix E). Compared to initial abundances, after the first 10 years of the simulation, the mean abundance within the unit is predicted to decline by 55–64 percent under decreased threats scenarios, 65–74 percent under expert-elicited threats scenarios, and 72–82 percent under increased threats scenarios. Halfway through the simulation after 25 years, mean abundance is predicted to decline by 90–99 percent compared to initial abundance across all six scenarios and is predicted to decline by 99–100 percent after 50 years in all scenarios (Service 2021, Appendix E).

Although abundance declined in all scenarios, the probability of extirpation within 50 years depends heavily on the threat levels and presence or absence of conservation actions. Without conservation, the species is exceptionally unlikely to be extirpated in this unit within 50 years under the ''Decreased Threats'' scenario, unlikely to be extirpated under the ''Expert-Elicited Threats'' scenario, and likely to become extirpated under the ''Increased Threats'' scenario (see Table 3, above). With conservation, the species is exceptionally unlikely to be extirpated under the ''Decreased Threats +'' scenario and the ''Expert-Elicited Threats +'' scenario, and very unlikely to be extirpated under the ''Increased Threats +'' scenario (see Table 4, above). In scenarios where the probability of extirpation is about as likely as not, when extirpation does occur, it is on average around the 47-year mark. In the conservation-absent scenarios, quasi-extirpation is very likely to occur within 26–33 years. While the likelihood that the species will become extirpated in the Apalachicola analysis unit varies by scenario and ranges between likely to exceptionally unlikely, quasi-extirpation, where abundances fell below 5 percent of current levels, is very likely to virtually certain to occur with or without conservation actions within 50 years in all scenarios (see Tables 3 and 4, above).

Northern Mississippi-East Analysis Unit

The Northern Mississippi-East analysis unit currently supports the fewest alligator snapping turtles (0.06 percent) of any other unit across its range. Because of ongoing conservation efforts with turtle releases occurring in the Northern Mississippi-East analysis unit, alligator snapping turtle abundances in this unit are predicted to increase for the next decade because of the population augmentation efforts, but at 50 years in all scenarios, the population is predicted to decline to a mean of fewer than 51 females (Service 2021, pp. 72–74, Appendix E). Predicted declines are consistent across scenarios with and without conservation; however, the rate of decline is lower in the Northern Mississippi-East analysis unit (Service 2021, Appendix E). Compared to initial abundances, after the first 10 years of the simulation, mean abundance is predicted to increase by at least 200 percent across every scenario. By halfway through the simulation after 25 years, mean abundances are predicted to fall but remain over 32 percent higher than initial abundances. By the end of the 50-year simulation, however, abundances are predicted to decline by 47–51 percent compared to initial abundances in the scenarios without conservation actions, and 44–48 percent in the scenarios with conservation actions (Service 2021, Appendix E).

Although abundance eventually declines in all scenarios after initial increases, the species is exceptionally unlikely to very unlikely to be extirpated in this unit within 50 years under any modeled scenario (Service 2021, p. 74). Quasi-extirpation is similarly very unlikely to occur in any scenario; however, abundance continues to decline beyond 50 years.

Southern Mississippi-East Analysis Unit

The Southern Mississippi-East analysis unit includes around 14 percent of the total estimated abundance of the species; however, the total abundance in the Southern Mississippi-East analysis unit is predicted to decline over the next 50 years in all scenarios (Service 2021, pp. 70–72). Predicted declines are more rapid the higher the threat level and are slightly mediated by conservation actions (Service 2021, Appendix E). Compared to initial abundances, after the first 10 years of the simulation, mean abundance is predicted to decline by 76–82 percent under decreased threats scenarios, 83–88 percent under expert-elicited threats scenarios, and 87–92 percent under increased threats scenarios (see Tables 3 and 4, above). Halfway through the simulation, after 25 years, mean abundance is predicted to decline by 95–100 percent compared to initial abundance across all six scenarios (Service 2021, Appendix E).

Although abundance declines in all scenarios, the probability of extirpation within 50 years depends heavily on the threat levels and presence or absence of conservation actions. Without conservation, the species is unlikely to be extirpated in this unit within 50 years under the ''Decreased Threats'' scenario, likely to be extirpated under the ''Expert-Elicited Threats'' scenario, and very likely to become extirpated under the ''Increased Threats'' scenario (see Table 3, above). With conservation, the species is exceptionally unlikely to be extirpated under the ''Decreased Threats +'' scenario, very unlikely to be extirpated under the ''Expert-Elicited Threats +'' scenario, and about as likely as not to be extirpated under the ''Increased Threats +'' scenario (see Table 4, above). While the likelihood that the species will become completely extirpated within this unit varied by scenario, quasi-extirpation where abundances fell below 5 percent of current levels is virtually certain in all scenarios within the next 13–21 years. Predicted time to quasi-extirpation averages 18–21 years under the decreased threats scenarios, 15–18 years under the expert-elicited threats scenarios, and 13–16 years under the increased threats scenarios, with the lower bound of each range predicted when conservation actions are present.

The Western, Southern Mississippi-West, and Northern Mississippi-West analysis units are not included in the future simulation modeling because we do not have adequate input data. However, we have no evidence that alligator snapping turtle demographic trends in response to threats in these analysis units would behave dramatically differently from the range of analysis units that we did model. While we do not have precise abundance estimates in the future or probabilities of extirpation or quasi-extirpation, it is likely that alligator snapping turtles in these analysis units will decline along similar trajectories as

the modeled analysis units, meaning they likely face a high probability of quasi-extirpation within the next 30–50 years.

In summary, alligator snapping turtle abundance was shown to decline drastically over the next 30 to 50 years in all analysis units that are included in the model (Alabama, Apalachicola, Northern Mississippi-East, and Southern Mississippi-East) across all scenarios. The model projects out past 50 years; however, the declining abundance trends drop so low within 50 years, there was no need to project beyond that time period. The future conditions projections, which include three conservation-based scenarios, indicate a 95 percent decline in 50 years and quasi-extirpation in approximately 30 years under even the most optimistic scenario.

Resilience is expected to drastically decline across all analysis units under all scenarios. We modeled scenarios that reflected uncertainty in the impact of threats on alligator snapping turtle demography, and all threat levels (decreased, expert-elicited, and increased) produced mean growth rates (lambda) indicating population decline. Predicted abundances are likely to very likely to virtually certain to drop below 5 percent of current abundances within 12–50 years under all scenarios in the Southern Mississippi-East, Alabama, and Apalachicola analysis units (Service 2021, pp. 78–82). The only analysis unit for which quasi-extirpation is not consistently likely is the Northern Mississippi-East analysis unit. Although the risk of quasi-extirpation is lower in this analysis unit than the others, this is in part an artifact of the way that quasi-extirpation thresholds are defined, as a percentage of the initial abundance. In terms of raw abundance, the Northern Mississippi-East analysis unit is predicted on average to support fewer than 51 female alligator snapping turtles (as we used a female-only demographic model) with or without conservation actions. Thus, even though quasi-extirpation risks are lower than other analysis units, the predicted abundances for this unit still indicate that alligator snapping turtles will become very rare or disappear from this analysis unit.

Time to quasi-extirpation varies across analysis units and scenarios (conservation absent–conservation present), but in general, the first analysis unit likely to reach the quasi-extirpation threshold is the Alabama unit (12–22 years), followed by the Southern Mississippi-East unit (after an average of 14–25 years depending on the scenario), the Apalachicola unit (21–33 years), and finally the Northern Mississippi-East unit, where quasi-extirpation is not likely to occur within the 50-year time frame.

After 50 years, the mean female abundance in any given analysis unit is not predicted to exceed 133 individuals in any scenario. As we did for the current condition, we scaled future predicted abundances (after 25 years and after 50 years of the simulation) to the area of open water in each analysis unit to aid in comparing abundances among units of different sizes.

Resilience refers to the ability of populations (or, in our case, analysis units, as we are unable to delineate populations with currently available information) to withstand stochastic disturbances (*e.g.,* demographic, environmental stochasticity). Abundance is central to resilience, as small populations are more vulnerable to perturbations than larger populations. We compiled the best information available about alligator snapping turtles, their demographic rates, and threats, and the resulting simulation model predicts dramatic declines in abundance, and thus resilience, over the next 50 years across all analysis units. Abundances in nearly every analysis unit are predicted to decline by more than 95 percent, resulting in drastically lowered abilities of populations to withstand stochastic events, if alligator snapping turtle populations persist at all.

Most of the threats described in the SSA report (Service 2021, pp. 17–21) (hook ingestion, illegal collection, etc.) are factors that affect adult or juvenile survival, and so large changes in population growth and predicted future abundance are expected to occur when those effects are incorporated into the model. For example, experts indicated that hook ingestion is likely to negatively affect adult survival and could cause up to 8 percent decline in survival rate in areas where trotline and other fishing activities are allowed, dropping survival from 95 percent to 87 percent. That one threat alone changes the trajectory of the population from stable or increasing to rapidly declining, as a result of the cumulative threats.

Future representation, referring to the ability of the species to adapt to changing environmental conditions over time, is similarly predicted to decline rapidly as alligator snapping turtles in every representative unit decline in abundance to quasi-extirpation or true extirpation. The loss of alligator snapping turtles across all representative units would represent losses in genetic diversity (two broad genetic lineages), life-history diversity along a north-south gradient, and finer scale genetic differences among drainages within the larger genetic lineages.

Future redundancy, or the ability to withstand catastrophic events, for alligator snapping turtles is expected to decline drastically over the next 50 years. Our future simulation model operates at the scale of the analysis unit and is limited to the units for which data are available, so we cannot provide precise predictions about which States or counties are most likely to lose or retain alligator snapping turtle biological populations in the future. While accounting for uncertainty with the magnitude of threats at the analysis unit scale, all units are predicted to lose resiliency at such a high rate that no analysis unit will remain across the landscape to contribute to redundancy. Where alligator snapping turtles persist in the future, they are predicted to be rare and not found in adequately resilient groupings. Analysis units are predicted to reach quasi-extirpation thresholds in some cases within the next two decades, with more units becoming quasi-extirpated each decade after that. The addition of conservation actions, or different assumptions about the impact of threats on alligator snapping turtle demography, alters the time to quasi-extirpation by about a decade at most, typically less. No scenarios result in stable or increasing redundancy within representative units or rangewide. The future condition analysis for the alligator snapping turtle is described in detail in the SSA report (Service 2021, pp. 59–84).

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have not only analyzed individual effects on the species, but we have also analyzed their potential cumulative effects. We incorporate the cumulative effects into our SSA analysis when we characterize the current and future condition of the species. To assess the current and future condition of the species, we undertake an iterative analysis that encompasses and incorporates the threats individually and then accumulates and evaluates the effects of all the factors that may be influencing the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative effects analysis.

Determination of Alligator Snapping Turtle's Status

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an ''endangered species'' or a ''threatened species.'' The Act defines an ''endangered species'' as a species that is in danger of extinction throughout all or a significant portion of its range, and a ''threatened species'' as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

The Act requires that we determine whether a species meets the definition of ''endangered species'' or ''threatened species'' because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

When evaluating the species to determine if it is in danger of extinction throughout all of its range, we consider the threats acting on the species and the cumulative effects of those threats under the section 4(a)(1) factors. The current threats include harvest and collection (Factor B), nest predation (Factor C), habitat degradation and loss (Factor A), and hook ingestion and entanglement due to bycatch associated with freshwater fishing (Factor E). The current condition of the alligator snapping turtle, as discussed under Current Condition above, describes the species and the threats acting on the species such that it retains sufficient resiliency, redundancy, and representation to ensure the species is currently maintaining viability across its range.

The species is currently still relatively widespread, occurring throughout much of its historical range, and remains extant within all analysis units. Although some resiliency has been lost due to past and ongoing threats, sufficient resiliency remains across the seven analysis units, especially in the core of the range in the southern parts of the Alabama, Apalachicola, South Mississippi-East, and Western analysis units. There has been some range contraction in some of the fringe States, including Illinois, Kansas, Missouri, Oklahoma, and Tennessee where the species' resilience is lowest in the northernmost analysis units.

Despite the historical, large-scale commercial harvest in some areas and additional ongoing threats, the overall population across the current range is still large with an estimated 360,000 turtles (range of 68,000 to 1.4 million) (Service 2021, pp. 50). However, due to the delayed age of sexual maturity and a generation time of about 30 years, the species has been slow to recover from the historical harvest pressures. An example of the slow response is evident in a study conducted 22 years after alligator snapping turtle commercial harvest ended in Georgia; surveys conducted during 2014 and 2015 in Georgia's Flint River reveal no significant change in abundance since 1989 (King et al. 2016, entire). Thus, despite the prohibition of legal harvest of alligator snapping turtles in all States except Louisiana and Mississippi, the species has been slow to recover because it is a long-lived species with high nest predation and relatively low fecundity.

This past large-scale removal of large, adult turtles continues to affect the current demographics; however, successful reproduction is occurring. While the species is not currently impacted by commercial harvest, resiliency is lower than it was historically as a result of the loss of reproductive females, low juvenile survival, and the species' life-history traits (long-lived, late age to sexual maturity, low intrinsic growth rate). Regardless, the current estimated population size provides a sufficient contribution to the species' viability through successful reproduction that is adequate to sustain the populations across all units. Thus, after assessing the best available information, we conclude that the alligator snapping turtle is not currently in danger of extinction throughout all of its range.

To determine if the species is likely to become an endangered species within the foreseeable future throughout all of its range, we considered the threats that will affect the species in the future and the species' response to those threats. According to the description above under Future Condition, six scenarios are considered to project the threats acting on the species' viability over the next 50 years; however, the species will decline into extirpation or quasi-extirpation under all six scenarios within the next 30–50 years. We can reasonably predict the threats acting on the species and the species' response to those threats within the 30- to 50-year timeframe when extirpation within most of the analysis units is projected. Based on this information, we determined the appropriate timeframe for assessing whether this species is likely to become in danger of extinction in the foreseeable future is 30–50 years. While there is inherent uncertainty in the modeling, we have determined we can make reliable predictions as to the status of the alligator snapping turtle within this timeframe. As our framework for determining foreseeable future articulates, ''reliable'' does not mean ''certain;'' it means sufficient to provide a reasonable degree of confidence in the prediction. We have a reasonable degree of confidence in our status predictions, particularly because the species declines into extirpation or quasi-extirpation under even the most optimistic scenarios.

When evaluating the future viability of the species, we found that the threats currently acting on the species are expected to continue across its range into the future, resulting in greater reduction of the number and distribution of reproductive individuals and continued effects of subsidized nest predators on nest success and juvenile survival. This species is highly dependent upon adult female survival to maintain viability. Existing and ongoing threats affecting adult female survival are projected to reduce recruitment to an extent that the species will continue to decline in the foreseeable future. While there is uncertainty regarding the rate at which population declines will occur, the threats are projected to drive the species towards extinction unless reduced. Additionally, the resiliency of each analysis unit will continue to decline and further reduce the species' redundancy and representation into the future. The existing regulatory mechanisms are not adequate to protect the species from these threats (Factor D).

There are additional stressors including disease, nest parasites, and climate change impacts (elevated nest temperatures, increased flooding, increased water withdrawals, etc.). These secondary environmental stressors will have compounding impacts that further reduce the viability of the species in the foreseeable future.

Despite the implementation of the conservation actions described above under *Conservation Measures,* the delay in the species' response to historical over-harvesting indicates other factors may be acting on the species or additional conservation actions are needed. This is illustrated by the future conditions projections, which include three conservation-based scenarios and indicate a 95 percent decline in 50 years and quasi-extirpation in approximately

30 years under even the most optimistic scenario.

The best available information shows that the species' viability is expected to decline with projected quasi-extirpation of most units to occur within the next 30 years and within the next 50 years for the Northern Mississippi-East unit (Service 2021, pp. 78–79). Based on modeling results, which address uncertainty regarding the extent and severity of threats, resiliency is expected to decline dramatically under all scenarios. Regardless of whether the projected timeframe to quasi-extirpation is fully accurate, the projected loss of resiliency across the range of the species will place the alligator snapping turtle at risk of extinction within the foreseeable future across all of its range due to the inability of this species to effectively reproduce and maintain viability in the coming decades in light of ongoing threats.

Thus, after assessing the best available information regarding the threats acting on the species and the species' response as described in the future condition analysis (Service 2021, pp. 59–85), we conclude that the alligator snapping turtle is likely to become in danger of extinction within the foreseeable future throughout all of its range.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extirpation or likely to become so in the foreseeable future throughout all or a significant portion of its range. The court in *Center for Biological Diversity* v. *Everson,* 2020 WL 437289 (D.D.C. Jan. 28, 2020) (*Center for Biological Diversity*), vacated the aspect of the Final Policy on Interpretation of the Phrase ''Significant Portion of Its Range'' in the Endangered Species Act's Definitions of ''Endangered Species'' and ''Threatened Species'' (79 FR 37578; July 1, 2014) that provided that the Service does not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range. Therefore, we proceed to evaluating whether the species is endangered in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant; and (2) the species is in danger of extirpation in that portion. Depending on the case, it might be more efficient for us to address the ''significance'' question or the ''status'' question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

Following the court's holding in *Center for Biological Diversity,* we now consider whether there are any significant portions of the species' range where the species is in danger of extirpation now (*i.e.,* endangered). In undertaking this analysis for alligator snapping turtle, we choose to address the status question first. We consider information pertaining to the geographic distribution of both the species and the threats that the species faces to identify any portions of the range where the species is endangered.

The statutory difference between an endangered species and a threatened species is the time frame in which the species becomes in danger of extinction; an endangered species is in danger of extinction now while a threatened species is not in danger of extinction now but is likely to become so in the foreseeable future. Thus, we reviewed the best scientific and commercial data available regarding the time horizon for the threats that are driving the alligator snapping turtle to warrant listing as a threatened species throughout all of its range. We considered whether the threats are geographically concentrated in any portion of the species' range in a way that would accelerate the time horizon for the species' exposure or response to the threats. We examined the following threats: Harvest (legal and poaching), fishing bycatch (recreational and commercial), and nest predation. We also considered the cumulative effects acting on the species with additional stressors such as disease, nest parasites, and climate change.

After considering the threats acting on the species, we identified a concentration of threats in Mississippi and Louisiana due to legal harvest, albeit more limited in Mississippi. The three analysis units that overlap with these two States include the Alabama, Southern Mississippi-East, and Southern Mississippi-West units. The Alabama unit has the greatest abundance and density estimates of all seven analysis units, indicating this unit at the core of the range may be a stronghold for the species in terms of resiliency and contributing to the species' overall viability. The Alabama unit currently demonstrates high resiliency in comparison to the other units; however, due to the continued compounding effects of the threats acting on the species in the Alabama unit, resiliency will decline in the future.

The estimated abundance within the Southern Mississippi-East unit is around 50,000 individuals; the major threats acting on the species in this unit include nest predation and harvest. Legal harvest has been ongoing in the Louisiana and Mississippi portions of this unit; however, the species is not in danger of extinction now due to the high abundance of turtles and augmented populations from conservation efforts of head-start and release programs. The historical and current distribution in this unit has some shifts in county and parish occurrences with some range contraction in western Tennessee and expansion in Mississippi and Louisiana (Service 2021, p. 42). Additionally, the species has been managed through conservation efforts by supplementing the population from a captive breeding program that raises the turtle beyond the first few years and releases them into the wild. Due to the current condition of the population within this unit, it is not currently in danger of extinction; however, the ongoing threats will cause the species to decline in the future.

The Southern Mississippi-West unit has an estimated current abundance of 15,000 alligator snapping turtles, but impoundments have fragmented the habitat in this unit. About 9 percent of the unit is the upper northwestern part of Louisiana where legal harvest is still allowed. When considering the historical and current ranges, there has been some range contraction in some counties in Oklahoma; however, occurrence is unknown, meaning there have been no recent surveys or documented records in some of those counties. The species has become virtually extirpated in Kansas. The species is still found in all parishes in Louisiana with no changes in the historical distribution. In Texas, there have been changes from occupied to unknown status and vice versa, but no contractions of the species' range have been confirmed between historical and current distribution. Because the species is still widely distributed across this unit as described in the species' current condition, the population within this unit has sufficient resiliency such that the species is not currently in danger of extinction in this unit, but the ongoing threats will cause the species to decline in the future.

Although the threat of legal harvest is concentrated in the Mississippi and Louisiana areas of the Alabama, Southern Mississippi-East, and Southern Mississippi-West units, the best scientific and commercial data available do not indicate that the concentration of threats, or the species'

responses to the concentration of threats, are likely to accelerate the time horizon in which the species becomes in danger of extinction in this portion of its range. As a result, the alligator snapping turtle is not in danger of extinction now in this portion range of the species' range.

We also considered the threat of habitat degradation and loss compounded with historical overharvest that has affected the species along the fringe areas of the range as there has been some range contraction in Illinois, Kansas, Kentucky, Missouri, Tennessee, and possibly in Oklahoma likely due to changes in the habitat. These areas are all on the fringe of the range, where conditions are likely marginal and more dynamic. The species does not occur in large numbers or densities in these areas because the core areas are associated with the more southern portions of the species' range. The species' occurrence within these areas is inherently low because of the variable pressures associated with dynamic conditions. The alligator snapping turtle is not in danger of extinction now in this portion range of the species' range.

After analyzing the portions of the range where threats are concentrated, we found there are no significant portions of the range where the species is at risk of extinction and do not meet the definition of endangered. Therefore, we determine that the species is likely to become in danger of extinction within the foreseeable future throughout all of its range. This is consistent with the courts' holdings in *Desert Survivors* v. *Department of the Interior,* No. 16–cv–01165–JCS, 2018 WL 4053447 (N.D. Cal. Aug. 24, 2018), and *Center for Biological Diversity* v. *Jewell,* 248 F. Supp. 3d, 946, 959 (D. Ariz. 2017).

Determination of Status

Our review of the best scientific and commercial data available indicates that the alligator snapping turtle meets the Act's definition of a threatened species. Therefore, we propose to list the alligator snapping turtle as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness and conservation by Federal, State, Tribal, and local agencies; private organizations; and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The goal of such conservation efforts is the recovery of these listed species so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning consists of preparing draft and final recovery plans, beginning with the development of a recovery outline and making it available to the public subsequent to a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. The plan may be revised to address continuing or new threats to the species as new substantive information becomes available. The recovery plan also identifies recovery criteria for review of when a species may be ready for reclassification from endangered to threatened (''downlisting'') or removal from protected status (''delisting''), and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan for alligator snapping turtle will be available on our website (*http://www.fws.gov/endangered*), or from our Louisiana Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (*e.g.,* restoration of native vegetation), research, protective regulations, adjustments to fishing techniques to reduce bycatch, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. Achieving recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

If the alligator snapping turtle is listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the States of Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Oklahoma, Tennessee, and Texas would be eligible for Federal funds to implement management actions that promote the protection or recovery of the alligator snapping turtle. Information on our grant programs that are available to aid species recovery can be found at: *http://www.fws.gov/grants.*

Although the alligator snapping turtle is only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for the species. Additionally, we invite you to submit any new information on the species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal

action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

Federal agency actions within the species' habitat that may require conference, consultation, or both, as described in the preceding paragraph, may include, but are not limited to, management and any other landscape-altering activities on Federal lands administered by the U.S. Fish and Wildlife Service; U.S. Forest Service; NPS; Department of Transportation (construction and maintenance of roads or highways by the Federal Highway Administration and railroads by the Federal Railroad Administration); National Aeronautics and Space Administration; Department of Defense (DOD), including issuance of section 404 Clean Water Act permits by the U.S. Army Corps of Engineers; and Federal Energy Regulatory Commission (dams that produce hydropower).

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing. The discussion below regarding protective regulations under the Act's section 4(d) complies with our policy.

II. Proposed Rule Issued Under Section 4(d) of the Act

Background

Section 4(d) of the Act contains two sentences. The first sentence states in part that the Secretary shall issue such regulations as she deems necessary and advisable to provide for the conservation of species listed as threatened. The U.S. Supreme Court has noted that statutory language like ''necessary and advisable'' demonstrates a large degree of deference to the agency (see *Webster* v. *Doe,* 486 U.S. 592 (1988)). Conservation is defined in the Act to mean the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Additionally, the second sentence of section 4(d) of the Act states in part that the Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants. Thus, the combination of the two sentences of section 4(d) provides the Secretary with wide latitude of discretion to select and promulgate appropriate regulations tailored to the specific conservation needs of the threatened species. The second sentence grants particularly broad discretion to the Service when adopting the prohibitions under section 9.

The courts have recognized the extent of the Secretary's discretion under this standard to develop rules that are appropriate for the conservation of a species. For example, courts have upheld rules developed under section 4(d) as a valid exercise of agency authority where they prohibited take of threatened wildlife or include a limited taking prohibition (see *Alsea Valley Alliance* v. *Lautenbacher,* 2007 U.S. Dist. Lexis 60203 (D. Or. 2007); *Washington Environmental Council* v. *National Marine Fisheries Service,* 2002 U.S. Dist. Lexis 5432 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (*see State of Louisiana* v. *Verity,* 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was initially enacted, ''once an animal is on the threatened list, the Secretary has an almost infinite number of options available to [her] with regard to the permitted activities for those species. [She] may, for example, permit taking, but not importation of such species, or [she] may choose to forbid both taking and importation but allow the transportation of such species'' (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Exercising this authority under section 4(d), we have developed a proposed rule that is designed to address the alligator snapping turtle's conservation needs. Although the statute does not require us to make a ''necessary and advisable'' finding with respect to the adoption of specific prohibitions under section 9, we find that this rule as a whole satisfies the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of the alligator snapping turtle. As discussed above under Summary of Biological Status and Threats, we have concluded that the alligator snapping turtle is likely to become in danger of extinction within the foreseeable future primarily due to harvest/collection, nest predation, habitat alteration, and bycatch (hook ingestion, entanglement, and drowning) associated with commercial and recreational fishing.

The provisions of this proposed 4(d) rule would promote conservation of the alligator snapping turtle by prohibiting harvest and encouraging implementation of best management practices for activities in freshwater wetlands and riparian areas to minimize habitat alteration to the maximum extent practicable. The provisions of this proposed rule are one of many tools that we would use to promote the conservation of the alligator snapping turtle. This proposed 4(d) rule would apply only if and when we make final the listing of the alligator snapping turtle as a threatened species.

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act.

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of actions that are subject to the section 7 consultation process are actions on State, Tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat—and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or carried out by a Federal agency—do not require section 7 consultation.

This obligation to confer on species proposed to be listed or engage in consultation with the Service on actions that may affect listed species or their critical habitat does not change in any way for a threatened species with a species-specific 4(d) rule. Actions that result in a determination by a Federal agency of ''not likely to adversely affect'' continue to require the Service's written concurrence and actions that are ''likely to adversely affect'' a species require formal consultation and the formulation of a biological opinion.

Provisions of the Proposed 4(d) Rule

This proposed 4(d) rule would provide for the conservation of the alligator snapping turtle by prohibiting the following activities, except as otherwise authorized or permitted: Importing or exporting; take (as set forth at 50 CFR 17.21(c)(1) with exceptions as discussed below); possessing, selling, delivering, carrying, transporting, or shipping of unlawfully taken specimens from any source; delivering, receiving, transporting, or shipping in interstate or foreign commerce in the course of commercial activity; and selling or offering for sale in interstate or foreign commerce. We also include several exceptions to these prohibitions, which along with the prohibitions are set forth under Proposed Regulation Promulgation, below.

Under the Act, ''take'' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulation at 50 CFR 17.3. Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally. This proposed 4(d) rule would provide for the conservation of alligator snapping turtle by prohibiting intentional and incidental take, except as otherwise authorized or permitted. Prohibiting take of the species resulting from activities, including, but not limited to, harvest (legal and poaching), hook ingestions and entanglement due to bycatch associated with commercial and recreational fishing practices for freshwater fish (particularly as a result of unlawful activities and/or abandonment of equipment), and habitat alteration, will provide for the conservation of the species. Regulating take associated with these activities under a 4(d) rule would prevent continued declines in population abundance and decrease synergistic, negative effects from other threats; this regulatory approach will provide for the conservation of the species by improving resiliency within all seven analysis units.

Prohibitions

Due to the life-history characteristics of the alligator snapping turtle, specifically delayed maturity, long generation times, and relatively low reproductive output, this species cannot sustain significant collection from the wild, especially of adult females (Reed et al. 2002, pp. 8–12). An adult female harvest rate of more than 2 percent per year is considered unsustainable, and harvest of this magnitude or greater will result in significant local population declines (Reed et al. 2002, p. 9). Louisiana and Mississippi allow recreational harvest of alligator snapping turtles; all other States within the species' range prohibit commercial and recreational harvest of the species. Due to the species' demography, however, the overall population has not recovered from prior extensive loss of individuals from past over-exploitation. While current recruitment is sufficient to maintain viability, continued harvest, combined with other stressors, will eventually result in quasi-extinction. Therefore, this proposed 4(d) rule would prohibit collection and harvest (with some exceptions as described below).

Habitat alteration is also a concern for the alligator snapping turtle, as the species is endemic to river systems that drain into the Gulf of Mexico, including tributary waterbodies and associated wetland habitats (*e.g.,* swamps, lakes, reservoirs, etc.), where structure (*e.g.,* tree root masses, stumps, submerged trees, etc.) and a high percentage of canopy cover is more often selected over open water (Howey and Dinkelacker 2009, p. 589). Alligator snapping turtles spend the majority of their time in aquatic habitat; overland movements are generally restricted to nesting females and juveniles moving from the nest to water (Reed at al. 2002, p. 5). The primary causes for habitat alteration include actions that change hydrologic conditions to the extent that dispersal and genetic interchange are impeded.

Activities that may alter the habitat include dredging, deadhead logging, clearing and snagging, removal of riparian cover, channelization, instream activities that result in stream bank erosion and siltation (*e.g.,* stream crossings, bridge replacements, flood control structures, etc.), and changes in land use within the riparian zone of waterbodies (*e.g.,* clearing land for agriculture). Deadhead logs and fallen riparian woody debris provide refugia during low-water periods (Enge et al. 2014, p. 40), resting areas for all life stages (Ewert et al. 2006, p. 62), and important feeding areas for hatchlings and juveniles. The species' habitat needs concentrate around a freshwater ecosystem that supplies both shallower water for hatchlings and juveniles and deeper water for adults, with associated forested habitat that is free from inundation for nesting and provides structure within the waterbody. The species can tolerate some brackish conditions; however, freshwater provides higher quality habitat.

Exceptions to the Prohibitions

The exceptions to the prohibitions set forth in this proposed 4(d) rule include activities conducted as authorized by a permit issued under 50 CFR 17.32 for threatened species, as well as certain actions taken by an employee or agent of the Service, of the National Marine Fisheries Service, or of a State conservation agency that is operating a conservation program in accordance with 50 CFR 17.31(b), as discussed later in this document. In addition, this proposed 4(d) rule includes some of the general exceptions allowed for take of endangered wildlife as set forth at 50 CFR 17.21 (see the rule portion of this document) and certain other specific activities that we propose for exception, as described below.

We are proposing to except certain activities involving specimens originating from captive breeding operations, for conservation or commercial purposes, if the captive breeding operations meet the necessary requirements. We are also proposing to except take incidental to construction, operation, and maintenance activities using appropriate BMPs; pesticide and herbicide use; silviculture practices and forestry activities that implement industry and/or State-approved BMPs accordingly; and maintenance dredging that affects previously disturbed portions of the maintained channel.

Captive breeding for conservation—The Service recognizes that captive breeding provides for the species' conservation (*i.e.,* captive rearing, head-starting, and reintroductions) by supplementing depleted populations and reintroducing turtles to areas where the species has been extirpated. This includes head-starting programs, where turtles are bred and raised beyond the hatchling phase to improve survival, then released into the wild. Captive rearing for the purposes of head-starting hatchlings to release back into the wild can help mitigate losses from nest predation and parasitic insects, as well as provide individuals for reintroduction into areas with depleted turtle numbers. Such activities can help bolster population numbers by improving overall juvenile survival and may also increase genetic diversity. When brood stock is legally acquired and permitted, with proper pedigree management and disease surveillance, Federal and State agencies can implement head-start programs without putting undue stress on the wild population.

All captive production programs for the purpose of reintroducing alligator snapping turtles to the wild must also

develop a controlled propagation plan in accordance with the Service's Policy Regarding Controlled Propagation of Species Listed under the Endangered Species Act (65 FR 56916; September 20, 2000). In addition, captive breeding for conservation purposes should apply kinship-based pedigree management to avoid consequences of inbreeding or inadvertently introducing turtles with deleterious alleles into the wild population. Thus, incidental take associated with Federal and State captive-breeding programs to support conservation efforts for wild populations (*i.e.,* head-starting) would be excepted from the prohibitions when conducted using permitted brood stock and following approved turtle husbandry practices in accordance with State regulations and U.S. Fish and Wildlife Service policy.

State-authorized farming/captive breeding programs—The Service recognizes that turtle farming can alleviate harvest of wild stock and provides a means to serve international markets without affecting wild populations in the future. Therefore, existing State-authorized farming operations using captive brood stock or otherwise legally acquired turtles prior to the listing of the species would be excepted. We will work with States to ensure an appropriate mechanism for identifying, marking, and tracking captive brood stock to differentiate them from wild stock. Without a system to identify alligator snapping turtles that have originated from these operations, we will not be able to finalize such an exception, as there will not be a way to distinguish captive-bred from wild-caught alligator snapping turtles.

This 4(d) rule would allow individuals to take; deliver, receive, carry, transport or ship in interstate commerce, in the course of a commercial activity; or sell or offer for sale in interstate commerce alligator snapping turtle specimens that meet the definitions of ''captive-bred'' or ''bred in captivity'' in 50 CFR 17.3 and the definitions and requirements in 50 CFR part 23 (see 50 CFR 23.5 and 23.24) if the specimen originated in a State-approved facility. It also allows individuals to import; export; deliver, receive, carry, transport, or ship in foreign commerce and in the course of a commercial activity; or sell or offer to sell in foreign commerce dead specimens of alligator snapping turtle that are otherwise lawfully taken. We are not currently proposing to allow foreign commerce and foreign trade of live specimens, in an effort to further ensure that wild specimens are not laundered through the black market and international trade. However, we seek public comment on whether such an exception may be appropriate if a mechanism is developed for identifying captive-bred specimens.

Any person wishing to exercise this exception would have to maintain documentation to demonstrate that the specimen was legally acquired and held in captivity prior to the effective date of the final rule listing the alligator snapping turtle. Such documentation may include a bill of sale or other receipts, including the State permit information for the source facility; record of pedigree of pit-tagged or uniquely identified, marked turtles with State permit from the source facility; accession records; CITES documents; or wildlife declaration forms dated prior to the specified dates. Also, the activity must not be prohibited by either the State or Tribe where the taking occurs or by the State or Tribe where the specimen is sold or otherwise transferred. Finally, the specimens held by a person claiming the benefit of this exception would have to be managed in a manner that prevents hybridization of the species or subspecies and in a manner that maintains genetic diversity.

Best management practices for implementing actions that occur near or in a stream—Implementing best management practices to avoid and/or minimize the effects of habitat alterations in areas that support alligator snapping turtles would provide additional measures for conserving the species by reducing direct and indirect effects to the species. We considered that certain construction, forestry, and pesticide/herbicide management activities that occur near and in a stream may result in removal of riparian cover or forested habitat, changes in land use within the riparian zone, or stream bank erosion and/or siltation. These actions andactivities may have some minimal leveloftake of the alligator snapping turtle, but any such take isexpected to be rare and insignificant, and is not expected to negatively impact the species' conservation and recovery efforts.

Construction, operation, and maintenance activities, such as installation of stream crossings, replacement of existing instream structures (*e.g.,* bridges, culverts, water control structures, boat launches, etc.), operation and maintenance of existing flood control features (or other existing structures), and directional boring, when implemented with industry and State-approved standard best management practices, will have minimal impacts to alligator snapping turtles and their habitat. In addition, we recognize that silvicultural operations are widely implemented in accordance with State-approved BMPs (Cristan et al. 2018, entire), and the adherence to these BMPs broadly preserves water quality standards, particularly related to sedimentation (Cristan et al. 2016, entire; Warrington et al. 2017, entire), to an extent that does not impair the species' conservation. Lastly, invasive species removal activities, particularly through pesticide and herbicide application, are considered beneficial to the native ecosystem and are likely to improve habitat conditions for the species; therefore, pesticide and herbicide application that follow the chemical label and appropriate application rates would not impair the species' conservation. These activities should have minimal impacts to alligator snapping turtles if industry and/or State-approved BMPs are implemented. These activities and management practices should be carried out in accordance with any existing regulations, permit and label requirements, and best management practices to avoid or minimize impacts to the species and its habitat.

Thus, under this proposed 4(d) rule, incidental take associated with the following best management practiced and activities would be excepted:

(1) Construction, operation, and maintenance activities that occur near and in a stream, such as installation of stream crossings, replacement of existing instream structures (*e.g.,* bridges, culverts, water control structures, boat launches, etc.), operation and maintenance of existing flood control features (or other existing structures), and directional boring, when implemented with industry and/or State-approved BMPs for construction.

(2) Pesticide and herbicide application that follows the chemical label and appropriate application rates.

(3) Silviculture practices and forest management activities that use State-approved BMPs to protect water and sediment quality and stream and riparian habitat.

Maintenance dredging of navigable waterways—We considered that maintenance dredging activities generally disturb the same area of the waterbody in each cycle; thus, there is less likelihood that suitable turtle habitat (*e.g.,* submerged logs, cover, etc.) occurs in the maintained portion of the channel. Accordingly, incidental take associated with maintenance dredging activities that occur within the previously disturbed portion of the navigable waterway would be excepted from the prohibitions as long as these

activities do not encroach upon suitable turtle habitat outside the maintained portion of the channel and provide for the conservation of the species.

Tribal employees—Under the exceptions in this proposed 4(d) rule, when acting in the course of their official duties, Tribal employees designated by the Tribe for such purposes, working in the range of the species, would be able to take alligator snapping turtles for the following purposes:

(A) Aiding or euthanizing sick or injured alligator snapping turtles;

(B) Disposing of a dead specimen; and

(C) Salvaging a dead specimen that may be used for scientific study.

Such take would have to be reported to the local Service field office within 72 hours, and specimens would have to be retained or disposed of only in accordance with directions from the Service.

State-licensed wildlife rehabilitation facilities—Under the exceptions in this proposed 4(d) rule, when acting in the course of their official duties, State-licensed wildlife rehabilitation facilities would be able to take alligator snapping turtles for the purpose of aiding or euthanizing sick or injured alligator snapping turtles. Such take would have to be reported to the local Service field office within 72 hours, and specimens would have to be retained and disposed of only in accordance with directions from the Service.

We are also considering an exception for incidental take of the alligator snapping turtle associated with bycatch from otherwise lawful recreational and commercial fishing. We note that alligator snapping turtle bycatch from recreational and commercial fishing with hoop nets and trot lines (and varieties including jug lines, bush hooks, and limb lines) is a concern for the conservation of the species due to its effects on species abundance, particularly in light of the species' life-history traits. However, there is limited information on the magnitude and on the temporal and spatial distribution of this threat across the species' range. It is important to ensure that fishing activities take into consideration the need to prevent accidental turtle deaths from the use of such fishing gear, and we will work with the States to identify measures and revisions to existing regulations to reduce bycatch of alligator snapping turtle. If we conclude that the measures and/or revisions to existing regulations would provide for the conservation of the species, we may include a provision in the final 4(d) rule excepting incidental take associated with legal recreational or commercial fishing activities for other targeted species, in compliance with State regulations, if such an exception is appropriate in light of comments and new information we receive during the comment period on this proposed rule (see **DATES**, above).

Also, to better understand threats associated with bycatch related to otherwise lawful fishing, we are considering adding a provision to the 4(d) rule that would require reporting within 72 hours of all injured or dead alligator snapping turtles resulting from bycatch from recreational or commercial fishing (for other targeted species) in accordance with State regulations and the relevant information provided to the Service. We specifically request comments on the additional 4(d) rule exception and provision that we are considering.

Future conservation efforts may be possible through advances in fishing gear technology that implement effective turtle escape or exclusion devices for hoop nets or modified trot lines (including limb lines and jug lines) that would reduce or eliminate turtle bycatch. Thus, we are requesting information from the public regarding new technology, design of a turtle escape, or exclusion device and modified trot line techniques that would effectively eliminate or significantly reduce bycatch of alligator snapping turtles from recreational fishing. We would particularly appreciate input from the commercial and recreational fishing communities. Our intent is to allow exceptions to incidental take for recreational and commercial fishing bycatch pending new technologies and regulations that may be applied to reduce the threat to the species; we are relying on input during the public comment period to further address bycatch incidental take.

We may issue permits to carry out otherwise prohibited activities, including those described above, involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32. With regard to threatened wildlife, a permit may be issued for the following purposes: For scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act. The statue also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

We recognize the special and unique relationship with our State natural resource agency partners in contributing to conservation of listed species. State agencies often possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants. State agencies, because of their authorities and their close working relationships with local governments and landowners, are in a unique position to assist the Service in implementing all aspects of the Act. In this regard, section 6 of the Act provides that the Service shall cooperate to the maximum extent practicable with the States in carrying out programs authorized by the Act. Therefore, any qualified employee or agent of a State conservation agency that is a party to a cooperative agreement with the Service in accordance with section 6(c) of the Act, who is designated by his, her, or their agency for such purposes, would be able to conduct activities designed to conserve alligator snapping turtle that may result in otherwise prohibited take without additional authorization.

Nothing in this proposed 4(d) rule would change in any way the recovery planning provisions of section 4(f) of the Act, the consultation requirements under section 7 of the Act, or the ability of the Service to enter into partnerships for the management and protection of the alligator snapping turtle. However, interagency cooperation may be further streamlined through planned programmatic consultations for the species between Federal agencies and the Service, where appropriate. We ask the public, particularly State agencies, Tribes, and other interested stakeholders that may be affected by the proposed 4(d) rule, to provide comments and suggestions regarding additional guidance and methods that the Service could provide or use, respectively, to streamline the implementation of this proposed 4(d) rule (see Information Requested, above).

III. Critical Habitat

Background

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a

determination that such areas are essential for the conservation of the species.

Our regulations at 50 CFR 424.02 define the geographical area occupied by the species as an area that may generally be delineated around species' occurrences, as determined by the Secretary (*i.e.,* 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).

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658)), and our associated Information Quality Guidelines provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

Prudency Determination

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12), require that, to the maximum extent prudent and determinable, the Secretary shall designate critical habitat at the time the species is determined to be an endangered or threatened species. Our regulations (50 CFR 424.12(a)(1)) state that the Secretary may, but is not required to, determine that a designation would not be prudent in the following circumstances:

(i) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(ii) The present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or threats to the species' habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(iii) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States;

(iv) No areas meet the definition of critical habitat; or

(v) The Secretary otherwise determines that designation of critical habitat would not be prudent based on the best scientific data available.

In our SSA and proposed listing determination for the alligator snapping turtle, we determined that the present or threatened destruction, modification, or curtailment of habitat or range is a threat to the species and that those threats in some way can be addressed by section 7(a)(2) consultation measures. The species occurs wholly in the jurisdiction of the United States, and we are able to identify areas that meet the definition of critical habitat.

However, as discussed earlier in this document, collection and/or vandalism has been identified as a threat to this species. The alligator snapping turtle is declining throughout its range as a consequence of factors including collection of live adult turtles from the wild for human consumption and for the pet trade. Adult alligator snapping turtles are harvested for local human consumption and for use in the specialty meat trade both domestically and internationally.

It is unclear, however, whether identification and mapping of critical habitat would increase the degree of such threat to the alligator snapping turtle. Accordingly, we seek comment on whether the designation of critical habitat may not be prudent because it would more widely announce the exact locations of alligator snapping turtles and their highly suitable habitat which could facilitate poaching, thereby exacerbating the threat of collection and contributing to further declines of the species' viability.

Therefore, because we are seeking comment on whether the identification of critical habitat can be expected to increase the degree of taking as a result of human activity, but we find that none of the other circumstances enumerated in our regulations at 50 CFR 424.12(a)(1) have been met, we determine that the designation of critical habitat may be prudent for the alligator snapping turtle.

Critical Habitat Determinability

Having determined that critical habitat may be prudent, under section 4(a)(3) of the Act we consider whether critical habitat for the alligator snapping turtle is determinable. Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist:

(i) Data sufficient to perform required analyses are lacking, or

(ii) The biological needs of the species are not sufficiently well known to identify any area that meets the definition of ''critical habitat.''

For the alligator snapping turtle, the species' needs are sufficiently well known. However, information sufficient to perform the required analyses are lacking because we have not determined the extent to which critical habitat may be prudent. Therefore, we find designation of critical habitat for the alligator snapping turtle is not determinable at this time. The Act allows the Service an additional year to publish a critical habitat designation that is not determinable at the time of listing (16 U.S.C. 1533(b)(6)(C)(ii)).

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(1) Be logically organized;

(2) Use the active voice to address readers directly;

(3) Use clear language rather than jargon;

(4) Be divided into short sections and sentences; and

(5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*), need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes.

Upon the initiation of the SSA process, we contacted Tribes within the range of the alligator snapping turtle and additional Tribes of interest to inform them of our intent to complete an SSA for the species that would inform the species' 12-month finding. In addition, as described above under *Tribal employees,* the proposed 4(d) rule would authorize certain take by Tribes. As we move forward with this listing process, we will continue to consult with Tribes on a government-to-government basis as necessary.

References Cited

A complete list of references cited in this rulemaking is available on the internet at *http://www.regulations.gov* in Docket No. FWS–R4–ES–2021–0115 and by mailed request from the Louisiana Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are the staff members of the Service's Species Assessment Team and the Louisiana Ecological Services Field Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

■ 2. Amend § 17.11(h) by adding an entry for ''Turtle, alligator snapping'' to the List of Endangered and Threatened Wildlife in alphabetical order under Reptiles to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
*	*	*	*	* * *
REPTILES				
*	*	*	*	* * *
Turtle, alligator snapping	*Macrochelys temminckii*	Wherever found	T	[**Federal Register** CITATION OF THE FINAL RULE]; 50 CFR 17.42(o).[4d]
*	*	*	*	* * *

■ 3. As proposed to be amended at 85 FR 61700 (September 30, 2020) and 86 FR 18014 (April 7, 2021), § 17.42 is further amended by adding paragraph (o) to read as follows:

§ 17.42 Special rules—reptiles.

* * * * *

(o) Alligator snapping turtle (*Macrochelys temminckii*).

(1) *Prohibitions.* The following prohibitions that apply to endangered wildlife also apply to alligator snapping turtle. Except as provided under paragraphs (o)(2) and (3) of this section and §§ 17.4 and 17.5, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or cause to be committed, any of the following acts in regard to this species:

(i) Import or export, as set forth at § 17.21(b) for endangered wildlife.

(ii) Take, as set forth at § 17.21(c)(1) for endangered wildlife.

(iii) Possession and other acts with unlawfully taken specimens, as set forth at § 17.21(d)(1) for endangered wildlife.

(iv) Interstate or foreign commerce in the course of commercial activity, as set forth at § 17.21(e) for endangered wildlife.

(v) Sale or offer for sale, as set forth at § 17.21(f) for endangered wildlife.

(2) *General exceptions from prohibitions.* In regard to this species, you may:

(i) Conduct activities as authorized by a permit under § 17.32.

(ii) Take, as set forth at § 17.21(c)(2) through (c)(4) for endangered wildlife.

(iii) Take as set forth at § 17.31(b).

(iv) Possess and engage in other acts with unlawfully taken wildlife, as set forth at § 17.21(d)(2) for endangered wildlife.

(v) Federal and State captive-breeding programs to support conservation efforts for wild populations that use permitted brood stock and approved turtle husbandry practices in accordance with

State regulations and U.S. Fish and Wildlife Service policy.

(vi) Take; export; import; delivery, receipt, carrying, transport, or shipment in interstate or foreign commerce, in the course of a commercial activity; or sale or offer for sale in interstate or foreign commerce specimens that meet the definition of ''captive-bred'' or ''bred in captivity'' at § 17.3 and the definitions and requirements in 50 CFR part 23 for Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) source codes ''C'' (Bred-in-captivity) or ''F'' (Captive-bred) (see 50 CFR 23.5 and 23.24), if they originated in a State-approved captive breeding facility and provided that all of the following requirements are met:

(A) Take is authorized in accordance with the laws and regulations of the State or Tribe where the taking occurs.

(B) Delivery, receipt, carrying, transport, or shipment in interstate commerce and in the course of a commercial activity, or sale or offer for sale in interstate commerce, is only authorized if the activity is conducted in accordance with the laws and regulations of the State or Tribe in which the taking occurs and the State or Tribe in which the sale or transfer occurs. The activity must not be prohibited by either the State or Tribe where the taking occurs or the State or Tribe where the specimen is sold or otherwise transferred.

(C) Import; export; delivery, receipt, carrying, transport, or shipment in foreign commerce and in the course of a commercial activity; or sale or offer for sale in foreign commerce is only authorized with dead specimens taken in accordance with paragraph (o)(2)(vi)(A) of this section, and only if trade in the specimen meets the requirements of parts 13, 14, and 23 of this chapter. This exception does not apply to gametes, eggs, or live alligator snapping turtles.

(D) Any specimens that do not qualify as ''captive-bred'' or ''bred in captivity'' (*e.g.,* any specimens taken from the wild) may only be used by captive breeding operations as parental stock (or broodstock), and only if the specimens were legally acquired and held in captivity prior to the effective date of the final rule. You must maintain documentation to demonstrate that the specimen was legally acquired and held in captivity prior to the effective date of the final rule. Such documentation may include a bill of sale or other receipt that includes the State permit information for the source facility, record of pedigree of pit-tagged or uniquely identified, marked turtles with State permit from the source facility, accession records, CITES documents, or wildlife declaration forms that must be dated prior to the specified dates.

(E) All gametes, eggs, and live specimens of the species held by a person claiming the benefit of an exception under this paragraph (o)(2)(vi) of this section must be managed in a manner that prevents hybridization of the species or subspecies and in a manner that maintains genetic diversity.

(F) Each person claiming the benefit of an exception under this paragraph (o)(2)(vi) of this section must maintain accurate written records of activities, including of any birth, death, take, possession, transportation, sale, purchase, barter, exportation, importation, and any other transfers of specimens. Any person claiming the benefit of an exception in paragraph (o)(2)(vi)(C) of this section must also maintain accurate written records as are otherwise required to be maintained by all import/export licensees under part 14 of this subchapter. Such records shall be maintained as in the normal course of business, reproducible in the English language, and retained for a minimum of 5 years from the date of each transaction. Subject to applicable limitations of law, duly authorized officers at all reasonable times shall be afforded access to inspect any wildlife or plant held or to inspect, audit, or copy any permits, books, or records required to be kept by regulations of this subchapter B.

(vii) When acting in the course of their official duties, Tribal employees designated by the Tribe for such purposes may take alligator snapping turtle for the following purposes:

(A) Aiding or euthanizing sick or injured alligator snapping turtles;

(B) Disposing of a dead specimen; and

(C) Salvaging a dead specimen that may be used for scientific study.

(viii) State-licensed wildlife rehabilitation facilities, when acting in the course of their official duties, may take alligator snapping turtle for the purpose of aiding or euthanizing sick or injured alligator snapping turtles.

(ix) Take carried out under paragraphs (o)(2)(vii) and (viii) of this section must be reported to the local Service field office within 72 hours, and specimens may be retained or disposed of only in accordance with directions from the Service.

(3) *Exceptions from prohibitions for specific types of incidental take.* You may take alligator snapping turtle while carrying out the following legally conducted activities in accordance with this paragraph (o)(3):

(i) Construction, operation, and maintenance activities that occur near and in a stream, such as installation of stream crossings, replacement of existing instream structures (*e.g.,* bridges, culverts, water control structures, boat launches, etc.), operation and maintenance of existing flood control features (or other existing structures), and directional boring, when implemented with industry and/or State-approved best management practices for construction.

(ii) Pesticide and herbicide application that follows the chemical label and appropriate application rates.

(iii) Silviculture practices and forest management activities that use State-approved best management practices to protect water and sediment quality and stream and riparian habitat.

(iv) Maintenance dredging activities that remain in the previously disturbed portion of a maintained channel.

Martha Williams,

Principal Deputy Director, Exercising the Delegated Authority of the Director, U.S. Fish and Wildlife Service.

[FR Doc. 2021–23994 Filed 11–8–21; 8:45 am]

BILLING CODE 4333–15–P