carbon footprint when compared to a newly manufactured drum.[32]

However, if the EPA in the future revises the regulations affecting drum reconditioners, then one possible unintended consequence could be to steer used drums away from reconditioners and instead divert them straight to scrap recycling or disposal. The RIPA has raised concerns about direct-to-scrap management of used industrial containers, including the potential for contamination of the scrap metal and plastics from the container residues, and the lost environmental benefits from container reconditioning.[33]

Possible solutions to this potential unintended consequence could be to limit the empty container provision found at 40 CFR 261.7 to containers sent to reconditioners, and/or require containers to be clean of all hazardous residues (and not just be ''RCRA empty'') prior to going to scrap recycling or to disposal. In addition, the EPA could consider requiring containers with any amount of hazardous residues (including crushed or shredded containers) to meet the hazardous debris alternative treatment standard in 40 CFR 268.45 prior to being land disposed.

The EPA requests comment on end-of-life management of containers with hazardous residues remaining in the containers, including information on the extent that residues in scrapped containers pose an issue for scrap recycling or disposal, existing industry standards that may help prevent contamination from end-of-life containers from posing an environmental or public health risk, how end-of-life issues differ for different types of containers, and any practical difficulties or unintended consequences that may arise from the possible regulatory solutions to the problem of contaminated scrapped containers.

VIII. Transportation Equipment Cleaning Facilities

As with drum reconditioners, transportation equipment (*e.g.,* tanker car/rail car) cleaning facilities, which clean out equipment that once held RCRA hazardous waste and other hazardous materials, can also be the source of contamination and releases. Similar to drum reconditioners, these facilities can also potentially manage large amounts of hazardous waste residues that remain in the transportation equipment each year. Lack of oversight of these facilities, coupled with systematic non-compliance stemming from gaps in the regulations, may have resulted in environmental and public health impacts to communities where these facilities are located. While each individual transportation equipment tanker or rail car may pose little risk, the EPA estimates that approximately 500 clean out facilities exist, each processing thousands of pieces of transportation equipment per year, resulting in potentially millions of gallons of unmanaged hazardous waste.

While not specifically included in the scope of this ANPRM, the EPA recognizes these facilities have similar issues to drum reconditioners, and potential actions stemming from this ANPRM could be applied to these transportation equipment cleaning facilities. To further investigate, the EPA has started assessing publicly available information on these facilities and the Agency aims to gain an understanding of the total universe, general practices and procedures, waste and tank car operations and management, and potential damage cases.

The Agency is interested in public comment on similar environmental problems with transportation equipment clean out facilities and whether some of the approaches discussed in this ANPRM for drum reconditioners could also be used to address environmental issues at the transportation equipment cleaning facilities.

IX. Statutory and Executive Order Reviews

This action is not a significant regulatory action as defined in Executive Order 12866, as amended by Executive Order 14094, and was therefore not subject to a requirement for Executive Order 12866 review. Because this action does not propose or impose any requirements, other statutory and executive order reviews that apply to rulemaking do not apply. Should the EPA subsequently determine the Agency will pursue a rulemaking, the EPA will address all the statutes and executive orders as applicable to that rulemaking.

Nevertheless, the Agency welcomes comments and/or information that would help the Agency to assess particularly the following: the potential impact of a rule on small entities pursuant to the Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq.*) and human health or environmental effects on minority or low-income populations pursuant to Executive Order 12898, entitled *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 FR 7629, February 16, 1994). The Agency will consider such comments during the development of any subsequent rulemaking.

Additional information about statutes and executive orders can be found at *https://www.epa.gov/laws-regulations/laws-and-executive-orders.*

Michael S. Regan,

Administrator.

[FR Doc. 2023–16752 Filed 8–10–23; 8:45 am]

BILLING CODE 6560–50–P

[32] *Life Cycle Assessment of Newly Manufactured and Reconditioned Industrial Packaging,* Ernst & Young, EY, January 2014. *http://resch-packaging.com/files/Life-Cycle-Analysis-Report-2014.pdf.*

[33] ''No More Direct To Scrap''; Reusable Industrial Packaging Association *https://www.reusablepackaging.org/direct-to-scrap/;* retrieved December 21, 2022.

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R2–ES–2022–0115; FF09E22000 FXES1113090FEDR 234]

RIN 1018–BG94

Endangered and Threatened Wildlife and Plants; Removing the Apache Trout From the List of Endangered and Threatened Wildlife

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service or USFWS), propose to remove the Apache trout (*Oncorhynchus apache*), a fish native to Arizona, from the Federal List of Endangered and Threatened Wildlife due to recovery. Our review of the best available scientific and commercial data indicates that the threats to the species have been eliminated or reduced to the point that the species no longer meets the definition of a threatened species or an endangered species under the Endangered Species Act of 1973, as amended (Act). If we finalize this rule as proposed, the prohibitions and conservation measures provided by the Act, particularly through section 7 and our regulations would no longer apply to the Apache trout. We request information and comments from the public regarding this proposed rule for the Apache trout.

DATES: We will accept comments received or postmarked on or before October 10, 2023. 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 September 25, 2023.

ADDRESSES: You may submit comments on this proposed rule by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal: *https://www.regulations.gov.* In the Search box, enter FWS–R2–ES–2022–0115, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the 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–R2–ES–2022–0115, 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).

Availability of supporting materials: This proposed rule and supporting documents (including the species status assessment (SSA) report, references cited, and 5-year review) are available at *https://www.regulations.gov* under Docket No. FWS–R2–ES–2022–0115.

FOR FURTHER INFORMATION CONTACT: For questions related to the SSA report and associated literature cited: Jess Newton, Project Leader, Arizona Fish and Wildlife Conservation Office, U.S. Fish and Wildlife Service, 2500 S Pine Knoll Drive, Flagstaff, AZ 86001; telephone 928–556–2140.

For questions related to this proposed rule and other supporting documents: Heather Whitlaw, Field Supervisor, Arizona Ecological Services Office, U.S. Fish and Wildlife Service, 9828 North 31st Ave. #C3, Phoenix, AZ 85051–2517; telephone 602–242–0210.

Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point-of-contact in the United States.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, a species warrants delisting if it no longer meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become endangered in the foreseeable future throughout all or a significant portion of its range). The Apache trout is listed as threatened, and we are proposing to delist it. We have determined the Apache trout does not meet the Act's definition of an endangered or threatened species. Delisting a species can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process (5 U.S.C. 551 *et seq.*).

What this document does. This action proposes to remove the Apache trout from the List of Endangered and Threatened Wildlife due to the species' recovery.

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. The determination to delist a species must be based on an analysis of the same factors.

Under the Act, we must review the status of all listed species at least once every five years. We must delist a species if we determine, on the basis of the best available scientific and commercial data, that the species is neither a threatened species nor an endangered species. Our regulations at 50 CFR 424.11 identify three reasons why we might determine a species shall be delisted: (1) The species is extinct; (2) the species does not meet the definition of an endangered species or a threatened species; or (3) the listed entity does not meet the definition of a species. Here, we have determined that the Apache trout does not meet the definition of an endangered species or a threatened species and, therefore, we are proposing to delist it.

Information Requested

We intend that any final action resulting from this proposal 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 governmental or State agencies, Native American Tribes, the scientific community, industry, or other interested parties concerning this proposed rule.

We particularly seek comments concerning:

(1) Reasons why we should or should not remove the Apache trout from the List of Endangered and Threatened Wildlife (*i.e.,* ''delist'' the species);

(2) New biological or other relevant data concerning any threat (or lack thereof) to this fish (*e.g.,* those associated with climate change or nonnative trout);

(3) New information on any efforts by the State or other entities to protect or otherwise conserve the Apache trout or its habitat;

(4) New information concerning the range, distribution, and population size or trends of this fish; and

(5) New information on the current or planned activities in the habitat or range of the Apache trout that may adversely affect or benefit the fish.

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 action under consideration without providing supporting information, although noted, do not provide substantial information necessary to support a determination. 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 determination may differ from this proposal. For example, based on the new information we receive (and any comments on that new information), we may conclude that the species should remain listed as threatened, or we may conclude that the species should be reclassified from threatened to endangered.

Public Hearing

Section 4(b)(5) of the Act provides for a public hearing on this proposal, if requested. Requests must be received by the date specified in **DATES**. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule a public hearing on this proposal, if requested, and announce the date, time, and location of the hearing, as well as how to obtain reasonable accommodations, in the **Federal Register** and local newspapers at least 15 days before the hearing. We may hold the public hearing in person or virtually via webinar. We will announce any public hearing on our website, in addition to the **Federal Register**. The use of virtual public hearings is consistent with our regulations at 50 CFR 424.16(c)(3).

Peer Review

A species status assessment (SSA) team prepared an SSA report for the Apache trout. The SSA team was composed of Service biologists, in consultation with other species experts from White Mountain Apache Tribe (WMAT), Arizona Game and Fish Department (AZGFD), U.S. Forest Service (USFS), and Trout Unlimited. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species.

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 solicited independent scientific review of the information contained in the SSA report. We sent the SSA report to three independent peer reviewers and received responses from all three peer reviewers. Results of this structured peer review process can be found at *https://regulations.gov.* In preparing this proposed rule, we incorporated the results of the peer reviews, as appropriate, into the final SSA report, which is the foundation for this proposed rule.

Summary of Peer Reviewer Comments

As discussed in Peer Review above, we received comments from three peer reviewers on the draft SSA report. We reviewed all comments received from three peer reviewers for substantive issues and new information regarding the information contained in the SSA report. The peer reviewers generally concurred with our methods and conclusions and did not provide additional information for inclusion in the report. We considered one of these comments to be substantive, which we summarize below.

Comment: A reviewer commented that: (1) only future scenario 3 (the status quo scenario) is likely to occur; and (2) further consideration should be given to Apache trout resiliency within future scenarios given the impacts of climate change.

Our Response: We retained all five future conditions scenarios in the SSA report because we concluded that they cover the entire range of plausible outcomes for the Apache trout given the possible levels of conservation management. For our status determination in this proposed rule we evaluated the two scenarios that we consider to be plausible given the completion of the cooperative management plan (CMP) and current commitments to ongoing species management. We recognize the seriousness of impacts to Apache trout related to climate change and conducted thorough analyses on the possible effects on Apache trout resiliency from warmer stream temperatures, more frequent and severe droughts, increased risk of wildfire and post-fire debris flow, decrease in snowpack but increased rain on snow events, and more intense summer monsoon rains. These analyses are presented in the SSA report and we incorporated them into our future scenarios. Therefore, we conclude that the SSA report adequately addresses consideration of the potential effects of climate change in our analysis of resiliency within the future scenarios.

Previous Federal Actions

The Apache trout was listed as endangered under the Endangered Species Preservation Act in 1967 (32 FR 4001; March 11, 1967) due to threats from overexploitation, habitat degradation (*e.g.,* mining and agricultural development), hybridization with nonnative salmonids, and predation by species such as the brown trout (*Salmo trutta*). The species was subsequently downlisted to threatened under the Act in 1975 (40 FR 29863; July 16, 1975) after successful culturing in captivity and discovery of additional populations. The 1975 downlisting rule included a 4(d) rule that allows AZGFD to establish and regulate sport fishing opportunities on non-Tribal lands. The WMAT regulates take and sport fishing for Apache trout on the Fort Apache Indian Reservation. There is no critical habitat designation for the Apache trout because listing and reclassification occurred before the 1978 and 1982 amendments to the Act that provide for critical habitat designation. The first recovery plan for the Apache trout was finalized in 1979 (USFWS 1979, entire), and a revised plan was finalized in 1983 (USFWS 1983, entire). A second revision was completed in 2009 (USFWS 2009, entire).

A 5-year review for Apache trout was completed in 2010 (USFWS 2010, entire). While recognizing that many of the threats identified in the recovery plan had been addressed, the persistence of certain threats (such as the invasion by nonnative trout into Apache trout habitat) resulted in a recommendation of ''No change'' in the species' status (USFWS 2010, p. 4). On May 5, 2021, we published a notice in the **Federal Register** (86 FR 23976) announcing the initiation of 5-year status reviews and information requests for 23 species, including the Apache trout. On August 29, 2022 (USFWS 2022a, entire), a 5-year review of the Apache trout status was completed. This latest 5-year review concludes that the status of the Apache trout has substantially improved since the time of the species' listing and recommends that the Apache trout be considered for delisting due to recovery.

Background

A thorough review of the biological information on the Apache trout including taxonomy, life history, ecology, and conservation activities, as well as threats facing the species or its habitat is presented in our SSA report (USFWS 2022b, entire) and the revised Recovery Plan for Apache trout (USFWS 2009, entire), which are available at *https://www.regulations.gov* under Docket No. FWS–R2–ES–2022–0115. The following is a summary of the best available information on Apache trout.

The Apache trout is a salmonid species endemic to the White Mountains region of east-central Arizona. The species is currently found in the White River, Black River, and the Little Colorado River drainages in the

White Mountains of east-central Arizona, although the historical distribution is not known with certainty. Apache trout occupies headwater streams upstream of natural and conservation barriers, which likely reflects a truncated distribution from historical distributions due to nonnative trout, habitat alterations, and other factors (USFWS 2009, pp. 1, 6–16). Distinguishing characteristics of Apache trout include a fusiform (spindle-shaped) body and large dorsal fin, with spots on the body pronounced and often uniformly spaced both above and below the lateral line. Spots are circular in outline, are medium-sized, and appear slightly smaller than most interior subspecies of cutthroat trout (*Oncorhynchus clarkii*) but more like typical cutthroat trout than Gila trout (*O. gilae*) (Miller 1972, pp. 410–411). Yellow or yellow-olive colors predominate, with tints of purple and pink observable on live specimens. Two black spots are located horizontally on the eye before and aft of the pupil, creating the image of a black band through the eye. A red or pink lateral band is usually absent (Miller 1972, p. 414). Dorsal, pelvic, and anal fins have conspicuous cream or yellowish tips. Like most trout occupying small headwater streams, the Apache trout has been described as an opportunistic feeder, primarily feeding on various species of insects such as caddisflies (Trichoptera), mayflies (Ephemeroptera), stoneflies (Plecoptera), and beetles (Coleoptera) (Harper 1978, p. 108).

Recovery Planning and Recovery Criteria

Section 4(f) of the Act directs us to develop and implement recovery plans for the conservation and survival of endangered and threatened species unless we determine that such a plan will not promote the conservation of the species. Under section 4(f)(1)(B)(ii), recovery plans must, to the maximum extent practicable, include objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of section 4 of the Act, that the species be removed from the List.

Recovery plans provide a roadmap for us and our partners on methods of enhancing conservation and minimizing threats to listed species, as well as measurable criteria against which to evaluate progress towards recovery and assess the species' likely future condition. However, they are not regulatory documents and do not substitute for the determinations and promulgation of regulations required under section 4(a)(1) of the Act. A decision to revise the status of a species, or to delist a species is ultimately based on an analysis of the best scientific and commercial data available to determine whether a species is no longer an endangered species or a threatened species, regardless of whether that information differs from the recovery plan.

There are many paths to accomplishing recovery of a species, and recovery may be achieved without all criteria being fully met. For example, one or more criteria may be exceeded while other criteria may not yet be met. In that instance, we may determine that the threats are minimized sufficiently, and that the species is robust enough that it no longer meets the definition of an endangered species or a threatened species. In other cases, we may discover new recovery opportunities after having finalized the recovery plan. Parties seeking to conserve the species may use these opportunities instead of methods identified in the recovery plan. Likewise, we may learn new information about the species after we finalize the recovery plan. The new information may change the extent to which existing criteria are appropriate for identifying recovery of the species. The recovery of a species is a dynamic process requiring adaptive management that may, or may not, follow all the guidance provided in a recovery plan.

The Apache trout recovery plan identified two major areas of focus to achieve the long-term survival and viability of the species: protection of Apache trout habitat from various watershed alteration activities (*e.g.,* forestry, livestock grazing, reservoir construction, agriculture, road construction, and mining) and protection from introduction of nonnative trout species that have resulted in hybridization, competition, and predation (USFWS 2009, p. v). In order to achieve recovery, the recovery plan identified criteria that will assist in determining whether the Apache trout has recovered to the point that the protections afforded by the Act are no longer needed. These criteria are:

(1) Habitat sufficient to provide for all life functions at all life stages of 30 self-sustaining, discrete populations of pure Apache trout has been established and protected through plans and agreements with responsible land and resource management entities. These plans will address and serve to remedy current and future threats to Apache trout habitat.

(2) Thirty discrete populations of genetically pure Apache trout have been established and determined to be self-sustaining. A population will be considered self-sustaining by the presence of multiple age classes and evidence of periodic natural reproduction. A population will be considered established when it is capable of persisting under the range of variation in habitat conditions that occur in the restoration stream.

(3) Appropriate angling regulations are in place to protect Apache trout populations while complying with Federal, State, and Tribal regulatory processes.

(4) Agreements are in place between the Service, AZGFD, and WMAT to monitor, prevent, and control disease and/or causative agents, parasites, and pathogens that may threaten Apache trout.

Recovery Plan Implementation

The following discussion summarizes the recovery criteria and information on recovery actions that have been implemented under each delisting criterion.

Delisting Criterion 1: Habitat sufficient to provide for all life functions at all life stages of 30 self-sustaining, discrete populations of pure Apache trout has been established and protected through plans and agreements with responsible land and resource management entities. This criterion has been met. Since the time of listing, the Service, in collaboration with WMAT, AZGFD, USFS, and Trout Unlimited, have worked to maintain and restore riparian habitats where the Apache trout occurs. Multiple age classes are represented across the populations, which are indicative of healthy recruitment and stable populations from year to year. Although the average abundance of adults is fewer than 500 within most populations, the diversity of age classes suggests healthy survival and recruitment rates. Furthermore, adult individuals make up a significant share of the overall population, which is indicative that many fry and juveniles are able to survive to adulthood without the need of restocking from adjacent populations or hatcheries.

The habitat of Apache trout is managed, and land-use impacts on the species are reduced through environmental review of proposed projects. For example, the Apache-Sitgreaves National Forests (ASNF) Land Management Plan incorporates desired conditions for aquatic habitats to contribute to the recovery of federally listed species and to provide self-sustaining populations of native species (ASNF 2015, pp. 16–26). WMAT also has land management plans that help protect Apache trout populations. Alteration of logging practices, road closure and removal, and ungulate exclusion through fencing or retiring allotments have all been used to manage Apache trout habitat on the ANSFs and Fort Apache Indian Reservation (Robinson et al. 2004, p. 1; USFWS 2009, pp. 23–29).

Delisting Criterion 2: Thirty discrete populations of genetically pure Apache trout have been established and determined to be self-sustaining. This criterion has almost been met. Compared to the time of listing when we identified 14 genetically pure populations, currently, the Apache trout consists of 29 genetically pure populations and one population that is suspected to be genetically pure. These populations are comprised of both relict and replicate populations. A relict population of Apache trout is one that was originally discovered in a stream within the historical range of the species and is the species' original genetic stock. A replicate population of Apache trout is one that was established using individuals from a relict population or another replicate population that represents a relict genetic lineage. Replicate populations are usually established within the historical range of the species, including streams that were originally unoccupied by Apache trout and streams where Apache trout have been extirpated. The relict populations have remained pure and are self-sustaining without the need for restocking since their discovery (Leon 2022, pers. comm.).

Following the initial introduction of 100–200 individuals, most of the replicate populations did not require additional introduction of individuals (USFWS 2022b, p. 58). However, periodic introductions of additional individuals from the same donor streams have been made in subsequent years in several populations to improve genetic diversity within replicated populations and to reduce impacts to donor streams from large, one-time transfers. Replicate populations were established as early as 1967 and as late as 2008.

In order to ensure that genetically pure populations of Apache trout are protected, conservation barriers that prohibit nonnative trout species from accessing upstream portions of occupied Apache trout habitat have been and will continue to be constructed and maintained per the CMP. The prevents nonnative trout from hybridizing with, competing with, and preying on Apache trout.

Delisting Criterion 3: Appropriate angling regulations are in place to protect Apache trout populations while complying with Federal, State, and Tribal regulatory processes. This criterion has been met. Apache trout streams are protected with fishing closures when populations are small and vulnerable, and with catch-and-release regulations in larger populations where harvest could negatively impact the population. AZGFD does provide put-and-take opportunities for Apache trout in Silver Creek, East Fork Black River, and West Fork Little Colorado River to generate public support for recovery of the species, as does WMAT in the North Fork White River, lower East Fork White River, Cibeque Creek, lower Paradise Creek, and lower Diamond Creek. Apache trout fisheries are also established in some lakes (*e.g.,* Big Bear, Hurricane, Christmas Tree, Earl Park) to afford the public opportunities to harvest Apache trout, which also has the benefit of raising public awareness for the species.

Delisting Criterion 4: Agreements are in place between the Service, AZGFD, and WMAT to monitor, prevent, and control disease and/or causative agents, parasites, and pathogens that may affect Apache trout. This criterion has been met. By December 2021, the Service, AZGFD, USFS, WMAT, and Trout Unlimited had all signed the cooperative management plan (CMP) for Apache trout. The goal of the CMP is to ensure the long-term persistence of the Apache trout by monitoring and maintaining existing populations, establishing new populations, restoring and maintaining existing habitats, and conducting disease, parasite, and pathogen prevention and monitoring activities. Although the CMP is a voluntary agreement among the cooperating agencies, it is reasonable to conclude the plan will be implemented into the future for multiple reasons. First, each of the cooperating agencies have established a long record of engagement in conservation actions for the Apache trout. Many of the management activities, such as the construction of conservation barriers, have been ongoing since at least the 1990s (USFWS 2022b, pp. 70–73). Second, implementation of the CMP is already underway. Conservation barriers are being constructed and maintained, invasive species are being removed, planning is underway for restocking Apache trout as needed, and habitats are being repaired and restored. Third, the conservation mission and authorities of these agencies authorize this work even if the species is delisted. Fourth, there is a practical reason to anticipate implementation of the CMP into the future: the plan's actions are technically not complicated to implement, and costs are relatively low. We also have confidence that the actions called for in the CMP will be effective in the future because they have already proven to be effective as evidenced by the information collected from recent habitat actions and associated monitoring (USFWS 2022b, entire). Lastly, if the CMP is not adhered to by the cooperating agencies or an evaluation by the Service suggests the habitat and population numbers are declining, the Service would evaluate the need to again add the species to the List (*i.e.,* ''relist'' the species) under the Act. Taken together, it is therefore reasonable to conclude that the CMP will be implemented as anticipated, and that the long-term recovery of Apache trout will be maintained and monitored adequately thus meeting the conditions of this criterion.

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in title 50 of the Code of Federal Regulations set forth the procedures for determining whether a species is an endangered species or a threatened species, issuing protective regulations for threatened species, and designating critical habitat for endangered species. In 2019, jointly with the National Marine Fisheries Service, the Service issued a final rule that revised the regulations in 50 CFR part 424 regarding how we add, remove, and reclassify endangered and threatened species and the criteria for designating listed species' critical habitat (84 FR 45020; August 27, 2019). On the same day the Service also issued final regulations that, for species listed as threatened species after September 26, 2019, eliminated the Service's general protective regulations automatically applying to threatened species the prohibitions that section 9 of the Act applies to endangered species (84 FR 44753; August 27, 2019). 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 have an effect on 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. The determination to delist a species must be based on an analysis of the same five factors.

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 species' expected response 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 of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of 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 we 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 the 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. The SSA report does not represent our decision on whether the species should be proposed for delisting. 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.

To assess the viability of the Apache trout, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency is the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years), redundancy is the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and representation is the ability of the species to adapt to both near-term and long-term changes in its physical and biological environment (for example, climate conditions, pathogens). In general, species viability will increase with increases in resiliency, redundancy, and representation (Smith et al. 2018, p. 306). Using these principles, we identified the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated the species' life-history needs. The next stage involved 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 involved 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 decision.

The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket No. FWS–R2–ES–2022–0115 on *https://www.regulations.gov* and at *https://ecos.fws.gov/ecp/species/3532.*

Summary of Biological Status and Threats

We reviewed the biological condition of the species and its resources, and the threats that influence the species' current and future condition, in order to assess the species' overall viability and the risks to that viability.

The primary threats affecting the Apache trout are the invasion of Apache trout habitat by nonnative trout species and the effects of climate change, which are projected to result in more wildfire and debris runoff in streams. Introgression of nonnative trout species into Apache trout habitat has resulted in hybridization of certain populations. Additionally, nonnative trout species also compete with the Apache trout and certain species have been known to prey on the Apache trout. In addition to invasion by nonnative trout, wildfires in the region can result in ash and debris flow, creating unsuitable conditions for the Apache trout and possibly resulting in fatalities and extirpation of populations. To address these major threats, management actions, including construction of conservation barriers, as well as restocking and restoring habitats, have been implemented.

Nonnative Species

Nonnative species, especially nonnative salmonids, remain one of the largest threats to the Apache trout (Rinne 1996, p. 152). Over 61 million nonnative sport fishes have been stocked into lakes in the Little Colorado and Black River drainages since the 1930s (Rinne and Janisch 1995, p. 398). Over 8 million nonnative sport fishes were introduced directly into the Little Colorado and Black rivers and their tributaries since the 1930s, and many of these were nonnative salmonids (Rinne and Janisch 1995, p. 398). Recent stocking practices have been altered to reduce interactions with, and risks to, native species, such as using triploid (sterile) rainbow trout for stocking into open water systems (EcoPlan Associates 2011, p. 21). However, threats remain due to acclimated nonnative populations from historical stockings.

As discussed below, hybridization with rainbow trout and cutthroat trout can lead to functional extirpation of populations. Competition with and predation by brown trout and brook trout are also of high concern. While no published studies have documented competition and predation impacts on Apache trout by nonnative salmonids such as brown trout and brook trout, it is generally accepted that the negative interaction has led to reduction or extirpation of some populations (Rinne 1996, p. 152). Appendix C of the SSA report analyzes the negative effect of nonnative trout presence on occupancy of juvenile (less than 125 mm total length (TL)) Apache trout at the site scale (approximately 100 m) in fish surveys (USFWS 2022b, p. 134–137).

Genetic Factors (Population)

Discussed below are the three genetic factors that pose a risk to the viability of Apache trout populations: hybridization, inbreeding, and low genetic variability.

Hybridization

Hybridization can introduce traits that are maladaptive, disrupt adaptive gene complexes, or result in outbreeding depression (Hedrick 2000, entire). Hybridization can also lead to the loss of species-specific alleles, and hybridization with Pacific trout species has long been recognized as a threat to the viability of native trout species (or subspecies) (Behnke 1992, p. 54). This has resulted in arguments that only genetically pure populations should be considered a part of the species or subspecies (Allendorf et al. 2004, p. 1212).

A long history of nonnative trout stocking in Arizona has led to hybridization between Apache trout and rainbow trout, even to the extent of genetic extirpation, and it is one of the main reasons for the historical decline of Apache trout (Rinne and Minckley 1985, pp. 285, 288–291; Carmichael et al. 1993, pp. 122, 128; Rinne 1996, pp. 150–152). The major threat of hybridization is why the 2009 revised recovery plan lists as an objective the establishment and/or maintenance of 30 self-sustaining, discrete populations of genetically pure Apache trout within its historical range (USFWS 2009, pp. vi, vii, 5, 22). That same objective has largely been in place since the first recovery plan was developed for the species in 1979 (USFWS 1979, p. 15). A comprehensive assessment of the genetic purity of naturally reproducing Apache trout populations showed only 11 of 31 streams are deemed to be generically pure (Carmichael et al. 1993, p. 128). At the time the 2009 revised recovery plan was completed, 28 populations of genetically pure Apache trout were extant (USFWS 2009, p. 2). Currently, the Apache trout consists of 29 genetically pure populations and one population suspected to be genetically pure.

Inbreeding and Low Genetic Diversity

As discussed earlier, small populations are more likely to exhibit inbreeding and low genetic diversity. Inbreeding often results in inbreeding depression and expression of recessive and deleterious alleles (Wang et al. 2002, p. 308). Cutthroat trout are an example of inland trout in North America where inbreeding has been documented for some small, isolated populations (Metcalf et al. 2008, p. 152; Carim et al. 2016, pp. 1368–1372). Low genetic diversity limits the ability of populations to adapt to changing and novel environments (Allendorf and Ryman 2002, pp. 62–63).

The only study of genetic diversity in Apache trout showed strong distinction among three genetic lineages (Soldier, Ord, and East Fork White River lineages) represented by the nine populations studied, but genetic diversity was low within populations (Wares et al. 2004, pp. 1896–1897). Low genetic diversity within populations suggests that they were founded with a small number of individuals. Replicate populations of Apache trout have often been established with only a few hundred individuals, with an unknown subset successfully reproducing. Although no studies have evaluated inbreeding in Apache trout populations, or how genetic management (*e.g.,* genetic rescue) may benefit Apache trout populations, these topics remain of management interest given the relatively small size of many extant populations (Wang et al. 2002, pp. 308, 313–315; Whiteley et al. 2015, pp. 42–48; Robinson et al. 2017, pp. 4418–4419, 4430).

Climate Change, Wildfire, Stream Conditions

The climate has changed when compared to historical records, and it is projected to continue to change due to increases in atmospheric carbon dioxide and other greenhouse gasses (USGCRP 2017, pp. 10–11). The American Southwest has the hottest and driest climate in the United States. The U.S. Fourth National Climate Assessment suggests that warming temperatures will lead to decreasing snowpack, increasing frequency and severity of droughts, and increasing frequency and severity of wildfires, and these in turn will result in warmer water temperatures, reduced streamflows (especially baseflows), and increased risk of fire-related impacts to aquatic ecosystems (Gonzales et al. 2018, pp. 1133–1136; Overpeck and Bonar 2021, p. 139). In fact, the current drought in the western United States is one of the worst in the last 1,200 years and is exacerbated by climate warming (Williams et al. 2020, p. 317). Climate warming will make droughts longer, more severe, and more widespread in the future.

An eight-fold increase in the amount of land burned at high severity during recent wildfires, including in the southwestern United States, has been observed and it is likely that warmer and drier fire seasons in the future will continue to contribute to high-severity wildfires where fuels remain abundant (Parks and Abatzoglou 2021, p. 6). Wildfires have increased in frequency and severity in Arizona and New Mexico primarily due to changes in climate but also because of increased fuel loads (Mueller et al. 2020, p. 1; Parks and Abatzoglou 2021, pp. 5–7), including within the historical range of the Apache trout (Dauwalter et al. 2017b, entire). Larger, more frequent, and more severe wildfires accompanying a changing climate together may drive conversions in vegetation type from forest to shrub or grassland because of higher tree mortality, limited seed dispersal in larger burn patches, soil damage that reduces seedling establishment, and a changing climate that reduces seedling survival—all of which combine to inhibit forest regeneration (Keeley et al. 2019, p. 775; Coop et al. 2020, p. 670). Wildfires can result in ash flows that create unsuitable water quality conditions for salmonids, and high-intensity fires in steep watersheds are likely to result in channel-reorganizing debris flows (Gresswell 1999, pp. 210–

211; Cannon et al. 2010, p. 128). Approximately 30 percent of forests in the Southwest are projected to have an elevated risk of conversion to shrubland and grassland because of increased fire severity due to climate change (Parks et al. 2019, p. 9). Conifer reduction in the White Mountains could reduce stream shading important for maintaining suitable stream temperatures for Apache trout (Baker and Bonar 2019, pp. 862–864).

In the absence of existing peer-reviewed science on the effects of climate change on the Apache trout itself, we applied the vulnerability assessment approach that was used to evaluate wildfire and temperature warming vulnerability in Gila trout streams and applied it to Apache trout populations (USFWS 2022b, pp. 121–130). The analysis suggests that streams such as West Fork Little Colorado River have a high risk of crown fire (wildfire spreading at the canopy level) and subsequent debris flows. Other streams in the Wallow Fire perimeter have a lower risk of future wildfires due to reduced fuel loads. To evaluate stream temperature risk due to climate warming, we first evaluated Apache trout occupancy across all habitat patches and found that 95% of all occupied patches occurred in reaches at or below 16.5 °C (61.7 °F) mean July water temperatures. Then all streams were modeled to contain reaches where mean July water temperatures were less than or equal to 16.5 °C (61.7 °F), a conservative temperature threshold, based on temperature projections for the 2080s from an ensemble global climate model for the A1B emissions scenario (*i.e.,* middle-of-the-road scenario). Big Bonito Creek, Fish Creek, and Boggy/Lofer Creeks contained the largest amount of habitat with mean July temperatures less than 16.5 °C (61.7 °F) in the 2080s. The East Fork Little Colorado River, Snake Creek, Rock Creek, Rudd Creek, and South Fork Little Colorado River had the lowest percent of habitat with mean July temperatures less than or equal to 16.5 °C (61.7 °F) in the 2080s, highlighting their vulnerability to future climates.

Cumulative Impacts

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 conditions of the species. To assess the current and future conditions 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.

Conservation Management and Actions

Several conservation actions are routinely undertaken to protect, restore, and re-establish Apache trout populations across the species' historical range and, in one case, outside of the historical range. Discussed below are the major efforts which include removal of nonnative trout species, reintroduction of Apache trout, habitat maintenance and restoration, hatchery propagation, and angling regulations. These activities are managed under the CMP. The CMP will remain in force until terminated by mutual agreement. Any involved party may withdraw from this plan on 30 days' written notice to the other signatories. Amendments to the CMP may be proposed by any involved party and will become effective upon written approval by all partners.

Nonnative Trout Removal

Removal of nonnative salmonids often occurs after conservation barriers are constructed and before Apache trout are reintroduced, or removals are done when nonnative salmonids have invaded an extant Apache trout population. As noted above, conservation barriers are artificial barriers built to separate upstream populations of Apache trout from downstream populations where other trout species and hybrids are found. These downstream populations are managed to provide sportfishing opportunities. Removal is commonly done using piscicides (chemicals that are poisonous to fish) or electrofishing. A few studies have documented the higher effectiveness of piscicides on removing nonnative salmonids from Apache trout streams, although more than one treatment may be required (Rinne et al. 1981, p. 78; Kitcheyan 1999, pp. 16–17).

Electrofishing (often referred to as mechanical removal) is also used to remove nonnative fishes where piscicides have not been approved for use, or where populations of Apache trout are sympatric with nonnative trout, and it is not desirable to eliminate Apache trout simultaneously with nonnative trout. For example, electrofishing was used from 2018 to 2021, to remove over 14,670 brook trout and 3,932 brown trout from nine Apache trout streams, with successful eradication suspected in some streams that will be later confirmed with future electrofishing or environmental DNA (eDNA) surveys (Manuell and Graves 2022, p. 8). Piscicides are typically more effective at ensuring all fish are removed, which is important because nonnative populations can become reestablished if only a few individuals survive (Thompson and Rahel 1996, pp. 336–338; Finlayson et al. 2005, p. 13; Meyer et al. 2006, p. 858). Electrofishing removal is most effective in small stream systems with simple habitat (Meyer et al. 2006, p. 858). Environmental DNA surveys are conducted to confirm presence or absence of target organisms; this technique is often used in native trout conservation projects to help locate any remaining nonnative fish and target them for removal using either electrofishing or secondary applications of piscicides (Carim et al. 2020, pp. 488–490).

Reintroduction

Apache trout are typically reintroduced after the habitat is protected by a conservation barrier and nonnative salmonids have been removed. Apache trout populations are usually established using fish from another population, although hatchery stocks have been used to establish populations as well. The donor stream is selected, in part, based on the number of fish in that population so that removing some does not jeopardize donor population viability, but donor stream selection is also based on the need to replicate relict populations to enhance redundancy of those lineages. Planning efforts are underway to establish additional populations where feasible, for example in Fish Creek, Hayground Creek, Home Creek, and the lower West Fork-Black River. Historically, 100–200 fish have been used to establish populations, but there is evidence that this low number of founding individuals has resulted in the low genetic diversity observed in some populations (Wares et al. 2004, pp. 1896–1897). Future populations will be established using larger total numbers over several years to maximize genetic diversity while minimizing impacts to donor populations (USFWS et al. 2021, p. 13).

Habitat Management and Restoration

Past habitat surveys and anecdotal observations have identified stream segments in poor condition and in need of protection and restoration (Carmichael et al. 1995, p. 116; Robinson et al. 2004, pp. 1–3, 14–17). The subbasins where Apache trout are found are managed by multiple agencies at the Federal, State, and Tribal level. The management of the individual subbasins are as follows: Black River (WMAT, USFS/AZGFD), Bonito Creek (WMAT), East Fork White River (WMAT), North Fork White River (WMAT), Diamond Creek (WMAT), Little Colorado River (USFS/AZGFD), and Colorado River (AZGFD). Of the 29 known genetically pure populations and 1 suspected pure population, 16 relict and 6 replicated populations occur only on WMAT lands, 1 relict and 1 replicated population occur on both WMAT and USFS/AZGFD managed lands (Soldier Creek and upper West Fork Black River, respectively), 5 replicated populations occur only on USFS/AZGFD managed lands, and 1 replicated population occurs on both San Carlos Apache Tribe and USFS/AZGFD managed lands (Bear Wallow Creek).

The habitat of Apache trout is managed to ameliorate land-use impacts through environmental review of proposed projects. For example, WMAT has land management plans that help protect Apache trout populations and has implemented habitat restoration projects. Projects occurring on or adjacent to Apache trout habitat include alteration of logging practices, road closure and removal, and ungulate exclusion through fencing or retiring allotments, and all have been reviewed for potential impacts to Apache trout habitat on the ASNF and Fort Apache Indian Reservation (Robinson et al. 2004, entire 1; USFWS 2009, p. 23).

While these actions have reduced land-use impacts, further emphasis should be given to restoration of riparian and aquatic habitats (ASNF 2018, pp. 19–20). The Southwest Region of the U.S. Forest Service has the Riparian and Aquatic Ecosystem Strategy (Strategy; USFS 2019, entire), and restoration of aquatic habitat is identified through site-specific land management actions, such as the currently ongoing Black River Restoration Project (BRRP). Working with partners on such actions is outlined in the Strategy (USFS 2019, pp. 17–18).

Hatcheries

Hatcheries have been used for Apache trout conservation and to establish sportfishing opportunities in lakes and streams. Apache trout from Williams Creek National Fish Hatchery have been used to establish populations including those in the West Fork Little Colorado and West Fork Black rivers, but they have been most often used to provide sportfishing opportunities in lakes and streams on the Fort Apache Indian Reservation. Progeny from the Apache trout broodstock at Williams Creek National Fish Hatchery are also transferred annually, at the direction of WMAT, to be reared at Arizona's Silver Creek and Tonto Creek hatcheries and stocked to support sportfishing on State-managed lands. This broodstock is expected to be used to establish additional recovery populations in the future due to improvements in genetic fitness and representation following implementation of a genetics management plan.

Angling and Harvest Regulations

Apache trout streams are largely protected with fishing closures when populations are small and vulnerable, or by catch-and-release regulations in larger populations where harvest could negatively impact the population. WMAT does not allow any fishing to occur in areas occupied by Apache trout recovery populations. However, both WMAT and AZGFD provide put-and-take opportunities for Apache trout in multiple lakes and streams to afford the public opportunities to harvest Apache trout and generate public awareness and support for recovery of the species.

Emergency Contingency Plan

Wildfire, drought, nonnative trout invasions (*e.g.,* barrier failure), and disease can threaten the viability and genetic integrity of Apache trout populations. We and our partners will track these threats during the monitoring described in the CMP or through other monitoring and reporting systems. If needed, we and our partners in the CMP will transport individuals to other streams or hatcheries with suitable isolation facilities until they can be repatriated into their original or an alternate site (USFWS et al. 2021, p. 13).

Current Condition

Resiliency—Demographic and Habitat Factors

Resiliency references the ability of a species or population to bounce back from disturbances or catastrophic events, and is often associated with population size, population growth rate, and habitat quantity (patch size) and quality (USFWS 2016, p. 6).

Three demographic and six habitat factors were used to describe the current condition (status) and overall resiliency of Apache trout populations. These factors are commonly used to describe the health and integrity of native trout populations in the western United States (Williams et al. 2007, pp. 478–481; USFWS 2009, pp. 17–22; Dauwalter et al. 2017a, pp. 1–2). The three demographic factors are genetic purity, adult population size, and recruitment variability. The six habitat factors are stream length occupied, July temperature, percent of intermittency, habitat quality, nonnative trout presence, and barrier effectiveness.

Hybridization can introduce traits that are maladaptive or result in outbreeding depression. Thus, often only genetically pure populations are considered to be part of a species for conservation purposes. Apache trout populations were classified using the results of the most recent genetic testing for the presence of nonnative trout alleles (rainbow trout and cutthroat trout) when available (Carmichael et al. 1993, p. 127; Carlson and Culver 2009, pp. 5–9; Weathers and Mussmann 2020, pp. 4–7; Weathers and Mussmann 2021, pp. 4–7). Genetic material (*e.g.,* fin clips) is often collected during population monitoring, or it is collected during surveys targeting fish for genetic testing if there is evidence that barriers are compromised or other evidence suggest that hybridizing species (rainbow trout and cutthroat trout) or hybrid individuals may be present (*e.g.,* from visual assessment). In the absence of genetic testing, the presence of hybridizing species, presence of hybrid phenotypes, or professional judgment based on putative barrier effectiveness were used to classify populations as being genetically pure or hybridized.

Adult population size is the estimated number of adult Apache trout (greater than or equal to 130-mm TL) in a population in the most recent year of population monitoring. Before 2016, estimates of streamwide adult abundance were made from monitoring data collected under the Basinwide Visual Estimation Technique (BVET) protocol (Dolloff et al. 1993, pp. v–17), and in a few cases, from information collected during general aquatic wildlife surveys (*e.g.,* Robinson et al. 2004, pp. 3–13) or from electrofishing data (catch per single electrofishing pass) when collecting tissues for genetic analysis (such as was used in Carlson and Culver 2009). Since 2016, estimates of adult abundance have been based on an updated systematic sampling design (Dauwalter et al. 2017a, entire).

Recruitment variability seeks to quantify the number of size classes present. The presence of individuals in more size (and therefore age) classes is indicative of more stable recruitment from year to year, which indicates that populations are more able to withstand year-to-year environmental variability (stochasticity; Maceina and Pereira 2007, pp. 121–123). Length frequency data from monitoring surveys were used to determine the number of size classes present. Before 2016, these data were collected under the BVET (Dolloff et al. 1993, pp. v–17) protocol, during general aquatic wildlife surveys (*e.g.,* Robinson et al. 2004, pp. 3–13), or from electrofishing data when collecting tissues for genetic analysis (such as was used in Carlson and Culver 2009). Since 2016, these data have been based on the updated systematic sampling design (Dauwalter et al. 2017a, entire).

The length of an occupied stream, often referred to as patch size, was measured in kilometers using the National Hydrography Dataset (1:24,000 scale), and upstream and downstream extents were typically defined by experts as the extent of occupancy from fish survey data, suitable habitat, or barriers to fish passage (conservation barriers). Extent of occupied habitat has been shown to be positively associated with the probability of population persistence (*e.g.,* viability, extinction probability) for western native trout (Harig et al. 2000, pp. 997–1000; Hilderbrand and Kershner 2000, pp. 515–518; Finlayson et al. 2005, p. 13), and it has been used as an indicator of persistence in indices of population health and as an indicator of translocation success (Harig and Fausch 2002, pp. 546–548; Williams et al. 2007, pp. 479–480; Cook et al. 2010, pp. 1505–1508).

We selected July temperature as a measurement of habitat quality because the Apache trout, like other salmonids, is a cold-water stenotherm (a species that can survive only within a narrow range of temperature). Under *Climate Change, Wildfire, Stream Conditions,* above, we highlight the thermal tolerance and habitat suitability values derived from several laboratory and field studies of Apache trout. The maximum mean July temperature in habitat extent occupied by each Apache trout population is based on modeled average July temperatures predicted for each 1-km stream segment in Arizona from the NorWeST dataset (Isaak et al. 2017, pp. 7–13). The NorWeST dataset predicts mean August temperatures (average of mean daily temperatures for the month of August) for each 1-km stream segment in the National Hydrography Dataset (1:100,000 scale). These predictions were adjusted based on an empirical relationship between mean August and mean July (monthly mean of mean daily temperatures) temperatures in Apache trout streams from data collected by USFS on ASNF.

Intermittency percentage is the percent of occupied habitat extent estimated to become intermittent during severe drought years. The percent of stream length occupied that becomes intermittent (dry) during severe drought years due to low natural flows, decreasing flow trends in recent years, anthropogenic impacts to flow, or other factors. The percentage was based on professional judgment and knowledge of the habitat. The southwestern United States is a naturally warm and dry environment with reduced surface water resources that may subside due to low annual precipitation (snowpack and rainfall) and interactions with local geology (Long et al. 2006, pp. 90–94). The region is currently in a megadrought that has large consequences for streamflows (Williams et al. 2020, p. 314), and other researchers highlighted the time period from 2000 to 2003 as a severe drought period (Hoerling and Eischeid 2007, p. 2).

Habitat quality is the condition of riparian and instream habitat throughout the occupied habitat extent. Stream habitat quality was classified based on professional judgment at the whole stream scale or by segment and then computed as a weighted average (weighted by length).

The presence of rainbow trout, brown trout, brook trout, or cutthroat trout within the habitat accessible to the Apache trout population (or defined habitat extent) is either confirmed or not present. Rainbow trout and cutthroat trout have been documented to hybridize with Apache trout (Carmichael et al. 1993, p. 128), and brown trout and brook trout compete with and prey on Apache trout, thus reducing the carrying capacity of habitat to support Apache trout (Carmichael et al. 1995, p. 114). Presence of each species is attributed based on survey data, angler reports, anecdotal information, and, in some cases, barrier effectiveness and proximity of nonnative species and likelihood of invasion upstream of ineffective barriers.

Barriers were classified as functional or nonfunctional, and functionality was classified as known or suspected. Functionality was classified based on documented presence of nonnative trout above a barrier, documented movement of marked fish from below to above a barrier, known streamflow paths around or through barriers, poor structural integrity, or other factors influencing perceived functionality based on professional judgment. On some streams, more than one conservation barrier has been constructed to provide functional redundancy and security due to possible failure, as well as to allow management flexibility for controlling nonnative trout invasions or conducting nonnative trout removals (mechanical or chemical).

Resiliency

Demographic and habitat factor data show that relict and hybridized Apache trout populations occur in two major river basins (the Black River and White River basins), replicate populations occur in all major basins (including one replicate population outside the species' historical range in the Colorado River), and unoccupied recovery streams occur in the Little Colorado River and Black River basins. Relict populations occur in five of six subbasins to which they are native. Hybridized populations occur in the Black River and Diamond Creek subbasins. As mentioned previously, of the 38 extant populations of Apache trout, 29 populations of Apache trout are known to be pure, with one population suspected to be genetically pure (81.1 percent). One of eight (12.5 percent) populations has been confirmed as hybridized through genetic testing, whereas seven have been assumed to be hybridized because of known barrier failures and invasion of rainbow trout.

A summary of demographic factors showed a majority of Apache trout populations to have adult (greater than 130-mm TL) population sizes that are fewer than 500 individuals (see table 11 in USFWS 2022b, p. 86); one population, East Fork White River, was estimated to have more than 2,200 adults (see table 11 in USFWS 2022b, p. 86). Despite low abundances, most populations showed consistent recruitment, with four or five size classes (and presumably year classes) present, which suggests they are stable and self-sustaining populations (see figure 18C in USFWS 2022b, p. 83).

Habitat factors for Apache trout populations showed a wide range of current conditions. The extent of stream occupied by Apache trout populations ranged from 0.4 (0.25 mi) to 30.1 km (18.7 mi); most were less than 14 km (8.7 mi). Maximum mean July temperatures in occupied habitat were less than or equal to 15.5 °C for relict and replicate populations, whereas unoccupied streams and hybrid populations had warmer maximum mean July temperatures up to 17.5 °C. Most populations or unoccupied streams exhibited little intermittency during severe drought, but two hybridized populations and one unoccupied stream were estimated to be more than 50 percent intermittent (up to 95 percent). Unoccupied streams and streams occupied by hybrid populations had the lowest habitat quality (in part due to 2011 Wallow Fire), while a majority of relict and replicate populations inhabited high-quality habitat. Nineteen Apache trout populations were sympatric with brown trout, 7 with rainbow trout, and 2 with brook trout. Thirty-six populations or unoccupied recovery streams currently have conservation barriers to isolate them from nonnative fishes downstream, but only 31 populations are protected by barriers that are known or suspected to be functional; 10 populations have a second barrier downstream for added protection across all population types (relict, replicate, hybrid, unoccupied).

Overall, the current condition of the 38 Apache trout populations (excluding the 6 unoccupied recovery streams) rated an average of 2.60 (B− average) on a 4.0 grading scale (USFWS 2022b, p. 7, 88). The 30 genetically pure populations that would count towards recovery averaged 2.89 (B average). Based on the demographic and habitat factor grade point equivalents for each population, Apache trout populations were more often limited by demographic factors than habitat factors. Adult (greater than 130-mm TL) population size was most frequently the limiting demographic factor, as most populations were fewer than 500 adults and received lower grades. Unoccupied streams (*e.g.,* Home Creek) had demographic GPAs (grade point averages) equaling 0.0. East Fork White River had the highest demographic GPA (4.00). Likewise, presence of nonnative trout was frequently a limiting habitat factor. Centerfire and Stinky creeks on the Apache-Sitgreaves National Forests (ASNF) had the lowest habitat factor (GPA of 1.33); Deep Creek (WMAT) had the highest habitat factor (GPA of 3.50).

Redundancy and Representation

Representation and redundancy for Apache trout were evaluated by quantifying the presence of relict populations, and their replication on the landscape, as putative genetic lineages at the subbasin level. Representation was based on presence of genetically pure relict populations from each subbasin. Redundancy was measured as the replication of relict lineages into new streams by subbasin. Replication of relict populations, and thus redundancy of purported relict subbasin lineages, was measured both within and outside of the native subbasin for each subbasin genetic lineage. The number of populations that meet certain persistence, abundance, and recruitment criteria can also be used to quantify population redundancy by subbasin or a larger basin unit (*e.g.,* geographic management unit). Tracking the representation and redundancy of relict populations by subbasin, as subbasin lineages, is a surrogate for the assumed unique genetic diversity, and presumed unique adaptation potential, that is often found to be structured around the hierarchical nature of drainage basins (Vrijenhoek et al. 1985, pp. 400–402; Wares et al. 2004, pp. 1890–1891, 1897). While such genetic structuring is evident in Apache trout for the 9 populations (and three genetic lineages) that have been studied (Wares et al. 2004, pp. 1895–1896), no comprehensive rangewide study of genetic diversity has been conducted across all genetically pure populations. Accounting for relict Apache trout populations in this way presumably reflects the representation and redundancy of genetic diversity, and thus adaptive potential, of the species in each subbasin in which it is native.

When quantified in this way, extant relict populations exist in 5 of 6 subbasins within the historical range of the Apache trout; only the Little Colorado River subbasin is no longer represented within an extant relict lineage. The East Fork White River subbasin has the highest level of redundancy and representation; it contains six relict populations still extant within the subbasin and four replicated populations in other subbasins that were founded with individuals from relict populations native to the East Fork White River subbasin. Of the subbasins containing relict populations, the Black River and Diamond Creek subbasins contain the lowest level of redundancy and representation, with three populations each occurring on the landscape (Black River: one relict and two replicates; Diamond Creek: two relicts and one replicate).

Future Condition

The primary threats affecting Apache trout viability include invasion by nonnative trout and climate change, which encompasses warmer stream temperatures, more frequent and severe droughts, increased wildfire frequency and post-fire debris flow, reduced snowpack and increased rain on snow events, and more intense summer monsoon precipitation. A 30-year future (which equates to approximately six generations of Apache trout) was chosen for our future condition projections because within this timeframe it is likely that these primary threats will continue to impact the species, and also because it is biologically reasonable to assess the species' response to these threats within this timeframe. Additionally, this timeframe allows us to reasonably forecast upcoming management activities as they will be implemented through the CMP.

The threats that can be actively managed through implementation of the CMP include introduction of nonnative trout, and wildfire and post-fire debris flow. Nonnative trout impact the Apache trout in multiple ways including hybridization, predation, and competition. Wildfires primarily produce debris flows that render habitat unsuitable for the species. To mitigate these two threats, conservation actions that have been and will continue to be undertaken are most important to the future viability of the Apache trout. These actions include the construction and maintenance of conservation barriers, removal (by physical or chemical means) of nonnative trout species, restocking of Apache trout via hatchery and/or existing relict populations, restoration of Apache trout habitats and reduction of fuel loads to reduce the risk of wildfires, and fish salvages following wildfires per the CMP. Continued construction and maintenance of conservation barriers will be needed to prevent hybridization of the Apache trout with other trout species, as well as to prevent competition with and predation by other fish species. Continued conservation actions, implemented through the CMP as well as by other mechanisms, will therefore play a critical role in determining the overall viability of the Apache trout into the future.

Climate change threats that are more uncertain and difficult to mitigate include warming stream temperatures, more frequent and severe droughts, reduced snowpack with increased rain on snow events, and more intense summer monsoon precipitation. The future scenarios that were developed for Apache trout incorporate these factors in order to evaluate how climate variability might influence future condition for the species.

While the SSA report contains a total of five scenarios, in determining the future condition and status of the species for this rulemaking we determined that only two of the five scenarios are plausible. Scenarios 1 and 2 in the SSA assumed that no multi-agency CMP would be in place after the species is delisted; however, since the SSA report and the scenarios were developed the CMP has been signed and is currently being implemented, making these scenarios not plausible. Our assessment of scenarios indicated that scenario 5 is also not plausible given the constraints involved with securing funding and commitment from partners for ''greatly increased'' management of the species to occur (USFWS 2022b, p. 121). Given these factors, we did not consider scenarios 1, 2, and 5 and relied on scenarios 3 and 4 to inform our status determination.

As noted above, a 30-year timeframe was chosen because it encompasses six generations of Apache trout and is, therefore, a biologically reasonable timeframe for assessing the likelihood of threats as well as the species' response to those threats. Additionally, this timeframe allows us to reasonably forecast upcoming management activities that will be implemented through the CMP. The two scenarios used for our status determination in this proposed rule reflect both exogenous factors such as watershed condition and climatic changes, as well as management action feasibility and volume given funding and other programmatic constraints (funding and other resources) and policy. The scenarios incorporate a status quo level of management through the CMP, as well as potentially increased levels of management through future conservation actions that could take place throughout the future. Each scenario was based on a 30-year timeframe and each includes climate change impacts and other factors impacting the Apache trout, implementation of the CMP, and scientific and technological advancement. The two scenarios from the SSA report that we evaluated are:

Scenario 3 (Sustained Management, i.e., status quo): Recovery and conservation efforts continue at sustained levels, which during the years 2000–2020 were proven to be beneficial to Apache trout recovery. This level of management will be maintained into the future as prescribed by and implemented through the CMP. Thus, actions continue and are effective at reducing some threats. This includes legally required actions and those voluntarily agreed to in the CMP. Barrier construction, population expansion, and nonnative trout removals occur at levels required to meet recovery criteria (30 pure populations, or similar) and are maintained thereafter. USFWS assistance to the White Mountain Apache Tribe continues. Some funding sources disappear (*e.g.,* National Fish and Wildlife Foundation Apache Trout Keystone Initiative), but other funding sources emerge (*e.g.,* National Fish Habitat Act; Recovering America's Wildlife Act). This scenario represented the status quo scenario with approximately the same level of resources and management action as a 2000–2020 baseline.

- Barrier installation and maintenance continues at 2000–2020 levels. The number of viable Apache Trout populations and metapopulations increases to meeting recovery goals and is maintained after delisting.
- Effectiveness of land management policies for stream ecosystem and threatened species is initially maintained through de-listing due to the CMP agreement in place. Across the Apache Trout range, watershed functional conditions are maintained or improved, riparian and instream habitat are maintained or improved in quality, and stream temperatures are maintained or improved to support Apache Trout due to protections during land management planning and implementation.
- Because of climate change, stream temperatures become warmer, droughts continue to become more frequent and severe, risk of wildfire and post-fire debris flow increases, snowpack decreases but increased rain on snow events occur, and summer monsoon rains become more intense.

Scenario 4 (Increased Management): Recovery and conservation efforts continue but at levels increased slightly from 2000–2020 baseline levels that are beneficial to the species. Management actions continue and some become effective at reducing some threats. After barrier construction, population expansion, and nonnative trout removals initially occur at levels required to meet recovery criteria (30 pure populations, or similar) and Apache trout are delisted, the level of actions is maintained due to the CMP in place, but also increases due to emergence of new research and technology. USFWS assistance to the White Mountain Apache Tribe continues. Legislation emerges resulting in new funding sources for fish habitat projects (*e.g.,* National Fish Habitat Act; Recovering America's Wildlife Act), and there is broad implementation of the Four Forest Restoration Initiative, Black River Restoration Environmental Assessment (EA), and FAIR Forest Management Plan (fuels management) that are beneficial to watershed functional conditions and reduced wildfire risk.

- Barrier installation and maintenance increases slightly from 2000–2020 levels due to new technology that increases effectiveness and reduces cost and maintenance. The number of viable Apache trout populations increases, and one large metapopulation is realized (*e.g.,* WFBR), to meet and exceed recovery goals.
- Effectiveness of land management policies for stream ecosystem and threatened species is initially maintained through de-listing due to the CMP in place. Across the Apache trout range, watershed functional conditions are improved, riparian and instream habitat are improved in quality, and stream temperatures are improved (riparian restoration and recovery) to support Apache Trout due to protections during land management planning and implementation.
- Because of climate change, stream temperatures become warmer, droughts continue to become more frequent and severe, risk of wildfire and post-fire debris flow increases, snowpack decreases but more rain on snow events occur, and summer monsoon rains become more intense.

For each scenario provided in the SSA report, Apache trout core team members indicated in an online survey the overall impact of each scenario on populations across the species' range, or subsets of the range with which they are familiar, using their best professional judgment. Each core team expert responded to survey questions in terms of what the condition—described as a GPA—of each Apache trout population (or currently unoccupied stream) would be, based on the grading scale used to describe current conditions above, under each of the five future condition scenarios after a 30-year timeframe. GPAs were summarized across populations to assess the influence of each scenario on the rangewide status of Apache trout.

When survey responses of future condition were summarized (averaged) across populations for scenarios 3 and 4 to infer a future rangewide condition of the Apache trout under each scenario, the future condition of the species under scenario 4 (increased management) was expected to improve compared to scenario 3 (sustained management), similar to that of individual populations.

Under scenario 3, which maintains the same level of conservation management and actions as are currently being implemented through the CMP, the condition of the species was estimated at a GPA score of 2.53. This average score, however, includes variation in populations. Under scenario 3, we project the future condition of the majority of the relict populations would modestly decline, resulting in slightly lower resiliency. These declines are attributed to potential impacts from climate change and its effect on forest fires that are not expected to be offset by other management actions (*e.g.,* nonnative trout eradication) which are generally not currently needed in relict populations. On the other hand, we project that some replicate populations would have slightly better condition in the future compared to current conditions due to completion of ongoing nonnative trout eradication efforts (*e.g.,* West Fork Black River [lower]) and planned replacement of nonfunctional conservation barriers (*e.g.,* West Fork Little Colorado River). Overall, relative to current condition, the species' overall resiliency under scenario 3 may modestly decline. Therefore, even though redundancy would remain the same, representation may be slightly reduced due to the projected decline of the Apache trout relict populations under scenario 3.

Under scenario 4, which evaluates an increased level of conservation management versus what is currently being implemented through the CMP, the future condition of the Apache trout would be essentially unchanged with a GPA score of 2.86. This represents a nominal decrease when compared to the current condition GPA score of 2.89. Under scenario 4, we project slight improvement in future conditions across some populations with other populations remaining essentially unchanged or experiencing slight declines.

Some natural processes (*e.g.,* purging of nonnative alleles) and planned management actions not represented in scenarios 3 and 4 (*e.g.,* new population establishment, metapopulation creation) are expected to occur that will further improve specific and range-wide GPA scores. Further, average grant funding to support field crews and conservation projects obtained during 2020–2022 also far exceeds the average annual funding obtained for similar work during the 2000–2020 baseline period. Thus, future condition scores for scenarios 3 and 4 likely underestimate actual future conditions for the species as additional populations are created and maintained, nonnative trout populations are eradicated, and populations with low levels of introgression purge nonnative alleles over time.

Under both scenarios, the CMP plays an important role in determining the species' future condition for threats that can be managed. The CMP was drafted and signed to ensure that current conservation efforts will continue in perpetuity. The signing of the CMP has a demonstrable effect on the species' overall status with current management level resulting in only a slight and modest decline under scenario 3 (the status quo scenario). Scenario 4, in which funding for conservation efforts would increase, results in maintaining the species' overall future condition. Overall, the result of our future scenarios analysis demonstrates the importance of continued implementation of the CMP to ensure both the maintenance of current populations and habitat, the restoration of degraded habitat, and the establishment of new populations.

For climate-related threats to Apache trout that are not able to be actively managed, we relied on a model developed to inform the magnitude of effects that these factors might have through the foreseeable future. For increased stream temperatures, our model suggested that most streams currently occupied by Apache trout, or unoccupied but designated as recovery streams, are not temperature limited, and that suitability improved when 2080s projections of temperature alone were considered because some headwater reaches appeared to be currently too cold for occupancy. Most habitat patches were not limited by warm stream temperatures because the habitat designated for species recovery is upstream of protective fish passage barriers (Avenetti et al. 2006, p. 213; USFWS 2009, p. 19; USFWS 2022b, pp. 118–127) that are far enough upstream to not be temperature limiting now or into the 2080s. In fact, the effect of temperature on juvenile Apache trout occupancy suggested that streams can be too cold, and model projections of stream temperature in the 2080s increased the amount of suitable habitat in some streams because of the unimodal response to temperature. This suggests cold temperatures can be limiting Apache trout populations in some streams, and any warming may benefit them in headwater reaches—at least up until the 2080s.

It was only when future changes in precipitation were considered in tandem with stream temperature that habitat suitability decreased into the 2080s. Many habitat patches that are currently occupied by the species are projected to remain suitable into the 2080s, which suggests their resiliency is only limited by the size of the patch they currently occupy (Peterson et al. 2014, pp. 564–268; Isaak et al. 2015, pp. 2548–2551; USFWS 2022b, pp. 135–140). However, when projections of reduced precipitation were also considered, habitat suitability decreased in Apache trout streams. This is not surprising given that stream intermittency and drought have impacted some populations in the past (Robinson et al. 2004, pp. 15–17; Williams et al. 2020, entire), and less precipitation, and thus streamflow, would exacerbate these impacts, especially since the Southwest is anticipated to experience novel and mega-drought conditions in future climates (Crausbay et al. 2020, pp.337–348; Williams et al. 2020, entire).

Precipitation in the White Mountains primarily falls as winter snow and summer monsoon rain (Mock 1996, pp. 1113–1124). However, decreases in precipitation due to climate change are expected to occur in winter in the form of snow (Easterling et al. 2017, p.207), and decreases in snowpack are likely to negatively impact stream baseflows and, thus, summer temperatures. Hydrologic models linked to climate models show future precipitation increasingly falling as rain, higher frequency of rain-on-snow, and increased snowmelt rates, all of which lead to increased overland runoff to streams and less infiltration to groundwater. Less groundwater storage leads to less groundwater discharge to streams in late summer and early autumn (Huntington and Niswonger 2012, pp. 16–18). The summer monsoon season can add precipitation, but at much warmer temperatures regardless of whether it occurs as overland flow or through shallow groundwater discharge pathways.

While snow melt can result in overland flow during spring runoff, it also infiltrates into groundwater and does so at near freezing temperatures (at or just above 0 °C (32 °F); Potter 1991, pp. 847, 850). Thus, any groundwater contributions to streams that originate from snowmelt are likely to have a stronger cooling effect on stream temperatures released over longer time periods than overland flow from either snowmelt or monsoon rains. If snowpack is reduced in the future it is likely that groundwater return flows may occur earlier and be less overall, thus providing less of a cooling effect into late summer, especially prior to monsoon rains (Overpeck and Bonar 2021, pp. 139–141).

Determination of 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 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.

Status Throughout All of Its Range

The Apache trout is a species endemic to multiple river basins in eastern Arizona. Due to conservation efforts undertaken within these past decades, the Apache trout now encompasses the 29 genetically pure populations and one suspected genetically pure population across three basins and six subbasins. While these populations will continue to be impacted by potential invasion of nonnative trout and debris runoff from wildfire and climate change, construction and maintenance of conservation barriers and restocking efforts have contributed to restoration of habitats and populations. Currently, these 30 Apache trout populations are assessed to possess good conditions (2.89 on a 4.0 grading scale). Within these 30 populations, relict populations have an average GPA of 2.93, and replicate populations have an average GPA of 2.85. These results demonstrate that both types of populations contain moderate to good condition with the relict populations rated slightly better.

Apache trout representation is best demonstrated within the 17 relict populations across five subbasins. While further studies would need to be conducted to ascertain the genetic uniqueness of each relict population, these populations are not derived from known populations, suggesting that some of these populations could represent unique genetic lineages for the species. To further preserve the genetic diversity of the species, the Service and our partners have established replicate populations within and alongside other subbasins, resulting in the total of 30 populations across six subbasins. As noted above in our resiliency discussion, through continuous monitoring, restoration of habitat, and, if needed, restocking, these populations are rated as being in fair or good condition. The genetic uniqueness of these populations helps maintain the diverse gene pool of the species, giving the species greater adaptive capacity to respond to environmental changes.

The presence of multiple relict and replicate populations across different subbasins demonstrates a high level of redundancy. Redundancy is further enhanced through the creation of new replicate populations from relict populations. These populations are created in adjacent subbasins, providing greater protection for the species against catastrophic events that may impact individual subbasins. Overall, the presence of 30 populations across seven subbasins, with all being rated as fair to good condition, provide the Apache trout with sufficient redundancy to withstand catastrophic events that may impact the species.

Lastly, as noted earlier, we have nearly met all criteria that the recovery plan recommended for delisting. While we have not met the criterion of 30 genetically pure populations within the historical range of the species, 29 genetically pure populations exist within the historical range, and one suspected genetically pure population exists outside of the historical range. This represents a significant recovery of the species and comes close to achieving all criteria spelled out in the recovery plan. Recovery plan criteria are meant to function as guidance for recovery rather than hard metrics that must be met. Instead, we will use the best available information to determine the status of the species. Overall, the Apache trout now consists of multiple, sufficiently resilient populations across subbasins encompassing a large percentage of the species' historical range. Furthermore, while long-term threats such as nonnative trout species will continue to persist, continued management of conservation barriers will ensure that the threats do not negatively impact the species. Accordingly, we conclude that the species is not currently in danger of extinction, and thus does not meet the definition of an endangered species, throughout its range.

In considering whether the species meets the definition of a threatened species (likely to become an endangered species within the foreseeable future) throughout its range, we identified the foreseeable future of Apache trout to be 30 years based on our ability to reliably predict the likelihood of future threats as well as the species' response to future threats. Our analysis of future condition emphasized the importance of continued management of the conservation barriers and removal of nonnative trout. Species viability modestly declined in scenario 3, and increased in scenario 4, due to increases in management efforts. Scenarios 3 and 4 are both scenarios in which the CMP is being implemented. In our assessment, we found that the CMP, while voluntary in nature, plays a vital role in continuing to improve the status of the Apache trout into the future. For example, WMAT, AZGFD, and the Service are working together to mechanically remove brook trout from the upper West Fork Black River population, including Thompson Creek, in case chemical renovation of this system is not ultimately approved.

This effort represents just one of the ongoing efforts to improve the species' overall condition, as well as the willingness of Federal, State, Tribal, and private partners to continue these efforts into the future. Other collaborative conservation efforts include brook and brown trout removal projects, fish passage improvements, riparian habitat restoration projects, and conservation barrier replacements or old barrier removal projects on Tribal, State, and Federal lands. WMAT and the Service are currently working to eradicate brown trout from Aspen, Big Bonito, Coyote, Little Bonito, and Little Diamond creeks. All partners are working on fish passage improvements including removing four conservation barriers on Hayground, Home, and Stinky creeks and replacing six culverts on Paradise and Thompson creeks to improve fish passage, increase occupied extents, and allow for metapopulation dynamics among connected populations. Riparian habitat restoration projects are underway on Boggy and Lofer creeks and being planned for Flash Creek, South Fork Little Colorado River, and West Fork Black River. Finally, conservation barrier replacements are underway (engineering design development or construction contracting phases) that will protect the populations in Aspen, Boggy/Lofer, Coyote, Crooked, Flash, Little Bonito, Little Diamond, Ord, Paradise, and Wohlenberg creeks.

While there is a need to manage Apache trout habitat in ways that facilitate habitat connectivity and metapopulation dynamics (Williams and Carter 2009, pp. 27–28), conservation barrier management will remain important to the conservation of the species. Because the intent of barriers is to isolate populations of Apache trout from nonnative trout, many populations will have to persist in place rather than shift in space to adapt to future changes in climate (Thurman et al. 2020, entire). This may restrict the ability of some populations to adapt in place to climate change effects. Adaptation potential should be considered in concert with the reality that many populations reside in small habitat patches. This can constrain long-term viability and is one of the trade-offs that comes with isolation management (Fausch et al. 2009, entire); however, our identification of climate resilient habitats in our climate analysis did incorporate patch size as a driver of long-term persistence.

Apache trout populations with high resiliency will continue to be the focus of active habitat management, such as riparian vegetation management and habitat restoration, to improve or ensure their climate resiliency into the 2080s and potentially beyond. Finally, most habitat patches are not currently limited by warm stream temperatures. Habitat designated for Apache trout recovery largely occurs in colder, upstream areas above conservation barriers (Avenetti et al. 2006, p. 213; USFWS 2009, p. 19), and even with increasing stream temperatures through the foreseeable future many of these areas will not be limited by warmer temperatures into the 2080s. As described previously, the effect of temperature on juvenile Apache trout occupancy suggests that many streams can in fact be too cold, and projections of stream temperature into the 2080s in some cases increased the amount of suitable habitat in some streams because of the unimodal response to temperature.

Overall, the signing of the CMP in 2021 which, while subject to review and termination by the signing parties, ensures that conservation for the Apache trout will remain in perpetuity. With the CMP in place, and considering future effects from climate change and the response of Apache trout to these effects, we conclude that the Apache trout will exhibit sufficient resiliency, redundancy, and representation to maintain viability for the foreseeable future. Accordingly, we conclude that the species is not likely to become in danger of extinction in 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 extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. Having determined that Apache trout is not in danger of extinction or likely to become so in the foreseeable future throughout all of its range, we now consider whether it may be in danger of extinction (*i.e.,* endangered) or likely to become so in the foreseeable future (*i.e.,* threatened) 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 extinction or likely to become so in the foreseeable future 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.

In undertaking this analysis for Apache trout, we choose to address the status question first. We began by identifying portions of the range where the biological status of the species may be different from its biological status elsewhere in its range. For this purpose, we considered information pertaining to the geographic distribution of (a) individuals of the species, (b) the threats that the species faces, and (c) the resiliency condition of populations.

We evaluated the range of the Apache trout to determine if the species is in danger of extinction now or likely to become so in the foreseeable future in any portion of its range. Because the range of a species can theoretically be divided into portions in an infinite number of ways, we focused our analysis on portions of the species' range that may meet the definition of an endangered species or a threatened species. Although we assessed current and future conditions at a population scale in the SSA report, interactions between populations within a subbasin can be complex (*i.e.,* in some subbasins, there are genetic exchanges between populations while in others, populations are separated by barriers). Thus, to assess these portions equally, we focus our analysis here at the subbasin scale. That said, the current and future conditions of the populations will be used to discuss the conditions of the subbasins.

Within these portions, we examined the following threats: invasive trout, habitat loss due to wildfire, and the effects from climate change, including synergistic and cumulative effects. As discussed in our rangewide analyses, nonnative trout and wildfire are the main drivers of the species' status.

Looking across the different subbasins, all but one have the mean GPA of 2.83 or above under its current condition (meaning good conditions under our conditions metric). When examining future conditions, even under the worst case scenario where with reduced management and no CMP, all but one subbasin have a future condition status of fair. While there are differences in scoring within each subbasin, at the subbasin scales, these subbasins possess sufficient resiliency such that we do not consider them to be in danger of extinction or likely to become so within the foreseeable future. For these subbasins, we assessed them to possess the same status as our rangewide analysis.

Out of all the subbasins of the Apache trout, the Diamond subbasin has the lowest mean GPA of 2.33 under its current condition. However, under future condition, we project the species will slightly decline from its current condition under scenario 3. Under both scenarios 3 and 4, the subbasin would be on the lower end of the fair rating.

The major driver of a subbasin's status is its habitat condition score. Although future condition scoring does not separate demographic GPA from habitat GPA, we know from the current condition score that the limiting factor for Apache trout within the Diamond subbasin is habitat condition. Three of the four populations within the Diamond subbasin have high demographic GPA with high abundance and multiple age classes. However, the scores for habitat quality are 2.33, 2.00, 1.83, and 1.83, due primarily to shorter occupied stream lengths compared to other populations. Additionally, the streams within the Diamond subbasin experience a higher percentage of intermittency, meaning that larger portions of the stream tend to go dry during periods of drought. Given the continuing effects of climate change, it is likely that these streams will experience periods with intermittent streamflow in some reaches into the future.

Although populations of the Apache trout in the Diamond subbasin are currently rated as being in fair condition, the low habitat quality (primarily due to occupied stream length being less than 11.25 km, estimations of intermittent stream proportions, the presence of brown trout, and current barrier conditions) and the potential for decline due to climate change could lead to elevated risk to populations in the foreseeable future in this portion of the range. Work to eradicate (and prevent reinvasion of) brown trout from two streams in this subbasin is underway, which, if successful, would result in higher habitat scores once completed (with all other scores remaining unchanged, the subbasin's average habitat GPA would rise to 2.58 once the work is completed) and would reduce the risk of population declines in this portion of the range (USFWS 2022b, p. 101). However, these actions have not yet significantly improved the status of this subbasin, and we assessed this subbasin to be at elevated risk of extinction to a degree that it may be in danger of extinction within the foreseeable future.

Given that the Diamond subbasin may be in danger of extinction within the foreseeable future, we next evaluated if this portion of the range was significant. Although every subbasin provides some contribution to the species' resiliency, representation, and redundancy, as noted above, the Diamond subbasin populations occupy a short stream length (30.2 km (18.8 mi)) that comprises a small portion of the Apache trout's overall range (10.7 percent of the Apache trout's overall range of 281.5 km (174.9 mi)). Ecologically, the habitats where these populations are found are not dissimilar to habitats found in the other subbasins. As in the other subbasins, Apache trout in the Diamond subbasin are found in headwater streams with shallow depth, relatively slow-moving water, and coarse, clean gravel streambeds.

The Diamond subbasin is comprised of a mixture of replicate and relict populations. Although this subbasin contains relict populations, these and the replicate populations are associated with populations in the neighboring subbasins of North Fork White River and East Fork White River. Specifically, relict populations in the adjacent subbasin were used as founder stocks for the replicate populations in the Diamond subbasin, and the relict population in the Diamond subbasin was used to create a replicate population in an adjacent subbasin. Thus, through the process of replication of populations, the genetic contribution of the Diamond subbasin is dispersed across other subbasins.

Overall, the Diamond subbasin's short stream length relative to the species' overall range, lack of ecological uniqueness, close proximity to other subbasins, and existence of replicate populations lead us to conclude that this portion of the Apache trout's range is not significant in terms of its overall contribution to the species' resiliency, redundancy, and representation. Therefore, because we could not answer the significance question in the affirmative, we conclude that the Diamond subbasin does not warrant further consideration as a significant portion of the range. Therefore, we find that the species is not in danger of extinction now or likely to become so in the foreseeable future in any significant portion of its range. This does not conflict with the courts' holdings in *Desert Survivors* v. *Department of the Interior,* 336 F. Supp. 3d 1131 (N.D. Cal. 2018), and *Center for Biological Diversity* v. *Jewell,* 248 F. Supp. 3d. 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not apply the aspects 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), including the definition of ''significant'' that those court decisions held to be invalid.

Determination of Status

Our review of the best available scientific and commercial information indicates that the Apache trout does not meet the definition of an endangered species or a threatened species in accordance with sections 3(6) and 3(20) of the Act. In accordance with our regulations at 50 CFR 424.11(e)(2) currently in effect, the Apache trout does not meet the definition of an endangered or a threatened species. Therefore, we propose to remove the Apache trout from the Federal List of Endangered and Threatened Wildlife.

Effects of This Rule

This proposal, if made final, would revise 50 CFR 17.11(h) by removing the Apache trout from the Federal List of Endangered and Threatened Wildlife. Accordingly, we would also remove the Apache trout from the rule issued under section 4(d) of the Act (''4(d) rule'') at 50 CFR 17.44(a). The prohibitions and conservation measures provided by the Act, particularly through sections 7 and 9, would no longer apply to this species. Federal agencies would no longer be required to consult with the Service under section 7 of the Act in the event that activities they authorize, fund, or carry out may affect the Apache trout. No critical habitat has been designated for Apache trout, so there would be no effect to 50 CFR 17.95. State laws related to the Apache trout would remain in place, be enforced, and continue to provide protection for this species.

Editorial Corrections

In this proposed rule, we incorporate editorial corrections to the 4(d) rule set forth at 50 CFR 17.44(a) to provide the correct scientific names for Lahontan cutthroat trout and Paiute cutthroat trout. Those scientific names were updated on the List of Endangered and Threatened Wildlife at 50 CFR 17.11(h) with the 1990 issue of the Code of Federal Regulations, but the scientific names provided in the 4(d) rule were not updated at that time. This action would correct that oversight.

Post-Delisting Monitoring

Section 4(g)(1) of the Act requires us, in cooperation with the States, to implement a monitoring program for not less than 5 years for all species that have been delisted due to recovery. Post-delisting monitoring (PDM) refers to activities undertaken to verify that a species delisted remains secure from the risk of extinction after the protections of the Act no longer apply. The primary goal of a PDM program is to monitor the species to ensure that its status does not deteriorate, and if a decline is detected, to take measures to halt the decline so that proposing it as an endangered or threatened species is not again needed. If at any time during the monitoring period data indicate that protective status under the Act should be reinstated, we can initiate listing procedures, including, if appropriate, emergency listing.

The PDM program for Apache trout would monitor populations following the same sampling protocol used by cooperators prior to delisting. Monitoring would consist of tracking Apache trout distribution and abundance and potential adverse changes to Apache trout habitat due to environmental or anthropogenic factors. Post-delisting monitoring would occur for a 10-year period, beginning after the final delisting rule was published, and would include the implementation of (1) Apache Trout Monitoring Plan (''Monitoring Plan,'' Dauwalter et al. 2017a, entire) and (2) Apache Trout Cooperative Management Plan (CMP, Apache Trout CMP Workgroup 2021, entire) for the duration of the PDM period. Both plans are currently being implemented and will continue to be implemented into the future. The Monitoring Plan describes population and habitat survey methods, data evaluation methods, and monitoring frequency for each population. The CMP describes roles, responsibilities, and evaluation and reporting procedures by the cooperators. Together these plans would guide collection and evaluation of pertinent information over the PDM period and would be implemented jointly by the Service, WMAT, AZGFD, USFS, and Trout Unlimited. Both documents will be available upon the publication of this proposed rule at *https://www.regulations.gov,* under the Docket No. FWS–R2–ES–2022–0115.

During the PDM period, if declines in the Apache trout's protected habitat, distribution, or persistence were detected, the Service, together with other PDM partners, would investigate causes of the declines, including considerations of habitat changes, human impacts, stochastic events, or any other significant evidence. The outcome of the investigation would be to determine whether the Apache trout warranted expanded monitoring, additional research, additional habitat protection, or relisting as an endangered or threatened species under the Act. If relisting the Apache trout were warranted, emergency procedures to relist the species may be followed, if necessary, in accordance with section 4(b)(7) of the Act.

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:

(a) Be logically organized;

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

(c) Use clear language rather than jargon;

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

(e) 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 names 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.

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, 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 Secretary's 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.

The Apache trout occurs on area managed by the White Mountain Apache Tribe (WMAT). As noted above, we have coordinated with WMAT in conserving and protecting the Apache trout's habitat and populations. Furthermore, WMAT was an invited participant in the development of the SSA. Going forward, we anticipate our partnership with WMAT to continue into the future regardless of any potential changes in the Apache trout's status under the Act.

References Cited

A complete list of all references cited in this proposed rule is available on the internet at *https://www.regulations.gov* or upon request from the person listed under **FOR FURTHER INFORMATION CONTACT**.

Authors

The primary authors of this proposed rule are staff members of the Service's Species Assessment Team and the Arizona Fish and Wildlife Conservation Office.

List of Subjects in 50 CFR Part 17

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

Proposed Regulation Promulgation

Accordingly, we hereby 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.

§ 17.11 [Amended]

■ 2. In § 17.11, in paragraph (h), amend the List of Endangered and Threatened Wildlife by removing the entry for ''Trout, Apache'' under FISHES.

■ 3. In § 17.44, amend the introductory text of paragraph (a) to read as follows:

§ 17.44 Special rules—fishes.

(a) Lahontan cutthroat trout and Paiute cutthroat trout (*Oncorhynchus clarkii henshawi* and *Oncorhynchus clarkii seleniris*).

* * * * *

Martha Williams,

Director, U.S. Fish and Wildlife Service.

[FR Doc. 2023–15689 Filed 8–10–23; 8:45 am]

BILLING CODE 4333–15–P