

DEPARTMENT OF THE INTERIOR**Fish and Wildlife Service****50 CFR Part 17**[Docket No. FWS-R9-ES-2012-0039;
4500030113]

RIN 1018-BC81

Endangered and Threatened Wildlife and Plants; Listing the Scarlet Macaw**AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), determine the northern subspecies of scarlet macaw (*Ara macao cyanoptera*) is an endangered species under the Endangered Species Act of 1973 (Act), as amended; the northern distinct population segment (DPS) of the southern subspecies of scarlet macaw (*A. m. macao*) is a threatened species under the Act, and the southern DPS of the southern subspecies of scarlet macaw (*A. m. macao*) and subspecies crosses (*A. m. cyanoptera* and *A. m. macao*) to be threatened species based on similarity of appearance. We are also establishing a rule pursuant to section 4(d) of the Act for the *A. m. macao* subspecies and subspecies crosses to provide for its further conservation.

DATES: This rule is effective March 28, 2019.**ADDRESSES:** Comments and materials we received, as well as supporting documentation used in preparation of this rule, are available for public inspection at <http://www.regulations.gov>.**FOR FURTHER INFORMATION CONTACT:** Don Morgan, Chief, Branch of Delisting and Foreign Species, Ecological Services Program, U.S. Fish and Wildlife Service, 5275 Leesburg Pike, MS:ES, Falls Church, VA 22041; telephone 703-358-2444. If you use a telecommunications device for the deaf (TDD), you may call the Federal Relay Service at 800-877-8339.**SUPPLEMENTARY INFORMATION:****Executive Summary**

Why we need to publish a rule. Under the Act, a species may warrant protection through listing if it is endangered or threatened throughout all or a significant portion of its range. Listing a species as an endangered or threatened species can only be completed by issuing a rule.

On July 6, 2012, we published in the **Federal Register** (FR) a 12-month

finding on a petition to list the scarlet macaw. We determined the scarlet macaw (*A. m. macao*) did not warrant listing under the Act at the species level but found the northern subspecies of scarlet macaw (*Ara macao cyanoptera*) and the northern distinct population segment (DPS) of the southern subspecies (*A. m. macao*) warranted listing and issued a proposed rule to list those entities as endangered under the Act (77 FR 40222). On April 7, 2016, we published a revised proposed rule (81 FR 20302) maintaining the proposed endangered status for *A. m. cyanoptera*, but (1) revising the proposed listing determination for the northern DPS of the southern subspecies (*A. m. macao*) from endangered to threatened; and (2) proposing to treat the southern DPS of *A. m. macao* and subspecies crosses as threatened based on similarity of appearance to *A. m. cyanoptera* and the northern DPS of *A. m. macao*. We also proposed a rule under section 4(d) of the Act (a “4(d) rule”) that incorporated the prohibitions and provisions of 50 CFR 17.31 and 17.32 that we found necessary and advisable for the species’ conservation.

This rule lists the northern subspecies of scarlet macaw (*A. m. cyanoptera*) as an endangered species, the northern DPS of the southern subspecies of scarlet macaw (*A. m. macao*) as a threatened species, and the southern DPS of the southern subspecies of scarlet macaw (*A. m. macao*) and subspecies crosses (*A. m. cyanoptera* and *A. m. macao*) as a threatened species due to similarity of appearance under the Act. This rule also establishes a 4(d) rule for those listed as threatened species to further provide for the species’ conservation.

The basis for our action. Under section 4(a)(1) of the Act, we determine that a species is an endangered or threatened species based on 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. The primary causes attributed to the decline of the scarlet macaw (*A. m. cyanoptera* and *A. m. macao*) include habitat loss and forest degradation (Factor A), poaching for the pet trade (Factor B), lack of enforcement of existing regulations (Factor D), and small population size (Factor E).

Section 4(d) of the Act authorizes the Secretary of the Interior (Secretary) to extend to threatened species the

prohibitions provided for endangered species under section 9 of the Act. For threatened species, section 4(d) of the Act gives the Service discretion to specify the prohibitions and any exceptions to those prohibitions that are appropriate for the species, as well as include provisions that are necessary and advisable to provide for the conservation of the species. A rule issued under section 4(d) of the Act allows us to include provisions that are tailored to the specific conservation needs of that threatened species.

Our implementing regulations for threatened wildlife found at 50 CFR 17.31 incorporate the section 9 prohibitions for endangered wildlife, except where a species-specific rule is promulgated under 4(d) of the Act. While we proposed to rescind this provision last summer (83 FR 35174; July 25, 2018), that proposal has not been finalized at this time.

Peer review and public comment. We sought comments from independent specialists to ensure that our designation is based on scientifically sound data, assumptions, and analyses. We invited peer reviewers and the public to comment on our listing proposals. All substantive information from peer review and public comments was fully considered and is incorporated into this final rule, where appropriate.

Previous Federal Actions

Please refer to the proposed listing rule, published in the **Federal Register** on July 6, 2012 (77 FR 40222), for more comprehensive information on previous Federal actions for the scarlet macaw. The publication of the proposed listing rule opened a 60-day public comment period, which closed on September 4, 2012. Based on new information, we published a revised proposed rule (81 FR 20302; April 7, 2016) to make the following changes to our proposed rule: (1) Revise the location of what we consider to be the boundary between the two subspecies of *A. macao*; (2) provide additional information on the species in northeast Costa Rica, southeast Nicaragua, and Panama, and reevaluating the status of *A. m. cyanoptera*; (3) provide additional information on the northern DPS of *A. m. macao*, reevaluating the status of this DPS, and revise our proposed listing of this DPS from endangered status to threatened status; (4) add a proposal to treat the southern DPS of *A. m. macao* and subspecies crosses (*A. m. macao* and *A. m. cyanoptera*) as threatened based on similarity of appearance to *A. m. cyanoptera* and to the northern DPS of *A. m. macao*; and

(5) add a proposed rule pursuant to section 4(d) of the Act (16 U.S.C. 1531 *et seq.*) to define the prohibitions and exceptions that apply to scarlet macaws listed as threatened. That revised proposed rule also opened a 60-day public comment period, which closed on June 6, 2016.

Summary of Changes From the Revised Proposed Rule

In this final rule, and based on public comments, we incorporate additional information regarding the distribution of scarlet macaws in Mesoamerica (Mexico and Central America). Specifically, we include information pertaining to reintroduction programs occurring throughout the range of *Ara macao cyanoptera*, and we include information that indicates the populations in Costa Rica in the northern DPS of the southern subspecies of scarlet macaw (*A. m. macao*) are likely increasing.

We also took into account the relevant information from eBird into our analysis regarding the distribution of the species.

Summary of Comments and Recommendations

We reviewed all comments we received from peer reviewers and the public for substantive issues and new information. All substantive information from peer review and public comments has been fully considered and is incorporated into this final rule, where appropriate.

We received 282 public comments combined on the proposed and revised proposed rules to list the scarlet macaw under the Act during their respective comment periods. Some of the comments we received were similar to comments that we received previously for the proposed rule; therefore, we only address these comments once in this final rule. See the Substantive Changes to the Proposed Rule section in the revised proposed rule (81 FR 20302; April 7, 2016).

The following section summarizes information and issues raised in the public comments and provides our responses.

Comment (1): Several commenters stated that listing the scarlet macaw will hurt U.S. businesses such as aviculture, pet food and supply companies, and veterinarians.

Our Response: Determinations on whether a species should be added to the Federal Lists of Endangered and Threatened Wildlife and Plants are based on whether the species meets the definition of “endangered species” or of “threatened species” in section 3 of the Act. The Act directs the Service to make these determinations solely on the basis

of the best scientific and commercial data available. Therefore, we may not consider economic impacts when determining the status of a species. We understand that listing the scarlet macaw will have an effect on those involved in the pet bird industry, especially bird breeders. The 4(d) rule that we are putting in place streamlines the permitting process by extending certain prohibitions but deferring to existing laws (CITES and the Wild Bird Conservation Act (WBCA) that are protective of scarlet macaws (*A. m. macao* and subspecies crosses) in the course of import and export and by not requiring permits under the Act for certain types of activities. Additionally, we are not prohibiting the interstate commerce of scarlet macaws (*A. m. macao* and subspecies crosses) within the United States (see 4(d) Rule, below).

Comment (2): Several commenters stated that reducing the availability of captive birds by listing the species under the Act may lead to an increase of wild-caught birds for the pet trade.

Our Response: We do not anticipate that listing the scarlet macaw under the Act will further reduce the availability of captive birds or lead to an increase of wild-caught birds for the pet trade. The scarlet macaw is listed in Appendix I of CITES, which is an international agreement among governments to ensure that the international trade of CITES-listed plants and animals does not threaten the survival of the species in the wild. Trade must be authorized through a system of permits and certificates that are issued by the designated CITES Scientific and Management Authorities of each CITES Party. For species included in CITES Appendix I, international trade is permitted only under exceptional circumstances, which generally precludes commercial trade. The United States implements CITES through the Act and our implementing regulations at 50 CFR part 23. It is unlawful for any person subject to the jurisdiction of the United States to engage in any trade in any specimens contrary to the provisions of CITES, or to possess any specimens traded contrary to the provisions of CITES, the Act, or our implementing regulations at 50 CFR part 23. Protections for CITES-listed species are provided independently of whether a species is an endangered species or a threatened species under the Act.

Two other laws in the United States apart from the Act also already provide protection from the illegal import of wild-caught birds into the United States: The WBCA and the Lacey Act (18 U.S.C. 42–43; 16 U.S.C. 3371–3378). The WBCA ensures that exotic bird species

are not harmed by international trade and encourages wild bird conservation programs in countries of origin. Under the WBCA and our implementing regulations (50 CFR 15.11), it is unlawful to import into the United States any exotic bird species listed under CITES except under certain circumstances. The Service may issue permits to allow import of listed birds for scientific research, zoological breeding or display, cooperative breeding, or personal pet purposes, when the applicant meets certain criteria (50 CFR 15.22–15.25). Under the Lacey Act, in part, it is unlawful: (1) To import, export, transport, sell, receive, acquire, or purchase any fish, or wildlife taken, possessed, transported, or sold in violation of any law, treaty, or regulation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law; or (2) to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any State or in violation of any foreign law. Similarly, under the Lacey Act it is unlawful to import, export, transport, sell, receive, acquire, or purchase specimens of this species traded contrary to CITES.

Based in large part on the protection from illegal and legal trade afforded to the scarlet macaw by CITES, the WBCA, and the Lacey Act, the best available data indicate that the current threat from trade to the scarlet macaw stems mainly from illegal trade in the domestic markets within Central and South America (Weston and Memon 2009, pp. 77–80; Shanee 2012, pp. 4–9). Additionally, interstate commerce within the United States is not a current threat to the scarlet macaw and will not affect any efforts to recover wild populations. Therefore, we do not anticipate that listing the scarlet macaw under the Act will further reduce the availability of captive-bred birds or lead to an increase of wild-caught birds since those birds are already regulated by existing laws. This 4(d) rule, in large part, adopts the framework of those laws.

Comment (3): Several commenters stated that at least 25 States adopt the Federal Lists of Endangered and Threatened Wildlife and Plants to their State list, which they claim would make it illegal to possess scarlet macaws or its feathers. The commenters stated that these laws do not include “grandfathering,” which means that those who have scarlet macaws prior to the listing and live in one of these States would be in violation of the law immediately once the listing is effective.

Our Response: Ownership of a listed species is not prohibited by the Act and therefore, does not require a permit. We further note that, under section 9(b)(1) it is not unlawful to import or export a scarlet macaw that was held in captivity prior to the date of this final rule provided that its holding was not in the course of commercial activity. Further, while we have certainly not conducted an in-depth study on the various provisions of state law, we observe that under Article I of the United States Constitution, retroactive application of a law is permitted only in extraordinary cases. *Ex post facto* laws (or laws that criminalize conduct that was legal when originally performed) are generally prohibited. However, we acknowledge that we have no discretion over regulations that certain States implement regarding federally listed wildlife and plants.

Comment (4): A few commenters stated that breeders and pet owners in the United States have been supplying feathers through sales or trade to Native American artisans, and the Service should find a way to accommodate feather and art sales within the United States because these artisans make ceremonial products to support themselves and their tribes.

Our Response: The 4(d) rule will apply to all commercial and noncommercial international shipments of live and dead scarlet macaws, the southern subspecies of *A. m. macao* and subspecific crosses (*A. m. macao* and *A. m. cyanoptera*), and their parts and products, including the import and export of personal pets and research samples. In most instances, the 4(d) rule adopts existing regulatory requirements of CITES and the WBCA as the appropriate regulatory provisions for the import and export of scarlet macaws. Under the 4(d) rule, a person may deliver, receive, carry, transport, or ship *A. m. macao* and subspecies crosses in interstate commerce in the course of a commercial activity, or sell or offer to sell in interstate commerce without a permit under the Act (see 4(d) rule, below). Therefore, the 4(d) rule would allow individuals to engage in certain commercial activities with *A. m. macao* and subspecies crosses that could provide Tribal artisans materials to make their products.

The 4(d) rule does not include subspecies *A. m. cyanoptera* that is listed as endangered, and therefore, all the prohibitions of 50 CFR 17.31 apply to this subspecies. While the Act does not prohibit intrastate (within a state) sale of a listed species, it does prohibit interstate (between states) commercial sale, unless a buyer obtains a permit.

Permits for prohibited activities, such as interstate sale, import and export, can be issued for endangered species if the activities enhance the propagation or survival of the species in the wild. Additionally, a breeder could obtain a Captive-bred Wildlife Registration (CBW), which would authorize interstate commerce. However, it must be shown that the sale enhances the propagation or survival of the affected species and the principal purpose is to facilitate conservation breeding and not for the sale of protected species as pets.

Comment (5): Several commenters stated that the Endangered Species Act is designed to protect domestic species only, and listing scarlet macaws under the Act does not address the main cause of decline for the species, which is habitat destruction in the species' native countries.

Our Response: The broad definitions of "species," "fish or wildlife," and "plant" in section 3 of the Act do not differentiate between species native to the United States, species native to both the United States and one or more other countries, and species not native to the United States. Further, sections 4(b)(1)(A) and 4(b)(1)(B)(i) expressly require the Service to consider efforts by a foreign nation prior to making a listing determination. Additionally, the findings and purposes at sections 2(a)(4), 2(a)(5), and 2(b) also speak to the application of the Act to meet the United States international commitments under treaties and conventions, and numerous provisions of the Act and the implementing regulations refer to foreign jurisdictions (e.g., sections 8 and 8A of the Act, 50 CFR 424.11(e)). As such, we have no basis to determine the protections of the Act only apply to domestic species. However, we acknowledge that we do not have authority to directly regulate activities in a foreign country that may cause the species to be endangered or threatened.

Comment (6): Several commenters stated that there is no benefit to listing scarlet macaws under the Act because the species is already sufficiently protected by CITES and the WBCA.

Our Response: The decision to list a species under the Act is based on whether the species meets the definition of an endangered or threatened species as defined under section 3 of the Act and is made solely on the basis of the best scientific and commercial data available. The purpose of the WBCA is to ensure that exotic bird species are not harmed by international trade and encourages wild bird conservation programs in countries of origin. The purpose of CITES is to ensure that

international trade in plants and animals does not threaten their survival in the wild. Protection provided by other laws, such as CITES and WBCA, is taken into consideration when determining the status of the species. However, simply being protected by these other laws does not preclude the requirement to list and provide additional protections under the Act where the species meets the definition of a threatened or endangered species. Further, the standards for listing under each legal regime are different, and the protections afforded to species listed under each legal regime are different, though they can overlap in some respects. While CITES regulates the international trade of certain wildlife, it has limited regulatory authority once the species enters the United States for activities that take place within the United States, though there are restrictions on use after import for some specimens, especially Appendix I specimens. Listing under the Act helps ensure that the United States and its citizens do not contribute to the further decline of the species.

Conservation measures or benefits provided to foreign species listed as endangered or threatened under the Act include recognition, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness, and may encourage and result in conservation actions by foreign governments, Federal and State governments, private agencies and interest groups, and individuals.

Comment (7): Several commenters noted that the International Union for Conservation of Nature (IUCN) classifies the scarlet macaw as "least concern;" and therefore, listing under the Act is not warranted.

Our Response: The decision to list a species under the Act is based on whether the species meets the definition of an endangered or threatened species as defined under section 3 of the Act and is made solely on the basis of the best scientific and commercial data available. The IUCN uses different standards and criteria and the designations are not interchangeable. Within certain countries, particularly in the range of *A. m. cyanoptera*, the subspecies is considered in danger of extinction or on a country's list of threatened or endangered species (Government of Mexico 2010a, p. 64; (Biodiversity and Environmental Resource Data System of Belize 2012, unpaginated; Meerman 2005, p. 30; (Government of Guatemala 2001, p. 15; Secretaria de Recursos Naturales y Ambiente. 2008, p. 62). However,

because of the relatively good status of the species in the Amazon, which accounts for the majority of the species range and population, and the scarlet macaw's relative tolerance of degraded and fragmented habitat (BLI 2011c, unpaginated), we found the scarlet macaw did not warrant listing under the Act rangewide at the species level (*A. m. macao*). The IUCN classified this entity—the overall species—as “Least Concerned.”

Comment (8): A few commenters questioned our decision in the revised proposed rule to change the northern DPS of the southern subspecies of scarlet macaw (*A. m. macao*) from endangered to threatened. The commenters assert that because we revised the boundaries and now attribute the population on Isla Coiba, Panama, to be part of the northern subspecies (*A. m. cyanoptera*), the decline in the number of known populations for the northern DPS of *A. m. macao* does not warrant a reversal of the Service's prior determination. It indicates a reduction in the number of populations; therefore, the DPS is now at a greater risk of extinction.

Our Response: The northern DPS of the southern subspecies, *A. m. macao*, consists of two main populations in Costa Rica, the Central Pacific Costa Rica (Área de Conservación Pacífico Central (ACOPAC)) and South Pacific Costa Rica (Área de Conservación Osa (ACOSA)) populations that are likely stable or increasing Vaughan *et al.* 2005, p. 128; Dear *et al.* 2010, p. 20; Brightsmith 2016, *in litt.*, pp. 10–13) and consist of 1,000 to 2,000 birds; a group of at least 14–25 birds in Palo Verde (Brightsmith 2016, *in litt.*, p. 14; Dear *et al.* 2010, p. 8) in northwest Costa Rica, along with scattered sightings of scarlet macaws from Palo Verde National Park south to Carara National Park and throughout western Guanacaste (Brightsmith 2016, *in litt.*, p. 14); small groups of captive-released birds in some locations within the Costa Rica portion of the DPS; small populations in northwestern Panama in the Chiriquí province (Brightsmith 2016, *in litt.*, p. 17; Sullivan *et al.* 2009, unpaginated), and an unknown number on the southern end of the Azuero Peninsula of Veraguas, near Cerro Hoya National Park (Brightsmith 2016, *in litt.*, p. 17; Sullivan *et al.* 2009, unpaginated; Rodriguez and Hinojosa 2010, in McReynolds 2011, *in litt.*, unpaginated); and an unknown but likely small number of birds in northwest Colombia. Thus, although the two largest populations currently appear to be increasing and appear stable even with ongoing poaching pressure, they both

are small and their total range represents only a portion of the range. Northwest Colombia has large tracts of suitable habitat capable of supporting a population (although we have no information about the current population estimate for northwest Colombia). However, because current threats to scarlet macaws are ongoing, enforcement of existing regulations is inadequate, and the population sizes of scarlet macaws in this region are small, we reaffirm our determination that the northern DPS of *A. m. macao* is threatened in accordance with the definition in the Act.

Comment (9): Several commenters stated that by listing the northern subspecies of scarlet macaw (*A. m. cyanoptera*) as endangered, bird owners will not be able to sell birds, and if they cannot sell birds they will not breed birds or will breed hybrids to get around the listing. Thus, the gene pool for *A. m. cyanoptera* will be reduced, if not be eliminated.

Our Response: Commenters responding to the 2012 proposed rule (77 FR 40222; July 6, 2012) noted that aviculturists have bred the species without regard for taxa, resulting in crosses of the two subspecies (*A. m. cyanoptera* and *A. m. macao*). Therefore, the best available information indicates that pet scarlet macaws may be bred with little regard for genetics and include an unknown number of subspecies crosses, regardless of whether the species is listed under the Act (Schmidt 2013, pp. 74–75). The Act does not prohibit intrastate (within a state) sale of a listed species so bird owners could sell birds within state, but because *A. m. cyanoptera* is listed as endangered, interstate (between states) commercial sale is prohibited without a permit. We do not believe that the gene pool will be reduced or eliminated because while some scarlet macaws in captivity in the United States will be a mixture of subspecies, it is possible to determine with genetic techniques where individual scarlet macaws have come from and whether or not they are from one pure single subspecies or a mix of subspecies (Brightsmith 2016, *in litt.*, p. 23).

Comment (10): Several commenters stated that we dismiss the benefit of captive-bred scarlet macaws, which may be used to repopulate the population if a major natural, biological, or manmade disaster occurs in the native habitat of the species, and to educate and raise awareness for the species.

Our Response: We find that there is a difference in conservation value between captive-bred scarlet macaws that are bred for the pet trade and those

bred for potential release into the wild and that are not in trade. We are not aware of any evidence indicating that release of pet or pet-trade scarlet macaws benefits wild populations. Pet scarlet macaws are poor candidates for reintroduction programs because those bred for the pet trade are bred with little regard for genetics and include an unknown number of subspecies crosses (Schmidt 2013, pp. 74–75), pets socialized with humans fail to act appropriately with wild individuals when released, and individuals held as pets may pose a disease risk to wild populations (Brightsmith *et al.* 2005, p. 471). However, scarlet macaws bred in captivity for soft-release programs are more appropriate than pet scarlet macaws to contribute to the wild population because of the breeding techniques, decreased level of human interaction, disease testing, and training of these birds to survive on their own in the wild upon release. Refer to “Reintroduction of Scarlet Macaws,” below, for examples of captive-bred birds raised and released into the wild to integrate with the wild populations of scarlet macaws. These birds released back into their native range and nearby existing populations may increase the overall population and contribute to the long-term conservation of the species.

Comment (11): A few commenters stated that the information used in the proposed rule was outdated.

Our Response: The Service is required by the Act to make determinations solely on the basis of the best scientific and commercial data available. We use the existing information and are not required to develop new data. We based the proposed rule on all the information we received following the initiation of the status review for the scarlet macaw, as well as all of the information we found during our own research and that received during the comment periods of the 2012 proposed rule and 2016 revised proposed rule. The “best available” information depends on research being conducted in the field and the availability of information and may be more, or less, recent depending on the efforts being conducted. After publishing the proposed rule, we found additional information that had become available since the publication of the proposed rule and reviewed information that was submitted by the public, including studies from a species expert and conservation organizations within the scarlet macaw's range countries.

Comment (12): One commenter claimed that the Service violated mandatory statutory deadlines by waiting nearly 4 years to take further action on its original listing proposal

and never formally invoking the legally allowable 6-month extension.

Our Response: We acknowledge that we failed to meet the statutory deadline for this rulemaking. However, we are obligated to make listing determinations under the Act based on the best available scientific and commercial information. In our proposed rule (77 FR 40222; July 6, 2012), we found that the northern subspecies of scarlet macaw, *A. m. cyanoptera*, and the northern DPS of the southern subspecies, *A. m. macao*, were in danger of extinction (an endangered species) based on their populations sizes and the magnitude of threats, such as loss of habitat and poaching, within the subspecies' respective ranges. We also found the southern DPS of the southern subspecies, *A. m. macao*, not to be warranted for listing under the Act. During the public comment period on the proposed rule, we received several requests from the public to extend the comment period. Additionally, subsequent to the proposed rule, we received new information from the public and peer review, and we issued a revised proposed rule (81 FR 20302; April 7, 2016). As a result of this information, we made five substantive changes to our July 6, 2012, proposed rule. Specifically, we: (1) Revised the location of what we consider to be the boundary between the northern subspecies, *A. m. cyanoptera*, and the northern DPS of the southern subspecies, *A. m. macao*; (2) provided additional information on *A. m. cyanoptera* in northeast Costa Rica, southeast Nicaragua, and Panama, and reevaluated the status of the subspecies; (3) provided additional information on the northern DPS of *A. m. macao*, reevaluated the status of this DPS, and revised our proposed listing of this DPS from endangered status to threatened status; (4) added a proposal to treat the southern DPS of *A. m. macao* and subspecies crosses (*A. m. cyanoptera* and *A. m. macao*) as threatened based on similarity of appearance to *A. m. cyanoptera* and to the northern DPS of *A. m. macao*; and (5) added a proposed rule under section 4(d) of the Act to define activities that are necessary and advisable for the conservation of scarlet macaws listed as threatened and crosses of the two scarlet macaw subspecies. We then revised our determination for the southern subspecies of *A. m. macao* in consideration of the new information and comments we received to conclude that the northern DPS of *A. m. macao*'s risk of extinction is not as imminent as previously determined and that the southern DPS of *A. m. macao* has

similarity of appearance and will therefore be treated as threatened. We opened a new comment period to allow the public the opportunity to submit additional comments in light of the new information and our revised determinations. Thus, we have used this time to consider and incorporate complex data so that we may ensure our rulemaking is based on the best available information.

Comment (13): A few commenters claimed that the Service offers no explanation on how the proposed 4(d) rule allowing all commercial and noncommercial international shipments of live or dead members of the southern subspecies (*A. m. macao*) and subspecies crosses (*A. m. macao* and *A. m. cyanoptera*) can be effectively limited to only those entities given the similarity of appearance. The proposed 4(d) rule depends entirely on the ability to differentiate between birds and products made from their bodies, which the Service has previously stated cannot be done without genetic analysis.

Our Response: Scarlet macaw subspecies, *A. m. macao* and *A. m. cyanoptera*, primarily differ in the coloration of their wing coverts (a type of feather) and wing size. We recognize that differences between *A. m. cyanoptera* and *A. m. macao* are not always apparent, particularly in birds from the middle of the species' range, and evidence in trade is usually in the form of partial remains, detached feathers, and artwork incorporating their feathers. Additionally, aviculturists often breed species without regard to their taxa. Thus, identification of the subspecies or the geographic origin of birds can be difficult or improbable without genetic analysis.

The 4(d) rule allows a person to import or export certain scarlet macaws (*A. m. macao* and subspecies crosses (*A. m. macao* and *A. m. cyanoptera*)) without a permit issued under the Act. However, to import and export scarlet macaws a person must follow procedures and requirements of CITES and the WBCA, as the 4(d) rule adopts existing conservation regulatory requirements of CITES as the appropriate regulatory provisions for the import and export of certain scarlet macaws (see 4(d) Rule, below). Both subspecies of the scarlet macaw are listed in Appendix I of CITES, which ensures that the international trade of CITES-listed species does not threaten the survival of the species in the wild. Trade must be authorized through a system of permits and certificates that are issued by the designated CITES Authorities of each CITES country. For species included in CITES Appendix I,

international trade is permitted only under exceptional circumstances, which generally precludes commercial trade.

Any scarlet macaws or parts in international trade to the United States would require documentation that indicates the source and purpose of the specimen or parts, and we identify which countries the southern subspecies (*A. m. macao*) and potential subspecies crosses (*A. m. macao* and *A. m. cyanoptera*) are located in the wild. Birds from the two extremes of the range (Mexico and the Amazon) are morphologically discernable (Schmidt 2011, pers. comm.). However, we recognize that it can be difficult to differentiate between subspecies and determine whether the specimen is part of *A. m. cyanoptera*, and also requires a permit under the Act. Over the last 20 years less than 200 entries in the LEMIS (Law Enforcement Management Information System) database were scarlet macaw parts or unspecified, and 38 percent of the overall entries were seized. Therefore, even if some parts are difficult to determine which subspecies of scarlet macaw without genetic analysis, which would add considerable cost and effort to law enforcement, the quantity of scarlet macaw imports into the United States is not extensive.

Comment (14): One commenter cited Matuzak *et al.* (2008) for evidence that scarlet macaws are willing to feed on introduced species, which makes the species less susceptible to loss of native habitat. The commenter asserts that this is one reason why we should not list *A. m. cyanoptera* as endangered.

Our Response: The fact that scarlet macaws consume nonnative species does not change our determination that *A. m. cyanoptera* is in danger of extinction because of the extent of the decline in the range and numbers of *Ara macao cyanoptera* due to ongoing habitat destruction and degradation, poaching for the pet trade, the lack of enforcement of existing regulatory mechanisms addressing these threats, and the small population sizes that work in combination with the other threats.

Comment (15): A few commenters stated that threats to *A. m. cyanoptera* have been reduced over the past decade due to ongoing conservation efforts. The commenters also assert that our description of "extreme fragmentation of habitat and population" is an overstatement and habitat loss and fragmentation do not threaten the survival of *A. m. cyanoptera*. They claim scarlet macaws can fly dozens to hundreds of kilometers in a day and generally overcome fragmentation of populations; scarlet macaws use small

protected areas with sufficient large trees; and large areas of undisturbed habitat exist in Northern Central America. Thus, *A. m. cyanoptera* should not be listed as endangered.

Our Response: Reintroduction programs to introduce captive-bred scarlet macaws into wild populations have proven successful, especially within the range of *A. m. cyanoptera* (see “Reintroduction of Scarlet Macaws,” below). Information provided by a peer reviewer of the revised proposed rule (81 FR 20302; April 7, 2016) indicates that the scarlet macaw is likely increasing in numbers in the border region on the Caribbean slope of southeastern Nicaragua and northeastern Costa Rica, as well as showing an ability to inhabit human-disturbed habitats. However, destruction of forest habitat is one of the main causes of the decline of the scarlet macaw in Mesoamerica (Comisión Nacional Para el Conocimiento y Uso de la Biodiversidad (CONABIO) 2011, p. 5; Lezama 2011, pers. comm.; McGinley *et al.* 2009, p. 11; Garcia *et al.* 2008, p. 50; Hansen and Florez 2008, pp. 48–50; Snyder *et al.* 2000, p. 150; Collar 1997, p. 421; Forshaw 1989, p. 406; Ridgely 1981, pp. 251–253). The remaining forest is fragmented and includes few large tracts of forest habitat (Bray 2010, pp. 92–93; Snyder *et al.* 2000, p. 150; Wiedenfeld 1994, p. 101). Although deforestation rates have declined in Mesoamerica since 1990, they are still very high (FAO 2010a, pp. 232–233; Kaimowitz 2008, p. 487). Deforestation is occurring in many areas within the range of *A. m. cyanoptera*, including, but not limited to, in Chiapas, Mexico, western Petén in Guatemala; in the Mosquitia region in eastern Honduras and Nicaragua; and southeastern Nicaragua (Kaimowitz 2008, p. 487; Fagan *et al.* 2013, unpaginated; Chassot and Monge-Arias 2012, p. 63; Chassot and Monge-Arias 2011, p. 1; Chassot *et al.* 2009, p. 9). Therefore, as discussed in our July 6, 2012, and April 7, 2016, proposed rules, and reaffirmed herein, the low numbers of individuals of this subspecies, fragmentation of its habitat and population, and the substantial threats of habitat loss and poaching acting on this subspecies throughout its range place it in danger of extinction at this time.

Comment (16): One commenter disagrees with our determination that disease could be introduced through reintroduction programs that may affect wild populations of scarlet macaws. The commenter stated that disease does not pose a risk to wild populations, especially in northern Central America, and cited Boyd and McNab 2008.

Our Response: We are not aware of any information indicating that disease poses a significant threat to the species, especially in northern Central America. The risk of introducing diseases into wild populations increases when a large number of birds are introduced annually, but this is cost-prohibitive and unlikely (Boyd and McNab 2008, p. vii). Generally speaking, disease risk is small because the probable frequency of occurrence is low (Clum 2008, p. 79). As long as adequate disease testing is performed, and there are existing protocols for minimizing the threat of introducing exogenous diseases (*i.e.*, diseases that originate outside of the organism) into wild populations, the birds for release could come from multiple suitable sources (Boyd and McNab 2008, p. vii, Boyd *et al.* 2008, p. 112).

Comment (17): Some commenters disagreed with proposing a 4(d) rule that would allow the import and export of captive-bred scarlet macaws and interstate commerce without a permit.

Our Response: The Act does not prohibit these activities for threatened species. However, under 4(d), we may extend some or all of the prohibitions of 9(a)(1) to threatened species and are exercising our authority to do so here. We assessed the conservation needs of the scarlet macaw in light of the broad protections provided to the species under CITES and the WBCA. The best available data indicate that the current threat of trade to the scarlet macaw stems mainly from illegal trade in the domestic markets of Central and South America (Weston and Memon 2009, pp. 77–80; Shanee 2012, pp. 4–9). Accordingly, we find that adopting the import and export prohibitions of 9(a)(1), which extend only to the jurisdiction of the United States, would not regulate such activity and is not likely to impact the species status. Additionally, because interstate commerce within the United States has not been found to threaten the scarlet macaw or affect efforts at recovery of wild populations, and international trade of this species is regulated under CITES, we do not find it necessary to regulate such activity for this species. Therefore, we find the 4(d) rule contains all the prohibitions and authorizations necessary and advisable for the conservation of the species.

Comment (18): One commenter asserts that the Service’s statement that northwest Colombia has large tracts of forest suitable for supporting a presently unknown scarlet macaw population and could contribute to the resiliency and redundancy of the DPS is both speculative, because it is unknown if

scarlet macaws presently exist there, and is undercut by the finding that deforestation is ongoing and expected to continue in this area.

Our Response: The scarlet macaw was reported to occur in relatively small areas outside the Amazon, including west of the Andes in northwest Colombia (Hilty and Brown 1986, p. 200). The best available information indicates that the population in northwest Colombia faces significant ongoing threats and may be potentially extirpated from this region (Donegan 2013, *in litt.*; Ellery 2013, *in litt.*; McMullen 2010, p. 60). However, although no current population estimates are available, this region is reported to have large tracts of forest suitable for supporting scarlet macaws (Ortega and Lagos 2011, p. 82; Salaman *et al.* 2009, p. 21). While the commenter did not provide any additional information to their concern, the information that this region is reported to have large tracts of suitable habitat was not a focus of our status determination regarding the status of the population of *A. m. macao*.

Comment (19): A few commenters provided new information concerning reintroduction efforts in the native range of *A. m. cyanoptera* and the northern DPS of *A. m. macao*. These commenters encouraged us to incorporate information about reintroduction programs into our final rule. The commenters claimed that positive information, such as captive-breeding and release programs that are occurring throughout the species’ range, are discounted compared to negative information, such as threats, on population status. They encouraged the Service to equally consider information for and against endangerment, including the potential uses of captive birds in conservation.

Our Response: Captive-bred birds released back into their native ranges and nearby existing populations have the potential to increase the overall population in the wild and contribute to the long-term conservation of the species, although the success of reintroduced scarlet macaws partly depends on the methods used to raise and release captive-bred birds into the wild. We have incorporated this information in our analysis and included a description of the reintroduction efforts for *A. m. cyanoptera* and *A. m. macao* in their respective ranges. See “Reintroduction of Scarlet Macaws,” below.

Comment (20): One commenter claims that listing of the southern DPS of *A. m. macao* based on similarity of appearance alone is not warranted in

the absence of any potential threat to wild populations. The movement of the southern DPS of *A. m. macao* would be subjected to extensive permitting and reviews under CITES and the WBCA, so listing it under the Act would provide little extra protection.

Our Response: During the public comment period for the proposed rule (77 FR 40222; July 6, 2012), we received additional information supporting a similarity of appearance listing for the southern DPS of *A. m. macao* and scarlet macaw subspecies crosses between *A. m. cyanoptera* and *A. m. macao*, which we incorporated into the revised proposed rule (81 FR 20302; April 7, 2016) and carry forward in this final rule. Because it can be difficult to visually differentiate between the two subspecies and this difficulty is an additional threat for the northern DPS of *A. m. macao*, we determined that treating the southern DPS of *A. m. macao* under the Act's section 4(e) similarity of appearance provisions will substantially facilitate law enforcement actions to protect and conserve scarlet macaws. Extending the protections of the Act to the similar entities through this listing of those entities due to similarity of appearance under section 4(e) of the Act and providing applicable prohibitions and exceptions in a rule issued under section 4(d) of the Act will provide greater protection to *A. m. cyanoptera* and the northern DPS of *A. m. macao*. For these reasons, we are treating the southern DPS of *A. m. macao* as threatened due to the similarity of appearance to the northern DPS of *A. m. macao*, pursuant to section 4(e) of the Act. Furthermore, simply being protected by CITES and the WBCA does not preclude the need to list and provide additional protections under the Act. Listing under the Act helps ensure that the United States and its citizens do not contribute to the further decline of the species.

Background

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in part 424 of title 50 of the Code of Federal Regulations (50 CFR part 424) set forth procedures for adding species to, removing species from, or reclassifying species on the Federal Lists of Endangered and Threatened Wildlife and Plants. The Act defines "endangered species" as any species that is in danger of extinction throughout all or a significant portion of its range (16 U.S.C. 1532(6)), and "threatened species" as any species that is likely to become an endangered species within the foreseeable future

throughout all or a significant portion of its range (16 U.S.C. 1532(20)).

We summarize below the information on which we based our final determination and evaluation of the five factors provided in section 4(a)(1) of the Act. We are also adopting a rule authorized under section 4(d) of the Act for the scarlet macaw to further its conservation. We find this rule contains the prohibitions and authorizations necessary and advisable for the conservation of the scarlet macaw.

Species Information

Species Description

The scarlet macaw (*Ara macao*) is one of several large neotropical parrot species commonly referred to as macaws. They measure 84–89 centimeters (33–35 inches) in length, weigh 900–1490 grams (2.0–3.3 pounds), and are one of the larger macaws (Collar 1997, p. 421). Scarlet macaws are brilliantly colored and predominantly scarlet red; most of the head, body, tail, and underside of the wings are red. Color on the upper side of the wing appears generally as bands of red, yellow, and blue, with varying amounts of green occurring between the yellow and blue band. Lower back, rump, and tail coverts (upper tail feathers) are blue. The species has large white, mostly bare facial patches on either side of its bill. The upper bill is a light, whitish color, whereas the lower bill is black. The sexes are similar, and immature birds are similar to adults, except immature birds have shorter tails (Collar 1997, p. 421; Wiedenfeld 1994, p. 100; Forshaw 1989, pp. 404, 406).

Taxonomy

The scarlet macaw was first described in 1758, by Linnaeus (Collar 1997, p. 421; Wiedenfeld 1994, p. 99). In 1994, the subspecies *Ara macao cyanoptera*, was separated from the originally described taxon (or nominate form), *A. m. macao* (Wiedenfeld 1994, entire). *Ara macao cyanoptera* occurs from southern Mexico south to central Nicaragua. Birds from southern Nicaragua to northern Costa Rica represent a zone of intergradation between the two forms; the nominate form (*A. m. macao*) occurs from this zone southward through the South American range of the species (Wiedenfeld 1994, pp. 100–101). *Ara macao cyanoptera* is different from *A. m. macao* in size and wing color; *A. m. cyanoptera* is larger than *A. m. macao*, with significantly longer wing lengths; and the yellow wing coverts that are tipped in blue have no green band

separating the yellow and blue as in *A. m. macao*.

The subspecies classification described by Wiedenfeld (1994, entire) is used in the scientific community and the subspecies are recognized by the Integrated Taxonomic Information System (ITIS) as valid taxa (ITIS 2011, unpaginated). The subspecies classification is supported by genetic analyses (Schmidt 2011, pers. comm.; Schmidt and Amato 2008, pp. 135–137).

Schmidt (2013) represents the only spatial analysis of scarlet macaw genetic variation across the historical range of the species, and we consider this study to be the best available information on the range of the two subspecies. Therefore, the mainland Central America boundary between *A. m. cyanoptera* and *A. m. macao* is the central mountain range of Costa Rica, with *A. m. cyanoptera* found on the Caribbean (eastern) slope of the country and *A. m. macao* on the Pacific (western) slope. Additionally, scarlet macaws on Isla Coiba are likely to be the subspecies *A. m. cyanoptera*. Consequently, we consider scarlet macaws in Mexico, Guatemala, Nicaragua, Honduras, the Caribbean slope of Costa Rica, and Isla Coiba in Panama to be *A. m. cyanoptera*. We consider birds on the Pacific slope of Costa Rica and southward through the remainder of the species' range in South America to be *A. m. macao* (see Figure 1, below).

The data also show genetic differentiation between *A. m. macao* that occur on either side of the Andes in South America, indicating two populations: One consisting of birds west of the Andes in northwest Colombia, mainland Panama, and Pacific slope of Costa Rica; and the other population consisting of birds east and south of the Andes and throughout the species' South American range (Schmidt 2011, pers. comm.).

Range

The range of the scarlet macaw is the broadest of all the macaw species (Ridgely 1981, p. 250). Extending from Mexico southward to central Bolivia and Brazil, it covers an estimated 7,030,975–10,200,000 square kilometers (km²) (2,714,675–3,938,242 square miles (mi²)) (BirdLife International (BLI) 2018, unpaginated; Vale 2007, p. 112). The majority (83 percent) of the species' range lies within the Amazon Biome of South America (BLI 2011a, unpaginated; BLI 2011b, unpaginated; BLI 2011c, unpaginated).

Historically, the range of the scarlet macaw included the southern portion of the Mexico state of Tamaulipas

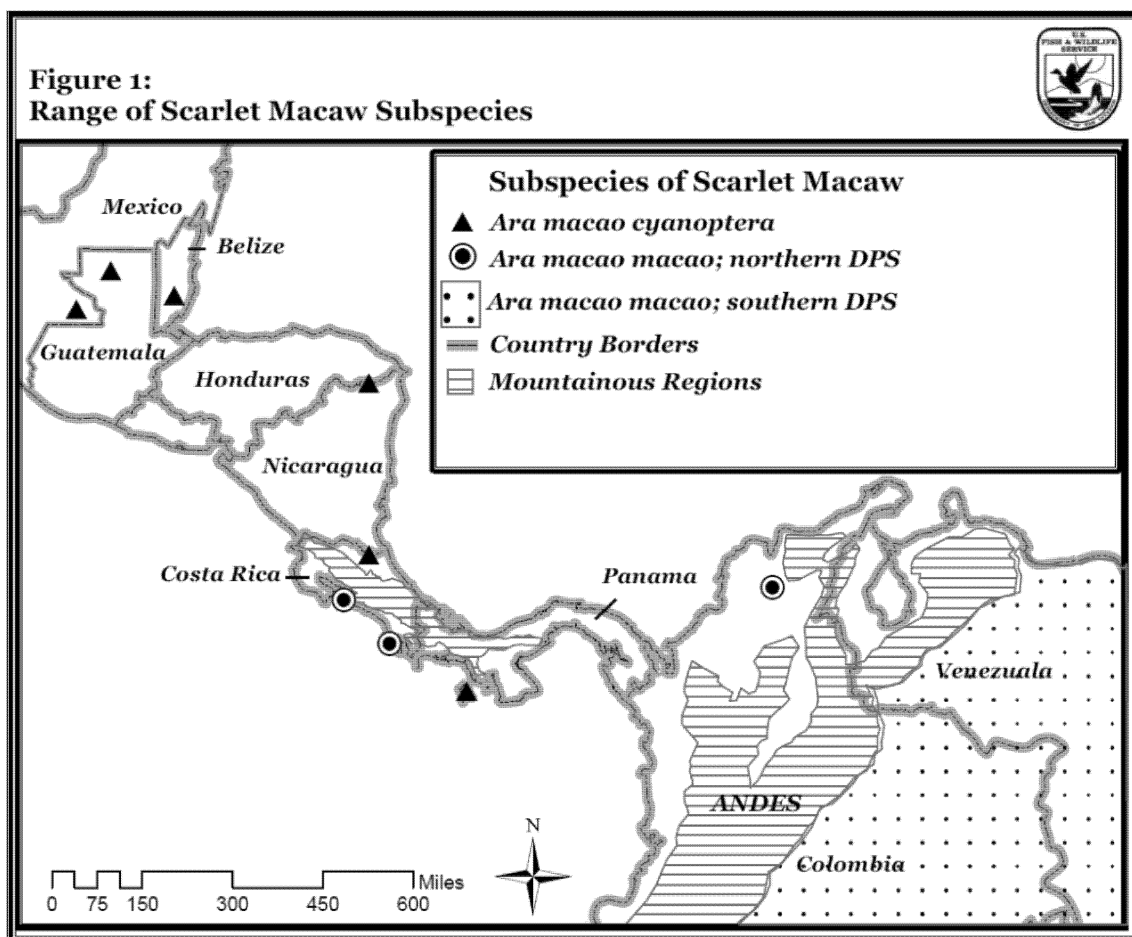
southward through the states of Veracruz, Oaxaca, Tabasco, Chiapas, and Campeche; all of Belize; the Pacific and Caribbean slopes of Guatemala, Honduras, Nicaragua, El Salvador, and Costa Rica; the Pacific slope of Panama and Costa Rica; the Magdalena Valley in Colombia; and that part of South America within Colombia, Ecuador, Peru, Venezuela, Suriname, Guyana, French Guiana, and Bolivia and Brazil as far south as Santa Cruz and northern Mato Grosso, respectively (Wiedenfeld 1994, pp. 100–101; Forshaw 1989, p. 406; Ridgely 1981, p. 250; Iñigo-Elias 2010, p. 8). Some authors report the native range of the species to include Trinidad and Tobago (BLI 2011d, unpaginated; Forshaw 1989, p. 406). However, the historical record consists of only two questionable site records of the species in Trinidad and Tobago

(Forshaw 1989, p. 407; French 1973, p. 76). The species may occur in that country as a very occasional vagrant or an escapee from captivity (Forshaw 1989, p. 407).

The scarlet macaw's range in Mesoamerica (Mexico and Central America) has been reduced and fragmented over the past several decades primarily as a result of habitat destruction and harvesting the species for the pet trade (Vaughan *et al.* 2003, pp. 2–3; Collar 1997, p. 421; Wiedenfeld 1994, p. 101; Snyder *et al.* 2000, p. 150). It has been extirpated from almost all of its former range in Mexico, all of its former range in El Salvador, and much of its former range throughout Central America.

Currently, in Mesoamerica, the *A. m. cyanoptera* occurs in the Maya Forest region of eastern Chiapas, in Mexico, western Petén, in northern Guatemala,

and Chiquibil, in southwest Belize; in the Mosquitia region of eastern Honduras and Nicaragua; in the border region of southeastern Nicaragua and northeastern Costa Rica near the Rio San Juan (San Juan River); the *A. m. macao* occurs in Palo Verde in northwestern Costa Rica; Carara National Park and surrounding area, in west-central Costa Rica; the Osa Peninsula and surrounding area, Costa Rica; and in western border region of Panama and Costa Rica in the Chiriquí province and on the southern end of the Azuero Peninsula and Isla Coiba, Panama. In South America, the *A. m. macao* occurs in small areas outside the Amazon west of the Andes in northwest Colombia and in parts of several northern Venezuelan states. Within the Amazon, the scarlet macaw still occurs over much of its historical range (see Figure 1, below).



Distribution and Abundance

Using 1992 estimates from Honduras, and extrapolating from these estimates, the total number of scarlet macaws in Mesoamerica is approximately 5,000 birds, consisting of 4,000 *A. m.*

cyanoptera (occurring from southern Mexico to Nicaragua and Isla Coiba, Panama), and 1,000 *A. m. macao* (northern DPS and occurring in Costa Rica and mainland Panama) (Wiedenfeld 1994, p. 102). More

recently, the current population of *A. m. cyanoptera* was estimated to be fewer than 1,000 birds (McNab 2009, p. 1). The known populations of scarlet macaw in their range countries are described below (see Table 1). All the

population estimates are of birds, except Mexico, in which breeding pairs were estimated.

TABLE 1—SCARLET MACAW POPULATIONS THROUGHOUT ITS RANGE
[Estimates are individuals unless otherwise stated]

Population range country	Population name	Population estimates
<i>Ara macao cyanoptera</i> :		
Southeast Mexico	upper Rio Uxpanapa region; Usamacinto Watershed—Eastern Chiapas, Mexico, Lacandón Forest.	~50; < 200 breeding pairs.
Guatemala	Northern Petén	150–250.
Belize	Chiquibul	60–219.
Eastern Honduras, Northeastern Nicaragua	Mosquitia Region	Honduras: 1,000–1,500; Nicaragua: <100–700.
Southeast Nicaragua Border and Northeast Costa Rica.	Rio San Juan (San Juan-La Selva/San Juan-El Castillo).	possibly >200.
Isla Coiba, Panama	Isla Coiba	100–200.
Total <i>A. m. cyanoptera</i>	2,000–3,000.
<i>Ara macao macao</i> Northern DPS:		
Cerro Hoya National Park	Mainland Panama	<25.
Costa Rica	Central Pacific Conservation Area (ACOPAC)	~450.
Costa Rica	Osa Conservation Area (ACOSA)	800–1,200; up to 2,000.
Northwest Colombia	Northwest Colombia	unknown.
Total <i>A. m. macao</i> Northern DPS	1,000–2,000.
Total Mesoamerica	3,000–5,000.
<i>Ara macao macao</i> Southern DPS:		
Amazon, south and east of the Andes Mountains (Colombia, Ecuador, Peru, Venezuela, Suriname, Guyana, French Guiana, and Bolivia and Brazil).	Amazon	15,000–45,000.
Total <i>Ara macao</i>	~20,000–50,000.

Mesoamerica

Mexico, Guatemala, and Belize (Maya Forest) (*A. m. cyanoptera*)

Described as previously abundant in Mexico (CONABIO 2011, p. 2) and numbering in the many thousands (Patten *et al.* 2010, p. 30), the *A. m. cyanoptera* is now reported to occur in only two small populations in Mexico. One population occurs in the upper Rio Uxpanapa region near San Francisco La Paz in Oaxaca (Inigo-Elias 1996, pp. 16–17). Citing several sources, Inigo-Elias (2010, unpaginated) and McReynolds (2011, *in litt.*, unpaginated) indicate that the upper Uxpanapa River population consists of possibly 50 scarlet macaws. It is possible that the species may occur seasonally in this area (Peterson *et al.* 2003, p. 232). The second population that occurs in Mexico is along the southern Mexico and Guatemala border area of eastern Chiapas, and is discussed below.

Within the tri-national region of southern Mexico, northern Guatemala, and Belize, the species occurs in three small populations or subpopulations: (1) In the Usamacinto watershed in eastern Chiapas, Mexico, located in the Lacandon forest that is within the Maya

Forest, which is the largest remaining expanse of tropical rainforest in the Americas (The Nature Conservancy 2018, unpaginated), and includes the Montes Azules Biosphere Reserve (approximately 3,000 km² (1,158 mi²), several smaller protected areas, and the municipality of Maques de Commillas (United Nations Educational, Scientific, and Cultural Organization (UNESCO) 2012a, unpaginated; McReynolds 2011, *in litt.*; Enriquez *et al.* 2009, p. 13; Castillo-Santiago *et al.* 2007, pp. 1215, 1217; Inigo-Elias 1996, pp. 16–17, 23); (2) in the western Department of Petén in northern Guatemala, primarily in the Maya Biosphere Reserve (MBR) (Garcia *et al.* 2008, pp. 49–64; McNab 2009, p. 1); and (3) in southwest Belize, where it is known to breed only in the Chiquibul region, which includes Chiquibul National Park and other protected areas (Salas and Meerman 2008, p. 42).

Based on field studies conducted from 1989 to 1993, it was estimated that probably fewer than 200 breeding pairs exist within Mexico’s Usamacinto watershed (Inigo-Elias 1996, pp. 96–97). In Guatemala, the population is estimated at 150 to 250 birds (McNab 2008, p. 7; Wildlife Conservation Society Guatemala 2005, in McReynolds

2011, *in litt.*, unpaginated; McNab 2009, p. 1). Estimates from Belize vary from 60 to 219 individuals, but based on field observations in 2009, the current Belize population is estimated at 200 individuals (McReynolds 2011, *in litt.*, unpaginated). However, the total population in the tri-national Maya region (Mexico, Guatemala, and Belize), based on habitat modeling and current threats, was estimated to be 399 individuals—137 in Mexico, 159 in Guatemala, and 103 in Belize (Garcia *et al.* 2008, pp. 52–53).

Populations in Mexico, Guatemala, and Belize are described as not being completely isolated from one another. It is likely that the population in western Petén, Guatemala, and the population in southeastern Mexico are connected because there is continuous habitat and the birds from Guatemala, when they disperse in the non-breeding season, are known to go to the west of their breeding grounds (Brightsmith 2016, *in litt.* p. 8). In a radio telemetry study, a fledgling radio-tagged in Guatemala flew 130 km (81 mi) to Mexico in one day (McReynolds 2011, *in litt.*, unpaginated). In addition, studies provide evidence of gene flow between nest sites in Guatemala and Belize, and

high levels of genetic diversity in the tri-national region (Schmidt and Amato 2008, p. 137). However, the Belize population may be more isolated from the Guatemala and Mexico populations because the area between these populations is well covered by eBird observers and no scarlet macaws have been seen even though there is high-quality habitat (Brightsmith *in litt.* 2016, unpaginated).

Honduras (*A. m. cyanoptera*)

The scarlet macaw was widespread in Honduras, occurring in the arid lowlands of the Pacific slope and the interior below 1,100 m (3,609 ft), as well as in the Caribbean lowland rainforest (Monroe 1968, p. 139). The scarlet macaw may have had a distribution over 60 percent of the national territory at the end of the 19th century (Monroe 1968, p. 139; Portillo Reyes et al. 2010, p. 69). Currently, the scarlet macaw is restricted to the Mosquitia region, which is a region of forest straddling the southeastern Honduras-northeastern Nicaragua border (Wiedenfeld 1994, pp. 101–102; Portillo Reyes 2005, p. 71). This region includes several thousand square kilometers in protected areas, such as the Plátano Biosphere Reserve (5,000 km² (1,931 mi²)) Reserva de la Biosfera Tawahka (Tawahka Biosphere Reservation) (2,500 km² (965 mi²)), the Parque Nacional Patuca (Patuca National Park) (3,755 km² (1,450 mi²)) in Honduras, and the Bosawás Biosphere Reserve (21,815 km² (8,423 mi²)) in neighboring Nicaragua (UNESCO 2012b, unpaginated; UNESCO 2012c, unpaginated; Valley et al. 2010, p. 52).

The total population of Honduras was estimated at 1,000 to 1,500 birds in 1992, reportedly occurring in the Colón area and provinces of Olancho and Gracias a Dios that are in the Mosquitia region of Honduras (Wiedenfeld 1994, pp. 101–102). An estimate of scarlet macaws in the Rus Rus area of the Honduran Mosquitia (Rus Rus is in the province of Gracias a Dios) was 1,000 to 1,500 birds (McReynolds 2011, *in litt.*, unpaginated). However, this estimate was based on the assumption that all the chicks reported as poached by Portillo Reyes et al. (2004, in McReynolds 2011, *in litt.*, unpaginated) would fledge and assumed a 20 percent reproductive success rate. There are no population estimates for the Río Patuca and Río Plátano areas, though there have been flocks as large as eight counted on the Río Plátano (Gallardo 2002, in McReynolds 2011, *in litt.*, unpaginated). The most recent information indicates that loss of habitat and demand for the pet trade pose a substantial threat for

the species in this region (Portillo Reyes 2005, in Portillo Reyes et al. 2010, p. 6; Brightsmith *in litt.* 2016, p. 8).

Nicaragua (*A. m. cyanoptera*)

Scarlet macaws in eastern Nicaragua along the Caribbean slope were estimated to be 1,500 to 2,500 birds in 1995 (Wiedenfeld 1995, in Snyder et al. 2000, p. 150). However, the species was not detected during either of two national surveys of parrots conducted in 1999 and 2004 (Lezama et al. 2004, p. 102; McReynolds 2011, *in litt.*, unpaginated). Some estimates predict up to 700 birds in this region of Nicaragua; groups of 30 to 40 scarlet macaws are frequently reported in the Río Coco area (Lezama 2011, pers. comm., in McReynolds 2011, *in litt.*, unpaginated), which forms the border with Honduras. Others consider the number in eastern Nicaragua to be fewer than 100 birds (Feria and de los Monteros 2007, in McReynolds 2011, *in litt.*, unpaginated). The only scarlet macaws on the Pacific slope of Nicaragua are confined to Cosigüina Volcán Nature Preserve, with approximately 20 to 50 birds (Bjork 2008, p. 15; Lezama 2011, pers. comm., in McReynolds 2011, *in litt.*, unpaginated).

Costa Rica (*A. m. cyanoptera* and *A. m. macao*)

Scarlet macaws (*A. m. cyanoptera*) occur in southeastern Nicaragua and northeastern Costa Rica on both sides of the border. This region consists of the El Castillo-San Juan-La Selva Biological Corridor that is located on both sides of the Río San Juan (San Juan River) (Monge et al. 2012, p. 6), which separates Nicaragua and Costa Rica. In 2004, several groups of scarlet macaws were reported in the Río San Carlos area close to the border with Nicaragua, in what is now designated as Maquenque National Wildlife Refuge (Refugio Nacional de Vida Silvestre mixto Maquenque), which also abuts the Indio Maíz Biological Reserve in Nicaragua (Chassot and Monge-Arias 2004, pp. 12–13; Chassot 2011, pers. comm.). Multiple scarlet macaws were observed flying from Nicaragua over the Río San Juan into Costa Rica (Chassot and Monge-Arias 2004, pp. 12–13).

Evidence of scarlet macaws in northeast Costa Rica obtained during several years of research on great green macaws (*Ara ambiguus*) indicates that scarlet macaws in this region are increasing (Chassot and Monge-Arias 2004, pp. 12–13; Brightsmith 2012, *in litt.*, unpaginated). During the 2009 scarlet macaw breeding season, an intensive search for scarlet macaw nests

was conducted on both sides of the Río San Juan as part of a larger study to quantify and characterize nests of both scarlet and great green macaws (Monge et al. 2012, entire). They found six scarlet macaw nests (five in Costa Rica, one in Nicaragua). The scarlet macaw has recently expanded its range southward to La Selva Biological Station, which is approximately 35–40 km (15–18 miles) south of the Río San Juan, and sightings of scarlet macaws have increased in the region (Brightsmith 2016, *in litt.*, p. 5; Sullivan et al. 2009, unpaginated). Scarlet macaws were absent from this station since it was established in the 1960s, but they have been observed breeding on adjacent land since the mid-2000s (Brightsmith 2012, *in litt.*, unpaginated). Approximately 50 scarlet macaws occur in Maquenque National Wildlife Refuge in northeast Costa Rica (Penard et al. 2008, in McReynolds 2011 *in litt.*, unpaginated). There are no density estimates of scarlet macaws from this area, but based on the density reported for great green macaws (0.07 birds per km²) in an area of 3,000 km² (1,158 mi²), there could be more than 200 scarlet macaws in northeastern Costa Rica (Brightsmith *in litt.* 2016, p. 6; Brightsmith 2012, *in litt.*, unpaginated).

Scarlet macaws were described as having previously occurred in tropical wet and dry forests throughout most of Costa Rica (Vaughan et al. 1991, abstract), while Ridgely (1981, p. 252) describes the species as having always occurred primarily on the Pacific slope of the country. Aside from the birds in northeastern Costa Rica, the scarlet macaw (*A. m. macao*) occurs in two viable populations on the Pacific slope: In the ACOPAC in the region of Carara National Park, which contains approximately 450 birds (Arias et al. 2008, in McReynolds 2011, *in litt.*); and in Costa Rica's Osa Conservation Area (ACOSA) in the region of Corcovado National Park and the Osa Peninsula, which contains between 800 and 1,200, but possibly up to 2,000 birds (Dear et al. 2005 and Guzman 2008, in McReynolds 2011, *in litt.*). However, based on plausible regional estimates, the population for the entire country is approximately 1,800 birds (McReynolds 2011, *in litt.*, unpaginated).

By all indications, the scarlet macaw (*A. m. macao*) has been expanding from the traditional stronghold in and around Carara National Park (Brightsmith 2016, *in litt.*, p. 11). Since 2013, scarlet macaws in groups of up to 30, along with pairs during the height of the breeding season, were observed hundreds of times down the coast and approximately 70 km (43 mi) south of

the point where the census is usually conducted. In addition, scarlet macaws from the areas immediately to the northwest of Carara have been reported. Scarlet macaws may frequently pass through these areas but may not be present continuously or at high densities (Brightsmith 2016, *in litt.*, p. 12). The nearest areas with repeated sightings of the species are Ensenada Lodge at 60 km (37 mi) north of the census location for Carara; 40 km (25 mi) from the small population of 14–25 birds in Palo Verde (Brightsmith 2016, *in litt.*, p. 12; Dear *et al.* 2010, p. 8); and 60 km (37 mi) from the core of the ACOPAC population. This site has 16 sightings, with 13 since 2012, and group sizes have been small (1 to 4). But it is unclear what the source of these birds may be; they could be escaped or released birds, or could be natural dispersers from either the Palo Verde or ACOPAC populations (Brightsmith 2016, *in litt.*, p. 14). Because there have been scattered sightings of scarlet macaws from Palo Verde National Park south to Carara National Park and throughout western Guanacaste, the birds near Palo Verde are no longer considered completely isolated (Brightsmith 2016, *in litt.*, p. 14). However, evidence to support successful expansion and establishment to the north is weak (Brightsmith 2016, *in litt.*, p. 13).

The ACOSA population is simultaneously expanding up the coast from the south, so sightings of scarlet macaws between the ACOPAC and ACOSA may represent individuals from either of the populations. In fact, birds were reported to occur in a 50-km (31-mi) area, which is the midpoint between the two populations (Brightsmith 2016, *in litt.*, p. 11). Moreover, 85 percent of residents interviewed in 2005 believed scarlet macaws were more abundant than 5 years prior, suggesting this population may be increasing (Dear *et al.* 2010, p. 10). However, it is difficult to distinguish between expansion of the ACOPAC population to the south and the expansion of the ACOSA population to the north (Brightsmith 2016, *in litt.*, p. 11).

Panama (*A. m. macao*)

The scarlet macaw was once described as almost extinct on the mainland of Panama, but abundant and occurring in substantial numbers on Isla Coiba, which once was a penal colony where settlement and most hunting was prohibited (Ridgely 1981, p. 253). More recent information on distribution and abundance in the country indicates that mainland Panama has very few scarlet macaws (McReynolds 2011, *in litt.*,

unpaginated). In 1998, there were sporadic sightings of scarlet macaws in the western border region of Panama and Costa Rica, in the area of the upper Río Corotu (or Río Bartolo Arriba) near Puerto Armuelles in the Chiriquí province (Burica Press 2007, unpaginated; McReynolds 2011, *in litt.*, unpaginated). A few (fewer than 10) scarlet macaws were observed in 2015, in northwestern Panama, near Querevalo and also in the Chiriquí province (Brightsmith *in litt.* 2016, p. 17; Sullivan *et al.* 2009, unpaginated), but it is uncertain if these birds were wild or escaped captive-raised birds dispersing south from a reintroduction program at Tiskita, Costa Rica (Brightsmith 2016, *in litt.*, p. 17) (see “Reintroduction of Scarlet Macaws,” below). Additionally, there is a small, but unknown, number on the southern end of the Azuero Peninsula of Veraguas, near Cerro Hoya National Park, Tonosi Forest Reserve, and farther to the east (Brightsmith 2016, *in litt.*, p. 17; Sullivan *et al.* 2009, unpaginated; Rodriguez and Hinojosa 2010, in McReynolds 2011, *in litt.*, unpaginated). The current population of scarlet macaws in Panama is likely less than 200, with the vast majority of the population occurring on Isla Coiba (Keller and Schmitt 2008, in Brightsmith 2012, *in litt.* and McReynolds 2011, *in litt.*, unpaginated).

South America (*A. m. macao*)

Within South America, the scarlet macaw occurs primarily in the Amazon Biome, which overlaps eastern Colombia, Venezuela, Guyana, Suriname, French Guiana, northeast Ecuador, eastern Peru, northern Bolivia, and most of Brazil (collectively referred to as the Amazon in this document) (BLI 2011a, unpaginated; Iñigo-Elias 2010, unpaginated; Juniper and Parr 1998, p. 425; Collar 1997, p. 421; Forshaw 1989, pp. 406–407). The Amazon comprises approximately 83 percent of the species’ entire range (BLI 2011c, unpaginated). The scarlet macaw is also reported to occur in relatively small areas outside the Amazon, including west of the Andes in northwest Colombia (Hilty and Brown 1986, p. 200) and in parts of several northern Venezuelan states (Hilty 2003, p. 327).

We are aware of little recent information on local (country, region) populations within South America. The only local population estimate we are aware of includes the Tambopata Province of Peru (Lloyd 2004, p. 270). Using density estimates calculated from field counts in different forest types, and area of forest cover presented in Kratter (1995, in Lloyd 2004, p. 269), the

Tambopata population was calculated to number from 4,734–24,332 individuals. The population of scarlet macaws in Peru is adjacent to large populations in adjacent Ecuador, Brazil, Bolivia, and Colombia (Brightsmith 2009, *in litt.*, unpaginated). Therefore, the total individuals could represent scarlet macaws from more than just Peru.

The remaining information on the species’ populations in South America is qualitative. In Colombia, the species is believed to occur west of the Andes in the Magdalena Valley and in gallery forest and partially cleared rainforest where large trees have been left (Hilty and Brown 1986, p. 200; Forshaw 1989, p. 407); their presence may be the result of seasonal movements for food resources (Juniper and Parr 1998, p. 425). The species is also common east of the Andes and in the Orinoco and Amazon Basins in Colombia, but there are no current population estimates (Hilty and Brown 1986, p. 200; Iñigo-Elias 2010, unpaginated). In Venezuela, the species is becoming rare with patchy distribution in the states of Bolívar, Monagas, Apure, and Amazonas (Iñigo-Elias 2010, unpaginated; Meyer de Schauensee and Phelps, Jr. 1978, p. 99; Juniper and Parr 1998, p. 425); there are no current population estimates. The species has been described as occurring widely throughout the Amazon basin of Brazil, eastern Ecuador, and eastern Peru (Juniper and Parr 1998, p. 425). However, more recently it was described as uncommon, locally extirpated in areas, and declining in eastern Peru (Inigo-Elias 2010, unpaginated). Citing several published works from the 1970s and 1980s, scarlet macaws were described as locally extirpated from areas with a history of ornithological study in northeastern Ecuador and northeastern Bolivia (Forshaw 1989, p. 407), although it has also been described as occurring in northern and eastern Bolivia in Santa Cruz (Juniper and Parr 1998, p. 425). Other authors reported that in recent decades scarlet macaws have rapidly declined in the lowland Ecuadorian Amazon in Ecuador (Ridgely and Greenfield 2001, in Karubian *et al.* 2005, p. 618). The scarlet macaw occurs widely in the Guianas, which includes Guyana, Suriname, and French Guiana (Juniper and Parr 1998, p. 425), although the species may be uncommon in the vicinity of settlements (Forshaw 1989, p. 407). In Suriname, scarlet macaws are common in the interior rainforest but seldom seen in the coastal area and are rare in the eastern part of the country (Spaans *et al.* 2018, unpaginated). Other sources indicate

that the species is found along tropical riparian evergreen forests in western and central Suriname (Haverschmidt and Mees 1994, in Inigo-Elias 2010, unpaginated). In Brazil, the species is widely distributed throughout the Amazon, but there are no current population estimates (Inigo-Elias 2010, unpaginated; Juniper and Parr 1998, p. 425).

Overall, the scarlet macaw is generally considered common and widespread over much of its range in the Amazon (Hilty 2003, p. 327; Angehr *et al.* 2001, p. 161; Juniper and Parr 1998, p. 425; Collar 1997, p. 421; Forshaw 1989, p. 406; Hilty and Brown 1986, p. 200; Ridgely 1981, p. 251). Using the estimate of 20,000–50,000 birds for the total population, and the estimate of 5,000 birds in Mesoamerica, the South American population of the scarlet macaw can be very roughly estimated to be 15,000–45,000 birds.

Essential Needs of the Species

Habitat

The scarlet macaw inhabits various habitat types throughout its range, including tropical humid evergreen forest, deciduous and humid forest, intact and partially cleared lowland rain forest, mixed pine and broad-leaved woodlands, open areas and edges with scattered stands of tall trees, gallery forest, mangroves, and savannas, with many of the areas that scarlet macaw inhabit near rivers (Juniper and Parr 1998, p. 425; Wiedenfeld 1994, p. 101; Forshaw 1989, p. 407; Meyer de Schauensee and Phelps, Jr. 1978, p. 99). The species generally occurs from sea level to about 500 meters (m) (1,640 feet (ft)) elevation, but has been reported ranging up to 1,500 m (4,921 ft) in Central America (Juniper and Parr 1998, p. 425; Vaughan 1983, in Vaughan *et al.* 2006, p. 919).

The scarlet macaw is considered somewhat tolerant of degraded or fragmented habitat (BLI 2011c, unpaginated; Forshaw 1989, p. 406; Brightsmith *in litt.* 2016, pp. 4–7). If not hunted or captured for the pet trade, they can survive in human-modified landscapes provided sufficient large trees remain for nesting and feeding requirements (BLI 2011c, unpaginated; Forshaw 1989, p. 406; Ridgely 1981, p. 251). Landscapes may include a combination of agricultural land, pastureland, timber harvesting areas, and remnant forest patches (Vaughn *et al.* 2006, p. 920; Vaughan *et al.* 2005, p. 120; Vaughan *et al.* 2003, p. 7); partially cleared forest where large trees have been left standing (Forshaw 89, p. 407); pastureland with scattered woodlots or

remnant patches of rainforest (Vaughn *et al.* 2009, p. 396; Forshaw 89, p. 407); and areas of human settlement (towns) (Guittar *et al.* 2009, p. 390). However, the species occurs at lower densities in disturbed or secondary (recovering) forest habitat than in primary (undisturbed) forest (Cowen 2009, pp. 11–15; Karubian *et al.* 2005, pp. 622–623; Lloyd 2004, p. 269, 272).

Diet and Foraging

Scarlet macaws, like most parrots, feed primarily in the canopy (Vaughan *et al.* 2006, p. 920; Renton 2006, p. 282; Lee 2010, p. 20) and display a wide dietary breadth. They have been reported to consume up to 52 plant species in the Amazon of Peru (Gilardi 1996, in Matuzak *et al.* 2008, p. 361) and up to 43 different plant species in Costa Rica (Vaughan *et al.* 2006, p. 920; Matuzak *et al.* 2008, p. 355). Fruits and seeds comprise the majority of a scarlet macaw's diet, but they also consume, to a lesser degree, fruit pulp, flowers, leaves, bark, lichen, and bromeliads (Lee 2010, pp. 153–160; Matuzak *et al.* 2008, p. 355; Renton 2006, p. 281; Vaughan *et al.* 2006, pp. 920, 924; Marineros and Vaughan 1995, pp. 451–452; Nycander *et al.* 1995, p. 424).

Plant species consumed by scarlet macaws are both seasonal and available year round (Abramson *et al.* 1995, p. 24). Changes in local abundance patterns of parrots can be triggered by seasonal availability of food resources within habitat mosaics (Renton 2002, p. 17; Haugaasen and Peres 2007, p. 4179). Fluctuations in food abundance are likely to result in seasonal movements of scarlet macaws to areas with greater food availability (Karubian *et al.* 2005, p. 624; Haugaasen and Peres 2007, pp. 4179–4180; Renton 2002, pp. 17–18; Juniper and Parr 1998, p. 425). Additionally, in some areas of the scarlet macaw's range, they regularly visit claylicks (naturally forming wall of clay on a riverbank) where they consume soil or minerals; it is unclear whether this provides a nutritional or other benefit to the species such as counteracting toxins in food sources (Brightsmith *et al.* 2010, entire; Brightsmith 2004, pp. 136–137; Lee 2010, p. 141).

Nesting and Reproduction

Reproductive biology of large parrots, including the scarlet macaw, is generally characterized by low rates of reproduction, small clutch sizes, low survival of nestlings and fledglings, late age to first reproduction, a large proportion of nonbreeding adults in any given year, and restrictive nesting requirements (Wright *et al.* 2001, p. 711;

Collar 1997, pp. 296, 298; Munn 1992, pp. 53–56).

Scarlet macaws are secondary cavity-nesting birds, meaning they do not create their own cavities but rely upon natural or abandoned cavities for nesting; their breeding success is dependent upon the availability and quality of nesting sites. They nest in both live and dead trees and in a variety of tree species, including, but not limited to, *Ceiba pentandra* (kapok tree), *Schizolobium parahybum* (Brazilian firetree), *Vatairea lundellii* (bitter angelim), *Caryocar costaricense* (no common name), *Acacia glomerosa* (white tamarind), *Dipteryx micrantha* (Brazilian teak), *Iriartea deltoidea* (stilt palm), and *Erythrina* spp. (coral tree) (Guittar *et al.* 2009, pp. 389–399; Renton and Brightsmith 2009, pp. 3–4; Brightsmith 2005, p. 297; Vaughan *et al.* 2003, p. 8; Inigo-Elias 1996, p. 57; Marineros and Vaughan 1995, p. 456; Nycander *et al.* 1995, p. 431). Due to their large size, scarlet macaws require large cavities, which are usually found in older trees. The average height of scarlet macaw nests ranges from about 16 to 24 m (52.5 to 79 ft) above the ground (Guittar *et al.* 2009, pp. 389–391; Anleu *et al.* 2005, p. 44; Inigo-Elias 1996, p. 59; Marineros and Vaughn 1995, p. 455). In addition to cavity size and height parameters, scarlet macaws appear to select nest sites with a clear understory or isolated from surrounding vegetation, possibly to reduce predation rates (Inigo-Elias 1996, p. 93; Brightsmith 2005, p. 302). The species will also nest in previously used cavities (Renton and Brightsmith 2009, pp. 4–5; Nycander *et al.* 1995, p. 428), and will readily investigate and nest in artificial (human-made) cavities when supplied (Brightsmith 2005, p. 297; Vaughan *et al.* 2003, p. 10; Nycander *et al.* 1995, pp. 435–436).

Scarlet macaws are frequently observed competing for nest cavities with other macaws, including other species and other scarlet macaw pairs (Renton and Brightsmith 2009, p. 5; Vaughan *et al.* 2003, p. 10; Inigo-Elias 1996, pp. 79, 96; Nycander 1995, p. 428). Thus, intense competition for nest cavities suggests suitable nesting sites may be limited in some areas (Vaughan *et al.* 2003, pp. 10–12; Inigo-Elias 1996, p. 92; Nycander *et al.* 1995, p. 428; Munn 1992, pp. 55–56).

Conservation Status

The scarlet macaw has been included in Appendix I of CITES since 1985 (United Nations Environment Programme–World Conservation Monitoring Center (UNEP–WCMC) 2012, unpaginated). The species is

currently classified as “Least Concern” by the IUCN. In 2011, BLI proposed reclassifying the scarlet macaw in the IUCN Red List of Threatened Species from “Least Concern” to “Threatened,” based on the area of Amazon habitat projected to be lost to deforestation by 2050 (BLI 2011b, unpaginated; BLI 2011e, unpaginated). However, based on review and recommendations from regional experts, a current revision of the proposal recommends the species remain classified as “Least Concern” due to its level of tolerance of degraded and fragmented habitat (BLI 2011c, unpaginated) and the relatively good status of the species in the Amazon, which accounts for the majority of the species range and population.

In Mesoamerica, the northern subspecies of scarlet macaw (*A. m. cyanoptera*) is considered in danger of extinction in Mexico (Government of Mexico 2010a, p. 32), Belize (Biodiversity and Environmental Resource Data System of Belize 2012, unpaginated; Meerman 2005, p. 30), Costa Rica (Costa Rica Sistema Nacional de Areas de Conservacion 2012, unpaginated), and Panama (Fundación de Parques Nacionales y Medio Ambiente 2007, p. 125). This subspecies is also on Guatemala’s *Listado de Especies de Fauna Silvestre Amenazadas de Extinción (Lista Roja de Fauna)* (list of species threatened with extinction (red list of fauna)) (Government of Guatemala 2001, p. 15), Honduras’s *Listado Oficial de Especies de Animales Silvestres de Preocupación Especial en Honduras* (Official List of Species of Wild Animals of Special Concern in Honduras) (Secretaria de Recursos Naturales y Ambiente. 2008, p. 62), and Nicaragua’s list of species for which the season of use (e.g., for harvest or capture) is indefinitely closed (Nicaragua Ministerio del Ambiente y Los Recursos Naturales 2010, entire).

In South America, the subspecies *A. m. macao* is listed as vulnerable in Peru (Government of Peru 2004, p. 276855), but a more recent evaluation of the species categorizes it at the lower threat level of “near threatened” (Brightsmith 2009, *in litt.*, unpaginated). The species is also categorized as “near threatened” in Ecuador (Ridgely and Greenfield 2001, in Karubian *et al.* 2005, p. 618) and as “near threatened” on Venezuela’s red list (Rodriguez and Rojas-Suarez 2008, p. 50). We are unaware of the scarlet macaw having official conservation status in any other of the species’ range countries (e.g., Colombia, the Guianas, Brazil, and Bolivia).

Factors Affecting the Species

Section 4 of the Act (16 U.S.C. 1533), and its implementing regulations in title 50 of the Code of Federal Regulations at 50 CFR part 424, set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, we may list a species based on (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.

In considering what factors may constitute threats, we must look beyond the mere exposure of the species to the factor to determine whether the species responds to the factor in a way that causes actual impacts to the species. If there is exposure to the factor, but no response, or only a positive response, that factor is not a threat. If there is exposure and the species responds negatively, the factor may be a threat and we then attempt to determine if it may drive or contribute to the risk of extinction of the species such that the species warrants listing as an endangered or threatened species as those terms are defined by the Act. In 2016, we revised our proposal to list the northern subspecies of the scarlet macaw (*Ara macao cyanoptera*) as an endangered species under the Act, the northern DPS of the southern subspecies *Ara macao macao* as a threatened species under the Act, and the southern DPS of the southern subspecies *Ara macao macao* as threatened due to similarity of appearance under the Act (81 FR 20302, April 7, 2016). Please see our analysis of those entities and the factors affecting their status below.

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

One of the two main threats to neotropical parrot species is loss of forest habitat (Snyder *et al.* 2000, p. 98). Deforestation, which includes clear-cutting forests to convert them to other land uses such as agriculture and cattle ranching, as well as forest degradation, which is the reduction in forest biomass such as through selective logging or fire, occurs throughout much of the scarlet macaw’s range. The primary cause of forest loss is conversion to agriculture (crop and pasture), although other land uses such as infrastructure, logging, fires, oil and gas extraction, and mining

also contribute significantly and to varying degrees in different areas of the species’ range (Blaser *et al.* 2011, pp. 263, 290, 299, 310, 319, 334, 343–344, 354, 363–364, 375, 393–394; Boucher *et al.* 2011, entire; Clark and Aide 2011, entire; FAO 2011a, pp. 17–18; May *et al.* 2011, pp. 7–13; Pacheco 2011, entire; Government of Costa Rica 2010, pp. 38–39; Belize Ministry of Natural Resources and Environment 2010, pp. 40–45; Armenteras and Morales 2009, pp. 133–145, 176–191; Kaimowitz 2008, p. 487; Mosandl *et al.* 2008, pp. 38–40; Nepstad *et al.* 2008, entire; Foley *et al.* 2007, pp. 26–27; Fearnside 2005, pp. 681–683).

The construction of roads are an important driver of deforestation because they provide access to previously remote areas and allow further expansion of activities that result in additional areas of deforestation and degradation (Davidson *et al.* 2012, p. 323; Lambin and Meyfroidt 2011, pp. 3468–3469; May *et al.* 2011, pp. 6, 9–11; Foley 2007, pp. 26–27; Soares-Filho *et al.* 2006, p. 520; Fearnside 2005, pp. 681–683; Laurance *et al.* 2004, entire). Historically, large areas of forest have been removed throughout Mesoamerica, and the large tracts of forest that remain, such as the Maya and Lacandon Forests, the transnational forest in the Mosquitia region, and the major transnational forest on the Atlantic border of Costa Rica and Panama, have almost been cut off from each other by deforestation (Bray 2010, p. 93).

Activities that lead to deforestation and forest degradation pose a threat to the scarlet macaw because they directly eliminate the species’ tropical forest habitat by removing the trees that support the species’ essential needs for nesting, roosting, and food (see *Essential Needs of the Species*, above). Removing large sections of forest habitat may fragment the landscape and reduce and isolate populations. As the size of the habitat is reduced, it is less likely to provide the essential resources for species that require large ranges—such as scarlet macaws—and small patches of habitat retain far fewer species and populations than large patches (Ibarra-Macias 2009, p. 6; Lees and Peres 2006, pp. 203–205). Scarlet macaws use partially cleared and cultivated landscapes if the landscape provides dietary requirements and maintains enough large trees. This species is dependent on larger, older trees that have large nesting cavities. However, scarlet macaws have a better chance of surviving in large tracts of forest where suitable cavities are more common than in open and small forest remnants (Inigo-Elias 1996, p. 91). Selective

logging can lead to forest degradation because this practice generally targets older and larger trees, thus decreasing suitable nesting sites, increasing competition, and causing the loss of current generations through an increase in infanticide and egg destruction (Lee 2010, pp. 2, 12). Indirectly, clearing or degrading forests often provides people with easier access to previously inaccessible areas inhabited by scarlet macaws, which in turn increases the vulnerability of species to overexploitation by humans (Peres 2001, entire; Putz *et al.* 2000, pp. 16, 23) (see *Factor B* discussion, below). Additionally, gaining access is also often followed by full deforestation and lands cleared for agricultural use (Kaimowitz and Angelsen 1998, in Putz *et al.* 2000, p. 16).

Below, we provide a summary of information on deforestation and forest degradation within the range countries of the *A. m. cyanoptera* and northern DPS of *A. m. macao*.

Mesoamerica

Destruction of forest habitat is one of the main causes of the decline of the scarlet macaw in Mesoamerica (CONABIO 2011, p. 5; Lezama 2011, pers. comm.; McGinley *et al.* 2009, p. 11; Garcia *et al.* 2008, p. 50; Hansen and Florez 2008, pp. 48–50; Snyder *et al.* 2000, p. 150; Collar 1997, p. 421; Forshaw 1989, p. 406; Ridgely 1981, pp. 251–253). Habitat destruction is occurring rapidly in many areas within the range of the scarlet macaw in this region, including in Chiapas, Mexico; western Petén in Guatemala; eastern Olancho in Honduras; and eastern Nicaragua (Kaimowitz 2008, p. 487; Hansen *et al.* 2013, entire). This region has deforestation rates that are among the highest rates in the world (Bray 2010, pp. 92–95; Kaimowitz 2008, p. 487; Carr *et al.* 2006, pp. 10–11; FAO 2015, pp. 9–14); the remaining forest is fragmented and includes few large tracts of forest habitat (Bray 2010, pp. 92–93; Snyder *et al.* 2000, p. 150; Wiedenfeld 1994, p. 101). Although deforestation rates have declined in Mesoamerica since 1990, they are still very high (FAO 2010a, pp. 232–233; Kaimowitz 2008, p. 487; FAO 2015, pp. 9–14) and include the loss of significant amounts of primary forest (FAO 2010a, pp. 55, 259). Mexico (*A. m. cyanoptera*)

The main drivers of deforestation and forest degradation in Mexico are conversion of forest to pasture and agriculture, and uncontrolled logging (Government of Mexico 2010b, pp. 22–24; Jimenez-Ferrer *et al.* 2008, pp. 195–196; Castillo-Santiago *et al.* 2007, p.

1217; Oglethorpe *et al.* 2007, p. 85). From 1990 to 2015, Mexico lost approximately 3.7 million hectares (ha) (9.2 million acres (ac)) of total forest (FAO 2015, p. 12) (see Tables 2a and 2b, below), and had one of the largest decreases in primary forests worldwide (FAO 2010a, pp. 56, 233), although the rate slowed toward the latter part of that period (FAO 2015, p. 12).

In southeastern Mexico, the area of land devoted to cattle ranching has increased dramatically due to the increase of regional meat prices and a decrease in the economy of staple crop cultivation (Jimenez-Ferrer *et al.* 2008, pp. 195–196; Soberanes 2018, unpaginated). Most of Mexico's remaining scarlet macaws occur in the Lacandon Forest of the southeastern state of Chiapas. This state encourages cattle ranching through subsidies, and clearing of forest for pasture in the state is ongoing (Enriquez *et al.* 2009, pp. 48–49, 58). In fact, Chiapas had the second highest rate of deforestation of Mexico's 31 states, with forest losses averaging approximately 600 km² (232 mi²) per year (Masek *et al.* 2011, p. 10). Within the Lacandon Forest, cattle ranching is the most profitable activity, and it is extensive in the region (Jimenez-Ferrer *et al.* 2008, pp. 195–196). Outside of protected areas in the Lacandon Forest, the deforestation risk is primarily categorized as high to very high; inside protected areas the risk of deforestation is categorized as low to very low (Secretaría de Medio Ambiente y Recursos Naturales de México—SEMARNAT 2011, unpaginated). Monte Azules Biosphere Reserve is the largest protected area in the Lacandon Forest, and it has been relatively successful at conserving the resources within its boundaries (Castillo-Santiago *et al.* 2007, pp. 1223–1224; Figueroa and Sanchez-Cordero 2008, p. 3231). However, according to Mexico's Federal Environmental Protection Agency (*Procuraduría Federal de Protección al Ambiente* (Profepa)) more than 60 percent of illegal logging in the country occurs in 32 priority forest regions, including the reserve (Enriquez *et al.* 2009, pp. 28, 57). While illegal logging has received more attention from Mexico's policy makers, efforts to address the problem have had limited success due to insufficient human and financial resources to enforce laws, and poorly designed control efforts (Blaser *et al.* 2010, p. 346; Enriquez *et al.* 2009, p. 57; Kaimowitz 2008, p. 491) (see *Factor D* discussion, below). From 2001 to 2007, Profepa secured about 0.13 percent of the calculated total of timber illegally extracted in the country

(CCMSS 2007, in Enriquez *et al.* 2009, p. 57).

We are unaware of information on projected future rates of deforestation specifically in the Lacandon Forest region, but a loss of approximately 20,000 km² (7,722 mi²) between 2000 and 2015 in the southeastern States (which include Chiapas) was projected, assuming the same rate of loss that occurred during the period 1987–2000 (Diaz-Gallegos *et al.* 2010, p. 194). By 2030, forest area in Mexico as a whole is projected to decrease, with anywhere from about 10 to 60 percent of mature forests lost, and up to 54 percent of regrowth forests lost (Commission for Environmental Cooperation 2010, pp. 45, 75).

Mexico implements several forest conservation measures and has made significant progress in conserving forest within its boundaries (Blaser *et al.* 2011, pp. 344–346; Center for International Forestry Research (CIFOR) 2010, pp. 34–36; Masek *et al.* 2011, p. 17; FAO 2010a, p. 233; Enriquez *et al.* 2009, pp. 4, 36–41). However, deforestation and forest degradation continue to be a threat to the subspecies in Mexico because the clearing of forest for agriculture, cattle ranching, and illegal logging is ongoing in Chiapas and projected to continue, and illegal logging is ongoing in the largest reserve in the Lacandon Forest in conjunction with the high risk of deforestation in protected areas outside of the forest.

Guatemala, Belize, Honduras, and Nicaragua (*A. m. cyanoptera*)

The countries of Guatemala, Honduras, and Nicaragua have the highest deforestation rate in Latin America (FAO 2010a, p. 232; FAO 2015, pp. 9–14). Guatemala lost 483 km² (186.5 mi² or 1.2 percent), Honduras lost 1,418 km² (547.5 mi² or 2.3 percent), and Nicaragua lost, 560 km² (216 mi² or 1.5 percent) of total forest, per year between 1990 and 2015 (FAO 2015, pp. 9–14) (see Tables 2a and 2b, below). Belize has a lower deforestation rate of 100 km² (39 mi² or 0.7 percent) per year (FAO 2015, pp. 9), but deforestation is increasing in the Chiquibul region, which is the only region scarlet macaws are known to nest in the country (Belize Ministry of Natural Resources and Environment 2010, pp. 44–45; Salas and Meerman 2008, pp. 22, 42).

The main causes of deforestation and forest degradation within the range of the scarlet macaw in these countries include clearing for agriculture and cattle ranching, illegal human settlements in protected areas, illegal logging, purposefully set fires, and in

some areas, activities related to drug trafficking. Some or all of these activities are ongoing in areas occupied by the species, including in the MBR in Guatemala; Río Plátano Biosphere in Honduras; Bosawas Biosphere Reserve in Nicaragua; and the Chiquibul region in Belize.

Guatemala (*A. m. cyanoptera*)

Guatemala has lost approximately 1.2 million ha (3 million ac) of forest area over the past 25 years (FAO 2015, p. 11). Approximately 38 percent of Guatemala's remaining forest area is primary forest (FAO 2015, p. 36). Deforestation is the dominant trend nationally, but rates of loss appear to be much higher in tropical over temperate areas. The most significant threat to the conservation of biodiversity and tropical forests is habitat loss, degradation, and fragmentation from wildfires, agriculture and cattle ranching, mineral and petroleum development, and drug trafficking (Tolisano and Lopez-Selva 2010, p. 3). Deforestation in the conifer forests of the highlands has existed for centuries, but today it mostly takes place in the Petén (Blaser *et al.* 2011, p. 310) where a population of *A. m. cyanoptera* occurs. Approximately 65 percent of the deforestation in Guatemala occurs in the Petén region, with most (approximately 60 percent) occurring outside protected areas (IARNA 2006, in Tolisano and Lopez-Selva 2010, p. 22). Additionally, the Petén of Guatemala is one of the few areas in the entire region that is still undergoing intensive tropical colonization resulting in forest loss from agriculture and represents the most intense deforestation threats to the Maya Forest (Bray 2010, pp. 100–102). Colonization pressure in the MBR is strong in the western and central regions; the human population increased 20-fold since 1960 and was predicted to double from 2008 to 2018 in the Petén (Bray *et al.* 2008, unpaginated).

Habitat destruction is particularly severe in two protected areas, Laguna del Tigre National Park and Sierra del Lacandón National Park; both of these areas were former strongholds of scarlet macaws (García *et al.* 2008, p. 50). Furthermore, some parks that compose the MBR lost approximately 10 percent of forest cover between 1986 and 2004, with forest loss thought to be accelerating (Bray 2010, p. 100). Between 1974 and 1997, the MBR lost 65 percent of its buffer zone, and areas near roads showed increasing deforestation pressures in 1995–1997 (Hayes *et al.* 2002, p. 305; Bray *et al.* 2008, unpaginated).

Considerable efforts have been made since the start of the 21st century to reorganize the control and management of forest resources in Guatemala (Blaser *et al.* 2011, p. 317). In the rainforests of the Petén, large community-run timber concessions allow local people to improve their livelihoods on the basis of forest resources. However, forest management is hindered by high rates of deforestation and forest degradation driven by agricultural expansion, mining, illegal logging, drug-trafficking, and other threats (Blaser *et al.* 2011, p. 317; Reynolds 2008, pp. 6–7).

Belize (*A. m. cyanoptera*)

Belize has a lower deforestation rate (100 km² (39 mi², or 0.7 percent)) per year than the other countries in Mesoamerica (FAO 2015, p. 9), but deforestation is increasing in the Chiquibul region, which is the only region scarlet macaws are known to nest in the country (Belize Ministry of Natural Resources and Environment 2010, pp. 44–45; Salas and Meerman 2008, pp. 22, 42). Belize lost 250,000 ha (618,000 ac) of total forest area over the past 25 years (FAO 2015, pp. 9, 40).

The Chiquibul National Park (CNP) is Belize's largest protected area, measuring approximately 161,874 ha (400,000 ac). It is located in the Cayo District and within a larger forest region known as the Chiquibul Forest, which abuts the Belize-Guatemala border and is contiguous to the Chiquibul-Montañas Mayas Biosphere Reserve that is located in the Department of Petén, Guatemala (Salas and Meerman 2008, p. 10). This region also includes the Chiquibul Forest Reserve and the Caracol Archaeological Reserve. The most significant pressure on the CNP, the Chiquibul Forest, and biodiversity within this region includes deforestation from urban encroachment, agriculture expansion, wildfires, legal and illegal logging, illegal hunting, mining and oil exploration, and dam construction (Salas and Meerman 2008, pp. 45–46; Belize Ministry of Natural Resources and Environment 2010, p. 42).

The border areas of Belize, including the Chiquibul Maya Mountain that contains the CNP, Chiquibul Forest Reserve, and Caracol Archaeological Reserve, are vulnerable because insufficient enforcement resources are available, particularly for Guatemalans who are impacting forested areas on the Belize side of the border. Satellite imagery showed 113 ha (280 ac) in the CNP had been cleared as of 1987 by Guatemalans for agricultural use, this increased six-fold to 692 ha (1,710 ac) by 1994, and to approximately 3,126 ha

(7,725 ac) by 2007 (FCD 2007, in Belize Ministry of Natural Resources and Environment 2010, p. 45). Additionally, more than 405 ha (1,000 ac) of freshly cultivated area was reported in the CNP and incursions into Belize by Guatemalan armed forces have also been observed (FCD 2007, in Belize Ministry of Natural Resources and Environment 2010, p. 45). Unlike legal extraction, which can be regulated, illegal extraction and particularly illegal extraction by non-Belizean nationals continues to escalate, which poses a greater threat to forests than legal extraction (Belize Ministry of Natural Resources and Environment 2010, pp. 42–45). Transboundary incursions, while temporary, can have a severe impact on the forest because of the increase in demand for land for housing and farms, as well as the introduction or reinforcement of unsustainable agricultural practices (Belize Ministry of Natural Resources and Environment 2010, p. 42).

Honduras (*A. m. cyanoptera*)

Honduras lost approximately 3.5 million ha (8.7 million ac) of forest area over the past 25 years (FAO 2015, p. 11) and had the highest rate of deforestation in the Americas (see Tables 2a and 2b, below). The Honduran forest landscape is characterized by relative stability in temperate areas with localized areas of variability in forest cover but with continuing deforestation in tropical areas (Bray 2010, p. 104), especially in the eastern tropical broadleaved forest (Blaser *et al.* 2011, p. 334; Humphries *et al.* 1998, p. 99; Hansen and Florez 2008, p. 12). The most dramatic losses have been in the forests of the Atlantic Coast, which declined by approximately 73 percent between 1962 and 1990, compared to only 30 percent loss for other broadleaf forests in the same period (Humphries 1998, p. 99).

The high level of deforestation is due to illegal logging, infrastructure (*e.g.*, roads), institutionalized forest sector corruption, production of biofuels, and expanding agricultural frontiers (although some of the latter may be regarded as socially desirable) (Richards *et al.* 2003, p. 282). In the past, deforestation was due to agro-industrial development, mainly for banana plantations. However, more recently demand for land by small-scale farmers is thought to be the major cause (ITTO 2006, in Blaser *et al.* 2011, p. 334); often, such small-scale farmers ultimately sell the deforested land to larger farmers and agro-industrial owners (Blaser *et al.* 2011, p. 334). In addition, the country has a high dependence on wood as an energy

source for poor households; thirty-eight percent of the population uses firewood for domestic purposes, which is considered a very high consumption rate (Government of Honduras 2009, unpaginated).

The Mosquitia region has been characterized by relatively low population density and inaccessibility, and its indigenous inhabitants have maintained the forest cover for centuries. However, the Honduran Mosquitia appears to be under significant deforestation pressure and continues to suffer from colonization, agricultural expansion, and illegal logging, which has led to deforestation and degradation in this region and parts of the Río Plátano Biosphere Reserve (Bray 2010, p. 102; Anderson and Devenish 2009, pp. 256–257; Hayes 2007, pp. 733–734). Recent information indicates that loss of habitat and demand for the pet trade (see *Factor B* discussion, below) are significant threats in this region (Portillo Reyes 2005, in Portillo Reyes *et al.* 2010, p. 6; Brightsmith *in litt.* 2016, p. 8).

Nicaragua (*A. m. cyanoptera*)

In terms of total forest loss, Nicaragua has lost more forest than all other Central American countries except Honduras. Nicaragua has lost approximately 1.4 million ha (3.5 million ac) of forest area over the past 25 years (FAO 2015, pp. 11, 41) (see Tables 2a and 2b, below).

Much of the historic deforestation in Nicaragua was due to the expansion of cattle ranching and cotton farming until both industries declined in the 1980s, resulting in abandonment of much pasture land that left almost 1 million ha (2.5 million ac) in forest fallow (Bray 2010, p. 106). More recently, forest loss and degradation in Nicaragua was due to the expansion of agricultural and grazing land, slash-and-burn agricultural practices that create a mosaic of forest and cultivated patches across an increasing expanse of the landscape (Global Witness 2007, in McGinley 2009, p. 13). Illegal logging and institutionalized forest sector corruption have also led to forest loss and degradation (Richards *et al.* 2003, p. 282). Deforestation and forest degradation has also been attributed to forest fires, pests (*e.g.*, pine bark beetle (*Dendroctonus* sp.)) and hurricanes, though to a much lesser degree than to anthropogenic factors (Rodríguez Quiros 2005, in McGinley 2009, p. 13). Farmers often use fire to clear forest and scrubland in preparation for crops, and though these practices are typically intended to be limited to a specific area, they can spread to adjacent vegetation

and lead to uncontrollable wildfires that result in forest and other biodiversity degradation and loss (McGinley 2009, p. 35).

The Nicaraguan Mosquitia (on the Caribbean slope), which is one area where the scarlet macaw is known to occur in the country, is considered an important area of extensive lowland tropical forest that it is threatened by rapid deforestation due to colonization and the advancement of the agricultural frontier (Kaimowitz 2008, p. 487; McGinley 2009, p. 31; Bray 2010, p. 105). The bulk of Nicaragua's forests on the Caribbean slope are in indigenous territories that hold rights to own their own forests, but most lack formal titles and tenure conflicts are widespread (Kaimowitz 2008, p. 487; McGinley 2009, p. 13). For example, Mosquitia residents contend that public management of protected areas fails to control agricultural expansion and violates indigenous ancestral rights to the land and its resources (Hayes 2007, p. 734). Illegal logging is a threat to forests in the Caribbean region and the Mosquitia (Bray 2010, p. 105). Illegal logging in broadleaf forests was estimated to be 30,000 to 50,000 m³/year (1.1 to 1.8 million ft³/year), or approximately 50 percent of the total production (Richards *et al.* 2003, p. 284). However, with respect to the binational Mosquitia region, the pressures appear to be greater on the Honduran side, although areas outside the core of the Bosawas Biosphere Reserve area are also under pressure (Bray 2010, p. 106). The indigenous occupied core zones of Bosawas are showing virtually no deforestation, with one such area having 97 percent forest cover in 2003 (Hayes 2007, p. 741). In contrast, the Río Plátano Biosphere Reserve on the Honduran side of the Mosquitia is under great deforestation pressures because of failed efforts to centralize management in the government, while protection is much more effective in the Bosawas core area due to the decentralization of management in the hands of the indigenous inhabitants (Bray 2010, p. 106).

Deforestation is ongoing in southeast Nicaragua and resulted in forest cover loss from 2000–2017 (Hansen *et al.* 2013, entire). Southeast Nicaragua includes the Indio Maíz Biological Reserve (IMBR) and its buffer zone. The reserve is situated at the southeastern border of the country (Chassot and Monge-Arias 2012, p. 63) and is one of Nicaragua's best preserved forested areas (Ravnborg *et al.* 2006, p. 2). However, the reserve is threatened by the growing human population in or

around the reserve, a result of the continuous arrival of families from other parts of the country into the region in search of cheap land (Ravnborg 2010, pp. 12–13; Ravnborg *et al.* 2006, pp. 4–5). Between 1998 and 2005, the population increased more than 100 percent in the municipality of El Castillo, which is composed entirely of IMBR buffer zone and core area (Ravnborg 2010, p. 10). The expansion of African palm plantations, pasture lands, human settlements, and logging have contributed to an estimated 60 percent deforestation of the buffer zones surrounding IMBR and these activities are expanding in the reserve (Fundacion del Rio and IUCN 2011, pp. 7–8; Ravnborg 2010, pp. 12–13; Nygren 2004, pp. 193–194; Ravnborg *et al.* 2006, p. 2). Forest conservation efforts in the Nicaragua-Costa Rica border region have resulted in lower deforestation rates within the San Juan-La Selva Biological Corridor, which includes the IMBR along with other protected areas (Chassot *et al.* 2010a, in Chassot and Monge-Arias 2012, p. 67), although both primary and regrowth forest within the corridor and within the larger border region continue to decrease due to timber extraction and agricultural expansion (Fagan *et al.* 2013, unpaginated; Chassot and Monge-Arias 2012, p. 63; Chassot and Monge-Arias 2011, p. 1; Chassot *et al.* 2009, p. 9). Thus, despite the existence of protected areas, deforestation continues to occur and is a serious threat to biodiversity in this region (Fundacion del Rio 2012a, pp. 2–3; Fundacion del Rio 2012b, pp. 2–3; Fundacion del Rio and IUCN 2011, pp. 34, 37, 73–74; Chassot *et al.* 2006, p. 84). According to eBird (Sullivan *et al.* 2009, unpaginated), many sightings of scarlet macaws exist in southeastern Nicaragua and northeastern Costa Rica since the issuance of our proposed rules (77 FR 40222, July 6, 2012; 81 FR 20302, April 7, 2016), indicating that the species has continued to expand its range in this region. However, expansion of scarlet macaws in this region will likely be limited due to high rates of deforestation (Brightsmith 2016, *in litt.*, pp. 4–8).

Costa Rica (*A. m. cyanoptera* and *A. m. macao* Northern DPS)

Costa Rica experienced some of the highest rates of deforestation in the world historically (Bray 2010, p. 107; Government of Costa Rica 2010, p. 68), and as a result, the country's forest cover declined from 67 percent in 1940, to 17–20 percent in 1983 (Bray 2010, p. 107). Much of this deforestation was driven by agriculture and cattle ranching; however, agriculture

expansion was not as prevalent as livestock expansion (Government of Costa Rica 2010, p. 38). Cattle ranching underwent a serious contraction after 1989 (Arroyo-Mora *et al.* 2005, p. 28). In 1993, only 20 percent of original scarlet macaw habitat remained, all within protected areas (Marineros and Vaughan 1995, pp. 445–446). However, during the 1990s, Costa Rica implemented several forest conservation strategies, including new laws protecting forests and mechanisms of payment for ecosystem services (Bray 2010, pp. 107–109; Kaimowitz 2008, pp. 488–491; Pagiola 2008, entire; Sanchez-Azofeifa *et al.* 2003, entire).

Costa Rica is the only country in Mesoamerica to experience a positive change in forest cover from 1990 to 2015 (FAO 2015, p. 10) (see Tables 2a and 2b, below). Total forest cover in 2005 was estimated to be 53 percent (Government of Costa Rica 2010, p. 68), more than double the country's forest cover in the 1980s. Between 1990 and 2015, Costa Rica gained 192,000 ha (474,442 ac) of total forest area, with an annual rate of approximately 7,700 ha (19,000 ac or 0.3 percent) (FAO 2015, p. 10).

Even though Costa Rica has an increase in total forest over the past 25 years (1990–2015), some level of deforestation still occurs in parts of the country due to expansion of agriculture and livestock activities, and to illegal logging in private forests, national parks, and reserves (Government of Costa Rica 2011, p. 2; Government of Costa Rica 2010, pp. 10–11, 38, 52–54; Parks in Peril 2008, unpaginated). Fifty percent of forests in Costa Rica are found in individual rural private properties (Government of Costa Rica 2011, p. 1). The major driver of deforestation on private lands is the conversion of forest to livestock and agricultural uses. In many cases, land users generate a higher annual income with agriculture or livestock-raising than with forests. In protected areas, underfunding and lack of human resources allows the penetration of squatters and illegal loggers. Additionally, land tenure issues contribute to forest loss because indigenous communities have difficulties keeping nonindigenous farmers from encroaching onto their lands (Government of Costa Rica 2011, p. 1).

National Parks on the Caribbean slope are experiencing higher deforestation on surrounding lands than those on the Pacific slopes, which is attributed to the intensification and expansion of agricultural cash crops such as banana and pineapple (Sanchez-Azofeifa *et al.* 2003, p. 129). However, Corcovado

National Park, the largest protected area in ACOSA, is one of the protected areas in Costa Rica most affected by deforestation close to its boundaries (Sanchez-Azofeifa *et al.* 2003, pp. 128–129). A comprehensive study of deforestation in Costa Rica's park system found that deforestation inside protected areas was negligible from 1987 to 1997, and that 1-km (0.62-mi) buffer zones around the protected areas had a net forest gain for the same period. However, a 1 percent annual deforestation rate was found in 10-km (6.2-mi) buffer zones, suggesting increased isolation of protected areas (Sanchez-Azofeifa *et al.* 2003, pp. 128–134). Additionally, in the ACOPAC population region, more deforestation is ongoing northwest of Carara than to the south (Brightsmith 2016, *in litt.*, p. 12).

The scarlet macaw occurs in northeastern Costa Rica, near Palo Verde and surrounding areas in northwest Costa Rica, and in the two main populations of the ACOPAC and ACOSA. Overall, Costa Rica is both losing and gaining forest cover throughout the country (Hansen *et al.* 2013, entire; Brightsmith 2016, *in litt.* p. 1). However, the best available information indicates that the scarlet macaw population in Costa Rica appears to be increasing, and Costa Rica is the only country in Central America to experience a positive change in forest cover over the past 25 years (1990–2015). We conclude that deforestation or forest degradation in the current range of the scarlet macaw in Costa Rica is not occurring at a level that is causing a further decline in the species; however, this area is not enough to sustain the northern DPS of *A. m. macao* in the future in given the threats occurring in the remainder of the range.

Panama (*A. m. macao* Northern DPS)

Deforestation in Panama is relatively low for the Mesoamerica region; the annual decrease from 1990–2015 was 169 km² (65 mi² or 0.4 percent) (FAO 2015, p. 12) (see Tables 2a and 2b, below). Drivers of deforestation include urbanization, cattle ranching, agro-industrial development, unregulated shifting cultivation, open mining, poor logging practices, charcoal-making, and fire (ITTO 2005, in Blaser *et al.* 2011, p. 354). Deforestation in the country currently occurs primarily in the Darien, Colon, Ngabe Bugle, and Bocas del Toro provinces (Blaser *et al.* 2011, p. 354), which are outside the range in which scarlet macaw currently occurs in Panama. Illegal logging is widespread in the humid forests, even in protected areas (Blaser *et al.* 2011, p. 361).

Most of Panama's scarlet macaw population occurs on Isla Coiba, which was used by the government of Panama as a penal colony until 2004, thus limiting human access and development on the island (Government of Panama 2005, p. 23; Steinitz *et al.* 2005, p. 26). Consequently, forests on the island remain largely intact. The Panamanian Tourism Authority has developed a master plan for sustainable tourism for Isla Coiba (2007–2020), which includes strategic guidelines for tourism management. Further details on these guidelines are not provided, but the plan does not include infrastructure or high-impact development (UNESCO 2011c, p. 60). Available information indicates that deforestation is not occurring on Isla Coiba (Brightsmith 2016, *in litt.*, p. 1; Hansen *et al.* 2013, entire), although some level of degradation on the island may occur by a herd of approximately 2,500 to 3,500 feral cattle (UNESCO 2011c, pp. 23, 43; Suman *et al.* 2010, p. 25). However, the extent of the cattle's impact is unknown. The complete eradication of the cattle from Coiba National Park was classified as a priority issue (Suman *et al.* 2010, p. 25), but we are not aware of information indicating that the removal of cattle has occurred. While cattle on Isla Coiba may be inhibiting the regrowth of former pasture to secondary forest, they are probably not having a significant impact on the larger forest trees on which scarlet macaws depend (Angehr 2012, *in litt.*, unpaginated).

On the mainland of Panama, in the area of the upper Río Corotú near Puerto Armuelles and Querévalo in the Chiriquí province where there have been sporadic sightings of scarlet macaws, we are unaware of information indicating that deforestation and forest degradation are impacting scarlet macaws. We are also unaware of information indicating that deforestation is occurring near the small (but unknown) number of scarlet macaws on the southern end of the Azuero Peninsula of Veraguas, near Cerro Hoya National Park and in the forest reserves just to the east. Less than 15 percent of the peninsula is covered by mature forest, but most of the remaining forest can be found in Cerro Hoya National Park and the Tronosa Forest Reserve to the east (Miller *et al.* 2015, p. 1).

We are aware of little information on the magnitude and extent of deforestation and forest degradation on Panama's mainland and Isla Coiba, although the most recent information indicates that deforestation is not occurring on Isla Coiba or any areas where the scarlet macaw remains in

very small populations on the mainland. The World Heritage Centre and IUCN concluded that the main conservation

concerns (*i.e.*, cattle) on Isla Coiba remain poorly addressed (UNESCO 2011c, p. 61).

Summary Tables

TABLE 2a—TOTAL FOREST AREA IN MESOAMERICA 1990–2015

	Forest area (1,000 ha)				
	1990	2000	2005	2010	2015
Belize	1,616	1,459	1,417	1,391	1,366
Costa Rica	2,564	2,376	2,491	2,605	2,756
Guatemala	4,748	4,208	3,938	3,722	3,540
Honduras	8,136	6,392	5,792	5,192	4,592
Mexico	69,760	67,856	67,083	66,498	66,040
Nicaragua	4,514	3,814	3,464	3,114	3,114
Panama	5,040	4,867	4,782	4,699	4,617

TABLE 2b—PERCENT CHANGE OF TOTAL FOREST AREA IN MESOAMERICA 1990–2015

	Annual change rate							
	1990–2000		2000–2010		2010–2015		1990–2015	
	1,000 ha/yr	% change	1,000 ha/yr	% change	1,000 ha/yr	% change	1,000 ha/yr	% change
Belize	–15.7	–1.0	–6.8	–0.5	–5.0	–0.4	–10.0	–0.7
Costa Rica	–18.8	–0.8	22.9	0.9	30.2	1.1	7.7	0.3
Guatemala	–54.0	–1.2	–48.6	–1.2	–36.4	–1.0	–48.3	–1.2
Honduras	–174.4	–2.4	–120.0	–2.1	–120.0	–2.4	–141.8	–2.3
Mexico	–190.4	–0.3	–135.8	–0.2	–91.6	–0.1	–148.8	–0.2
Nicaragua	–70.0	–1.7	–70.0	–2.0	0.0	0.0	–56.0	–1.5
Panama	–17.3	–0.3	–16.8	–0.4	–16.4	–0.4	–16.9	–0.4

South America

Northwest Colombia (*A. m. macao* Northern DPS)

Colombia has lost approximately 5.9 million ha (14.6 million ac) of forest over the past 25 years, with a steady rate of change over that time frame (FAO 2015, p. 10). In northwest Colombia, forest loss is due primarily to conversion of land to pasture and agriculture, but also mining, illicit crops, and logging (Ortega and Lagos 2011, pp. 85–86). Scarlet macaws in northwest Colombia are believed to be affected primarily by habitat loss, and to a lesser extent trade (Donegan 2013, *in litt.*, unpaginated).

The Magdalena and Caribbean regions of northwest Colombia have approximately 7 percent and 23 percent (respectively) of their land area in original vegetation, with the remainder converted primarily to grazing land (Etter *et al.* 2006, p. 376). The Magdalena region lost 40 percent of its forest cover between 1970 and 1990, and an additional 15 percent between 1990 and 1996 (Restrepo and Syvitski 2006, pp. 69, 72). Within the Caribbean region, Parque Nacional Natural (PNN) Paramillo (460,000 ha (1,136,680 ac)), Santuario de Fauna y Flora Los Colorados (Los Colorados Fauna and Flora Sanctuary) (1,000 ha (2,500 ac)),

and Reserva Forestal de Montes de Maria (Montes Maria Forest Reserve) (7,460 ha (18,500 ac)) have lost 42, 71, and 70 percent of their forest, respectively, since they were created in the late 1970s and early 1980s (Millet *et al.* 2004, p. 454). The Caribbean region of northwest Colombia showed the highest projected rate of change of forest cover by the year 2030 of all regions evaluated (González *et al.* 2011, p. 45).

Deforestation is ongoing in northwest Colombia (Colombia Gold Letter 2012, pp. 1–2; Ortega and Lagos 2011, pp. 81–82). Few large tracts of forest remain within the range of the scarlet macaw in this region, for instance, in the areas of Serrania de San Lucas and PNN Paramillo, but these areas in northwest Colombia are also deforestation hotspots (Ortega and Lagos 2011, p. 82; Salaman *et al.* 2009, p. 21).

Summary of Factor A

The destruction and modification of the scarlet macaw’s habitat because of deforestation and forest degradation is a threat to the scarlet macaw throughout parts of its current range, although the magnitude of this impact varies across its range. Deforestation has fragmented habitat and continues to reduce and isolate areas that support populations of scarlet macaws. It directly eliminates the species’ tropical forest habitat by

removing the trees that support the species’ nesting, roosting, and food requirements. Further, clearing or degradation of forests, including selective logging and the development of roads, provides additional opportunities for humans to expand into previously inaccessible areas, which in turn creates easier access and opportunity to exploit previously undisturbed areas. Subsequent encroachment is often followed by additional deforestation as lands are cleared for cattle ranching and agriculture. Although scarlet macaws are known to use partially cleared and cultivated landscapes, they are only able to do so if the landscape maintains enough large, older trees that provide the essential needs of the species.

Deforestation rates in Mesoamerica, excluding Costa Rica, are the highest in Latin America due to expanding agriculture, cattle ranching, and selective and often illegal logging. Destruction of forest habitat is one of the main causes of the decline of scarlet macaw subspecies *Ara macao cyanoptera*. Throughout the range of the northern subspecies (*A. m. cyanoptera*) where most of the species’ historical habitat has been eliminated, evidence indicates that deforestation is ongoing. We consider deforestation and forest degradation to be an immediate threat to

the subspecies because clearing of forest for agriculture, cattle ranching, and illegal logging that leads to the loss of scarlet macaw habitat are ongoing in Mexico in the Lacandon Forest and Chiapas, in the western Petén of Guatemala, and in the Chiquibul region of Belize. The Honduran Mosquitia appears to be under significant deforestation pressure and continues to suffer from rapid colonization, agricultural expansion, and illegal logging. Nicaragua lost more forest than all other Central American countries except Honduras. With respect to the binational Mosquitia region, pressure appears to be greater on the Honduran side, but Nicaragua suffers rapid deforestation due to colonization and illegal logging. The border region (Río San Juan (San Juan River) of southeastern Nicaragua and northeastern Costa Rica has sections of contiguous forests; however, deforestation continues to occur and is a serious threat to biodiversity in this area.

Throughout the range of the northern DPS of the southern subspecies (*Ara macao macao*) evidence indicates that Costa Rica is both losing and gaining forest cover throughout the country. Costa Rica experienced some of the highest rates of deforestation in the world historically. More recently, Costa Rica has an increase in total forest over the 25-year period from 1990–2015 and is the only country in Central America to experience a positive change in forest cover. But some level of deforestation still occurs in parts of the country due to expansion of agriculture and livestock activities, and illegal logging in private forests and in national parks and reserves. The available information indicates that the scarlet macaw population in Costa Rica appears to be increasing, and we are unaware of any information indicating that deforestation or forest degradation in the current range of the scarlet macaw in Costa Rica is occurring at a level that is causing or likely to cause a further decline in the species.

In Panama, we are aware of little information on the magnitude and extent of deforestation and forest degradation on the mainland, although the scarlet macaw was described as almost extinct from mainland Panama. Currently, deforestation is concentrated in provinces outside the range of where scarlet macaws occur in Panama. On Isla Coiba, where most of the population in Panama occurs, evidence indicates large-scale deforestation is not a threat to the species.

Much of northwest Colombia has been deforested and it is expected to continue

in the region. The Caribbean region of northwest Colombia showed the highest projected rate of change of forest cover of all regions evaluated. Forest loss in the region is due primarily to conversion of land to pasture and agriculture, mining, illicit crops, and logging. The number of scarlet macaws in northwest Colombia is unknown, but habitat loss has caused the decline of the species there, such that the species has been all but extirpated from large areas in the region. However, the region is reported to have large tracts of suitable forest habitat.

The scarlet macaw subspecies (*Ara macao cyanoptera* and *A. m. macao*) in Mesoamerica are significantly impacted by deforestation in many countries in this region, which comprises less than 17 percent of the species' range. Because deforestation is ongoing and the populations of the scarlet macaw subspecies *A. m. cyanoptera* are small, we consider habitat destruction and modification to be a substantial threat to the northern subspecies *A. m. cyanoptera* throughout its range in Mexico, Guatemala, Belize, Honduras, Nicaragua, and Costa Rica (Atlantic slope). But even though deforestation continues in parts of Costa Rica, we do not find that it is occurring at a level that is an immediate threat to *A. m. macao* on the Pacific Coast of Costa Rica, especially because the data indicate that the species is likely increasing within the two main populations on the Pacific Coast. Similarly, the data indicate that deforestation is not impacting the scarlet macaw in Panama where it currently occurs. Therefore, we do not consider deforestation to be as significant of a stressor to *A. m. macao* in Costa Rica and Panama. However, in Colombia, habitat loss has caused the decline of the species from large areas in the region, and many of the areas in northwest Colombia are deforestation hotspots, even though the region is reported to have large tracts of suitable forest habitat.

Factor B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Parrots and macaws have been captured and traded for centuries in the Neotropics (Cantu-Guzman *et al.* 2007, p. 9; Guedes 2004, p. 279; Snyder *et al.* 2000, pp. 98–99). Because they are colorful, adapt to captivity, and can imitate language, they are captured for their feathers and used as pets (Guedes 2004, p. 279). The scarlet macaw is a popular pet species within its range countries, and the majority of birds sold as pets remain within country (Snyder

et al. 2000, p. 150; Wiedenfeld 1994, p. 102). Poaching of parrots from the wild is driven by demand from the pet industry and rural poverty where wild parrot populations exist. Capture for sale in local markets can provide a significant source of supplemental income in rural areas (Huson 2010, p. 58; González 2003, p. 438). Overall, capture for the pet trade, along with habitat loss as described above, are the main factors impacting the existence of scarlet macaws in the wild (Iñigo-Elias *in litt.* 1997, in Snyder *et al.* 2000, p. 150; Guedes 2004, p. 280).

Because the scarlet macaw is a long-lived species with a low reproductive rate, low survival of chicks and fledglings, late age to first reproduction, and large proportions of nonbreeding adults, this species is particularly vulnerable to overexploitation from harvesting (Munn 1992, p. 57; Wright *et al.* 2001, p. 712). Capture of parrots decreases the population, inhibits future breeding by removing reproductive age adults, causes mortality of eggs or chicks, causes the loss of or damage to nesting sites, and can stop population growth and cause local extirpations if individuals are removed year after year (Cantu-Guzman *et al.* 2007, p. 14). When chicks are targeted, the effects on the population may be difficult to detect because scarlet macaws are long-lived and it would take time to show a decline (Wright 2001, p. 717). When adults are targeted, the population is depleted more rapidly because reproductive individuals are removed from the population and the impact is immediate (Collar *et al.* 1992, p. 6).

Legal International Trade

The United States and Europe were historically the main markets for wild birds in international trade (FAO 2011b, p. 3). Trade in parrots was particularly high in the 1980s, due to a huge demand from developed countries (Rosales *et al.* 2007, pp. 85, 94; Best *et al.* 1995, p. 234). However, in the years following the enactment of the WBCA in 1992 (16 U.S.C. 4901 *et seq.*), poaching levels were lower than in prior years, suggesting that import bans in developed countries reduced poaching levels in exporting countries (Wright *et al.* 2001, pp. 715, 718). A massive reduction occurred in the number of wild-caught parrots imported to the United States, both from Central and South America and the rest of the world, following the enactment of the WBCA (Pain *et al.* 2006, p. 327). The European Union, which was the largest market for wild birds following enactment of the WBCA, banned the import of wild birds in 2006 due to

disease concerns (FAO 2011b, p. 21), thus eliminating another market for wild birds and further reducing international trade.

The scarlet macaw was initially listed in Appendix II of CITES (June 6, 1981), but effective January 8, 1985, was included in Appendix I. Species included in Appendix I are considered threatened with extinction, and international trade is permitted only under exceptional circumstances, which generally precludes commercial trade. Of the total live specimens reported in trade between 1985 and 2016, approximately 95 percent of the total live, wild-sourced scarlet macaws that were in trade during 1985 to 2016 were exported from Suriname, which is one of only two countries in South America that still legally export significant quantities of wildlife (Duplaix 2001, p. ii) and the only scarlet macaw range country that entered a reservation to the Appendix I listing of the species. A reservation means that these countries are treated as a country not party to CITES with respect to the species concerned. However, if a country with a reservation to a listing in the CITES Appendices wishes to trade that species with a country that has not taken the same reservation, then that trade must follow the CITES permit requirements (CITES 2018, unpaginated). Wildlife exports generate significant income and jobs in Suriname, and the country has set an annual voluntary export quota of 100 live specimens per year since 1998. The quota includes a notation that Parties may not authorize import for primarily commercial purposes (CITES 2018, unpaginated). Suriname's wildlife export quotas are reported to be "realistic" in that they are based on the belief that larger parrots cannot sustain large harvests (Duplaix 2001, pp. 10, 65, 68). Actual exports of CITES listed species are often lower than Suriname's allowed quotas (FAO 2010b, p. 42; Duplaix 2001, p. 10). However, in a number of recent years, Suriname has also reported exports in excess of its quota of 100 live specimens.

Poaching Within Mesoamerica

The scarlet macaw is protected by domestic laws within all countries in Mesoamerica (see *Factor D* discussion, below). However, enforcement of wildlife laws in these countries is generally lacking because they often do not have the resources, personnel, or both to adequately enforce their laws (TRAFFIC NA 2009, p. 20; Valdez *et al.* 2006, p. 276; Mauri 2002, entire). Additionally, low salaries and high unemployment in the region drives people to search for extra sources of

income, and as a result, scarlet macaws are still captured throughout the region and traded illegally (TRAFFIC NA 2009, pp. 23–24). Due to the high mortality rate associated with capture and transport, the number of birds actually sold or exported for the pet trade represents only a portion of those removed from the wild. Cumulative mortality rates before parrots reach customers have been estimated to be as high as 77 percent; for nestlings, approximately 80 percent died before reaching a pet store (Inigo and Ramos 1991 and Enkerlin 2000, in Cantu-Guzman *et al.* 2007, p. 60).

Mexico, Guatemala, and Belize (*A. m. cyanoptera*)

Poaching has occurred at significant levels in the Maya Forest region of Mexico, Guatemala, and Belize, and is one of the most important factors influencing population growth of the scarlet macaw in this region, indicating that even relatively low levels of poaching could result in population declines (Clum 2008, pp. 76–80).

Poaching is a persistent problem and the second largest threat to scarlet macaws in Mexico after deforestation, although information on the extent of poaching in Mexico is largely unavailable (Inigo-Elias 1996, p. 62; Boyd and McNab 2008, p. xiii). In many instances, poachers damage trees to reach the birds. During the 1993 breeding season, four nest trees from a total of 41 were cut down and another was burned (Inigo-Elias 1996, p. 62). Detained traffickers reported that parrot populations in Chiapas (the primary state in which the species occurs in Mexico) have decreased so much that trapping is now conducted in protected areas in Chiapas (Cantu-Guzman *et al.* 2007, p. 14). Fewer than 50 scarlet macaws are captured annually in Mexico (Cantu-Guzman *et al.* 2007, p. 35).

Much of the scarlet macaw population in Guatemala is currently protected through conservation efforts. Prior to the Wildlife Conservation Society (WCS) monitoring nests in 2002, poaching was a serious concern. Between 1992 and 2002, citing Proyecto Guacamaya of ProPeten data, 115 chicks were poached from the Laguna del Tigre area (Moya and Castillo Villeda 2002, in McReynolds 2016, *in litt.*, unpaginated). However, since 2003, the severity of poaching has greatly decreased because of WCS's conservation efforts (Garcia *et al.* 2008, p. 51). Although in areas where the WCS is not working and protection is lacking, which is up to 25 percent of the population in Guatemala, it is likely that these nests are poached (Boyd and

McNab 2008, p. vi; Garcia *et al.* 2008, p. 51).

In the Chiquibul Forest in Belize, poaching is a threat to scarlet macaws, but the situation has improved in recent years. In 2011, the poaching rate was 89 percent (Breaking Belize News 2017, unpaginated). Nests were being poached by guaceros and xateros, which are Guatemalans who illegally cross the border into Belize for economic reasons. Thus, with this high percentage of poached chicks, scarlet macaws essentially had no productivity (Harbison 2017, unpaginated). Of the nests monitored in 2013, approximately 30 percent of the failed nests were attributed to poaching; these nests contained 33 percent of the total hatchlings (The Guardian Belize 2014, unpaginated). Incidences of poaching were reduced to an average of 35 percent between 2012 and 2015 (Breaking Belize News 2017, unpaginated). Over the past 5 years, the Scarlet Six team (see *Conservation Measures*, below) has reduced overall nest poaching from higher than 90 percent to less than 30 percent, and 2017 is the second year in a row that no known nests were poached (Harbison 2017, unpaginated).

Honduras and Nicaragua (*A. m. cyanoptera*)

Poaching of the scarlet macaw occurs in both Honduras and Nicaragua, although little quantitative information is available (TRAFFIC NA 2009, p. 5).

In Honduras, the scarlet macaw population has decreased and is experiencing severe reproductive limits due to poaching (Lafeber Conservation and Wildlife 2011, unpaginated). Nest monitoring indicated 5 of 6 nests active in February 2003 were poached by August (McReynolds 2016, *in litt.*, unpaginated). In 2003, an estimated 200 to 300 chicks were poached just in the Rus Rus area of the Honduran Mosquitia (Portillo Reyes *et al.* 2004, in McReynolds 2011, *in litt.*, unpaginated). In a 2010–2011 survey of 20 nests previously used by parrots, 16 of which were scarlet macaws, 17 showed evidence of poaching including all the scarlet macaw nests (Lafeber Conservation and Wildlife 2011, unpaginated).

In Nicaragua, capture of parrots for the pet trade is described as common (Herrera 2004, p. 1). Scarlet macaws are one of the three most preferred species in Nicaragua's parrot trade and are among the main CITES-species harvested for illegal trade in the country (McGinley *et al.* 2009, p. 16; Lezama 2008, abstract; Nicaragua Ministerio del Ambiente y Los Recursos Naturales

(MARENA) 2008, p. 25). Based on interviews with locals, Nicaraguan poachers bring chicks into Honduras from Nicaragua, where they more easily enter into trade (Portillo-Reyes *et al.* 2004, in McReynolds 2016, *in litt.*, unpaginated). Confiscations and prosecutions by government authorities occurred in 2009 in the Caribbean region of the county and in 2010 in Managua where a dozen scarlet macaws were for sale (McReynolds 2016, *in litt.*, unpaginated). Parrot populations in Nicaragua have declined by as much as 60 percent since the mid-1990s, although the loss of habitat has also contributed to the decline (MARENA 2008, p. 51). Additionally, the small population in the Cosigüina Nature Reserve on the Pacific Coast suffers from poaching of both chicks and adults (Boyd and McNab 2008, p. x).

Costa Rica (*A. m. cyanoptera* and *A. m. macao*)

Historically, scarlet macaws in Costa Rica experienced heavy poaching pressure. Of 56 known nest cavities in the ACOPAC studied from 1992 to 2000, 64 percent were considered at high risk and 23 percent were at medium risk (Vaughan *et al.* 2003, p. 8; McReynolds 2016, *in litt.*, unpaginated). In studies conducted in the 1990s in Carara National Park, which is the traditional stronghold of the ACOPAC population of scarlet macaws, 56 to 64 percent of evaluated nest sites showed signs of being poached with some nests poached yearly (Vaughan *et al.* 2003, pp. 6, 8; Snyder *et al.* 2000, p. 150; Marineros and Vaughan 1995, p. 460). However, anti-poaching efforts in ACOPAC during 1995–1996 may have increased recruitment into the population (Vaughan *et al.* 2005, p. 127). From 2004 to 2009, most of the poached animals were paca (*Cuniculus paca*), but scarlet macaws were also poached and were among the top four species identified by park officials as most at risk of poaching, local extinction, or both (Huson 2010, pp. 19–20). Hunting is important in the communities for both subsistence and monetary gain; with low-income communities surrounding the park, the incentives to poach are great (Huson 2010, p. 66). A significant effort to control poaching in the Carara area is ongoing because poaching continues to be a serious problem (Vaughan 2005, pers. comm., in McReynolds 2016, *in litt.*, unpaginated). However, the ACOPAC population of scarlet macaws was believed to be self-sustaining, even with heavy poaching pressure (Vaughan *et al.* 2005, p. 128).

In 2005, in the ACOSA, approximately half (48 percent) of

residents interviewed believed that scarlet macaws were still being poached in the ACOSA, although 85 percent of the interviewees believed numbers of scarlet macaws were increasing (Dear *et al.* 2010, pp. 10–13). Forty-three percent of the interviewees mentioned that less poaching occurs now than before, and none said the activity had increased (Dear *et al.* 2010, p. 13). Therefore, it is believed that poaching is ongoing but has decreased and the ACOSA population is increasing (Dear *et al.* 2010, p. 19). Based on interviews, it was estimated that 25 to 50 chicks are poached each year (Dear *et al.* 2005, p. 19). In 2006, 11 of 57 (19 percent) potential nest cavities found in ACOSA were reported by local residents as recently poached, but the actual number of poached nests is likely greater (Guittar *et al.* 2009, pp. 390, 392).

Panama (*A. m. macao*)

Little information is available on capture of scarlet macaws in Panama, although it was a factor leading to the virtual extirpation of this species from the country (McReynolds 2016, *in litt.*, unpaginated). Trade in rare and endangered species is a constant threat in the country due to the high prices paid for these animals and their parts (Parker *et al.* 2004, p. II–6; Keller and Schmitt 2008, abstract). Additionally, poaching is a common occurrence in rural areas because wild game is a traditional source of protein for residents (Parker *et al.* 2004, p. II–6). Cerro Hoya National Park is located within Panama's most impoverished province, and thus the capture of scarlet macaws is a potential threat because campesinos (a Latin American Indian farmer or farm laborer) invade unoccupied lands and poaching for sustenance and monetary gain is common (Government of Panama 2005, p. 36). Moreover, despite a program to use captive scarlet macaw feathers to cut down on hunting of wild birds for their feathers, hunting still occurs and poaching of chicks for pets remains a problem at Cerro Hoya National Park (Rodríguez and Hinojosa 2010, in McReynolds 2016, *in litt.*, unpaginated).

While scarlet macaws may occasionally be illegally captured on Isla Coiba, we are not aware of any information that poaching is currently a threat to the species on the island. The scarlet macaw primarily occurs on the south end where poaching is a possibility. However, based on interviews with the owner of Bird Coiba (the bird guide service for the island), two rangers with many years of experience on the island, and a discussion with the superintendent of

Isla Coiba National Park, poaching is not a known problem on the island (McReynolds 2016, *in litt.*, unpaginated). The island has no permanent habitations except a police base and the ranger base; the island has no roads and very few maintained trails, which are all short; and access is by boats that are boarded and checked regularly (McReynolds 2016, *in litt.*, p. 8).

Summary of Factor B

Parrots and macaws have been captured and traded for centuries in the Neotropics. Despite regulation of international scarlet macaw trade through CITES, the WBCA, and similar stricter measures by the European Union, some level of international trade occurs with wild scarlet macaws. However, most scarlet macaws reported in trade are from non-wild sources; were captive-bred; or were parts, feathers, or scientific specimens rather than live birds. Of the wild-sourced, live birds, the vast majority were exported from Suriname, which is reported to set realistic quotas. Therefore, international trade of scarlet macaws is not a current threat to the species.

The scarlet macaw is a popular pet species within its range countries and overutilization as a result of poaching for the pet trade is a significant threat to the scarlet macaw in some areas of its current range. The scarlet macaw is susceptible to overharvest because it is a long-lived species with a low reproductive rate and it is slow to recover from harvesting pressures; thus, removal of individuals year after year can stop population growth and cause local extirpation. Most harvested birds likely remain within the species' range countries.

The subspecies *Ara macao cyanoptera* occurs mainly in small populations; thus, poaching wild birds for the pet trade is detrimental to sustaining these populations. Evidence suggests poaching occurs at significant levels in the Maya Forest region, where even moderate levels of poaching could cause a decline in these already small populations. Many of the scarlet macaws nesting sites in Guatemala are currently protected through conservation efforts compared to nesting sites in Mexico; therefore, success rates in Mexico are almost certainly lower than in Guatemala, even though about 25 percent of Guatemala's population is unprotected. In Belize, nest poaching has been dramatically reduced over the past 5 years but continues. Although quantitative data from Honduras and Nicaragua are lacking, poaching is recognized as a significant threat to the scarlet macaws in these countries.

The subspecies *Ara macao macao* in Costa Rica and Panama has experienced heavy poaching pressure historically. Efforts to control poaching are ongoing in Costa Rica, but it continues to be a substantial problem. Little information is available regarding poaching of scarlet macaws in Panama. It is one factor that led to the near extirpation of this species from mainland Panama and remains a concern at Cerro Hoya National Park. Poaching is not a threat on Isla Coiba.

The scarlet macaw in Mesoamerica consists mostly of small populations, and it is reasonable to conclude that any level of poaching poses a significant threat to the species in this portion of its range, especially considering the susceptibility of scarlet macaws because of its reproductive traits. The available information indicates that poaching of *Ara macao cyanoptera* chicks and adults is a significant stressor throughout its range. Populations of *A. m. macao* in Costa Rica on the Pacific slope are likely increasing even with poaching pressure, indicating that poaching may not be a major threat in Costa Rica. However, poaching continues and remains a concern. Little information exists regarding poaching of scarlet macaws in Panama, but because poaching was one of the reasons for the species' almost extirpation on the mainland and the remaining populations are very small and susceptible to poaching, we consider poaching to be a stressor to scarlet macaws on mainland Panama. We are not aware of information regarding the level of poaching in northwest Colombia.

Factor C. Disease or Predation

In our proposed rule (77 FR 40237–40238; July 6, 2012), we concluded that disease and predation are not threats to the northern subspecies of scarlet macaw or the northern DPS of the southern subspecies. We received no additional information indicating otherwise.

Factor D: Inadequacy of Existing Regulatory Mechanisms

Forest Conservation Regulations

With the exception of Belize, all countries in the range of *A. m. cyanoptera* and the northern DPS of *A. m. macao* have a national or subnational policy framework on forests and their management, although Belize has a variety of regulations that protect their natural resources. Of those countries with a policy framework, all but Colombia have specific national forest laws in support of these policies, but

laws supporting national forest policy in Colombia are incorporated within other laws (FAO 2010a, pp. 302–303). All range countries except Belize also have National Forest programs that provide the framework to develop and implement their forest policies, although the status of Panama's program is unknown (for information on regulatory mechanisms pertaining to forest management in scarlet macaw range countries see: Peña-Claros et al. 2011, entire; Espinosa et al. 2011, pp. 21–26; FAO 2011c, p. 78; Government of Colombia 2011, pp. 89–91, 203–211; Guignier 2011, pp. 12–22; Larson and Petkova 2011, entire; May et al. 2011, pp. 16–55; Stern and Kernan 2011, pp. 52–54, 88–90; United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD) 2011, unpaginated; Belize Ministry of Natural Resources and Development 2010, pp. 54, 57–58; Blaser et al. 2010, pp. 263–267, 277–281, 291–293, 300–302, 311–312, 320–323, 334–337, 345–346, 365–367, 376–377, 394–396; CIFOR 2010, p. 45; FAO 2010a, pp. 150–158, 302–303; Government of Belize 2010, pp. 27–34; Sparovek 2010, pp. 6046–6047; Tolisano and Lopez-Selva 2010, pp. 24–28; Bauch et al. 2009, entire; McGinley et al. 2009, pp. 18–30; Patriota 2009, pp. 612–615; Trevin and Nasi 2009, entire; Byers and Israel 2008, pp. 29–34; Torres-Lezama et al. 2008, entire; Hopkins 2007, pp. 398–405; Playfair 2007, entire; Portilla and Eguren 2007, pp. 19–32; World Bank 2007, pp. 10–28, 71–76; Clark 2006, pp. 19–29; Grenand et al. 2006, pp. 49, 54–56; Baal 2005, unpaginated; Parker et al. 2004, pp. III–1–III–8, Annex H, Annex I; Government of Belize 2003, entire; Bevilacqua et al. 2002, pp. 6–9; Mauri 2002, entire; Vreugdenhil et al. 2002, pp. 6–10).

Habitat destruction or modification from deforestation and forest degradation occurs in most portions of the range of the *A. m. cyanoptera*. Many, if not all, of these countries have regulations aimed at conserving forested area, but for the most part they are not able to adequately enforce their regulations due to lack of financial, personnel, and technical resources; conflicts over land ownership, which can lead to illegal logging and expansion of agriculture and pasture; and lack of oversight or coordination with a governing body.

In the northern DPS of the southern subspecies *A. m. macao*, Costa Rica is both losing and gaining forested land, but we are unaware of any information indicating that deforestation or forest degradation in the current range of the

scarlet macaw in Costa Rica is occurring at a level that is causing a decline in the species. Forest area has increased over 25 years and the range of scarlet macaws on the Pacific slope of Costa Rica has increased. In Panama, although large-scale deforestation is not occurring where the small populations of scarlet macaws are currently known to exist, small-scale logging continues with little oversight and significantly contributes to ongoing forest degradation. In northwest Colombia, even though the region is reported to have large tracts of suitable forest, many of the areas in northwest Colombia are deforestation hotspots. Habitat loss has caused the decline of the species from large areas in the region, and existing regulations have not been sufficient to reverse the transformation of natural ecosystems. Major forest reserves have been degraded from their original condition. Therefore, the existing regulatory mechanisms addressing this threat in Panama and Colombia are not adequate to protect forested land that the species depends on.

Illegal Capture and Trade

The scarlet macaw is protected under CITES, an international agreement among governments to ensure that the international trade of CITES-listed plant and animal species does not threaten species' survival in the wild. Under this treaty, CITES Parties (member countries or signatories) regulate the import, export, and re-export of specimens, parts, and products of CITES-listed plant and animal species. Trade under CITES is authorized through a system of permits and certificates that are issued by the designated CITES Management Authority of each CITES Party (CITES 2018, unpaginated). All the countries within the range of the scarlet macaw are Parties to CITES. However, when the species was included in Appendix I in 1985, Suriname (along with three European countries: Austria, Switzerland, and Liechtenstein) entered a reservation to the listing (Austria withdrew its reservation in 1989) (UNEP-WCMC 2012, unpaginated). A reservation means that a country is treated as not a party to CITES with respect to the species concerned. However, if a country with a reservation to a listing in the CITES Appendices wishes to trade that species with a country that has not taken the same reservation, then that trade is subject to the CITES permit requirements since the non-reserving Party is bound by the CITES requirements (CITES 2018, unpaginated).

The import of scarlet macaws into the United States is also regulated by the

WBCA, which was enacted on October 23, 1992. The purpose of the WBCA is to promote the conservation of exotic birds by ensuring that all imports of exotic birds to the United States are biologically sustainable and not detrimental to the species in the wild. The WBCA restricts the import of most CITES-listed live or dead exotic birds. Import of dead specimens is allowed for scientific purposes and museum specimens. Permits may be issued to allow import of listed birds for various purposes, such as scientific research, zoological breeding or display, or personal pets, when certain criteria are met. The Service may also approve cooperative breeding programs and subsequently issue import permits to allow the import of birds for use in such programs. The United States may also approve foreign sustainable use management plants under the WBCA. At this time, the scarlet macaw is not part of a Service-approved cooperative breeding program, and very few wild-caught birds have been recorded for importation.

The Lacey Act (18 U.S.C. 42; 16 U.S.C. 3371–3378) was originally passed in 1900, and was the first Federal law protecting wildlife. Today, it provides civil and criminal penalties for the illegal trade of animals and plants. Under the Lacey Act, in part, it is unlawful to import, export, transport, sell, receive, acquire, or purchase any fish or wildlife taken, possessed, transported, or sold: (1) In violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law; or (2) in interstate or foreign commerce, any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any State or in violation of any foreign law. The Lacey Act covers all fish and wildlife and their parts or products, plants protected by CITES.

Although illegal trapping for the pet trade occurred at high levels during the 1980s, international trade has decreased significantly as a result of tighter enforcement of CITES regulations, adoption of the WBCA, and similar stricter measures under European Union legislation, along with adoption of national legislation in range countries (Snyder *et al.* 2000, p. 99). Based on the best available data, we found no information indicating international trade is currently a threat to the scarlet macaw populations.

The laws and regulations that govern capture and trade of scarlet macaw in the range countries are briefly discussed below.

Mexico (*A. m. cyanoptera*)

The General Law of Wildlife for Mexico establishes that no bird specimen corresponding to the family Psittacidae or psittacid (including *Ara macao cyanoptera*), whose natural distribution is within the national territory, may be subject to extractive exploitation for subsistence or commercial purposes, especially species that are endemic, threatened, endangered, or protected by international treaties (Official Mexican Standard NOM–059–SEMARNAT–1994; Animal Legal and Historical Center 2018, unpaginated; Cantu-Guzman 2007, p. 45). Mexico considers the scarlet macaw to be in danger of extinction within the country (Government of Mexico 2010a, p. 32). The Secretariat may only grant authorizations for extractive use for conservation or scientific research purposes. Responsibility for implementation lies with Profepa, the agency of the Environment Ministry in charge of policing environmental laws (Cantu-Guzman *et al.* 2007, p. 45). The most serious difficulty Profepa faces in the combat against illegal bird trade is the limited number of inspectors it has for the whole country (Profepa 2002, in Cantu-Guzman *et al.* 2007, p. 45). Seizures by Profepa was estimated at approximately 2 percent of the annual illegal trade, which represents a very small portion of the number of parrots captured each year (Cantu-Guzman *et al.* 2007, p. 49). Of the 65,000 parrots that were captured annually, data indicate as few as up to 50 scarlet macaws (or less than 0.1 percent of the total parrots) were captured annually in Mexico, even though some of these may be from Central American countries (Cantu-Guzman *et al.* 2007, p. 35). From 1995 to 2005, 144 scarlet macaws were seized by Profepa (Cantu-Guzman *et al.* 2007, p. 52).

Guatemala (*A. m. cyanoptera*)

National hunting legislation was first passed in Guatemala in 1970, with the mandates of this national policy reinforced in the legislation passed on protected areas in 1989. Hunting is widely used by most rural residents in Guatemala to supplement food and income needs, and is largely unregulated and inconsistently monitored (Tolisano and Lopez-Selva 2010, p. 44).

Most of the data on hunting has not been published or systematically organized to indicate the magnitude or intensity of local and national hunting pressures (CECON–PROBIOMA 2005, in Tolisano and Lopez-Selva 2010, p. 44).

National and municipal agencies generally have insufficient human resources, have insufficient training, and lack the necessary equipment to effectively monitor or mitigate hunting impacts, and much of the monitoring that does occur is done on a relatively haphazard basis by different research institutions and nongovernmental organizations (Tolisano and Lopez-Selva 2010, p. 44).

A similar situation to unregulated hunting exists for the capture and sale of live animals to supply the pet trade, research institutions, and zoological collections. Scarlet macaws are overexploited; nestlings are taken from their tree cavity nests prior to fledging and sold on the local market in the Petén (Tolisano and Lopez-Selva 2010, p. 44). Guatemalan authorities do a relatively good job of trying to control this traffic, but rumors that scarlet macaw chicks can fetch \$300–\$600 USD on the black market continue to fuel illegal trade within the country (Muccio 2009, p. 14).

Belize (*A. m. cyanoptera*)

Belize's Wildlife Protection Act provides for the regulation of hunting and the commercial dealing in wildlife. It prohibits hunting of specific species, in closed areas, and of immature wildlife or females accompanied by their young. It is administered by the Forest Department of the Ministry of Natural Resources and the Environment (Government of Belize 2010, p. 29). This law prohibits hunting of the scarlet macaw and prohibits hunting wildlife in a forest reserve without a license (Wildlife Protection Act 2000, entire). Scarlet macaws have been poached by Guatemalans (guaceros and xateros) that illicitly cross the border into Belize for economic reasons. Most poaching is opportunistic. Past incidences of conflict between law enforcement and Guatemalan nationals have occurred (Harbison 2017, unpaginated). The Belize Defense Force cooperates with the Scarlet Six team to deter poaching scarlet macaw chicks (see *Conservation Measures*, below).

Honduras (*A. m. cyanoptera*)

Three institutions are charged with biodiversity conservation in Honduras: The Secretariat of Natural Resources and Environment (SERNA); the Secretariat of Agriculture and Cattle Ranching (SAG); and the ICF who develops programs, regulations, or projects for biodiversity conservation with an emphasis on species in danger of extinction (Hansen and Florez 2008, p. 17). Internal legislation concerning biodiversity centered on a 1990

government decree prohibiting the capture and sale of wildlife within Honduras. However, it has been criticized for contributing to illegal trafficking of wildlife through neighboring countries, particularly through the sparsely populated border with Nicaragua (Anderson and Devenish 2009, p. 257). A National Biodiversity Strategy was published in 2000 (Anderson and Devenish 2009, p. 257). However, no specific legislation to manage biodiversity exists (World Bank 2007, p. 12). Wildlife is sold openly in the streets, and families maintain scarlet macaws as pets (Hansen and Florez 2008, p. 22). Also, despite the Río Plátano Biosphere Reserve's status, poaching occurs within its boundaries. Nicaragua (*A. m. cyanoptera*)

Historically, wildlife in Nicaragua has been used as food for poor rural and indigenous populations, for sport hunting, for medicinal and cultural use, and as pets (MARENA 2008, p. 22). Illegal capture and trade of wildlife species is also a source of income (McGinley *et al.* 2009, p. 16). Despite the scarcity of records, laws to regulate wildlife trade in Nicaragua have existed since the late 19th century.

MARENA is a key agency responsible for conservation of endangered species in Nicaragua. In 2008, 123 species were permanently banned from harvest or use, and another 61 species were partially banned; many of these banned species are also listed by the IUCN or by CITES. Hunting of the scarlet macaw is prohibited (Nicaraguan laws 559 and 641; FAOLEX 2018, unpaginated). Nonetheless, these national species protection bans are rarely applied and enforced (McGinley *et al.* 2009, p. 22). The scarlet macaw is a principal species involved in illegal trade (McGinley *et al.* 2009 p. 16; MARENA 2008, p. 25). On the Caribbean coast, commercial harvesting occurs of species such as scarlet macaws, which is not currently subject to a harvesting quota and are sold on the local market (MARENA 2008, p. 25).

Nicaragua's adoption of CITES has led to improvement in the management and regulation of domestic and international wildlife trade. Nonetheless, the existing legal framework is inadequate for the protection and sustainability of domestic wildlife trade (McGinley *et al.* 2009, p. 22). Furthermore, nonregulatory instruments, such as monitoring, research, education, and information, are poorly, if at all, used in the oversight of commercial wildlife trade in Nicaragua (McGinley *et al.* 2009, p. 22).

Costa Rica (*A. m. cyanoptera* and *A. m. macao*)

Costa Rica's Wildlife Conservation Law and its amendments prohibit the hunting, collection, and extraction of species, except in certain cases for subsistence by indigenous groups, scientific purposes, or species control (Costa Rican Embassy 2013, unpaginated; NOVA 2013, unpaginated; Tico Times 2017, unpaginated).

The Biodiversity Law has the objective of conserving biodiversity and the sustainable use of the resources, as well as to distribute in an equitable manner the benefits and derived costs. The law includes the obligation of the state to avoid and prevent damage or destruction, present or future, to human, animal, or plant health, or to the integrity of the ecosystems, and to avoid any risk or danger which threatens the permanence of ecosystems (Hopkins 2007, p. 404).

Costa Rica has protected its resources through an ambitious national parks and biological reserves system, but they are inadequately funded and insufficiently controlled (Government of Costa Rica 2010, p. 34). Poaching by local communities is a problem of great concern; hunting within national park boundaries is illegal, but such activities are difficult to monitor and enforce with limited funds and supervision (Huson 2010, p. 18; Government of Costa Rica 2010, p. 52). This limitation is reported in Carara National Park, in which park officials believe that they do not have enough enforcement staff to effectively control poaching (Huson 2010, p. 8).

Panama (*A. m. macao*)

To protect and regulate the use of wildlife, flora and fauna, the Panamanian government has created numerous laws. The initial legislation protecting Panama's biological diversity was Law 23 (1967) on the protection and conservation of wildlife (Parker *et al.* 2004, p. III-2). Another important piece of legislation is Resolution DIR-002-80 (1980) that identifies 82 species in danger of extinction and bans hunting, capturing, buying, selling, or exporting of all species included in this list (Parker *et al.* 2004, p. III-2). Scarlet macaw is one of these species. Other important regulatory mechanisms include Resolution DIR-003-80 (1980) that regulates wildlife in captivity and its importation and exportation, and the Wildlife Law 24 (1995), which establishes that wildlife is part of the natural heritage of Panama and provides for the protection, restoration, research, management and development of the country's genetic resources, including

rare species (Parker *et al.* 2004, p. III-2; Blaser *et al.* 2011, p. 355).

The Panamanian national police force is responsible for preventing all infractions of the law, such as hunting violations (Parker *et al.* 2004, p. III-8). ANAM counts on police support, which is often more concerned about major crime, and routinely treats environmental infractions as minor nuisances. Local corregidores (*i.e.*, local administrative officials) often have little knowledge of environmental laws and little impact on their enforcement, but these local officials are important links in the enforcement of environmental laws, and have influence on resident's behavior (Parker *et al.* 2004, p. V-10). Training officials adjacent to or within protected areas results in less illegal hunting and harvesting in protected areas (Parker *et al.* 2004, pp. III-2, V-10). Nonetheless, sport and commercial hunting without regulation and subsistence hunting in the country continue.

Colombia (*A. m. macao* Northern DPS)

Under Colombian wildlife legislation, all wildlife belongs to the State; although local communities (*e.g.*, mayors, regional autonomous corporations, indigenous reserves) have the right to participate in decisions regarding resources under their jurisdictions and to enjoy a healthy environment (International Institute for Environment and Development 2018, unpaginated; Blaser *et al.* 2011, p. 297). Wildlife legislation stipulates a general ban on hunting, but subsistence hunting and fishing are allowed provided no ban is in place for a particular species. In 1994, illegal hunting was established as a crime in the penal code, which includes penalties for poaching and illicit use of renewable natural resources (Gomez *et al.* 2015, unpaginated). Trade of scarlet macaws taken from the wild is forbidden in Colombia, although regulations are not always followed and scarlet macaws are involved in illegal trade in the country (CITES 2001, p. 8). The Colombian National Army and National Police are cooperating with the Ministry of the Environment to protect the country's wildlife and combat illegal wildlife trafficking, much of that illegally acquired wildlife is intercepted near the northern Colombian coasts (Pedraza 2015, unpaginated).

Summary of Illegal Capture and Trade

Legal international trade is not a current threat because of international laws such as CITES, the WBCA, and similar stricter measures under European Union legislation that restrict the trade of wild scarlet macaws. All

range countries have laws and policies that aim to prevent illegal capture and trade of scarlet macaws, although some hunting and capture continues. However, illegal capture for the domestic pet trade within most range countries occurs at a level that is likely to negatively impact the species throughout all of the range of subspecies *A. m. cyanoptera*, and in the range of the subspecies *A. m. macao* in Costa Rica and Panama. Because capture for the pet trade is ongoing and poses a threat to scarlet macaws in these regions, we conclude that the regulatory mechanisms addressing this threat in these regions are inadequate.

Summary of Factor D

We found threats discussed under Factors A and B to be threats to the species throughout all of the range of subspecies *A. m. cyanoptera*, except on Isla Coiba, Panama; and in the range of the subspecies *A. m. macao* in Costa Rica (Factor B only), Panama, and Colombia west of the Andes (Factor A only). The existing regulatory mechanisms do not appear to be adequate to address threats, primarily because these countries lack resources to effectively enforce all their laws. Therefore, we conclude that the existing regulatory mechanisms are not adequate to protect subspecies *A. m. cyanoptera* throughout all of its range, and the northern DPS of *A. m. macao* from the threats of deforestation and overutilization.

Factor E: Other Natural or Manmade Factors Affecting the Species' Continued Existence

Small Population Size and Synergistic Effects of Threats

Small, isolated populations place species at greater risk of local extirpation or extinction due to a variety of factors, including loss of genetic variability, demographic and environmental stochasticity, and natural catastrophes (Lande 1995, entire; Lehmkuhl and Ruggiero 1991, p. 37; Gilpin and Soulé 1986, pp. 25–33; Soulé and Simberloff 1986, pp. 28–32; Shaffer 1981, p. 131; Franklin 1980, entire). Stochastic events that put small populations at risk include, but are not limited to, variation in birth and death rates, fluctuations in gender ratio, inbreeding depression, and random environmental disturbances such as fire and climatic shifts (Blomqvist *et al.* 2010, entire; Gilpin and Soulé 1986, p. 27; Shaffer 1981, p. 131).

Overall levels of genetic variation in the scarlet macaw remain high, but a decrease in diversity was noted among

birds from the Chiquibul Forest Reserve in Belize (Schmidt 2013, abstract). Gene flow occurs between nest sites in Guatemala and Belize, and levels of genetic diversity are high in the tri-national region (Schmidt and Amato 2008, p. 137), but the Belize population may be more isolated from the Guatemala and Mexico populations (Brightsmith 2016, *in litt.*, p. 8). The isolation of populations and subsequent loss of genetic exchange would impact the population at different timescales. In the short term, populations may suffer the deleterious consequences of inbreeding; over the long term, the loss of genetic variability diminishes a species' capacity to adapt to changes in the environment (Blomqvist *et al.* 2010, entire; Reed and Frankham 2003, pp. 233–234; Nunney and Campbell 1993, pp. 236–237; Soulé and Simberloff 1986, pp. 28–29; Franklin 1980, pp. 140–144).

Negative impacts associated with small population size and vulnerability to random demographic fluctuations or natural catastrophes may be further magnified by synergistic interactions with other threats, such as those discussed in Factors A and B.

Small populations that are declining can be especially vulnerable to habitat loss (O'Grady *et al.* 2004, pp. 513–514). As bird assemblages in forest habitat are reduced because the size of the habitat is reduced, smaller areas are less likely to provide the essential resources for species such as scarlet macaw that have large ranges. Thus, deforestation in combination with other negative impacts can have profound effects and potentially reduce a species' effective population (the proportion of the actual population that contributes to future generations) by orders of magnitude (Gilpin and Soulé 1986, p. 31). For example, an increase in habitat fragmentation can separate populations to the point where individuals can no longer disperse and breed among habitat patches, causing a shift in the demographic characteristics of a population and a reduction in genetic fitness (Gilpin and Soulé 1986, p. 31). This risk is especially applicable for scarlet macaws in Mesoamerica, where the species was once wide-ranging but has lost a significant amount of its historical range due to habitat loss and degradation. Large forest areas have been removed throughout Mesoamerica and the large tracts of forest that remain, such as the Maya and Lacandon Forests, the transnational forest in the Mosquitia region, and the transnational forest on the border of Costa Rica and Panama, have almost been cut off from each other by deforestation (Bray 2010, p. 93).

Scarlet macaws may use partially cleared and cultivated landscapes if the landscape provides dietary requirements and maintains enough large trees because this species is dependent on larger, older trees that have large nesting cavities. However, scarlet macaws have a better chance of surviving in large tracts of forest where suitable cavities are more common than in open and small forest remnants (Inigo-Elias 1996, p. 91).

Commercial exploitation of scarlet macaw chicks may further contribute to inbreeding depression and loss of genetic diversity. However, other large, long-lived avian species have demonstrated significant retention of molecular diversity after marked declines, thus indicating that longevity of the species may act as an intrinsic buffer against the rapid loss of genetic variation (Schmidt 2013, pp. 132–133). But the presence of high genetic variation in long-lived species may mask demographic instability introduced by habitat alteration and overexploitation, resulting in a sudden and marked loss of diversity (Schmidt 2013, p. 133). Systematic removal of scarlet macaw nestlings over extended periods of time has likely produced an unstable age distribution in the tri-national region (Mexico, Guatemala, and Belize), heavily skewed toward older individuals with low recruitment (Clum 2008, p. 79).

Historically, the scarlet macaw in Mesoamerica existed in much higher numbers in more continuous habitat. Currently, the scarlet macaw occurs in relatively small and fragmented populations within Mesoamerica; most populations in this region are believed to contain approximately 100 to 700 individuals, with only two populations potentially containing more than 1,000 individuals. The total population size for scarlet macaws in Mesoamerica is likely no greater than 5,000 individuals. Overall, suitable habitat is becoming increasingly limited and is not likely to expand in the future. Therefore, the species' reproductive and life-history traits, combined with its limited and fragmented habitat, increases the species' vulnerability to deforestation and overutilization in the *A. m. cyanoptera* and northern DPS of *A. m. macao* subspecies due to the small size of the species' populations.

Competition for Nest Cavities

Competition for suitable nest cavities limits reproductive success by limiting the available nesting sites and thus limiting the number of pairs that can breed, or by causing nest mortality as a result of agonistic interactions.

Intraspecific competition between different pairs of scarlet macaws, and competition with pairs of other macaw species, is reported to be intense in some areas (Renton and Brightsmith 2009, p. 5; Inigo-Elias 1996, p. 96; Nycander 1995, p. 428).

Competition for nesting sites occurs throughout the scarlet macaw's range. In Mexico, species including other psittacines (*Amazona farinosa*, *Amazona autumnalis*), toucans (*Ramphastos sulfuratus*), and falconiforms (*Herpetotheres cachinnans*) breed synchronously with scarlet macaws and compete to use the same nest cavities (Inigo-Elias 1996, p. 61). In Costa Rica, quality nest sites appear to be in demand because at least four pairs of scarlet macaws were seen competing for the same nest cavity, which may be a limiting factor in the successful fledgling in the population (Vaughan *et al.* 2003, p. 10). Additional avian nest competitors include chestnut-mandibled toucan (*Ramphastos swainsonii*), barred forest falcon (*Micrastur semitorquatus*), and yellow-napped parrot (*Amazona auropalliata*) (Vaughan *et al.* 2003, p. 10). At a remote site in southeastern Peru, approximately 70 percent of the nesting attempts involved competition over nests (Brightsmith 2010, unpaginated). Competition for nest sites with other macaws was found to be the primary cause of failure of nests with chicks. Scarlet macaws and red-and-green macaws (*Ara chloropterus*) frequently compete for nest cavities, which have been recorded annually. The smaller and less competitive scarlet macaws are at a disadvantage, perhaps contributing to their use of a wider range of cavity resources (Renton and Brightsmith 2009, p. 5).

Africanized honey bees (*Apis mellifera scutellata*) are also reported to be a serious competitor with scarlet macaws for nest cavities (Garcia *et al.* 2008, p. 52; Vaughan *et al.* 2003, p. 13; Inigo-Elias 1996, p. 61). Africanized honey bees are an exotic species originally introduced in Brazil in 1956 (Whitfield *et al.* 2006, p. 644). They subsequently spread throughout South and Central America, displacing naturalized European honey bees (*Apis mellifera*), and arriving in Mexico, Guatemala, and Belize around 1986 (Whitfield *et al.* 2006, pp. 643–644; Clarke *et al.* 2002 and Rogel *et al.* 1991, in Berry *et al.* 2010, p. 486; Fierro *et al.* 1987, unpaginated). Africanized honey bees occur at higher densities and are more aggressive than naturalized European honey bees (Rogel 1991 and Clarke *et al.* 2002, in Berry *et al.* 2010, p. 486). Studies in Mexico, Guatemala,

and Costa Rica reported bees attacking nests with eggs and chicks and that the bees usurped nesting cavities, resulting in the failure of the scarlet macaw nest (Inigo-Elias 1996, p. 61; Garcia *et al.* 2008, p. 52). Additionally, breeding pairs of scarlet macaws were attacked when they approached the nest cavity (Inigo-Elias 1996, p. 61; Garcia *et al.* 2008, p. 52). Because these bees occur throughout the scarlet macaw's range in Central and South America and have demonstrated a negative effect on scarlet macaw nesting, we assume these bees are competitors for nest cavities throughout the scarlet macaw's range, but we are unaware of any other data or information regarding the magnitude of these impacts on scarlet macaw nesting success.

Climate Change

Our analyses under the Act include consideration of ongoing and projected changes in climate and the effects of any such change. Described in general terms, climate refers to the mean and variability of different types of weather conditions over a long period of time, which may be reported as decades, centuries, or thousands of years. The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (*e.g.*, temperature, precipitation) that persists for an extended period, typically decades or longer, and whether the change is due to natural variability, human activity, or both (Intergovernmental Panel on Climate Change (IPCC) 2007, p. 78). Various types of changes in climate can have direct or indirect effects on species, and these may be positive or negative depending on the species and other relevant considerations, such as the effects of interactions with non-climate conditions (*e.g.*, habitat fragmentation). We use our expert judgment to weigh information, including uncertainty, in our consideration of various aspects of the effects of climate change that are relevant to the scarlet macaw.

Several studies project various changes in climate in Mesoamerica and the Amazon by the mid- to late century or sooner (Karmalkar *et al.* 2011, entire; Kitoh *et al.* 2011, entire; Giorgi and Bi 2009, entire; Anderson *et al.* 2008, entire; Cook and Vizy 2008, entire; Li *et al.* 2008, entire; Christensen *et al.* 2007, pp. 892–896). Although there are uncertainties in these models and variation in projections, the general trajectory under most scenarios is one of increased warming in Mesoamerica and the Amazon, and decreased precipitation in Mesoamerica and some areas of the Amazon. Several studies

project changes in habitat in areas of the species' range, either from the effects of climate change or from the effects of climate change in combination with deforestation (Imbach *et al.* 2011, abstract; Marengo *et al.* 2011, entire; Asner *et al.* 2010, entire; Vergara and Scholz 2010, entire; Malhi *et al.* 2009, entire; Malhi *et al.* 2008, entire; Nepstad *et al.* 2008, entire). However, high levels of uncertainty remain in projecting habitat changes within the species' range (see review by Davidson *et al.* 2012, entire), and there is no consensus on the type or extent of habitat changes that will occur. Therefore, because the scarlet macaw is tolerant of a relatively broad range of ecological conditions; occurs in a variety of habitat types including wet forest, dry forest, and savanna provided they contain suitable nest cavities and roosting sites; has a broad diet including nonnative species; and is known to inhabit patchworks of forest and human-modified landscapes, we assume the scarlet macaw is likely to adapt to some level of change in its environment provided its essential needs are met. Overall, we are unaware of any information indicating that the effects of climate change are now causing, or will in the future cause, declines in the scarlet macaw population.

Summary of Factor E

Small population size and competition for nest cavities may be threats to the scarlet macaw in some parts of its range in Mesoamerica and northwest Colombia. Populations have a high level of genetic diversity, but they remain vulnerable to stochastic demographic and environmental events because of their small populations. Competition for nest cavities may be a limiting factor and likely reduces reproductive success. The general consensus is that the scarlet macaw's range is going to become hotter and drier; however, the scarlet macaw is tolerant of a relatively broad range of ecological conditions. Because the species persists in small and mostly isolated populations, threats often operate synergistically, particularly when populations of a species are decreasing. Thus, the initial effects of one threat factor can exacerbate the effects of other threats (Gilpin and Soulé 1986, pp. 25–26).

Within the preceding review of the five factors, we have identified threat factors A and B that may have interrelated impacts on this species, particularly in Mesoamerica. The species' productivity in Mesoamerica may be reduced because of any of these threats, either singularly or in

combination. For example, deforestation reduces the amount of nesting cavities, which increases competition among pairs of scarlet macaws and other species for nesting sites. Deforestation and the infrastructure that may accompany it creates access to previously inaccessible areas, thereby opening up new areas of the species' range to the threat of poaching and further habitat loss. Therefore, because the populations of scarlet macaw are small and mostly isolated in Mesoamerica, and these small populations are subject to a combination of threats, we believe that small population size is a contributing stressor to scarlet macaws throughout Mesoamerica, including the entire range of subspecies *A. m. cyanoptera* and the range of *A. m. macao* in Costa Rica, Panama, and northwest Colombia.

Conservation Measures

Reintroduction of Scarlet Macaws

Reintroduction efforts for the scarlet macaw have occurred throughout the range of *A. m. cyanoptera* and the northern DPS of the southern subspecies *A. m. macao*. We briefly discussed some of the reintroduction efforts in our July 6, 2012, and April 7, 2016, proposed rules to list the scarlet macaw (77 FR 40222 and 81 FR 20302, respectively). However, based on public and peer reviewer comments we received, we are incorporating additional information regarding these conservation efforts and programs that reintroduce captive-bred and confiscated scarlet macaws back into the wild within their respective historical ranges. We received information on some of the release sites and reintroduction programs and describe many of them, although we may not have information on every reintroduction program occurring for scarlet macaws. Most, if not all, of the reintroduction sites are within, adjacent to, or at least within flight distance of currently existing populations.

Because of the increasing number of reintroduction projects involving various species worldwide, the IUCN Species Survival Commission published guidelines for reintroductions to help ensure that reintroduction efforts achieve intended conservation benefits and do not cause adverse side effects of greater impact (IUCN/SSC 2013, entire; IUCN/SSC 1998, entire). Additionally, recommendations were made specific to parrot reintroductions based on a review of previous releases and reintroductions of psittacines worldwide (White *et al.* 2012, entire). We considered these guidelines and recommendations when evaluating the effectiveness of the

reintroduction programs to conserve scarlet macaw throughout its range in Mesoamerica.

Reintroduction of *Ara macao cyanoptera*

Mexico

In 1993, Xcaret began a program of scarlet macaw reproduction in captivity, developing and using the best protocols for hand rearing, and establishing new procedures to facilitate parental rearing of the chicks without human intervention (Raigoza Figueras 2014, p. 51). The aim is to rear captive-bred macaws that will adapt to the wild successfully and not require post-release supplemental feeding (Raigoza Figueras 2014, p. 48). The release program began in 2013. Xcaret supplies captive scarlet macaws for reintroduction at two sites in Mexico: (1) Palenque, Chiapas; and (2) Los Tuxtlas, Veracruz (Xcaret 2014, unpaginated).

The Palenque, Chiapas, release site is located in forested habitat of Aluxes Ecopark of Palenque, a wildlife rescue and rehabilitation center that encompasses 44 ha (108 ac). This site is approximately 0.5 km (0.3 mi) from Palenque National Park (Amaya *et al.* 2015, p. 457) and more than 100 km (62 mi) away from the nearest current wild population (Brightsmith *in litt.* 2016, p. 21). All scarlet macaws used for reintroduction were captive bred at Xcaret Ecopark.

In the April 7, 2016, proposed rule (81 FR 20302), we identified the program in Palenque, Chiapas, Mexico, in which 96 scarlet macaws were released between April 2013 and June 2014, with a 91 percent survival rate as of May 2015, including nine nesting events and successful use of wild foods by released birds (Estrada 2014, p. 345). Results of the reintroduction program in Palenque, Chiapas, show that the dietary diversity and breadth of the reintroduced scarlet macaws closely approaches that of wild macaws; the reintroduced birds have the capacity to find and track wild food sources; they have very low mortality in the released population (9 percent); they have had nine successful nesting events, including seven in natural cavities (Estrada, unpublished, in Amaya *et al.* 2015, p. 471); and they have expanded their foraging and activity range outside of the release site (Amaya *et al.* 2015, pp. 466–471). This reintroduction appears successful at integrating captive-reared scarlet macaws into the wild and could be a model for reintroduction efforts throughout the range.

During the years of 2008–2010, the status of parrot species in Los Tuxtlas,

Veracruz, Mexico, was assessed by obtaining data on abundance, habitat use, and date of pet trade. Only three species out of the nine species previously reported remain in this area (De Labra *et al.* 2010, p. 599). Scarlet macaw was not recorded, and there is a consensus of local and historical extinction of the *Ara macao* in this region (Schaldach and Escalante 1997 and Winker 1997, in De Labra *et al.* 2010, p. 607).

Since that time, La Otra Opción is a 336-ac (136-ha) private ecological reserve and breeding center for endangered species in the Los Tuxtlas Biosphere Reserve buffer zone has worked to reintroduce scarlet macaws in the Los Tuxtlas region. In 2014, scarlet macaws were reintroduced to this area after disappearing for 40 years, and to date, more than 100 scarlet macaws have been released (Raigosa *et al.* 2016, in Defenders of Wildlife 2016, *in litt.*, p. 4; Mexico Daily News 2017, unpaginated; Escalante 2016, unpaginated). Many captive-bred scarlet macaws remain in the wild with pairing observed and potential nesting (Mexico Daily News 2017, unpaginated; Escalante 2016, unpaginated). Thus, this reintroduction effort appears moderately successful integrating scarlet macaws into the wild population in Mexico.

The reintroduction programs in Palenque and Los Tuxtlas were aligned with the IUCN guidelines and the recommendations made by White *et al.* 2012. After the first year of implementation in Palenque, the number of reintroduced and surviving macaws raises the number of extant macaws in the wild in Mexico by about 34 percent (Estrada 2014, p. 360). Considering Palenque and Los Tuxtlas together, the population of scarlet macaws in Mexico has increased up to 82 percent in 3 years (Rodriguez 2016, unpaginated; Lopez 2018, unpaginated).

Guatemala

The Wildlife Conservation Society (WCS) started working in Guatemala in 1992, with the mission of conserving the MBR as one of Mesoamerica's most important wildlife conservation areas. The MBR is the last stronghold for scarlet macaws in Guatemala and contains the most important nesting area for the species in the country. The WCS has worked to reduce poaching, protect nesting sites from deforestation, monitor nesting success and distribution, construct artificial nests, provide environmental education in local communities, and create a captive-release program (WCS 2016, pp. 6–16). In addition, they started a veterinarian evaluation program, supplementary

feeding, and management of wild chicks during nesting season (WCS 2018, unpaginated). In June 2016, WCS placed six rehabilitated chicks in safe scarlet macaw nests (Boyd 2016, *in litt.*, p. 9). With these interventions, they have increased the number of fledglings per nest (WCS 2018, unpaginated; WCS 2016, p. 11). WCS Guatemala is also working in collaboration to eradicate wildlife trafficking between Belize and Guatemala.

The Wildlife Rescue and Conservation Association (Asociación Rescate y Conservación de Vida Silvestre (ARCAS)) is a rehabilitation and breeding-for-release center for Guatemalan wildlife that has been confiscated from the black market by the Guatemalan government. Since its establishment, the ARCAS Rescue Center has grown into one of the largest and most complex wildlife rehabilitation centers in the world and a leader in training programs for other wildlife rescue groups and veterinary students (Oakland Zoo 2018, unpaginated). In October 2015, in Petén, ARCAS released nine captive-bred scarlet macaws into the wild in Guatemala, which was the first time captive-bred scarlet macaws were released into the wild in Guatemala. At least 60 percent of the released birds survived more than 10 months on their own, showing that they successfully adapted to the environment and were able to feed and fly on their own. This program for rehabilitation and release has generated quantifiable results that can be used to prove the viability of such a strategy in the reinforcement of the depleted scarlet macaw population of the Sierra del Lacandón National Park, which is where the scarlet macaws were released and is one of the largest and best protected natural areas in the MBR (ARCAS 2016, pp. 5–6). In 2016, they planned to release 10 more scarlet macaws (Boyd 2016, *in litt.*, p. 10), but we do not have any information regarding the results of this release.

Belize

In Belize, the protection of the scarlet macaw in the Chiquibul region is provided by numerous organizations, some of which have joined efforts to improve protection with the goal of increasing the chance of survival for this species (Hagen Avicultural Research Institute 2015, unpaginated). For example, the Scarlet Six Biomonitoring Team (Scarlet Six), Friends for Conservation and Development (FCD), and the Belize Self-Defense Forces work together to reduce illegal gold mining; timber extraction; and poaching of

animals, particularly scarlet macaw chicks.

The FCD rangers patrol the Chiquibul Forest, collaborate with the Scarlet Six, and receive support from the Belize Defense Force. Their goal is to conserve the natural and cultural resources of the western Chiquibul-Maya Mountains (FCD 2016, p. 4). In addition to protecting scarlet macaws in the wild, the FCD also started a captive-rearing program modeled after successful programs in Mexico and Guatemala (Harbison 2017, unpaginated). If a nest cannot be effectively protected by the rangers while the chicks are growing, or if a nest produces a third chick that will not survive, FCD removes the chicks from the nest and brings them to the lab. All eight macaws in 2015's cohort successfully fledged, but it took until January 2016 before they left the area for good (Harbison 2017, unpaginated). The FCD also signed an agreement with WCS in Guatemala and Natura y Ecosistemas Mexicanos A.C. in July to coordinate research, management, and conservation efforts of scarlet macaws in the Maya Forest (FCD 2016, p. 13). In January 2016, FCD signed an extended agreement of cooperation with Asociación Balam for the protection of the Chiquibul ecosystem for the period 2016–2020. This agreement primarily seeks to jointly promote the protection of the Chiquibul Maya Mountains ecosystem and reduce conflict among communities located on the Belize and Guatemala adjacency zone (FCD 2016, p. 9).

Honduras

In Honduras, scarlet macaws have been released into multiple sites. Releasing scarlet macaws at the Isla Zacate Grande biological station in Honduras began around 1996–1997 (Raigoza Figueras 2014, p. 50; Boyd and McNab 2008, p. x). A private reserve released scarlet macaws on the island. This reintroduction effort started with four chicks; a few years later, they received and released another five scarlet macaws (adults and chicks) of unknown origin (Boyd and McNab 2008, p. x). About 20 scarlet macaws have been released at the site (Bjork 2008, pp. x, 17–18; Raigoza Figueras 2014, p. 50). Some of the reintroduced birds have ranged outside the release point to nearby communities and the adjacent island of Amapala, Honduras. Released birds have been observed around the Gulf of Fonseca, where Paso Pacifico is conducting a scarlet macaw conservation program on the Cosigüina Peninsula, Nicaragua (see “Nicaragua,” below), which hosts a small wild population of 20 to 50 birds (Paso

Pacifico 2017, unpaginated; Boyd and McNab 2008, p. x). Isla Zacate Grande is approximately 35 km (22 mi) (overwater) from the Cosigüina Peninsula, an overland flight distance within documented range for scarlet macaws (Boyd and McNab 2008, p. x). Although no formal records are kept, nesting activity has been observed in artificial nests placed in natural hollows (Raigoza Figueras 2014, p. 50). However, as a model, there are concerns about the reintroduction at this site because disease testing was not performed; there was no documentation of the project; the birds have no fear of humans and continue to depend on regular supplemental food; and the birds appear to have been conditioned to nest in inappropriate situations (*i.e.*, low to the ground), which makes them highly vulnerable to human and non-human predators alike. High security and long-term daily maintenance is required (Boyd and McNab 2008, p. x; Bjork 2008, pp. 17–18).

A reintroduction of scarlet macaw at the Copán archaeological site (Parque Arqueológico Copán Ruinas) in Honduras began in 2011. The World Parrot Trust, the Macaw Mountain Bird Park and Nature Reserve, the Institute of Anthropology and History of Honduras and the Association Copán have organized a long-running program to return the scarlet macaw to the Parque Arqueológico Copán Ruinas, a national park (Raigoza Figueras 2014, pp. 50–51). The Macaw Mountain scarlet macaw breeding program is releasing birds into the forests surrounding the Copán Ruins (Boyd 2016, *in litt.*, p. 6). Most of the birds come from private donations of pet birds; others were confiscated by the Environment Office of the Public Ministry (Macaw Mountain 2017, unpaginated). In 2018, scarlet macaws released produced seven chicks (World Parrot Trust 2019, unpaginated). We are not aware of the release methods or if this program takes into account the IUCN guidelines and White *et al.* (2012) recommendations. However, this program has been judged a resounding success (Macaw Mountain 2019, unpaginated; Asociación Copan 2017, unpaginated).

A macaw conservation and local development program was started in the Mosquitia region of Honduras by the Lafeber Company, Dr. Kim Joyner, indigenous peoples of several villages, the Forestry Service of Honduras, Universidad Nacional Autónoma Honduras, and the Universidad Nacional de Agricultura (Boyd 2016, *in litt.*, p. 7; Lafeber 2018, unpaginated). This program started in 2010, and in 2011 through 2012, confiscated scarlet

macaws were released at the village Mabita. Once these birds grew large enough to fly, they were released from their cages, slowly learning to fly around the village. Government officials have released more birds, for a total of 22, and approximately 16 regularly visit the village, coming in every morning to feed. The earliest birds released in Mabita (in 2011) have an active nest; they have produced two chicks, which demonstrates that the program can successfully raise birds to reproduce in the wild (Lafeber 2018, unpaginated). However, it is not ideal that the birds are so dependent on humans for food. We are not aware of the release methods or if this program takes into account the IUCN guidelines and White *et al.* (2012) recommendations.

Nicaragua

Paso Pacifico works throughout Nicaragua, focusing on the natural ecosystems of Central America's Pacific slope (Boyd 2016, *in litt.*, p. 5). In 2015, they launched a scarlet macaw conservation program in the Cosigüina Volcano area of northern Nicaragua (Paso Pacifico 2017, unpaginated). With financial support from the Loro Parque Fundación, among others, community rangers protect and monitor the remaining scarlet macaws. Their objectives are to establish accurate baseline information about the population, focusing on demographics, nesting success, and habitat use in the reserve; to strengthen the ability of the Nicaraguan army to deter poachers; to involve and empower the local community to protect nesting scarlet macaws; and to increase awareness among Ministry of Environment officials and the Nicaraguan environmental community (Loro Parque Fundación 2015, unpaginated). They have also been working closely with families from La Salvia, the village nearest to the scarlet macaw nesting area, through an educational program involving birdwatching and other field-based activities that highlight the significance of the scarlet macaw and the dry tropical forests at Cosigüina (pasopacifico 2017, unpaginated). Two scarlet macaw chicks have safely fledged, which was the first successful macaw nest documented in this area in over 20 years (pasopacifico 2017, unpaginated).

Reintroduction of *Ara macao macao*

Costa Rica

On the Nicoya Peninsula in northwestern Costa Rica, scarlet macaws are currently released at Punta Islita, Playa Tambor, and Curú National

Wildlife Refuge, which are all within 50 km (31 mi) of each other. It is difficult to determine how these populations will fare over time because these populations are fairly isolated, but these three release sites could help repopulate the Nicoya Peninsula (Brightsmith 2016, *in litt.*, p. 15). The Punta Islita release site is situated in the tropical moist forest of Costa Rica's North Pacific coast; wild scarlet macaws had been locally extinct in this area for decades. Between 2011 and 2018, 37 scarlet macaws were released at this site (Ara Project 2017, unpaginated). We have no data concerning the current status of the released birds. At Curú, scarlet macaws were released starting in January 1999. Ten of the 13 birds released were still alive after 4 years, and pairs have attempted to nest in natural tree cavities in two different years, but no chicks have been produced (Brightsmith *et al.* 2005, p. 468). At Playa Tambor, we do not have information on the number of scarlet macaws released into the wild or the success of the releases at this site.

Within the scarlet macaw's range in southwestern Costa Rica, a few reintroduction programs exist around the Gulf (Golfo Dulce) and the Osa Peninsula. These include Santuario Silvestre de Osa (SSO), which releases birds close to Piedras Blancas National Park; Zoo Ave, which releases birds in the Golfito area; Amigos de las Aves, which releases offspring of confiscated birds in Alajuela, Punta Banco (Dear *et al.* 2010, pp. 15–17; Forbes 2005, p. 97); and Tiskita Lodge and the Ara project, which releases birds in Tiskita Jungle Lodge's private reserve also in Punta Blanco (Ara Project 2018, unpaginated). These organizations receive and release birds confiscated from poachers from all parts of the country (Dear *et al.* 2010, p. 15). Seventy-seven scarlet macaws were released in 1997; as of 2002, almost 90 percent of the released birds were still alive (Dear *et al.* 2010, p. 16). Additionally, the range of birds released at Punta Banco has grown to reach 84 km² (32 mi²) (Forbes 2005, *in Dear et al.* 2010, p. 17). The breeding center in Alajuela has since closed and moved to Tiskita (Tiskita Jungle Lodge 2018, unpaginated). Between 2002 and 2014, nine groups of birds were released in Tiskita, most of which are thriving and reproducing in the wild (Ara Project 2018, unpaginated; Tiskita Jungle Lodge 2018, unpaginated). To date, the survival rate is close to 90 percent, and at least five pairs have successfully fledged chicks in natural cavities since 2008. Over 75 scarlet macaws have been released into the wild at this site (Tiskita Jungle Lodge 2018,

unpaginated). This reintroduction program has ceased because a viable population has been established that is large enough to potentially connect with populations in the ACOSA that are farther north along the coast (Tiskita Jungle Lodge 2018, unpaginated). Thus, releases could potentially aid in recolonization of the macaw population's original range, to the extent that the habitat within that range remains suitable.

In total, the past and ongoing reintroduction efforts have added hundreds of scarlet macaws to the wild in Costa Rica. Additionally, most reintroduction projects conduct environmental education at a local level and attract additional media attention at the local and national level. As a result, each reintroduction project educates the public about the importance of scarlet macaws and of conservation and the environment in general (Brightsmith 2016, *in litt.*, p. 22).

Impacts of Reintroducing Captive-Bred Scarlet Macaws Into the Wild

Releases of captive scarlet macaws could increase the wild populations because many of the reintroduced captive-raised and confiscated birds are released adjacent to existing populations or at least within the range that scarlet macaws are known to disperse, and some of the release birds have adapted to surviving in the wild by finding mates and food and nesting resources similar to what wild scarlet macaws use. In addition, releases of scarlet macaws could potentially aid in recolonization of the population's original range in Mesoamerica, to the extent that the habitat within that range remains suitable and programs are available to protect scarlet macaws in the wild from poachers. Conversely, releases of captive scarlet macaws could potentially pose a threat to wild populations by exposing wild birds to diseases for which wild populations have no resistance, invoking behavioral changes in wild macaws that negatively affect their survival, or compromising the genetic integrity of wild populations (Dear *et al.* 2010, p. 20; Schmidt 2013, pp. 74–75; also see IUCN 2013, pp. 15–17). However, generally speaking, disease risks are small because the probable frequency of occurrence is low (see *Factor C* discussion in 77 FR 40237–40238; July 6, 2012).

Other Conservation Programs

Conservation programs operate in some areas of the scarlet macaw's range but not throughout its entire range. Many partner organizations work together to implement these

conservation programs that study and aim to increase the viability of scarlet macaw populations in the wild. To the extent that we have information indicating the effects of these programs on the scarlet macaw's status, we included information in the **Factors Affecting the Species**, above. In addition, general conservation measures such as education, use of artificial nest boxes, and nest monitoring are discussed below. Because too many organizations exist to list them all here, we summarize the general actions taken. Organizations in certain regions where scarlet macaws persist conduct the following conservation efforts:

(1) Implement education programs that promote the scarlet macaw, as well as sustainable forest management, because much of the territory in the scarlet macaw's range is held by local communities or indigenous people (Ara Project 2017, unpaginated; Vaughan *et al.* 1999, entire; WCS 2010, entire; FAO 2010a, pp. 238–239, Blaser *et al.* 2011, pp. 312, 346; Marineros and Vaughan 1995, pp. 462–463);

(2) Protect and monitor nests to reduce poaching, which has reduced overall nest poaching in Belize from higher than 90 percent to less than 30 percent, with 2017 the second year in a row that no known nests were poached, and has greatly decreased the severity of poaching in Guatemala (Harbison 2017, unpaginated; Garcia *et al.* 2008, p. xii);

(3) Construct artificial nest boxes, which increases nesting sites and ultimately recruitment (Vaughan *et al.* 2003, p. 10; Brightsmith 2000a, entire; Brightsmith 2000b, entire; Brightsmith 2005, p. 297; Nycander *et al.* 1995, pp. 435–436); and

(4) Use local conservation organizations to coordinate conservation activities with stakeholders (Vaughan *et al.* 2005, p. 123; WCS 2008, entire).

Finding

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in part 424 of title 50 of the Code of Federal Regulations (50 CFR part 424) set forth procedures for adding species to, removing species from, or reclassifying species on the Federal Lists of Endangered and Threatened Wildlife and Plants. Section 3 of the Act defines an “endangered species” as “any species which is in danger of extinction throughout all or a significant portion of its range,” and a “threatened species” as “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” As required by the Act, we conducted a review of the status of the species and

considered the five factors in assessing whether the scarlet macaw meets the definition of an endangered species or threatened species. We examined the best scientific and commercial information available regarding factors affecting the status of the scarlet macaw. We reviewed the petition, information available in our files, information provided by peer review and public comments, and other available published and unpublished information.

Final Determination for the Northern Subspecies (*Ara macao cyanoptera*)

The northern subspecies of scarlet macaw, *Ara macao cyanoptera*, exists in Mexico, Guatemala, Belize, Honduras, Nicaragua, eastern Costa Rica, and Isla Coiba in Panama. Little quantitative data on historical populations are available, but evidence indicates that the range of this subspecies has been greatly reduced and the total current population of *A. m. cyanoptera*, based on available data (see Table 1), is estimated to be approximately 2,000 to 3,000 individuals.

The primary threats we identified to *A. m. cyanoptera* are habitat loss due to activities that cause deforestation and forest degradation (Factor A), poaching for the pet trade and sustenance (Factor B), and small population size that works in combination with the other threats (Factor E). The existing regulatory mechanisms are not adequate to protect the species from these threats to the level that the species is not in danger of extinction (Factor D).

Destruction of forest habitat is one of the main causes of the decline of *A. m. cyanoptera*. Deforestation rates in Mesoamerica, excluding Costa Rica, are the highest in Latin America due to expanding agriculture, cattle ranching, and selective and often illegal logging. Throughout the range of the subspecies where most of the species' historical habitat has been eliminated, deforestation is rapidly occurring, including in all the forested areas where scarlet macaws currently exist (except Isla Coiba, Panama). Activities that lead to deforestation and forest degradation directly eliminate the scarlet macaw's tropical forest habitat by removing the trees that support the species' essential needs for nesting, roosting, and food. Scarlet macaws are known to use partially cleared and cultivated landscapes, but they are only able to do so if the landscape maintains enough large, older trees that provide the essential needs of the species.

Poaching, mainly for the pet trade but also for sustenance, is the other main cause of decline of *A. m. cyanoptera*.

The scarlet macaw is a popular pet species within its range countries, and overutilization as a result of poaching is a significant threat to *A. m. cyanoptera* (except on Isla Coiba, Panama). The scarlet macaw is susceptible to overharvest because it is a long-lived species with a low reproductive rate and slow to recover from harvesting pressures. Thus, removal of individuals year after year can inhibit population growth and cause local extirpation. Evidence suggests poaching occurs at significant levels in the Maya Forest region, even with conservation measures such as monitoring and protecting nesting sites in Guatemala and Belize, and is a significant threat in Honduras and Nicaragua. Poaching is exacerbated by habitat removal because it increases access to previously inaccessible areas, thereby opening up new areas to poaching.

Most if not all of the countries within the range of *A. m. cyanoptera* have regulations aimed at conserving forested lands, biodiversity, and prohibit poaching of scarlet macaws. However, these countries are not able to adequately enforce their regulations due to lack of resources, conflicts over land ownership that lead to illegal logging and expansion of agriculture and pasture, and lack of oversight or a governing body to enforce the regulations.

Some range countries employ conservation measures such as protecting nesting sites from poachers and reintroducing captive-bred scarlet macaws into the wild. While these programs have had success protecting nests from poachers and slightly increasing the number of scarlet macaws in the wild in some populations (see *Conservation Measures*, above), many of the reintroduction programs do not have data to show long-term viability of reintroduced birds. Therefore, while conservation measures have had a positive impact on the populations of *A. m. cyanoptera*, these conservation actions occur in small sections of the range of the subspecies and the threats identified above are ongoing.

Scarlet macaws in Mesoamerica maintain a high level of genetic diversity, but because of the few populations and the small numbers in each of the populations, and their virtual isolation from other populations due to deforestation, they remain vulnerable to extirpation and extinction. Fewer than 5,000 scarlet macaws remain in this relatively large geographic area.

Because of the extent of the decline in the range and numbers of *Ara macao cyanoptera* due to ongoing habitat destruction and degradation, poaching,

the lack of enforcement of existing regulatory mechanisms addressing these threats, and the small population sizes that work in combination with the other threats, we find that these threats place *A. m. cyanoptera* in danger of extinction. Therefore, on the basis of the best scientific and commercial information available, we find that *A. m. cyanoptera* meets the definition of an “endangered species” in accordance with the definition in the Act.

Final Determination for the Northern DPS of Southern Subspecies (Ara macao macao)

The range of *Ara macao macao* north and west of the Andes has been greatly reduced and fragmented. The scarlet macaw has been almost extirpated from mainland Panama and much of its former range in Costa Rica. Its remaining distribution is on the Pacific slope of Costa Rica, in the Chiriquí province and at the southern end of the Azuero Peninsula of Veraguas, near Cerro Hoya National Park in Panama, and in northwest Colombia.

Because information indicates that the ACOPAC and ACOSA populations in Costa Rica, which make up the bulk of the northern DPS of *A. m. macao*, may be stable and likely increasing and expanding their range on the Pacific slope of Costa Rica, it is reasonable to conclude that the northern DPS of *A. m. macao* is not currently in danger of extinction and does not meet the definition of an “endangered species” under the Act. A threatened species is “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act does not define the phrase “foreseeable future,” but we interpret it to describe the extent to which we can reasonably rely on the predictions about the future in making determinations about the future conservation status of the species. We conclude that it is reasonable to rely on the information contained in the studies discussed above under “Factors Affecting the Species” involving land-use trends and population sizes, as well as the information regarding enforcement of existing regulations and other factors that negatively influence the species, to make a determination about the future conservation status of the northern DPS of *A. m. macao*.

Poaching continues and remains a concern for the future viability of the species for the foreseeable future. In Panama, poaching of scarlet macaws was one factor that led to the virtual extirpation of this species from the mainland, and poaching remains a concern at Cerro Hoya National Park,

which is one of the only locations where a very small population of scarlet macaws exists on mainland Panama. Additionally, the best available information indicates that the population in northwest Colombia faces significant ongoing threats from deforestation within the foreseeable future. No current population estimates are available for northwest Colombia, and this region is reported to have large tracts of suitable forest habitat, but many areas in northwest Colombia are considered deforestation hotspots. Thus, although the two largest populations currently appear to be increasing, they both are small and their total range represents only a portion of the range of the northern DPS. Therefore, we find that the best available information indicates that current threats to scarlet macaws in northwest Colombia (deforestation); ongoing poaching of scarlet macaws in Costa Rica and mainland Panama; ongoing, small-scale, subsistence logging in Panama; inadequate enforcement of existing regulations; and the small population sizes of scarlet macaws in this region put this DPS in danger of extinction in the foreseeable future. On the basis of the best scientific and commercial information available, we find that the northern DPS of *A. m. macao* meets the definition of a “threatened species” in accordance with the definition in the Act.

Similarity of Appearance

Final Determination for Southern DPS of Southern Subspecies (Ara macao macao)

In our proposed rule we found that the southern DPS of the southern subspecies *A. m. macao* did not warrant listing as an endangered species or a threatened species based on its status. However, we determined that it is advisable to treat the southern DPS as a threatened species based on its similarity of appearance to the northern DPS of *A. m. macao* and subspecies crosses of *A. m. cyanoptera* and *A. m. macao*. Section 4(e) of the Act authorizes the treatment of a species, subspecies, or distinct population segment as endangered or threatened if: “(A) [S]uch species so closely resembles in appearance, at the point in question, a species which has been listed pursuant to [section 4 of the Act] that enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species; (B) the effect of this substantial difficulty is an additional threat to an endangered or threatened species; and (C) such treatment of an

unlisted species will substantially facilitate the enforcement and further the policy of this [Act].” All applicable prohibitions and exceptions for species treated as threatened under section 4(e) of the Act due to similarity of appearance to a threatened or endangered species will be set forth in a rule issued under section 4(d) of the Act.

Several factors make differentiating between scarlet macaw listable entities difficult. First, the scarlet macaw subspecies, *Ara macao macao* and *Ara macao cyanoptera*, primarily differ in the coloration of their wing coverts (a type of feather) and wing size. But these differences are not always apparent, especially in birds from the middle of the species’ range (which may include crosses between *A. m. cyanoptera* and *A. m. macao*), sometimes making it difficult to visually differentiate between subspecies (Schmidt 2011, pers. comm.; Weidenfeld 1994, pp. 99–100). According to information received from the Service’s Forensics Laboratory, many scarlet macaw remains submitted for examination by Office of Law Enforcement special agents and wildlife inspectors do not consist of intact carcasses; rather, evidence is usually in the form of partial remains, detached feathers, and artwork incorporating their feathers. Therefore, identification of the subspecies or the geographic origin of these birds is difficult or improbable without genetic analysis, which would add considerable difficulties and cost for law enforcement.

Second, we are not aware of any information indicating that distinguishing morphological differences between the northern and southern DPSs of *A. m. macao* would allow for visual identification of the origin of a bird of this subspecies. Lastly, aviculturists have bred the species without regard for taxa, resulting in crosses of the two subspecies (*A. m. cyanoptera* and *A. m. macao*) that maintain a combination of characteristics of either parent being present in trade (Wiedenfeld 1994, p. 103). As a result, the similarity of appearance between an unlisted southern DPS of *A. m. macao* and subspecies crosses to the listed northern DPS of *A. m. macao* and *A. m. cyanoptera* may result in the ability to pass off a protected specimen as an unlisted DPS or unlisted subspecies cross and poses an additional threat to the northern DPS of *A. m. macao* and subspecies *A. m. cyanoptera*. Therefore, we consider this difficulty in discerning an unlisted southern DPS and unlisted subspecies crosses from the listed northern DPS of *A. m. macao* and

subspecies *A. m. cyanoptera* as an additional threat to the listed entities.

The close resemblance between the listed and the unlisted entities would make differentiating the listed scarlet macaws (the subspecies *Ara macao cyanoptera* and the northern DPS of the subspecies *Ara macao macao*) from those that are not listed (individuals of the southern DPS of *A. m. macao* and subspecies crosses (*A. m. cyanoptera* and *A. m. macao*)) difficult for law enforcement to enforce. Therefore, we determine that treating the southern DPS of *A. m. macao* and subspecies crosses (*A. m. cyanoptera* and *A. m. macao*) under the 4(e) similarity of appearance provisions of the Act will substantially facilitate law enforcement actions to protect and conserve scarlet macaws. If the southern DPS of *A. m. macao* or subspecies crosses (*A. m. cyanoptera* and *A. m. macao*) were not listed, importers and exporters could inadvertently or purposefully misrepresent a specimen of *A. m. cyanoptera* or the northern DPS of *A. m. macao* as a specimen of the unlisted entity, creating a loophole in enforcing the Act's protections for listed species of scarlet macaw. Thus, the listing will facilitate Federal and State law-enforcement efforts to curtail unauthorized import and trade in *A. m. cyanoptera* or the northern DPS of *A. m. macao*.

Extending the prohibitions of the Act to the similar entities through this listing of those entities due to similarity of appearance under section 4(e) of the Act and providing applicable prohibitions and exceptions in a rule issued under section 4(d) of the Act will provide greater protection to *A. m. cyanoptera* and the northern DPS of *A. m. macao*. Although the 4(e) provisions of the Act do not contain criteria as to whether a species listed under the similarity of appearance provisions should be treated as endangered or threatened, we find that treating the southern DPS of *A. m. macao* and subspecies crosses (*A. m. cyanoptera* and *A. m. macao*) as threatened is appropriate because the 4(d) rule, for the reasons mentioned in our finding below, provides adequate protection for these entities. For these reasons, we are proposing to treat the southern DPS of *A. m. macao* and subspecies crosses (*A. m. cyanoptera* and *A. m. macao*) as threatened due to the similarity of appearance pursuant to section 4(e) of the Act.

4(d) Rule

When a species is listed as endangered, certain actions are prohibited under section 9 of the Act

and our regulations at 50 CFR 17.21. These include, among others, prohibitions on take within the United States, within the territorial seas of the United States, or upon the high seas; import; export; and shipment in interstate or foreign commerce in the course of a commercial activity. Exceptions to the prohibitions for endangered species may be granted in accordance with section 10 of the Act and our regulations at 50 CFR 17.22.

The Act does not specify particular prohibitions and exceptions to those prohibitions for threatened species. Instead, under section 4(d) of the Act, the Secretary, as well as the Secretary of Commerce depending on the species, was given the discretion to issue such regulations as deemed necessary and advisable to provide for the conservation of such species. The Secretary also has the discretion to prohibit by regulation with respect to any threatened species any act prohibited under section 9(a)(1) of the Act. For the scarlet macaw, the Service is exercising our discretion to issue a 4(d) rule. By adopting the existing parrot 4(d) rule for the scarlet macaw, we are incorporating all prohibitions and provisions of 50 CFR 17.31 and 17.32. However, import and export of certain scarlet macaws into and from the United States and certain acts in interstate commerce are allowed without a permit under the Act, as explained below.

The 4(d) rule will apply to the southern subspecies of scarlet macaw (*Ara macao macao*) and to crosses of the two scarlet macaw subspecies, *A. m. macao* and *A. m. cyanoptera*. We are including subspecies crosses in this rule because aviculturists have bred the species without regard to their taxa, resulting in crosses of the two subspecies being present in trade. All prohibitions of 50 CFR 17.31 will apply to *A. m. macao* and subspecies crosses of *A. m. macao* and *A. m. cyanoptera*, except that import and export of certain *A. m. macao* and subspecies crosses into and from the United States and certain acts in interstate commerce will be allowed without a permit under the Act, as explained below. For activities otherwise prohibited under the 4(d) rule involving specimens of the southern DPS of the scarlet macaw and subspecies crosses, such activities will require authorization pursuant to the similarity-of-appearance permit regulations at 50 CFR 17.52. If an applicant is unable to meet the issuance criteria for a similarity-of-appearance permit and demonstrate that the scarlet macaw in question is a subspecific cross or originated from the southern DPS,

authorization for an otherwise prohibited activity would need to be obtained under the general permit provisions for threatened species found at 50 CFR 17.32. For activities otherwise prohibited under the 4(d) rule involving specimen of the northern DPS of the scarlet macaw (*A. m. macao*), such activities would require authorization pursuant to the general permit provisions for threatened species found at 50 CFR 17.32.

Import and Export

The 4(d) rule will apply to all commercial and noncommercial international shipments of live and dead southern subspecies of scarlet macaws and subspecific crosses of *A. m. macao* and *A. m. cyanoptera* and their parts and products, including the import and export of personal pets and research samples. In most instances, the rule will adopt the existing conservation regulatory requirements of CITES and the WBCA as the appropriate regulatory provisions for the import and export of certain scarlet macaws. The import into the United States and export from the United States of birds taken from the wild after the date this species is listed under the Act; conducting an activity that could take or incidentally take scarlet macaws; and foreign commerce must meet the requirements of 50 CFR 17.31 and 17.32, including obtaining a permit under the Act. However, the 4(d) rule allows a person to import or export without a permit issued under that Act if the specimen either: (1) Was held in captivity prior to the date this species is listed under the Act; or (2) is a captive-bred specimen, provided the export is authorized under CITES and the import is authorized under CITES and the WBCA. If a specimen was taken from the wild and held in captivity prior to the date this species is listed under the Act, the importer or exporter must provide documentation to support that status, such as a copy of the original CITES permit indicating when the bird was removed from the wild or museum specimen reports. For captive-bred birds, the importer must provide either a valid CITES export/re-export document issued by a foreign Management Authority that indicates that the specimen was captive-bred by using a source code on the face of the permit of either "C," "D," or "F." Exporters of captive-bred birds must provide a signed and dated statement from the breeder of the bird confirming its captive status, and documentation on the source of their breeding stock. The source codes of C, D, and F for CITES permits and certificates are as follows:

(C) Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5 of the Convention.

(D) Appendix-I animals bred in captivity for commercial purposes in operations included in the Secretariat's Register, in accordance with Resolution Conf. 12.10 (Rev. CoP15), and Appendix-I plants artificially propagated for commercial purposes, as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 4, of the Convention.

(F) Animals born in captivity (F1 or subsequent generations) that do not fulfill the definition of "bred in captivity" in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof.

The 4(d) rule's provisions regarding captive-bred birds apply to birds bred in the United States and abroad. The terms "captive-bred" and "captivity" used in the 4(d) rule are defined in the regulations at 50 CFR 17.3 and refer to wildlife produced in a controlled environment that is intensively manipulated by man from parents that mated or otherwise transferred gametes in captivity. Although the 4(d) rule requires a permit under the Act to "take" (including harm and harass) a scarlet macaw, our regulations at 50 CFR 17.3 establish that "take" when applied to captive wildlife does not include generally accepted animal-husbandry practices; breeding procedures; or provisions of veterinary care for confining, tranquilizing, or anesthetizing, when such practices, procedures, or provisions are not likely to result in injury to the wildlife.

We assessed the conservation needs of the scarlet macaw in light of the broad protections provided to the species under CITES and the WBCA. The scarlet macaw is included in Appendix I of CITES, a treaty that contributes to the conservation of the species by regulating international trade and ensuring that trade in Appendix-I species is not detrimental to the survival of the species. The purpose of the WBCA is to promote the conservation of exotic birds and to ensure that imports of exotic birds into the United States do not harm them. The best available data indicate that the current threat of trade of the scarlet macaw stems mainly from illegal trade that stays within the domestic

markets of Central and South America. Thus, the general prohibitions on import and export contained in 50 CFR 17.31, which extend only within the jurisdiction of the United States, would not regulate such activities.

Accordingly, we find that the import and export requirements of the 4(d) rule provide the necessary and advisable conservation measures for this species. This 4(d) rule streamlines the permitting process by deferring to existing laws that are protective of scarlet macaws in the course of import and export and not requiring permits under the Act for certain types of activities.

Interstate Commerce

Under the 4(d) rule, a person may deliver, receive, carry, transport, or ship *Ara macao macao* and subspecies crosses (*A. m. macao* and *A. m. cyanoptera*) in interstate commerce in the course of a commercial activity, or sell or offer to sell in interstate commerce *A. m. macao* and subspecies crosses without a permit under the Act. At the same time, the prohibitions on take under 50 CFR 17.21, as presently extended to threatened species under 50 CFR 17.31, will apply under this 4(d) rule, and any interstate commerce activities that could incidentally take *A. m. macao* and subspecies crosses or otherwise prohibited acts in foreign commerce will require a permit under 50 CFR 17.32.

We have no information that suggests current interstate commerce activities are associated with threats to the scarlet macaw or would negatively affect any efforts aimed at the recovery of wild populations of the species. Therefore, we are not placing into effect any prohibitions on interstate commerce of scarlet macaw within the United States. Because the species will be otherwise protected in the course of interstate commercial activities under the take provisions and foreign commerce provisions contained in 50 CFR 17.31 as applied to this species, and international trade of this species is regulated under CITES, we find this 4(d) rule contains all the prohibitions and authorizations necessary and advisable for the conservation of the scarlet macaw.

Required Determinations

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

We have determined that we do not need to prepare an environmental assessment, as defined under the authority of the National Environmental Policy Act of 1969, in connection with regulations adopted under section 4(a) of the Endangered Species Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

References Cited

A complete list of references cited in this rulemaking is available on the internet at <http://www.regulations.gov> and upon request from the U.S. Fish and Wildlife Service, Ecological Services, Branch of Delisting and Foreign Species (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this rule are staff members of the Branch of Delisting and Foreign Species, Ecological Services Program, U.S. Fish and Wildlife Service.

List of Subjects in 50 CFR Part 17

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

Regulation Promulgation

Accordingly, we 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; 4201–4245, unless otherwise noted.

■ 2. Amend § 17.11(h) by adding entries for "Macaw, scarlet", "Macaw, scarlet [Northern DPS]", "Macaw, scarlet [Southern DPS]", and "Macaw, scarlet [Subspecies crosses]" in alphabetical order under BIRDS to the List of Endangered and Threatened Wildlife, to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
BIRDS				
Macaw, scarlet	<i>Ara macao cyanoptera</i>	Wherever found	E	84 FR [insert Federal Register page where the document begins], 2/26/2019.
Macaw, scarlet [Northern DPS]	<i>Ara macao macao</i>	Colombia (northwest of the Andes), Costa Rica (Pacific slope), Panama (mainland).	T	84 FR [insert Federal Register page where the document begins], 2/26/2019; 50 CFR 17.41(c). ^{4d}
Macaw, scarlet [Southern DPS]	<i>Ara macao macao</i>	Bolivia, Brazil, Colombia (southeast of the Andes), Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela.	T(S/A)	84 FR [insert Federal Register page where the document begins], 2/26/2019; 50 CFR 17.41(c). ^{4d}
Macaw, scarlet [Subspecies crosses].	<i>Ara macao macao</i> X <i>Ara macao cyanoptera</i> .	Costa Rica, Nicaragua (Atlantic slope border region).	T(S/A)	84 FR [insert Federal Register page where the document begins], 2/26/2019; 50 CFR 17.41(c). ^{4d}

■ 3. Amend § 17.41 by revising paragraphs (c) introductory text and (c)(2)(ii) introductory text and by adding paragraph (c)(2)(ii)(E) to read as follows:

§ 17.41 Special rules—birds.

* * * * *

(c) The following species in the parrot family: Salmon-crested cockatoo (*Cacatua moluccensis*), yellow-billed parrot (*Amazona collaria*), white cockatoo (*Cacatua alba*), hyacinth macaw (*Anodorhynchus hyacinthinus*), and scarlet macaw (*Ara macao macao* and scarlet macaw subspecies crosses

(*Ara macao macao* and *Ara macao cyanoptera*)).

* * * * *

(2) * * *

(ii) *Specimens held in captivity prior to certain dates:* You must provide documentation to demonstrate that the specimen was held in captivity prior to the dates specified in paragraph (c)(2)(ii)(A), (B), (C), (D), or (E) of this section. Such documentation may include copies of receipts, accession or veterinary records, CITES documents, or wildlife declaration forms, which must be dated prior to the specified dates.

* * * * *

(E) For *scarlet macaws*: March 28, 2019 (the date this species was listed under the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*)).

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Dated: February 4, 2019.

Margaret E. Everson,

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

[FR Doc. 2019-03165 Filed 2-25-19; 8:45 am]

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