

DEPARTMENT OF THE INTERIOR**Fish and Wildlife Service****50 CFR Part 17**[Docket No. FWS-HQ-ES-2024-0157;
FXES1111090FEDR-256-FF09E21000]

RIN 1018-BH64

Endangered and Threatened Wildlife and Plants; Listing the Giraffe**AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce our 12-month finding on a petition to list the giraffe (including its subspecies) as endangered or threatened under the Endangered Species Act of 1973, as amended (Act or ESA). After a review of the best available scientific and commercial information, we find that the following listing actions are warranted: We propose to list all three subspecies of the northern giraffe (*Giraffa camelopardalis*)—the West African giraffe (*Giraffa camelopardalis peralta*), the Kordofan giraffe (*Giraffa camelopardalis antiquorum*), and the Nubian giraffe (*Giraffa camelopardalis camelopardalis*)—as endangered species under Act. We also propose to list the reticulated giraffe (*Giraffa reticulata*) and the Masai giraffe (*Giraffa tippelskirchi*), both from east Africa, as threatened species with protective regulations issued under section 4(d) of the Act (“4(d) rule”). After a thorough review of the best scientific and commercial data available, we find that, based on the Act’s section 4(a)(1) factors, it is not warranted at this time to list either subspecies of the southern giraffe (*Giraffa giraffa*)—the Angolan giraffe (*Giraffa giraffa angolensis*) and the South African giraffe (*Giraffa giraffa giraffa*)—but we are proposing, under the authority of section 4(e) of the Act, to treat both of these subspecies as threatened species based on their similarity of appearance to the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe. If we finalize this rule as proposed, it would add all giraffes to the List of Endangered and Threatened Wildlife, under the authority of either section 4(a)(1) or 4(e) of the Act, and extend the Act’s protections to these taxa.

DATES: *Comments on the proposed rule:* We will accept comments on the proposals in this document that are received or postmarked on or before February 19, 2025. Comments submitted

electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. eastern time on the closing date. We must receive requests for a public hearing, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by January 6, 2025.

12-month petition finding: The 12-month petition finding for the Angolan giraffe and South African giraffe announced in this document was made on November 21, 2024.

ADDRESSES:

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

(1) *Electronically:* Go to the Federal eRulemaking Portal: <https://www.regulations.gov>. In the Search box, enter FWS-HQ-ES-2024-0157, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the panel on the left side of the screen, under the Document Type heading, check the Proposed Rule box to locate this document. You may submit a comment by clicking on “Comment.” If your comments will fit in the provided comment box, please use this feature of <https://www.regulations.gov>, as it is most compatible with our comment review procedures. If you attach your comments as a separate document, our preferred file format is Microsoft Word. If you attach multiple comments (such as form letters), our preferred format is a spreadsheet in Microsoft Excel.

(2) *By hard copy:* Submit by U.S. mail to: Public Comments Processing, Attn: FWS-HQ-ES-2024-0157, U.S. Fish and Wildlife Service, MS: PRB/3W, 5275 Leesburg Pike, Falls Church, VA 22041-3803.

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

Availability of supporting materials: Supporting materials, such as the species status assessment report, are available at <https://www.regulations.gov> at Docket No. FWS-HQ-ES-2024-0157.

FOR FURTHER INFORMATION CONTACT: Rachel London, Manager, Branch of Delisting and Foreign Species, Ecological Services Program, U.S. Fish and Wildlife Service, MS: ES, 5275 Leesburg Pike, Falls Church, VA 22041-3803; telephone 703-358-2171. Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY,

TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point-of-contact in the United States. Please see Docket No. FWS-HQ-ES-2024-0157 on <https://www.regulations.gov> for a document that summarizes this proposed rule.

SUPPLEMENTARY INFORMATION:**Executive Summary**

Why we need to publish a rule. Under the Act, a species warrants listing if it meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range). If we determine that a species warrants listing, we must list the species promptly. We have determined that the three subspecies of northern giraffe—West African giraffe, Kordofan giraffe, and Nubian giraffe—each meet the Act’s definition of an endangered species, and the reticulated giraffe and Masai giraffe each meet the Act’s definition of a threatened species; therefore, we are proposing to list these species as such. Listing a species as an endangered or threatened species can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process (5 U.S.C. 551 *et seq.*).

What this document does. We propose to list the West African giraffe, Kordofan giraffe, and Nubian giraffe as endangered species under the Act. We also propose to list the reticulated giraffe and Masai giraffe as threatened species with protective regulations under section 4(d) of the Act. We find that listing the Angolan giraffe and South African giraffe as endangered or threatened species under the factors set forth in section 4(a)(1) of the Act is not warranted. However, we propose to list the Angolan giraffe and South African giraffe as threatened species under the authority of section 4(e) of the Act, with protective regulations under section 4(d) of the Act, based on their similarity of appearance to the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe.

The basis for our action. Under the Act’s section 4(a)(1), we may determine that a species is an endangered or threatened species because of any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial,

recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that West African giraffe, Kordofan giraffe, and Nubian giraffe are endangered due to the following ongoing and imminent threats: habitat loss, fragmentation, and degradation because of the conversion of natural habitats and vegetation to croplands and urbanization (Factors A and E), and poaching for consumption, personal use, and trade (Factor B), which are all exacerbated by rapid human population growth and the effects from climate change (including the inter-related effects such as civil unrest and human food insecurity) (Factor E). We have further determined that the reticulated giraffe and Masai giraffe are threatened due to the following threats: habitat loss, fragmentation, and degradation because of the conversion of natural habitats and vegetation to croplands and urbanization (Factors A and E), and poaching for consumption, personal use, and trade (Factor B), which are exacerbated by rapid human population growth and the effects from climate change (including the inter-related effects such as civil unrest and human food insecurity) (Factor E).

We have determined that both Angolan giraffe and South African giraffe are not warranted as endangered or threatened species due to the following threats: habitat loss, fragmentation, and degradation because of the conversion of natural habitats and vegetation to croplands and urbanization (Factors A and E), and poaching for consumption, personal use, and trade (Factor B), which are exacerbated by rapid human population growth and the effects from climate change (including the inter-related effects such as civil unrest and human food insecurity) (Factor E). Under the Act's section 4(e), we may treat any species as an endangered or threatened species based on its similarity of appearance to a species listed as an endangered or threatened species. This "similarity of appearance" listing is intended to protect listed species by facilitating the enforcement and furthering the policy of the Act. Our proposal to list the Angolan giraffe and South African giraffe as threatened species under the authority of section 4(e) of the Act is based on their similarity of appearance to the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe.

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other governmental agencies (including foreign governments within the range of any giraffe species), Native American Tribes, the scientific community, industry, or any other interested parties concerning this proposed rule. We particularly seek comments concerning:

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

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

(b) Genetics and taxonomy;

(c) Historical and current range, including distribution patterns and the locations of any additional populations of these species or subspecies;

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

(e) Past and ongoing conservation measures for these species or subspecies, their habitats, or both.

(2) Threats and conservation actions affecting these species or subspecies, including:

(a) Factors that may be affecting the continued existence of these species or subspecies, which may include habitat destruction, modification, or curtailment; overutilization for commercial, recreational, scientific, or educational purposes; disease; predation; the inadequacy of existing regulatory mechanisms; or other natural or manmade factors;

(b) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to these species or subspecies; and

(c) Existing regulations or conservation actions that may be addressing threats to these species or subspecies.

(3) Additional information concerning the historical and current status of these species or subspecies.

(4) Information to assist with applying or issuing protective regulations under section 4(d) of the Act that may be necessary and advisable to provide for the conservation of any threatened species of giraffe. In particular, we seek information concerning:

(a) The extent to which we should include any of the section 9 prohibitions in the 4(d) rule; or

(b) Whether we should consider any additional or different prohibitions or exceptions from the prohibitions in the proposed 4(d) rule, such as:

(i) A prohibition on importing threatened species of giraffes without a permit issued under title 50 of the Code of Federal Regulations (CFR) at section 17.32 (50 CFR 17.32) for a threatened species.

(ii) A requirement for an enhancement of propagation or survival finding or other criteria to import or export any specimen of a threatened species of giraffe.

(iii) A requirement for a similarity of appearance permit to import or export any specimen of a giraffe species or subspecies treated as endangered or threatened based on similarity of appearance.

(iv) An exception associated with our captive-bred wildlife program (see 50 CFR 17.21(g)) to conduct otherwise prohibited activities under certain circumstances to enhance the propagation or survival of giraffe species.

(v) An exception for interstate commerce from a public institution to another public institution, specifically commerce between museums, zoological parks, and scientific or educational institutions that meet the definition of "public" at 50 CFR 10.12.

(vi) Any specific provisions for intercrosses between threatened species or subspecies of giraffe (hybrid giraffes), which would otherwise be considered "offspring" under the definition of "fish or wildlife" (16 U.S.C. 1532(8)) and protected accordingly.

(5) Information regarding legal killing (hunting) or illegal killing (poaching) or any other taking of the West African, Kordofan, Nubian, reticulated, Masai, Angolan, or South African giraffe.

(6) Information regarding domestic and international trade of the West African, Kordofan, Nubian, reticulated, Masai, Angolan, or South African giraffe.

(7) Information regarding threats to one or more species or subspecies of giraffe from hunting, poaching, or any other taking or trade involving one or more other species or subspecies of giraffe, such as threats to the West African, Kordofan, Nubian, reticulated, or Masai giraffe from hunting, poaching, or any other taking or trade involving the Angolan giraffe or South African giraffe.

(8) Information regarding the ability and any methodology to differentiate, without substantial difficulty, among different giraffe species or subspecies of giraffe and their parts and products, including at ports of import and export,

and what documentation should be provided to the Service to assist in making species or subspecies determinations for issuance of permits.

(9) Information regarding the role of private lands, particularly game farms, reserves, and conservancies, in conserving any of the giraffe species or subspecies in the wild.

(10) For the Angolan giraffe and South African giraffe, we ask the public to submit to us at any time new information relevant to the subspecies' status or its habitat including threats or conservation measures.

(11) Information on whether listing giraffes at the species or subspecies level is most appropriate for giraffes.

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

Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, do not provide substantial information necessary to support a determination. Section 4(b)(1)(A) of the Act directs that determinations as to whether any species is an endangered or a threatened species must be made solely on the basis of the best scientific and commercial data available.

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

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

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

Our final determinations may differ from this proposal because we will consider all comments we receive during the comment period as well as any information that may become available after this proposal. Based on the new information we receive (and, if relevant, any comments on that new information), we may conclude that any

of the northern giraffe subspecies are threatened instead of endangered, or that the reticulated giraffe is endangered instead of threatened, or that the Masai giraffe is endangered instead of threatened, or we may conclude that one or more of the species proposed for listing does not warrant listing as either an endangered species or a threatened species. We may also conclude that either subspecies of southern giraffe may be endangered or threatened instead of not warranted for listing, which would prompt our consideration of a new proposed rule for the subspecies. In addition, we may change the parameters of the prohibitions or the exceptions to those prohibitions in the protective regulations under section 4(d) of the Act if we conclude it is appropriate in light of comments and new information received. For example, we may expand the prohibitions if we conclude that the protective regulation as a whole, including those additional prohibitions, is necessary and advisable to provide for the conservation of the threatened species. Conversely, we may establish additional or different exceptions to the prohibitions in the final rule if we conclude that the activities would facilitate or are compatible with the conservation and recovery of the threatened species. In our final rule, we will clearly explain our rationale and the basis for our final decision, including why we made changes, if any, that differ from this proposal.

Public Hearing

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

Previous Federal Actions

We received a petition on April 19, 2017, from the Center for Biological Diversity, Humane Society International, The Human Society of the United States, International Fund for

Animal Welfare, and Natural Resources Defense Council to list the giraffe (*Giraffa camelopardalis*) as endangered or threatened under the Act. Because of ongoing changes in taxonomy (see Taxonomy section) of the giraffe species and subspecies at the time of the petition, the petitioners included an alternate request to list all giraffe subspecies or distinct population segments at least as threatened, with qualified subspecies or distinct population segments listed as endangered if taxonomic consensus changes or if the Service decides to list an entity below the species level. On April 26, 2019, we published in the **Federal Register** (84 FR 17768) a 90-day finding that the petition presented substantial scientific or commercial information indicating that the petitioned action may be warranted. This document serves as our 12-month finding on the April 19, 2017, petition.

Peer Review

A species status assessment (SSA) team prepared SSA reports for the currently recognized species of giraffe (northern giraffe, reticulated giraffe, Masai giraffe, and southern giraffe). The SSA team was composed of Service biologists, in consultation with other species experts. The SSA reports represent a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species.

In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review in listing and recovery actions under the Act (<https://www.fws.gov/sites/default/files/documents/peer-review-policy-directors-memo-2016-08-22.pdf>), we are soliciting independent scientific review of the information contained in the northern, reticulated, Masai, and southern giraffe SSA reports. We will seek peer review of the SSA reports from at least three independent peer reviewers. We will ensure that the opinions of peer reviewers are objective and unbiased by following the guidelines set forth in the Director's Memo, which updates and clarifies Service policy on peer review (Service 2016, entire). The purpose of peer review is to ensure that our decisions are based on scientifically sound data, assumptions, and analysis. Accordingly, our final decisions may differ from this proposal. Comments from peer reviewers will be posted at <https://www.regulations.gov>, incorporated, as

appropriate, into the SSA reports, and included in the decision file for the final rule.

Taxonomy

Until recently, giraffe was classified as a single species (*Giraffa camelopardalis*) with nine subspecies based on its geographic distribution, morphology, and skin pattern (Dagg 1971, entire; Fennessy et al. 2016, p. 2543; Muller et al. 2018, p. 1; Brown et al. 2021, p. 3). Dagg (1971) was the authority most relied upon for giraffe taxonomy. In 2016, new analysis of data from all nine recognized subspecies concluded that giraffe should be split into four separate and distinct species (Fennessy et al. 2016, entire). One result of this analysis was that Thornicroft's giraffe (*G. c. thornicrofti*) was found to be indistinguishable from Masai giraffe (*G. c. tippelskirchi*), and Rothschild's giraffe (*G. c. rothschildi*) was found to be indistinguishable from Nubian giraffe (*G. c. camelopardalis*). Thus, these subspecies were subsumed accordingly (Fennessy et al. 2016, entire; Bock et al. 2014, p. 2). The best available information, therefore, indicates giraffes are classified as four separate and distinct species, as follows: (1) the northern giraffe (*Giraffa camelopardalis*) is a species that consists of three subspecies—the Nubian giraffe (*G. c. camelopardalis*), Kordofan giraffe (*G. c. antiquorum*), and West African giraffe (*G. c. peralta*); (2) the reticulated giraffe (*Giraffa reticulata*) is its own species; (3) the Masai giraffe (*Giraffa tippelskirchi*) is its own species; and (4) the southern giraffe (*Giraffa giraffa*) is a species that consists of two subspecies—the South African giraffe (*G. g. giraffa*), and Angolan giraffe (*G. g. angolensis*) (Fennessy et al. 2016, entire; Winter et al. 2018a, entire; Coimbra et al. 2021, entire; ITIS 2024, unpaginated). The Integrated Taxonomic Information System (ITIS) also recognizes four separate and distinct species of giraffe with the same subspecies as the valid taxonomic classification of giraffe (ITIS 2024, unpaginated).

The International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Giraffe and Okapi Specialist Group (GOSG) recognizes giraffe as one species with nine subspecies, based on the classification in Dagg (1971) (Muller et al. 2018, p. 1). The GOSG is composed of a group of technical experts from around the world; it was established in March 2013, in recognition of widespread threats to giraffe and okapi and to address their conservation needs (GOSG 2023, unpaginated). The GOSG

has not, however, undertaken a formal assessment of the taxonomic status of giraffe since information indicating a revised taxonomy has become available (Dunn et al. 2021, p. 2). The IUCN Red List assessment also classifies giraffe as a single species with nine subspecies based on Dagg (1971) (Muller et al. 2018, p. 1). CITES lists all giraffes as one species (*Giraffa camelopardalis*) (CITES 2019a, p. 2; CITES 2019b, p. 3; CITES 2024, unpaginated). Even though the GOSG and IUCN Red List recognize the giraffe as one species with nine subspecies, the best available information indicates that there are four separate and distinct species of giraffe, and we use the best available information to inform this proposed rule.

I. Finding for the Angolan Giraffe and South African Giraffe

Under section 4(b)(3)(B) of the Act, we are required to make a finding on whether or not a petitioned action is warranted within 12 months after receiving any petition that we have determined contains substantial scientific or commercial information indicating that the petitioned action may be warranted (“12-month finding”). We must make a finding that the petitioned action is: (1) Not warranted; (2) warranted; or (3) warranted but precluded.

Summary of Information Pertaining to the Five Factors

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in title 50 of the Code of Federal Regulations set forth the procedures for determining whether a species is an endangered species or a threatened species, and issuing or applying protective regulations for threatened species.

The Act defines an “endangered species” as a species that is in danger of extinction throughout all or a significant portion of its range, and a “threatened species” as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an endangered species or a threatened species because of any of the following factors:

- (A) The present or threatened destruction, modification, or curtailment of its habitat or range;
- (B) Overutilization for commercial, recreational, scientific, or educational purposes;
- (C) Disease or predation;
- (D) The inadequacy of existing regulatory mechanisms; or

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

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

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

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In determining whether a species meets either definition, we must evaluate all identified threats by considering the species' expected response and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species.

The Act does not define the term “foreseeable future,” which appears in the statutory definition of “threatened species.” Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis, which is further described in the 2009 Memorandum Opinion on the foreseeable future from the Department of the Interior, Office of the Solicitor (M-37021, January 16, 2009; “M-Opinion,” available online at <https://www.doi.gov/interior/solicitor/m-37021>).

www.doi.gov/sites/doi.opengov.ibmcloud.com/files/uploads/M-37021.pdf). The foreseeable future extends as far into the future as the U.S. Fish and Wildlife Service and National Marine Fisheries Service (hereafter, the Services) can make reasonably reliable predictions about the threats to the species and the species' responses to those threats. We need not identify the foreseeable future in terms of a specific period of time. We will describe the foreseeable future on a case-by-case basis, using the best available data and taking into account considerations such as the species' life-history characteristics, threat projection timeframes, and environmental variability. In other words, the foreseeable future is the period of time over which we can make reasonably reliable predictions. "Reliable" does not mean "certain"; it means sufficient to provide a reasonable degree of confidence in the prediction, in light of the conservation purposes of the Act.

In conducting our evaluation of the five factors provided in section 4(a)(1) of the Act to determine whether the Angolan giraffe or South African giraffe currently meets the definition of "endangered species" or "threatened species," we considered and thoroughly evaluated the best scientific and commercial data available regarding threats, regulatory mechanisms, conservation measures, current condition, and future condition. We reviewed the petition, information available in our files, and other available published and unpublished information. This evaluation includes information from recognized experts; foreign Federal, State, and Tribal governments; academic institutions; private entities; and other members of the public. After comprehensive assessment of the best scientific and commercial data available, we determine that the Angolan giraffe and South African giraffe each do not meet the Act's definition of an endangered species or a threatened species.

In accordance with the regulations at 50 CFR 424.14(h)(2)(i), this document announces the not-warranted findings on a petition to list the Angolan giraffe and South African giraffe. We have also elected to include brief summaries of the analyses on which these findings are based. We provide the full analyses, including the reasons and data on which the findings are based, in the decision file for each of the not-warranted findings included in this document. The following is a description of the documents containing these analyses:

The species assessment form for the southern giraffe contains more detailed biological information, a thorough analysis of the listing factors, conservation measures and existing regulatory mechanisms, a list of literature cited, and an explanation of why we determined that the southern giraffe's subspecies (the Angolan giraffe and South African giraffe) do not meet the Act's definition of an "endangered species" or a "threatened species." To inform our status reviews, we completed a species status assessment (SSA) report for the southern giraffe. The SSA report for the southern giraffe contains a thorough review of the taxonomy, life history, and ecology of the Angolan giraffe and South African giraffe; a thorough description of the factors influencing the viability of these subspecies; and the current and future conditions of these subspecies (Service 2024d, entire). This supporting information can be found on the internet at <https://www.regulations.gov> under docket number FWS-HQ-ES-2024-0157. The following is a summary of our determination for the Angolan giraffe and South African giraffe.

Summary of Findings for Angolan Giraffe and South African Giraffe

The southern giraffe consists of two subspecies: Angolan giraffe and South African giraffe (Fennessy et al. 2016, p. 2545; Winter et al. 2018b, p. 10159). Angolan giraffes mainly occur in three geographic areas (Angolan giraffe units): Namibia, central Botswana, and southern Zimbabwe (Brown et al. 2021, p. 12). By the late 1990s, giraffes were assumed to be extirpated in Angola (East 1999, p. 98); recent reintroductions have reestablished very small populations of the Angolan giraffe in southern Angola. The exact range of the Angolan giraffe is uncertain because numerous translocations of Angolan giraffes from Namibia have occurred throughout southern Africa, and Angolan giraffes now occur even in areas with no record of translocations. Additionally, extralimital populations of Angolan giraffes were introduced to the Democratic Republic of Congo (DRC), South Africa, Nigeria, and Zambia (Brown et al. 2021, p. 12).

The South African giraffe occurs in Angola, Botswana, Eswatini, Malawi, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe. Most South African giraffes occur in northern Botswana around the Okavango Delta and North West, Chobe, and Central Districts, and in northern South Africa in the Limpopo Province and Kruger National Park. Both these regions are part of Transfrontier Conservation Areas

(TFCAs). The Kavango Zambezi (KAZA) TFCA supports approximately 25 percent of the total population of southern giraffe including populations or partial populations in Angola, Botswana, Namibia, Zambia, and Zimbabwe. The Great Limpopo TFCA includes the Great Limpopo Transfrontier Park, which links national parks in South Africa, Zimbabwe, and Mozambique, as well as a wildlife corridor on communal land; and Banhine and Zinave National Parks in Mozambique and bordering private- and state-owned conservation areas (Peace Parks Foundation 2024, unpaginated). South African giraffes have been translocated within their native range and introduced into several countries outside of their native range. Giraffes were reintroduced to Limpopo National Park and Zinave National Park in Mozambique after having been previously extirpated. In Malawi and Eswatini, the historical occurrence of South African giraffes is uncertain, and no references are made of them historically occurring in these countries (East 1999, p. 95; Dagg 1962, pp. 500–503; Sidney 1965, p. 155). However, giraffes have been translocated to Malawi and Eswatini, where small populations currently exist (Marais et al. 2020a, p. 3; Hoffman et al. 2022, p. 3). Small, extralimital populations of South African giraffes also occur in Angola, the DRC, and Senegal (Brown et al. 2021, p. 13).

Several populations of giraffes in northern Botswana, northwest Zimbabwe, northeastern Namibia, southwestern Zambia, and central South Africa are Angolan or South African giraffes, and there is potentially hybridization between the two subspecies in this area (Muller et al. 2018, p. 1; Bock et al. 2014, p. 7; Deacon and Parker et al. 2016, p. 3). Additionally, both Angolan giraffes and South African giraffes are held on private lands (e.g., game farms, conservancies, and reserves) (Deacon and Parker 2016, pp. 5–7; Giraffe Conservation Foundation (GCF) 2016, unpaginated; du Raan 2016, p. 3). When referring to private lands that are game farms, reserves, and conservancies, we consider the giraffes in these private lands to be wild giraffes because they are not in enclosures, are not supplemented with food, are not captive bred, and are mostly kept on adequately sized properties; however, some of these areas are as small as 0.2 square kilometers (Deacon and Parker 2016, p. 4). While private lands are often fenced, giraffes on private lands are otherwise generally free-roaming. We do not

consider giraffe on these private lands to be in an environment that is intensively manipulated, thus distinguishing them from the definition of “captivity” in 50 CFR 17.3. Additionally, southern giraffe on these private lands are managed as wild under the laws and management practices in the range countries of Angolan giraffe and South African giraffe, which rely on private game farms, reserves, and conservancies to conserve wild giraffes in suitable habitat for giraffe.

Giraffes live in a complex society characterized by loose subgroup composition, a pattern of sexual segregation, and longer-term relationships that are typical in fission-fusion societies (Bercovitch et al. 2006, p. 314; Carter et al. 2013, p. 390; Dagg 2019, p. 39). This type of structured society involves the formation and dissolution of subgroups within a larger social network based upon preferential associations within a larger community that rarely coalesces into a single unit (Dagg 2019, p. 43; Bercovitch and Berry 2012, p. 2). Herds tend to be small and average 3 to 5 animals with female-female associations more common than male-male or male-female associations (Dagg 2019, p. 45; Bercovitch and Berry 2012, p. 6). Male giraffes are nonterritorial and mostly solitary individuals that adopt a roaming reproductive strategy and become increasingly more solitary as they age (Bercovitch and Berry 2014, p. 172; Leuthold 1979, p. 29). Females are seldom alone and are often in groups with other females and any young born to those females (nursing groups).

The giraffe’s primary activity is feeding, and they consume a variety of leaves, stems, flowers, and fruits (Dagg 2019, p. 24; Muller et al. 2016, p. 6). Because giraffes have high metabolic and reproductive requirements, they need to consume large quantities of food throughout the year (Parker and Bernard 2005, p. 207). Giraffes have been noted to forage on at least 100 different plant species, although *Acacia*, *Commiphora*, and *Terminalia* species are major staples (Kingdon 1997, p. 494; Muller et al. 2016, p. 6). *Acacia* trees or bushes are a preferred resource and are fed on in high proportions wherever giraffes occur (Dagg 2019, p. 25).

Giraffes need high-quality forage year-round to maintain their high-energy budget, particularly females that are pregnant for most of their adult lives. Each population has a diverse diet, and food that giraffes select throughout the year largely depends on the seasonal changes in the phenology of plant species (Pellew 1984, p. 74) or, for females, whether they are nursing

(Caister et al. 2003, p. 209; Saito and Idani 2018, p. 15). Anthropogenic influences strongly affect giraffe’s use of space (Brown et al. 2023, p. 8) as do physical and geographic barriers such as rivers, fencing, and urbanization (Fennessy et al. 2009, p. 324; Le Pendu and Ciofolo 1999, p. 350; Perry 1978, p. 80). Generally, giraffes do not show large-scale seasonal migrations, but within individual home ranges, small-scale seasonal movements occur primarily based on food resources (Pellew 1984, p. 65; Brown et al. 2023, p. 7; Fennessy 2009, p. 324). Because giraffes engage in small-scale seasonal movements based on changes in the distribution of food resources, they need adequate space within which to move and find high-quality food that meets their metabolic needs. Within their home ranges, giraffes also need access to mates.

Giraffes, in some regions of sub-Saharan Africa, are affected by civil unrest and political instability. Most wars in sub-Saharan Africa have been civil conflicts fought within the boundaries of a single sovereign country (State Failure 2001, cited in Glew and Hudson 2007, p. 141). However, internal conflicts may overspill defined boundaries, affecting both a country and its neighbors for substantial lengths of time (Commission for Africa, 2005, cited in Glew and Hudson 2007, p. 141). Civil unrest does not usually directly target ecological resources in pursuit of a military outcome, but impacts to wildlife occur because of resource exploitation during periods of lawlessness (Glew and Hudson 2007, p. 7, citing many authors; Dudley et al. 2002, p. 326). However, large mammals (when available) are often a vital food source for isolated military or paramilitary groups operating within war zones and disputed territories (Plumptre et al. 1997, p. 271; Dudley et al. 2002, p. 322). Additionally, wildlife products are often sold or bartered for food, arms, ammunition, or other goods and services (Dudley et al. 2002, p. 322). Civil unrest also causes significant displacement of people (Badiora 2017, p. 316; Davis 2019, p. 180; Glew and Hudson 2007, p. 141). Refugee encampments are often associated with severe environmental degradation from the use of slash-and-burn agriculture and the overharvesting of vegetation for fuel, food, and construction materials. This, in turn, results in widespread deforestation and erosion, and takes a heavy toll on wildlife and habitats in affected areas (Plumptre et al. 1997, p. 326; Pech 1995, in Dudley et al. 2002, p. 322). Relative political stability

within the range of the Angolan and South African giraffe reduces the likelihood that these subspecies of giraffe are affected by poaching and other effects of civil unrest, and increases the ability of range country governments to enact and enforce regulatory protections.

At the subspecies level, Angolan and South African giraffes require multiple populations with high population abundances, large effective population sizes, and sufficient, high-quality (nutritious and unfragmented) habitat distributed across heterogeneous environments.

Determination of Status: Background

Section 4 of the Act and its implementing regulations at 50 CFR part 424 set forth the procedures for determining whether a species meets the Act’s definition of an endangered species or a threatened species. The Act requires that we determine whether a species meets the definition of an endangered species or a threatened species because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We consider these five factors and the species’ responses to these factors when making these determinations.

Section 3 of the Act defines “endangered species” and “threatened species.” An endangered species is a species that is in danger of extinction throughout all or a significant portion of its range, and a threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both definitions include not only the phrase “throughout all,” but also the phrase “or a significant portion of its range.” Thus, there are ultimately four bases for listing a species under the Act (in danger of extinction throughout all of its range, in danger of extinction throughout a significant portion of its range, likely to become an endangered species within the foreseeable future throughout all of its range, or likely to become an endangered species within the foreseeable future throughout a significant portion of its range). These four bases are made up of two classifications (*i.e.*, endangered or threatened) and two components (*i.e.*,

throughout all of its range or throughout a significant portion of its range).

Beginning in 2001, a number of judicial opinions addressed our interpretation of the phrase “or a significant portion of its range” (the SPR phrase) in these statutory definitions. The seminal case was *Defenders of Wildlife v. Norton*, 258 F.3d 1136 (9th Cir. 2001) regarding the flat-tailed horned lizard (*Phrynosoma mcallii*). The court in that case held that the SPR phrase in the Act was “inherently ambiguous,” finding that it was something of an oxymoron to speak of a species being at risk of extinction in only a portion of its range (*id.* at 1141); because the Act does not define a “significant portion, the Secretary has wide discretion to delineate it (*id.* at 1145). However, the court found that, even with wide discretion, the interpretation we had applied in analyzing the status of the flat-tailed horned lizard was unacceptable because it would allow for a species to warrant listing throughout a significant portion of a species’ range only when the species “is in danger of extinction everywhere” (*id.* at 1141). The court held that the SPR phrase must be given independent meaning from the “throughout all” phrase to avoid making the SPR phrase in the statute superfluous.

In an attempt to address the judicial opinions calling into question our approach to evaluating whether a species is endangered or threatened throughout a significant portion of its range, the Services jointly published the “Final Policy on Interpretation of the Phrase ‘Significant Portion of Its Range’ in the Endangered Species Act’s Definitions of ‘Endangered Species’ and ‘Threatened Species’” (2014 SPR Policy; 79 FR 37578, July 1, 2014). The December 9, 2011, notice announcing the draft policy and requesting public comments on it provides more detail about litigation before 2014 regarding the SPR phrase (76 FR 76987). The 2014 SPR Policy includes four elements:

(1) Consequence—that the consequence of determining that a species warrants listing based on its status in a significant portion of its range is to list the species throughout all of its range;

(2) Significance—a definition of the term “significant”;

(3) Range—that the species’ “range” is the current range of the species; and

(4) Distinct population segment (DPS)—that, if a species is endangered or threatened in an SPR, and the population in that SPR is a distinct population segment (DPS), the Service will list just the DPS.

Subsequently, two district courts vacated the definition of “significant” contained in the 2014 SPR Policy (*Ctr. for Biological Diversity v. Jewell*, 248 F. Supp. 3d 946, 959 (D. Ariz. 2017) (“*CBD v. Jewell*”), and *Desert Survivors v. U.S. Dep’t of the Interior*, 321 F. Supp. 3d 1011, 1070–74 (N.D. Cal. 2018) (“*Desert Survivors*”). The courts found that the definition in the 2014 SPR Policy set too high a threshold and rendered the SPR language in the statute superfluous, failing to give it independent meaning from the “throughout all” phrase.

In 2020, another court (*Ctr. for Biological Diversity v. Everson*, 435 F. Supp. 3d 69 (D.D.C. 2020) (“*Everson*”)) also vacated the specific aspect of the 2014 SPR Policy under which, “if the Services determine that a species is threatened throughout all of its range, the Services will not analyze whether the species is endangered in a significant portion of its range” (*id.* at 98). This was an extension of the definition of “significant,” which required that for a portion of the range of a species to be significant, the species must not be currently endangered or threatened throughout its range. In an extension of the earlier rulings from *CBD v. Jewell* and *Desert Survivors*, the court found that this aspect of the definition of the 2014 SPR Policy was not only inconsistent with the statute because it “rendered the ‘endangered in a significant portion of its range’ basis for listing superfluous,” but also “inconsistent with ESA principles” and “not a logical outgrowth from the draft policy.” Under this ruling, if we find a species is not in danger of extinction throughout all of its range, we must evaluate whether the species is in danger of extinction throughout a significant portion of its range, even in cases where we have determined that the species is likely to become in danger of extinction within the foreseeable future (*i.e.*, it meets the Act’s definition of a threatened species) throughout all of its range. The remaining three elements of the 2014 SPR Policy remain intact and have not been invalidated or questioned by the courts.

In short, courts have directed that the definition of “significant” must afford the phrase “or a significant portion of its range” an independent meaning from the “throughout all of its range” phrase. Therefore, to determine whether any species warrants listing, we determine for each classification (endangered and threatened) the appropriate component to evaluate (throughout all of its range or throughout a significant portion of its range).

We make this determination based on whether the best scientific and

commercial data indicate that the species has a similar extinction risk in all areas across its range (at a scale that is biologically appropriate for that species). When a species has a similar extinction risk in all areas across its range, we analyze its regulatory status using the component “throughout all of its range.” For example, in some cases, there is no way to divide a species’ range in a way that is biologically appropriate. This could be because the range is so small that there is only one population or because the species functions as a metapopulation such that effects to one population directly result in effects to another population. On the other hand, when the species’ extinction risk varies across its range, we analyze its regulatory status using the component “throughout a significant portion of its range.”

For either classification (endangered or threatened), we consider the five factors and the species’ responses to those factors regardless of which component (throughout all of its range or throughout a significant portion of its range) we have determined is appropriate for that classification. When assessing whether a species is endangered or threatened throughout a significant portion of its range, we address two questions because we must determine whether there is any portion of the species’ range for which both (1) the portion is “significant” (the significance question) and (2) the species is in danger of extinction or likely to become in danger of extinction within the foreseeable future throughout that portion (the status question). We may address the significance question or the status question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species’ range.

Determination of Status: Angolan Giraffe

The Angolan giraffe does not meet the Act’s definition of an endangered species or a threatened species. As stated above, we determine a species’ classification based upon its regulatory status throughout all of its range when the species has similar extinction risk in all areas across its range at a scale that is biologically appropriate for that species. Conversely, if the extinction risk varies across its range, we determine a species’ classification based upon its regulatory status throughout a significant portion of its range. Either way, we begin by determining the scale that is biologically appropriate for that species. For many species, we can

divide the range in an infinite number of ways. As discussed above, Angolan giraffe populations primarily occur in three Angolan giraffe units (Namibia, Botswana, and Zimbabwe) and while Angolan giraffe may periodically interact within these units, we do not expect interactions among giraffes among these units given their geographic separation. Although information on the smaller, introduced populations of Angolan giraffe is limited, the best available information indicates that threats and the subspecies' responses to those threats are similar in any introduced small populations for which we lack information. In summary, the "Angolan giraffe unit" is the unit that provides the most appropriate scale at which to assess extinction risk for the Angolan giraffe.

Endangered Species Classification

We evaluated whether the Angolan giraffe has a similar risk of extinction in all areas across its range by assessing its extinction risk in each Angolan giraffe unit. Our review indicated that the Angolan giraffe's extinction risk is similar in all areas across its range. Therefore, we evaluated whether it may be endangered based upon the "throughout all of its range" component. In undertaking this analysis of whether the Angolan giraffe is endangered throughout all of its range, we reviewed the best scientific and commercial data available regarding threats to the subspecies, the subspecies' responses to those threats, and any associated conservation measures; we then assessed the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors. We examined the following threats: habitat loss, degradation, and fragmentation (Factor A), predation and disease (Factor C), and hunting and poaching (Factor B), all of which may be exacerbated by increasing human populations, effects from climate change (including the inter-related effects such as civil unrest and human food insecurity) and low genetic diversity (Factor E), as well as cumulative effects. Additionally, the maintenance of private lands for activities such as personal use, tourism, and hunting (Factor E) impacts the subspecies because private lands in southern Africa comprise large proportions of the respective populations.

Angolan giraffes need multiple healthy, resilient populations that are distributed across the subspecies' range to reduce the risk of extinction. After evaluating threats to the subspecies and

assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we found that habitat loss, degradation, and fragmentation, and poaching, all of which may be exacerbated by ongoing and near-term effects of human population growth, climate change, as the threats with the greatest potential to affect the subspecies' near-term viability. We also considered potential threats such as predation and disease, and while individuals are affected by these threats, there is no information to suggest population-level or subspecies-level effects.

The best estimate of current population size for the Angolan giraffe is approximately 18,626 individuals (20,192 including extralimital populations) (Brown et al. 2021, p. 11). The current estimated population size is approximately 124 percent of the estimated historical population size (15,000 individuals), and the population has increased from about 5,000 individuals in the 1970s to about 10,000 individuals in 2004 to 18,626 individuals in 2020, or by approximately 0.7–2.7 percent per year. Because there is uncertainty in the range of Angolan giraffe, there are discrepancies in the historical data. For the purposes of the historical population estimate, we added both historical estimates for Angolan giraffe from Muller et al. 2018 (supplement, p. 2) that equate to 15,000 individuals.

Large populations occur in all three Angolan giraffe units: Namibia (*e.g.*, Etosha National Park), Botswana (Central Kalahari Game Reserve and adjacent Khutse Game Reserve), and Zimbabwe (Bubye Valley Conservancy). Namibia holds approximately 78 percent of the population (14,500 individuals), with approximately half of these occurring on private lands (du Raan et al. 2016, pp. 10–11). Populations in central Botswana and Zimbabwe are smaller and comparable to each other (approximately 2,000 in Botswana and 2,000–4,000 individuals in Zimbabwe) (Brown et al. 2021, pp. 11–12).

While best available information indicates the subspecies is increasing overall, the population trends vary among the three units (Brown et al. 2021, p. 12). Angolan giraffes are increasing in Namibia. In Botswana, the population is stable based on data since 1989 indicating that populations of giraffes in protected areas are stable or have increased in recent years (KAZA Secretariat 2022, p. 7; Chase 2015, p. 75; Chase et al. 2018, p. 86; Ferguson et al. 2021, p. 7). In Zimbabwe, while populations continue to decline in

certain populations (Bubye Valley Conservancy), they are increasing in other populations, such as the Save Valley and Nuanetsi Conservancies, that have adequate resources for management and enforcement (KAZA Secretariat 2022, p. 11; GCF 2022a, unpaginated).

Large, connected populations remain within each of the three analysis units (AUs) where Angolan giraffes can meet their needs. The best available information indicates that any combined effects of habitat loss, degradation, and fragmentation and of poaching are not causing declines in resiliency or redundancy of wild populations in the near term in any of the three AUs. While some Zimbabwe populations have experienced recent declines, these populations continue to be large in abundance, and GCF has partnered with ZimParks and landowners in the country to conserve giraffe populations. Angolan giraffes are also managed by range countries where hunting is legal to sustain ecotourism and trophy-hunting activities, which in turn are managed to produce revenues that may be used by range countries and local communities for giraffe conservation activities such as anti-poaching, reintroduction, and habitat preservation and restoration to benefit giraffes in the country. The private sector has contributed significantly to the increase in the subspecies' population through management and by helping restore the subspecies to many parts of its former range (du Raan 2016, p. 3; GCF 2016, unpaginated; Marais et al. 2020b, entire).

Although the Angolan giraffe has experienced some declines in habitat and area of occupancy outside of the three Angolan giraffe units (*e.g.*, within Angola), resiliency and redundancy are increasing since the 1970s with increasing abundance in several populations. The subspecies occurs throughout much of its historical range and maintains ecological representation, including large, connected populations in each of the Angolan giraffe units (Namibia, Botswana, and Zimbabwe). With the recent and near-term projected increasing population trend, expansion of range in Namibia and stable ranges in Botswana and Zimbabwe, and existence of multiple healthy, resilient populations (at least one in each Angolan giraffe unit), the Angolan giraffe exhibits representation, redundancy, and resiliency such that the subspecies is not in danger of extinction. Overall, while threats are ongoing, given the large population sizes for the three Angolan giraffe units in the near term, these threats are not of

such a magnitude that the subspecies is in danger of extinction in any of the Angolan giraffe units.

In summary, we find that the Angolan giraffe is not in danger of extinction in any of the Angolan giraffe units. Thus, there is no portion of the range where the Angolan giraffe may be endangered. After assessing the best scientific and commercial data available, we conclude that because there is no portion of the range in which the Angolan giraffe is endangered, it is necessarily not in danger of extinction throughout all of its range. Because we have determined that there is no portion of the range where the subspecies may be endangered (*i.e.*, the subspecies is also not in danger of extinction throughout a significant portion of its range), we proceed with determining whether Angolan giraffe is threatened (*i.e.*, is likely to become endangered within the foreseeable future throughout all or a significant portion of its range).

Threatened Species Classification

The statutory difference between an endangered species and a threatened species is the timeframe in which the species becomes in danger of extinction. An endangered species is in danger of extinction, and a threatened species is not in danger of extinction but is likely to become so within the foreseeable future. We evaluated whether the Angolan giraffe has a similar risk of extinction within the foreseeable future in all areas across its range by assessing its extinction risk within each Angolan giraffe unit. Because our review indicated that the Angolan giraffe's extinction risk is similar in all areas across its range, we then evaluated whether it may be threatened based upon the "throughout all of its range" component. In undertaking this analysis of whether the Angolan giraffe is threatened throughout all of its range, we reviewed the best scientific and commercial data available regarding threats to the subspecies, the subspecies' responses to those threats, and any associated conservation measures; we then assessed the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors. For the threatened species determination, we examined the same threats that we evaluated for the endangered species determination.

As mentioned above, Angolan giraffes need multiple healthy, resilient populations that are distributed across the subspecies' range to reduce the risk of extinction. After evaluating threats to the subspecies and assessing the cumulative effect of the threats under

the Act's section 4(a)(1) factors, we found that habitat loss, degradation, and fragmentation, and poaching, all of which may be exacerbated by human population growth and climate change, and low genetic diversity are the threats with the greatest potential to affect the subspecies' viability within the foreseeable future.

Habitat loss, fragmentation, or alteration is unlikely on protected lands (government or private) and is otherwise expected to continue in parts of each Angolan giraffe unit. Drought duration, frequency, and intensity are projected to increase within the range of the Angolan giraffe similarly in each Angolan giraffe unit. By 2100, across the subspecies' range, human population size is projected to just more than double under the lower scenario, and to increase almost ninefold under the upper scenario. In turn, Angolan giraffes may face reductions in food quality and availability, and restriction of their movement patterns and ability to access necessary resources. Additionally, although we were unable to quantify potential future increases in poaching, we anticipate that poaching will likely continue in each Angolan giraffe unit with increased food insecurity associated with rapid human population growth and climate change. While plausible future conditions indicate that habitat conditions will decline, human populations will increase, and climate change will increase the duration, frequency, and intensity of drought, there is no evidence suggesting that the subspecies' response to any of these threats will differ in the future.

The overall Angolan giraffe population has increased to 18,626 individuals (20,192 including extralimital populations), which represents an increase of approximately 0.7–2.7 percent per year since the 1970s. The population increase includes populations in formally protected areas such as Etosha National Park and private lands. The population is unlikely to continue growing into the future at the recent rate, given the low starting abundances. Additionally, population trends in the future are dependent upon the continued protections afforded the subspecies by private lands such as those used for ecotourism and sport-hunting. Population trends may be stable or increasing if private landowners continue to conserve Angolan giraffe at their current extent or increase. We find it most likely based on the best available data and past and present trends that private landowners will continue to conserve giraffe at rates comparable to the present. However, protections from

these sources are not guaranteed, and giraffe abundance may decline if those do not continue and/or climate change impacts are not sufficiently mitigated.

Even should populations decline, the Angolan giraffe occurs in three units with populations that are large, connected, and with adequate resiliency to sustain some reductions. Poaching, which is a driving factor in the decline of other giraffe species across the African continent, may be tempered by the relative political stability in the range of the Angolan giraffe. Habitat loss, degradation, and fragmentation are not likely to cause population-level declines to the point that the subspecies is likely to become in danger of extinction within the foreseeable future due to the Angolan giraffe's versatility and diverse diets, as well as to the future decisions of how southern African countries in how giraffes are managed. Angolan giraffes are also managed by range countries where hunting is legal to sustain ecotourism and trophy-hunting activities, which in turn may be managed to produce revenues that are used by range countries and local communities for giraffe conservation activities such as anti-poaching, reintroduction, and habitat preservation and restoration to benefit and address threats to giraffes in the country. The private sector has contributed significantly to the increase in the subspecies' population through management, including by helping restore the subspecies to many parts of its former range (du Raan 2016, pp. 3–11; GCF 2016, unpaginated; Marais et al. 2020b, entire). The subspecies is expected to continue to occur throughout much of its historical range and maintain ecological representation in each of the Angolan giraffe units (Namibia, Botswana, and Zimbabwe). Overall, while threats are projected to increase in magnitude over time, given the large, connected populations in each Angolan giraffe unit, the threats are not of such a magnitude that the subspecies is likely to become in danger of extinction within the foreseeable future in any of the Angolan giraffe units.

In summary, we find that the Angolan giraffe is not likely to become in danger of extinction within the foreseeable future in any areas (*i.e.*, in any of the Angolan giraffe units). Thus, there is no portion of the range where the Angolan giraffe may be threatened. Based on the best scientific and commercial data available, we determine that the Angolan giraffe is not likely to become in danger of extinction within the foreseeable future throughout all or a significant portion of its range.

Determination of Status

Based on the best scientific and commercial data available, we determine that the Angolan giraffe does not meet the definition of an endangered species or a threatened species in accordance with sections 3(6) and 3(20) of the Act. Therefore, we find that listing the Angolan giraffe under the Act's section 4(a)(1) factors is not warranted at this time.

Determination of Status: South African Giraffe

The South African giraffe does not meet the Act's definition of an endangered species or a threatened species. As stated above, we determine a species' classification based upon its regulatory status throughout all of its range when the species has similar extinction risk in all areas across its range at a scale that is biologically appropriate for that species. Conversely, if the extinction risk varies across its range, we determine a species' classification based upon its regulatory status throughout a significant portion of its range. Either way, we begin by determining the scale that is biologically appropriate for a classification determination for that species. For many species, we can divide the range in an infinite number of ways. As discussed above, South African giraffe populations primarily occur in six South African giraffe units (KAZA TFCA, South Africa/Zimbabwe/Mozambique, Malawi, Eswatini, Zinave National Park, and Maputo Special Reserve), and while South African giraffes may periodically interact within these countries, we do not expect interactions among these units because there is no connectivity between the units. While information about any South African giraffe populations other than these six South African giraffe units is limited, the best available data indicate that threats and the subspecies' response to those threats are similar in any other populations for which we lack information. In summary, the South African giraffe unit is the unit that provides the appropriate scale to assess extinction risk for the South African giraffe.

Endangered Species Classification

We evaluated whether the South African giraffe has a similar risk of extinction in all areas across its range by assessing its extinction risk in each South African giraffe unit. Our review indicated that the South African giraffe's extinction risk is similar in all areas across its range. Therefore, we evaluated whether it may be endangered based upon the "throughout all of its

range" component. In undertaking this analysis of whether the South African giraffe is endangered throughout all of its range, we reviewed the best scientific and commercial data available regarding threats to the subspecies, the subspecies' responses to those threats, and any associated conservation measures; we then assessed the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors. For the endangered species determination, we examined the following threats: habitat loss, degradation, and fragmentation (Factor A), predation and disease (Factor C), and poaching and hunting (Factor B), all of which may be exacerbated by increasing human populations, effects from climate change (including the inter-related effects of civil unrest and human food insecurity), and low genetic diversity (Factor E), as well as cumulative effects. Additionally, the maintenance of private lands for activities such as personal use, tourism, and hunting (Factor E) impacts the subspecies because private lands with wild giraffes in southern Africa comprise large proportions of the respective populations.

South African giraffes need multiple healthy, resilient populations that are distributed across the subspecies' range to reduce the risk of extinction. After evaluating threats to the subspecies and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we found that habitat loss, degradation, and fragmentation, and poaching, all of which may be exacerbated by ongoing and near-term effects of human population growth and climate change, are the threats with the greatest potential to affect the subspecies' near-term viability. We also considered potential threats such as predation and disease, and while individuals are affected by these threats, there is no information to suggest population-level or subspecies-level effects.

The current total population size is approximately 29,390 individuals, which is 367 percent of the population size of 8,000 in 1979 (Muller et al. 2018, supplement, p. 2). This represents an increase of approximately 2.7–3.2 percent per year since 1979. The private sector has been largely responsible for restoring giraffes to many parts of their former natural range in South Africa (Deacon and Parker 2016, p. 5), in which thousands of private farms account for about 50 percent of the total South African giraffe population (Deacon and Tutchings 2018, p. 46; Deacon and Parker 2016, pp. 3–5). However, population increases have

also occurred on formally protected areas as well over the last few decades (Deacon and Parker 2016, p. 1).

Large, connected populations remain within the KAZA TFCA and South Africa/Zimbabwe/Mozambique units, and smaller populations occur on protected lands in the Malawi, Eswatini, Zinave National Park, and Maputo Special Reserve units, where the South African giraffe can meet its needs. The best available information indicates that any combined effects from habitat loss, degradation, and fragmentation, and from poaching, are not causing population-level declines in the near term. South African giraffes are also managed by range countries where hunting is legal to sustain ecotourism and trophy-hunting activities, which in turn may be managed to produce revenues that are used by range countries and local communities for giraffe conservation activities such as anti-poaching, reintroduction, and habitat preservation and restoration to benefit and address the threats to giraffes in the country.

Although the South African giraffe has experienced some declines in habitat and area of occupancy, the resiliency and redundancy of the subspecies has increased from historical levels with introduced populations and increasing abundance in all South African giraffe units. The subspecies occurs throughout much of its historical range and maintains ecological representation, including large, connected populations in the KAZA TFCA and South Africa/Zimbabwe/Mozambique units. With the recent and near-term projected increasing population trend, expansion of range in the South Africa/Zimbabwe/Mozambique unit and Eswatini and Malawi units, reintroduction of giraffes into the Zinave and Maputo units, the stable range in KAZA TFCA, and the existence of multiple healthy, resilient populations (at least one in each South African giraffe unit), the South African giraffe exhibits representation, redundancy, and resiliency such that the subspecies is not in danger of extinction. Overall, while threats are ongoing, given the large population sizes for two South African giraffe units and protected nature of the remaining four units, in the near term, these threats are not of such a magnitude that the subspecies is in danger of extinction in any of the South African giraffe units.

In summary, we find that the South African giraffe is not in danger of extinction in any of the South African giraffe units. Thus, there is no portion of the range where the South African giraffe may be endangered. After

assessing the best scientific and commercial data available, we conclude that because there is no portion of the range in which the South African giraffe is endangered, it is necessarily not in danger of extinction throughout all of its range. Because we have determined that there is no portion of the range where the subspecies may be endangered (*i.e.*, the species is also not in danger of extinction throughout a significant portion of its range), we proceed with determining whether South African giraffe is threatened (*i.e.*, is likely to become endangered within the foreseeable future throughout all or a significant portion of its range).

Threatened Species Classification

The statutory difference between an endangered species and a threatened species is the timeframe in which the species becomes in danger of extinction. An endangered species is in danger of extinction, and a threatened species is not in danger of extinction but is likely to become so within the foreseeable future. We evaluated whether the South African giraffe has a similar risk of extinction within the foreseeable future in all areas across its range by assessing its extinction risk within each South African giraffe unit.

For the threatened classification, we evaluated whether the South African giraffe has a similar risk of extinction within the foreseeable future in all areas across its range by assessing its extinction risk within each South African giraffe unit. Because our review indicated that the South African giraffe's extinction risk varies across its range, we then evaluated whether it may be threatened based upon the "throughout a significant portion of its range" component. We evaluated the portion of the range that includes the South African giraffe units where the South African giraffe may be threatened—the Malawi, Eswatini, Zinave National Park, and Maputo Special Reserve units. In the remaining South African giraffe units of KAZA TFCA and South Africa/Zimbabwe/Mozambique, the South African giraffe is not likely to become in danger of extinction within the foreseeable future, because the populations are large, interconnected, and have increasing population trends, so we are not including those units in the portion that we are evaluating for the threatened classification.

As mentioned above, South African giraffes need multiple healthy, resilient populations that are distributed across the subspecies' range to reduce the risk of extinction. After evaluating threats to the subspecies and assessing the

cumulative effect of the threats under the Act's section 4(a)(1) factors, we found that habitat loss, degradation, and fragmentation, and poaching, all of which may be exacerbated by human population growth, climate change, and low genetic diversity, are the threats with the greatest potential to affect the subspecies' viability within the foreseeable future.

Habitat loss, fragmentation, or degradation is unlikely on protected lands (government or private) and is otherwise expected to continue in parts of each South African giraffe unit. Drought duration, frequency, and intensity are projected to increase within the range of the South African giraffe similarly in each South African giraffe unit. Human population size is projected to increase by approximately 27 percent under the lower scenario and to increase almost sixfold under the upper scenario across the subspecies' range by 2100. In turn, South African giraffes may face reductions in food quality and availability, and restriction of their movement patterns and ability to access necessary resources. Additionally, although we were unable to quantify potential future increases in poaching, we anticipate that poaching will likely continue in each South African giraffe unit with increased food insecurity associated with rapid human population growth and climate change. While plausible future conditions indicate that habitat conditions will decline, human populations will increase, and climate change will increase the duration, frequency, and intensity of drought, there is no evidence suggesting a change in the subspecies' past response to any of these threats in the future.

The overall South African giraffe population has increased to 29,390 individuals, 367 percent of the population size of 8,000 in 1979, which represents an increase of approximately 2.7–3.2 percent per year over this time. The population is unlikely to continue growing into the future at the recent rate given the low starting abundances. Additionally, population trends in the future are dependent upon the continued protections afforded the subspecies by private lands such as those used for tourism and private game farms. The population outside of private lands has increased since the 1970s, and population trends may be stable or increasing if private landowners continue to conserve South African giraffe at their current extent or increase. We find it most likely based on the best available data and past and present trends that private landowners will continue to conserve giraffe at rates

comparable to the present. However, protections from these sources are not guaranteed, and giraffe abundance may decline if those do not continue and/or climate change impacts are not sufficiently mitigated.

Even should populations decline, both the KAZA TFCA and South Africa/Zimbabwe/Mozambique units have populations that are large, connected, and that have adequate resiliency to sustain some reductions. Poaching, which is a driving factor in the decline of other giraffe species across the African continent, may be tempered by the relative political stability in the range of the South African giraffe. Habitat loss, degradation, and fragmentation are not likely to cause population-level declines to the point that the subspecies is likely to become in danger of extinction within the foreseeable future due to the South African giraffe's versatility and diverse diets, as well as to the future decisions of southern African countries in how giraffes are managed. South African giraffes are also managed by range countries where hunting is legal to sustain ecotourism and trophy-hunting activities, which in turn may be managed to produce revenues that are used by range countries and local communities for giraffe conservation activities such as anti-poaching, reintroduction, and habitat preservation and restoration to benefit and address the threats to giraffes in the country. The private sector has contributed significantly to the increase in the subspecies' population through management, including by helping restore the subspecies to many parts of its former range. Overall, while continued threats are projected, given the large population sizes for the KAZA TFCA and South Africa/Zimbabwe/Mozambique units, the threats are not of such a magnitude that the subspecies is likely to become in danger of extinction within the foreseeable future. However, the rest of the range contains much smaller populations that are more vulnerable to these threats into the future. In summary, we find that the South African giraffe is not likely to become in danger of extinction within the foreseeable future in either the KAZA TFCA or the South Africa/Zimbabwe/Mozambique units, but it may be threatened in a portion of the range—the Malawi, Eswatini, Zinave National Park, and Maputo Special Reserve units.

When assessing whether a species is endangered or threatened throughout a significant portion of its range, we address two questions because we must determine whether there is any portion

of the species' range for which both (1) the portion is "significant" (the significance question) and (2) the species is in danger of extinction or likely to become in danger of extinction within the foreseeable future throughout that portion (the status question). We first addressed the significance question. In undertaking this analysis of whether any portion of the range is significant based on its conservation value for the subspecies, we considered whether (1) the portion is a sufficiently large proportion of the current range such that it necessarily provides an important conservation value for the subspecies or (2) the portion otherwise contributes an important conservation value for the subspecies. The combined geographical size of the Malawi, Eswatini, Zinave National Park, and Maputo Special Reserve units is a very small proportion (approximately 2 percent) of the current range of the South African giraffe. This portion of the range also does not otherwise contribute an important conservation value for the subspecies. The portion does not currently or recently contain high abundance or density of individuals or populations of the subspecies relative to its geographic size. Additionally, the populations in Malawi and Eswatini are likely extralimital populations introduced outside of the historical range. The reintroduced populations at Zinave National Park and Maputo Special Reserve are still quite small (fewer than 50 giraffes at each location). The portion of the range does not contain important habitat features for the subspecies' conservation that are not found elsewhere within the range. The portion of the range does not connect other more significant populations and does not increase genetic diversity because these populations were reintroduced from other populations of southern giraffe. Among the similar habitat features, across the range, the portion does not contain geographical areas of any specific higher or unique value. We therefore find that the Malawi, Eswatini, Zinave National Park, and Maputo Special Reserve units portion is not significant. As a result of our finding that this portion of the range is not "significant," we do not need to determine whether the South African giraffe is likely to become in danger of extinction within the foreseeable future throughout this portion of the range.

Because no portion of the subspecies' range is significant, there is no basis to determine that the subspecies is likely

to become in danger of extinction within the foreseeable future throughout a significant portion of its range. In reaching this conclusion, we did not apply the aspects of the 2014 SPR Policy, including the definition of "significant," that courts have held to be invalid.

Determination of Status

Based on the best scientific and commercial data available, we determine that the South African giraffe does not meet the definition of an endangered species or a threatened species in accordance with sections 3(6) and 3(20) of the Act. Therefore, we find that listing the South African giraffe under the Act's section 4(a)(1) factors is not warranted at this time.

II. Proposed Listing Determinations for the West African Giraffe, Kordofan Giraffe, Nubian Giraffe, Reticulated Giraffe, and Masai Giraffe

Background

A thorough review of the taxonomy, life history, and ecology of the northern giraffe (which consists of three subspecies: West African giraffe, Kordofan giraffe, and Nubian giraffe), reticulated giraffe, and Masai giraffe is presented in each species' respective SSA report (Service 2024a, entire; Service 2024b, entire; Service 2024c, entire).

Giraffes are the tallest living terrestrial animal and the largest ruminant on Earth. Life-history traits of multiple giraffe species have been reported from several locations across their ranges and demonstrate both a strong degree of consistency of traits across regions as well as a large amount of individual variation (Bercovitch and Berry 2009, p. 535). No difference in behavior or development among species has been reported (San Diego Zoo Wildlife Alliance (SDZWA) 2023, unpaginated). Therefore, we consider all giraffes to have similar needs and life-history traits.

The giraffe's primary activity is feeding, and they consume a variety of leaves, stems, flowers, and fruits (Dagg 2019, p. 24; Muller et al. 2016, p. 6). Because giraffes have high metabolic and reproductive requirements, they need to consume large quantities of food throughout the year (Parker and Bernard 2005, p. 207). Giraffes have been noted to forage on at least 100 different plant species, although *Acacia*, *Commiphora*, and *Terminalia* species are major staples (Kingdon 1997, p. 494; Muller et al. 2016, p. 6). *Acacia* trees or bushes are

a preferred resource and are fed on in high proportions wherever giraffes occur (Dagg 2019, p. 25).

Giraffes need high-quality forage year-round to maintain their high-energy budget; this is particularly true for females, which have long gestation periods and are pregnant for most of their adult lives. Each population has a diverse diet, and the food that the giraffes select throughout the year largely depends on the seasonal changes in the phenology of plant species (Pellew 1984, p. 74) or, for females, whether they are nursing (Caister et al. 2003, p. 209; Saito and Idani 2018, p. 15). Generally, giraffes do not show large-scale seasonal migrations, but within individual home ranges, small-scale seasonal movements occur primarily based on food resources (Pellew 1984, p. 65; Brown et al. 2023, p. 7; Fennessy 2009, p. 324). Additionally, because giraffes engage in small-scale seasonal movements based on changes in the distribution of food resources, they need adequate space within which to move and find high-quality food that meets their metabolic needs. Within their home ranges, giraffes also need access to mates.

Giraffes live in a complex society characterized by loose subgroup composition, a pattern of sexual segregation, and longer-term relationships that are typical in fission-fusion societies (Bercovitch et al. 2006, p. 314; Carter et al. 2013, p. 390; Dagg 2019, p. 39). Females are sexually mature at around 4–5 years old, and the average gestation period is about 15 months; thus, females produce their first offspring at around 5 to 6 years old (Pratt and Anderson 1982, p. 481; Berry and Bercovitch 2012, p. 159; Dagg 2019, p. 140). The calving interval can be highly variable, with a mean of 20 months, and is influenced by survival of the first calf and food quality (Pellew 1983, pp. 280–281; Lee and Strauss 2016, p. 5, citing many authors).

Giraffes are versatile and have adapted to a variety of habitats, ranging from desert landscapes to woodland and savanna ecosystems, forming a wide arc across sub-Saharan Africa covering west, central, east, and southern Africa (Muller et al. 2016, p. 2; O'Connor et al. 2019, p. 286). Giraffes are most often found in savanna and woodland habitats and always near trees or bushes (Dagg 1971, p. 4). Northern, reticulated, Masai, and southern giraffes occur in multiple countries in sub-Saharan Africa (see table 1).

TABLE 1—FOUR SPECIES OF GIRAFFES AND THE COUNTRIES IN WHICH THEY OCCUR IN AFRICA

Northern giraffe	Reticulated giraffe	Masai giraffe	Southern giraffe
Cameroon	Ethiopia	Kenya	Angola.
Central African Republic	Kenya	Rwanda	Botswana.
Chad .....	.....	Tanzania	Eswatini.
Democratic Republic of the Congo .....	.....	Zambia	Malawi.
Ethiopia .....	.....	.....	Mozambique.
Kenya .....	.....	.....	Namibia.
Niger .....	.....	.....	South Africa.
South Sudan .....	.....	.....	Zambia.
Uganda .....	.....	.....	Zimbabwe.

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in title 50 of the Code of Federal Regulations set forth the procedures for determining whether a species is an endangered species or a threatened species, and issuing protective regulations for threatened species.

The Act defines an “endangered species” as a species that is in danger of extinction throughout all or a significant portion of its range, and a “threatened species” as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an endangered species or a threatened species because of any of the following factors:

- (A) The present or threatened destruction, modification, or curtailment of its habitat or range;
- (B) Overutilization for commercial, recreational, scientific, or educational purposes;
- (C) Disease or predation;
- (D) The inadequacy of existing regulatory mechanisms; or
- (E) Other natural or manmade factors affecting its continued existence.

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

We use the term “threat” to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term “threat” includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term

“threat” may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In determining whether a species meets either definition, we must evaluate all identified threats by considering the species’ expected response and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species.

The Act does not define the term “foreseeable future,” which appears in the statutory definition of “threatened species.” Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis, which is further described in the 2009 Memorandum Opinion on the foreseeable future from the Department of the Interior, Office of the Solicitor (M–37021, January 16, 2009; “M–Opinion,” available online at <https://www.doi.gov/sites/doi.opengov.ibmcloud.com/files/uploads/M-37021.pdf>). The foreseeable future extends as far into the future as the Services can make reasonably reliable predictions about the threats to the species and the species’ responses to those threats. We need not identify the foreseeable future

in terms of a specific period of time. We will describe the foreseeable future on a case-by-case basis, using the best available data and taking into account considerations such as the species’ life-history characteristics, threat projection timeframes, and environmental variability. In other words, the foreseeable future is the period of time over which we can make reasonably reliable predictions. “Reliable” does not mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction, in light of the conservation purposes of the Act.

Analytical Framework

The SSA reports document the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species. The SSA reports do not represent our decision on whether these species should be proposed for listing as an endangered or threatened species under the Act. However, they do provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies.

To assess the viability of northern giraffe, reticulated giraffe, Masai giraffe, and southern giraffe, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency is the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years); redundancy is the ability of the species to withstand catastrophic events (for example, droughts, large pollution events); and representation is the ability of the species to adapt to both near-term and long-term changes in its physical and biological environment (for example, climate conditions, pathogens). In general, species viability will increase with increases in (and decrease with

decreases in) resiliency, redundancy, and representation (Smith et al. 2018, p. 306). Using these principles, we identified these species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing these species' viability.

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

The following is a summary of the key results and conclusions from the SSA reports; the full SSA reports can be found at Docket FWS-HQ-ES-2024-0157 on <https://www.regulations.gov>.

Summary of Biological Status and Threats

In this discussion, we review the biological condition of the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, Masai giraffe, and their resources, and the threats that influence these species' current and future condition, to assess their overall viability and the risks to that viability. We analyze these factors both individually and cumulatively to determine the current condition of these species and project their future condition under plausible future scenarios.

Species Needs

We consider all giraffe species to have similar needs because no difference in behavior or development among species has been reported (SDZWA 2023, unpaginated). Therefore, West African, Kordofan, and Nubian, reticulated, and Masai giraffes have the same requirements to have high viability; they need to maintain representation (adaptive capacity) by having multiple, robust populations broadly distributed across diverse environments with spatial heterogeneity.

Giraffes need high-quality forage year-round to maintain their high-energy

budget, this is particularly true for females, which have long gestation periods and are pregnant for most of their adult lives. Each population has a diverse diet, and the food that giraffes select throughout the year largely depends on the seasonal changes in the phenology of plant species (Pellew 1984, p. 74) or, for females, whether they are nursing (Caister et al. 2003, p. 209; Saito and Idani 2018, p. 15). Anthropogenic influences strongly affect the giraffe's use of space (Brown et al. 2023, p. 8), physical and geographic barriers such as rivers, fencing, and urbanization (Fennessy et al. 2009, p. 324; Le Pendu and Ciofolo 1999, p. 350; Perry 1978, p. 80). Because giraffes engage in small-scale seasonal movements based on changes in the distribution of food resources, they need adequate space to move and find high-quality food that meets their metabolic needs. Within their home ranges, giraffes also need access to mates.

Giraffe populations with robust abundances, population growth rates, and quality habitat are more resilient than populations that are less genetically or demographically healthy. Populations of giraffes that are distributed broadly across varying ecological conditions are more resilient to regional-scale environmental stochasticity; a broad distribution also reduces the chance that all populations (individuals) will experience catastrophic events concurrently. Giraffe evolutionary potential is maximized in large, connected populations (Coimbra et al. 2021, p. 2935), and a broad distribution of giraffe populations facilitates the development of unique ecological adaptations in different populations. Maintaining connectivity between populations fosters population-level genetic diversity (heterozygosity) via gene flow and increased evolutionary potential of these species.

The combination of life-history traits of giraffes that enhance their adaptive capacity also limits their reproductive output and creates a complex dynamic. Giraffes can utilize diverse food resources and cover large areas as resource availability becomes more variable (Dagg 2019, pp. 26–27; Muller et al. 2016, p. 6; Pellew 1984, p. 78; McQualter et al. 2015, p. 3), but their slow reproductive rates (Pratt and Anderson 1982, p. 481; Berry and Bercovitch 2012, p. 159; Dagg 2019, p. 140; Pellew 1983, pp. 280–281; Lee and Strauss 2016, p. 5, citing many authors) may prevent them from effectively responding to rapid environmental changes. Thus, giraffe viability requires high population abundances, large effective population sizes, and

sufficient, high-quality (nutritious and unfragmented) habitat distributed across heterogeneous environments.

Factors Influencing Giraffe Viability

In this discussion, we first review the factors that influence the condition of all giraffe species, which are changing habitat conditions (causing habitat loss, degradation, and fragmentation) and poaching; these factors are exacerbated by rapid human population growth and climate change. We then review any additional details regarding these threats and any additional factors (e.g., disease) that influence each species' or subspecies' current and future condition, to assess overall viability and the risks to that viability.

Changing Habitat Conditions

Changing habitat conditions affect giraffes directly or indirectly through reduced food availability and reduced or obstructed movements to find necessary resources, which negatively affect giraffe's survival and recruitment. The sources of habitat loss, degradation, and fragmentation are conversion of natural habitats and natural vegetation to croplands and rangelands, urbanization, deforestation, production of fuelwood, and climate change. Changing habitat conditions also result in increased risk of human conflict (e.g., war) and human-wildlife conflict (e.g., retaliation and poaching).

Africa is the fastest growing region in the world (Sakho-Jimbira and Hathie 2020, p. 3). In sub-Saharan Africa, the human population is approximately 1.2 billion people (WorldBank 2023, unpaginated). Annual population growth has ranged from 2.5 to 2.9 percent over the last 35 years, and the sub-Saharan African population is projected to double by 2050 and triple by 2100 (Intergovernmental Panel on Climate Change (IPCC) 2022, p. 1294). The exponential growth of the human population and the demand for land and resources are causing giraffes to explore new areas in search of food (Suraud et al. 2012, p. 581; Ferguson et al. 2020, p. 5). Conversion of natural habitats into farmlands and urban development not only affects giraffes through loss of food, but also contributes to the fragmentation of their habitats, making it more difficult for giraffes to find suitable feeding, drinking, breeding, and sheltering areas (Ali et al. 2023, p. 178). Because of habitat fragmentation, giraffes need to find alternative routes, often traversing through farmlands, feeding on crops, and increasing the risk of human-wildlife conflict (Ali et al. 2023, entire).

Giraffes always occur near trees and/or bushes and rely on them for food. Therefore, forest loss, while not a direct measure of impacts to giraffe habitat, can be considered a reasonable surrogate for changing habitat conditions for giraffes. The rate of net forest loss has increased in Africa in each of the three decades since 1990, and Africa had the highest global annual rate of forest loss from 2010 to 2020 at 3.9 million hectares (ha) (Food and Agricultural Organization of the United Nations (FAO) 2020, p. 15). Large declines in “other wooded land” (canopy cover of 5 to 10 percent) were also recorded from 1990–2020 in all African subregions (FAO 2020, p. 24).

One source of habitat loss is charcoal production. One billion people—roughly four of every five—in sub-Saharan Africa rely on cooking fuels used in open fires or basic stoves (IEA 2023, p. 14). Wood removal associated with fuelwood increased in all regions of Africa between 1990 and 2018 (FAO 2020, pp. 112–113). Woody vegetation, particularly Acacia trees, is the main source of charcoal production in the giraffe’s range (Kiruki et al. 2017, p. 476; Abera et al. 2022, p. 10; Abate and Abate 2017, p. 9). Acacia trees also are a preferred food source of giraffes; therefore, a reduction of Acacia trees due to the demand for fuelwood reduces the availability of high-quality food resources for giraffes. Charcoal production also results in overall woodland degradation because it exacerbates vegetation loss, soil erosion, and creation of associated access roads (Kiruki et al. 2017, pp. 476, 478).

Related effects from increased human population growth and land use changes—With a rapidly increasing human population, pastoralists (livestock farmers) across Africa are experiencing large-scale loss of rangeland access because of agriculture expansion, private ranches, wildlife reserves, and urbanization (Holechek et al. 2017, p. 275; Brottem 2021, p. 2). The threat to the livelihood of pastoralists intensifies human conflicts, and this breakdown of traditional pastoral and subsistence agricultural systems is a principal factor of civil unrest in Africa (Holechek et al. 2017, p. 275, citing many authors).

Most wars in sub-Saharan Africa have been civil conflicts fought within the boundaries of a single sovereign country (State Failure 2001, cited in Glew and Hudson 2007, p. 141). However, internal conflicts may overspill defined boundaries, affecting both a country and its neighbors for substantial lengths of time (Commission for Africa, 2005, cited in Glew and Hudson 2007, p. 141). Civil

unrest does not usually directly target ecological resources in pursuit of a military outcome, but impacts to wildlife occur because of resource exploitation during periods of lawlessness (Glew and Hudson 2007, p. 7, citing many authors; Dudley et al. 2002, p. 326). However, large mammals (when available) are often a vital food source for isolated military or paramilitary groups operating within war zones and disputed territories (Plumptre et al. 1997, p. 271; Dudley et al. 2002, p. 322). Additionally, wildlife products are often sold or bartered for food, arms, ammunition, or other goods and services (Dudley et al. 2002, p. 322). Civil unrest also causes significant displacement of people (Badiora 2017, p. 316; Davis 2019, p. 180; Glew and Hudson 2007, p. 141). Refugee encampments are often associated with severe environmental degradation from the use of slash-and-burn agriculture and the overharvesting of vegetation for fuel, food, and construction materials. This, in turn, results in widespread deforestation and erosion, and takes a heavy toll on wildlife and habitats in affected areas (Plumptre et al. 1997, p. 326; Pech 1995, in Dudley et al. 2002, p. 322).

Poaching

Poaching is a primary threat to the giraffe’s overall survival throughout Africa (Giraffe Conservation Foundation 2022, p. 22; Lee et al. 2023, p. 346; Muller et al. 2018, p. 7). The reasons for illegally killing giraffes vary greatly across Africa, with local context playing a significant role in shaping human-giraffe interactions (Ruppert 2020, chapter 2). Poverty, tradition, and lack of economic opportunity drives wildlife poaching (Knapp 2012, p. 443; Lindsey et al. 2012, p. 33). Poaching also tends to spike when food-shortages are severe, and when the demand for agricultural labor is low (Lindsey et al. 2012, p. 5), a common impact of drought (Vicente-Serrano et al. 2022, p. 9, Engelbrecht et al. 2024, p. 178). Additionally, highly organized poachers, individuals linked to international criminal networks, and military personnel are involved in the killing or theft of wildlife resources, including giraffes (Douglas and Alie 2014, p. 273, citing many authors; Humphreys and Smith 2011, pp. 131–137; Wildlife Justice Commission 2023, p. 7; Interpol 2024, unpaginated). The COVID–19 pandemic caused a large reduction in tourism worldwide and resulted in economic hardship for many people throughout Africa. The loss of income in an already poverty-stricken area resulted in increased poaching of

giraffe for bushmeat to feed families (Krein 2021, p. 75).

Bushmeat is preferred in rural areas because it is normally cheaper than domesticated meat alternatives, whereas in urban areas bushmeat is considered a luxury (Lindsey et al. 2012, p. 6; Bowen-Jones et al. 2002, p. 11; Wilkie and Carpenter 1999, p. 940; Petrozzi et al. 2016, p. 546). Bushmeat consumption is consistently more prevalent closer to human settlements, although increasing national and international demand is driving commercialization of bushmeat (Lindsey et al. 2012, p. 6). Killing for bushmeat is more severe in poorer countries, in those countries with high human population densities, and during periods of political instability (Lindsey et al. 2011, p. 97).

In summary, the primary threats of changing habitat conditions and poaching are directly influenced by rapid human population growth and climate change, which also influence these threats through increased human-wildlife conflicts. The combination of these threats works synergistically to affect all giraffe species.

Factors Influencing Northern Giraffe

Factors that influence West African, Kordofan, and Nubian giraffes (the three subspecies of northern giraffe), are generally similar within and among populations, with differences in magnitude. Those factors include a combination of human actions that threaten the northern giraffe’s viability as well as conservation efforts and regulatory measures that aim to benefit and protect northern giraffes. Because northern giraffes overlap with humans and domesticated livestock, they rely on the same natural resources. Human-wildlife conflicts occur when wildlife and humans compete for the same resources (Uganda Wildlife Authority (UWA) 2018, p. 49).

The primary threats to the northern giraffe include changing habitat conditions caused by habitat loss, fragmentation, and degradation, and poaching, all of which are exacerbated by rapid human population growth as well as climate change through drought and extreme rainfall (Huho and Mugalavai 2010, entire; Lam et al. 2023, entire; Scholte et al. 2018, p. 2). However, other threats affect northern giraffes directly or compound these primary threats, such as low genetic diversity. We also considered potential threats such as predation and disease, and while individuals may be affected by these two threats, the best available information does not indicate population-level or species-level effects.

Multiple studies show concurrent deforestation or loss of woody cover (giraffe foraging habitat and cover) with increases in cropland and settlements directly within the range of the northern giraffe. The degree of forest loss from 2001–2023 was variable across the subspecies of the northern giraffe. West African giraffe lost minimal (less than 1 ha) forest area from 2001–2023, but already had low forest cover by 2000. However, in non-forested areas the subspecies experienced a high degree of cropland development within and between its two populations from 2003 to 2019 (Potapov et al. 2021, p. 19). Most of the forest loss within the range of the northern giraffe occurred in the range of the Nubian giraffe subspecies (29.3 kha of tree cover, equivalent to a 2.5 percent decrease). Across the full range of the Nubian giraffe, the primary driver of forest loss was shifting agriculture, defined as small- to medium-scale forest and shrubland conversion for agriculture (Curtis et al. 2018, p. 1108). Similarly, the primary driver of forest loss for Kordofan giraffe was shifting agriculture (Curtis et al. 2018, p. 1108), equating to a loss of tree cover across its range from 2001–2023, or a 0.55 percent decrease (CWF 2024, unpaginated). Substantial crop development has also occurred between populations for all three subspecies from 2003–2019, which can limit dispersal and gene flow between populations, and can restrict access to water resources (Potapov et al. 2021, p. 19).

Civil unrest is a longstanding and significant ongoing concern throughout the range of the northern giraffe. Armed conflicts have been ongoing for years in Niger. There was a coup in July 2023, and military authorities continue to run the government (British Broadcasting Corporation (BBC) 2024, entire). Insecurity is also caused from neighboring countries; in the border area between Burkina Faso, Mali, and Niger, attacks by non-state armed groups affiliated with either al-Qaeda or the Islamic State continue to force thousands of people to flee (United Nations Security Council 2023, p. 1; United Nations Refugee Agency (UNHCR) 2021, entire).

In the range of the Kordofan giraffe, ethnic conflicts have increased insecurity in the region and wildlife populations suffered heavy losses due to the widespread proliferation of guns in this region (Wildlife Conservation Society (WCS) 2017, unpaginated; Bouché et al. 2011, p. 7008; Ruggiero 1984, p. 12). Waza National Park in Cameroon, Garamba National Park in the DRC, and the Northern Central

African Republic (CAR) are situated in areas with hostilities, with armed poachers and various rebel groups (Bouché et al. 2009, p. 995; Elkan et al. 2015, p. 4; Bouché et al. 2011, p. 7008; Ruggiero 1984, p. 12). Waza National Park in Cameroon, which contains the second largest population of Kordofan giraffes, has suffered from the rise of the Boko Haram insurgency that has caused a major security threat to the northern regions of the country and has effectively halted any wildlife conservation or surveillance in the park since 2015 (Roland 2018, cited in Marias et al. 2019, p. 3; Elkan et al. 2015, p. 4). While terrorist activities currently remain relatively far from Zakouma National Park, where 50 percent of the Kordofan giraffe population exists, they do pose threats to other regions that may have remnant giraffe populations (Marais et al. 2020c, p. 3).

This pattern of destabilization across regions, combined with refugee migration, is characteristic of armed conflicts in west, central, and east Africa (Dudley et al. 2002, p. 322). As stated above, refugee encampments are often associated with severe environmental degradation from the use of slash-and-burn agriculture and the overharvesting of vegetation for fuel, food, and construction materials. This, in turn, results in widespread deforestation and erosion, and takes a heavy toll on wildlife and habitats in affected areas (Plumptre et al. 1997, p. 326; Pech 1995, in Dudley et al. 2002, p. 322).

In summary, changing habitat conditions because of habitat loss, degradation, and fragmentation, primarily due to agriculture expansion, urbanization, and fuelwood production, are considered historical, ongoing, and imminent threats to the West African, Kordofan, and Nubian giraffes. Changing habitat conditions reduce the availability of high-quality food and reduce foraging habitat, protective cover, and connectivity for giraffes, and these threats are anticipated to continue in the future, exacerbated by the increased pressure placed on land use and natural resources from a rapidly increasing human population and climate change (including the inter-related effects such as civil unrest and human food insecurity).

Poaching

The reasons for illegally killing giraffes vary greatly across Africa, with local context playing a significant role in shaping human-giraffe interactions (Ruppert 2020, chapter 2). Poaching has reduced the numbers of West African,

Kordofan, and Nubian giraffes. Many populations have been extirpated or have been severely reduced by poaching. Currently, there has been limited effectiveness in reducing poaching with a few successes, like the West African population in Niger and Zakouma National Park in Chad.

Illegal killing drove local extirpations of the West African giraffe in the 1970s and 1980s, which culminated with only an estimated 49 individuals remaining by 1996 in a single area in Niger (Gašparová et al. 2024, p. 2). This population has increased, partially because of the launch of several community projects that effectively reduced poaching of giraffe by locals (Gašparová et al. 2024, p. 5). The Government of Niger made concerted efforts to enforce legislation preventing the illegal killing of giraffes in the mid-1990s, further supported by a community education and awareness campaign (Suraud et al. 2012, p. 577; Ferguson et al. 2020, pp. 2–4).

For the Kordofan giraffe, poaching has resulted in severe reductions in giraffe populations (D'haen et al. 2019, p. 11403; Bouche et al. 2011, pp. 6–11). In countries where there is significant political and social instability, such as in CAR and the DRC, funding and management of protected areas is insufficient to eliminate poaching. One of the few exceptions is Zakouma National Park in Chad, which is the only park in central Africa with increasing numbers of megaherbivores (including giraffes) because of a high number of rangers, long-term European Union funding, and political support (Scholte 2021, pp. 4–6). The population of Kordofan giraffe is 2,297 individuals (Brown et al. 2021, p. 6). Zakouma National Park holds approximately 50 percent of the population of Kordofan giraffes (Brown et al. 2021, p. 6; Marais et al. 2020c, p. 4).

Populations of Nubian giraffe in Uganda have declined as much as 90 percent from the 1960s due to increased poaching because of political and social instability across their historical range (UWA 2018, p. 43). Overall, only a few small and isolated populations of Nubian giraffe remain in Kenya, Uganda, South Sudan, and Ethiopia (Wube et al. 2018, p. 1; Fennessy et al. 2018, pp. 1–2; Muneza et al. 2024, p. 1275). The Nubian giraffe's total population is 3,022 giraffes (Brown et al. 2021, pp. 4, 7). Murchison Falls National Park in Uganda holds approximately 60 percent (2,250 individuals) of the total population of Nubian giraffes. While populations have rebounded in areas where there is better security and management (*i.e.*, in the

protected areas in Uganda and Kenya where most of the giraffes occur), poaching remains a threat where populations are smallest, such as in South Sudan. In Kenya, Nubian giraffes have rebounded from near extirpation in the 1970s to roughly 1,000 individuals distributed among 13 populations. This rebound is attributed to better security and management in protected areas that has reduced poaching (Muneza et al. 2024, p. 1279). Poaching remains a threat in South Sudan, where Nubian giraffe populations are smallest and less protected; however, poaching has been reduced in the areas with the most Nubian giraffes in Uganda and Kenya.

Climate Change

The mechanisms by which climate change can affect the giraffe's fitness are complex, multifaceted, and contingent on a range of interacting factors. The primary influence of climate change on the viability of the West African, Kordofan, and Nubian giraffes is changes in precipitation patterns, notably drought and extreme precipitation pattern. Drought reduces water availability and food quality for giraffes. Giraffes are generally less able to access high-quality browse during times of drought due to an increase in tree mortality and a decline in browse abundance (Vicente-Serrano et al. 2022, p. 9, Engelbrecht et al. 2024, p. 178), as well as increased competition with other browsing species (Birkett and Stevens-Wood 2005, entire). Less access to high-quality food leads to giraffes needing to expand their home range, which in turn increases the relative proportion of time searching for food and can lead to human-wildlife conflicts and the increased risk of poaching. Giraffes can also be affected by extreme precipitation. High precipitation events were correlated with reduced survival in both adult and subadult giraffes, as higher rainfall can increase cover for predators, increase parasite and disease prevalence, and reduce food quality (Bond et al. 2023, pp. 3185–3193).

Indirectly, human food insecurity, brought on by both drought and heavy precipitation events, affects the giraffe's viability. Drought impacts pasture quality, livestock survival and production, crop yields, and malnutrition rates (Lam et al. 2023, p. entire). Heavy precipitation and flooding events in Kenya resulted in crop damages and impacts to 5 million people (1997); losses of life, property, and crops leading to human displacement (2002); and impacts to 112,000 people and crops (2013) (Kogo et al. 2021, p. 36). Impacts to current crops or livestock leads to changes in

farming practices (Huho and Mugalavai 2010, pp. 66–70). Many of these changes may result in the loss, degradation, or fragmentation of giraffe habitat.

In summary, climate change directly affects giraffes through reduced forage and competition with other browsing species. Decreased availability of high-quality forage may cause giraffes to expand their home range in search of high-quality forage, which increases the risks of poaching and human-wildlife conflict because of changing habitat conditions. Indirectly, drought affects giraffes because human food insecurity leads to changing land-use practices that in turn affect habitat conditions. Extreme precipitation events influence predation, disease, and food quality, the consequences of which can lead to direct mortality of, and reduced recruitment for, giraffes.

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have analyzed the cumulative effects of identified threats and conservation actions on the species. To assess the current and future condition of the species, we evaluate the effects of all the relevant factors that may be influencing the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative-effects analysis.

Conservation Efforts and Regulatory Mechanisms

Our evaluation of the status of the species takes into account the extent to which threats are reduced or removed as a result of conservation efforts or existing regulatory mechanisms. Across Africa and throughout the ranges of the West African, Kordofan, and Nubian giraffe, many conservation organizations are dedicated to the conservation of giraffes in the wild. National wildlife departments, nongovernmental organizations, and international organizations aid with conservation efforts for giraffes that include a multitude of actions such as translocations, anti-poaching efforts, capacity building and education, and technical and financial assistance. The conservation efforts that are ongoing within the range of the West African, Kordofan, and Nubian giraffes focus on enforcement of anti-poaching laws, minimizing human-wildlife conflicts and commercial trade, and working with communities where these

subspecies occur. However, these efforts are not likely to counter the ongoing and anticipated changes in land use and associated effects to the West African, Kordofan, and Nubian giraffe from human population growth and climate change because of the magnitude of the impacts in these areas, the small population sizes for these subspecies, and/or the currently downward trajectory of giraffes' abundance.

West African Giraffe

There are two primary conservation efforts for the West African giraffe in Niger: the Giraffe Zone and the re-establishment of a population in the Gadabedji Biosphere Reserve. The Giraffe Zone occurs in the arid Sahelian scrubland east of the capital Niamey and is part of the transition zone of Niger's W National Park Biosphere Reserve, which includes: (1) the central zone of Kouré, (2) the Dallol Bosso, and (3) the Fakara Plateau (Ferguson et al. 2020, p. 5; Ciofalo 1995, p. 579; Le Pendu and Ciofalo 1999, p. 342). The Giraffe Zone is an unprotected and unfenced area where giraffes move freely between the three areas and migrate based on seasonal availability of forage, giraffe carrying capacity in the core area, and increasing pressure from a growing human population (Ferguson et al. 2020, p. 5). Giraffes share their living space with local villagers and livestock, and their movements are synchronized with human activities based on habitat and forage availability (Pendu and Ciofalo 1999, p. 351).

The Giraffe Zone does not provide any formal protections for West African giraffes, but poaching currently appears to be rare. The West African giraffe is fully protected under Niger's "Loi N° 82–002 du 28 Mai 1982 portant réglementation de la chasse" (as amended by Law 98–07 of April 29, 1998, regulating hunting and wildlife protection) and may not be hunted (Food and Agriculture Organization database of national legislation (FAOLEX) 2024, unpaginated; Republic of Niger 1998). The Government of Niger made concerted efforts to enforce legislation preventing the illegal killing of giraffes in the mid-1990s, further supported by a community education and awareness campaign (Suraud et al. 2012, p. 577; Ferguson et al. 2020, pp. 2–4). Since 2000, incidents of poaching have been rare (Suraud et al. 2012, p. 577; GCF 2019, entire; Ferguson et al. 2020, p. 5). However, within the Giraffe Zone, habitat loss (including land degradation and habitat fragmentation) is well documented and continues to occur (Morou 2011, in Gašparová et al.

2020, p. 4; Abdou 2005, in Suraud et al. 2012, p. 581).

Starting in 2018, 12 West African giraffes were translocated to reestablish the Gadabedji Biosphere Reserve population. The population has expanded, with five calves born, showing early signs of success in the first 5 years after the initial translocation (Gašparová et al. 2024, p. 8). This is a protected area, but the current population size is very small and long-term post-translocation monitoring is crucial to evaluate the translocation success and advise on future translocations to the Reserve and other sites in the country or regionally (Gašparová et al. 2024, p. 8).

Kordofan Giraffe

Most individuals (approximately 80 percent) of the Kordofan giraffe currently occur in Zakouma National Park in southern Chad (approximately 1,200 giraffes) and Waza National Park in northern Cameroon (approximately 500 giraffes). In the near term, only the population in Zakouma National Park appears protected from habitat loss and poaching within a larger, intact, protected area. Zakouma National Park is part of the 28,162-square-kilometer (km²) Greater Zakouma Ecosystem, managed by African Parks in partnership with the Government of Chad. In 2022, the Government of Chad signed a revised agreement with African Parks, which extends until 2027. Zakouma National Park is the only park in Central Africa with increasing numbers of large herbivores because of its unique long-term European Union funding, many rangers, and political support (Scholte et al. 2021, pp. 4–6). The current management agreement for Zakouma only extends until 2027. The situation is quite different in Waza National Park in Cameroon. In Waza National Park and other protected areas in Cameroon, threats to the Kordofan giraffe remain and have been documented in multiple instances, such as lack of enforcement, tree removal, livestock grazing, and events of civil unrest (Kelly 2014, pp. 737–738; Scholte et al. 2021, entire; Garcia et al. 2022, p. 62). Political support for Waza National Park ended in the mid-1980s; thus, funding for the park was drastically reduced (Kelly 2014, p. 737). All the other national parks where Kordofan giraffes occur have very few giraffes remaining, largely due to poaching and a lack of management.

Nubian Giraffe

Rangewide, 60 percent of Nubian giraffes occur at Murchison Falls National Park in Uganda, a 3,840-km²

park managed by the Uganda Wildlife Authority. The park (3,840 km²), Karuma Wildlife Reserve (678 km²), and Bugungu Wildlife Reserve (474 km²) are part of the Murchison Falls Protected Area, the largest landscape of protected areas in Uganda (Plumptre et al. 2015, p. 4). The protected area (and its wildlife) has been described as likely the hardest hit of any of Uganda's protected areas during the civil unrest of the 1970s and 1980s (UWA 2018, pp. 5, 43). It was only following the political stabilization associated with establishment of the current government in Uganda that protection measures have increased large mammal populations, including giraffes (Plumptre et al. 2015, p. 4; UWA 2018, p. 53).

Since the 1990s, the Murchison Falls population has gradually increased to approximately 2,250 individuals. However, the park is becoming increasingly isolated. Settlement around the park has reduced potential wildlife corridors to other parks or available habitat (Fuda 2015, p. 26). In addition, oil and gas development is ongoing within Murchison Falls (Africa Institute for Energy Governance (AFIEGO) 2024, entire; Akisiimire et al. 2022, pp. 21–23).

There are four other small populations (fewer than 100 individuals each) in eastern and southern Uganda, and the rest of Nubian giraffes occur in small populations in Kenya, South Sudan, and Ethiopia.

The Boma-Jonglei ecosystem of South Sudan is a largely intact savanna and woodland habitat that includes Boma and Badingilo National Parks linked by wildlife movement corridors and key transboundary biodiversity areas (WCS 2019, unpaginated; Morjan et al. 2017, p. 367). Both Boma and Badingilo National Parks are proposed United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites (African Parks 2024, unpaginated). Nubian giraffes only exist in small populations around these two national parks in South Sudan. The ecosystem has a direct transboundary linkage with Gambella National Park in Ethiopia (WCS 2019, unpaginated). The small population of Nubian giraffes in Ethiopia currently reside in and around Gambella National Park, and there may be a small population existing in the Omo-Tama regions (Marais et al. 2020d, p. 3; Brown et al. 2021, p. 7). Several of Ethiopia's parks are designated protected areas but lack enforcement and management to achieve their stated conservation purposes (Jacobs and Schloeder 2001, p. 10).

The Ethiopian Wildlife Conservation Authority (EWCA), established in 2008, is the country's primary wildlife protection agency that oversees the protection, administration, and sustainable use of Ethiopia's fauna. Their principal goals are the conservation of endangered species, the repair and extension of protected areas, and the development of wildlife-based tourism that does not deplete natural resources (EWCA 2024, pp. 1–3). Giraffes are protected species in Ethiopia (Council of Ministers Regulations No. 163/2008, p. 35). However, the few trained staff and field-based wildlife rangers that the EWCA currently has are not enough to combat illegal wildlife trade and poaching even within the protected areas (Tessema 2017, p. 36). To help build enforcement capacity, the EWCA is supported by international organizations. For example, community members around the Gambella National Park were selected and trained on wildlife crime interventions, wildlife crime information collection techniques, and conservation awareness skills (Tessema 2017, p. 38).

The last remaining endemic population of Nubian giraffes in Kenya at Soi Ranch supplied giraffes for countrywide translocations in the 1960s and 1970s (Brenneman 2009, p. 712; Muruana et al. 2021, p. 8). Nubian giraffes have been translocated to national parks, private reserves, and other protected areas in western Kenya (Fennessy et al. 2018, p. 2; Muruana et al. 2021, p. 7), and now they occur in 13 locations (Muneza et al. 2024, table 1; Muruana et al. 2021, pp. 13–15, citing many authors). Most of the introductions were into private fenced wildlife areas (Brenneman et al. 2009, p. 712; Muruana et al. 2021, p. 4).

Kenya has developed a National Recovery and Action Plan for Giraffe in Kenya (2018–2022) (Kenya Wildlife Service (KWS) 2018, entire) and a national Wildlife Strategy 2030 (Ministry of Tourism and Wildlife 2018, entire). The National Recovery and Action Plan for Giraffe in Kenya is aimed at having viable, free-ranging populations of three giraffe species in Kenya (Masai, reticulated, and northern giraffe (including Nubian giraffe)) and addressing challenges for sustainable conservation and management of these species (KWS 2018, entire). One of the strategic objectives of the National Recovery and Action Plan for Giraffe in Kenya is to reduce the proportion of giraffe illegally killed by 50 percent within 5 years of 2018 (KWS 2018, p. 31).

As discussed above, in Kenya, the Nubian giraffe has rebounded from near extirpation in the 1970s to roughly 1,000 individuals distributed among 13 populations. This rebound is attributed to better security and management in protected areas that has reduced poaching (Muneza et al. 2024, p. 1279). Population estimates by KWS have increased with these efforts to increase penalties on crimes related to threatened species such as giraffes, although this increase is also attributed to the inclusion of more updated data in the 2021 report (Waweru et al. 2021, p. 110). The National Wildlife Strategy 2030 outlines a vision for wildlife conservation and describes Kenya's needs for wildlife conservation strategies because human population pressure, habitat loss, rapid development in key wildlife areas, poaching, insecurity, and overexploitation have accelerated the decline of wildlife populations and habitat degradation (Ministry of Tourism and Wildlife 2018, p. 7).

Additionally, the National Human-Wildlife Coexistence Strategy and Action Plan 2024–2033 is aimed at fostering sustainable wildlife conservation while effectively mitigating human-wildlife conflicts (KWS 2024, unpaginated). The KWS has a security division with an overall goal and primary mandate to strengthen law enforcement, protect wildlife and their habitats, enhance tourist security in protected areas, and safeguard KWS assets. Population estimates by KWS have increased with these efforts to increase penalties on crimes related to threatened species, although this increase is attributed to the inclusion of more updated data in the 2021 report (Waweru et al. 2021, p. 110).

Giraffes are also protected by international mechanisms that include protections, regulation of international trade, and awareness of giraffe conservation efforts in Africa. These mechanisms include the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Conservation of Migratory Species of Wild Animals (Convention), and the African Union, all of which are international agreements where member countries agree to implement measures to minimize illicit trade of wildlife including giraffes. Trade is not the primary cause of the decline of wild giraffe populations; however, trade has an additive effect when combined with the main causes of decline (habitat loss and poaching). Giraffes have historically been sought for their hair and tails, and their parts have been used for medicinal purposes,

but, more recently, giraffes have been increasingly hunted and poached for bushmeat. Giraffe parts are frequently in international commercial trade, but their country of origin, the subspecies (or species), and whether the specimens in trade were legally acquired can be uncertain (CITES 2019a, pp. 5–6).

Current Condition of Northern Giraffe

We describe the current condition of the northern giraffe and its three subspecies in terms of the primary influences affecting population abundance and trends, as well as the range contraction of the subspecies. The three subspecies are genetically distinct and separated by geographical or physical barriers and thus demographically distinct. The northern giraffe only remains in a small fraction of its historical range with small, isolated populations scattered across west, central, and east Africa with no connectivity between populations.

The population of the northern giraffe was estimated at 5,919 in 2020 (at least 600 West African, 2,297 Kordofan, and 3,022 Nubian) (Brown et al. 2021, p. 5). A historical estimate for the northern giraffe is not readily available; however, the combined estimate of the historical (*i.e.*, 1985) populations of the subspecies that comprise the northern giraffe places the historical population at 25,653 individuals (Muller et al. 2018, p. 6). Thus, the current population represents a 77 percent decline from the historical population.

The reason for the decline of the northern giraffe is primarily related to changing habitat conditions and poaching. Converting natural habitats has resulted in habitat loss and degradation of natural vegetation; fragmentation of the giraffe's range, which has historically been a more connected landscape of suitable habitat for northern giraffes; and increased risk of human-wildlife conflict, including poaching. Changing habitat conditions affect giraffes directly or indirectly through reduced food availability and reduced or obstructed movements to find necessary resources, which negatively affect survival and recruitment. Land use pressures within the range of the northern giraffe to meet the demands of the human population for their livelihoods, including agriculture, pastoralism, and other uses, come at the detriment of the giraffe's requirements for food and space. Poaching directly reduces the giraffe's condition through mortality, mainly reducing adult survival. In addition, the three northern subspecies have the second highest levels of genetic diversity among giraffe species and

subspecies (the reticulated giraffe has the highest levels). However, compared to other mammal species, their levels of heterozygosity are low, and levels of inbreeding are moderately high, especially for the West African and Nubian subspecies.

The influences on the three subspecies of the northern giraffe (West African, Kordofan, and Nubian) are generally similar within and among their populations, with differences in magnitude. All three subspecies are impacted by changing habitat conditions. The West African giraffe is less impacted by poaching pressure than the Kordofan and Nubian giraffes, although the Nubian giraffe is less impacted by poaching in its range in Kenya and Uganda than in the remainder of its range in Ethiopia and South Sudan. Except for the Giraffe Zone in Niger, all populations are in protected areas; however, enforcement is higher in Kenya and Uganda.

West African Giraffe

Historically, the West African giraffe was distributed widely from Senegal to Nigeria but has been extirpated across most of its range because of changing habitat conditions, drought, and poaching (Fennessy et al. 2018, p. 2; Gašparová et al. 2024, p. 2). The drastic decline in abundance and redundancy of the West African giraffe has limited the subspecies to two remaining populations in Niger. Giraffes in Niger are not currently experiencing population declines (since near extirpation by the mid-1990s). The population has steadily increased since 1996, which is attributed to reduced poaching pressure on the population. Most giraffes occur in the Giraffe Zone (Brown et al. 2021, p. 8; Ferguson et al. 2020, p. 6). The current population size of 690 is an increase of 1,308 percent from the 1995 population size of 49. The populations in Niger are currently not subject to poaching; however, they are currently affected by habitat loss, land degradation, and habitat fragmentation (Morou 2011, in Gašparová et al. 2020, p. 4; Abdou 2005, in Suraud et al. 2012, p. 581). The primary factors influencing the viability of the West African giraffe are the continuation of conservation initiatives, as well as threats from ongoing and imminent habitat loss and fragmentation, civil unrest, human food insecurity, poaching, and exacerbation of these threats with increasing human populations and climate change. Overall, the resiliency and redundancy of the West African giraffe are reduced due to declines in abundance and the subspecies being limited to two small areas in Niger. The two remaining

populations are small and isolated, and this lack of redundant healthy populations increases the risk of effects of catastrophic drought.

While some giraffe traits (*e.g.*, mobility, flexible diet) provide adaptive ability, other traits (*e.g.*, long lifespan, low reproductive output, high energetic demands, and limited gene flow) strongly constrain the giraffe's ability to respond to the rapidly changing conditions associated with human population growth and climate change. Similarly, the West African giraffe's ability to shift its range in response to changing environmental conditions is highly unlikely because populations are mostly confined to protected areas isolated from other populations. Therefore, West African giraffes have limited options to avoid the risks associated with habitat loss and poaching, and threats associated with rapidly increasing human populations and climate change.

Kordofan Giraffe

The Kordofan giraffe was formerly widespread across central African countries in the northern savanna woodlands and Sahel zone (Fennessy et al. 2018, p. 2; East 1999, pp. 95–97). The Sahel is a band of territory in Africa that stretches from the Atlantic coast of Senegal and Mauritania to the four countries bordering Lake Chad (United Nations Development Programme 2024, unpaginated). The Sahel acts like a buffer or transition zone between the Sahara Desert to the north and the fertile savannahs to the south. While the Kordofan giraffe currently occurs in its historical range countries of Cameroon, CAR, Chad, DRC, and South Sudan, population abundance has been declining over the last 40 to 60 years, the area of occupancy is greatly reduced, and the subspecies is restricted to small, disjunct populations.

In the 1950s, there were an estimated 6,360 to 7,360 individuals of the Kordofan giraffe across the DRC, Cameroon, Chad, and CAR; please note that South Sudan is not included in this estimate. Currently, the best estimate of current population size for the Kordofan giraffe is 2,297 individuals (Brown et al. 2021, p. 6) spread across five countries in central Africa. Thus, Kordofan giraffe is only 31–36 percent of the population size in the 1950s, a decline of approximately 1.5 to 7.0 percent per year. Approximately 80 percent of the remaining individuals now occur within just two populations (approximately 1,200 in Zakouma National Park in Chad, and approximately 500 in Waza National Park in Cameroon) (Brown et al. 2021, p. 6). The remaining

populations are small with little interaction between groups (Brown et al. 2021, p. 6; Marais et al. 2019, p. 4).

The primary causes of this historical and ongoing decline include poaching, giraffe-human conflict (via civil unrest), and habitat loss, degradation, and fragmentation, all of which are strongly driven by the rapidly increasing human population and climate change. While the Kordofan giraffe exhibits traits that provide adaptive ability, its long lifespan, low reproductive output, high energetic demands, dietary needs, and limited gene flow strongly constrain its ability to evolutionarily respond to rapidly changing conditions associated with human population growth and climate change. Similarly, the ability of Kordofan giraffes to shift their range in response to deteriorating habitat and climate conditions is highly unlikely. There are limited options for giraffes to avoid the risks associated with habitat loss, poaching, and threats associated with rapidly increasing human populations and climate change threats.

The continued reductions in the availability and quality of food resources, coupled with increased mortality due to intensifying human conflicts, place additional pressure on already stressed giraffe populations. To date, conservation efforts have been insufficient to address ongoing threats, and the best available information indicates that such efforts will not halt the declining trends. Given the degree of isolation among populations, the likelihood of demographic rescue following such events appears minimal. Reductions in the health, number, and distribution of populations, in turn, diminish the subspecies' capacity to withstand normal environmental stochasticity and recover from disturbances and catastrophic events.

Nubian Giraffe

The historical distribution of Nubian giraffe was north of the Nile River and ranged from the Rift Valley of central-west Kenya across Uganda, and northward into South Sudan and Ethiopia (Marais et al. 2017, p. 3, citing many authors; Brown et al. 2021, p. 7). Nubian giraffes were historically more widely distributed than they are currently (Sidney 1965, pp. 149, 151; Dagg 1962, p. 502). Murchison Falls National Park in Uganda holds approximately 2,250 individuals, or 60 percent of the total population of Nubian giraffes (GCF 2023, p. 1). Overall, only a few small and isolated populations of the Nubian giraffe remain in Kenya, Uganda, South Sudan, and Ethiopia (Wube et al. 2018, p. 1; Fennessy et al. 2018, pp. 1–2). There is

little or no potential for dispersal between sites and limited capacity for expansion (Fennessy et al. 2018, p. 1).

The current population size (3,022) of the Nubian giraffe is 14 percent of the population size of approximately 22,000 individuals in the 1960s–1980s (Brown et al. 2021, p. 7; Muller et al. 2018, supplement, p. 2). The population has declined from about the 1960s to 2020 at approximately 4.0–4.9 percent per year. The primary causes of decline are poaching and civil unrest. These threats are compounded by rapid human population growth and climate change. Poaching led to near extirpation of Nubian giraffes in Uganda, Kenya, and South Sudan in the 1970s and 1980s, as poaching increased due to widespread political and social instability. Poaching rates have been reduced in Uganda and Kenya, although poaching pressure remains as human food sources are currently less secure due to ongoing human population growth and climate change and inter-related effects of civil unrest. Other threats include extensive land use changes, disease, and low genetic diversity.

While some giraffe traits (*e.g.*, mobility, flexible diet) provide adaptive ability, other traits (*e.g.*, long lifespan, low reproductive output, high energetic demands, and limited gene flow) strongly constrain the Nubian giraffe's ability to respond to rapidly changing conditions associated with human population growth and climate change. Similarly, the subspecies' ability to shift its range in response to changing environmental conditions is highly unlikely because populations are confined to protected areas isolated from other populations. Therefore, Nubian giraffes have limited options to avoid the risks associated with habitat loss, poaching, and threats associated with rapidly increasing human populations and climate change.

Overall, the resiliency and redundancy of the Nubian giraffe are reduced due to declines in abundance and area of occupancy. Only one population of the Nubian giraffe (Murchison Falls National Park) appears resilient; this resiliency stems from protective measures (conservation initiatives to reduce poaching and habitat conversion) that allowed this population to gradually increase since the 1990s. However, this population is still vulnerable to habitat loss, degradation, and alteration from ongoing oil and gas development; climate change impacts; and increased isolation as habitat conversion continues around and within the park. Poaching also continues to be documented within the park.

The remaining populations of the Nubian giraffe throughout the subspecies' range are small and isolated, and vulnerable to normal environmental stochasticity, disturbances, and catastrophic drought events. Given the degree of isolation among populations, the likelihood of demographic rescue following such events appears minimal. Reductions in the health, number, and distribution of populations, in turn, diminish the subspecies' capacity to withstand normal environmental stochasticity and recover from disturbances and catastrophic events. To date, the population in Murchison Falls National Park has gradually increased as did the population in Kenya, but, for the most part, conservation efforts across the range of the Nubian giraffe have been insufficient to address ongoing threats. The limited capacity of the Nubian giraffe to cope with and adapt to rapidly changing environmental conditions exacerbates the risks posed by its declining resiliency and redundancy.

Summary of the Northern Giraffe's Current Condition

Resiliency and redundancy for the three subspecies of the northern giraffe is reduced from historical conditions. The overall population has declined approximately 77 percent since 1985, from 25,653 individuals to 5,919 individuals, and the species has been extirpated from numerous countries in west Africa. The reason for the historical, ongoing, and imminent decline of the northern giraffe is primarily related to changing habitat conditions and poaching, exacerbated by rapid human population growth and climate change. The sources of changing habitat conditions that are causing habitat loss, fragmentation, and degradation are ongoing. Because of rapid human population growth and climate change-induced droughts and extreme rainfall events, the pressure on available land and natural resources in west, central, and east Africa has produced and is expected to continue to produce changes to the northern giraffe's natural habitat. The influences for the three subspecies of northern giraffe are generally similar within and among their populations with some differences in magnitude. All three subspecies are impacted by changing habitat conditions, although poaching pressure is lower for the West African giraffe than for the Kordofan and Nubian giraffes. Most populations are in protected areas or afforded anti-poaching measures; however, enforcement is higher in Niger, Kenya, and Uganda, and limited to Zakouma

National Park in Chad. There are limited options for northern giraffes to avoid the risks associated with habitat loss, poaching, and threats associated with rapidly increasing human populations and the effects of climate change, particularly as populations are small and isolated.

Future Condition of Northern Giraffe

We developed two future condition scenarios for the northern giraffe to capture the plausible range of uncertainties regarding the primary threats and projected responses by the three subspecies of northern giraffe. These scenarios were the same for the three subspecies of the northern giraffe. We projected a lower and upper scenario with habitat condition based on historical rates of forest loss, projected moderate and higher human population increases, and climate change scenarios as described below. In one scenario, we assume that poaching will remain similar to current conditions and anti-poaching efforts continue, while in the other, we assume an increase in poaching. We also assume civil unrest will continue under both scenarios.

A climate scenario describes possible future climate conditions associated with a specific set of assumptions about societal actions and how the climate system will respond. For our climate scenarios, we used both the current generation of IPCC climate scenarios (shared socio-economic pathways or SSPs) and the previous generation of IPCC climate scenarios (representative concentration pathways or RCPs), depending on availability for each type of projected data (e.g., temperature projections vs. drought projections). RCPs reflect different levels of emissions and climate change, and SSPs reflect different socio-economic development pathways. We used SSP2–4.5/RCP4.5 and SSP5–8.5/RCP8.5 scenarios out to 2100. More information on these pathways is available at <https://apps.ipcc.ch/glossary/>. Because we determined that the current condition of the West African, Nubian, and Kordofan giraffes is consistent with the Act's definition of an endangered species (see the determination of status for each of the three subspecies of northern giraffe, below), we are not presenting the results of future scenarios for these subspecies in this proposed rule.

Factors Influencing Reticulated Giraffe

Factors that affect the reticulated giraffe in Kenya and Ethiopia are the same in each country and include a combination of human actions that

threaten the giraffe's viability as well as conservation efforts and regulatory measures that aim to benefit and protect giraffes. The primary threats to the reticulated giraffe include changes to the species' habitat condition resulting from habitat loss, fragmentation, and degradation, and poaching, all of which are exacerbated by rapid human population growth and effects from climate change (including the interrelated effects such as civil unrest and human food insecurity).

Changing Habitat Conditions

The sources of the changing habitat conditions in east Africa, including Ethiopia and Kenya where reticulated giraffes occur, are conversion of natural habitats and natural vegetation to croplands and rangelands, urbanization, deforestation, and production of fuelwood. Converting natural habitats and vegetation results in the loss, degradation, and fragmentation of suitable habitat, and increased human-wildlife conflict, including poaching. Changing conditions affect giraffes directly or indirectly through reduced food availability and reduced or obstructed movements to find necessary resources, which negatively affect survival and recruitment. Because reticulated giraffes overlap with humans and domesticated livestock, they rely on the same natural resources. Human-wildlife conflicts occur when wildlife and humans compete for the same resources (UWA, p. 49). Additionally, reticulated giraffes have been known to feed on cash crops (such as mangoes), causing economic losses for farmers and exacerbating conflict between humans and wildlife in Kenya (Ali et al. 2023, p. 175). Changing habitat conditions increase the risk of human conflicts and human-wildlife conflicts.

In Kenya, the agricultural sector employs more than 40 percent of the total population and more than 70 percent of Kenya's rural population (FAO 2024a, unpaginated). The rural population accounts for 71.5 percent of Kenya's population, increasing from 19.5 to 39.2 million people, or by approximately 100 percent, between 1990 and 2020 (FAOSTAT 2024a, unpaginated). In Ethiopia, the rural population is 77 percent of the total population in 2023, increasing from 41.8 million people in 1990 to 97.2 million people in 2023 (FAOSTAT 2024c, unpaginated). Because of human population growth, towns are overpopulated, causing people to relocate to rural areas (Ali et al. 2023, p. 178). Conversion of natural habitats into farmlands and urban development not only affects giraffes through loss of

food, but also contributes to the fragmentation of their habitats, making it more difficult for giraffes to find suitable feeding, drinking, breeding, sheltering areas (Ali et al. 2023, p. 178).

In northeastern Kenya, expansion of agricultural activities has led to the clearing of bushy woodlands, a vital ecosystem for giraffes and other wildlife (Ali et al. 2023, p. 178). Between 2001 and 2019, the 57 percent loss of *Acacia-Commiphora* trees within the reticulated giraffe's range in Kenya and Ethiopia was primarily because of cropland expansion (Abera et al. 2022, p. 10). Woody vegetation, particularly *Acacia* trees, are also the main source of charcoal production in Kenya and Ethiopia (Kiruki et al. 2017, p. 476; Abera et al. 2022, p. 10; Abate and Abate 2017, p. 9). *Acacia* trees are a preferred food source of giraffes; therefore, reduction of *Acacia* trees for fuelwood reduces the availability of high-quality food resources for giraffes. Charcoal production also results in overall woodland degradation because it exacerbates vegetation loss, soil erosion, and the creation of associated access roads (Kiruki et al. 2017, pp. 476, 478).

In east Africa (Ethiopia, Kenya, Uganda, Malawi, Rwanda, Tanzania, and Zambia), remote sensing over 20 years (1988 to 2017) showed increases of cropland and settlement of 35 percent and 43 percent, respectively, while all other land-use classes decreased, including a decline of 18.9 million (+/-1.6 million) ha in naturally vegetated land uses (grasslands, forests, and vegetated wetland) (Bullock et al. 2021, pp. 5–6). This trend is emblematic of sub-Saharan Africa as a whole, in which the growing demand for food is forcing agricultural expansion into historically less developed savannas and woodlands (Bullock et al. 2021, p. 12).

Livestock grazing is another important agricultural land use in Kenya. Because reticulated giraffes overlap with humans and domesticated livestock, they rely on the same natural resources. Kenya-wide surveys over a 40-year period (1977 to 2016) show that the increase in human population and domesticated livestock abundance correlates with a substantial decline of the reticulated giraffe in Kenya. Reticulated giraffe abundance declined by 65 percent over that 40-year period (Ogututu et al. 2016, supporting figures). Laikipia County in central Kenya represents an example of private lands where wildlife, people, and livestock co-occur. The human population has increased 137 percent over a 30-year period (1989–2019), and historically larger ranches are being subdivided and sometimes fenced. This subdivision of land has led to human-

wildlife conflicts as migratory corridors have been blocked (Litoroh et al. 2010, p. 9). The reticulated giraffe population in Laikipia County decreased by 27 percent over the last 40 years.

In the Borana region, including Borana National Park where reticulated giraffes occur in Ethiopia, there has been an increase in human-wildlife conflict because of competition for limited resources as the human population in the area rapidly grows. Borana National Park is bordered on all sides by agrarian and pastoralist communities that largely exploit it in search of arable land, pastureland, and fuelwood (Bussa 2023, p. 544, citing many authors; Wassie 2020, p. 19). Many national parks and protected areas in Ethiopia are under similar pressure (Wassie 2020, p. 19).

In summary, changing habitat conditions from habitat loss, degradation, and fragmentation because of agriculture expansion, urbanization, and fuelwood production are considered an historical and ongoing threat to the reticulated giraffe. These threats are anticipated to continue in the future and to be exacerbated by effects from increasing human population growth and climate change.

Poaching

The reasons for killing giraffes vary greatly across Africa, with local context playing a significant role in shaping human-giraffe interactions (Ruppert 2020, chapter 2). Poaching of the reticulated giraffe varies across the species' range in both reason for killing and the magnitude/level of killing over time. While bushmeat is likely the primary reason for killing giraffes, the demand for giraffe parts, including their skin, bones, and tails, fuels illegal activities (Ali et al. 2023, p. 175; Muller 2008, pp. 1–4; Khalil et al. 2016, pp. 1–5; Dunn et al. 2021, pp. 9–10). Giraffes are also hunted and killed in retaliation for crop damage that leads to economic hardship for farmers (Ali et al. 2023, p. 175). Poaching affects adult giraffes more than subadults or calves (Lee et al. 2016, p. 1021). Additionally, population structure may shift so that there are fewer adults relative to immatures, fewer adult males relative to adult females and more calves per adult female (Lee et al. 2023, p. 349).

Local opinions of giraffes and law enforcement are important to conservation efforts and dictate actions when there is a human-wildlife conflict. Local conservation programs in Kenya have increased the conservation of giraffes (Ruppert 2020, pp. 29, 84). However, the best available information suggests that rangewide poaching has

not been eliminated or even reduced in the range of the reticulated giraffe over time.

Historically, poaching caused a marked decrease in Ethiopia's giraffe populations (East 1999, p. 97; Yalden et al. 1984, p. 81). Giraffes are primarily hunted in Ethiopia for their tail, which is used in highly prized traditional necklaces, and for their meat (Wube 2013, p. 3; Abate and Abate 2017, p. 9). In Kenya, the hunting or killing of any species of giraffe is illegal (Republic of Kenya 2013, pp. 1304–1305). Giraffe meat, hides, and tail hair are valued commodities in Kenya (East 1999, pp. 97–98; Ali et al. 2023, p. 175). Reticulated giraffes were severely poached by the tribesmen of the Northern Province, who use giraffe hide and hair from giraffes' tails (J. Doherty pers. obs., cited in Muneza et al. 2018, p. 5). Poaching can be widespread during the dry season, and there were several reports of giraffes being found injured or dead because of poaching-related injuries (Muller 2008, p. 7).

Armed conflicts have plagued northern Kenya for decades because of civil unrest and terrorist activities originating from the neighboring countries of Ethiopia and Somalia (Murwana et al. 2021, p. 4). Civil unrest does not usually directly target ecological resources in pursuit of a military outcome, but impacts to wildlife occur because of resource exploitation during periods of lawlessness (Glew and Hudson 2007, p. 7, citing many authors; Dudley et al. 2002, p. 326). While human conflict can directly result in the killing of wildlife, it can also result in indirect negative impacts on wildlife, such as weakened protections or enforcement of protections and the proliferation of guns, which can increase poaching (Beyers et al. 2011, p. 6; Dudley et al. 2002, p. 322). Wildlife products are also often sold or bartered for food, arms, ammunition, or other goods and services (Dudley et al. 2002, p. 322). Civil unrest remains a significant concern in Kenya, Ethiopia, and Somalia; these countries have current U.S. State Department travel advisories in each country due to crime, terrorism, kidnapping, and civil unrest (U.S. Department of State, 2024, unpaginated).

Climate Change

The mechanisms by which climate change can affect the giraffe's fitness are complex, multifaceted, and contingent on a range of interacting factors. The primary influence of climate change on the reticulated giraffe's viability is changes in precipitation patterns,

notably drought and extreme precipitation patterns. Drought reduces water availability and food quality for giraffes. Giraffes are generally less able to access high-quality browse during times of drought due to an increase in tree mortality and a decline in browse abundance (Vicente-Serrano et al. 2022, p. 9, Engelbrecht et al. 2024, p. 178), as well as increased competition with other browsing species (Birkett and Stevens-Wood 2005, entire). Less access to high-quality food leads to giraffes needing to expand their home range, which in turn increases the relative proportion of time searching for food and can lead to human-wildlife conflicts and increase the risk of poaching.

Indirectly, drought affects the giraffe's viability via human food insecurity. Drought impacts pasture quality, livestock survival and production, crop yields, and malnutrition rates (Lam et al. 2023, p. entire). Impacts to current crops or livestock leads to changes in farming practices (Huho and Mugalavai 2010, pp. 66–70), many of which result in loss, degradation, or fragmentation of giraffe habitat. While only about 20 percent of Kenyan land is suitable for farming (United States Agency for International Development (USAID) 2022, unpaginated), agriculture supports up to 75 percent of the Kenyan population and generates almost all the country's food requirements. In arid and semi-arid areas of Kenya, livestock accounts for 90 percent of employment and 95 percent of family incomes (Huho and Mugalavai, 2010, pp. 63, 68). An increasing number of households are losing the capacity to participate economically and to grow their own food through the practice of rain-fed agriculture (Huho and Mugalavai, 2010, p. 62). Effects of increased population growth, climate change, food security, and human conflict are interrelated. These influences link to the habitat, human-wildlife conflict, and poaching.

Giraffes can also be affected by extreme precipitation. High precipitation events were correlated with reduced survival in both adult and subadult giraffes, as higher rainfall can increase cover for predators, increase parasite and disease prevalence, and reduce food quality (Bond et al. 2023, pp. 3185–3193). Heavy precipitation events can also contribute to food insecurity. Heavy precipitation and flooding events resulted in crop damages and impacts to 5 million people (1997); losses of life, property, and crops, leading to human displacement (2002); and impacts to 112,000 people and crops (2013) (Kogo et al. 2021, p. 36).

In summary, climate change directly affects giraffes through reduced forage and competition with other browsing species. Decreased availability of high-quality forage may cause giraffes to expand their home range in search of high-quality forage, which increases the risk to poaching and human-wildlife conflict. Indirectly, drought affects giraffes because human food insecurity leads to changing land use practices that in turn affect habitat conditions and food insecurity. Extreme precipitation events influence predation, disease, and food quality, the consequences of which can lead to direct mortality and competition for resources.

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have analyzed the cumulative effects of identified threats and conservation actions on the species. To assess the current and future condition of the species, we evaluate the effects of all the relevant factors that may be influencing the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative-effects analysis.

Conservation Efforts and Regulatory Mechanisms

Conservation measures for the reticulated giraffe include anti-poaching efforts and population monitoring, and many organizations provide human, financial, and/or logistical resources to support these efforts. As mentioned above, Kenya has developed a National Recovery and Action Plan for Giraffe in Kenya (2018–2022) (KWS 2018, entire) and a national Wildlife Strategy 2030 (Ministry of Tourism and Wildlife 2018, entire). Objectives of the National Recovery and Action Plan for Giraffe in Kenya are to have viable, free-ranging populations of all three giraffe species in Kenya (including reticulated giraffe) and reduce the proportion of giraffes illegally killed by 50 percent within 5 years (of 2018) (KWS 2018, p. 31). The National Wildlife Strategy 2030 outlines a vision for wildlife conservation because human population pressure, habitat loss, rapid development in key wildlife areas, poaching, insecurity, and overexploitation have accelerated the decline of wildlife populations and habitat degradation (Ministry of Tourism and Wildlife 2018, p. 7). The National Human-Wildlife Coexistence Strategy and Action Plan 2024–2033 is

aimed at fostering sustainable wildlife conservation while effectively mitigating human-wildlife conflicts (KWS 2024, unpaginated). The KWS has a security division with an overall goal and primary mandate to strengthen law enforcement, protect wildlife and their habitats, enhance tourist security in protected areas, and safeguard KWS assets. Wildlife population estimates by KWS have increased with these efforts, although this increase is attributed to the inclusion of more updated data in the 2021 report (Waweru et al. 2021, p. 110).

Other community-owned and privately owned reserves and conservancies have been successful in preserving giraffe habitats and connectivity in the region, by increasing security and anti-poaching efforts, protecting habitat, and raising awareness among local communities (O'Connor et al. 2019, pp. 294–295). The Hirola Conservation Programme monitors population trends and mortalities of giraffes in eastern Kenya. San Diego Zoo Global, in collaboration with KWS, Northern Rangelands Trust, Loisaba Conservancy, Lewa Conservancy, The Nature Conservancy, and the Giraffe Conservation Foundation, established the Twiga Walinzi team (giraffe guards), composed of locals who monitor giraffe populations, and engage in work involving human dimensions, and community engagement and education in Loisaba and Namunyak Wildlife conservancies (Muneza et al. 2018, p. 5). Additionally, even though giraffes no longer occur in Somalia, the Somali Giraffe Project contributes to the conservation of reticulated giraffes in eastern Kenya through anti-poaching efforts, and community engagement (Somali Giraffe Project 2024, unpaginated).

As mentioned earlier, the EWCA is Ethiopia's primary wildlife protection agency that oversees the protection, administration, and sustainable use of Ethiopia's fauna. The EWCA's principal goals are the conservation of endangered species, the repair and extension of protected areas, and the development of wildlife-based tourism that does not deplete natural resources (EWCA 2024, pp. 1–3). Giraffes are protected species in Ethiopia (Council of Ministers Regulations No. 163/2008, p. 35). However, the few trained staff and field-based wildlife rangers that the EWCA currently has are not enough to combat illegal wildlife trade and poaching even within the protected areas (Tessema 2017, p. 36).

In summary, the conservation efforts that are ongoing within the range of the

reticulated giraffe focus on enforcing anti-poaching laws, minimizing human-wildlife conflicts and commercial trade, and working with communities where reticulated giraffes occur. However, these efforts are not likely to counter the ongoing and anticipated future changes in land use and associated effects to the reticulated giraffe from human population growth and climate change because of the anticipated magnitude of the impacts within the species range and the projected downward trajectory of giraffes' abundance.

Current Condition of Reticulated Giraffe

We describe the current condition of the reticulated giraffe based on population abundance and trends, historical range contraction, habitat quality, influences affecting these metrics, and life-history traits of the species that determine its ability to rapidly recover from disturbances and population losses.

Until the early 2000s, the rangewide population was above 30,000 giraffes, but since then the population has been declining. The most recent population estimate is 15,985 individuals, with 99 percent of the population in Kenya (Brown et al. 2021, p. 10). Based on these population estimates, the current population of the reticulated giraffe has declined 3.2–4.4 percent annually and is 33–44 percent of the historical population size, meaning the population has declined 56–67 percent.

Reticulated giraffes have always had a relatively limited range, occupying portions of three countries: Kenya, Ethiopia, and southern Somalia. Currently, most individuals occur in northern Kenya, with a small population persisting in Borana National Park in southern Ethiopia on the border with northern Kenya. Giraffes still occur within their historical range in Kenya, and in southern Ethiopia; however, giraffes no longer occur in Somalia (Gedow et al. 2017, p. 23).

The decline in abundance and redundancy of reticulated giraffe populations is primarily related to changing habitat conditions and poaching. Because of rapid human population growth and the pressure on available land and natural resources, east Africa (including Ethiopia and Kenya) has undergone changes to its natural habitat. Since 1985, human populations in Kenya and Ethiopia have increased by 183 percent and 214 percent, respectively. Most of the human population in these countries live in rural areas (71.5 percent in Kenya; 77 percent in Ethiopia) and is agricultural and reliant on natural resources. Thus, the conversion of

natural vegetation to croplands, rangelands, urbanization, and fuelwood results in the loss, degradation, and fragmentation of habitats across the historical range of the reticulated giraffe. The increase in anthropogenic habitats also increased the risk of human-wildlife conflict, including poaching. Therefore, changing habitat conditions that affect resource availability negatively affect the reticulated giraffe's survival and recruitment.

Poaching is another main threat to reticulated giraffes. Giraffes are killed for bushmeat, hides, tails, and hair. Killing of giraffes is illegal in Kenya, yet it continues in the northern rangelands because this region has minimal enforcement. Poaching more commonly targets adults than juveniles or calves. Giraffe population growth is most sensitive to adult survival; thus, poaching strongly affects the rate of population growth.

Changes in precipitation patterns, notably drought and extreme precipitation patterns, are the primary mechanism through which climate change affects giraffes. Drought reduces food availability for giraffes, particularly juveniles that compete with other herbivores for resources. Drought also affects human food security, which in turn increases the risk of poaching and increases the risk of civil unrest. Civil unrest has been and remains a concern in Kenya, Ethiopia, and Somalia, and has increased poaching and overexploitation of natural resources.

In summary, multiple threats are interacting to affect the reticulated giraffe. Threats associated with habitat loss, fragmentation, and degradation are ongoing and projected to continue to escalate because of rapid human population growth. Land use within the range of the reticulated giraffe will need to meet the demands of the human population to the detriment of the giraffe's requirements for food and space. The threat of poaching will continue, but KWS is anticipated to continue its efforts to reduce poaching of reticulated giraffes.

Conservation measures for the reticulated giraffe include anti-poaching efforts, population monitoring, and the efforts of numerous organizations that provide human, financial, and/or logistical resources to support these efforts. However, conservation measures for giraffes may not adequately address climate change or the rapid human population growth that exacerbates the primary threats of changing habitat condition and poaching.

While some giraffe traits (e.g., mobility, flexible diet) provide adaptive ability, other traits (e.g., long lifespan,

low reproductive output, high energetic demands, and limited gene flow) strongly constrain the giraffe's ability to evolutionarily respond to the rapidly changing conditions associated with human population growth and climate change. Similarly, the species' ability to shift its range in response to changing environmental conditions is highly unlikely. There are limited options for reticulated giraffes to avoid the risks associated with habitat loss, poaching, and threats associated with rapidly increasing human populations and climate change.

Future Condition of Reticulated Giraffe

We now describe our analysis of the future conditions of the reticulated giraffe, considering how the past and current influences, and any additional influences, will act on the species into the future.

We developed two future condition scenarios for the reticulated giraffe to capture the plausible range of uncertainties regarding threats, and we projected responses by the reticulated giraffe to those threats. We projected a lower scenario and upper scenario with habitat conditions based on historical rates of forest loss, projected human population increases in east Africa, and lower bound (SSP2–4.5/RCP4.5) and upper bound (SSP5–8.5/RCP8.5) climate change scenarios as described below. In one scenario, we assume that poaching will remain similar to current conditions and anti-poaching efforts continue, while in the other, we assume an increase in poaching. We also assume civil unrest will continue under both scenarios (Service 2024b, p. 47). When possible, we report the magnitude of change under a lower bound climate change scenario (SSP2–4.5/RCP4.5) and an upper bound climate change scenario (SSP5–8.5/RCP8.5) at different time steps in the future. In cases where studies report only a single time step (end of century), a single scenario, or a specific temperature increase (e.g., 1.5 degrees Celsius (°C)), we provide a qualitative description of expected change into the future.

The ongoing threats associated with habitat loss, degradation, and fragmentation are ongoing and projected to escalate because of projected human population growth and the effects of climate change. Changes to the reticulated giraffe's habitat condition were projected as forest loss within the range of the species based on the historical lowest and highest rates observed between 2000 and 2023. Forest loss, while not a direct measure of impacts to giraffe habitat, can be considered a reasonable surrogate for

changing habitat conditions for giraffes because giraffes always occur near trees and/or bushes and rely on them for food.

Human population size in Kenya is projected to increase from 56 million in 2024 to 104 million people in 2100 (United Nations, Department of Economic and Social Affairs, Population Division, 2024). In Ethiopia, the population is projected to increase from 132 million in 2024 to 367 million people in 2100 (United Nations, Department of Economic and Social Affairs, Population Division, 2024).

Africa continues to be a hot spot for climate change (Nooni et al. 2021, p. 2). Temperature increases are expected to occur faster in Africa than the global average, and many African countries are expected to experience a large increase in the frequency of daily temperature extremes sooner than other nations (Trisos et al. 2022, pp. 1320–1321). There is high confidence that mean and maximum annual temperatures will increase across the entire continent in the future (Trisos et al. 2022, p. 1322). Surface temperatures are projected to continue to increase across the range of the reticulated giraffe, with divergence among future climate scenarios becoming discernible around mid-century (WorldBank 2024, unpaginated). As temperature continues to rise, drought extent, frequency, duration, and intensity increase as well. For example, the current increasing trend in percent of area affected by drought (extent) continues under both RCP4.5 and 8.5, and despite high inter-annual variability, the signal of an increasing trend over time is clear (Haile et al. 2020, p. 6). Additionally, drought duration and intensity are projected to increase. Drought frequency is projected to continually increase to the end of the century under RCP4.5 and 8.5, with higher drought frequency under RCP8.5 (Haile et al. 2020, p. 14). Drought duration is projected to increase from an average of 8 months during the historical baseline (1981–2010), with a slight decrease to 4–7 months during the 2020 decade, to 10–32 months at mid-century and 29–108 months at late-century under RCP4.5 and 8.5, respectively (Haile et al. 2020, pp. 10, 12–13). The projected frequency, duration, and intensity of drought events is variable across east Africa, with drought trends within southeastern Ethiopia and Kenya projected lower than elsewhere (Haile et al. 2020, p. 14). However, increasing drought trends are still apparent in areas occupied by reticulated giraffes. While droughts are projected to be more frequent, an increase in extreme rainfall events is

also expected to occur across most of the continent (Trisos et al. 2022, p. 1320; Seneviratne et al. 2021, p. 1565).

Multiple agencies and conservation organizations are working to reduce the threat to reticulated giraffes of poaching; however, poaching will likely continue. With human population size and drought projections, the human population will likely live under chronic and increasing food insecurity. Therefore, we expect that under the lower plausible scenario it is likely that current and ongoing conservation efforts can maintain or somewhat reduce poaching levels, while the upper scenario expectation is an increase in poaching rates due to the expected human population and drought increases.

We do not attempt to project the prevalence or severity of future occurrences of civil unrest; however, it is expected that civil unrest will likely occur in the future. Climate-induced displacement is widespread in Africa because poor conditions for agricultural and pastoral livelihoods cause people to relocate in search of better opportunities (Trisos et al. 2022, pp. 1350, 1360). Relatedly, the risk of violent conflict increases because of reduced economic opportunities caused by increased temperature and extreme weather events (Trisos et al. 2022, p. 1394; Elias and Abdi 2010, pp. 4–20; Pica-Ciamarra et al. 2007, pp. 10–11).

We describe the future condition of the reticulated giraffe given the plausible projections of threats described above. We summarize the influences driving future conditions and the expected trends in population abundance and range. The primary factors influencing the viability of the reticulated giraffe (habitat changes and poaching) are expected to continue with increasing magnitude.

Human population growth is projected to increase through 2060 under the lower bound scenario, and through 2100 or later in the upper bound scenario in Kenya, but the increase will be steady through 2100 under both scenarios in Ethiopia. The projected changes in drought extent, frequency, intensity, and duration, coupled with human population growth, are likely to increasingly limit the sustainability of the drought-coping strategies in Kenya's arid landscapes. Therefore, most of the Kenyan populace is expected to live under chronic food shortages (Huho and Mugalavai 2010, p. 70). Risks associated with food insecurity lead to changing habitat conditions and human-wildlife conflicts, including poaching and civil unrest; these risks are likely to increase

given continued human population growth and worsening climate conditions and their impacts on livelihoods in the range of the reticulated giraffe.

Human population growth and climate change will lead to further habitat loss, degradation, and fragmentation through the loss of forest and woody cover. Projecting this rate of loss into the future, there is expected to be an additional 8 to 38 kha (1.9 to 8.9 percent) loss of forest cover across the lower and upper bound scenarios. The continued habitat loss, degradation, and fragmentation will result in further reduced food quality and availability for reticulated giraffes, and further restrict their movement patterns and ability to access necessary resources. These reductions in food quality and need for greater movement or larger home ranges reduce reproduction and survival rates, especially in times of drought, which will increase in the future.

Apart from Kenya, only a small population of reticulated giraffes persists on the border of Kenya and Ethiopia in Borana National Park. With increasing habitat loss, degradation, and fragmentation, this population is at increasing risk of extirpation in the future. Therefore, it is likely the reticulated giraffe population will be restricted to Kenya in the future. In Kenya, increasing habitat loss, degradation, and fragmentation in the foreseeable future will likely lead to a continued decrease in density of reticulated giraffe populations and greater distances between them (Directorate of Resource Surveys and Remote Sensing (DRSRS), cited in KWS 2018, p. 44; Service 2024b, p. 11).

We simulated future population trajectories based on the current population size and upper and lower growth rate estimates for the reticulated giraffe. We assessed the potential change in future population size if historical trends and conditions continue unchanged. On average, the population is projected to decline to less than 5 percent (across the two growth rate scenarios, mean = 1.3–4.1 percent, 95 percent confidence interval (CI) = 0.7–6.8 percent) of the historical size by 2100 (Service 2024b, p. 49), or an estimated mean population size of 624–1,459 (95 percent CI = 333–2,451) individuals. The projections of giraffe populations are based on historical rates of decline and do not incorporate the full range of biological complexity, uncertainty, or anticipated increases in the magnitude of threats facing reticulated giraffes in the future. Nevertheless, we anticipate that the rate of decline in reticulated giraffe

populations will increase over time because the ongoing threats are increasing in magnitude, with increasing human population growth and climate change increasing the effects.

In summary, resiliency and redundancy for the reticulated giraffe will be further reduced from historical conditions. The overall population is projected to decline to less than 5 percent of its historical size by the end of the century. The reason for the decline of the reticulated giraffe population is primarily related to changing habitat conditions and poaching; however, other threats affect giraffes directly or compound the primary threats, which are expected to increase in the future because of human population growth and the effects of climate change, which will intensify. The magnitude of influences is the same across the range of the reticulated giraffe, and the species will have limited options to avoid the risks associated with habitat loss, poaching, and threats associated with rapidly increasing human populations and the effects of climate change.

Factors Influencing Masai Giraffe

Factors that affect the Masai giraffe across Kenya, Tanzania, Zambia, and Rwanda are generally similar in each country with differences in magnitude. The Masai giraffe faces minimal threats from poaching in Rwanda given its habitat is fenced and protected there; however, threats from climate change remain. In Kenya, Tanzania, and Zambia, Masai giraffes face similar threats and benefit from conservation efforts and regulatory measures to protect giraffes. However, populations in Zambia and Rwanda experience fewer impacts from changing habitat conditions and poaching. The threats to the Masai giraffe affect the species' habitat condition, resulting in habitat loss, fragmentation, and degradation, and affect the magnitude of poaching, but other threats, such as negative genetic effects from population bottleneck events, affect giraffes directly or compound the primary threats to Masai giraffes. The primary threats to the Masai giraffe are exacerbated by rapid human population growth and effects from climate change. We also considered the potential threats of predation, hunting, and disease, and while individuals may be affected by these threats, the best available information does not indicate population-level or species-level effects.

Changing Habitat Conditions

The sources of the changing habitat conditions (habitat loss, degradation, and fragmentation) in east Africa, including Kenya, Tanzania, and Zambia, are conversion of natural habitats and natural vegetation to croplands and rangelands, urbanization, deforestation, production of fuelwood, and climate change. Converting natural habitats results in habitat loss and degradation of natural vegetation; fragmentation of the giraffe's range, which has historically been a more open landscape of suitable habitat for Masai giraffes; and increased risk of human-wildlife conflict, including poaching. Changing habitat conditions affect giraffes directly or indirectly through reduced food availability and reduced or obstructed movements to find necessary resources, which negatively affect survival and recruitment. These changes also result in increased risk of effects from human conflict (e.g., war) and human-wildlife conflict (e.g., retaliation and poaching). Because Masai giraffes overlap with humans and domesticated livestock, they rely on the same natural resources. Human-wildlife conflicts occur when wildlife and humans compete for the same resources (UWA 2018, p. 49). Additionally, giraffes have been known to feed on cash crops (such as mangoes), causing economic losses for farmers and exacerbating conflict between humans and wildlife in Kenya (Ali et al. 2023, p. 175).

The agricultural sector employs more than 40 percent of the total population and more than 70 percent of Kenya's rural population (FAO 2024a, unpaginated). The rural population accounts for 71.5 percent of Kenya's population, increasing from 19.5 to 39.2 million people, or by approximately 100 percent, between 1990 and 2020 (FAOSTAT 2024a, unpaginated). More than 80 percent of the population in Tanzania is employed in agriculture, and 64 percent of the population is rural, which has increased from 20.6 to 41.4 million people between 1990 and 2020 (FAOSTAT 2024b, unpaginated). Almost 72 percent of the Zambian population is engaged in agricultural activities (FAO 2024b, unpaginated). Rwanda's economy remains predominantly dependent on agriculture, with 69 percent of rural households involved in small-scale farming on limited land.

Deforestation and loss of woody cover with increases in cropland and settlements is ongoing within the range of the Masai giraffe (Bullock et al. 2021, pp. 6–8). As mentioned above, this trend is emblematic of sub-Saharan

Africa as a whole: growing demand for food is forcing agricultural expansion in historically less developed savannas and woodlands (Bullock et al. 2021, p. 12).

In western Kenya (just west of the Masai giraffe's range), landcover changes within the Migori River watershed over the past 40 years (1980 to 2020) occurred with decreases in shrub land (40.6 percent), grassland (84.9 percent), forests (52.9 percent), water (82 percent), and wetland (38.4 percent) at the same time as increases occurred in cultivated land (34.3 percent), bare land (132.3 percent), and built-up area (461.2 percent) (Opiyo et al. 2022, pp. 223–224, 229). In southeastern Kenya, between 1985 and 2020 in the Tsavo landscape, Acacia woodland decreased by an average of 44 percent, with increases of settlement areas (55.6 percent), bare land (43.2 percent), and agricultural lands (35 percent) (Kabue 2021, p. 31). These land-use cover changes correspond to declining Masai giraffe populations in the same region (Kabue 2021, p. 41). One region with extensive woody cover loss in Kenya during this time (2002–2012) was near Tsavo East National Park and was mainly due to agricultural expansion (Abera et al. 2022, p. 8). In addition, between 1977 and 2016, Masai giraffes in southern Kenya decreased by 64 percent concurrent with an increase in numbers of domesticated livestock (sheep, goats, and camels) (Ogutu et al. 2016, pp. 10–14).

The landcover changes and uses in Tanzania are similar to those in Kenya. Agriculture is the backbone of the Tanzanian economy, and national campaigns have often involved promoting rural agricultural activities to improve incomes and standards of living (Noe 2003, p. 18). Additionally, Masai pastoralists traditionally have depended on livestock production, a type of agricultural practice that coexisted with wildlife. However, these pastoral areas are gradually shifting away from exclusive pastoralism towards both subsistence and commercial agriculture (Kiffner et al. 2015, p. 2; Noe 2003, p. 15). The growth in the agricultural sector from 2008 to 2014 was a result of increasing the land area under cultivation, from 8.3 million ha in 2008 to 13 million ha in 2014, representing a 9 percent annual growth rate (Wineman et al. 2020, p. 697).

Pastoralists and farmers in Tanzania have a long history of conflict over land and resources (Benjaminsen et al. 2009, pp. 436–438; Gwaleba and Silayo 2019, p. 2). Conflicts between farmers and pastoralists are most noticeable during drought seasons when resources are

limited (Mwalimu and Matimbwa 2019, p. 27). Because agriculture is the driver of the Tanzanian economy, the exclusion of pastoralists from their traditional grazing lands to expand agricultural lands has spurred conflicts with farming communities (Mwamfupe 2015, p. 1; Benjaminsen et al. 2009, p. 436). Traditionally, land use conflicts were on the margins between pastoral land and national parks. In recent decades, conflicts have increased in magnitude and spread southward and eastward (Mwamfupe 2015, p. 2). Civil unrest is a significant concern in Kenya and Tanzania, with current U.S. State Department travel advisories due to crime, terrorism, kidnapping, and civil unrest (U.S. Department of State 2024, unpaginated).

As mentioned above, cropland expansion was the main source of woody cover loss in east Africa in recent decades; however, fuelwood extraction was also a source of this loss (Abera et al. 2022, p. 10). Woody vegetation, particularly Acacia trees, is the main source of charcoal production in Kenya (Kiruki et al. 2017, p. 476; Abera et al. 2022, p. 10; Abate and Abate 2017, p. 9). Acacia trees are a preferred food source of giraffes, and reduction of Acacia trees because of the demand for fuelwood reduces the availability of high-quality food resources for giraffes. Charcoal production also results in overall woodland degradation because it exacerbates vegetation loss, soil erosion, and creation of associated access roads (Kiruki et al. 2017, pp. 476, 478).

Charcoal production is also a source of woody cover loss in Zambia, altering 197.4 km² of miombo woodlands annually (Sedano et al. 2022, p. 12). Remote-sensing-based analysis in Zambia identified that rather than agricultural expansion, charcoal production is the main driver of tree cover loss there (Sedano et al. 2022, p. 13). While Sedano et al. (2022, entire) focused their research in central Zambia, charcoal production also occurs in the Luangwa Valley (Lukama 2003, unpaginated).

Summary of Changing Habitat Conditions

In summary, changing habitat conditions from habitat loss, degradation, and fragmentation because of agriculture, urbanization, and fuelwood production are considered historical and ongoing threats to the Masai giraffe (in all populations except Rwanda). These threats are anticipated to continue in the future and to be exacerbated by effects from increasing human population growth and climate change.

Poaching

The reasons for killing giraffes vary greatly across Africa, with local context playing a significant role in shaping human-giraffe interactions (Ruppert 2020, chapter 2). Poaching of Masai giraffes varies across the species' range in both reason for killing and the magnitude/level of killing over time. While bushmeat is likely the primary reason for poaching, the demand for giraffe parts, including their skin, bones, and tails, fuels poaching activities (Ali et al. 2023, p. 175; Muller 2008, pp. 1–4; Khalil et al. 2016, pp. 1–5; Dunn et al. 2021, pp. 9–10). Giraffes are also killed in retaliation killings as a response to crop damage that leads to economic hardship for farmers (Ali et al. 2023, p. 175). Giraffe products are also used for traditional medicine. In northern Tanzania, some people believe that giraffe bone marrow and brains can be used to cure HIV (human immunodeficiency virus) and AIDS (acquired immunodeficiency syndrome), and tail-hair and other products are used to make bracelets and trinkets for tourists (GCF 2022b, unpaginated; Muneza et al. 2017, p. 2, citing many authors).

Local opinions regarding giraffes and of law enforcement are important to conservation efforts and dictate actions when there is a human-wildlife conflict. Local conservation programs and enforcement in Kenya increased conservation of giraffes and reduced poaching (Ruppert 2020, pp. 29, 84). However, the best available information suggests that rangewide poaching has not been eliminated or even reduced in the range of the Masai giraffe over time.

Poaching is rampant in Tanzania, particularly outside fully protected areas (Kiffner et al. 2015, p. 2). In northern Tanzania, the giraffe population declined in Serengeti National Park, and the major reasons for that decline are poaching, disease, and food limitations (Strauss et al. 2015, pp. 509–510; Muneza et al. 2017, p. 5). A 67–86 percent reduction in giraffe density in the Serengeti between 1975 and 2010 mirrors a 68–85 percent decline in giraffe abundance between 1977 and 2009 in the adjacent Masai Mara National Reserve in Kenya (Strauss et al. 2015, p. 512). Poaching also has had substantial impacts in parts of the Tarangire-Manyara ecosystem, Arusha National Park, and Mkomazi National Park in eastern Tanzania (Kiffner et al. 2015, p. 8; Muneza et al. 2017, p. 6; Lee et al. 2023, p. 350). Poaching is also reported to be widespread in the Katavi-Rukwa ecosystem in western Tanzania (Caro

2008, pp. 110–112) and in the Ruaha-Rungwa ecosystem in southern Tanzania (Muneza et al. 2017, p. 6, citing many authors). A study in the Serengeti National Park found that giraffe made up almost half of the animals being caught in illegal snares and observed that the number of giraffes live-snared increased dramatically after the first cell phone tower became operational in the park (Strauss et al. 2015, p. 513). Poaching more commonly targets adults than subadults or calves (Lee et al. 2016, p. 1021). Additionally, population structure may shift so that there are fewer adults relative to immature giraffes, fewer adult males relative to adult females, and more calves per adult female (Lee et al. 2023, p. 349). Giraffe consumption may be underreported in Tanzania because the giraffe is the country's national symbol and poachers face fines and jail time (Strauss et al. 2015, p. 514).

In Zambia, local people are not a substantial threat to the giraffe population (Bercovitch et al. 2018, p. 6). It seems unlikely that the giraffe was ever hunted purely for its meat, as the local Akunda people are apparently averse to eating it (Berry 1973, p. 78). The giraffe is not subjected to poaching in the Luangwa Valley, and its numbers are likely regulated by factors such as the availability of food (which is related to elephant density) (East 1999, p. 98). The hunting of giraffe in Zambia was illegal until 2015. Currently, professional hunters can obtain a license to hunt giraffes in “game management areas” and on private land in Zambia. However, the stronghold of giraffe in Zambia is the South Luangwa National Park, an area that prohibits hunting (Bercovitch et al. 2018, p. 6). Even though poaching and hunting pose potential threats to giraffe, these activities are not major threats influencing the Masai giraffe's population size in Zambia (Bercovitch et al. 2018, p. 6).

By the late 1970s in Rwanda, Akagera National Park was subject to massive levels of poaching (African Parks 2024, unpaginated). However, when African Parks assumed management of the park, the law enforcement strategy was overhauled, and reintroductions of wildlife took place (African Parks 2024, unpaginated). For example, Akagera National Park is surrounded by an electric fence with a canine unit trained to track and restrain poachers (Shabahat 2017, unpaginated). In addition, a team of more than 100 rangers (mainly local community members) patrol, track, and deter illegal activities. Engaging the local community has reduced poaching and prioritized conservation of wildlife

in the park (African Parks 2024, unpaginated). Since 2010, there have not been any recorded incidents of illegally killed giraffes, or carcasses found. However, giraffes have been sighted in snares and with other injuries; thus, poaching is still considered a threat (S. Hall pers. comm., cited in Marais et al. 2012, p. 2).

Disease

There are at least two known diseases that have been documented in giraffes (giraffe skin disease (GSD) and giraffe ear disease (GED)) that may pose a threat to the Masai giraffe, primarily in Tanzania. GSD is a disorder that is characterized by proliferative, crusty lesions. It manifests as chronic and severe scabs, wrinkled skin, encrustations, and dry or oozing blood on the legs, shoulders, or necks of giraffes (Epaphras et al. 2012, p. 62; Lee and Bond 2016, p. 753). GED causes wounds and lesions on the outer ear (Lyaru 2010, pp. 43–46). GED has only been observed in Tanzania and was first discovered in Mikumi National Park (Brown and Fennessy 2014, cited in Muneza et al. 2017, p. 3; Muneza et al. 2016, p. 146).

The causes of GSD have not been identified, and whether the spatial variation in GSD and manifestation of lesions across the giraffe's range is due to different infectious agents remains unknown (Muneza et al. 2016, pp. 153–155). The disease was first observed in 1999 in Tanzania (Mlengeya and Lyaru 2005, p. 52). Seven countries in sub-Saharan Africa have detected GSD: Uganda, Kenya, Tanzania, Zimbabwe, Botswana, Namibia, and South Africa. GSD is also present in zoos on six continents (Muneza et al. 2016, pp. 149–150). Thus, GSD affects wild and captive giraffes. In the most affected areas, about 10 percent of giraffes were observed with a severe form (Mlengeya and Lyaru 2005, p. 52; Lyaru 2010, p. 32).

Tanzania is a hotspot for GSD and has the highest reported rates in Africa (Muneza et al. 2016, p. 146). GSD was first observed in Ruaha National Park in 2000, and 86 percent of giraffes in this park have the disease (Epaphras et al. 2012, entire). Additionally, as many as 63 percent and 23 percent of the giraffe population in Tarangire National Park and Serengeti National Park, respectively, show signs of the skin disease (Muneza et al. 2017, p. 3). Unconfirmed reports also suggest that GSD affects giraffe populations in the Selous-Mikumi ecosystem (Brown and Fennessy 2014, unpublished report cited in Muneza et al. 2016, p. 150). In

Kenya, a few cases of GSD infections on Masai giraffes were observed.

Both GSD and GED present a potential threat to giraffes. However, no studies have been conducted to determine the extent to which these infections affect the giraffe's fitness and condition, and the best available information does not currently indicate that infections are fatal or having a population-level effect (Muneza et al. 2017, p. 3; Muneza et al. 2016, pp. 152, 155).

Climate Change

As mentioned above, the mechanisms by which climate change can affect the giraffe's fitness are complex, multifaceted, and contingent on a range of interacting factors. The primary influence of climate change on the Masai giraffe's viability is changes in precipitation patterns, notably drought and extreme precipitation pattern. Drought reduces water availability and food quality for giraffes. Giraffes are generally less able to access high-quality browse during times of drought due to an increase in tree mortality and a decline in browse abundance (Vicente-Serrano et al. 2022, p. 9, Engelbrecht et al. 2024, p. 178), as well as increased competition with other browsing species (Birkett and Stevens-Wood 2005, entire). Less access to high-quality food leads to giraffes needing to expand their home range, which in turn increases the relative proportion of time searching for food and can lead to human-wildlife conflicts and an increased risk of poaching. Giraffes can also be affected by extreme precipitation. High precipitation events were correlated with reduced survival in both adult and subadult giraffes, as higher rainfall can increase cover for predators, increase parasite and disease prevalence, and reduce food quality (Bond et al. 2023, pp. 3185–3193).

Indirectly, human food insecurity, brought on by both drought and heavy precipitation events, affects the giraffe's viability. Drought impacts pasture quality, livestock survival and production, crop yields, and malnutrition rates (Lam et al. 2023, p. entire). Heavy precipitation and flooding events in Kenya resulted in crop damages and impacts to 5 million people (1997); losses of life, property, and crops leading to human displacement (2002); and impacts to 112,000 people and crops (2013) (Kogo et al. 2021, p. 36). Impacts to current crops or livestock leads to changes in farming practices (Huho and Muglavai 2010, pp. 66–70). Many of these changes may result in loss, degradation, or fragmentation of giraffe habitat.

In summary, climate change directly affects giraffes through reduced forage and competition with other browsing species. Decreased availability of high-quality forage may cause giraffes to expand their home range in search of high-quality forage, which increases the risk of poaching and human-wildlife conflict. Indirectly, drought affects giraffes because human food insecurity leads to changing land use practices that in turn affect habitat conditions. Extreme precipitation events influence predation, disease, and food quality, the consequences of which can lead to direct mortality and competition for resources.

Genetic studies indicate Masai giraffes have among the lowest levels of heterozygosity and highest levels of inbreeding across the giraffe species and subspecies (Bertola et al. 2024, pp. 1578–1580; Coimbra et al. 2021, p. 2935; Coimbra et al. 2022, pp. 8–10; Lohay et al. 2023, pp. 10, 13). The high level of inbreeding has been attributed to past population bottleneck events between the 1890s to 1960s that resulted from recurring epidemics of rinderpest (an infectious viral disease of even-toed ungulates, including giraffes, which was characterized by fever, oral erosions, diarrhea, lymphoid necrosis, and high mortality). These epidemics affected giraffes directly through infection and indirectly through impacts on food availability (Lohay et al. 2023, p. 13). Inbreeding levels were slightly lower in the eastern Tanzanian populations than in the western Tanzanian populations (Lohay et al. 2023, p. 10). Overall, the low genetic diversity and high level of inbreeding suggest poor genetic health for this species.

Conservation Efforts and Regulatory Mechanisms

As mentioned above, Kenya has developed a National Recovery and Action Plan for Giraffe in Kenya (2018–2022) (KWS 2018, entire) and a national Wildlife Strategy 2030 (Ministry of Tourism and Wildlife 2018, entire). Objectives of the National Recovery and Action Plan for Giraffe in Kenya are to have viable, free-ranging populations of all three giraffe species in Kenya (including Masai giraffe) and reduce the proportion of giraffes illegally killed by 50 percent within 5 years (of 2018) (KWS 2018, p. 31). The National Wildlife Strategy 2030 outlines a vision for wildlife conservation because human population pressure, habitat loss, rapid development in key wildlife areas, poaching, insecurity, and overexploitation have accelerated the decline of wildlife populations and habitat degradation (Ministry of

Tourism and Wildlife 2018, p. 7). The National Human-Wildlife Coexistence Strategy and Action Plan 2024–2033 is aimed at fostering sustainable wildlife conservation while effectively mitigating human-wildlife conflicts (KWS 2024, unpaginated). The KWS has a security division with an overall goal and primary mandate to strengthen law enforcement, protect wildlife and their habitats, enhance tourist security in protected areas, and safeguard KWS assets. Wildlife population estimates by KWS have increased with these efforts, although this increase is attributed to the inclusion of more updated data in the 2021 report (Waweru et al. 2021, p. 110).

The Tanzania Wildlife Research Institute (TAWIRI), in collaboration with Tanzania National Parks, Tanzania Management Authority, Ngorongoro Conservation Area Authority, United States Agency for International Development, and Giraffe Conservation Foundation, developed the National Giraffe Conservation Plan (2020–2024) (TAWIRI 2019, entire). The giraffe is the national animal of Tanzania and, as such, is protected under the Wildlife Conservation Act No. 5 of 2009, which prohibits people from killing, wounding, capturing, or hunting giraffes (TAWIRI 2019, p. 6); however, TWRI recognizes that poaching remains an ongoing threat in Tanzania.

The core habitat area in Luangwa Valley, Zambia, is protected by several national parks and game management areas, with some giraffes also present on private game ranches. However, the level of protection provided by the parks and game management areas varies depending upon the ownership and the threat. The Zambia Wildlife Act of 1998 provided for establishment of the Zambia Wildlife Authority (ZAWA) (now renamed Department of National Parks and Wildlife), which is responsible for managing protected areas (Lindsey et al. 2014, p. 2). Nevertheless, there is a general ineffectiveness of these conservation areas for conserving wildlife (Freitsch et al. 2023, entire; Lindsey et al. 2014, entire). The Zambia Wildlife Act of 2015 banned hunting on national parks and controls hunting on game management areas (ZAWA 2015, entire). Well-managed trophy hunting and tourism can provide money for conserving wildlife and also bring resources to local communities. However, the Department of National Parks and Wildlife in Zambia remits a small proportion back to the communities but retains most of the income from hunting in game management areas. Income from wildlife is often paid late and does not

create a clear link between conservation and earnings, while the land is under customary tenure and belongs to the community (Lindsey et al. 2014, p. 7). Earnings for communities from trophy hunting are lower than estimated earnings from bushmeat and create weak incentives for the conservation of wildlife in this region (Lindsey et al. 2014, p. 7).

As mentioned above, Akagera National Park in Rwanda is managed by African Parks. One of the reasons for the incredible renewal of Akagera National Park and its wildlife is an effective conservation law enforcement strategy. A team of more than 100 rangers (mainly local community members) patrol, track, and deter illegal activities. Engaging the local community has reduced poaching and prioritized conservation of wildlife in the park (African Parks 2024, unpaginated).

In summary, the conservation efforts that are ongoing within the range of Masai giraffes focus on enforcing anti-poaching laws, minimizing human-wildlife conflicts and commercial trade, and working with communities where Masai giraffes occur. However, these efforts are not likely to counter the ongoing and anticipated future changes in land use and associated effects to Masai giraffe from future human population growth and climate change because of the anticipated magnitude of the impacts within the species range and the projected downward trajectory of giraffes' abundance.

Current Condition of Masai Giraffe

We describe the current condition of the Masai giraffe based on population abundance and trends, historical range contraction, habitat quality, influences affecting these metrics, and life-history traits of the species that determine its ability to rapidly recover from disturbances and population losses. Formal protection appears to influence Masai giraffe concentrations.

Given available population data, we identified five analysis units (AUs): (1) Kenya/Tanzania west—west of the Gregory Rift escarpment, (2) Kenya/Tanzania east—east of the Gregory Rift escarpment, (3) West Tanzania, (4) Zambia, and (5) Rwanda. Available information suggests limited connectivity among these units.

Resiliency and redundancy for the Masai giraffe are reduced from historical conditions. Before the 1980s, the rangewide population for the Masai giraffe was approximately 68,000 giraffes, but, since then, the population has been declining by approximately 1.0 to 3.3 percent per year for a total decline of 32 to 34 percent. Over a recent 40-

year period (1977–2016), the abundance of Masai giraffes in Kenya has declined (Ogutu et al. 2016, pp. 10–14, supplemental data), while the population of giraffes in Tanzania has also experienced a similar trend over a recent 30-year period (1986–2016). The population in Zambia has likely been stable or increasing since the 1950s (du Raan et al. 2015, pp. 5–7), and the population in Rwanda has been increasing since its introduction (Macpherson 2021, p. 5 and appendix 5; Brown and Bantlin 2023, cited in African Parks Network 2023, p. 9). The most recent population estimate for the species is 45,402 individuals (66 to 68 percent of its historical abundance), with most of the population in southern Kenya and northern Tanzania on both sides of the Gregory Rift escarpment.

By combining population assessments conducted for individual countries, counties, and parks, we estimated the proportion of total abundance in each analysis unit: Kenya/Tanzania east AU comprises approximately 42 percent of the total Masai giraffe population, Kenya/Tanzania west AU approximately 35 percent, West Tanzania AU approximately 21 percent, Zambia AU approximately 2 percent, and Rwanda AU less than 1 percent (Brown et al. 2021, p. 9; Ogutu et al. 2016, supplement table S1; TAWIRI 2019, pp. 31–40). It is difficult to quantify the exact rate of decline of the Masai giraffe population in the three Kenya/Tanzania AUs; however, these three Kenya/Tanzania AUs collectively comprise approximately 98 percent of the global Masai giraffe population, and it is likely each of these AUs is declining at a rate close to the rangewide rate of approximately 1.0 to 3.3 percent per year.

The Masai giraffe's historical range includes portions of three countries: Kenya, Tanzania, and Zambia. Currently, the Masai giraffe occurs throughout much of southern and eastern Kenya and central and northern Tanzania (East 1999, p. 98; Brown et al. 2021, p. 9; Bolger et al. 2019, p. 4). Masai giraffes are widely distributed in the southern part of Kenya (Dagg 1962, p. 6; Muruana et al. 2021, p. 6; Sidney 1965, p. 149) and occur both in protected areas and unprotected rangeland on public, private, and communal land (Brown et al. 2021, p. 9). In Tanzania, Masai giraffes are distributed throughout substantial parts of their historical range in Tanzania, which includes much of the country north of the Rufiji River (Dagg 1962, p. 6; East 1999, p. 98). While Masai giraffes remain widespread over much of their historical range, by the 1990s, they had

disappeared from extensive areas of central and coastal Tanzania (East 1999, p. 98). Therefore, the overall range is likely less than the historical range in Tanzania. Additionally, the area of occupancy and density in occupied areas has likely declined because of ongoing threats. In Zambia, the range is likely similar to its historical distribution in the Luangwa Valley. The species' current range also extends into Rwanda, as an extralimital population established via introduction in 1986. The only population of Masai giraffes in Rwanda occurs in Akagera National Park. The park represents the only protected savannah in Rwanda and the largest protected wetland in central Africa (African Parks Network 2023, p. 5).

The reason for the decline of the Masai giraffe population is primarily related to changing habitat conditions and poaching. Because of rapid human population growth, from 56 million to 157.2 million people over 40 years across the four countries where Masai giraffes occur, and recent droughts and extreme rainfall events, the pressure on available land and natural resources in east Africa in Kenya, Tanzania, Zambia, and Rwanda has produced changes to the Masai giraffe's natural habitat. Land use pressures within the range of the Masai giraffe to meet the demands of the human population for their livelihoods, including agriculture, pastoralism, and other uses, come at the detriment of the giraffe's requirements for food and space. Thus, the conversion of natural vegetation to croplands, rangelands, urbanization, and fuelwood results in the loss, degradation, and fragmentation of habitats across the historic range of the Masai giraffe. The increase in anthropogenic habitats also increased the risk of human-wildlife conflict, increasing poaching. Therefore, changing habitat conditions that affect resource availability negatively affect the Masai giraffe's survival and recruitment.

Poaching is another main threat to Masai giraffes. They are killed for bushmeat, hides, tails, and hair. Killing of giraffes is illegal in Kenya, Tanzania, and Rwanda, yet poaching continues. The Zambia Wildlife Act of 2015 banned killing giraffes on national parks and controls it on game management areas (ZAWA 2015, entire). Poaching targets adults more than juveniles or calves. Giraffe population growth is most sensitive to adult survival; thus, poaching strongly affects the rate of population growth.

Changes in precipitation patterns, notably drought and extreme precipitation patterns, are the

mechanisms through which climate change affects Masai giraffes. Drought reduces food availability for giraffes, particularly juveniles that compete with other herbivores for resources. Drought and heavy precipitation also affect human food security, which, in turn, increases the risk of poaching and further increases the risk of human conflict. High precipitation events were correlated with reduced survival in both adult and subadult giraffes (Bond et al. 2023, pp. 3185–3193), as higher rainfall can increase cover for predators, increase parasite and disease prevalence, and reduce forage nutrient concentration (food quality).

Civil unrest has been and remains a concern in Kenya and Tanzania and has resulted in increased poaching and overexploitation of natural resources. Pastoralists and farmers in Tanzania have a long history of conflict over land and resources. In addition, the Masai giraffe currently has low genetic diversity and high levels of inbreeding that likely result from past bottleneck events associated with rinderpest epidemics.

In summary, threats to the condition of the Masai giraffe's habitat work synergistically, exacerbating the primary threats to Masai giraffes of poaching and of habitat loss, habitat fragmentation, and degradation of natural vegetation. The threats associated with habitat loss and fragmentation are ongoing and projected to continue to escalate because of rapid human population growth and reliance of people within the range of the Masai giraffe on agriculture and pastoralism for their livelihoods. Thus, anthropogenic land use change within the range of the Masai giraffe to meet increasing human demands will negatively affect giraffe's requirements for food and space. Threats of poaching will continue, but KWS, the Tanzanian authorities, and African Parks will continue their efforts to reduce the incidents of poaching of Masai giraffes.

Conservation measures for Masai giraffes include anti-poaching efforts; monitoring of populations; and human, financial, and/or logistical resources provided by many organizations to support these efforts. Formal protection appears to influence Masai giraffe concentrations. However, conservation measures for giraffes may not adequately address climate change or the rapid human population growth that exacerbates the primary threats of changing habitat condition and poaching.

While some giraffe traits (e.g., mobility, flexible diet) provide adaptive ability, other traits (e.g., long lifespan,

low reproductive output, high energetic demands, and limited gene flow) strongly constrain the giraffe's ability to evolutionarily respond to the rapidly changing conditions associated with human population growth and climate change. Similarly, the species' ability to shift its range in response to changing environmental conditions is highly unlikely. In addition to physical (fencing, topography) and physiological barriers to large scale migration, there is limited habitat available nearby to avoid the anticipated risks from climate change. There are limited options for giraffes to escape the risks associated with habitat loss, poaching, and threats associated with rapidly increasing human populations and climate change.

Future Condition of Masai Giraffe

We now describe our analysis of the future conditions of the Masai giraffe, considering how the past and current influences, and any additional influences, will act on the species into the future.

We developed two future condition scenarios for the Masai giraffe to capture the plausible range of uncertainties regarding threats and projected responses to these threats by the Masai giraffe. We projected a lower scenario and upper scenario with habitat condition based on historical rates of forest loss, assumed human population increases in east Africa, and lower bound (SSP2–4.5/RCP4.5) and upper bound (SSP5–8.5/RCP8.5) climate change scenarios as described below. In one scenario, we assume that poaching will remain similar to current conditions and anti-poaching efforts continue, while in the other, we assume an increase in poaching. We also assume civil unrest will continue under both scenarios (Service 2024c, p. 47). When possible, we report the magnitude of change under a lower bound climate change scenario (SSP2–4.5/RCP4.5) and an upper bound climate change scenario (SSP5–8.5/RCP8.5) at different time steps in the future. In cases where studies report only a single time step (end of century), a single scenario, or a specific temperature increase (e.g., 1.5 °C), we provide a qualitative description of expected change into the future.

The ongoing threats associated with habitat loss, degradation, and fragmentation are ongoing and projected to escalate because of projected human population growth and the effects of climate change. Changes to the Masai giraffe's habitat condition were projected as forest loss within the range of the species based on the historical lowest and highest rates observed between 2000 and 2023. Forest loss,

while not a direct measure of impacts to giraffe habitat, can be considered a reasonable surrogate for changing habitat conditions for giraffes because giraffes always occur near trees and/or bushes and rely on them for food.

The median human population size in African countries within the range of the Masai giraffe is projected to nearly triple by 2100, from 160 million to 464 million people, with a 95 percent CI of 223 million to 1 billion people (United Nations, Department of Economic and Social Affairs, Population Division, 2024).

Africa continues to be a hot spot for climate change (Nooni et al. 2021, p. 2). Temperature increases are expected to occur faster in Africa than the global average, and many African countries are expected to experience a large increase in the frequency of daily temperature extremes sooner than other nations (Trisos et al. 2022, pp. 1320–1321). There is high confidence that mean and maximum annual temperatures will increase across the entire continent in the future (Trisos et al. 2022, p. 1322). Surface temperatures are projected to continue increasing across the range of the Masai giraffe, with divergence among future climate scenarios discernible around mid-century (WorldBank 2024, unpaginated). As temperature continues to rise across east Africa, drought extent, frequency, duration, and intensity increase as well. For example, the current increasing trend in percent of area affected by drought (extent) continues under both RCP4.5 and 8.5, and despite high inter-annual variability, the signal of an increasing trend is clear. Additionally, drought duration and intensity are projected to increase. Drought frequency is projected to continually increase to the end of the century under RCP4.5 and 8.5, with higher drought frequency under RCP8.5 (Haile et al. 2020, p. 14). Drought duration is projected to increase from an average of 8 months during the historical baseline (1981–2010), with a slight decrease to 4–7 months during the 2020 decade, to 10–32 months at mid-century and 29–108 months at late-century under RCP4.5 and 8.5, respectively (Hailie et al. 2020, pp. 10, 12–13). An increasing trend in frequency, coupled with increasing severity, portend worse droughts in the future (Haile et al. 2020, p. 17). Similarly, in the Zambia portion of the species' range, recent warming trends continue, with projected increases in drought magnitude, frequency, and severity across southern Africa, including in the range of the Masai giraffe (Engelbrecht et al. 2024, p. 171; Trisos et al. 2022, p. 1328 and

references within; Seneviratne et al. 2021, p. 1519). While droughts are projected to be more frequent, an increase in extreme rainfall events is also expected to occur across most of the continent (Trisos et al. 2022, p. 1320; Seneviratne et al. 2021, p. 1565).

Poaching in the future will be driven by the variety of factors mentioned above. As habitat conditions change from the effects of climate change and human population increases, poaching is likely to increase in many areas of Africa, including within the range of the Masai giraffe (Ruppert 2020, p. 45; Bond et al. 2023, p. 6694; Gašparová 2024, p. 8). However, a study using data including the Masai giraffe in Tanzania (Manyara Ranch and Tarangire National Park) showed that the strongest predictor for population decline was a reduction in law enforcement leading to more poaching (Bond et al. 2023, p. 6706).

While there are multiple agencies and conservation organizations working to reduce the threat of poaching for Masai giraffes, poaching will likely continue. As mentioned above, killing for bushmeat is more severe in poorer countries and in those areas with high human population densities, and it is consistently more prevalent closer to human settlements (Lindsey et al. 2011, p. 97). Poaching tends to spike when food shortages are severe, and when the demand for agricultural labor is low (Lindsey et al. 2012, p. 5). With the projections for human population size and drought, the human population is likely to live under chronic and increasing food insecurity. Therefore, we expect that under the lower plausible scenario it is likely that current and ongoing conservation efforts can maintain or somewhat reduce poaching levels, while the upper scenario expectation is an increase in poaching rates due to the expected increases in human population size and drought.

We do not attempt to project the prevalence or severity of future occurrences of civil unrest; however, it is expected that civil unrest will likely occur in the future. Climate-induced displacement is widespread in Africa because poor conditions for agricultural and pastoral livelihoods cause people to relocate in search of better opportunities (Trisos et al. 2022, pp. 1350, 1360). Relatedly, the risk of violent conflict increases because of fewer economic opportunities caused by increased temperature and extreme weather events (Trisos et al. 2022, p. 1394; Elias and Abdi 2010, pp. 4–20; Pica-Ciamarra et al. 2007, pp. 10–11).

We describe the future condition of the Masai giraffe given the plausible projections of threats described above. We summarize the influences driving future conditions and the expected trends in range and population abundance. The primary factors influencing the viability of the Masai giraffe (habitat changes and poaching) are expected to continue with increasing magnitude.

The median projected human population size in the four countries that contain the Masai giraffe's range is expected to nearly triple by 2100 (from 160 million in 2024 to 464 million people in 2100). Under the lower bound scenario, human population size by 2100 is projected to double in Tanzania and remain nearly stable in the other three nations. However, under the upper bound scenario, the population increases more than fivefold across the range of the species, with a fourfold increase in Kenya and a sevenfold to eightfold increase in the other nations. The projected changes in drought frequency and drought duration, coupled with human population growth, are likely to increasingly limit the sustainability of drought-coping strategies. With an increase in drought frequency and severity, most of the Kenyan populace is expected to live under chronic food shortages (Huho and Mugalavai 2010, p. 70). Similarly, more than 80 percent of the human population in Tanzania is employed in agriculture, and 64 percent of the population is rural (FAO 2024c, unpaginated); thus, climate change is likely to exacerbate household food insecurity in Tanzania (Randell et al. 2022, entire). Risks associated with food insecurity lead to changing habitat conditions; lead to human-wildlife conflicts, including poaching and civil unrest; and are likely to increase given continued human population growth, worsening climate conditions, and their impacts on livelihoods in the range of the Masai giraffe.

Human population growth and climate change will lead to further habitat loss, degradation, and fragmentation for the Masai giraffe. Forest and woody cover are expected to continue to decline. Assuming the rate of forest cover loss between 2000 and 2023 continues (approximately 10 percent), an additional 9 to 64 percent (697–5305 kha, lower and upper bound scenarios, respectively) loss of forest cover would occur by 2100. The continued habitat loss, degradation, and fragmentation will further reduce food quality and availability for the Masai giraffe and further restrict the species' movement patterns and ability to access

necessary resources. These reductions in food quality and the increased need for longer movements or larger home ranges will further reduce reproduction and survival rates, especially in times of drought, which will be more frequent in the future.

Under both future scenarios, the ranges of the Masai giraffe in Rwanda and Zambia are unlikely to exhibit a decline in area from accumulating influences. However, due to their limited area and abundance, a catastrophic event (e.g., multi-year, unprecedented drought) could result in the loss of these populations. Neither population is likely to expand its range: the population in the Rwandan AU is bounded by fencing (Shabahat 2017, unpaginated), and the Zambia population is near the unit's carrying capacity (Berry and Bercovitch 2016, p. 723; Bercovitch et al. 2018, p. 5). With projected habitat loss, degradation, and fragmentation, and poaching in Kenya and Tanzania, where nearly the entire population (98 percent) of Masai giraffes occur, the trend of decreasing density of populations and greater separations between them observed over the last 30 years will likely continue.

We simulated future population trajectories based on the current population size and growth rate estimates for the Masai giraffe to assess the potential change in future population size if historical trends and conditions continue unchanged. On average, the population is projected to decline to 5–24 percent (across the two growth rate scenarios, 95 percent, CI = 4–30 percent) of the historical size by 2100 (Service 2024c, p. 78), or an estimated mean population size of 3,725–16,074 (95 percent, CI = 2,899–20,175) individuals. The projections of Masai giraffe populations are based on historical rates of decline and do not incorporate the full range of biological complexity, uncertainty, or anticipated increases in the magnitude of threats facing Masai giraffes in the future. Due to a lack of consistent data to estimate the rate of population change for each AU, we did not separately project future population trends for each AU.

In summary, resiliency and redundancy for the Masai giraffe will be further reduced from historical conditions. The overall population is projected to decline to 5–24 percent of its historical size by the end of the century. The species will likely remain in its current range in Rwanda and Zambia, and its occupancy and distribution will likely decline in the future in Kenya and Tanzania (where most Masai giraffes occur). The reason for the projected continued decline of

the Masai giraffe population is primarily related to changing habitat conditions and poaching, which are expected to increase in the future because of human population growth and the effects of climate change, which will intensify. The magnitude of influences is the same across the range of the Masai giraffe. Masai giraffes currently move through ecosystems and cross the Kenya-Tanzania border, although formal protection appears to influence Masai giraffe concentrations. However, populations are geographically separated by the Gregory Rift escarpment (Lohay et al. 2023, p. 14), and they will have limited options to avoid the risks associated with habitat loss, poaching, and threats associated with rapidly increasing human populations and the effects of climate change.

Determination of Status: Background

Section 4 of the Act and its implementing regulations at 50 CFR part 424 set forth the procedures for determining whether a species meets the definition of an endangered species or a threatened species. The Act requires that we determine whether a species meets the definition of an endangered species or a threatened species because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We consider these five factors and the species' responses to these factors when making these determinations.

Section 3 of the Act defines “endangered species” and “threatened species.” An endangered species is a species that is in danger of extinction throughout all or a significant portion of its range, and a threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both definitions include not only the phrase “throughout all,” but also the phrase “or a significant portion of its range.” Thus, there are ultimately four bases for listing a species under the Act (in danger of extinction throughout all of its range, in danger of extinction throughout a significant portion of its range, likely to become an endangered species within the foreseeable future throughout all of its range, or likely to become an endangered species within the

foreseeable future throughout a significant portion of its range). These four bases are made up of two classifications (i.e., endangered or threatened) and two components (i.e., throughout all of its range or throughout a significant portion of its range).

Beginning in 2001, a number of judicial opinions addressed our interpretation of the phrase “or a significant portion of its range” (the SPR phrase) in these statutory definitions. The seminal case was *Defenders of Wildlife v. Norton*, 258 F.3d 1136 (9th Cir. 2001) regarding the flat-tailed horned lizard.

The court in that case held that the SPR phrase in the Act was “inherently ambiguous,” finding that it was something of an oxymoron to speak of a species being at risk of extinction in only a portion of its range (id. at 1141); because the Act does not define a “significant portion,” the Secretary has wide discretion to delineate it (id. at 1145). However, the court found that, even with wide discretion, the interpretation we had applied in analyzing the status of the flat-tailed horned lizard was unacceptable because it would allow for a species to warrant listing throughout a significant portion of a species' range only when the species “is in danger of extinction everywhere” (id. at 1141). The court held that the SPR phrase must be given independent meaning from the “throughout all” phrase making the SPR phrase in the statute superfluous. In an attempt to address the judicial opinions calling into question our approach to evaluating whether a species was endangered or threatened throughout a significant portion of its range, the Services published the 2014 SPR Policy (79 FR 37578; July 1, 2014). The December 9, 2011, notice announcing the draft policy and requesting public comments on it provides more detail about litigation before 2014 regarding the SPR phrase (76 FR 76987). The 2014 SPR Policy includes four elements:

(1) Consequence—that the consequence of determining that a species warrants listing based on its status in a significant portion of its range is to list the species throughout all of its range;

(2) Significance—a definition of the term “significant”;

(3) Range—that the species' “range” is the current range of the species; and

(4) DPS—that, if a species is endangered or threatened in an SPR, and the population in that SPR is a DPS, the Service will list just the DPS.

Subsequently, two district courts vacated the definition of “significant” contained in the 2014 SPR Policy (*CBD*

v. Jewell, 248 F. Supp. 3d 946, 959 (D. Ariz. 2017), and *Desert Survivors*, 321 F. Supp. 3d 1011, 1070–74 (N.D. Cal. 2018)). The courts found that the definition in the 2014 SPR Policy set too high a threshold and rendered the SPR language in the statute superfluous, failing to give it independent meaning from the “throughout all” phrase. In 2020, another court (*Everson*, 435 F. Supp. 3d 69 (D.D.C. 2020)) also vacated the specific aspect of the 2014 SPR Policy under which, “if the Services determine that a species is threatened throughout all of its range, the Services will not analyze whether the species is endangered in a significant portion of its range” (id. at 98). This was an extension of the definition of “significant,” which required that for a portion of the range of a species to be significant, the species must not be currently endangered or threatened throughout its range. In an extension of the earlier rulings from *CBD v. Jewell* and *Desert Survivors*, the court found that this aspect of the definition of the 2014 SPR Policy was not only inconsistent with the statute because it “rendered the ‘endangered in a significant portion of its range’ basis for listing superfluous,” but also “inconsistent with ESA principles” and “not a logical outgrowth from the draft policy.” Under this ruling, if we find a species is not in danger of extinction throughout all of its range, we must evaluate whether the species is in danger of extinction throughout a significant portion of its range, even in cases where we have determined that the species is likely to become in danger of extinction within the foreseeable future (*i.e.*, it meets the Act’s definition of a threatened species) throughout all of its range. The remaining three elements of the 2014 SPR Policy remain intact and have not been invalidated or questioned by the courts.

In short, courts have directed that the definition of “significant” must afford the phrase “or a significant portion of its range” an independent meaning from the “throughout all of its range” phrase. Therefore, to determine whether any species warrants listing, we determine for each classification (endangered and threatened) the appropriate component to evaluate (throughout all of its range or throughout a significant portion of its range).

We make this determination based on whether the best scientific and commercial data indicate that the species has a similar extinction risk in all areas across its range (at a scale that is biologically appropriate for that species). When a species has a similar extinction risk in all areas across its range, we analyze its regulatory status

using the component “throughout all of its range.” For example, in some cases, there is no way to divide a species’ range in a way that is biologically appropriate. This could be because the range is so small that there is only one population or because the species functions as a metapopulation such that effects to one population directly result in effects to another population. On the other hand, when the species’ extinction risk varies across its range, we analyze its regulatory status using the component “throughout a significant portion of its range.”

For either classification (endangered or threatened), we consider the five factors and the species’ responses to those factors regardless of which component (throughout all of its range or throughout a significant portion of its range) we have determined is appropriate for that classification. When assessing whether a species is endangered or threatened throughout a significant portion of its range, we address two questions because we must determine whether there is any portion of the species’ range for which both (1) the portion is “significant” (the significance question) and (2) the species is in danger of extinction or likely to become in danger of extinction within the foreseeable future throughout that portion (the status question). We may address the significance question or the status question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species’ range.

Determination of West African Giraffe Status

We propose to list the West African giraffe as an endangered species because it is in danger of extinction throughout all of its range. As stated above, we determine a species’ classification based upon its regulatory status throughout all of its range when the species has similar extinction risk in all areas across its range at a scale that is biologically appropriate for that species. Conversely, if the extinction risk varies across its range, we determine a species’ classification based upon its regulatory status throughout a significant portion of its range. Either way, we begin by determining the scale that is biologically appropriate for that species. For many species, we can divide the range in an infinite number of ways. As described above, for the West African giraffe there are only two populations that do not interact with each other. Those populations are the units that provide the appropriate scale to assess

extinction risk for the West African giraffe.

For the endangered classification, we evaluated whether the West African giraffe has a similar risk of extinction in all areas across its range by assessing its extinction risk within each population. Because our review indicated that the West African giraffe’s extinction risk is similar in all areas across its range, we then evaluated whether it may be endangered based upon the “throughout all of its range” component. In undertaking this analysis of whether the West African giraffe is endangered throughout all of its range, we reviewed the best scientific and commercial data available regarding threats to the subspecies, the subspecies’ responses to those threats, and any associated conservation measures. We then assessed the cumulative effects of those threats and conservation measures under the Act’s section 4(a)(1) factors. We examined the following threats: habitat loss, fragmentation, and degradation, and poaching, all of which are exacerbated by rapid human population growth and the effects from climate change, as well as disease and predation, including cumulative effects.

After evaluating threats to the species and assessing the cumulative effect of the threats under the Act’s section 4(a)(1) factors, we found that habitat loss, degradation, and fragmentation, which are and will continue to be exacerbated by increasing human population and effects from climate change, are the threats affecting the subspecies’ viability in the near term. There are approximately 690 West African giraffes. Fewer than 20 West African giraffes occur in the recently reintroduced population at the Gadabedji Biosphere Reserve, and all of the rest occur in one population in the Giraffe Zone, making both populations highly vulnerable to threats. While neither of these populations is currently subject to poaching, they are both currently and expected to continue to be affected in the near term by habitat loss, including land degradation; habitat fragmentation exacerbated by civil unrest; rapid human population growth; and climate change via drought. Civil unrest is a longstanding and significant ongoing concern for both populations of the West African giraffe, and both populations are at risk of catastrophic drought events in the near term. The best available information indicates that disease and predation are not currently resulting in population-level or species-level effects.

Overall, the resiliency, redundancy, and adaptive capacity of the West African giraffe have declined due to

declines in abundance, a significant range contraction, and moderately high levels of inbreeding. Historically, the West African giraffe was distributed widely from Senegal to Nigeria but has been extirpated across most of its range; the species is now limited to two small areas in Niger. The two remaining populations are small and isolated, and the limited capacity of West African giraffes to cope with and adapt to rapidly changing environmental conditions exacerbates the risks posed by their declining resiliency and redundancy. These reductions in viability, in the face of ongoing and imminent threats, results in the near-term risk of extinction in both populations such that they currently lack sufficient resiliency, redundancy, and representation for their continued existence to be secure. In summary, we find that the West African giraffe is in danger of extinction in all areas (*i.e.*, both populations). Thus, there is no portion of the range where the West African giraffe may have a regulatory status that is different from its status in the rest of its range.

In summary, after evaluating threats to the subspecies, the subspecies' responses to those threats, and any associated conservation measures, and after assessing the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors, we conclude that the West African giraffe is in danger of extinction throughout all of its range due to the limited number of resiliency of the two extant populations; the severity, extent, and immediacy of threats to those populations; and the anticipated responses of the West African giraffe to those threats. A threatened species status is not appropriate because the threats to the West African giraffe are ongoing or imminent and have already resulted in the species being in danger of extinction.

Determination of Status

Based on the best scientific and commercial data available, we determine that the West African giraffe meets the Act's definition of an endangered species because it is in danger of extinction throughout all of its range. Therefore, we propose to list the West African giraffe as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

Determination of Kordofan Giraffe Status

We propose to list the Kordofan giraffe as an endangered species because it is in danger of extinction throughout all of its range. As stated above, we

determine a species' classification based upon its regulatory status throughout all of its range when the species has similar extinction risk in all areas across its range at a scale that is biologically appropriate for that species. Conversely, if the extinction risk varies across its range, we determine a species' classification based upon its regulatory status throughout a significant portion of its range. Either way, we begin by determining the scale that is biologically appropriate for that species. For many species, we can divide a species' range in an infinite number of ways. As described above, for the Kordofan giraffe, the subspecies is spread across five countries in central Africa with little interactions between populations. Those populations are the units that provide the appropriate scale to assess extinction risk for the Kordofan giraffe.

For the endangered classification, we evaluated whether the Kordofan giraffe has a similar risk of extinction in all areas across its range by assessing its extinction risk within each population. Because our review indicated that the Kordofan giraffe's extinction risk is similar in all areas across its range, we then evaluated whether it may be endangered based upon the "throughout all of its range" component. In undertaking this analysis of whether the Kordofan giraffe is endangered throughout all of its range, we reviewed the best scientific and commercial data available regarding threats to the subspecies, the subspecies' responses to those threats, and any associated conservation measures. We then assessed the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors. We examined the following threats: habitat loss, fragmentation, and degradation, and poaching, all of which are exacerbated by rapid human population growth and the effects from climate change, as well as disease and predation, including cumulative effects.

There are approximately 2,300 Kordofan giraffes, which represents a 64 to 69 percent decline from its historical size of 6,360–7,360 in the 1950s. The overall numbers of Kordofan giraffes have been declining and are projected to continue to decline at a rate of 1.5 to 7.0 percent per year. The majority of Kordofan giraffes occur in two populations in disjunct national parks (approximately 500 in Waza National Park in Cameroon, and approximately 1,200 in Zakouma National Park in Chad); together, these two populations comprise approximately 80 percent of all Kordofan giraffes. The remaining populations are small (each with fewer

than 100 individuals) with little interaction between groups.

After evaluating threats to the subspecies and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we found that habitat loss, degradation, and fragmentation (Factor A), and poaching (Factor B), which are and will continue to be exacerbated by increasing human populations and effects from climate change (Factor E), are the threats affecting the subspecies' viability in the near term. In the near term, only one population across the Kordofan giraffe's range appears protected from habitat loss and poaching within a larger, intact, protected area (Zakouma National Park); however, the current management agreement only extends until 2027. The remaining populations (including at Waza National Park) are currently subject to poaching and are currently and expected to continue to be affected in the near term by habitat loss, degradation, and fragmentation exacerbated by ongoing and near-term civil unrest; rapid human population growth; and climate change via drought. Civil unrest is a longstanding and significant ongoing concern for the Kordofan giraffe. In addition, all populations are at risk of catastrophic drought events in the near term. Ongoing conservation efforts are insufficient to alleviate these threats. The best available information indicates that disease and predation are not currently resulting in population-level or subspecies-level effects.

Overall, the resiliency, redundancy, and adaptive capacity of the Kordofan giraffe have declined due to declines in abundance, significant range contraction, and moderately high levels of inbreeding. Historically, the Kordofan giraffe was distributed widely across central Africa countries in the northern savanna woodlands and Sahel zone, but it has been extirpated across most of its range. The subspecies' area of occupancy is greatly reduced, and approximately 80 percent of individuals now occurring within just two populations. All populations are vulnerable to catastrophic drought events. Only one population (Zakouma National Park) is protected from poaching and habitat loss through 2027. The other larger population is facing ongoing and severe threats. The remaining populations are small and isolated, and the limited capacity of the Kordofan giraffe to cope with and adapt to rapidly changing environmental conditions exacerbates the risks posed by the subspecies' declining resiliency and redundancy. These reductions in viability, in the face of ongoing and

imminent threats, results in the near-term risk of extinction in all populations such that they currently lack sufficient resiliency, redundancy, and representation for their continued existence to be secure. In summary, we find that the Kordofan giraffe is in danger of extinction in all areas (*i.e.*, every population). Thus, there is no portion of the range where the Kordofan giraffe may have a regulatory status that is different from its status in the rest of its range.

In summary, after evaluating threats to the subspecies, the subspecies' responses to those threats, and any associated conservation measures, and after assessing the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors, we conclude that the Kordofan giraffe is in danger of extinction throughout all of its range due to the limited resiliency of the extant populations; the severity, extent, and immediacy of threats to those populations; and the anticipated responses of the Kordofan giraffe to those threats. A threatened species status is not appropriate because the threats to the Kordofan giraffe are ongoing or imminent and have already resulted in the species being in danger of extinction.

Determination of Status

Based on the best scientific and commercial data available, we determine that the Kordofan giraffe meets the Act's definition of an endangered species because it is in danger of extinction throughout all of its range. Therefore, we propose to list the Kordofan giraffe as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

Determination of Nubian Giraffe Status

We propose to list the Nubian giraffe as an endangered species because it is in danger of extinction throughout all of its range. As stated above, we determine a species' classification based upon its regulatory status throughout all of its range when the species has similar extinction risk in all areas across its range at a scale that is biologically appropriate for that species. Conversely, if the extinction risk varies across its range, we determine a species' classification based upon its regulatory status throughout a significant portion of its range. Either way, we begin by determining the scale that is biologically appropriate for that species. For many species, we can divide the range in an infinite number of ways. As described above, populations of Nubian giraffe occur in Ethiopia, Kenya, South Sudan, and Uganda. Those populations are the

units that provide the appropriate scale to assess extinction risk for the Nubian giraffe.

For the endangered classification, we evaluated whether the Nubian giraffe has a similar risk of extinction in all areas across its range by assessing its extinction risk within each population. Because our review indicated that the Nubian giraffe's extinction risk is similar in all areas across its range, we then evaluated whether it may be endangered based upon the "throughout all of its range" component. In undertaking this analysis of whether the Nubian giraffe is endangered throughout all of its range, we reviewed the best scientific and commercial data available regarding threats to the subspecies, the subspecies' responses to those threats, and any associated conservation measures. We then assessed the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors. We examined the following threats: habitat loss, fragmentation, and degradation, and poaching, all of which are exacerbated by rapid human population growth and the effects from climate change, as well as disease and predation, including cumulative effects.

There are approximately 3,022 Nubian giraffes, which represents an 86 percent decline from its historical (1960s to 1980s) population size of 21,907, and the overall numbers of Nubian giraffes have been declining and are projected to continue to decline at a rate of 4–4.9 percent per year. The majority of Nubian giraffes (approximately 60 percent) occur in one population at Murchison Falls National Park, Uganda. There are four other small populations (fewer than 100 individuals each) in eastern and southern Uganda, and the rest of Nubian giraffes occur in small populations in Kenya, South Sudan, and Ethiopia. All these populations have little chance for dispersal between sites or capacity for expansion.

After evaluating threats to the subspecies and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we found that habitat loss, degradation, and fragmentation (Factor A), and poaching (Factor B), which are and will continue to be exacerbated by increasing human populations and effects from climate change (Factor E), are the threats affecting the subspecies' viability in the near term. In the near term, all populations are currently subject to poaching and are currently and expected to continue to be affected in the near term by habitat loss, including land degradation; habitat fragmentation

exacerbated by civil unrest; rapid human population growth; and climate change via drought. Civil unrest is a longstanding and significant ongoing concern for the Nubian giraffe. All populations are at risk of catastrophic drought events in the near term. Ongoing conservation efforts are not sufficient to alleviate these threats. While disease and predation are impacting individual Nubian giraffes, the best available information indicates that disease and predation are not currently resulting in population-level or subspecies-level effects.

Overall, the resiliency, redundancy, and adaptive capacity of the Nubian giraffe have declined due to declines in abundance and significant range contraction. Nubian giraffes were historically distributed across central-west Kenya into Uganda, Ethiopia, and South Sudan, but the subspecies has been extirpated across most of its range. The Nubian giraffe's area of occupancy is greatly reduced, and approximately 60 percent of individuals now occur within just one population. The remaining populations are small and isolated, and the limited capacity of the Nubian giraffe to cope with and adapt to rapidly changing environmental conditions exacerbates the risks posed by the subspecies' declining resiliency and redundancy. All populations are vulnerable to catastrophic drought events; the effects of habitat loss, degradation, and fragmentation, and poaching. These reductions in viability, in the face of ongoing and imminent threats, results in the near-term risk of extinction in all populations such that they currently lack sufficient resiliency, redundancy, and representation for their continued existence to be secure. In summary, we find that the Nubian giraffe is in danger of extinction in all areas (*i.e.*, every population). Thus, there is no portion of the range where the Nubian giraffe may have a regulatory status that is different from its status in the rest of its range.

In summary, after evaluating threats to the subspecies, the subspecies' responses to those threats, and any associated conservation measures, and after assessing the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors, we conclude that the Nubian giraffe is in danger of extinction throughout all of its range due to the limited resiliency of the two extant populations; the severity, extent, and immediacy of threats to those populations; and the anticipated responses of the Nubian giraffe to those threats. A threatened species status is not appropriate because the threats to the Nubian giraffe are ongoing or

imminent and have already resulted in the species being in danger of extinction.

Determination of Status

Based on the best scientific and commercial data available, we determine that the Nubian giraffe meets the Act's definition of an endangered species because it is in danger of extinction throughout all of its range. Therefore, we propose to list the Nubian giraffe as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

Determination of Reticulated Giraffe Status

We propose to list the reticulated giraffe as a threatened species because it is likely to become in danger of extinction within the foreseeable future throughout all of its range. As stated above, we determine a species' classification based upon its regulatory status throughout all of its range when the species has similar extinction risk in all areas across its range at a scale that is biologically appropriate for that species. Here, the reticulated giraffe functions as a single population that occurs primarily within Kenya (extending into Ethiopia with connectivity), and the threats affect the species such that it has similar extinction risk throughout its entire range. In other words, because of the fission-fusion behavior of reticulated giraffe and the roaming nature of male giraffes, effects to one part of the range are likely to affect the species within other parts of its range. Thus, there is no way to divide this species' range at a scale that is biologically appropriate for a classification determination. Reticulated giraffes are considered extirpated in Somalia, and Somalia is not included in the current range of this species. Therefore, we assessed the species' status based upon the "throughout all of its range" component.

In undertaking this analysis of whether the reticulated giraffe is threatened throughout all of its range, we reviewed the best scientific and commercial data available regarding threats to the species, the species' responses to those threats, and any associated conservation measures. We then assessed the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors. We examined the following threats: habitat loss, fragmentation, and degradation, and poaching, all of which are exacerbated by rapid human population growth and the effects from

climate change, as well as disease and predation, including cumulative effects.

The reticulated giraffe needs to maintain its healthy, resilient population (which contains multiple herds) across its range to reduce the risk of extinction. The species has experienced reductions in resiliency and redundancy over time, but we expect it will continue to have multiple herds with high abundance across its range in the near term. The statutory difference between an endangered species and a threatened species is the timeframe in which the species becomes in danger of extinction. An endangered species is in danger of extinction, and a threatened species is not in danger of extinction but is likely to become so within the foreseeable future. The species currently has an estimated 15,985 individuals, with 99 percent of the population occurring in Kenya. While there has been a decline from historical population size, this is still a large and relatively connected population, and, in the near term, the reticulated giraffe is maintaining its healthy, resilient population (which contains multiple herds) across its range. However, within the foreseeable future, declines are projected to continue to occur, as the best available information suggests that none of the threats are anticipated to be adequately mitigated or decline into the future. While threats are ongoing, the effects to the species are not currently at a magnitude that put the species in near-term risk of extinction; however, threats are expected to increase, resulting in an increasing risk of extinction over time. After evaluating the threats to the species and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we found that habitat loss, degradation, and fragmentation (Factor A), and poaching (Factor B), all of which are exacerbated by increasing human populations and effects from climate change (Factor E), are the threats affecting the species' viability within the foreseeable future. As human population growth and the effects of drought increase, human food security is expected to decrease, and, as a result, human-wildlife conflict will continue to increase.

Declines in the species' resiliency are projected to continue, with a projected population size of 104 million people in the range of the reticulated giraffe by 2100. While not considered a separate population, given the small number of individuals and threats within Ethiopia, including within the last region where reticulated giraffes occur in Ethiopia, the likelihood of extirpation there is high. The continued reticulated giraffe

population decline is likely because of the ongoing and future projected land use changes that support the increased human population and the effects of climate change. Although poaching does not currently pose a significant threat to the reticulated giraffe, it is anticipated to become more significant in the future because of the increased food insecurity anticipated from climate change and an increased human population. Drought duration, frequency, and intensity are projected to continue to increase within the range of the reticulated giraffe. The approximately 1 °C temperature increase resulting from climate change observed over the period of the reticulated giraffe's decline is expected to increase to a 2–4°C increase by 2100, resulting in increased drought extent, frequency, duration, and intensity. The range of projected human population size is from similar to current numbers (lower scenario) to quadruple current numbers (upper scenario) in Kenya and Ethiopia by 2100.

The current connection between these threats and giraffe viability is not expected to change into the future. In other words, we anticipate no change in species' response to changing habitat conditions or poaching. While currently abundant, reticulated giraffe populations have declined from historical levels, due to the declines in adult survival and recruitment that result from drought, changes in habitat condition, and poaching. Extrapolating the increases for the threats to the reticulated giraffe that have resulted in the decline to date, we expect ongoing risks to the reticulated giraffe's viability to continue and increase into the future such that the species is likely to have an inability to meet its needs of having a healthy, resilient population with multiple herds distributed across its range, resulting in an increased risk of extinction within the foreseeable future.

In addition, the species' ability to shift its range in response to changing environmental conditions is highly limited. In addition to physical (fencing, topography) and physiological barriers to large-scale migration, there is limited habitat available nearby to shift to escape the effects of climate change. The entire sub-Saharan region of Africa is considered a hot spot for climate change, which has led to increased frequency and severity of drought over the last four decades. Under a warming climate, drought risk and extreme rainfall events are projected to worsen in the near-term and accelerate at mid-century. Thus, even if the reticulated giraffe were able to shift or expand its range to in response to local land use-induced habitat changes, it appears

nearly certain that the species cannot avoid the long-term impacts from climate change.

Thus, based on the best scientific and commercial data available, we conclude that the reticulated giraffe is not in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range. As discussed above, there is no way to divide the reticulated giraffe's range that is biologically appropriate. Thus, there is no portion of the range where the species may be in danger of extinction.

Determination of Status

Based on the best scientific and commercial data available, we determine that the reticulated giraffe meets the Act's definition of a threatened species because it is likely to become in danger of extinction within the foreseeable future throughout all of its range. Therefore, we propose to list the reticulated giraffe as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Determination of Masai Giraffe Status

We propose to list the Masai giraffe as a threatened species because it is likely to become in danger of extinction within the foreseeable future throughout all of its range. As stated above, we determine a species classification based upon its regulatory status throughout all of its range when the species has similar extinction risk in all areas across its range at a scale that is biologically appropriate for that species. Conversely, if the extinction risk varies across its range, we determine a species' classification based upon its regulatory status throughout a significant portion of its range. Either way, we begin by determining the scale that is biologically appropriate for that species. For many species, we can divide the range in an infinite number of ways. As described above, for the Masai giraffe, we divided the range into five AUs: (1) Kenya/Tanzania west—west of the Gregory Rift escarpment, (2) Kenya/Tanzania east—east of the Gregory Rift escarpment, (3) West Tanzania, (4) Zambia, and (5) Rwanda. In summary, those five AUs are the units that provide the appropriate scale to assess extinction risk for the Masai giraffe.

Evaluation for Threatened Classification

For the threatened classification, we evaluated whether the Masai giraffe has a similar risk of extinction within the foreseeable future in all areas across its range by assessing its extinction risk within each of the AUs. Because our review indicated that the Masai giraffe's

extinction risk is similar in all areas across its range and will likely continue to be, we then evaluated whether it may be threatened based upon the "throughout all of its range" component. In undertaking these analyses, we reviewed the best scientific and commercial data available regarding threats to the species, the species' responses to those threats, and any associated conservation measures. We then assessed the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors. We examined the following threats: habitat loss, fragmentation, and degradation, and poaching, all of which are exacerbated by rapid human population growth and the effects from climate change, as well as hunting, disease, and predation, including cumulative effects.

The Masai giraffe needs multiple healthy, resilient populations that are distributed across its range to reduce the risk of extinction. The statutory difference between an endangered species and a threatened species is the timeframe in which the species becomes in danger of extinction. An endangered species is in danger of extinction, and a threatened species is not in danger of extinction but is likely to become so within the foreseeable future.

While three AUs (Kenya/Tanzania west, Kenya/Tanzania east, and West Tanzania) are much larger in geographical size and population abundance and more likely to be able to respond to stochastic events over time than the other two AUs, all AUs will experience increased threats within the foreseeable future that are likely to be similar. After evaluating threats to the species and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we found that habitat loss, degradation, and fragmentation, and poaching, all of which are exacerbated by human population growth and the effects of climate change, are the threats affecting the species' viability within the foreseeable future.

The following information applies to each of the AUs, unless explicitly stated otherwise. While current populations are either large and connected (Kenya/Tanzania west, Kenya/Tanzania east, and West Tanzania) or smaller with minimal threats (Zambia and Rwanda), within the foreseeable future, declines of at least 1 to 3 percent are projected to continue to occur within the three large AUs (Kenya/Tanzania west, Kenya/Tanzania east, and West Tanzania), as the best available information suggests that none of the threats will be mitigated or decline into

the future. While threats are ongoing, the effects to the species are not currently at a high magnitude but are expected to continue to increase, resulting in an increasing risk of extinction over time. Human population growth will increase, food security will decrease, human-wildlife conflict will increase, and the effects of drought will increase.

The ongoing threats of habitat condition changes (all AUs except Rwanda) and poaching (all AUs except Zambia and Rwanda) are expected to intensify into the future, as the human population in the countries where the Masai giraffe occurs continues to grow (e.g., nearly doubling in Kenya and more than tripling in Tanzania by 2100); drought extent, frequency, intensity, and duration increase; and habitat loss, degradation, and fragmentation increase (e.g., forest and woody cover will decline up to 1,860 and 5,305 kha by mid and late century, respectively). Drought duration, frequency, and intensity are projected to continue to increase within the range of the Masai giraffe. The approximately 1 °C temperature increase resulting from climate change observed over the period of the Masai giraffe's decline is expected to increase to a 2–4 °C increase by 2100, resulting in increased drought extent, frequency, duration, and intensity. Human population size is expected to increase by 60 to 800 million people within the four countries that contain the Masai giraffe by 2100.

In turn, Masai giraffes in all AUs will face further reductions in food quality and availability, and further restriction of their movement patterns and ability to access necessary resources. Additionally, poaching will likely continue due to increased food insecurity associated with rapid human population growth and climate change. Disease may also become a greater threat, as high rainfall events can increase disease prevalence.

There is no evidence suggesting a change in the species' past response to these threats in the future. Based on the historical rate of decline, the total population is projected to decline to an estimated 3,725–16,074 giraffes (5–24 percent of the 1970s population size) by 2100. These estimates are the minimum rates of future decline, as they do not incorporate the increasing magnitude of threats into the future. Thus, it is likely that the species will experience a substantial loss of abundance and, consequently, reductions in density and extent of occupancy into the future, especially for the Kenya/Tanzania west, Kenya/Tanzania east, and West Tanzania AUs. In Zambia, a maximum

of 660 giraffes are estimated to live in their core range within the Luangwa River Valley, and the population is currently between 600 and 700 individuals, suggesting it is near the carrying capacity. In Rwanda, available habitat is limited by the fenced area within Akagera National Park. These small populations are unlikely to continue increasing into the future and may begin to decline as risks related to climate change intensify.

These reductions in abundance will, in turn, further reduce the species' ability to withstand environmental stochasticity and disturbances, catastrophic events, and changing environmental conditions in all AUs. Additionally, because the magnitude and frequency of catastrophic events (e.g., extreme drought and extreme rainfall events) are expected to increase into the future, the Masai giraffe will have increasingly low ability to recover from those events in any AU. Large declines in abundance will also increase the proportional impact from individual catastrophic events on the remaining population. Finally, the species' ability to relocate will become more limited into the future, as its habitat will continue to be converted to other land uses and become further fragmented. Human population growth and climate change are also projected to increase into the future, accelerating the pace of environmental changes. The species' ability to shift its range in response to changing environmental conditions is highly limited. In addition to physical (fencing, topography) and physiological barriers to large-scale migration, there is limited habitat available nearby to shift to escape the risks from climate change. The entire sub-Saharan region of Africa is considered a hot spot for climate change, which has led to increased frequency and severity of drought over the last four decades. Under a warming climate, drought risk and extreme rainfall events are projected to worsen in the near-term and accelerate at mid-century. Thus, even if the Masai giraffe were able to shift or expand its range in response to local land use-induced habitat changes, it appears nearly certain that the species cannot escape the long-term impacts from climate change. Together, these projections of future threats and the species' response to those threats suggest the ability of the Masai giraffe to adapt or adjust to its changing environmental conditions will likely become severely limited in the future. Therefore, in the future, the Masai giraffe is likely to be unable to meet its needs of having multiple healthy, resilient populations that are

distributed across its range, resulting in an increased risk of extinction for the species.

In summary, the Masai giraffe is likely to become in danger of extinction within the foreseeable future in every AU; thus, for the threatened classification, there is no portion of the range where the Masai giraffe may have a regulatory status that is different from its status in the rest of its range. Based on the best scientific and commercial data available, we conclude that the Masai giraffe is likely to become in danger of extinction within the foreseeable future throughout all of its range.

When we find a species warrants listing as a threatened species, we must consider whether the species is endangered throughout a significant portion of its range. We determine that the Masai giraffe is not in danger of extinction throughout a significant portion of its range. To reach this determination, we first assessed whether we can divide the species' range at a biologically appropriate scale. As discussed above, AUs are the units that provide the appropriate scale to assess extinction risk for the Masai giraffe.

Evaluation for Endangered Classification

For the endangered classification, we evaluated whether the Masai giraffe has a similar risk of extinction in all areas across its range by assessing the Masai giraffe's extinction risk within each AU. Because our review indicated that the Masai giraffe's extinction risk is similar in all areas across its range, we then evaluated whether it may be endangered based upon the "throughout all of its range" component. In undertaking these analyses, we reviewed the best scientific and commercial data available regarding threats to the species, the species' responses to those threats, and any associated conservation measures. We then assessed the cumulative effects of those threats and conservation measures under the Act's section 4(a)(1) factors. We examined the following threats: habitat loss, fragmentation, and degradation, and poaching, all of which are exacerbated by rapid human population growth and the effects from climate change, as well as hunting, disease, and predation, including cumulative effects.

Masai giraffes need multiple healthy, resilient populations that are distributed across the species' range to reduce the risk of extinction. Three AUs (Kenya/Tanzania west, Kenya/Tanzania east, and West Tanzania) are much larger in geographical size and population

abundance (currently at an estimated 15,760, 19,070, and 9,460 individuals, respectively) and more likely to be able to respond to stochastic events over time than the other two AUs. However, the magnitude of the impact of poaching and land use changes is greater in those three largest AUs, and these populations have been experiencing declines of 1 to 3 percent per year. Ongoing conservation efforts, such as CITES and other provincial protections, have likely reduced, but have been inadequate to halt and reverse, the declining trend of the Masai giraffe in Kenya and Tanzania. The population in Zambia is stable or increasing since the 1950s, and the population in Rwanda is increasing since its establishment in 1986. The population in Zambia occurs in a system of protected areas in the Luangwa Valley; thus, poaching is not influencing this population. However, habitat conversion (e.g., settlement and cropland expansion) is occurring within game management areas adjacent to the national park. The Masai giraffe faces minimal threats in Rwanda given their fenced and protected state; however, threats from climate change remain. We also considered the potential threats of predation, hunting, and disease, and while individuals may be affected by these threats, the best available information does not indicate population-level or species-level effects.

The species has experienced reductions in resiliency and redundancy over time, but we expect all five AUs to be resilient to stochastic events in the near term. The Masai giraffe currently has an estimated 45,402 individuals, which is 66 to 68 percent of the historical population size in the 1970s. The overall range is likely similar to or less than the historical distribution in Kenya, Tanzania, and Zambia; however, the area of occupancy and density in occupied areas has likely declined because of ongoing threats. The species' current range also includes an introduced population in Rwanda. Within each AU, the species has a similar adaptive capacity. Overall, while threats are ongoing, given the large population sizes for three AUs and protections in two AUs in the near term, these threats are currently not of such a magnitude that the species is in danger of extinction. The Masai giraffe is currently meeting its need for multiple healthy, resilient populations that are distributed across the species' range. In summary, we find that the Masai giraffe is not in danger of extinction in any areas across its range (i.e., AUs).

Therefore, no portion of the species' range provides a basis for determining that the species is in danger of

extinction throughout a significant portion of its range. In reaching this conclusion, we did not apply the aspects of the 2014 SPR Policy, including the definition of “significant,” that courts have held to be invalid.

Determination of Status

Based on the best scientific and commercial data available, we determine that the Masai giraffe meets the Act’s definition of a threatened species because it is likely to become in danger of extinction within the foreseeable future throughout all of its range. Therefore, we propose to list the Masai giraffe as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Available Conservation Measures

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act.

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

Section 7 of the Act is titled, “Interagency Cooperation,” and it mandates all Federal action agencies to use their existing authorities to further the conservation purposes of the Act and to ensure that their actions are not likely to jeopardize the continued existence of listed species or adversely modify critical habitat. Regulations implementing section 7 are codified at 50 CFR part 402.

Section 7(a)(2) states that each Federal action agency shall, in consultation with the Secretary, ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Each Federal agency shall review its action at

the earliest possible time to determine whether it may affect listed species or critical habitat. If a determination is made that the action may affect listed species or critical habitat, formal consultation is required (50 CFR 402.14(a)), unless the Service concurs in writing that the action is not likely to adversely affect listed species or critical habitat. At the end of a formal consultation, the Service issues a biological opinion, containing its determination of whether the Federal action is likely to result in jeopardy or adverse modification.

In contrast, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. Although the conference procedures are required only when an action is likely to result in jeopardy or adverse modification, action agencies may voluntarily confer with the Service on actions that may affect species proposed for listing or critical habitat proposed to be designated. In the event that the subject species is listed or the relevant critical habitat is designated, a conference opinion may be adopted as a biological opinion and serve as compliance with section 7(a)(2) of the Act.

With respect to all giraffe species and subspecies, no known actions require consultation under section 7(a)(2) of the Act. Given the regulatory definition of “action” at 50 CFR 402.02, which clarifies that it applies to activities or programs carried out “in the United States or upon the high seas,” the giraffe is unlikely to be the subject of section 7 consultations, because the entire life cycles of the species occur in terrestrial areas outside of the United States and the species are unlikely to be affected by U.S. Federal actions. Additionally, no critical habitat will be designated for any giraffe species or subspecies because, under 50 CFR 424.12(g), we will not designate critical habitat within foreign countries or in other areas outside of the jurisdiction of the United States.

Section 8(a) of the Act (16 U.S.C. 1537(a)) authorizes the provision of limited financial assistance for the development and management of programs that the Secretary of the Interior determines to be necessary or useful for the conservation of endangered or threatened species in foreign countries. Sections 8(b) and 8(c) of the Act (16 U.S.C. 1537(b) and (c)) authorize the Secretary to encourage

conservation programs for foreign listed species, and to provide assistance for such programs, in the form of personnel and the training of personnel.

Additional requirements apply to activities with all giraffes, separate from their proposed listing as endangered species or threatened species. As a CITES-listed species, all international trade of any giraffe by persons subject to the jurisdiction of the United States must also comply with CITES requirements pursuant to section 9, paragraphs (c) and (g), of the Act (16 U.S.C. 1538(c) and (g)) and to 50 CFR part 23. As “fish or wildlife” (16 U.S.C. 1532(8)), giraffe imports and exports must also meet applicable wildlife import/export requirements established under section 9, paragraphs (d), (e), and (f), of the Act (16 U.S.C. 1538(d), (e), and (f)); the Lacey Act Amendments of 1981 (16 U.S.C. 3371 *et seq.*); and 50 CFR part 14. Questions regarding whether specific activities with giraffe would constitute a violation of section 9 of the Act should be directed to the Service’s Division of Management Authority (managementauthority@fws.gov; 703–358–2104).

Additional Measures for West African, Kordofan, and Nubian Giraffe

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to endangered wildlife. The prohibitions of section 9(a)(1) and 9(g) of the Act, and the Service’s implementing regulations codified at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or to cause to be committed any of the following acts with regard to any endangered wildlife: (1) import into, or export from, the United States; (2) take (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) within the United States, within the territorial sea of the United States, or on the high seas; (3) possess, sell, deliver, carry, transport, or ship, by any means whatsoever, any such wildlife that has been taken illegally; (4) deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of commercial activity; or (5) sell or offer for sale in interstate or foreign commerce. Certain exceptions to these prohibitions apply to employees or agents of the Service, the National Marine Fisheries Service, other Federal land management agencies, and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered wildlife under certain circumstances. Regulations governing permits for endangered wildlife are codified at 50 CFR 17.22, and general Service permitting regulations are codified at 50 CFR part 13. With regard to endangered wildlife, a permit may be issued: for scientific purposes, for enhancing the propagation or survival of the species, or for take incidental to otherwise lawful activities.

The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act. For example, the provisions in section 9(b)(1) of the Act (16 U.S.C. 1538(b)(1)) provide a limited exemption from certain otherwise prohibited activities regarding wildlife specimens held in captivity or in a controlled environment on the date they were first subject to the Act, provided that such holding and any subsequent holding or use of the wildlife was not in the course of a commercial activity (commonly referred to as “pre-Act” specimens). Therefore, if a giraffe is held in captivity prior to receiving protections under the Act (and the holding is not in the course of commercial activity), there are several activities that are allowed without the need for a permit (or exception in a 4(d) rule) in accordance with section 9(b)(1) of the Act.

Section 9(b)(1) was amended in the 1982 amendments to the Act (96 Stat. 1426–27), to clarify that the scope of the 9(b)(1) exemption is limited to only certain section 9(a)(1) prohibitions, that the exemption does not apply to pre-Act wildlife held or used in the course of a commercial activity on or after the pre-Act date for the species, and that the pre-Act date for species first listed after the enactment of the ESA is the date of publication in the **Federal Register** of the final regulation adding such species to the List of Endangered and Threatened Wildlife for the first time (H.R. Rep. No. 97–835, 97th Cong., 2nd Sess., at 35 (1982) (Conf. Rep.); S. Rep. No. 97–418, 97th Cong., 2nd Sess., at 24–25 (1982)). Specifically, section 9(b)(1) of the Act states that the prohibitions of sections 9(a)(1)(A) and 9(a)(1)(G) shall not apply to any fish or wildlife which was held in captivity or in a controlled environment on (A) December 28, 1973, or (B) the date of the publication in the **Federal Register** of a final regulation adding such fish or wildlife to any list of species published pursuant to section 4(c) of the Act (as relevant to listed wildlife, the list of endangered and threatened wildlife (50 CFR 17.11(h)) that such holding and any subsequent holding or use of the fish or

wildlife was not in the course of a commercial activity.

Therefore, for pre-Act wildlife, there is a limited exemption from the prohibitions associated with: (1) import into, or export from the United States of any endangered wildlife, or (2) violation of regulations pertaining to threatened or endangered wildlife. Other prohibitions of section 9—including those at section 9(a)(1)(B)–(F), regarding take of endangered wildlife, possession and other acts with unlawfully taken wildlife, interstate or foreign commerce in endangered wildlife, and sale or offer for sale of endangered wildlife—continue to apply to activities with qualifying endangered pre-Act wildlife specimens. For threatened species, prohibitions are promulgated by regulation under section 4(d) of the Act, and a specimen may qualify for the exemption in 9(a)(1)(G) with regard to regulatory violations. For those specimens that continue to qualify under the “pre-Act” exemption, 4(d) rule protections do not apply. Specimens born after the listing date and specimens taken from the wild after the listing date do not qualify as “pre-Act” wildlife under the text of section 9(b)(1) of the Act. If a person engages in any commercial activity with a “pre-Act” specimen, the wildlife would immediately cease to qualify as pre-Act wildlife and become subject to the relevant prohibitions, because it has been held or used in the course of a commercial activity.

Additional Measures for Reticulated and Masai Giraffes

Section 9 of the Act provides a specific list of prohibitions for endangered species but does not provide these same prohibitions for threatened species. Instead, pursuant to section 4(d) of the Act, for any species listed as a threatened species, the Secretary must issue protective regulations that are “necessary and advisable to provide for the conservation of such species” (these are referred to as “4(d) rules”). Additional measures for the reticulated and Masai giraffes are described below in relation to the proposed 4(d) rule for the reticulated giraffe, Masai giraffe, Angolan giraffe, and South African giraffe (see IV. Protective Regulations Under Section 4(d) of the Act for Reticulated Giraffe, Masai Giraffe, Angolan Giraffe, and South African Giraffe, below).

III. Similarity of Appearance for the Angolan Giraffe and South African Giraffe

Whenever a species that is not endangered or threatened closely resembles an endangered or threatened species, such unlisted species may be treated as either endangered or threatened if the Secretary makes a determination in accordance with section 4(e) of the Act for similarity of appearance. Section 4(e) authorizes the treatment of any species as an endangered or threatened species “even though it is not listed” pursuant to section 4(a)(1) of the Act, if: (A) the unlisted species so closely resembles in appearance, at the point in question, a species which has been listed pursuant to section 4(a)(1) 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 the Act.

A designation of an endangered or threatened species due to similarity of appearance under section 4(e) of the Act, however, does not extend other protections of the Act, such as consultation requirements for Federal agencies under section 7 and the recovery planning provisions under section 4(f), that apply to species that are listed as an endangered or threatened species under section 4(a)(1). The Service implements this section 4(e) authority in accordance with the Act and our regulations at 50 CFR 17.50. Our analysis of the criteria for the proposed 4(e) rule for the Angolan giraffe and South African giraffe is described below for the similarity of appearance of the Angolan giraffe and South African giraffe to the proposed endangered West African giraffe, Kordofan giraffe, and Nubian giraffe, and proposed threatened reticulated giraffe and Masai giraffe.

Do the Angolan giraffe and South African giraffe so closely resemble in appearance, at the point in question, the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, or Masai giraffe such that enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species?

Yes. At this time, it is not possible for law enforcement, using either morphology, genetics, or other forensic techniques to differentiate giraffe

species or subspecies. Morphologically, while some subspecies have been described to have distinct external morphological characteristics when provided a complete specimen (Kingdon and Hoffmann 2013, entire), there is considerable variation and overlap in giraffe morphology, and particularly in the parts and pieces that are commonly in the trade (e.g., small patch of skin, carved bones), which would not be able to be identified beyond genus. Similarly, Service law enforcement follows both current CITES and IUCN taxonomy, which consider the giraffe one species with nine subspecies. The existing genetic datasets are either currently not available and/or not verified to identify a specimen beyond the genus level when considering multiple species (as described in this rule) for enforcement purposes (Office of Law Enforcement 2024, pers. comm.).

Is the effect of this substantial difficulty an additional threat to West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, or Masai giraffe?

Yes. Specifically, we considered the possibility that an additional threat is posed to the proposed endangered West African giraffe, Kordofan giraffe, and Nubian giraffe, and proposed threatened reticulated giraffe and Masai giraffe, by providing an avenue for persons who misrepresent West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, or Masai giraffe specimens as Angolan giraffe and South African giraffe specimens to engage in unauthorized taking, trade, or commerce. This misrepresentation contributes to market demand for the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe. Due to the lack of distinct physical characteristics and difficulty in distinguishing individual species or subspecies of giraffes, the similarity of giraffe specimens poses a problem for law enforcement officers trying to stem unauthorized killing and trade of giraffes.

As stated above, poaching is a primary threat to giraffes, and allowing an avenue to traffic giraffes (including specimens, and the parts and products, of giraffes) could place additional stress on populations that are already small, and in most cases declining. The proposed listing of the Angolan giraffe and South African giraffe as threatened due to similarity of appearance minimizes the possibility that private and commercial collectors will be able to misrepresent West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, or Masai giraffe for private or commercial purposes.

Current protections and regulation of the trade under CITES are insufficient to help address these concerns, because CITES taxonomy and CITES documents do not distinguish between giraffe species or subspecies. Additionally, eight range countries have taken reservations to the CITES listing (Botswana, Democratic Republic of the Congo, Eswatini, Namibia, South Africa, United Republic of Tanzania, Zambia, and Zimbabwe) (CITES 2024, unpaginated). While these reserving Parties would be required to issue CITES documents for trade with the United States and other CITES Parties, these reserving Parties are able to trade in any giraffe with each other without CITES documents. With the large number of reservations, current CITES protections alone are therefore insufficient to ensure legal, biologically sustainable, traceable trade in the species. We find that the difficulty enforcement personnel have in attempting to differentiate between the giraffe species and subspecies would pose an additional threat to the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe.

Would treatment of the two unlisted giraffes as threatened or endangered due to similarity of appearance substantially further the enforcement and policy of the Act?

Yes. The listing of the Angolan giraffe and South African giraffe due to similarity of appearance will facilitate Federal, State, local, and foreign law enforcement agents' efforts to curtail unauthorized taking and trade in the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe. We find that listing the Angolan giraffe and South African giraffe due to similarity of appearance under section 4(e) of the Act and providing applicable prohibitions and exceptions under section 4(d) of the Act will substantially facilitate the enforcement and further the policy of the Act for the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe.

If the Angolan giraffe and South African giraffe were not listed, importers and exporters could inadvertently or purposefully misrepresent West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and/or Masai giraffe (including specimens, and their parts or products) as the unlisted entity, creating a loophole in enforcing the Act's protections for listed species of giraffe. The listing will facilitate law-enforcement efforts to curtail

unauthorized import and trade in West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe. Extending the prohibitions of the Act to the similar entities (Angolan giraffe and South African giraffe) through the 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 West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe.

Additionally, although the section 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 Angolan giraffe and South African giraffe as threatened is appropriate because the proposed 4(d) rule would provide adequate protection for these entities. Under section 4(e), regulations for commerce or taking may be promulgated to the extent deemed advisable, regardless of whether the species is treated as endangered or threatened. The proposed 4(d) rule would prohibit the same activities as those activities prohibited for endangered giraffe species through adoption of all of the Act's section 9(a)(1) prohibitions for each threatened species of giraffe, and for each subspecies of giraffe treated as threatened by reason of similarity of appearance. The proposed 4(d) rule would also ensure evidence that the specimens are Angolan giraffe or South African giraffe prior to permitting otherwise prohibited activities with either subspecies of giraffe, and would otherwise require applicants to meet the same permitting requirements that apply to threatened species of giraffe, unless another exception applies.

While species listed as endangered are limited to the permitting options provided in section 10 of the Act, there are additional permitting options available for species listed as threatened. We are unaware of an additional benefit that would be provided to the conservation of the West African giraffe, Kordofan giraffe, or Nubian giraffe by limiting permitting for southern giraffes (Angolan giraffe and South African giraffe) to the options for endangered species under section 10 of the Act. The primary advantage of requiring a permit for all otherwise prohibited activities is to ensure the ability to identify the giraffe species or subspecies prior to authorizing the activity (e.g., import from the range countries). This identification helps

ensure authorized trade in less protected species does not provide cover for illegal trade in other species of giraffe or result in negative conservation consequences for those species. We deem the treatment of Angolan giraffe and South African giraffe as threatened species, together with the proposed protections and exceptions of the proposed 4(d) rule, advisable to ensure protection for the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe.

For the above reasons, we propose to list the Angolan giraffe and South African giraffe as threatened due to similarity of appearance to the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe pursuant to section 4(e) of the Act.

IV. Protective Regulations Under Section 4(d) of the Act for Reticulated Giraffe, Masai Giraffe, Angolan Giraffe, and South African Giraffe Background

As discussed above in Available Conservation Measures, section 9 of the Act provides a specific list of prohibitions for endangered species but does not provide these same prohibitions for threatened species. Instead, pursuant to section 4(d) of the Act, for any species listed as a threatened species, the Secretary must issue protective regulations that are “necessary and advisable to provide for the conservation of such species” (these are referred to as “4(d) rules”). Section 4(d) of the Act contains two sentences. The first sentence states that the Secretary shall issue such regulations as she deems necessary and advisable to provide for the conservation of species listed as threatened species. Conservation is defined in the Act to mean the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Additionally, the second sentence of section 4(d) of the Act states that the Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants. With these two sentences in section 4(d), Congress delegated broad authority to the Secretary to determine what protections would be necessary and advisable to provide for the conservation of threatened species, and even broader authority to put in place any of the section 9 prohibitions, for a given species.

Courts have recognized the extent of the Secretary’s discretion under this

standard to develop rules that are appropriate for the conservation of a species. For example, courts have upheld, as a valid exercise of agency authority, rules developed under section 4(d) of the Act that included limited prohibitions against takings (see *Alsea Valley Alliance v. Lautenbacher*, 2007 WL 2344927 (D. Or. 2007); *Washington Environmental Council v. National Marine Fisheries Service*, 2002 WL 511479 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see *State of Louisiana v. Verity*, 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was initially enacted, “once an animal is on the threatened list, the Secretary has an almost infinite number of options available to [her] with regard to the permitted activities for those species. [She] may, for example, permit taking, but not importation of such species, or [she] may choose to forbid both taking and importation but allow the transportation of such species” (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Under our section 4(d) authorities, we put in place protections intended to both prevent a threatened species from becoming an endangered species and promote its recovery. We have two ways to put in place these protections for a threatened species: (1) we can issue a species-specific 4(d) rule (codified at 50 CFR 17.40–17.47 for wildlife and at 50 CFR 17.73 and 17.74 for plants), which would contain all of the protective regulations for that species; or (2) we can apply the “blanket rule” at 50 CFR 17.31(a) for wildlife and 50 CFR 17.71(a) for plants (for more information, see 89 FR 23919, April 5, 2024), which extends to threatened species without a species-specific rule all of the prohibitions that apply to endangered species under section 9 (with certain exceptions applicable to threatened species). Both “blanket rules” and species-specific 4(d) rules explain what is prohibited for a threatened species, thus requiring a permit or authorization under the Act unless otherwise excepted in the 4(d) rule (species-specific 4(d) rules may also include affirmative requirements).

The provisions of these proposed protective regulations under section 4(d) of the Act are one of many tools that we would use to promote the conservation of the reticulated giraffe and Masai giraffe. The proposed protective regulations would apply only if and when we make final the listing of the reticulated giraffe and Masai giraffe as threatened species, as well as the determination to treat the Angolan giraffe and South African giraffe as

threatened species based on their similarity of appearance; or otherwise make final under the authority of either section 4(a)(1) or 4(e) of the Act the listing of a giraffe species as a threatened species or treatment of a species of giraffe as a threatened species based on their similarity of appearance. The proposed protective regulations would promote conservation of the reticulated giraffe and Masai giraffe by ensuring that activities undertaken with these species by any person under the jurisdiction of the United States are also supportive of the conservation efforts undertaken for the species in Africa, as well as under the CITES Appendix-II listing, and, as explained above, would also help ensure protection for the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe.

Exercising the Secretary’s authority under section 4(d) of the Act, we propose a species-specific 4(d) rule to apply protections for the reticulated giraffe, Masai giraffe, Angolan giraffe, and South African giraffe. Section 4(d) requires the Secretary to issue such regulations as she deems necessary and advisable to provide for the conservation of each threatened species and authorizes the Secretary to include among those protective regulations any of the prohibitions that section 9(a)(1) of the Act prescribes for endangered species. We find that, if finalized, the protections, prohibitions, and exceptions in this proposed rule as a whole satisfy the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of the reticulated giraffe and Masai giraffe.

Under the proposed 4(d) rule, prohibitions and provisions that apply to endangered wildlife under section 9(a)(1) of the Act would help minimize threats that could cause further declines in the status of reticulated giraffe and Masai giraffe. We are also proposing to treat both Angolan giraffe and South African giraffe as threatened species based on similarity of appearance to the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe under the authority of section 4(e) of the Act with a 4(d) rule for these species to minimize misidentification and enforcement-related issues.

The protective regulations we are proposing for the reticulated giraffe, Masai giraffe, Angolan giraffe, and South African giraffe incorporate prohibitions from section 9(a)(1) to address the threats to the reticulated giraffe and Masai giraffe, as well as threats posed by similarity of

appearance of Angolan giraffe and South African giraffe to West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe. The prohibitions of section 9(a)(1) of the Act, and implementing regulations codified at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or to cause to be committed any of the following acts with regard to any endangered wildlife, unless they are otherwise authorized or permitted: (1) import into, or export from, the United States; (2) take within the United States, within the territorial sea of the United States, or on the high seas; (3) possess, sell, deliver, carry, transport, or ship, by any means whatsoever, any such wildlife that has been taken illegally; (4) deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of commercial activity; or (5) sell or offer for sale in interstate or foreign commerce. Certain exceptions to these prohibitions apply to employees or agents of the Service, the National Marine Fisheries Service, other Federal land management agencies, and State conservation agencies.

Under the Act, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulations at 50 CFR 17.3. Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally. This protective regulation would provide for the conservation of the reticulated giraffe and Masai giraffe by including all of these prohibitions because the reticulated giraffe and Masai giraffe are at risk of extinction within the foreseeable future and putting these prohibitions in place would help to decrease synergistic, negative effects from other ongoing or future threats.

As discussed above, poaching is a primary threat to giraffes, and trafficking of giraffe (e.g., specimens, parts, products) could place additional stress on populations that are already small, and in most cases declining. Prohibiting the acts prohibited under section 9(a)(1) of the Act and regulating import and export into, from, and through the United States, take, and interstate and foreign commerce by persons subject to the jurisdiction of the United States would indirectly contribute to conservation of the species in their range countries and help conserve the species by eliminating the United States as a potential market for illegally taken

and traded giraffes. It would ensure any activities with listed giraffes under U.S. jurisdiction contribute to enhancing the conservation of the species, and that any domestic demand for listed giraffes or for giraffes treated as listed due to similarity of appearance does not contribute to the decline of listed giraffe species in the wild.

Further, as noted above, current protections for giraffes and the regulation of giraffe trade under CITES are insufficient to address threats relating to similarity of appearance at this time, because CITES taxonomy and CITES documents do not distinguish between giraffe species or subspecies, and a number of countries have entered reservations that may result in undocumented trade in giraffes between countries in the ranges of multiple giraffe species without CITES documents. Current CITES protections alone are therefore insufficient to ensure legal, biologically sustainable, traceable trade in specimens of the species.

Despite these prohibitions regarding threatened species, we may under certain circumstances issue permits to carry out one or more otherwise prohibited activities, including those described above. The regulations that govern permits for threatened wildlife state that the Director may issue a permit authorizing any activity otherwise prohibited with regard to threatened species. These include permits issued for the following purposes: for scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act (50 CFR 17.32).

Although the general permit provisions for threatened species are found at 50 CFR 17.32, the Service issues permits for otherwise prohibited activities involving endangered or threatened species listed due to similarity of appearance under the regulatory criteria at 50 CFR 17.52. Under 50 CFR 17.52, a permit may be issued for any otherwise prohibited activity if the applicant adequately identifies the wildlife or plant in question so as to distinguish it from any endangered or threatened wildlife or plant. In the case of the Angolan giraffe and South African giraffe, the Service's criteria to issue such a permit would consist of the permit applicant providing adequate information to document that the specimen involved in the activity is an Angolan giraffe or a South African giraffe. This would ensure that otherwise prohibited activities, such as import and export, of

the specimens are not undertaken with West African giraffe, Kordofan giraffe, or Nubian giraffe without an endangered species permit, and are not undertaken with reticulated giraffe and Masai giraffe without a threatened species permit. Accordingly, this proposed 4(d) rule would promote and enhance the conservation of the West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe.

There are other standard exceptions to the prohibitions included in the proposed 4(d) rule for the reticulated giraffe, Masai giraffe, Angolan giraffe, and South African giraffe (see Proposed Regulation Promulgation, below), and the statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act. If the species-specific 4(d) rule is finalized as proposed, the import exemption for threatened wildlife listed in Appendix II of CITES (50 CFR 17.8; section 9(c)(2) of the Act) would not apply to the species. A threatened species import permit under 50 CFR 17.32 would be required for the importation of specimens of the species, or a similarity of appearance import permit under 50 CFR 17.52 would be required for the importation of specimens of Angolan giraffe or South African giraffe, regardless of whether the trade is reported as for commercial or personal purposes, in order to address the similarity of appearance issues explained above. Further, as noted above, we may also authorize certain activities associated with conservation breeding under captive-bred wildlife registrations (see 50 CFR 17.21(g)). We recognize that captive breeding of wildlife can support conservation, for example by producing animals that could be used for reintroductions. The proposed 4(d) rule would apply to all live and dead reticulated giraffe, Masai giraffe, Angolan giraffe, and South African giraffe, including any part, product, egg, or offspring thereof, and support conservation management efforts for giraffes in the wild in Africa.

As noted above, we are requesting information regarding threats to one or more species or subspecies of giraffe from hunting, poaching, or any other taking or trade involving one or more other species or subspecies of giraffe, such as threats to the West African, Kordofan, Nubian, reticulated, or Masai giraffe from hunting, poaching, or any other taking or trade involving the Angolan giraffe or South African giraffe. In most of the range countries of southern giraffe, only Angolan giraffes and/or South African giraffes occur in the wild (with the exception of Zambia,

where Masai giraffes also occur). Accordingly, in range countries where sport-hunting of southern giraffe is well-managed and used as an effective conservation management tool, it may be possible to determine that import of personal Angolan giraffe and/or South African giraffe sport-hunted trophies that are documented as legally taken in and exported from a southern giraffe range country, poses little risk of confusion with West African giraffe, Kordofan giraffe, Nubian giraffe, reticulated giraffe, and Masai giraffe based on similarity of appearance. While the risks noted above with respect to incomplete CITES documentation would need to be fully considered, such an exception may be possible because, at the time of importation of a personal sport-hunted trophy, hunters are required to provide wildlife inspectors for the Service's Office of Law Enforcement with substantial documentation on where and when the specimen was taken, including all permits or other documents required by the laws or regulations of any foreign country, as part of the inspection and clearance process for the import. We specifically request comment on whether to adopt an additional exception in the proposed 4(d) rule to allow a hunter to import a personal Angolan giraffe sport-hunted trophy or personal South African giraffe sport-hunted trophy without a threatened species permit or similarity of appearance permit, provided that (A) the Angolan giraffe or South African giraffe was legally taken by the hunter in Angola, Namibia, Botswana, Zimbabwe, Mozambique, South Africa, or Eswatini; (B) the import is only for the noncommercial use of the hunter; and (C) the applicable provisions of 50 CFR parts 13, 14, and 23 have been met.

Required Determinations

Clarity of the Rule

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

- (1) Be logically organized;
- (2) Use the active voice to address readers directly;
- (3) Use clear language rather than jargon;
- (4) Be divided into short sections and sentences; and
- (5) Use lists and tables wherever possible.

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

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

Regulations adopted pursuant to section 4(a) of the Act are exempt from the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) and do not require an environmental analysis under NEPA. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This includes listing, delisting, and reclassification rules, as well as critical habitat designations and species-specific protective regulations promulgated concurrently with a decision to list or reclassify a species as threatened. Courts have upheld this position (*e.g., Douglas County v. Babbitt*, 48 F.3d 1495 (9th Cir. 1995) (critical habitat); *Center for Biological Diversity v. U.S. Fish and Wildlife*

Service, 2005 WL 2000928 (N.D. Cal. Aug. 19, 2005) (concurrent 4(d) rule)).

References Cited

A complete list of references cited in this rulemaking is available on the internet at <https://www.regulations.gov> and upon request from the Branch of Delisting and Foreign Species (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are the staff members of the Fish and Wildlife Service's Species Assessment Team and the Branch of Delisting and Foreign Species.

List of Subjects in 50 CFR Part 17

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

Proposed Regulation Promulgation

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

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

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

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

■ 2. In § 17.11, in paragraph (h), amend the List of Endangered and Threatened Wildlife by adding entries for “Giraffe, Angolan”, “Giraffe, Kordofan”, “Giraffe, Masai”, “Giraffe, Nubian”, “Giraffe, reticulated”, “Giraffe, South African”, and “Giraffe, West African” in alphabetical order under MAMMALS to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *
(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
Mammals				
* Giraffe, Angolan	* <i>Giraffa giraffa angolensis</i>	* Wherever found	* T(S/A)	* [Federal Register citation when published as a final rule]; 50 CFR 17.40(w). ^{4d}
Giraffe, Kordofan	<i>Giraffa camelopardalis antiquorum</i> .	Wherever found	E	[Federal Register citation when published as a final rule].
Giraffe, Masai	<i>Giraffa tippelskirchi</i>	Wherever found	T	[Federal Register citation when published as a final rule]; 50 CFR 17.40(w). ^{4d}
Giraffe, Nubian	<i>Giraffa camelopardalis camelopardalis</i> .	Wherever found	E	[Federal Register citation when published as a final rule].
Giraffe, reticulated	<i>Giraffa reticulata</i>	Wherever found	T	[Federal Register citation when published as a final rule]; 50 CFR 17.40(w). ^{4d}

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
Giraffe, South African	<i>Giraffa giraffa giraffa</i>	Wherever found	T(S/A)	[Federal Register citation when published as a final rule]; 50 CFR 17.40(w). ^{4d}
Giraffe, West African	<i>Giraffa camelopardalis peralta</i> .	Wherever found	E	[Federal Register citation when published as a final rule].
*	*	*	*	*

■ 3. Further amend § 17.40, as proposed to be amended at 89 FR 20928 (March 26, 2024), by adding paragraph (w) to read as follows:

§ 17.40 Special rules—mammals.

* * * * *

(w) Reticulated giraffe (*Giraffa reticulata*), Masai giraffe (*Giraffa tippelskirchi*), Angolan giraffe (*Giraffa giraffa angolensis*), and South African giraffe (*Giraffa giraffa giraffa*).

(1) *Prohibitions.* The following prohibitions that apply to endangered wildlife also apply to the reticulated giraffe, Masai giraffe, Angolan giraffe, and South African giraffe. Except as provided under paragraph (w)(2) of this section and §§ 17.4 and 17.5, it is unlawful for any person subject to the jurisdiction of the United States to

commit, to attempt to commit, to solicit another to commit, or cause to be committed, any of the following acts in regard to these species:

- (i) Import or export, as set forth at § 17.21(b) for endangered wildlife.
 - (ii) Take, as set forth at § 17.21(c)(1) for endangered wildlife.
 - (iii) Possession and other acts with unlawfully taken specimens, as set forth at § 17.21(d)(1) for endangered wildlife.
 - (iv) Interstate or foreign commerce in the course of commercial activity, as set forth at § 17.21(e) for endangered wildlife.
 - (v) Sale or offer for sale, as set forth at § 17.21(f) for endangered wildlife.
- (2) *Exceptions from prohibitions.* In regard to these species, you may:
- (i) Conduct activities as authorized by a permit under § 17.32.

(ii) Conduct activities with Angolan giraffe and South African giraffe as authorized by a permit under § 17.52.

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

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

(v) Take, as set forth at § 17.31(b).

(vi) Conduct activities as authorized by a captive-bred wildlife registration under § 17.21(g) for endangered wildlife.

Gary Frazer,

Acting Director, U.S. Fish and Wildlife Service.

[FR Doc. 2024–26395 Filed 11–20–24; 8:45 am]

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