DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R9–ES–2010–0089; 4500030115; 1113F116]

RIN 1018–AT56

Endangered and Threatened Wildlife and Plants; Listing Two Distinct Population Segments of Broad-Snouted Caiman as Endangered or Threatened and a Special Rule

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to reclassify the broad-snouted caiman in Argentina from endangered to threatened in the List of Endangered and Threatened Wildlife under the Endangered Species Act of 1973, as amended (ESA or Act). As part of this proposed rule, we would establish two distinct population segments (DPSs) of the broad-snouted caiman (*Caiman latirostris*): a DPS in Argentina and a DPS that would encompass Bolivia, Brazil, Paraguay, and Uruguay. This second DPS would remain listed as endangered under the Act. We are proposing this action under the Act based on the best available data indicating that the Argentine population of the broad-snouted caiman no longer meets the definition of endangered under the Act. Intense management of the species in Argentina has brought the Argentine DPS to the point where a change in status is appropriate. This also serves as our 5-year review.

We also propose that the Argentine population of broad-snouted caiman be included in the special rule for trade in caiman species. Inclusion in this special rule would allow U.S. commerce in skins, other parts, and products of this species originating from Argentina, and reexport of such specimens originating in Argentina, if certain conditions are met prior to exportation to the United States. We are seeking information, data, and comments from the public on this proposed rule. This proposed rule to reclassify the broad-snouted caiman in Argentina to threatened under the Act also constitutes our warranted 12-month finding (status review) on a petition.

DATES: To ensure that we are able to consider your comments on this proposed rule, they must be received or postmarked on or before *March 5, 2012.* We must receive requests for public hearings, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** below by February 21, 2012.

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

- *Federal eRulemaking Portal: http://www.regulations.gov.* Search for docket number FWS–R9–ES–2010–0089 and then follow the instructions for submitting comments.
- *U.S. mail or hand-delivery:* Public Comments Processing, Attn: FWS–R9–ES–2010–0089; Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, MS 2042–PDM; Arlington, VA 22203.

We will not accept comments by email or fax. We will post all comments on *http://www.regulations.gov.* This generally means that we will post any personal information you provide us (see the Public Comments section below for more information).

FOR FURTHER INFORMATION CONTACT: Janine Van Norman, Chief; Branch of Foreign Species, Endangered Species Program; U.S. Fish and Wildlife Service; 4401 North Fairfax Drive, Room 420; Arlington, VA 22203, U.S.A. Individuals who are hearing-impaired or speech-impaired may call the Federal Information Relay Service at 800–877–8339 for TTY assistance 24 hours a day, 7 days a week.

SUPPLEMENTARY INFORMATION:

Public Comments

We received eight comments from the public on the 90-day finding (73 FR 33968, published on June 16, 2008). We received comments from foreign government agencies, the scientific community, and the reptile product industry. We received scientific literature about this species from members of the IUCN Crocodile Specialist Group. This literature provided additional information about the distribution, abundance, and conservation status of the species. The comments and information we received have been considered and incorporated into this proposed rule to reclassify the broad-snouted caiman.

We intend that any final action resulting from this proposed rule is based on the best scientific and commercial data available and be as accurate and effective as possible. Therefore, we request comments and information from government agencies, the scientific community, industry, and other interested parties concerning this proposed rule. The comments that will be most useful and likely to influence our decisions are those supported by scientific data or peer-reviewed studies and those that include citations to, and analyses of, applicable laws and regulations. Please make your comments as specific as possible and explain the basis for them. In addition, please include sufficient information with your comments to allow us to authenticate any scientific or commercial data you reference or provide. In particular, we seek comments concerning the following:

(1) New biological, trade, or other relevant information and data concerning any threat (or lack thereof) to the broad-snouted caiman, particularly whether there is information that indicates the species no longer meets the definition of endangered in any part of its range.

(2) New information and data on whether or not climate change is a threat to the broad-snouted caiman, what regional climate change models are available, and whether they are reliable and credible to use as a step-down model for assessing the effects of climate change on the species and its habitat.

(3) The location of any additional populations of broad-snouted caiman.

(4) New information concerning the range, distribution, and population size and population trends of the broad-snouted caiman in the wild.

(5) New information on the current or planned activities within the geographic range of the broad-snouted caiman that may impact or benefit the species.

(6) New information concerning captive-breeding operations in Argentina, Bolivia, Brazil, Paraguay, and Uruguay.

(7) New information and data on the broad-snouted caiman in Argentina, Bolivia, Brazil, Paraguay, and Uruguay that would enhance our analysis of whether or not these two populations qualify as a DPS under the Act (16 U.S.C. 1531 *et seq.*), and whether or not these populations warrant continued protection under the Act.

(8) Information concerning the status and results of monitoring actions for the broad-snouted caiman, including those implemented under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The information available emphasizes field studies and species management in Argentina, with little direct information on the species in the other range countries (Bolivia, Brazil, Paraguay, and Uruguay). This species is primarily being monitored in Argentina, and we were unable to find additional information or only able to locate a small amount of information regarding the broad-snouted caiman in its other range countries. We are seeking information and data on the status of the

species throughout its range, particularly in Bolivia, Brazil, Paraguay, and Uruguay as part of this proposed rule.

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

Prior to issuing a final rule on this proposed action, we will take into consideration all comments and any additional information we receive. Such information may lead to a final rule that differs from this proposal. All comments and recommendations, including names and addresses of commenters, will become part of the administrative record.

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. If you submit a comment via *http://www.regulations.gov,* your entire comment—including any personal identifying information—will be posted on the Web site. Please note that comments posted to this Web site are not immediately viewable. When you submit a comment, the system receives it immediately. However, the comment will not be publicly viewable until we post it, which might not occur until several days after submission.

If you mail or hand-deliver a hardcopy comment 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. To ensure that the electronic docket for this rulemaking is complete and all comments we receive are publicly available, we will post all hardcopy submissions on *http://www.regulations.gov.*

In addition, comments and materials we receive, as well as supporting documentation used in preparing this proposed rule, will be available for public inspection in two ways:

(1) You can view them on *http://www.regulations.gov.* In the Enter Keyword or ID box, enter FWS–R9–ES–2010–0089, which is the docket number for this rulemaking. Then click on the Search button.

(2) You can make an appointment, during normal business hours, to view the comments and materials in person at the U.S. Fish and Wildlife Service's Endangered Species Program located in our Headquarters office (see the **FOR FURTHER INFORMATION CONTACT** section).

Public Availability of Comments

Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Public Hearing

Section 4(b)(5)(E) of the Act provides for one or more public hearings on this proposed rule, if requested. The main purpose of most public hearings is to obtain public testimony or comment. In most cases, it is sufficient to submit comments through the Federal eRulemaking Portal, described above under **ADDRESSES**. We must receive requests for public hearings in writing at the address shown in **FOR FURTHER INFORMATION CONTACT** by the date shown in **DATES**. We will schedule public hearings on this proposal, if any are requested, and announce the dates, times, and places of those hearings, as well as how to obtain reasonable accommodations, in the **Federal Register** at least 15 days before the first hearing.

Previous Federal Actions

We listed this species as endangered on June 14, 1976 (41 FR 24062), in response to a petition we received in 1975 from the Fund for Animals, requesting that the Service list all species that were included in Appendix I of CITES (See additional discussion in CITES section.) as endangered under the Act. In 2007, we received a petition from the Government of Argentina, dated November 5, 2007, requesting that we reclassify the broad-snouted caiman in Argentina from endangered to threatened. The Argentine population of broad-snouted caiman has been listed on Appendix II of CITES since 1997. The broad-snouted caiman is still listed in Appendix I of CITES in Bolivia, Brazil, Paraguay, and Uruguay. With this petition, the Government of Argentina requested reclassification of the species from endangered to threatened in that country only. The petition contained detailed information about the natural history and biology of the broad-snouted caiman including the species' current status and distribution in Argentina. The Government of Argentina cited reasons for the reclassification such as the broad-snouted caiman populations in Argentina are healthy, habitat remains plentiful, caiman ranching programs in Argentina have proven successful (wild populations are increasing), and broad-snouted caiman production and harvest is increasing in Argentina.

The reclassification of the species under the Act would allow for commercial U.S. imports of broad-snouted caiman originating from Argentina to occur. Because the petition from the Government of Argentina was for reclassification of the Argentine population only, the Service must first consider whether the population of Argentina qualifies as a distinct vertebrate population segment (DPS) under the Act. (See discussion in Distinct Population Segment section.). We then evaluate the entire species to determine if a change in status under the Act is warranted based on any new information since the species was listed under the Act. The DPS policy requires FWS to determine whether or not a vertebrate population is discrete and significant; and the population segment's conservation status in relation to the Act's standards for listing, delisting, or reclassification (*i.e.,* is the population segment endangered or threatened). If it qualifies, the policy requires a status determination to determine if the population is endangered or threatened.

On June 16, 2008, the Service published in the **Federal Register** a 90-day finding (73 FR 33968) on the petition, stating that the petition provided substantial information to indicate that the requested action (to reclassify the Argentine population of the broad-snouted caiman) may be warranted. In that finding, we announced that we were initiating a status review of the species as required under section 4(b)(3)(A) of the Act, and that we were seeking comments on the petitioned action, as well as information on the status of the species, particularly in Argentina. The comment period closed on September 15, 2008. During the comment period, we received scientific literature about this species from members of the International Union for Conservation of Nature (IUCN) Crocodile Specialist Group (CSG), and researchers in South America, particularly in Argentina. This literature provided additional information about the distribution, abundance, and conservation status of the species, particularly in Argentina. The comments and new information have been considered and incorporated into this proposed rule to reclassify the

Argentine population of the broad-snouted caiman.

Background

The primary purpose of the Act is to prevent animal and plant species' endangerment and extinction. The Act requires the Service to identify species that meet the Act's definitions of endangered and threatened species, to add those species to the Federal Lists of Endangered and Threatened Wildlife and Plants (50 CFR 17.11 and 17.12, respectively), and to plan and implement conservation measures to improve their status to the point at which they no longer need the protections of the Act. When that protection is no longer needed, we take steps to remove (delist) the species from the Act. If a species is listed as endangered, we may first reclassify it to threatened status as an intermediate step before its eventual removal from the Federal Lists of Endangered and Threatened Wildlife and Plants; however, reclassification to threatened status is not required prior to removal. Section 3 of the Act provides the following definitions that are relevant to this rule: *Endangered species* means any species which is in danger of extinction throughout all or a significant portion of its range; *Threatened species* means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. *Species* includes any subspecies of fish or wildlife or plants, and any DPS of any species of vertebrate fish or wildlife which interbreeds when mature.

When an endangered species (or DPS) has recovered to the point where it is no longer currently in danger of extinction throughout all or a significant portion of its range, but is likely to become so in the foreseeable future, it is appropriate to reclassify that species (or DPS) to threatened. The broad-snouted caiman was listed as endangered in 1976. However, recent information indicates that the Argentine population has increased since the time of the original listing.

Technical Corrections

This proposed rule would correct errors in 50 CFR 17.11 as follows: The table at 50 CFR 17.11(h) does not currently list Bolivia in the historic range of the broad-snouted caiman. This proposed rule corrects the ''Historic Range'' entry to include Bolivia. In addition, we propose to correct errors in the entries for three other caiman species: brown caiman, common caiman, and yacare caiman. The entries for these species in the ''Special Rules'' column direct readers to 50 CFR 17.42(g); however, the special rule for all of these species is at 50 CFR 17.42(c).

Five-Year Review

Section 4(c)(2)(A) of the Act requires that we conduct a review of listed species at least once every 5 years. A 5-year review is a periodic process conducted to ensure that the classification of a listed species is appropriate. Section 4(c)(2)(B) requires that we determine: (1) Whether a species no longer meets the definition of threatened or endangered and should be removed from the List (delisted); (2) whether a species more properly meets the definition of threatened and should be reclassified from endangered to threatened; or (3) whether a species more properly meets the definition of endangered and should be reclassified from threatened to endangered. It is based on the best scientific and commercial data available at the time of the review. Therefore, we are requesting submission of any such information that has become available since the original listing of this species. This serves as our 5-year review of this species.

Species Description

The broad-snouted caiman is a medium-sized crocodilian with a body length usually no more than 2 meters (m) (6.6 feet (ft)), and has the proportionally broadest snout of any crocodile (Verdade *et al.* 2010, p. 18). It is found generally in lagoons, rivers, creeks, marshes, ponds, and mangroves in river systems of northeast Argentina, southeast Bolivia, Paraguay, and northern Uruguay (Borteiro *et al.* 2006, p. 97; Verdade *et al.* 2010, p. 18).

According to Imhof (unpublished 2006), approximately 60 percent of the species' range is in Brazil, 30 percent is in Argentina, seven percent is in Paraguay, and three percent is in Bolivia. The percentage of its range in Uruguay is unknown. Broad-snouted caiman populations are on the Atlantic coast, connected through the Paraná and São Francisco River systems of northeast Argentina, southeast Bolivia, Paraguay, and northeast Uruguay. The São Francisco River is 2,914 km (1,811 mi) in length.

The broad-snouted caiman exhibits greater climatic tolerance than other caiman species (Verdade and Piña 2006). The southernmost limit of the distribution of the broad-snouted caiman is northern Argentina (Jenkins *et al.* 2006), where it is found in the provinces of Chaco, Corrientes, Entre Ríos, Formosa, Jujuy, Misiones, Salta, Santa Fe, and Santiago del Estero. In Argentina, 80 percent of the Argentine distribution of the population occurs in the Province of Santa Fe. Here, the species is found primarily in the floodplain along the Paraná River, the Salado river watershed, and the Saladillos watershed (Larriera 1995, pp. 221–230).

This species is primarily found at altitudes up to 100 m (328 ft) above sea level (Borteiro *et al.* 2006, p. 99). The broad-snouted caiman exhibits a high degree of flexibility in its habitat preferences. It is an opportunistic feeder and prefers shallow, vegetated water. It generally prefers shallow aquatic environments with abundant vegetation. In some areas, the broad-snouted caiman is sympatric (occurs in overlapping geographical areas) with the yacare caiman (*Caiman yacare*), but the broad-snouted caiman is usually found in quieter, more heavily vegetated waters (Medem 1983, Scott *et al.* 1990). *C. yacare* prefers large rivers with adjacent marshes (Scott *et al.* 1990, pp. 43–51). Like many crocodilians, the broad-snouted caiman can be found in temporary bodies of water and manmade habitats, such as isolated cattle or agricultural stock ponds, livestock watering holes, and drainage ditches or areas of runoff water. It can be found in flooded forested areas in years of intense rains usually within 2,000 m (6,562 ft) from bodies of water (Larriera *et al.* 2008, p. 151).

The reproductive cycle of this species is seasonal. Mating occurs in the spring (October through December), when polygynous males (males who breed with more than one female) establish territories. When laying eggs, this species constructs a mound out of vegetation, and it deposits its eggs in the center of the mound. This process is called ''mound-nesting.'' Another characteristic of this species is that it exhibits communal nesting (several females laying eggs in the same nest). Partially divided nest chambers, each with normal clutch sizes, and nests with unusually large clutches (129 eggs) have been observed in this species which is indicative of communal nesting (Larriera 2002). Clutch sizes range between 18 to 50 eggs, with females typically laying between 30 and 40 eggs (Micucci and Waller 1995). Egg laying occurs during the wet summer season, which occurs from December through February (Verdade 1998, pp. 18–19). Young hatch at the end of fall and early winter (February–April) (Micucci and Waller 1995, p. 81).

This species is an opportunistic feeder. The young feed on insects and small arthropods. As hatchlings grow, their diet becomes primarily aquatic mollusks and crustaceans, and then

adults primarily feed on fish (Micucci and Waller 1995, pp. 81–112).

CITES

The broad-snouted caiman was listed in Appendix I of CITES on July 1, 1975. CITES Appendix I includes species that are ''threatened with extinction which are or may be affected by trade.'' Species listed under Appendix I may not be traded for primarily commercial purposes. These protections were put in place because the species had suffered substantial population declines throughout its range due to habitat destruction and overexploitation through the commercial crocodilian skin trade.

The Argentine population was transferred to Appendix II (which allows for commercial trade) in 1997. CITES Appendix II includes species that are less vulnerable to extinction and that ''although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival.'' Management activities in Argentina were reviewed by the CITES Parties prior to transferring this population from Appendix I to Appendix II. The review included assessments of population status, determination of sustainable harvest quotas (and approval of ranching programs), and the control of the illegal harvest. Management regulations imposed after harvest included the tagging of skins and issuance of permits to satisfy the requirements for Appendix-II species. For a more in-depth discussion on CITES, please see the *International Trade and Regulation under CITES* section under *Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes.*

Trade

Beginning in the 1940s, the broad-snouted caiman was hunted commercially for its leather, which is considered to be higher quality than that of other caiman species (Verdade *et al.* 2010, p. 19). Prior to being protected by CITES, thousands of broad-snouted caiman skins were exported from its range countries, which led to the listing of the species in Appendix I of CITES in 1975 (Verdade 1998, pp. 18–19, Larriera 2003, unpaginated). In 1990, ''Projecto Yacaré'' (''Caiman Project'') was implemented in Argentina based on a concept of conservation through sustainable use of broad-snouted caiman. The objective of the program was to improve the status of the population in two ways: by creating incentives for landowners and by increasing public awareness in the local communities to encourage the increase of caiman populations. Another objective was to conserve natural wetlands on which caimans depend (Larriera *et al.* 2008a, pp. 143–145). As of 2008, four ranching programs were operating in Argentina (Larriera *et al.* 2008), producing a total of approximately 12,000 skins per year (Verdade *et al.* 2010, p. 19). As of 2010, there were seven ranching programs registered with the government of Argentina. These programs also reintroduce captive-raised individuals to the wild. Three of the programs function on an educational basis, with no commercial production. These educational ranching operations are in Entre Ríos, Chaco, and Corrientes Provinces. Two of the commercial ranching programs are in Formosa; the other two are in Corrientes and Santa Fe Provinces. In 2010, there were 7,768 hatchlings produced in Argentina (Larriera 2010b, p. 1).

Conservation Status

The broad-snouted caiman is currently listed as endangered throughout its range under the ESA and received protections under the ESA on June 14, 1976 (41 FR 24062). With respect to CITES, this species was placed in Appendix I of CITES due to severe exploitation for international trade and habitat destruction. Because the Argentine broad-snouted caiman population was moved to Appendix II of CITES in 1997, commercial international trade is allowed, subject to several restrictions, for specimens, parts, and products originating in Argentina. The broad-snouted caiman is presently listed as endangered in its entirety under the Act (41 FR 24062; June 14, 1976), and importation into the United States of endangered species is prohibited under the Act with certain exceptions. IUCN classifies this species as ''least concern'' (*http://www.iucnredlist.org,* accessed November 8, 2010). However, IUCN rankings do not confer any actual protection or management.

Status in Range Countries and Population Estimates

In part because broad-snouted caiman habitat tends to be heavily vegetated and is difficult to access for humans, actual numbers of the species have been difficult to document; some researchers believe that the size of the population has historically been underestimated (Larriera and Imhof 2000, pp. 311–313). The imprecision is reflected in the global wild population estimate of between 250,000 and 500,000 individuals (*http://www.flmnh.ufl.edu/cnhc/csp_clat.htm,* accessed January 18, 2011).

It is difficult to accurately obtain population numbers for crocodiles due to variables such as water temperature, the nature of their behavior of disappearing underwater in response to certain types of disturbance, their respective visibility based on water depths, and their ability to migrate based on drought or flooding (Magnusson 1980, pp. 393–394; Bayliss 1987, p. 158; Graham 1988, p. 74; Pacheco 1996, p. 44). An early journal article described ''night counts'' as a mechanism for surveying American alligators, which live in habitat similar to that of broad-snouted caiman (Wood *et al.* 1986, p. 263) and exhibit similar characteristics. This paper indicated that ''the accuracy of night count indices is only 20–25 percent of true population means'' and referred to previous research conducted by Taylor and Neal (1984, pp. 316–317). Night count surveys use spotlights to detect caiman eyes. Although night counts are not entirely precise, they are very often used as a method of surveying crocodile species.

As an example of the difficulty in accurately obtaining population numbers for crocodiles, a review of crocodile ranching programs conducted for CITES by the IUCN Crocodile Specialist Group (CSG) in 2004 found that only three Parties (one of which was Argentina) to CITES attempted to estimate what proportion of the total wild production was being harvested under their ranching programs (Jenkins *et al.* 2006, p. 35). These estimates were based on production estimates which have wide variances and largely unknown accuracy. However, this report indicated that the easiest data to obtain and report to track population trends are those linked to the operation of the ranching programs (the method used by Argentina), data such as numbers of eggs collected from the wild. The eggs in Argentina's program are collected from known nest locations in the wild and are an indication of caiman density. This is why we use the information reported from Argentina's egg harvest as the best available information of population trend. The IUCN–CSG report also indicated that results probably indicate deficiencies in reporting rather than any declines of conservation significance in wild populations. The CSG recommended field data to verify this assertion, some of which has been collected over the past few years. However, recent surveys (Siroski 2004, 2006; Micucci *et al.* 2007;

Piña *et al.* 2008) have found broad-snouted caiman in sampled populations at densities comparable to the non-threatened American alligator (Wood *et al.* 1985, p. 271). In Argentina, recent densities of broad-snouted caiman ranged between 5 and 238 caiman per kilometer (km), and almost 70 sites were surveyed.

The map below illustrates the distribution of the species. Below is the best available information regarding the status of the species in each country.

Figure 1. Distribution of broad-snouted caiman. Courtesy of Piña *et al.* 2009.

Argentina

In Argentina, the broad-snouted caiman is found in nine provinces (Formosa, Santa Fe, Misiones, Corrientes, Entre Rios, Chaco, Santiago del Estero, Salta, and Jujuy). According to Imhof (unpublished 2006), approximately 30 percent of the species' range is in Argentina. Argentina has large areas of intact, although altered habitat with healthy populations (Verdade 1998, pp. 18–19; Piña *et al.* 2009). For example, broad-snouted caiman is thought to inhabit 2,400 of 2,700 water bodies (Piña *et al,* 2008, p. 4) in the Salta Province in Argentina. Surveys conducted in 2007 and 2008 indicated that broad-snouted caiman habitat in Salta Province is about 3,650 km^2 (1,409 mi^2). These surveys found broad-snouted caiman densities had increased to between 20 and 120 caiman per km in 2009; up from 2 to 8 caiman per km in 1990 when Argentina's management program of broad-snouted caiman first began (Siroski and Larriera 2010, pers. comm.). These densities are within the normal range for crocodile species. In Argentina, this species has been observed in a variety of habitats and waterways, including rivers near waterfalls such as Iguazú, and freshwater creeks with rocky bottoms (Micucci and Waller 1995, pp. 81–110). In the Province of Santa Fe, the species is found primarily in the floodplain along the Paraná River, the Salado river watershed, and the Saladillos watershed (Larriera 1995). Its nesting areas reflect the adaptability of this species to a variety of habitats. Nests have been found along dikes or levees, shallow lagoons, still and slow-moving waters in rivers and channels, artificial ponds, and on small hills in wetlands (Larriera 1995, pp. 221–230). Nests have also been found in mature chaco forests of open or closed canopy as far as 300–2,000 m (984–6,562 ft) from water (Larriera 1995, pp. 221–230; Larriera *et al.* 2008, p. 151).

Since management and monitoring of the Argentine population began, population estimates for Argentina have indicated an upward trend. This has been achieved through an organized ranching program and reintroduction of hatchlings into the wild (See Factors B and D discussion below). Through this program, a significant increase in egg collection and harvest has occurred in the wild; over 30,000 hatchlings from eggs collected have been released into

the wild since the program began. Surveys conducted between 1991 and 1992 indicated an average density of 12.2 individuals per km. Later surveys conducted during the 1999–2000 season indicated that in the Iberá Reserve, Corrientes Province, the density had increased to 32.4 individuals per km (Waller 2003 in Piña *et al.* 2010, p. 4). Night counts found an increase of less than 1 caiman per km when the program began, to almost 10 caiman per km in 2000, and over 4 caiman per kilometer in 2006 and 2007 (Larriera 2008c, p. 2). This decrease in density during 2006–2007 was attributed to drought (Larriera 2008c, p. 3); however, natural fluctuations such as this often occur in wild populations (Woodward 2010, p. 2). Caiman populations, like most other crocodilian populations, can be adversely affected by droughts. Most crocodilians and prey species suffer short term declines during these conditions but readily respond to wetter conditions. Overall, egg harvest increased 750 percent between 1992 and 2007 (Larriera 2008c, p. 2). This increase in egg production was attributed in part to caiman being released through this program and reaching sexual maturity (Larriera 2008c, p. 3). Additional surveys revealed densities found within its range recorded in Table 1.

TABLE 1—DENSITIES OF BROAD-SNOUTED CAIMAN OBSERVED DURING POPULATION COUNTS

Country/province	Years	Number of localities	Range of caiman densities	Source
Argentina/Formosa	2007–2008	11	22 to 238 per km	Piña *et al.* (2008).
Argentina/Corrientes	2007–2008	10	5 to 125 per km	Piña *et al.* (2008).
Argentina/Salta	2007–2008	39	3 to 5 caiman per lagoon	Piña *et al.* (2008).
Argentina/Sante Fe	2007–2008	**	4 per km*	Larriera *et al.* (2008).
Argentina/Santa Fe	2002	7	6 to 200 per km	Larriera and Imhoff (2004).
Bolivia/Pilcomayo River Basin, Tarija	1998	6	3 to 58 per km	Llobet-Querejazu (1998).
Bolivia/Tarija Department	2004–2005	54	6.17 per km	Aparicio and Rios (2008).
Uruguay	2001–2004	36	3.5 per km	Borteiro *et al.* (2008).
Brazil/São Francisco River Basin	2006–2007	64	Presence in 44 percent of areas surveyed.	Filogonio *et al.* (2009).

* Recent caiman counts suggest that populations declined somewhat during 2002–2003 and 2007–2008 (Micucci *et al.* 2007; Larriera *et al.* 2008). This has been attributed to cyclic drought conditions during the early 2000s (Micucci *et al.* 2007; Larriera *et al.* 2008).
** Not available.

Bolivia

The population of broad-snouted caiman in Bolivia is at the far western edge of the species' range. According to Imhof (unpublished 2006), approximately three percent of the species' range is in Bolivia. In 1983, broad-snouted caiman was found in the Pando Department (departments in South America are comparable to state jurisdictions in the United States) of Bolivia, which is at the northwestern tip of Bolivia (Medem 1983). In 1989, broad-snouted caiman was only found in the Pilcomayo River area, a tributary of the Paraguay River (King and Videz-Roca 1989). The Paraguay River, also known as Rio Paraguay, is 2,621 km (1,629 miles (mi)) in length and runs through Bolivia, Brazil, Paraguay, and Argentina, joining the broad-snouted caiman populations in these countries. Surveys in the late 1990s considered the Bolivian population of this species to be severely depleted (Verdade 1998, pp. 18–19). Anecdotal reports indicate that the abundance of broad-snouted caiman in the Pilcomayo River region may have increased over the past 10 years, but in the Bermejo River region, populations may have declined (Aparicio and Ríos 2008, pp. 111, 122). It is unclear whether the population change is public perception or whether the perception represents an actual change in broad-snouted caiman population numbers within Bolivia.

During a survey conducted in 2003 and 2004, 6.2 individuals per km were observed (Aparicio and Rios 2008, p. 104). The survey was conducted in 54 water bodies; 42 of which are part of the Pilcomayo River sub-basin, 12 water bodies were in the sub-basin of the Bermejo River (Aparicio and Rios 2008, p. 110). The highest abundance values were recorded in ''atajados'' (dikes) and artificial ponds. Broad-snouted caiman here exhibit preferences for inhabiting shallow temporary water bodies that have abundant vegetation cover. The population of broad-snouted caiman for this area was calculated on the basis of 135 individuals. In 1998, an abundance of 3.3 individuals per km was reported (Pacheco and Llobet 1998). The 1998 data indicated that the population was dominated by young individuals (Aparicio and Rios 2008, p. 110). A high level of young may indicate that the population is growing. Although different survey methods and timing were employed in the 1998 and 2003–2004 surveys, the population estimates suggest an increase in density of almost 3 individuals per km from 1998 to 2003–2004. A further observation of the survey found that broad-snouted caiman exist in areas previously unknown to be inhabited. It is found in the Gran Chaco, Arce, and O'Connor Provinces (sub-basins Pilcomayo and Bermejo) in the Tarija Department, which is in the south of Bolivia. Despite information suggesting an increasing trend in the Bolivian population, populations of broad-snouted caiman are still considered to be severely depleted in Bolivia (Aparicio and Ríos 2008, p. 104; Verdade *et al.* 2010, p. 19).

Brazil

Brazil has the largest range for this species; approximately 60 percent of the species' range is in Brazil (Imhof unpublished 2006). In 2003, Brazil established a nationwide research and development program, called Programme for Biology, Conservation and Management of Brazilian Crocodilians (Coutinho and Luz 2008 in Velasco *et al.* 2008 p. 80). The broad-snouted caiman was listed as an endangered species in Brazil until 2003, at which time the species was withdrawn from the Brazilian List of Endangered Fauna (The Brazilian Institute of Environment and Renewable Natural Resources [IBAMA] 2003). In 2006, it was reported that in southeast Brazil there were four farms involved in breeding this species. There were a total of 354 caiman in the farms, and in 2006, 719 hatchlings had been produced (CSG Steering Committee Meeting 2006, p. 6). We have no other information about the status of this program.

Although there is still a lack of population data and monitoring, the surveys conducted indicate that broad-snouted caiman is present (confirmed in

44 percent of 64 areas surveyed) throughout the São Francisco River basin, its primary habitat. A 2006–2007 survey conducted in the São Francisco River basin found the occurrence of crocodilians in 61 percent of 64 surveyed localities, in which the presence of broad-snouted caiman was confirmed in 44 percent of the surveyed sites. This was a survey conducted primarily to detect presence and absence, rather than an estimate of the population (Filogonio *et al.* 2009, p. 961). Caiman occurred in both lentic (still water) and lotic (moving water) habitats, although caiman preferred water bodies consisting of small dams, oxbow lakes, and wetlands. Despite the hunting pressure and human impact on natural habitats, results indicated that the populations of broad-snouted caiman in the São Francisco basin are broadly distributed and not fragmented (Filogonio *et al.* 2009, p. 961).

No other recent survey data are known in Brazil other than in the northwest portion of Santa Catarina Island, in the Ratones River plain. In this area surveyed, a density of 0.25 caiman per km was encountered (Fusco-Costa *et al.* 2008, p. 185). Based on their size, these caiman were generally considered to be adults. The purpose of study was to primarily confirm the presence of this species in this location.

Preliminary data indicate that this species is more widespread and prevalent in Brazil than previously believed. The main concern for this species in Brazil appears to be dams that have been constructed for hydroelectric stations that block water flow to wetlands. Both drainage of land for agriculture and river pollution have also reduced the availability of broad-snouted caiman habitat in Brazil (Verdade 1998, pp. 18–19). Hunting pressure is another factor that affects broad-snouted caiman in Brazil. It is hunted for several reasons: Because caiman feed on the fish attached to fishing nets; because caiman destroy fishing nets; and because caiman are a source of food. Although Brazil has established a research and development program for the conservation and management of Brazilian crocodilians, data are lacking for this species.

Paraguay

No recent survey data are available for Paraguay, however, according to Imhof (unpublished 2006); approximately seven percent of the species' range is in Paraguay. The latest data available indicate that the population of broad-snouted caiman is naturally low and scattered throughout eastern Paraguay and the southern half of the Chaco region, western Paraguay, possibly because other potential habitat in western Paraguay is ephemeral (seasonal, not permanent) (Scott *et al.* 1990, pp. 43–49). The Paraguayan population is found in seasonal marshes and livestock ponds, and has colonized manmade water bodies (Scott *et al.* 1990). There is no known conservation program for broad-snouted caiman in Paraguay.

Uruguay

The broad-snouted caiman is the only caiman species found in Uruguay (Borteiro *et al.* 2006, p. 98); the percentage of this species' range in Uruguay is unknown (Imhof unpublished 2006). There were little data available regarding this species' population numbers until recently. New information available to the Service updates the density estimates of broad-snouted caiman in Uruguay. The population of broad-snouted caiman in Uruguay is more widespread and appears larger than previously believed (Borteiro *et al.* 2006, pp. 97–108; Borteiro *et al.* 2008, pp. 244–250), but it is unclear whether population growth has occurred or whether earlier surveys were inaccurate. In the past, it was suggested that a decline in population had occurred in Uruguay, but no strong basis for this existed (Verdade 1998, p. 20). Recent observations and field surveys indicate that broad-snouted caiman is fairly common in northern Uruguay, and is also widely distributed in central and western Uruguay (Borteiro *et al.* 2008, p. 248). This species is adaptable to a wide range of water sources and habitats (Borteiro *et al.* 2006, p. 102, Borteiro *et al.* 2008, p. 244) and is connected to the Argentina and Brazilian populations through the Uruguay River basin (Borteiro *et al.* 2006, p. 103).

Previous local reports about the population status of broad-snouted caiman in Uruguay published since the mid 1950s suggested that this species was subject to extinction due to habitat destruction and poaching (Vaz-Ferreira 1956; Orejas-Miranda 1969; Talice 1971; Vaz-Ferreira 1971; Achaval 1977); however, no discussion of survey data and methods was made to support these conclusions (Borteiro *et al.* 2008, p. 247). During surveys conducted between 1981 and 2003, the species was found in both the Cebollatí and Tacuarí Rivers, as well as in the Pelotas, India Muerta, and San Miguel stream basins (Borteiro *et al.* 2006, p. 97). In the Department of Artigas (northern tip of Uruguay), broad-snouted caiman was found to be present in 29 out of 36 surveyed areas (Borteiro *et al.* 2008, pp. 246). The area studied consisted of approximately 400 km^2 (154 mi^2) of fluvial plains in the Uruguay River basin, in Artigas Department, northwestern Uruguay. The caiman observed were predominantly sub-adults. A total of 462 individuals were located during these surveys, and the density was determined to be 3.5 individuals per km.

Although comparisons with these previous surveys are difficult based on unknown methodologies used in the past, the 2008 data, along with the population age structure of caiman, suggests that the population may be increasing (Borteiro *et al.* 2008, p. 248). The researcher noted that the observed caiman were predominantly subadults and, thus, had the potential to recruit into adult size classes (as opposed to very young hatchlings which have a significantly higher mortality rate). This observation may be due to an increase in agricultural and livestock activities that inadvertently had a positive effect on broad-snouted caiman. These previous reports about the population status of broad-snouted caiman in Uruguay may have been due to inadequate surveys or survey methodology, or the population may have grown.

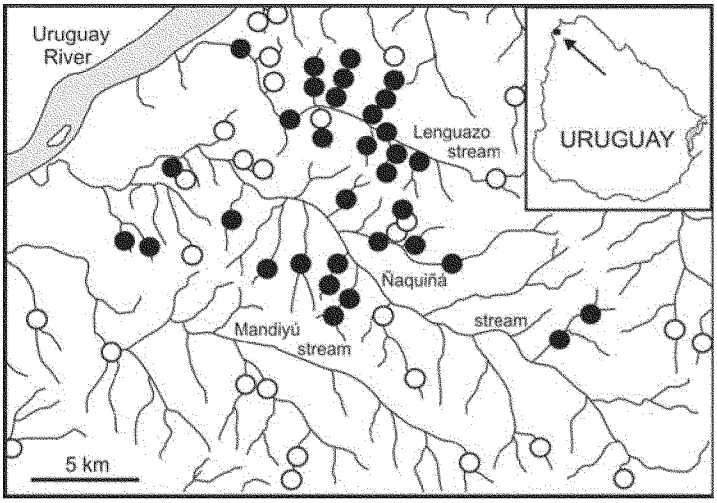

Figure 2. Uruguay broad-snouted caiman locations. Courtesy of Borteiro *et al.* 2008.

In 2008, the number of caiman located in each area surveyed ranged between one and 31. The average abundance was between 1.3 and 3.4 per km (Borteiro *et al.* 2008, p. 246). Research conducted recently regarding the population age structure of caiman in Uruguay indicates that the population is increasing (Borteiro *et al.* 2008, p. 248). This may be due to an increase in agricultural impoundments that have been constructed in the past few decades which have unintentionally created suitable habitat for caiman. Each department in which broad-snouted caiman has recently been documented and the most recent date observed is below (Borteiro *et al.* 2008, pp. 244–250).

Dept. of Artigas (Northern Uruguay; caiman commonly found)
- Yacuy stream (2002)
- Mandiyu stream (2003)

Dept. of Cerro Largo (eastern Uruguay)
- Fraile Muerto stream (2005)

Dept. of Lavelleja
- José Pedro Varela (2003)

Dept. of Paysandú (1997)

Dept. of Rocha
- San Luis (2001)
- San Miguel River stream (2003)

Dept. of Rivera (1992)

Dept. of Tacuarembó
- Paso Bonilla (2003)

Dept. of Salto (Northwestern Uruguay, no current reports; historical accounts only, Borteiro *et al.* 2006, pp. 98–100)

Dept. of Treinta y Tres
- Merin Lake; Tacuari River (2002)
- Paso del Dragon (2002)
- Kiosco Tacuari (2003)

Additionally, in Uruguay, a private farm began in 2002 that involved reproduction and reintroduction of this species into the wild. The goal of this Government-sanctioned farm was to produce skins and meat commercially. In 2008, there were 20 adult caiman in the farm, yet they had reintroduced 100 caiman back into the wild (Velasco *et al.* 2008, p. 82). The Service knows of no additional information regarding this private farm.

In summary, the population of broad-snouted caiman in Uruguay appears to be larger than previously believed, but differences in survey methodologies used make it difficult to assess population trends. The percentage of the broad-snouted caiman population that exists in Uruguay has still not been estimated.

Distinct Population Segment Analysis

As indicated previously in this document, the Government of Argentina requested that we review the status of the species in Argentina in order to determine whether or not the species warrants reclassification to threatened status under the Act. Section 3(16) of the Act defines ''species'' to include ''any species or subspecies of fish and wildlife or plants, and any *distinct population segment* (DPS) of any species of vertebrate fish or wildlife which interbreeds when mature'' (16 U.S.C. 1532(16)). In evaluating whether the action petitioned by Argentina is warranted, we first must analyze whether this population constitutes a ''species'' as defined under the Act. Thus, we begin our analysis with a determination of whether the population in Argentina represents a DPS. A DPS is a listable entity under the Act, and is treated the same as a listed species or subspecies. It is listed, protected, and recovered just as any other endangered or threatened species or subspecies. The term ''distinct population segment'' is part of the statutory definition of a ''species'' and is significant for listing, delisting, and reclassification purposes under section 4 of the Act.

To interpret and implement the DPS provisions of the ESA and Congressional guidance, the Service and the National Marine Fisheries Service jointly published the DPS Policy (see the Policy regarding the recognition of distinct vertebrate population segments under the Act (61 FR 4722; February 7, 1996). Congress included the DPS concept in the ESA, recognizing that a listing, reclassification, or delisting action may, in some circumstances, be more appropriately applied over something less than the entire area in which a species or subspecies is found or was known to occur in order to protect and recover organisms in a more timely and cost-effective manner. A DPS is a listable entity that is usually described *geographically* rather than *biologically*. By using international boundaries, we are able to clearly identify the geographic extent of the DPS listing and thereby facilitate law enforcement and promote public understanding of the listing. Under this Policy, we evaluate a set of elements in a three–step process in order to make our decision concerning the establishment and classification of a possible DPS. These elements are applied similarly for both additions to, reclassifications under, and removals from the Federal Lists of Endangered and Threatened Wildlife and Plants. These elements include:

(1) The discreteness of a population in relation to the remainder of the taxon to which it belongs;

(2) The significance of the population segment to the taxon to which it belongs; and

(3) The population segment's conservation status in relation to the Act's standards for listing (addition to the list), delisting (removal from the list), or reclassification (*i.e.,* is the population segment endangered or threatened).

The Policy first requires the Service to determine that a vertebrate population is *discrete* in relation to the remainder of the taxon to which it belongs. Discreteness refers to the ability to delineate a population segment from other members of a taxon based on either (1) Physical, physiological, ecological, or behavioral factors (quantitative measures of genetic or morphological discontinuity may provide evidence of this separation), or (2) international governmental boundaries that result in significant differences in control of exploitation, management, or habitat conservation status, or regulatory mechanisms that are significant in light of section 4(a)(1)(D) of the Act—the inadequacy of existing regulatory mechanisms.

Second, if we determine that the population is discrete under one or more of the discreteness conditions, then a determination is made as to whether the population is significant to the larger taxon to which it belongs in light of Congressional guidance (see Senate Report 151, 96th Congress, 1st Session) that the authority to list DPS's be used ''sparingly and only when the biological evidence indicates that such action is warranted.'' In carrying out this examination, we consider available scientific evidence of the population's importance to the taxon to which it belongs. This consideration may include, but is not limited to the following:

(1) The persistence of the population segment in an ecological setting that is unique or unusual for the taxon;

(2) Evidence that loss of the population segment would result in a significant gap in the range of the taxon;

(3) Evidence that the population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside of its historic range; and

(4) Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics from other populations of the species.

A population segment *needs to satisfy only one of these conditions to be considered significant.* Evidence with respect to any one of these scenarios may allow the Service to conclude that a population segment can be significant to the taxon to which it belongs. Furthermore, the Service may consider other information relevant to the question of significance, as appropriate.

Lastly, if we determine that the population is both discrete and significant, then the DPS Policy requires an analysis of the population segment's conservation status in relation to the Act's standards for listing (addition to the list), delisting (removal from the list), or reclassification (*i.e.,* is the population segment endangered or threatened). A detailed discussion is then presented for the five listing factors for each DPS as required by the Act. We analyze these factors in response to the current status of the species, which encompasses present and future threats and conservation efforts.

The broad-snouted caiman has a continuous range from Argentina to Bolivia, Brazil, Paraguay, Uruguay (see Figure 1). We evaluated the status of this species to determine if two distinct population segments exist (one in Argentina, and the other in Bolivia, Brazil, Paraguay, and Uruguay) under this Policy because its range spans several countries and its conservation status varies by country. We evaluated the species in this manner specifically for two reasons. First, the Government of Argentina petitioned us to reclassify the species in Argentina to threatened, and second, in Argentina, this species is listed in Appendix II of CITES, and in the rest of its range: Bolivia, Brazil, Paraguay, and Uruguay, it is listed in Appendix I of CITES. The significance of this distinction is that these two populations may be subject to different management regimes and may have different conservation statuses. Thus, we considered whether these two populations meet the discreteness and significance criteria under our DPS policy, and then whether these two potential DPSs of the broad-snouted caiman still meet the definition of endangered, should be reclassified to threatened, or whether either population segment has recovered and is no longer either endangered or threatened.

Discreteness

In the first step in our DPS analysis, we determine whether there are any populations that are discrete in relation to the remainder of the taxon to which it belongs. A DPS may be considered discrete if it meets the criteria described above under Distinct Population Segment Analysis. Recognition of international boundaries when they coincide with differences in the management, status, or exploitation of the species under the Act is consistent with CITES, which recognizes international boundaries for these same reasons.

Physical, Physiological, Ecological, or Behavioral Factors

There are no studies or information that indicate there are physical, physiological, ecological, or behavioral characteristics that would contribute to separateness between the Argentine population and the population in Bolivia, Brazil, Paraguay, and Uruguay. The Paraguay River joins the broad-snouted caiman populations in Argentina, Bolivia, Brazil, and Paraguay. The Uruguay population of the broad-snouted caiman is connected to the Argentine and Brazilian populations through the Uruguay River basin (Borteiro *et al.* 2006, p. 103). Broad-snouted caiman populations are also connected through the Paraná and São Francisco River systems of northeast Argentina, southeast Bolivia, Paraguay, and northeast Uruguay. This is a wide-ranging species that occurs primarily in freshwater environments such as lakes, swamps, and slow-moving rivers. Because it is connected via the major river systems that flow through the species' range and we have found no information indicating separateness between the Argentine population and the population occurring in the remainder of the species' range due to physical, physiological, ecological, or behavioral factors,, we did not find either population segment is discrete based on this factor.

Moreover, we are not aware of any quantitative data of genetic or morphological discontinuity to indicate separateness between the two populations. Because of their interactions through interconnected river systems and a current range that mirrors their historical range, we find that the two populations overlap, allowing for genetic intermixing. Therefore, these two population segments cannot be delineated based on physical, physiological, ecological, or behavioral factors.

International Differences in Species' Conservation Status

Under our DPS policy, consideration may be given to utilizing international boundaries in establishing discreteness when differences in management, conservation status, or control of exploitation of the species exist between

these population segments as a consequence of national legislation. Thus, we analyze below whether any of these differences exist that are significant in light of section 4(a)(1)(D) of the Act.

Argentina

Two clear differences in the exploitation, management, habitat conservation status, or regulatory mechanisms of this species exist between Argentina and the remainder of its range. This species is intensely managed in Argentina, and due to its improved status in the wild, is listed in Appendix II of CITES. In contrast, this species is not intensively managed in the remainder of its range, and it continues to be listed in Appendix I under CITES due to its unimproved status in the range countries outside of Argentina. The primary reason this species was protected by the ESA and CITES was because of the decrease in population numbers due to overutilization (see discussion under Factor B in the Evaluation of Factors Affecting the Species section below). Argentina's management regime has resulted in an increase in this species' population such that harvest for international trade may be conducted sustainably under proper management.

Although all of this species' range countries have national protected-species and protected-areas legislation under the jurisdiction of specific ministries or departments that control activities that impact the broad-snouted caiman and its habitat, Argentina's national legal framework is particularly robust (See Factor D). In 1990, Argentina began a joint government-private initiative to recover this species in the Santa Fe Province (Jenkins *et al.* 2004, pp. 25–28; Verdade 2010, pp. 18–20). This program was ratified by Provincial Law 4830, Articles 22 and 37 (CITES CoP 10, Proposal 10.1) and subsequently expanded in scope. Now there are seven government-approved broad-snouted ranching programs within four provinces. This initiative began in order to increase this species' population size and to be able to sustain commercial harvest. In the proposal to transfer this species from CITES Appendix I to Appendix II, the proposal noted that although the primary threat was initially overutilization, the more recent and significant threat was habitat loss (CITES Cop 10, Proposal 10.1). The proposal indicated that a method to reduce the threat of habitat loss is to put an economic value on the species' habitat, so that the local communities and farmers would not drain the land (degrade the species' habitat). Thus, Argentina's caiman egg harvesting program began creating incentives for locals to protect and conserve habitat for the broad-snouted caiman (see Factor D).

This species is also protected through legislation (Law 22.421 and Decree 691/81), administered by the Dirección Nacional de Fauna y Flora Silvestres. The Government of Argentina is adequately enforcing its legal frameworks, both at the national and international levels. The best available information strongly suggests that the caiman population in Argentina is increasing, while the population trend in the other range countries is unclear (Verdade *et al.* 2010, pp. 18–19). The species has significantly increased in density since the caiman ranching program began in 1990, and its range has expanded into areas where it had not been seen prior to 1990. In the Santa Fe Province, for example, the number of nests identified increased from 14 in 1990 to 304 nests in 2002 (Jenkins *et al.* 2004, p. 27). The monitoring reports indicate that Argentina's management of the species is resulting in an upward trend in this species' population. Argentina submits reports in accordance with CITES and is an active participant in the IUCN's Crocodile Specialist Group, particularly for this species. The management of this species has led to significant improvement in the status of the species in Argentina, which has been demonstrated through monitoring and reporting (Jenkins *et al.* 2004, pp. 25–28; Verdade *et al.* 2010, pp. 18–20). Due to Argentina's management, the population of broad-snouted caiman is now widespread and abundant throughout its range in Argentina. It is relatively common in suitable habitat in the provinces of Formosa, Santa Fe, Corrientes, and Salta. While some habitat loss and degradation remain in Argentina, these threats have been reduced, as explained in our five-factor analysis below.

Bolivia, Brazil, Paraguay, Uruguay

Within each of these countries, not only is there a wide variability in the amount of information available about the species, but also about the level of management and monitoring of the species (Borteiro *et al.* 2006; Larriera *et al.* 2008, p. 152; Verdade *et al.* 2010, p. 20). This species is listed in Appendix I of CITES in these range countries, which means that international trade originating from these countries of broad-snouted caiman including its parts and products, for primarily commercial purposes is prohibited. To our knowledge, none of these countries have submitted proposals to change the status of this species under CITES to the less restrictive Appendix II listing (*www.cites.org,* accessed July 7, 2011). Although this international trade restriction is in place for range countries other than Argentina, we remain concerned about habitat loss, the status and management of wild populations in those countries.

In the remainder of this species' range (Bolivia, Brazil, Paraguay, and Uruguay), these governments either have not demonstrated an ability to adequately enforce their legal framework, or there is no population trend or monitoring data about the species to indicate the status of the species in these countries is improving. We found little to no information about the status of the species in these countries. This was supported by the most recent report on the status of the species prepared by the IUCN's Crocodile Specialist Group (Verdade *et al.* 2010, pp. 18–19). The best available information indicates that this species in these countries is still subject to unmitigated pressures such as destruction of habitat due to human encroachment, construction of dams, and conversion of habitat to agriculture, and, in some cases, illegal hunting. Conservation actions for this species may not be a priority in these other range countries, and these countries may be facing economic issues, high levels of poverty, hunting pressure, and conversion of caiman habitat to other uses. The lack of funding and personnel often makes enforcement of their legal frameworks challenging. As a result of differences in exploitation, management, habitat conservation status, or regulatory mechanisms, the broad-snouted caiman in Bolivia, Brazil, Paraguay, and Uruguay remains in CITES Appendix I. Based on these differences in the control and management of habitat and exploitation as delineated by international boundaries, we consider the population in Bolivia, Brazil, Paraguay, and Uruguay to be a separate discrete population.

Conclusion on Discreteness

We have determined, based on the best available information, that the population of broad-snouted caiman in Argentina is discrete from the population in Bolivia, Brazil, Paraguay, and Uruguay due to the significant difference in the control of exploitation, management of habitat, conservation status, and regulatory mechanisms between international boundaries. We conclude that these two populations (1) the population in Argentina and (2), the population in Bolivia, Brazil, Paraguay,

and Uruguay, of the broad-snouted caiman meet the requirements of our DPS Policy for discreteness.

Significance

If a distinct population segment is considered discrete under one or more of the conditions described in the DPS policy, its biological and ecological significance will be considered in light of Congressional guidance (see Senate Report 151, 96th Congress, 1st Session). In making this determination, we consider available scientific evidence of each discrete population segment's importance to the taxon to which it belongs. Since precise circumstances vary considerably from case to case, the DPS policy does not describe all ways that might be used in determining the biological and ecological importance of a discrete population. However, the DPS policy describes four possible scenarios that provide evidence of a population segment's biological and ecological importance to the taxon to which it belongs (see additional discussion above under Distinct Population Segment Analysis).

A population segment needs to satisfy only one of these conditions to be considered significant. Furthermore, other information may be used as appropriate to provide evidence for significance. Having determined that the population of broad-snouted caiman in Argentina is discrete from the population in Bolivia, Brazil, Paraguay, and Uruguay, we then determine the significance of these two discrete populations to the taxon. We evaluate the biological and ecological significance based on the available scientific evidence of each population segment's importance to the taxon to which it belongs. A population's biological significance is evaluated based on the principles of conservation biology using the concepts of *redundancy, resiliency,* and *representation* (see Redford *et al.* 2011 for additional information on these concepts). These concepts also can be expressed in terms of four viability characteristics: Abundance, spatial distribution, productivity, and diversity of the species.

Persistence in a Unique Ecological Setting

The broad-snouted caiman is a wide-ranging species that occurs primarily in freshwater environments such as lakes, swamps, and slow-moving rivers. Its habitat in Argentina is typical of the species' habitat throughout its range (including Bolivia, Brazil, Paraguay, and Uruguay). We do not have any evidence to indicate that the Argentine population of the broad-snouted caiman occurs in habitat that includes unique features not used by the taxon elsewhere in its range. Therefore, we conclude that neither the discrete population of broad-snouted caiman in Argentina nor the discrete population in Bolivia, Brazil, Paraguay, and Uruguay are ''significant'' as a result of persistence in a unique or unusual ecological setting.

Differences in Genetic Characteristics

No data have been located that indicate that the Argentine population and the population in the remaining range countries are each significant based on genetics (Villela *et al.* 2008, pp. 628–635). Our knowledge across the range countries is sparse with respect to genetic diversity and integrity on the broad-snouted caiman. However, a 2008 study indicates that genetic flux (genetic flow between members of a species) occurs; the species remains fairly connected through the major waterways within its range. River channels are important routes to crocodilian dispersal. The Paraguay River joins Brazil, Bolivia, Paraguay, and Argentina, and the populations of this species are connected in part through this river. The populations of this species are also connected between Uruguay and Argentina via the Uruguay River, which is the border between these two countries.

Additionally, a 2006–2007 survey in Brazil found that *C. latirostris* is widely distributed throughout the São Francisco River basin, and its distribution pattern indicates that the populations within the river basin are not fragmented (Filogonio *et al.* 2010, p. 964). The genetic variations of broad-snouted caiman were found to be closely related to patterns of these river basins, and indicated that there was no significant correlation between genetic variation and genetic distance (Villela *et al.* 2008, p. 6). This species is not only a mobile species but is also flexible in its habitat preferences. The river basins within its range appear to be sufficiently connected, despite any habitat modifications. There is no other information available that indicates there are significant differences in the populations. Based on the best available information, we have determined that the Argentine population of the broad-snouted caiman does not have any genetic characteristics that are markedly different from the population in Bolivia, Brazil, Paraguay, and Uruguay.

Gap in the Taxon's Range

The loss of a DPS could result in a significant gap in the range of a taxon, indicating that a population segment represents a significant resource warranting conservation under the Act (61 FR 4724). The Ninth Circuit Court stated ''[t]he plain language of the second significance factor does not limit how a gap could be important,'' *National Association of Home Builders* v. *Norton,* 340 F.3d 835, 846 (9th Cir. 2003). Thus, we consider ways in which the loss of each discrete population of the broad-snouted caiman might result in a significant gap in the range of species. Its range is estimated as follows: 28 percent in Argentina, and 72 percent in the remainder of its range: 4 percent in Bolivia, 58 percent in Brazil, 8 percent in Paraguay, and 2 percent in Uruguay (Larriera pers. comm. 2011).

Argentina

We considered whether the Argentine DPS constitutes a significant gap in the range of the species. In 2006, the population of broad-snouted caiman in Argentina was estimated to be 13 percent of the potential global population. The species is distributed in nine provinces in the northern part of Argentina. It is increasing within its range within Argentina into habitat where it had not been seen since the caiman ranching program began. It has been observed in a variety of habitats and waterways including rivers near waterfalls, freshwater creeks with rocky bottoms, and in agriculture and cattle impoundments.

In Argentina, human impact on the species has been reduced since 1990 through educational programs and incentives which have served to minimize habitat loss. The caiman ranching program (see discussion under Factor A below) has resulted in improvements in the quality of the species' habitat (such as the decrease in draining of wetlands), thereby increasing the range and population size of the species. Its rate of survival in Argentina far surpasses the normal survival rate of this species in the remainder of its range due to the ranching program (described below). Reports indicate that the Argentine population of this species is increasing. The captive-held stock reported in 2010 was 39,624 (Larriera *et al.* 2010, p. 1), and the density of caiman surveyed in the wild has increased substantially (Piña *et al.* 2009, pp. 1–5) since surveying began in 1990.

Argentina is the only range country that actively manages and conserves the broad-snouted caiman and its habitat by harvesting eggs, hatching the young, raising them to an age where they are more able to escape predators and other threats, and returning between five and ten percent of those hatchlings to the

wild (Verdade *et al.* 2010, p. 20). Experts indicate that returning at least five percent of the hatchlings to the wild increases the species' survivability, as it mitigates for the high incidence of mortality that occurs in the wild even prior to hatching (Bolton 1989, Ch. 4, p. 1). Most caiman mortalities occur either before hatching or during the first few months after hatching due to factors such as flooding or nest predation (Bolton 1989, Ch. 4, p. 1). The release of these animals at a later age significantly increases their chances of survival, primarily due to the hatchlings' increased ability to escape predators and their ability to survive other factors such as nest flooding, fire ants, and exposure to pesticides. Because Argentina releases hatchlings into the wild after an age they are most susceptible to predators and flooding events, the population has a greater chance of survival in the wild than broad-snouted caiman hatchlings in the other range countries. This increase in survivability further distinguishes the Argentine population from rest of the species' range and greatly contributes to the resiliency (abundance, spatial distribution, and productivity) to the species as a whole.

Argentina's wild caiman population is also well distributed. The Argentine population is considered healthy and increasing as opposed to the populations in Bolivia, Brazil, Paraguay, and Uruguay. This species is moving into habitat where it had not been seen in many years, which increases the potential environmental variability within the range of the species. Argentina's broad-snouted caiman population helps contribute to the viability of the species overall; and it is providing a margin of safety for the species to withstand catastrophic events, strengthening the redundancy of the species. This expansion allows for adaptations in response to variations in the environment. The abundance of this species in Argentina contributes to the potential diversity of the species, particularly since Argentina constitutes the southernmost part of its range. Because it is at the edge of its range, this population may add to its adaptive capabilities, particularly if there is a significant gradient in temperature within the range of the species. Because the Argentine population is more robust than the other range countries, the loss of the Argentine population would result in a significant gap in the range of the species, particularly because it is believed to consist of over a quarter (approximately 28 percent) of the species' range.

Argentina's active management efforts affect the quality of the species' habitat which subsequently contributes to the species' resiliency. Based on the increase in density as evidenced by the population counts, the significant increase of hatchlings reared in captivity and subsequently released, and the expansion in range, we find that the population of the broad-snouted caiman in Argentina significantly contributes to the resiliency of the species.

We found that the success of the caiman ranching program has created a robust, healthy, sustainable, increasing population in Argentina. This distinguishes the Argentine population from rest of the species' range where it is not being intensely monitored and managed to the point where it is self-sustaining. The factors in Argentina including: The increase in density and population counts; large numbers of caiman collected from the wild, reared in captivity and subsequently released; and expansion in range, all contribute to the resiliency, representation, and redundancy of the species and its overall viability.

Thus, the loss of the Argentine population would create a significant gap in the current range of the species. Based on this evaluation of this population's biological significance, we found that the broad-snouted caiman in Argentina is significant to the species as a whole. We, therefore, conclude that the population of broad-snouted caiman in Argentina is significant under the DPS policy because it contributes to the redundancy, resilience, and representation of the species such that the loss of this DPS would result in a significant gap in the range of this taxon.

Bolivia, Brazil, Paraguay, and Uruguay

Because the species is widely distributed within these countries and constitutes 72 percent of its range, the Bolivia, Brazil, Paraguay, and Uruguay population is significant under the DPS policy because it also contributes to the redundancy, resilience, and representation of the species such that the loss of this population would result in a significant gap in the range of this taxon.

Conclusion on Significance

We have determined, based on the best available information, that the population of broad-snouted caiman in Argentina is significant to the taxon and the population in Bolivia, Brazil, Paraguay, and Uruguay is also significant to the taxon because the loss of each discrete population segment would create a significant gap in the current range of the species. Based on this evaluation of each population segment's significance, we found that each is significant to the species as a whole.

Conclusion of DPS Analysis

Under the DPS policy, once we have found that a population segment is discrete and significant, we then evaluate whether the potential DPS warrants endangered or threatened status under the Act, considering the factors enumerated under section 4(a)(1) and the statutory definitions for an ''endangered species'' and ''threatened species.'' Based on our evaluation under the DPS Policy, we propose to establish two distinct population segments of the broad-snouted caiman. The first is the population in Argentina, and the second is the population in the remainder of its range: Bolivia, Brazil, Paraguay, and Uruguay. We will refer to this second population as the ''Northern DPS.'' On the basis of the best available information, we conclude that each of these two population segments meet the requirements of our DPS Policy for discreteness and significance. These two DPSs are each discrete due to the significant differences in the management of habitat, conservation status, exploitation, and regulatory mechanisms between the international boundaries of Argentina and the species in the rest of its range: Bolivia, Brazil, Paraguay, and Uruguay. These two discrete population segments are clearly defined by international governmental boundaries and these other differences.

The robustness of the population in Argentina significantly contributes to the biological and ecological health and viability of the species as a whole. Argentina is the only country actively managing the broad-snouted caiman. It also is the only country actively working with local people to create financial incentives to protect caiman and its habitat. Argentina's implementation of its ranching program increases the species' survivability success, which further distinguishes the Argentine population from the rest of the species' range. It was reclassified to Appendix II in Argentina, allowing for commercial trade in accordance with the provisions of CITES. Due to Argentina's intense management of this species, the survivability rate of the Argentine population is far higher than in the other countries within this species' range. This difference is further supported by the fact that broad-snouted caiman in Bolivia, Brazil, Paraguay, and Uruguay remains listed in Appendix I of CITES as a species threatened with

extinction which is or may be affected by trade, while the population in Argentina no longer meets the criteria for an Appendix I listing.

We find that these two population segments meet our DPS policy for significance because the loss of either population (28 percent of its range in Argentina and 72 percent of its range in Bolivia, Brazil, Paraguay, and Uruguay) would result in a significant gap in the range of the taxon. Based on our analysis, we find that these two populations meet the criteria for discreteness and significance under the DPS Policy due to (a) differences in management delineated by international boundaries, and (b) a loss of either population segment (28 percent of its range in Argentina and 72 percent of its range in Bolivia, Brazil, Paraguay, and Uruguay) would result in a significant gap in the range of the taxon.

Evaluation of Factors Affecting the Species

Section 4(b) of the Act and regulations promulgated to implement the listing provisions of the Act (50 CFR part 424) set forth the procedures for listing, reclassifying, or removing species from listed status. We may determine a species to be an endangered or threatened species because of one or more of the five factors described in section 4(a)(1) of the Act; we must consider these same five factors in delisting species. Revisions to the list (adding, removing, or reclassifying a species) must reflect determinations made in accordance with these same five factors and the Act's definitions for endangered and threatened species Section 4(b) requires the determination of whether a species is threatened or endangered to be based on the best available science. We are to make this determination after conducting a review of the status of the species and taking into account any efforts being made by foreign governments to protect the species.

For species that are already listed as threatened or endangered, this analysis of threats is an evaluation of both the threats currently facing the species and the threats that are reasonably likely to affect the species in the foreseeable future following the delisting or downlisting and the removal or reduction of the Act's protections. Under section 3 of the Act, a species is ''endangered'' if it is in danger of extinction throughout all or a significant portion of its range and is ''threatened'' if it is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The word ''species'' also includes any subspecies or, for vertebrates, distinct population segments.

Following is a range wide threats analysis in which we evaluate whether the broad-snouted caiman is endangered or threatened in the Argentine DPS and the DPS which consists of Bolivia, Brazil, Paraguay, Uruguay, which we will refer to as the Northern DPS.

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

Habitat destruction and modification has increased throughout the species' range and is now likely the greatest threat to the survival of the broad-snouted caiman (Verdade *et al.* 2010, pp. 18–19). The overharvest for commercial purposes, rather than habitat destruction or modification, was the primary reason for the broad-snouted caiman's inclusion in CITES and subsequently being listed under the Act. The analysis of the five factors under the Act requires an investigation of both current and future potential factors that may impact the species, including the present or threatened destruction, modification, or curtailment of its habitat or range. We found that data on habitat destruction were generally presented separately for each individual country. Therefore, the following analysis of the potential threats to the species from habitat destruction or modification generally first presents the specific information available for broad-snouted caiman in each country, and then summarizes the information that was available for the two DPSs.

Argentine DPS

In some areas in Argentina, habitat destruction has significantly increased in recent years (Verdade *et al.* 2010, p. 19). Argentina has lost substantial forested areas, and conversion of caiman habitat to other uses is likely to further affect the broad-snouted caiman's habitat in Argentina. In some cases, habitat modification actually has positive effects on the caiman (such as the creation of water impoundments, for example), and in other cases the habitat modifications may have a negative effect. The practice of drying swamps (potential caiman habitat) through channeling occurs in its habitat, particularly for producing soybeans (Larriera *et al.* 2008, p. 152). Landowners also commonly channelize wetlands to increase grazing land for cattle (which may have a positive effect). Since the early 1800s, Argentina's economy greatly depended on cattle grazing; however, over the past 10 years, Argentina has undergone significant changes in land use.

The world market for soy is causing the conversion of pastures to soy monocultures. Soy is now Argentina's main export crop, and Argentina is the world's third largest producer of this commodity (USDA, Foreign Agricultural Service (FAS) 2010a, p. 11). Argentina's shift toward soy has displaced cultivation of many grains and vegetables as well as beef production. Many established cattle ranches are being sold to soy investors. For example, in Salta Province, potential conversion to soy cropland in Northern Argentina could exceed over one million hectares (USDA FAS 2010b, p. 1). Cattle feed mostly on established introduced grasses but native grasslands also persist in pastures, especially along wetlands edges. Soy now covers approximately 16.6 million hectares, more than half the country's cultivated land (USDA FAS 2010b, p. 10). The large scale production of soy requires the application of fertilizers and pesticides. As a result of this change in habitat use from traditional cattle grazing to primarily soy production in many areas, significant changes in the habitat and landscape occur which affect this species to the point that its former habitat is no longer suitable.

Adding to this problem of habitat conversion is that Argentina's management of its resources is decentralized. Provincial and municipal governments have great autonomy, property rights are respected, and federal authority is relatively limited. This is particularly evident in control over property with respect to the conservation of natural resources, land use, and protection of the environment. In this decentralized system, there is very little comprehensive land use planning at all levels of government. Regulatory mechanisms that exist at the national and provincial levels are seldom coordinated and are sometimes contradictory and inefficient.

Although habitat conversion is currently impacting the species, suitable broad-snouted caiman appears to exist, and the species is expanding into new sites, in part due to intense management of this species through Argentina's caiman ranching programs. For example, as of 2004, surveys indicated that the broad-snouted caiman population in Santa Fe Province increased 320 percent since the project began (Larriera and Imhof 2006). Observed wild population densities increased from an average of between 2 and 8 individuals per km in 1990, to between 20 and 120 individuals per km during the 2008–2009 survey period

(Larriera and Siroski 2010, p. 2). The distribution of the wild population has expanded into areas from which the species had formerly disappeared (Larriera *et al.* 2005).

With respect to habitat modification, some changes have positive effects and some have negative effects. Although this species has been shown to occupy disturbed habitat, much of the species' original range in Argentina has been altered, and significant alteration is expected to occur in the future due to the conversion of cattle pastures to monocultures such as soy, which is not desirable habitat. Increases have been observed in the relative abundance of the species in Argentina due in part to active management programs (see Factor D). These caiman conservation and public awareness programs have resulted in less habitat alteration (*e.g.* burned grass) and less drained marshland for cattle production in the nesting areas (Larriera and Imhof 2006). While these programs are helping, increases in habitat conversion to agriculture, roads and transportation, infrastructure to transport crops such as soy continue (USDA FAS 2010b, p. 2). Without additional incentives and intervention, suitable habitat for this species will decrease. Although it is mitigated by provincial governments through the caiman ranching program, habitat destruction and modification in Argentina is likely to continue in the foreseeable future. Despite the intense management of this species in Argentina, we conclude that the present or threatened destruction, modification, or curtailment of its habitat or range continues to be a threat to the broad-snouted caiman.

Summary of Factor A for the Argentine DPS

In most of the range of this species, the habitat threats are very similar; however, a country's management actions (refer to factor D) affect the status of the species. In Argentina, habitat conversion to agriculture continues to cause habitat degradation within the broad-snouted caiman range, although this is being mitigated through the caiman ranching program. Habitat conversion is expected to increase and further degrade this species' habitat. The population numbers in the wild have significantly increased since this species was listed. Data collected on the distribution and abundance of the species indicate that the species' range has expanded and overall population numbers appear to be increasing (Larriera and Imhof 2006). As of 2004, surveys indicate that the broad-snouted caiman population in Santa Fe Province, Argentina, increased 320 percent since the project began (Larriera and Imhof 2006). Observed wild population densities here increased from an average of 2 to 8 individuals per km in 1990, to 20 to 120 individuals per km in 2008–2009 (Larriera and Siroski 2010; p. 2). The distribution of the wild population has also expanded into areas from which the species had formerly disappeared (Larriera *et al.* 2005). However, the degradation and destruction of this species' habitat continues to occur in Argentina. Therefore, based on the best available information, we find that the population in Argentina continues to be threatened by the destruction, modification, or curtailment of its habitat now and in the future.

Bolivia, Brazil, Paraguay, Uruguay DPS (Northern DPS)

In Bolivia, the broad-snouted caiman is on the edge of its range. Broad-snouted caiman has been found in the Pando Department, the Pilcomayo River area, a tributary of the Paraguay River, and in the Tarija department. Here, key threats, particularly in broad-snouted caiman habitat, include loss, conversion, and degradation of forests and other natural habitats and pollution of aquatic ecosystems (Byers *et al.* 2006, p. vi). Particular to this species, both agriculture and pollution have been indicated to be significant threats. In Bolivia, vast areas have been drained for agricultural purposes (also see the discussion under Factor E).

Deforestation in lowland Bolivia exceeded 1,500 km^2 (579 mi^2) per year during the 1980s and early 1990s (Steininger *et al.* 2001, pp. 856–866). Currently, about 300,000 ha (741,316 ac) of forest is lost each year for a variety of reasons including expanding agriculture, due both to large-scale industrial agriculture and to small-scale colonization and cultivation; large-scale infrastructure projects (roads, dams, energy infrastructure); expanding coca production; forest fires; illegal logging; and climate change causing changes in geographical and altitudinal distribution of species and ecosystems (Byers *et al.* 2006, p. vi).

Factors such as low land prices and economic policies promoting an export economy have led to a rapid increase in the growth of the private agricultural sector (Pacheco 1998). Both large-scale and small-scale farmers contribute to the expansion of the agriculture and livestock frontier, and both thrive in the near absence of regulatory oversight and control (Byers *et al.* 2008, p. 22). In Bolivia, large tracts of land have been cleared particularly for sugarcane plantations and soybean production (Aide and Grau 2004, p. 1915; Pacheco 2004, pp. 205–225). The highest abundance values of this species were recorded in ''atajados'' (dikes) and artificial ponds. The tropical forests of Bolivia are found in the departments of Santa Cruz, Beni, and Pando, and northern areas of La Paz and Cochabamba. The deforestation to the north and east of Santa Cruz is primarily due to large-scale agro-industry, whereas the areas of deforestation around Pando and Beni tend to be mainly a result of small-scale colonization and clearing. Large-scale agriculture responds mainly to external market demands (*e.g.,* biofuels, sugarcane, soy; principally from the United States, Brazil, and Argentina), while smaller farmers respond mainly to the domestic market.

The government actively promotes the development of infrastructure projects in the Bolivian lowlands, in particular extensive road construction and improvement (Byers *et al.* 2008 p. 22). Road projects in northwest Bolivia are being considered, including paving of the ''Northern Corridor,'' which is part of the Peru-Brazil-Bolivia hub of the Initiative for Integration of Regional Infrastructure in South America (IIRSA, *http://www.iirsa.org*).

Contamination of water bodies due to sugar mills, which empty their waste into the Rio Grande (Aparicio and Rios 2008, p. 114), also occurs. Sugar mills are commonly known to produce high levels of air and solid waste pollutants as byproducts (U.S. Environmental Protection Agency [EPA] 1997, 26 pp). Waste water from sugar mills can rapidly deplete available oxygen in water creating an inhospitable environment for aquatic life and for species that depend on aquatic environments. In the Bermejo River sub-basin in Tarija, Bolivia, based on the absence of nests and the low number of individuals recorded during nest counts, researchers believe that this population of broad-snouted caiman is probably not reproductively active due to water pollution (Aparicio and Rios 2008, p. 115). This particular area borders wetlands and estuaries in Argentina, where higher quality suitable habitat is available (OSDE 2005b, p. 2) for the species and is likely less disturbed and polluted by humans. Because the Bermejo River sub-basin in Bolivia faces threats due to sugarcane plantations and contamination from sugar mill activities, it is not likely to sustain a healthy population of broad-snouted caiman.

Although natural resource managers recognize the importance of wetlands

(Byers *et al.* 2008, p. 14), economic considerations usually outweigh concerns regarding habitat loss and destruction in Bolivia. The activities described under this factor, such as agricultural production and expansion, sugar mill activities, roads, and other infrastructure development, affect broad-snouted caiman habitat. Its habitat is primarily being affected due to agriculture and pollution. Based on the above factors, we find that the present or threatened destruction, modification, or curtailment of its habitat or range continues to be a threat to this species in Bolivia.

In Brazil, agriculture, pollution, and hydroelectric dams have been indicated to be significant threats to the species (Verdade *et al.* 2010, p. 1). In this country, vast areas have been drained for agricultural purposes. The effects from agricultural activities on the species can be either consumptive (for example, destruction of nests and eggs by machinery) or nonconsumptive (for example, loss of access to traditional nesting or feeding sites), and these effects are generally attributed to habitat loss or fragmentation. Pollution has been a considerable problem in rivers that flow through Brazil's large cities. São Paulo, Brazil's largest city, is in the center of the species' range in Brazil. The species exists here in artificial reservoirs, ponds, marshes, and small wetlands. Construction of large hydroelectric dams (Verdade *et al.* 2010, p. 19) to support Brazil's human population has been indicated to be one of the primary threats here to broad-snouted caiman. Most of the natural wetlands of the Paraná and São Francisco River systems in Brazil have been dammed for these large hydroelectric stations. Construction of dams can have severe impacts on ecosystems (McCartney *et al.* 2001, p. v). For example, a dam blocks the flow of sediment downstream. During construction of dams, disturbance to soils at the construction site is one of the largest concerns. This leads to downstream erosion and increased sediment buildup in a reservoir.

Because the construction of the Jupifi and Ilha Solteira Dams in the 1970s caused the loss of a significant amount of floodplains of the Paraná River, a survey was conducted prior to construction of the Porto Primavera Dam (also known as the Engineer Sérgio Motta Dam). The Porto Primavera Dam is 28 km (17 mi) upstream from the confluence of the Paranapanema and Paraná Rivers. This dam created the Porto Primavera Reservoir and was filled in two stages: The first in December 1998 and the second in March 2001. The purpose of the 1995 survey was to determine what species would be affected by the construction. The survey was done in the Paraná River basin between São Paulo and Mato Grosso do Sul states. The number of caiman nests found during the survey indicated that at least 630 reproductive females were present at that time. The presence of so many nests suggested a large total population (Mourão and Campos 1995, pp. 27–29) in that area. After the study was completed, a recommendation was made to create a reserve to protect habitat downstream of the dam; however, it is unclear whether a reserve was established as a result of the dam being constructed.

With the construction of Porto Primavera Dam, the last floodplains of the Paraná River within the state of São Paulo disappeared, and with them, those populations of wild animals dependent on wetlands for survival also disappeared. Lakes, swamps, and seasonally flooded areas contribute to hydrological ecosystem processes by retaining water and mitigating flooding. These wetlands and lakes are important ecosystem components and are particularly important to the broad-snouted caiman. When altered, they no longer are capable of supporting their unique assemblages of species and maintaining important ecological processes and functions, upon which the caiman relies. Caiman use the São Francisco River main channel and its tributaries as dispersion routes; however, populations of individuals of all age and sizes occur mainly in lentic (still water such as lakes, ponds, or swamps) environments. Studies on the impact of the construction of large hydroelectric stations and how they affect the density and reproduction of broad-snouted caiman populations were conducted using aerial surveys (Mourão and Campos 1995, pp. 27–29). The surveys indicate major damage of the habitat due to these dams. An unusual finding with respect to caiman was that researchers found that the destruction of floating vegetation is particularly destructive. This is likely because floating vegetation is used by caiman for nest construction.

In 2001, the government of Brazil launched a plan for the São Francisco River basin in order to minimize human impacts and implement restoration efforts (Andrade 2002 in Filogonio *et al.* 2010, p. 962). This was a huge undertaking involving federal and local governments, nongovernmental organizations (NGOs), universities, and the public. An initial report was issued in 2005 that indicated that progress had been made in terms of identifying these four issues to be addressed: (1) River basin and coastal zone environmental analysis; (2) public and stakeholder participation; (3) organizational structure development; and (4) watershed management program formulation. As of 2005, the studies and projects had all been completed (www.oas.org/osde, accessed March 9, 2011). However, the implementation process is still underway (*www.ana.gov.br/gefsf,* accessed March 9, 2011).

Caiman habitat is still severely degraded in Brazil. Broad-snouted caiman in the São Francisco River basin occurred not only in preserved habitats but also in habitats affected strongly by human occupation. This attests to the species' highly flexible nature. Researchers even found broad-snouted caiman in sewage and urbanized areas, showing that the species is fairly resistant to human impacts and that habitat modification has varied effects on the species' distribution. The data indicated that habitat modification may be a variable in determining the small size of these natural populations, rather than affecting the species' distribution pattern, at least in Brazil (Filogonio *et al.* 2010, p. 964). A 2006–2007 survey found that most of the surveyed sites presented some degree of human impact (Filogonio *et al.* 2010, p. 962). Habitat modification included: Conversion to pasture in 46 surveyed localities (72 percent), roads (25 localities; 39 percent), urbanization (23 localities; 36 percent) and monocultures (Filogonio *et al.* 2010, p. 962). Of the areas surveyed, broad-snouted caiman was present (positively identified as broad-snouted caiman rather than a different caiman species or unknown caiman species), in 39 localities surveyed (61 percent), and was widely distributed along the river basin. Its presence was detected in all lentic water body types, in the three biomes: Cerrado, Caatinga, and Atlantic Forest (Filogonio *et al.* 2010, pp. 963–964). However, the researchers did not attempt to estimate population size. They observed a number of populations with low numbers of individuals, which were scattered throughout the survey sites. During 2006 and 2007 surveys, researchers found the presence of caiman species in only 17 municipalities in 64 locations along the São Francisco River basin in Brazil.

The density data found in Brazil were similar to that found by Borteiro (2006, 2008), who also found broad-snouted caiman widespread in Uruguay, occurring in 29 of the 36 localities surveyed (81 percent of the sampled areas). Caiman in Brazil were observed in lotic (actively moving water) habitats,

and considering that river channels are important routes to crocodilian dispersal, it is logical to predict not only physical movement of *C. latirostris* throughout its range, but also genetic flux within the river basin. The distribution pattern in Brazil indicates that the populations within the river basin are not fragmented, but seem to exist in low numbers. Despite this data, trend data are lacking regarding the population in Brazil and the health of the species overall. The construction of hydroelectric dams and associated habitat degradation such as pollution and environmental degradation is currently affecting broad-snouted caiman and its habitat. Pollution is a severe problem—caiman habitat overlaps São Paulo, Brazil's largest city, and these polluted rivers that flow through Brazil's large cities.

Although a plan was initiated in 2001 to address issues associated with the construction of the dam in central caiman habitat, 10 years later, there is no evidence that caiman habitat has improved in Brazil, nor does it appear that caiman are a main concern of the plan. The conservation of broad-snouted caiman in Brazil does not appear to be a priority, and there is very little current information available regarding this species in Brazil. Based on the best available scientific and commercial information available, we find that the present or threatened destruction, modification, or curtailment of this species' habitat is a threat to the species and is likely to continue in the future in Brazil.

In Paraguay, no recent data are available specifically for this species. However, we do know that over the past 60 years, widespread and uncontrolled deforestation practices have continued throughout Paraguay, particularly in the eastern region (World Land Trust 2009, p. 1). In 1945, 8.8 million ha (21,745,273 ac) of forest covered this region, but currently it is estimated that less than 1.6 million ha (3,953,686 ac) remain (Huerta 2011, p. 1). Most of Paraguay's tropical moist forests are in the eastern region of the country near the Paraná River. This river is 4,880 km (3,032 mi) in length and extends from the confluence of the Grande and Paranaíba rivers in southern Brazil. It runs through the Atlantic rainforest, also known as Mata Atlântica. The Atlantic Forest stretches from northeast Brazil along the Brazilian Atlantic coastline into Uruguay, inland into the northeast portion of Argentina and eastern Paraguay; and partially overlaps the range of the broad-snouted caiman. Imhof (unpubl. 2006) estimated that 7 percent of the species' range is in Paraguay. Within Paraguay, the Atlantic Forest has been under increasing pressure from development. In Paraguay, the Atlantic Forest is reduced to one large tract, San Rafael, and increasingly numerous scattered and fragmented small patches. More than half of the original area of the Atlantic rainforests had been degraded by the turn of the last century, and more recently only one percent was found to be still in its original state (Wilson 1988, in Rivas *et al.* 1999, chapter 5). Conservative estimates have placed the remaining forest cover in Paraguay at approximately 6 percent of the original cover (IUCN 1988a). Threats to this remaining forest cover include fragmentation and acceleration of large-scale agriculture and ranching projects, commercial logging, and the construction of hydroelectric dams (Rivas *et al.* 1999, ch. 5) such as the Itaipu hydroelectric dam on the borders of Paraguay and Brazil.

Habitat destruction has increased throughout the species' range in Paraguay, and is believed to be one of the greatest threats to its survival in Paraguay (Verdade 1998, pp. 18–19). Approximately 98 percent of Paraguay's population lives in Paraguay's eastern region, with a population density of 18.6 per km^2, compared with 0.2 per km^2 in the western, or Chaco, region. A contributing factor is that in the eastern region, the soil is more suitable for cultivating crops; therefore, cattle production, forestry products, and agricultural crops are widespread in the range of this species in Paraguay. Paraguay's main agricultural exports are soybeans and cotton (Harcourt and Sayer 1996; USDA FAS 2010, p. 2). Although the overharvest for commercial purposes, rather than habitat destruction or modification, was the primary reason for this species being listed under the Act, threats have changed. Now, the largest threat seems to be habitat destruction or modification due to agriculture and development of urban infrastructure, which still occur to a large extent in Paraguay, particularly within the range of broad-snouted caiman. Paraguay implemented a Zero Deforestation Law as of 2004; however prior to that law, its rate of deforestation was the second highest in the world (WWF 2006, p. 1). Despite the enactment of this law, the best available information indicates that this habitat destruction and modification still significantly affect this species. We have no indication that conditions have improved in Paraguay since this species was listed under the Act; rather, habitat loss has increased. Therefore, we find that the present and threatened destruction, modification, or curtailment of its habitat in Paraguay continues to be a threat to broad-snouted caiman. However, we will review the information we receive during the comment period on this proposed rule.

In Uruguay, very little information has been collected about how habitat degradation affects the broad-snouted caiman. Based on available information, current threats to this species' habitat in Uruguay are likely due to agriculture and cattle ranching which occur within this species' range. Cattle and sheep farming in Uruguay occupy 60 percent of its land (Food and Agriculture Organization of the United Nations [FAO], p. 4). Other agricultural activities such as production for dairy, fodder for cattle, and crops such as rice consist of approximately 20 percent. Secondary, related effects related to agriculture are habitat degradation and pollution due to pesticide use, erosion, and altered ecosystems. The surveys conducted in the early 2000s indicate that caiman do exist in manmade habitats in northwestern Uruguay. However, the current amount of suitable habitat for this species in Uruguay is unknown. Researchers suggest that the apparent increase in this species' population may be due to the construction of agriculture impoundments, which provide habitat for broad-snouted caiman in recent decades (Borteiro *et al.* 2008, p. 248). In the area surveyed to determine caiman presence and abundance, impoundments were being used mainly for irrigation of rice (69 percent) and sugar cane crops (31 percent) in the Ñaquiñá stream basin. In the Lenguazo stream basin, 80 percent was used for irrigation of sugar cane and 20 percent was used for other food crops.

Two other factors that likely affect caiman habitat here are drought and hydroelectric dams (United Nations Environment Programme [UNEP] 2004, pp. 78–85; Borteiro *et al.* 2008, p. 248; Verdade *et al.* 2010, p. 20). Uruguay has experienced severe drought in the past few years (IPS NEWS 2011), which has had a significant effect on agricultural and cattle production, and this very likely affects caiman habitat. The construction and existence of hydroelectric dams to generate electricity may be an additional threat to the broad-snouted caiman (UNEP 2004, pp. 78–85). Uruguay is highly dependent on hydroelectricity, and these hydroelectric dams are within broad-snouted caiman habitat. Although we know these activities occur within the range of the broad-snouted caiman in Uruguay, there is very little

information regarding the status of the species in Uruguay. We have no evidence that there has been any change to the status of the species in Uruguay. We do not know population trends in Uruguay, and threats to the species' habitat such as agricultural activities, drought, and hydroelectric dams exist. There is no information to indicate that habitat modification or destruction has decreased such that the population trend is stable or increasing. Researchers here recommend more surveys of broad-snouted caiman at a larger scale in northern Uruguay to assess the usage of manmade habitats by caiman in order to apply this knowledge to caiman conservation and management strategies. Given the lack of evidence that indicates that Uruguay's population of broad-snouted caiman has either increased or has stabilized since its inclusion under the Act, we find that the present or threatened destruction, modification, or curtailment of its habitat or range continues to be a threat to the species in Uruguay.

Summary of Factor A for Bolivia, Brazil, Paraguay and Uruguay (Northern) DPS

In most of the range of this species, the habitat threats are very similar; however, a country's management actions (refer to factor D) may affect the status of the species. In Bolivia, Brazil, Paraguay, and Uruguay, although these countries are making progress with respect to habitat modification and destruction and some have adopted relevant conservation laws (see Factor D), habitat loss continues to occur. Increasing human populations, development of hydroelectric projects, and draining of wetlands also have caused habitat degradation. Conversion of broad-snouted caiman habitat to agricultural plantations occurs commonly in these countries, and adequate management plans in these countries for this species are not in place. We seek information on the status of the species, particularly in Bolivia, Brazil, Paraguay, and Uruguay, as part of this proposed rule. Although the species is widespread, we have no information to indicate that the status of the species has changed in these four countries, and there is little to no population trend information available in these countries. Based on a review of the best available information, we find the destruction, modification, or curtailment of its habitat or range in these four countries is a continued threat to the species.

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

The overharvest for commercial purposes was the primary reason for the broad-snouted caiman's inclusion in Appendix I of CITES and subsequent listing under the Act. The species suffered due to effects of unregulated exploitation between 1930 and 1980. Protections were put in place because the species had suffered substantial population declines throughout its range due to overexploitation through the commercial crocodilian skin trade. Under this factor, we examine how overutilization within each country has changed since the species was listed under the Act, and then we discuss this factor with respect to international trade and its regulation through CITES.

Argentine DPS

In Argentina, illegal hunting was widespread through the late 1980s, but decreased in the early 1990s (Micucci and Waller 1995, pp. 81–108) due to the proliferation of caiman ranching programs and the enforcement of national and provincial regulations (see Factor D). Between the 1940s and early 1990s, reports indicate that more than 700,000 caiman skins were produced from Corrientes Province in Argentina (estimated in Micucci and Waller (1995) in Piña *et al.* 2010, p. 4). Some of these skins were illegally obtained; however, there has been no report of illegal hunting since 1998 (Larriera *et al.* 2008, p. 143). Since the species was listed both under CITES and the Act, a significant change in public perception and awareness regarding this species has occurred. Now, the species is thought to be managed sustainably in Argentina (Jelden 2010, pers. comm.; Verdade *et al.* 2010, p. 19; Woodward 2010, p. 3). Local people participate in caiman ranching programs in which they locate nests and harvest eggs from these nests (Larriera *et al.* 2008; Verdade *et al.* 2010, p. 19) and take them to captive-rearing facilities. These individuals, primarily cattle-ranchers, are compensated for the eggs. The communities within the range of the broad-snouted caiman have an understanding of the caiman ranching program, and they no longer have a need or desire to illegally hunt these animals because individuals earn an income from harvesting eggs. This is due in part to a long-standing public awareness program and significant community involvement in protecting this species (Larriera *et al.* 2008, p. 145).

The Government of Argentina has had a long history of research and active management of its population of the broad-snouted caiman, particularly since 1990. Currently, there are seven ranching programs registered with the Federal government in Argentina. Three of them function as educational programs, with no commercial exploitation. The non-commercial ranching operations are in Entre Ríos, Chaco, and Corrientes Provinces. There are four commercial ranching programs: two in Formosa Province, one in Corrientes Province, and one in Santa Fe Province. The ranching programs in Formosa, Corrientes, and Chaco are for both the broad-snouted caiman and yacare caiman. The programs in Entre Ríos and Santa Fe are for only broad-snouted caiman. Each ranching program showed an increase in the number of eggs collected since the program began. This indicates an upward trend in population numbers.

Ranching Programs in Argentina

On cattle ranches in Argentina, landowners commonly channelize the wetlands to increase grazing land for cattle; this subsequently provides suitable caiman habitat. Most habitat preferred by the caiman (swamps with heavy vegetation) are considered unproductive agricultural land. In the past, the swampy areas have been drained for conversion to agricultural lands. However, by placing an economic value on preserving caiman habitat through compensation from the ranching program, habitat destruction can be reduced. Additionally, by providing monetary compensation to ranch employees for each nest they locate, there is incentive for ranch owners and employees to protect the wetlands and caiman nesting areas. As of 2006, there had been a 30 percent increase in the caiman nesting areas on cattle ranches where caiman egg harvest occurs (Larriera *et al.* 2006). For example, the caiman nesting area of the Lucero Ranch (Estancia) in Santa Fe Province was 830 ha (2,051 ac) in 1990, and increased to 1,060 ha (2,619 ac) in 2004. Larriera suggests that one reason for the increased population density may be due to a decline in the practice of burning and drying wetlands for economic reasons, in addition to the dispersion of female broad-snouted caiman into new habitat due to the caiman ranching program.

In the wild, as many as 60 to 70 percent of the eggs do not hatch (Smith and Webb 1985; Woodward *et al.* 1989, p. 124). Estimated survival of hatchlings in the wild has been as low as 10 to 20 percent, depending on environmental conditions (*e.g.,* frost and predation can alter survival (Aparicio and Rios 2008,

p. 109); see discussion under Factors C and D below). In Woodward, researchers explained that in order to increase survival rate of American alligators, the practice of egg collection has been implemented to preclude embryo mortality due to factors such as depredation, flooding, and desiccation. In the Argentina ranching program, to increase survivability, young caiman are reintroduced to their former nesting site after they have passed critical life stages in which they are more susceptible to factors such as predation and nest flooding (Larriera 2003). Removal and incubation of eggs taken from the wild increases hatchling survivability because the larger the caiman is, the greater likelihood it has of long-term survival in the wild (Woodward *et al.* 1989, p. 124).

High mortality can occur during the first few weeks of incubation in the wild; one study found that highest embryo mortality of alligator eggs occurred between days 7 and 16 of incubation (Joanen and McNease 1987 in Woodward *et al.* 1989, p. 124). In the caiman ranching programs in Argentina, the practice is to remove all eggs from all the nests in collection areas that are accessible and not flooded, burned, depredated, or necessary for survival studies (Larriera 1995). Between the months of December and January, eggs are collected soon after laying. Caiman ranch project managers pay cattle ranch employees for each located nest, and each nest is assigned a number. The nests are marked so that young hatched and reared in captivity can be returned to the same area. Each ranching program maintains records of how many are collected, how many are reared, and how many individuals are later released back into the wild.

Artificial incubation has been demonstrated to enhance hatch success in addition to early development of hatchlings (Ferguson 1985, Joanen and McNease 1987 in Woodward *et al.* 1989, p. 124). Caiman ranching programs in Argentina use various methods in artificial incubation to increase the success rate. For example, small temperature variances can be used to accelerate the growth of hatchlings. Animals reared at a slightly higher temperature (22.4 °C; 72.3 °F) grow faster than those maintained at a lower temperature (18.2 °C; 65 °F) (Piña and Larriera 2002, pp. 387–391). Hatching success and survival are not negatively affected by artificial incubation temperature, as long as it is within the appropriate temperature range for this species (Piña *et al.* 2003, pp. 199–201). For broad-snouted caiman, eggs incubated at 29 or 31 °C (84–88 °F) produced 100 percent females, while at 33 °C (91 °F) 100 percent males were produced. Incubation at a higher temperature (34.5 °C; 94 °F) induced production of both sexes (Simoncini *et al.* 2008, p. 231).

Young are marked by removing selected caudal scutes corresponding to hatch year and nest origin. Hatchlings are raised for nine months in concrete pools until November, when some are removed for reintroduction to the original nest site. The decision on how many young will be retained in captivity for commercial production; as well as how many will be reintroduced to the wild depends on the status of the wild population in the area from which the eggs were harvested. Argentina provides reports to the CITES Secretariat in accordance with CITES Resolution Conf. 11.16. If there is a high population density in the wild, more young are retained and raised for commercial purposes.

Chaco Province

El Cachapé Wildlife Refuge (Refugio de Vida Silvestre El Cachapé) is a conservation and sustainable-use project developed through an agreement between a private landowner and Fundación Vida Silvestre Argentina in Chaco Province. The project was established in 1996 for the ranching of both yacare and broad-snouted caiman (Cossu *et al.* 2007, p. 330), and it also conducts ecotourism activities. El Cachapé is in the center of the harvest area, and encompasses 1,760 hectares (ha) (4,349 acres (ac)). Between 1998 and 2004, the Chaco program collected 4,867 eggs and released 1,236 yearlings (Larriera and Imhof 2006) within the Chaco Province. A population survey conducted over 60,000 ha (148,263 ac) of the harvest area in Chaco Province indicates that there was an average density of 4.0 individuals of *C. latirostris* per km during the 1999–2000 study period (Prado 2005), but we are unaware of any additional data collected since that time. This conservation ranching program is working towards increasing population numbers of this species in the Chaco Province (Verdade 2010, pp. 18–22). We are requesting additional information pertaining to population data for all provinces, including the Chaco Province, as part of this proposed rule.

Corrientes Province

An experimental program in Corrientes Province was established in 2004, based on an agreement between a company called Yacaré Porá S.A. and the Dirección Provincial de Recursos Naturales (Provincial Directorate of Natural Resources, Corrientes Province). The experimental program initially conducted surveys and included a small-scale collection of eggs. Population surveys for yacare and broad-snouted caiman in the province were conducted to determine the feasibility and biological sustainability of a commercial ranching program (Micucci and Waller 2005) and now this is a commercial operation. In preparation for the experimental ranching program in the Province of Corrientes, the numbers of broad-snouted caiman nests in three study areas were surveyed. In nesting seasons 2004–2005 and 2005–2006, one area maintained its number of nests and the other two areas showed increases resulting in a total of 165 nests observed in the first season; and 265 nests observed in the second season (Larriera *et al.* 2008). The first egg collection was conducted in 2005 (Jenkins *et al.* 2006, p. 27). In late 2010, 500 hatchlings were released. As of 2010, there were 4,736 hatchlings and 12,793 individuals over one year in age in captivity (Larriera 2010, p. 1).

Formosa Province

The program in Formosa Province (in the most northern part of the species range in Argentina) was established in 2001, based on an agreement between a company called Caimanes de Formosa S.R.L. and the Dirección de Fauna y Parques de Formosa (Directorate of Wildlife and Parks of Formosa) under the Ministry of Production (Jenkins *et al.* 2006). The first egg collection in Formosa Province was in 2002. The Formosa program collected 13,050 eggs between 2002 and 2004, and released 1,265 young (Larriera and Imhof 2006). Surveys of the combined yacare caiman and broad-snouted caiman populations in Formosa have indicated that the wild population densities have increased from a range of 2.3 to 66 individuals per km in 2002 (Siroski 2003; Siroski and Piña 2006), to 22 to 238 individuals per km in 2008 (Piña *et al.* 2008).

Santa Fe Province

The Santa Fe program (in the southernmost part of the species' range in Argentina) is the largest of the approved programs; this province has the largest population of broad-snouted caiman in the wild in Argentina. Proyecto Yacaré, in the province of Santa Fe, Argentina, was established in 1990, with an agreement between the Ministry of Agriculture of the Province of Santa Fe and a non-governmental organization called Mutual del Personal Civil de la Nación (Benefit of Civil Personnel of the Nation) to improve the

conservation status of the broad-snouted caiman and its wetland ecosystem (Larriera and Imhof 2000). The northern part of the Province of Santa Fe contains 80 percent of the wild broad-snouted caiman population in Argentina. Early on, the Caiman Specialist Group (CSG) identified ranching programs in Argentina as a high priority for species conservation (Verdade 1998, pp. 18–19). It described the program in Santa Fe Province as a model for other Argentine provinces where habitat still remains and the wild population is large. In 1999, the management for sustainable use of broad-snouted caiman reached a commercial scale (Verdade 1998, pp. 18–19).

Between 1990 and 2004, the Santa Fe program harvested 1,410 of 1,945 identified nests and produced 35,197 hatchlings from 47,948 eggs (Larriera and Imhof 2006). Of the hatchlings that survived, 15,120 yearlings were returned to the wild and 14,046 were retained for commercial use (Larriera and Imhof 2006). The number of nests found in the collection area increased from 14 (1990–1991) to 439 (2003–2004), resulting in an increase from 372 to 12,031 eggs collected per year during the same time period (Larriera and Imhof 2006). Mean clutch size in Santa Fe Province has been reported to be 35 eggs per nest, and the natural incubation period is around 70 days (Larriera and Imhof 2000).

As of 2004, monitoring the wild population in the collection areas indicated that the broad-snouted caiman population in Santa Fe increased 320 percent since the project began (Larriera and Imhof 2006). Observed wild population densities increased from an average of 2 to 8 individuals per km in 1990, to 20 to 120 individuals per km in 2008–2009 (Larriera and Siroski 2010, p. 2). This program has resulted in increased numbers of broad-snouted caiman in the wild in areas surveyed and expansion of nesting areas (Larriera and Imhof 2000, 2006; Larriera *et al.* 2006). The distribution of the wild population has expanded into areas from which the species had formerly disappeared (Larriera *et al.* 2005).

International Trade and Regulation Under CITES

CITES provides varying degrees of protection to more than 32,000 species of animals and plants that are traded as whole specimens, parts, or products. CITES regulates the import, export, and reexport of specimens, parts, and products of CITES-listed plant and animal species (also see discussion under Factor D). Trade is managed through a system of permits and certificates that are issued by the designated CITES Management and Scientific Authorities of each CITES Party (*http://www.cites.org*). In the United States, the Scientific and Management Authorities reside in the U.S. Fish and Wildlife Service.

Under CITES, a species is listed in one of three appendices; listing in each Appendix has a corresponding level of protection (*i.e.,* regulation of international trade), and different permit requirements (CITES 2007). Appendix II allows for commercial trade and includes species requiring regulation of international trade in order to ensure that trade of the species is compatible with the species' survival. At times a species may be listed as endangered under the U.S. Endangered Species Act, and concurrently listed under Appendix II of CITES, rather than the more restrictive Appendix I, which does not allow commercial trade of wild specimens, except under limited circumstances. Although CITES Appendix II allows for commercial trade, in order for specimens of this species to be traded internationally, a determination must be made that the specimens were legally obtained; and that the export will not be detrimental to the survival of the species in the wild. CITES Appendix I includes species that are ''threatened with extinction which are or may be affected by trade.'' Appendix I has a further restriction that a CITES import permit must be issued by the importing country after finding that the specimen will not be used for primarily commercial purposes.

The World Conservation Monitoring Centre (WCMC) at UNEP manages a CITES Trade Database on behalf of the CITES Secretariat. Each Party to CITES is responsible for compiling and submitting annual reports to the CITES Secretariat regarding their country's international trade in species protected under CITES. The trade database (*www.unep-wcmc.org/citestrade*) indicates that between 2000 and 2009, 11,837 broad-snouted caiman parts and products (primarily leather and skins), plus an additional 1,210 kilograms (2,662 pounds) of such parts and products were exported. The vast majority of exports were from Argentina, and the database did not indicate any trends in the trade data to cause concern. There were very few exports from the other range countries during the period reviewed.

If the proposed rule to reclassify the Argentine population and accompanying Special Rule are finalized, then commercial exports of broad-snouted caiman products from Argentina to the United States would be allowed, provided that certain conditions are met. We do not believe this potential increase in international trade is likely to threaten or endanger wild broad-snouted caiman based on Argentina's management and monitoring of the caiman ranching program. However, exports of broad-snouted caiman and its parts and products from the rest of the range countries would still be regulated under CITES Appendix I and as endangered under the Act.

Summary of Factor B for Argentine DPS

In Argentina, the legal harvest does not appear to have negative impacts on the species based on reported harvest, nest counts, and egg harvest trends (Larriera *et al.* 2010, pp. 1–2; Larriera and Siroski 2010, pp. 1–5). We believe that adequate protections are in place under Federal and provincial law and regulations in Argentina. Broad-snouted caiman that hatched in captivity and were released near their former nesting site have successfully matured and reproduced in the wild (Larriera *et al.* 2006). For example, during the summers of 2001 and 2002, seven females released as part of Proyecto Yacaré were recaptured while attending their nests. The females were between 9 and 10 years old at the time of capture. Their clutch sizes and hatching success were similar to those of wild females of unknown age also captured during the season. Mortality of eggs and hatchlings in the wild can exceed 95 percent (Hutton 1984 in Larriera *et al.* 2008, p. 154). This indicates that released ranched yearlings can survive and reproduce at least as successfully as their wild counterparts, and may have a greater rate of survival.

Research also indicates that this practice of releasing a percentage of captive-hatched juveniles is a valuable management tool for crocodilian species. This is because releasing them into the wild at an age of 8–10 months, rather than at hatching, has been shown to enhance their chances of survival (Elsey *et al.* 1992, p. 671). Survivorship in juvenile alligators has been shown to be a function of size, with survivorship increasing as size increases (Woodward *et al.* 1989, p. 124).

Wild populations in the collection areas are increasing based on egg collection and density surveys (Larriera *et al.* 2010). Despite the fact that all accessible nests are harvested in the collection areas and the number of yearlings returned to the wild is variable, the Santa Fe program has resulted in higher population densities. Increased reproduction in released

animals, a greater number of nests located and harvested, and the observation of broad-snouted caiman in areas where they had been extirpated (Larriera and Imhof 2006; Larriera *et al.* 2008, pp. 143–172) have also been observed. What may be most important to the survival of the broad-snouted caiman, however, is that nesting areas are now protected by local inhabitants who have an economic interest in maintaining the wild populations. Due to public awareness programs and monetary incentives for locals who collect eggs, there has been no report of illegal harvest since 1998.

The information reported on ranching programs indicate increased population numbers in Argentina of this species based on nest counts and egg harvest reports (Jenkins *et al.* 2006, pp. 26–27). For example, in the 1991 season in Santa Fe, 10 nests were harvested; 14 nests were located, and 237 hatchlings were produced. In 2003, 228 nests were located, 304 were identified, and 5,638 hatchlings were produced (p. 27). The current population survey methods used in Argentina are not entirely reliable as a tool for establishing direct relationships with populations in the wild, but they provide a general idea of the increase in caiman numbers. Prior determination of density or absolute abundance of nests prior to the removal of eggs is a more reliable way of determining the population numbers. Although there is not accurate population trend data for this species in the wild (Micucci 2010 pers. comm.), we consider the egg harvest data to be the best available information. Micucci points out that the information provided directly by nest counts and night surveys is more reliable and direct than egg harvest counts, at least in environments with large fluctuations in water mass, which is the case of this species, particularly in Argentina (2010 pers. comm.). We acknowledge that the current population survey methods used in Argentina are not the most reliable means of providing population estimates of this species in the wild; however, the data collected indicate an upward trend in population numbers for this species.

A secondary concern in the management of this species in Argentina is there may be inadequate oversight by provincial governments when extracting eggs from nests, movement of eggs, and tracking the origin of these eggs (this also applies to Factor D, the *Inadequacy of Regulatory Mechanisms*). Additionally, the level of independent or outside evaluation of the ranching programs in Argentina is unclear and there may be a lack of transparency in monitoring. This may be indicative of a need for stronger involvement by the provincial and federal governments or the need for a stronger legal framework at the provincial level to regulate or monitor these activities. However, despite these concerns, the reports on the broad-snouted caiman conservation program in Argentina do indicate that the population is increasing, and the program is being actively monitored within the country. The government of Argentina oversees the ranching program in Santa Fe Province, and Santa Fe contains the largest population of broad-snouted caiman in the wild.

The species is not overutilized in Argentina and overutilization is unlikely to be a threat to the population in the future. Annual reporting under CITES may alert us to any new threat of overutilization in Argentina. We are seeking information on the status of the species in Argentina as part of this proposed rule. However, based on a review of the best available information, and in the absence of conflicting new information, we find no evidence that overutilization for commercial, recreational, scientific, or educational purposes is a threat to the broad-snouted caiman throughout its range.

Bolivia, Brazil, Paraguay, and Uruguay (Northern) DPS

One of the primary threats to the species before it was listed in CITES Appendix I in 1975 was uncontrolled international trade. In Bolivia, Brazil, Paraguay, and Uruguay, this species is listed in Appendix I of CITES. International trade primarily for commercial purposes is restricted from Bolivia, Brazil, Paraguay, and Uruguay due to the species' Appendix I status under CITES. The UNEP–WCMC trade database did not indicate any unusual trends in the species' trade with respect to these countries.

Beginning in the 1940s, the broad-snouted caiman was hunted commercially for international trade in its leather, which is commonly reported to be of higher quality than that of other caiman species (Brazaitis 1987 in Verdade *et al.* 2010, pp. 1–2). However, since the time the species has been protected by CITES and the Act, this factor is no longer a threat to the species in these countries.

In Bolivia, caiman is used for its fat, meat, and leather products (Aparicio and Rios 2008, p. 112). It is also killed out of fear by humans. In the Chaco province of Bolivia, there were reports of the species attacking and killing pigs and other small cattle (Pacheco in Embert 2007, p. 55), but these incidences do not seem to occur frequently. No other recent data are available in Bolivia for this species.

In Brazil, small amounts of illegal harvest are reported to still occur in some areas (Verdade *et al.* 2010, p. 19) and in Uruguay (Borteiro *et al.* 2006, p. 102). In northeastern Brazil, illegal hunting still supplies local markets for meat in small cities along the São Francisco River basin. The meat is sold as salted carcasses like codfish, and is actually called ''São Francisco codfish'' (Verdade 2001a). Hunting for meat also occurs in some parts of Uruguay (Borteiro *et al.* 2006, p. 104). However, species experts concluded that illegal hunting is no longer a major threat to the species due to improved protection, costs and consequences of illegal hunting, and the availability of legal skins (Verdade 1998, pp. 18–19). People in the past justified hunting caiman primarily for food. Many fishermen also killed caiman because caiman feed on the fish in their fishing nets, and caiman also destroy their nets (Filogonio *et al.* 2010, p. 964). Thus, current levels of hunting pressure may have only localized impacts.

In Paraguay, in the past, the broad-snouted caiman may have been subject to greater hunting pressure than *C. yacare* because the quality of its skin is considered finer (Scott *et al.* 1990, pp. 45–46). Hunting was almost uncontrolled through 1990, and some caiman populations almost disappeared. However, small residual populations were increasing in size when last surveyed in places where they and their habitat were protected (Scott *et al.* 1990, pp. 45–46).

In Uruguay, broad-snouted caiman was never legally hunted for commercial purposes (Verdade 1998, pp. 18–19), although illegal hunting has been observed (Borteiro *et al.* 2006, p. 97). Uruguay's standard of living, literacy rate, and large urban middle class (*http://www.state.gov,* accessed March 14, 2011) are reported to be quite high compared with other countries within this species' range, which may account for the lack of commercial hunting in this country. There is no indication that overutilization occurs in Uruguay.

Summary of Factor B for the Bolivia, Brazil, Paraguay, and Uruguay (Northern) DPS

We are seeking information on the status of the species in Bolivia, Brazil, Paraguay, and Uruguay as part of this proposed rule. Domestic use still occurs, but levels remain low. Any incidence of hunting or harvest that may occur does not significantly affect the species. Based on a review of the best available

information, and in the absence of conflicting new information, we find that overutilization for commercial, recreational, scientific, or educational purposes is no longer a threat to the broad-snouted caiman in Bolivia, Brazil, Paraguay, and Uruguay.

Factor C. Disease or Predation

Argentina

There is little information on diseases that affect wild broad-snouted caiman (Huchzermeyer 2003; Jacobson 2007). In 1999, the Field Veterinary Program of the Wildlife Conservation Society and Fundación Vida Silvestre Argentina studied the health of caiman populations in the wild and in captivity at the El Cachapé ranching operation in Chaco Province, Argentina. There was a very low incidence of pathogens and no evidence of infectious disease in either population. Health conditions of ranched and wild animals continue to be monitored in Argentina (Uhart and Moreno 2000; Uhart *et al.* 2000).

There is naturally a high level of predation on eggs and hatchlings. In the wild, an average of 60 to 70 percent of the eggs do not hatch, usually due to nest flooding or predation (Hutton 1984; Larriera 2003). One study found that the rate of depredation in a low rainfall season was significantly higher than normal seasons; resulting in over half of the nests being depredated in some areas (Larriera and Piña 2000). During particularly dry seasons, high predation may occur due to easier access to nests, and the increased distance between the nest and the water. This may be in part due to less maternal attention when the mother is in the water. At such times, up to 50 percent of entire clutches in forest nests and 80 percent of clutches along levees and dykes can be consumed by predators (Larriera and Imhof 2006). Predators of eggs and hatchlings include herons (*Ardea cocoi*), storks (*Ciconia ciconia*), crested caracaras (*Caracara plancus*), iguanas (*Tupinambis merianae*), and carnivorous mammals such as the South American gray fox (*Pseudalopex griseus*) (Larriera and Imhof 2006). Other research found that no more than 10 percent of the hatchlings typically survive to adulthood (Larriera and Imhof 2006). This level of mortality from predation is considered normal in caiman populations.

In Argentina, methods are taken to minimize the effects of predation. To decrease the death rate due to predation, ranched young are returned to the wild only after they are past the critical first year when the risk of predation is greatest (Larriera and Imhof 2006). Even when nests are depredated, females can rebuild these nests (Larriera and Piña 2000). Clutch sizes can be as high as 129 eggs in a good year (Larriera 2002, p. 202). Based on surveys conducted and numbers of eggs collected, it appears that caiman populations are continuing to increase in Argentina. Although disease and predation are sources of mortality, it is not a limiting factor for population growth.

Summary of Factor C for the Argentine DPS

Disease and predation normally occur in populations, and the best available scientific and commercial information does not indicate that either of these factors negatively affect the broad-snouted caiman here such that they rise to the level of threats to the species. Neither disease nor predation are a significant factor affecting this species. Therefore, we do not find that disease nor predation threatens this distinct population segment of the broad-snouted caiman, now or in the future.

Bolivia, Brazil, Paraguay, and Uruguay (Northern) DPS

In the range countries of Bolivia, Brazil, Paraguay, and Uruguay, there is no indication that disease and predation are affecting the broad-snouted caiman such that this factor threatens the species. Therefore, we do not find that disease nor predation threatens this population segment of the broad-snouted caiman.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Argentine DPS

The broad-snouted caiman was listed in Appendix I of CITES on July 1, 1975. This listing (also refer to the factor B discussion) requires strict regulation of international movement of this species, which may only be authorized in ''exceptional circumstances,'' and trade for commercial purposes is generally prohibited. In 1990, the ''Projecto Yacaré'' was implemented in Argentina based on a concept of conservation through sustainable use of broad-snouted caiman. The objective of the program was to improve the status of the population in two ways: by creating incentives for landowners and by increasing public awareness in the local communities to encourage the increase of caiman populations. Another objective was to conserve natural wetlands on which caimans depend (Larriera *et al.* 2008a, pp. 143–145). These programs also reintroduce captive-raised individuals to the wild. Since the government of Argentina began the management and monitoring of the Argentine population of broad-snouted caiman, population estimates for Argentina have indicated an upward trend. Through this program, a significant increase in egg collection and harvest has occurred in the wild; over 30,000 hatchlings from eggs collected have been released into the wild since the program began.

On September 18, 1997, at the 10th meeting of the Conference of the Parties (''CoP10''), the Argentine population of broad-snouted caiman was transferred to Appendix II based on a proposal from Argentina. The proposal described the increased population status of the species in Argentina, and a ranching program that had contributed to its increase (CoP10 Doc. 10.86, CoP10 Prop. 10.1, Government of Argentina 1997). Appendix II allows for regulated commercial trade as long as the exporting country finds that the specimens were legally acquired and that the activity is not detrimental to the survival of the species. Exported skins must be tagged according to the CITES Resolution on a universal tagging system for the identification of crocodile skins (Resolution Conf. 11.12 (Rev. CoP15)).

A Resolution on a universal tagging system for the identification of crocodile skins was adopted by the Parties at CoP9, held in 1994. At CoP10 (1997, Harare, Zimbabwe), the CITES Secretariat reported that, to its knowledge, all range countries were effectively implementing the Universal Tagging System Resolution. *Caiman yacare* skins and products originating in Argentina have been imported into the United States with the appropriate CITES tags. This species was downlisted under the Act in 2000 to threatened status [65 FR 25867, May 4, 2000]. Adherence to the CITES tagging requirements has reduced the potential for substitution of illegal skins, which has reduced trade enforcement problems involving the similarity of appearance of skins and products among different species of crocodilians.

According to CITES Resolution Conf. 11.16 (Rev. CoP15), for trade in ranched specimens of species transferred from Appendix I to Appendix II to occur, a ranching program must: (1) Demonstrate that the program is beneficial to the conservation of the local population; (2) identify and document all products to ensure that they can be readily distinguished from products of Appendix I populations; (3) maintain appropriate inventories and harvest-level controls and mechanisms in the program to monitor wild populations; and (4) establish sufficient safeguards in

the program to ensure that adequate numbers of animals are returned to the wild if necessary and where appropriate.

At the national level, Argentine Law 22.421 prohibits all use of fauna that is not specifically authorized (Micucci and Waller 1995). In 2000, when the experimental operations began commercial production of broad-snouted caiman, Resolution 283/00 was enacted by the Government of Argentina under Law 22.421. This law approves the inter-province transit and export of caiman products from ranching operations that comply with CITES Resolution 11.16, but trade in specimens from any other sources (*i.e.,* not from registered ranching operations) is illegal. Resolution 283/00 also establishes minimum requirements for ranching operations. One of the requirements is that there must be a baseline population study covering at least 40 percent of the province in which the operation is located. The study must be conducted for at least 2 years (Larriera and Imhof 2006). The study results must be approved by the province and then submitted to the national authorities (Dirección de Fauna y Flora Silvestres [Directorate of Wild Fauna and Flora]) for final approval. The Registro Nacional de Criaderos (National Registry of Breeding Centers, Resolution 26/92) lists registered ranching operations. In provinces with nationally approved ranching programs, the provincial government must conduct an annual evaluation of the population status of the species in their province and submit it to the Dirección de Fauna y Flora Silvestres. According to Larriera (pers. comm. 2006), all the surveys are conducted under the supervision of members of the CSG. Ranching operations and harvests of wildlife that are not transported across provincial boundaries or exported are controlled through regulation at the provincial level (Larriera and Imhof 2006).

National Legislation To Implement CITES

Information available to the Service indicates that Argentina has protected-species and protected-areas legislation under the jurisdiction of specific ministries or departments that control activities that impact the broad-snouted caiman and its habitat. The Federal legal framework within the Government of Argentina is particularly robust. The CITES National Legislation Project (*www.cites.org,* SC59 Document 11, Annex p. 1) deemed that the Government of Argentina has national legislation that is considered Category 1, which means they meet all the requirements to implement CITES. With respect to CITES, based on the trade data (see Factor B discussion) and other data and information available to the Service, the Argentina appears to be adequately enforcing international trade through its legal framework.

Summary of Factor D for Argentine DPS

Monitoring indicates that management efforts within Argentina are working. The population in Argentina, based on reports provided to the Service and the CITES Secretariat, appears to be increasing. All Parties that conduct ranching operations approved in accordance with Resolution Conf. 11.16 are obligated to report to the CITES Secretariat (Jenkins *et al.* 2006, p. 3). While some habitat loss and degradation remain in Argentina, these threats have been reduced based on intensive management efforts of this species. These reports suggest that the populations of this species are increasing in Argentina. While we do not have complete population survey information in Argentina, all indications suggest that the wild population is well managed and is increasing. Wildlife such as the caiman can be advantageously used in commerce if management is sufficient to maintain suitable habitats, and if harvest is at a level that allows maintenance of healthy and sustainable populations. Broad-snouted caiman, under such conditions, can provide revenue to pay for its own management and stimulate local economies. Therefore, we find that although the strong management of the species through local programs promoting egg harvest and hatchling release has reduced threats to this species and its habitat, threats (see factor A) do still exist. With respect to international trade of broad-snouted caiman parts and products, we find that CITES is an adequate regulatory mechanism throughout its range. We will continue to monitor the status of the species in Argentina; however, based on the best available information, we find that this factor is not a threat to the species in Argentina.

Bolivia, Brazil, Paraguay, and Uruguay (Northern) DPS

Bolivia's current environmental legislative framework represents a significant improvement since the 1992 World Summit on Sustainable Development in Rio de Janeiro began a foundation for the sustainable and equitable use of the country's environmental resources and to control destructive practices. This framework has had a positive effect on Bolivia's economic development, especially in the forestry sector, where it provided clearly defined roles for institutional oversight and control. To its credit, Bolivia has become the world leader in the area of certified production forests (Byers *et al.* 2008, p. 31). Because there has been a growing concern regarding indigenous people's rights, workers' rights, and reductions in the environmental impact of logging, there has been an increase in third-party certifiers such as the Forest Stewardship Council (FSC) in the global wood trade (www.fsc.org, accessed March 14, 2011). FSC certification ensures that wood is responsibly harvested. In Bolivia, most of the FSC certified operations are large-scale private enterprises that are able to pay for audits and maintain access to international markets for certified products. However, management issues in Bolivia still remain. The ratification of autonomy statutes by the Departments of Santa Cruz, Pando, Beni, and Tarija, and their conflict with the National government is currently one of the more contentious issues (Byers *et al.* p. 33). The most important implications of this movement toward enhanced departmental authority and responsibility relate to land-use planning and authority over land tenure matters. This issue is still in flux and this transfer towards decentralized governance could have negative repercussions on the broad-snouted caiman.

With respect to caiman management in Bolivia, a management plan for *Caiman latirostris* population recovery and conservation in Tarija department was proposed for 2006–2009. It is unclear whether the plan was implemented, and no updated data have been provided with respect to the species' status in Bolivia (Aparicio and Ríos 2008). The best available information does not indicate that the regulatory mechanisms in place are adequate to sufficiently protect this species. Populations of broad-snouted caiman are still considered to be severely depleted in Bolivia (Aparicio and Ríos 2008, p. 104; Verdade *et al.* 2010, p. 19). Habitat loss, destruction, and modification (refer to Factor A discussion) are still occurring and are not expected to decrease in the future (Anderson and Gibson 2006, p. 99), thus suggesting that existing regulatory mechanisms are insufficient to ameliorate or remove the threat from habitat destruction.

Brazil is faced with competing priorities of encouraging development for economic growth and resource protection. In the past, the Brazilian government, through various

regulations, policies, incentives, and subsidies, has actively encouraged development of previously undeveloped lands in southeastern Brazil, which helped facilitate the large-scale habitat conversions that have occurred throughout the Atlantic Forest (Ratter *et al.* 1997, pp. 227–228; Saatchi *et al.* 2001, p. 874; Brannstrom 2000, p. 326; Butler 2007, p. 3; Conservation International 2007c, p. 1; Pivello 2007, p. 2). These development projects include logging, housing and tourism developments, and expansion of plantations (Collar *et al.* 1992, p. 776; Ratter *et al.* 1997, pp. 227–228; Barnett *et al.* 2000, pp. 377–378; Saatchi *et al.* 2001, p. 874; Butler 2007, p. 3). These projects impact potentially important sites for this species and would affect habitat within and adjacent to established protection areas in Brazil (Collar *et al.* 1992, p. 776; Barnett *et al.* 2000, p. 377–378). The Brazilian government has encouraged development of dams for hydroelectric power, irrigation and expansion of agricultural practices, primarily for soybean production (Braz *et al.* 2003, p. 70; Hughes *et al.* 2006, pp. 51–56; Verdade *et al.* 2010, pp. 18–19). Brazil's competing priorities make it difficult to enforce regulations that protect broad-snouted caiman habitat.

In 2003, Brazil established a nationwide research and development program, called Programme for Biology, Conservation and Management of Brazilian Crocodilians (Coutinho and Luz 2008 in Velasco *et al.* 2008 p. 80). The broad-snouted caiman was listed as an endangered species in Brazil until 2003, at which time the species was withdrawn from the Brazilian List of Endangered Fauna (The Brazilian Institute of Environment and Renewable Natural Resources [IBAMA] 2003). Despite these initiatives, we have no information to indicate that regulatory mechanisms exist to effectively limit or restrict habitat destruction for this species. We do not have information indicating that impacts to this species (*e.g.,* development of dams for hydroelectric power, and expansion of agricultural practices, primarily for soybean production) have been or will be adequately addressed through existing regulatory mechanisms at the sites where this species is found or in its habitat. Based on data and information available to the Service, we believe that the existing regulatory mechanisms in Brazil are inadequate to ameliorate the current threats to this species in Brazil.

In Paraguay, the environmental situation has improved; Paraguay has completed many of its governmental reform objectives (USAID 2004, p. 4). However, there are still concerns; land is still being converted to soybean plantations, and land ownership is still a concern in Paraguay (USAID 2004, pp. 3, 8). Paraguay's objectives are to work towards more effective regulation and utilization practices. Environmental laws, such as the ''Zero Deforestation Law'' and ''Valuation and Retribution of Environmental Services Law'' have had the most significant impact during the past five years. These measures have declared wild areas be protected from the private sector.

While we acknowledge that Paraguay is making significant progress in the conservation of its resources, existing regulatory mechanisms are still inadequate. For example, Paraguay provides a legal framework for the forestry sector under the Forest Law of 1973. Some of the aspects of Paraguay's forest law are that it establishes incentives for reforestation and defines forest land in categories such as reserves, production forests, or semi-protected forests; and sets up regulations and fines to protect the forest resources. The export of logs was prohibited in 1972, but illegal export was still occurring in the 1980s, especially from the northeastern part of the country (IIED and USAID 1985, in Harcourt and Sayer 1996). In part, this has been due to insufficient financial resources. The 1973 Forest law was problematic in the sense that not only does it allow people to colonize forest reserves, but it also considers forested lands unproductive, and therefore little attempt is made to prevent deforestation. Agricultural land has a much higher economic value than forested land (in some regions it can be as high as $1,000 U.S. dollar (USD) per ha, compared with $400 USD per ha for forested land), which represents an obvious economic incentive for deforestation. In 1991, Paraguay's annual deforestation rate was estimated to be 4.7 percent (WWF 1991, cited in Brooks *et al.* 1992), which at the time was higher than that of any other South American country.

More recently, Paraguay enacted a Forest Conversion Moratorium (also known as the Zero Deforestation Law) in 2004 which is still in place. The law prohibits the conversion of forested areas in Paraguay's eastern regions. Restrictions are difficult to implement and enforce. For example, the area in the northernmost part of Paraguay known as the Alto Paraguay was once a refuge for wildlife such as the caiman. This was primarily due to its isolation and difficulty in accessing the habitat. However, when the Paraguayan government promoted a waterway in the Paraguay–Paraná Basin known as the Hidrovía development project, the Alto Paraguay forest became an area of land speculation. It is unclear what is occurring in this area now and how this activity may affect the broad-snouted caiman.

There is no evidence that effective protective measures have been undertaken to conserve the broad-snouted caiman. The existing regulatory mechanisms currently in place for broad-snouted caiman in Paraguay do not adequately address the factors threatening the species. We are seeking information and data on the status of the species in Paraguay as part of this proposed rule; however, in the absence of new information, we find that regulatory mechanisms in Paraguay are inadequate to protect broad-snouted caiman.

Uruguay's richest biodiversity is found in its wetlands and its growing practice of rice production. Its economy is highly dependent on exports, and the agricultural sector contributes 11 percent of its total gross domestic product (GDP). One of Uruguay's environmental problems is that rice paddies are replacing marshlands, and it is causing degradation of these ecosystems. While some species are capable of adapting to these human-made ecosystems, environmental degradation is associated with the conversion of natural habitat to rice paddies.

The government has taken steps to address the issue of wetland protection and biodiversity. Uruguay has developed methods aimed at improving issues associated with rice production such as harmful residue generated during processing and is working at methods of reducing the impact caused by residue accumulation. In the past, the rice hulls were burned which emitted toxic chemicals into the atmosphere and contributed to air pollution. Now, Uruguay is working towards composting the rice hulls, which has minimal environmental impact. Additionally, Uruguay became a member of the Ramsar Convention in 1984 and a member of the Convention on Biological Diversity in 1992 in order to increase wetlands protection. Uruguay enacted law number 16.170 which directly addresses the conservation of wetlands, and specifically mandates that the areas assigned for wetlands conservation must be respected by rice farmers.

Although Uruguay has made progress in improving its environmental laws and recognizes the importance of protecting its biodiversity, enforcement

of its laws regulating protection of this species may still be insufficient in some areas (Brazaitis *et al.* 1996). This has primarily been due to the limited resources available to local enforcement agencies, as well as the remoteness and inaccessibility of much of the caiman habitat. We have no information to indicate that the existing regulatory mechanisms effectively limit or restrict habitat destruction for this species. Although Uruguay is making progress in its protection of natural resources, it is unclear how this species is being monitored and managed in Uruguay. We do not have sufficient evidence that impacts to this species (*e.g.,* conversion of wetlands to rice paddies and subsequent environmental degradation that occurs) have been or will be adequately addressed through existing regulatory mechanisms at the sites where this species is found or in its habitat. Based on the best available information, we find that the existing regulatory mechanisms continue to be inadequate to ameliorate the current threats to this species in Uruguay.

National Legislation To Implement CITES in Bolivia, Brazil, Paraguay, and Uruguay

The CITES National Legislation Project (*www.cites.org,* SC59 Document 11, Annex p. 1) deemed that the Governments of Brazil and Uruguay have national legislation that is considered Category 1, which means they meet all the requirements to implement CITES. Bolivia was described as being in Category 2, both with a CITES legislation plan and draft legislation, but not enacted, and Paraguay was described as Category 2 with no plan and only draft legislation. Overutilization (unsustainable trade in skins, parts, and products) was the primary reason that this species was listed in CITES Appendix I and also listed as endangered under the ESA. However, now, overutilization is no longer a concern for this species. With respect to CITES, based on the trade data (see Factor B discussion), we find that the governments of Bolivia, Brazil, Paraguay, and Uruguay are adequately enforcing international trade through their respective legal frameworks.

Summary of Factor D for Bolivia, Brazil, Paraguay, and Uruguay (Northern) DPS

With respect to international trade of broad-snouted caiman parts and products, we find that CITES is an adequate regulatory mechanism in Bolivia, Brazil, Paraguay, and Uruguay. However, the best available scientific and commercial information indicates that broad-snouted caiman continues to be threatened by the inadequacy of the existing regulatory mechanisms in Bolivia, Brazil, Paraguay, and Uruguay to ameliorate the effects of habitat loss and degradation. Management efforts vary within the range of broad-snouted caiman. Each country has both unique and overlapping factors that affect the species. In some cases, there was an abundance of information available regarding potential threats to the species, and in other cases, there was little to no information available, particularly regarding the adequacy of regulatory mechanisms with respect to this species.

In Bolivia, Brazil, Paraguay, and Uruguay, the best available information indicates that the primary threat to the species is habitat loss (Factor A). Related to this factor is the inability of the governments, at a national, provincial, or regional level, to adequately enforce mechanisms to address threats. In these countries, there is little monitoring data on broad-snouted caiman. Based on a review of the information available, we were unable to find that regulatory mechanisms are adequate in Bolivia, Brazil, Paraguay, and Uruguay to protect broad-snouted caiman from threats including habitat loss.

Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

Following is a rangewide threats analysis in which we evaluate whether other natural or manmade factors affect the continued existence of the broad-snouted caiman throughout its range because the information available is not specific to each DPS. This evaluation is not specific to each country unless specified as such.

Pesticides and Endocrine Disruptors

Approximately 10 to 15 percent of pesticides applied in agricultural activities actually reach target organisms, and the remainder is dispersed into the atmosphere, soil, and water (Poletta *et al.* 2009, p. 96). In Argentina, soy, which requires the application of pesticides, occupies 16 million hectares, and land dedicated to soy plantations continues to expand (Larriera *et al.* 2008, p. 165). A study regarding the genotoxicity of the herbicide formulation Roundup® (glyphosate) was conducted in Argentina on broad-snouted caiman. Glyophosate is a broad-spectrum herbicide used widely in weed control. In this study, specimens of broad-snouted caiman were exposed to various concentrations and compounds of glyphosate commonly used in agriculture, particularly on soy plantations. Not only did the study result in deformities of exposed caiman, but it also resulted in mortalities (Poletta *et al.* 2009, p. 98). One form of glyphosate, Cycloposphamide, in particular, caused malformations in the exposed caiman, causing 90 percent embryo mortality (Poletta *et al.* 2009, p. 97). Another study found that exposure to pesticides increases the egg weight loss and decreases hatchlings weight of *Caiman latirostris* (Beldomenico *et al.* 2007, p. 246), which negatively affects species' fitness. This study evaluated responses based on exposure to atrazine and endosulfan, which are commonly used in agriculture. Egg weight loss was significantly greater for those eggs treated with an environmentally relevant dose of atrazine (0.2 parts per million) (ppm) and relatively low doses of endosulfan (2 and 20 ppm) (Beldomenico *et al.* 2007, p. 249). The study was done on captive-held broad-snouted caiman; the impact of these pesticides on natural caiman populations is unknown. However, extrapolations can be made that exposed smaller hatchlings would have less chance of survival during their first year, thus affecting the population dynamics of the species. Impaired embryonic growth may also be occurring when exposed to contaminated water and food (Beldomenico *et al.* 2007, p. 250).

Potential effects from contamination by commonly used pesticides such as aldrin, chlordane, endrin, lindane, methoxyclor, toxaphene, DDT, parathion, endosulfan, malathion, and carbaryl, similar to that found in the studies conducted on captive broad-snouted caiman, are likely to occur and affect this species in the wild. Farmers are not well trained in proper application methods, often over-applying agrochemicals, applying them under inappropriate physical or environmental conditions, and not following appropriate handling, washing, and storage protocols (Byers *et al.* 2008, p. 26). Despite regulations governing the use of these and other pesticides, more oversight and resources are needed to monitor their use and effects on this species. Such pesticide use is likely to occur throughout the species' range.

In Bolivia, contamination of aquatic systems from agrochemicals occurs in some areas, particularly in Santa Cruz and Cochabamba (Byers *et al.* 2008, p. 26). In the lowlands of Santa Cruz Department, for example, where broad-snouted caiman may exist, agro-industrial development is leading to increased use of agrochemicals. Soy,

sunflower, cotton, and sugarcane are the main crops, and to a lesser extent coffee, cacao, and rice are grown. Mechanized agriculture on large areas with poor soil has led to the increased use of agrochemicals such as fertilizers and pesticides that are often applied by aerial spraying. Despite increasing oversight, 17 pesticides have been banned in Bolivia but are nevertheless freely sold in local markets and routinely used (Byers *et al.* 2008, p. 26).

Although we recognize that pesticides will result in mortalities and decreased fitness in some individuals, the best available information does not indicate that pesticides threaten this species. Studies have been conducted in Argentina, where similar pesticides are used, and reproduction and survival rates of broad-snouted caiman in Argentina appear to be currently robust. Populations currently remain stable or are increasing in Argentina; and the species has even expanded its range in some areas (Borteiro *et al.* 2008, pp. 244–249; Verdade *et al.* 2010, pp. 18–22). This is an indication of the species' intrinsic resilience and adaptability. Although environmental contaminants such as pesticides and herbicides likely affect individuals, there is no evidence that they currently pose a threat to the species.

Specifically, with respect to endocrine disrupters, studies in other crocodile species have been conducted to examine their effects (Rainwater *et al.* 2008, pp. 101–109). Vitellogenin induction is a useful biomarker to examine exposure and response to endocrine disruptors, specifically environmental estrogens. The vitellogenin gene is a biomarker frequently used to detect estrogenic effects in male fish. However, this study concluded that endocrine disruptors do not appear to have negative effects on crocodile species in the wild. To the best of our knowledge, endocrine disrupters are not a threat to broad-snouted caiman.

We recognize that environmental contaminants may affect individuals, especially given the potential for long-term bioaccumulation of contaminants during the species' life. However, we do not have information or data on the extent of the impact, if any, that environmental contaminants currently have on the species. An inadvertent aspect of the research referenced above indicated that the removal of eggs from the wild and hatching in a captive environment can actually have a beneficial effect. If eggs are negatively affected by exposure to pesticides through either a decrease in fitness or mortality in the wild, it would be of benefit to remove them shortly after females lay eggs to reduce or eliminate exposure to environmental contaminant. Regardless of this aspect, based on the best available scientific and commercial information available, we currently do not find that exposure to pesticides or other environmental contaminants is a threat to the species.

Human Conflict

Although it is commonly known that human conflict with caiman occurs, this is not a significant factor affecting the species. The most recent status survey of broad-snouted caiman by the Crocodile Specialist Group indicates that the principal threats to this species are habitat destruction, illegal hunting in localized areas (in some states of Brazil, where caiman population is low), and construction of large hydroelectric dams (Verdade *et al.* 2010, p. 1). In Bolivia, a survey indicated that 92 percent of individuals said that they hunted broad-snouted caiman to avoid the danger of an attack. This was more common when caiman were found in cattle watering areas such as ponds and agricultural impoundments near their homes. However, the actual impacts are unknown; the survey was anecdotal. Most broad-snouted caiman populations in Argentina occur on privately owned wetlands. In Chaco, Argentina, local people have been known to kill caiman, not only for food, but out of fear that these animals will attack them or their livestock and poultry (Prado 2002, Aparicio and Rios 2008, p. 112). Based on interviews with ranchers, landowners and police, it is estimated that approximately 30 to 40 wild caiman per year are killed for food, and about 50 per year are killed out of fear (Larriera 2006, pers. comm.). These killings often occur during the dry season, when caiman move to ponds that are closer to human-populated areas. To counter these fears, biologists have been working with local communities through the caiman ranching project at the El Cachapé Wildlife Refuge in Argentina. One aspect of this program was that they developed an educational campaign in local schools. The students also participate in the ranching project on the refuge. The project has produced two educational Web sites, www.yacare.net and www.chicos.net, that describe the conservation and ecology of caiman species in Argentina.

In Argentina, because there is incentive for local communities and villagers in the range of the species to conserve broad-snouted caiman, conflict and killing of caiman for food, although it occurs, do not occur to the extent that it rises to the level of a threat. Throughout the rest of the species' range, human conflict with broad-snouted caiman occurs sporadically and may result in the death of some individual caiman. However, the best available scientific and commercial information does not indicate that human conflict occurs to the extent that it is a threat to the species. Therefore, relative to the population size, human conflict does not appear to be a threat to the species.

The broad-snouted caiman, like other wildlife, is a victim of collisions with motor vehicles while crossing roadways. This results in the mortality of about 200 animals per year (Larriera, pers. comm. 2006). Broad-snouted caiman often successfully cross roads in areas containing sparse human developments. Development of high volume transportation corridors in broad-snouted caiman habitat may inhibit their movements between habitat patches, potentially reducing connectivity among water bodies generally inhabited by broad-snouted caiman. However, these mortality events do not occur to such an extent that they are a significant factor affecting the species.

Fire Ants

The red fire ant, *Solenopsis invicta,* is an extremely aggressive species. It is originally from central South America and is distributed throughout a large variety of habitats (Folgarait *et al.* 2005 in Parachú-Marcó *et al.* 2008, pp. 1–2). It completely occupies the area of distribution of broad-snouted caiman. This is an opportunistic, aggressive species and is able to reach high population densities. The fire ant prefers total or partial exposure to the sun, and apparently is attracted by sources of protein, sugar, and lipids as well as high levels of humidity. Because broad-snouted caiman generally nest in fairly open habitats, and its nests are raised, they provide an ideal source of protection for *S. invicta* colonies from rains during the summer. Allen *et al.* (1997, pp. 318–320) showed that red fire ants affect the success of hatching, causing the death of unborn embryos in the nest, and possibly preventing the female from opening the nest when her hatchlings call. In Argentina, these ants use broad-snouted caiman nests to set up their new colonies (Larriera 2006, personal communication), and have been documented to decrease hatching success by 20 percent (Parachú-Marcó *et al.,* 2005, pp. 1–2). The severity and magnitude of long and short term effects of fire ants on broad-snouted caiman populations is currently unknown.

Although fire ants have the potential of being a localized threat, particularly in disturbed areas, the best available information does not indicate that this factor affects the species such that it is a threat to the species throughout all or a significant part of its range.

Drought and Flooding

This species has survived large-scale droughts and floods in the past (Larriera 2003), but high rainfall can lead to reduced hatching success from flooding (Larriera and Piña 2000). Recent caiman counts suggest that populations declined somewhat during 2002–2003 and 2007–2008 (Micucci *et al.* 2007, Larriera *et al.* 2008). This was attributed to cyclic drought conditions during the early 2000s (Micucci *et al.* 2007, Larriera *et al.* 2008). The harvest of broad-snouted caiman eggs during the 2009 season was drastically reduced in Corrientes, Santa Fe, and Formosa Provinces also due to a severe drought. However, in 2010, wetlands recovered due to heavy rains, and egg harvest in 2010 was approximately 30 percent higher than the historical average (Larriera and Siroski 2010, pp. 1–2). However, drought and flooding does not occur to such an extent that they are a significant factor affecting the species.

Climate Change

The term ''climate'' refers to an area's long-term average weather patterns, or more specifically, the mean and variation of surface variables such as temperature, precipitation, and wind, whereas ''climate change'' refers to any change in climate over time, whether due to natural variability or human activity (Intergovernmental Panel on Climate Change (IPCC) 2007, pp. 6, 871). Although changes in climate occur continuously over geological time, changes are now occurring at an accelerated rate. For example, at continental, regional and ocean basin scales, recent observed changes in long-term trends include: A substantial increase in precipitation in eastern parts of North American and South America, northern Europe, and northern and central Asia; declines in precipitation in the Mediterranean, southern Africa, and parts of southern Asia; and an increase in intense tropical cyclone activity in the North Atlantic since about 1970 (IPCC 2007, p. 30). Examples of observed changes in the physical environment include an increase in global average sea level and declines in mountain glaciers and average snow cover in both the northern and southern hemispheres (IPCC 2007, p. 30).

The IPCC used Atmosphere-Ocean General Circulation Models and various greenhouse gas emissions scenarios to make projections of climate change globally and for broad regions through the 21st century (Meehl *et al.* 2007, p. 753; Randall *et al.* 2007, pp. 596–599). Highlights of these projections include: (1) It is virtually certain there will be warmer and more frequent hot days and nights over most of the earth's land areas; (2) it is very likely there will be increased frequency of warm spells and heat waves over most land areas, and the frequency of heavy precipitation events will increase over most areas; and (3) it is likely that increases will occur in the incidence of extreme high sea level (excludes tsunamis), intense tropical cyclone activity, and the area affected by droughts in various regions of the world (Solomon *et al.* 2007, p. 8). More recent analyses using a different global model and comparing other emissions scenarios resulted in similar projections of global temperature change (Prinn *et al.* 2011, pp. 527, 529).

As is the case with all models, there is uncertainty associated with projections due to assumptions used, data available, and features of the models. Despite this, however, under all models and emissions scenarios the overall surface air temperature trajectory is one of increased warming in comparison to current conditions (Meehl *et al.* 2007, p. 762; Prinn *et al.* 2011, p. 527). Climate models and associated assumptions, data, and analytical techniques continue to be refined, and thus projections are refined as more information becomes available (*e.g.,* Rahmstorf 2010 entire). For instance, observed actual emissions of greenhouses gases, which are a key influence on climate change, are tracking at the mid- to higher levels of the various scenarios used for making projections, and some expected changes in conditions (*e.g.* melting of Arctic sea ice) are occurring more rapidly than initially projected (Raupach *et al.* 2007, Figure 1, p. 10289; Comiso *et al.* 2008, p. 1; Pielke *et al.* 2008, entire; LeQuere *et al.* 2009, Figure 1a, p. 2; Manning *et al.* 2010, Figure 1, p. 377; Polyak *et al.* 2010, p. 1,797). In short, the best scientific and commercial data available indicates that increases in average global surface air temperature and several other changes are occurring and likely will continue for many decades and in some cases for centuries (*e.g.* Solomon *et al.* 2007, pp. 822–829; Church 2010, p. 411).

Changes in climate can have a variety of direct and indirect impacts on species, and can exacerbate the effects of other threats. For instance, climate-associated environmental changes to the landscape, such as decreased stream flows, increased water temperatures, reduced snowpacks, and increased fire frequency, or other changes occurring individually or in combination, may affect species and their habitats. The vulnerability of a species to climate change impacts is a function of the species' sensitivity to those changes, its exposure to those changes, and its adaptive capacity (IPCC 2007, p. 883). As described above, in evaluating the status of a species the Service uses the best scientific and commercial data available, and this includes consideration of direct and indirect effects of climate change. As is the case with all other stressors we assess, if the status of a species is expected to be affected that does not necessarily mean it is a threatened or endangered species as defined under the Act. Species that are dependent on specialized habitat types, limited in distribution, or occurring already at the extreme periphery of their range will be most susceptible to the impacts of climate change; however, the broad-snouted caiman has a wide distribution.

The information currently available on the effects of climate change and the available climate change models do not make sufficiently accurate estimates of location and magnitude of effects at a scale small enough to apply to the range of the broad-snouted caiman. Below is a discussion of data and research available, with which we can make inferences on the projected impacts to the broad-snouted caiman due to climate change, particularly the potential impacts of shifting global temperatures on sex ratios as well as the species' distribution.

A study conducted to determine climate change's projected impacts to the American crocodile (*Crocodylus acutus*) illustrates possible impacts to the broad-snouted caiman (Escobedo-Galván 2006, p. 131). This is significant because the sex of crocodiles is determined during incubation and is temperature-dependant. This study selected areas in Florida and western Mexico that contain American crocodiles, and predicted how increased temperatures could affect the geographical distribution and sex ratios of the species in Florida, the Caribbean, and Central America. It focused on the geographic distribution and sex ratios of American crocodiles in the present (2006), 2020, and 2050. It suggested that the geographic distribution and sex ratios of American crocodile populations in different parts of its range would change in response to temperature and sea-level parameters. Optimal growth in crocodilians has been found to occur around 31 °C

digestion diminishing below 29 °C (84 °F) (Coulson and Hernandez 1964, pp. 2–33; Coulson and Coulson 1986, pp. 585–588), which correlates with optimal temperatures for incubation.

According to Escobedo-Galván *et al.* 2008, increased global temperatures and sea level could in some ways benefit the American crocodile by significantly increasing its potential habitat and distribution. Through this we could infer that similar effects could occur in the broad-snouted caiman species. The study predicted that the distribution for the American crocodile would expand 69 percent in 2020 and 207 percent in 2050. This is an 81 percent increase in potential distribution from 2020 to 2050 (Escobedo-Galván *et al.* 2008, pp. 9–10). While the American crocodile is adapted to a narrow climate range (Escobedo-Galván *et al.* 2008, p. 5), the broad-snouted caiman's geographic distribution is one of the widest latitudinal ranges among all crocodilians (Schmidt-Villela *et al.,* 2008 p. 1). Broad-snouted caiman latitudinal range is between 5 °S to 32 °S (Simoncini *et al.* 2009, p. 191). As global temperatures increase, areas that are currently too cool to support broad-snouted caiman may become warm enough to support them in the future.

The study also predicted that increased global temperatures could have a negative impact on the sex ratios of the American crocodile. Like other crocodilian species, both the American crocodile and the broad-snouted caiman exhibit temperature-dependent sex determination. Temperature determines the proportion of males to females produced in nests (Escobedo-Galván *et al.* 2008, p. 4). In *C. crocodilus,* incubation temperatures greater than about 34 °C (93 °F) or less than 32 °C (90 °F) were found to produce females while temperatures between 32 and 34 °C (90 and 93 °F) generally produced males (Escobedo-Galván 2006, p. 133; Escobedo-Galván *et al.* 2008, p. 2). Thus, the production of males is entirely dependent upon a sustained incubation temperature range of only three degrees. In this study, incubation temperatures greater than 36 °C (97 °F) were found to be at the upper end of the tolerance range for these eggs and resulted in both death of embryos and stress to the surviving hatchlings (Escobedo-Galván *et al.* 2008, p. 2).

Although the study with respect to *C. crocodilus* predicted that by 2020, the sex ratio is expected to shift in favor of males, this did not appear to be the case for broad-snouted caiman. For broad-snouted caiman, one study indicated that eggs incubated at 29 °C or 31 °C (84 or 88 °F) produced 100 percent females, while at 33 °C (91.4 °F) 100 percent males were produced. Incubation at higher temperatures (34.5 °C; 94.1 °F) induced production of both sexes (Simoncini *et al.* 2008, p. 231).

There is conflicting information on how climate change could affect this species; it could benefit the species or have no significant impact. We are not able to make inferences based on a study on *C. crocodilus* in this case. Based on the data available, we do not currently have sufficient information to determine how changes in climate will affect this species at this time, particularly with respect to how it will affect the species' sex determination and distribution.

The broad-snouted caiman's geographic distribution is one of the largest latitudinal ranges among all crocodilians (Verdade and Piña 2006). Due to its variability in use of habitat, an expansion of the range of the broad-snouted caiman may occur, as it is more of a habitat generalist than other crocodile species.

Based on scenarios that do not assume explicit climate policies to reduce greenhouse gas emissions, global average temperature is projected to rise by 2–11.5 °F by the end of this century (relative to the 1980–1999 time period) (USGCRP 2011, p. 9). Optimal growth in crocodilians has been found to occur around 88 °F (31 °C), with appetites and effective digestion diminishing below 84 °F (29 °C). Although climate change may cause changes in the broad-snouted caiman distribution, especially given the crocodilian requirement for temperature dependent sex determination, we do not have any data to indicate that effects on the species due to climate change would have a detrimental effect, nor is climate change likely to become a threat in the foreseeable future. However, we are seeking information and data on the effects of climate change on the broad-snouted caiman as part of this proposed rule.

Summary of Factor E

Few, if any, other natural or manmade factors are anticipated to significantly affect the continued existence of the broad-snouted caiman in either DPS. We reviewed factors such as fire ants, human conflict, pesticides and endocrine disruptors, droughts and flooding, and climate change. With respect to climate change, we lack adequate local or regional models on how climate change would specifically affect the habitat in the broad-snouted caiman's range. Given that reliable, predictive models have not been developed for use at the local scale in Argentina, Bolivia, Brazil, Paraguay, and Uruguay, there is little certainty regarding the timing, magnitude, and net effect of climate change's impacts. Therefore, we find it is not possible at this time to make reliable predictions of climate change effects on the Argentine population or the Bolivia, Brazil, Paraguay, Uruguay population due to the current limitations in available data and climate models. We found no information that the other stressors evaluated under this factor significantly affect the survival of the species. Based on the best available information, we find that there are no other natural or manmade factors are not threats to either population segment.

Finding

We have carefully assessed the best available scientific and commercial information regarding the past, present, and future threats faced by the broad-snouted caiman throughout its range, and we have separately evaluated the population in Argentina (referred to as a distinct population segment, or DPS) and the Northern DPS which consists of Bolivia, Brazil, Paraguay, and Uruguay.

Argentine DPS

In Argentina, our status review found that, although some localized impacts to broad-snouted caiman still occur in Argentina, such as habitat modification, particularly due to agricultural development, the Government of Argentina has reduced threats associated with habitat loss and overutilization through its ranching program such that the species is not currently in danger of extinction. Through the five-factor analysis, we considered the progress made by Argentina towards addressing previous threats to this species. We took into consideration the conservation actions that have occurred, are ongoing, and are planned. Since listing under the ESA, the species' status has improved in Argentina based on the following:

- National and international laws and treaties have minimized the impacts of trade.
- Effective community-based ranching programs have been established.
- Population numbers appear to be increasing in Argentina based on nest counts and egg harvest data.

The primary factor that led to the listing of this species under the Act was overutilization. In Argentina, we find few threats to the species in the wild, though we find the DPS is still threatened by the present or threatened

destruction, modification, or curtailment of its habitat or range (Factor A). However, information regarding the caiman ranching program in Argentina indicates that the caiman is increasing in the wild in Argentina such that it is no longer in danger of extinction. The information indicates that the broad-snouted caiman population is now widespread throughout its historic range in Argentina, and it is found in comparable densities relative to other species of crocodilians. Recent surveys (Siroski 2004, 2006; Micucci *et al.* 2007; Piña *et al.* 2008) have found broad-snouted caiman in sampled populations at densities similar to the American alligator (Wood *et al.* 1985; Woodward 2008, p. 1). This supports our finding that the broad-snouted caiman populations are increasing in the wild. In the region that has had the oldest caiman ranching program (Santa Fe province); population trend information based on night counts during 1990–2002 indicates five of six populations increased during that period (Larriera and Imhof 2004). Recent data tracking of the success of hatching shows the percentage of hatchlings born from the harvested eggs has been above 70 percent in recent years, sometimes exceeding 80 percent (Larriera *et al.* 2008, p. 158).

As discussed under Factor B, removing eggs from the wild, rearing the young, and releasing them at an age where they can defend themselves more readily can be advantageous, because larger size in young crocodilians improves survivorship. Survivorship in juvenile crocodilians has been shown to be a function of size, with survivorship increasing as size increases (Elsey *et al.* 1992). For crocodilians, supplementing wild populations with captive-reared juveniles taken from eggs collected in the wild is a valuable tool for crocodilian management, because mortality of juveniles in the wild decreases with age and size.

Enforcement of existing national and international laws and treaties has minimized the potential impact of trade in Argentina, and available data strongly suggest that wild populations in Argentina are increasing (Piña *et al.* 2009). Exports from Argentina are carefully managed and commercial exports are limited to those caiman from managed programs. All indications suggest that Argentina has been quite successful in increasing its population of broad-snouted caiman through intensive management efforts. The population has increased as evidenced by an increase in population density, the identification of reproductive females previously released by the program, the expansion of the nesting areas, the increase in the quantity of harvested nests, and the observation of caiman in places where they had disappeared (Larriera *et al.* 2008, p. 172). Age classes reflect healthy reproduction and recruitment into a wild breeding population.

We find that the impacts previously identified in Argentina when the species was listed under the Act no longer are of sufficient magnitude such that it is endangered. Because the Argentine population of broad-snouted caiman satisfies both the discreteness and significance criteria as defined by the DPS Policy, we propose to reclassify the distinct population segment of the broad-snouted caiman (*C. latirostris*) in Argentina from its present endangered status under the Act to threatened status. As identified above, only one of the five listing factors currently poses a known threat to the broad-snouted caiman, namely, Factor A—the present or threatened destruction, modification, or curtailment of its habitat or range. Although not currently in danger of extinction due to the destruction, modification, or curtailment of its habitat, we find that it is likely to become so with the continued destruction of habitat in the foreseeable future. We have seen substantial progress in Argentina with respect to addressing threats to this species. In developing this proposed rule, we carefully assessed the best scientific and commercial data available regarding the threats facing this species, as well as the ongoing conservation efforts by Argentina. Consequently, we have determined that the Argentine DPS of the broad-snouted caiman should be reclassified to threatened.

Bolivia, Brazil, Paraguay, and Uruguay (Northern) DPS

In contrast, there is a lack of information about the broad-snouted caiman in Bolivia, Brazil, Paraguay, and Uruguay (Aparicio and Ríos 2008; Borteiro *et al.* 2008; Verdade *et al.* 2010, p. 20). In Bolivia, Brazil, Paraguay, and Uruguay, the best available information indicates that threats remain such that the species should retain its endangered status under the Act due to habitat degradation and the inadequacy of regulatory mechanisms (Factors A and D, respectively). Although we have very little data about the species in these countries and are unable to determine population numbers or trends, the best available information indicates that the species continues to face threats under Factors A and D in Bolivia, Brazil, Paraguay, and Uruguay such that the species remains currently in danger of extinction. Therefore, because this population segment satisfies the discreteness and significance criteria under the DPS policy, we find that the distinct population segment of the broad-snouted caiman in Bolivia, Brazil, Paraguay, and Uruguay should remain endangered under the Act. We will continue to monitor the status of the species throughout its entire range. Additionally, the broad-snouted caiman in Bolivia, Brazil, Paraguay, and Uruguay will remain listed in Appendix I of CITES.

Special Rule

Section 4(d) of the Act states that the Secretary of the Interior (Secretary) may, by regulation, extend to threatened species prohibitions provided for endangered species under section 9. Our implementing regulations for threatened wildlife (50 CFR 17.31) incorporate the section 9 prohibitions for endangered wildlife, except when a special rule is promulgated. For threatened species, section 4(d) of the Act gives the Secretary discretion to specify the prohibitions and any exceptions to those prohibitions that are appropriate for the species, provided that those prohibitions and exceptions are necessary and advisable to provide for the conservation of the species. A special rule allows us to include provisions that are tailored to the specific conservation needs of the threatened species and which may be more or less restrictive than the general provisions at 50 CFR 17.31.

In some cases, caiman skins and other parts are exported to another country, usually for tanning and manufacturing purposes. The processed skins and finished products are exported to the United States. The rule prohibits importation or re-exportation of such skins, parts, and products if we determine that either the country of origin or re-export is engaging in practices that are detrimental to the conservation of caiman populations. The purpose of this rule is threefold. First, the rule accurately reflects the conservation status of the broad-snouted caiman. Second, we wish to promote the conservation of the broad-snouted caiman by ensuring proper management of commercially harvested caiman species in its range countries and, through implementation of trade controls (as described in the CITES Universal Tagging System Resolution), to reduce co-mingling of caiman specimens. Third, downlisting of the broad-snouted caiman Argentine DPS to threatened reconciles listings of the species in the Act and CITES.

This special rule: (1) Recognizes the positive recovery efforts and accomplishments of the government of Argentina in recovering the broad-snouted caiman to the extent that the species no longer meets the definition of endangered; (2) Provides increased regulatory flexibility; and (3) Helps streamline or eliminate review and permitting requirements, thus providing a net benefit to the broad-snouted caiman by providing incentives to countries who are conducting conservation efforts for the species. A special rule for this DPS allows U.S. commerce in their skins, other parts, and products from Argentina and countries of re-export if certain conditions are satisfied by those countries prior to exportation to the United States. Therefore, under section 4(d) of the Act, we determine, through this special rule, that it is necessary and advisable to provide for the conservation of the broad-snouted caiman in accordance with applicable laws.

Currently, the listing of the broad-snouted caiman from Argentina in Appendix II of CITES allows commercial trade under certain restrictions in the species, including parts and products. On May 4, 2000, the Service reduced restrictions on a similar species, the yacare caiman (*Caiman yacare*), by reclassifying it from endangered to threatened under the Act (65 FR 25867). That final listing rule included a special rule that exempts the commercial importation and re-exportation, under certain conditions, of yacare skins, parts, and products into and out of the United States from the Act's implementing regulatory prohibitions for threatened species under section 50 CFR 17.31. Our regulations at 50 CFR 17.42(c) set forth this special rule for threatened caiman, including, among others, the yacare (*C. yacare*), common caiman (*C. crocodilus crocodilus*), and brown caiman (*C. crocodiles fuscus* and *C. crocodiles chiapasius*). Section 17.42(c) allows the import, export, or re-export, or the interstate or foreign commerce of caiman skins, parts, and products without a threatened species permit otherwise required under 50 CFR 17.32, provided the requirements of this Special Rule and parts 13, 14, and 23 of 50 CFR are met.

We propose to add the Argentine DPS of the broad-snouted caiman to the special rule at 50 CFR 17.42(c). This special rule allows import, re-export, and interstate commerce of specimens and products originating only from Argentina. This proposed rule, in most instances, adopts the existing conservation regulatory requirements of CITES as the appropriate regulatory provisions. It would also allow interstate or foreign commerce. The proposed special rule would, if adopted, allow import and export of broad-snouted caiman parts and products and interstate or foreign commerce of this species without a permit under the Act as described at 50 CFR 17.42(c).

Finally, this special rule does not cover the importation of viable caiman eggs or live caimans into the United States. Importation of these two types of specimens will require an Endangered Species Act import permit and the appropriate CITES permit. This requirement will allow scrutiny of individual applications for importation of live caimans or eggs so as to prevent accidental introduction of these exotic species into the United States, which may have detrimental effects on U.S. native wildlife or ecosystems. Reexportation from the United States of caiman skins, other parts, and products will continue to require CITES documents. We find that it is not necessary or advisable for the conservation of the broad-snouted caiman to regulate interstate or foreign commerce of this species.

In addition, Argentina must continue to effectively implement the CITES Resolution on a universal tagging system for the identification of crocodile skins and must have adequate national legislation for the implementation of CITES. The special rule would also allow trade in broad-snouted caiman parts and products through intermediary countries only if the countries involved are effectively implementing CITES. Both the country of origin and intermediary countries must be effectively implementing the CITES Universal Tagging System Resolution. The intent of this special rule is to enhance the conservation of the broad-snouted caiman in Argentina, which is properly managing its broad-snouted caiman populations. By gaining access to commercial markets in the United States for broad-snouted caiman products, Argentina will be encouraged to continue its sustainable-use management programs. These programs require annual surveys of wild populations to ensure biological sustainability in participating provinces and reintroduction of ranched offspring to the wild. The programs also provide an economic incentive for local people to protect and expand broad-snouted caiman habitat.

Effects of This Rule

This rule, if made final, would revise 50 CFR 17.11(h) to reclassify the broad-snouted caiman in Argentina as threatened in the List of Endangered and Threatened Wildlife. This rule, if adopted, would also establish a special rule for the broad-snouted caiman in Argentina, which would allow the importation into the United States of skins and other parts and products from Argentina. This rule would also allow the import of specimens originally from Argentina reexported by other countries, if certain conditions are met by those countries prior to exportation to the United States. These conditions pertain to the implementation of a CITES Resolution on a universal tagging system for the identification of crocodile skins as well as provisions intended to support appropriate management for sustainable use of wild populations of *C. latirostris.* Thus, for specimens that do not qualify under the provisions of the special rule, prohibited activities requiring a permit under 50 CFR 17.32 would still include take; export or reimport; delivery, receipt, carrying, transport or shipment in interstate or foreign commerce, in the course of a commercial activity; or sale or offering for sale in interstate or foreign commerce live animals, eggs, or gametes. In addition, changing the species' status under the Act will not decrease the level of protection provided by CITES.

Consistent with the requirements of sections 3(3) and 4(d) of the Act, as described above, this proposed rule contains a special rule to amend 50 CFR part 17.42(c) to allow commercial importation and reexportation, under certain conditions, of whole and partial skins, other parts, and products from broad-snouted caiman from Argentina without a threatened species import permit otherwise required by 50 CFR part 17, if all requirements of the special rule and 50 CFR parts 13 (General Permit Procedures), 14 (Importation, Exportation, and Transportation of Wildlife), and 23 (CITES) are met.

The reclassification of the broad-snouted caiman from Argentina to threatened and the accompanying special rule allowing commercial trade into the United States without threatened species import permits does not end protection for this species, which remains listed in Appendix II of CITES. To the contrary, the special rule complements the CITES universal tagging resolution. A benefit of this special rule is that it would reconcile the Act's requirements for the importation and exportation of Argentine broad-snouted caiman parts and products shipments into and from the United States with CITES requirements.

In summary, this special rule would prohibit the importation, exportation, and reexportation of specimens (skins, other parts, or products) of broad-snouted caiman originating from Argentina or imported from a country of manufacture or reexport unless the following conditions are met:

(1) Each Argentine broad-snouted caiman skin or part imported, exported, or reexported must be tagged or labeled in accordance with the CITES Resolution on a universal tagging system for the identification of crocodile skins. This does not apply to meat, skulls, scientific specimens, or products, or to the noncommercial import, export, or reexport of personal effects in accompanying baggage or household effects.

(2) Any countries reexporting Argentine broad-snouted caiman skins or parts must have implemented an administrative system for the effective matching of imports and reexports.

(3) Argentina and any intermediary country(s) must be effectively implementing CITES as described above. If we receive persuasive information from the CITES Secretariat or other reliable sources that a specific country is not effectively implementing CITES, we will prohibit or restrict imports from such country(s) as appropriate for the conservation of the species.

In a limited number of situations in which the original tags from the country of export have been lost in processing the skins, we will allow whole skins, flanks, and chalecos into the United States if CITES-approved reexport tags have been attached in the same manner as the original tags and proper reexport certificates accompany the shipment. If a shipment contains more than 25 percent replacement tags, the U.S. Management Authority will consult with the Management Authority of the reexporting country before clearing the shipment. Such shipments may be seized if we determine that the requirements of the Convention have not been met.

Finally, this special rule would not cover the importation of viable caiman eggs, gametes, or live caimans into the United States. Importation of these specimens would require a threatened species import permit and the appropriate CITES permit or certificate. This requirement would allow scrutiny of individual applications for importation of live caimans, eggs, or gametes so as to prevent accidental introduction of this exotic species into the United States, which may have detrimental effects on U.S. native wildlife or ecosystems. Reexportation from the United States of caiman skins, other parts, and products will continue to require CITES documents. Interstate commerce within the United States in legally imported caiman skins, other parts, and products would not require U.S. threatened species permits.

This special rule would allow trade through intermediary countries. Countries are not considered as intermediary countries or countries of reexport if the specimens remain in Customs control while transiting or being transshipped through the country, and provided those specimens have not entered into the commerce of that country. However, the CITES Resolution on a universal tagging system for the identification of crocodile skins presupposes that countries of reexport have implemented a system for monitoring skins.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition of conservation status, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies and groups, and individuals. The protection required of Federal agencies and the prohibitions against take and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, and as implemented by regulations at 50 CFR part 402, requires Federal agencies to evaluate their actions that are to be conducted within the United States or upon the high seas, with respect to any species that is proposed to be listed or is listed as endangered or threatened and with respect to its proposed or designated critical habitat, if any is being designated. Because the broad-snouted caiman's range does not include the United States, no critical habitat is being proposed for designation with this rule. Regulations implementing the interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a proposed Federal action may affect a listed species, the responsible Federal agency must enter into formal consultation with the Service. Currently, with respect to broad-snouted caiman, no Federal activities are known that would require consultation.

Section 8(a) of the Act 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 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.

Section 9 of the Act and its implementing regulations at 50 CFR part 17.31, set forth a series of general prohibitions and exceptions that apply to all threatened wildlife. As such, these prohibitions are applicable to the broad-snouted caiman. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to ''take'' (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or to attempt any of these) within the United States or upon the high seas; import or export; deliver, receive, carry, transport, or ship in interstate commerce in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any threatened wildlife species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken in violation of the Act. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving threatened wildlife species under certain circumstances. Regulations governing such permits are codified at 50 CFR part 17.32. Import into, export from, or reexport from the United States, as well as other prohibitions, including movement in the course of a commercial activity and sale in interstate or foreign commerce, of threatened species and their parts and products, are currently prohibited under the Act unless otherwise authorized. Authorizations for species listed as threatened under the Act may be made for scientific purposes, to enhance the propagation or survival of the species, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for other special purposes consistent with the purposes of the Act.

Monitoring

We will continue to monitor the status of this species in cooperation with the range countries.

Peer Review

In accordance with our joint peer review policy with the National Marine Fisheries Service, ''Notice of Interagency Cooperative Policy for Peer Review in Endangered Species Act Activities,'' that published in the **Federal Register** on July 1, 1994 (59 FR 34270), and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review, dated December 16, 2004, we will seek the expert opinions of at least three appropriate independent specialists regarding the science in this proposed rule. The purpose of peer review is to ensure that listing, downlisting, and delisting decisions are based on scientifically sound data, assumptions, and analyses. We will send copies of this proposed rule to the peer reviewers immediately following publication in the **Federal Register**. We will invite these peer reviewers to comment during the public comment period, on the specific assumptions and conclusions in this proposed downlisting of the Argentine population (DPS) of the broad-snouted caiman. We will summarize the opinions of these reviewers in the final decision document, and we will consider their input and any additional information we received as part of our process of making a final decision on this proposal. Such communication may lead to a final decision that differs from this proposal.

References Cited

A complete list of the references used to develop this proposed rule is available upon request from the Endangered Species Program in our Headquarters office (see **FOR FURTHER INFORMATION CONTACT**).

Author

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List of Subjects in 50 CFR Part 17

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

Proposed Regulation Promulgation

For the reasons described in the preamble, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as follows:

Part 17—[AMENDED]

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

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. In § 17.11(h), the List of Endangered and Threatened Wildlife, revise the entries for ''Caiman, broad-snouted,'' ''Caiman, brown,'' ''Caiman, common,'' and ''Caiman, yacare'' under REPTILES to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*		*
REPTILES							
*	*	*	*	*	*		*
Caiman, broad-snouted.	*Caiman latirostris*	Argentina, Bolivia, Brazil, Paraguay, Uruguay.	Bolivia, Brazil, Paraguay, Uruguay.	E	15	NA	NA
Caiman, broad-snouted.	*Caiman latirostris*	Argentina, Bolivia, Brazil, Paraguay, Uruguay.	Argentina	T	790	NA	17.42(c)
Caiman, brown	*Caiman crocodilus fuscus* (includes *Caiman crocodilus chiapasius*).	Mexico, Central America, Colombia, Ecuador, Venezuela, Peru.	Entire	T(S/A)	695	NA	17.42(c)
Caiman, common	*Caiman crocodilus crocodilus*.	Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela.	Entire	T(S/A)	695	NA	17.42(c)
Caiman, yacare	*Caiman yacare*	Argentina, Bolivia, Brazil, Paraguay.	Entire	T(S/A)	695	NA	17.42(c)
*	*	*	*	*	*		*

3. Amend § 17.42 by revising paragraph (c)(1)(i) to read as follows:

§ 17.42 Special rules—reptiles.

* * * * *

(c) * * *

(1) * * *

(i) *Threatened crocodilian* means any live or dead specimen of the following species:

(A) Broad-snouted caiman (*Caiman latirostris*) originating in Argentina;

(B) Brown caiman (*Caiman crocodilus fuscus,* including *Caiman crocodilus chiapasius*);

(C) Common caiman (*Caiman crocodilus crocodilus*);

(D) Yacare caiman (*Caiman yacare*);

(E) Nile crocodile (*Crocodylus niloticus*); and

(F) Saltwater crocodile (*Crocodylus porosus*) originating in Australia (also referred to as Australian saltwater crocodile).

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Dated: December 16, 2011.

Gregory E. Siekaniec,

Acting Director, Fish and Wildlife Service.

[FR Doc. 2011–33602 Filed 1–4–12; 8:45 am]

BILLING CODE 4310–55–P