Form 3-200-37

MAR 1 8 2020

OMB Control No. 1018-0093
Expires 08/31/2020

Department of Interior
U.S. Fish and Wildlife Service

Federal Fish and Wildlife Permit Application Form

U.S. Fish and Wildlife Service
Division of Management Authority
Branch of Permits, MS: IA
5275 Leesburg Pike
Falls Church, VA 22041-3803
1-800-358-2104 or 703-358-2104

Type of Activity

EXPORT/RE-EXPORT/IMPORT/INTERSTATE AND FOREIGN COMMERCE/TAKE OF ANIMALS (LIVE/ SAMPLES/PARTS/PRODUCTS) under the Convention on International Trade In Endangered Species (CITES) and/or the U.S. Endangered Species Act (ESA)

Complete Sections A or B, and C, D, and E of this application. U S. address may be required in Section C, see instructions for details. **Instructions on how to make your application complete and help avoid unnecessary delays are attached.**

Section A: Complete if applying as an individual

1 a Last Name	1 b First Name	1 c. Middle Name/Initial	1 d Suffix

2. Date of Birth (mm/dd/yyyy)	3 Telephone Number	3 a Alternate Telephone Number	4 E-mail address

Section B: Complete if applying on behalf of a business, corporation, public agency, Tribe, or institution

1 a Name of business, agency, Tribe, or institution		1 b Doing business as (DBA)	
Saint Louis Zoo		Same	
2 Tax identification no		3 Description of business, agency, Tribe, or institution	
43-1027364		Public zoological garden	
4 a Principal officer Last name	4 b Principal officer First Name	4 c. Principal officer Middle name/Initial	4 d Suffix
Bonner	Jeffrey	P.	Ph.D.
5 Principal officer title		6 Primary contact name	
Dana Brown Ceo/President		Rae Lynn Haliday	
7 a Business telephone number	7 b Alternate telephone number	7 c. Business fax number	7 d Business e-mail address
314 781-0900	(314) 799-5132	(314) 647-7969	haliday@stlzoo.org

Section C: All applicants complete address information

1 a Physical address (Street address, Apartment #, Suite #, or Room #, no P O Boxes)				
1 Government Drive				
1 b City	1 c. State	1 d Zip code/Postal code	1 e County/Province	1 f Country
St. Louis	MO	63110	St. Louis	USA
2 a. Mailing address (include if different than physical address include name of contact person if applicable)				
2 b City	2 c. State	2 d Zip code/Postal code	2 e County/Province	2 f Country

Section D: All applicants MUST complete

1. Attach the nonrefundable application processing fee in the form of a check or money order payable to the U S FISH AND WILDLIFE SERVICE in the amount of $100. Federal, Tribal, State, and local government agencies, and those acting on behalf of such agencies, are exempt from the processing fee – *attach documentation of fee exempt status as outlined in instructions* [50 CFR 13 11(d)]. See Enclosure #1

2. Certification. I hereby certify that I have read and am familiar with the regulations contained in *Title 50 Part 13 of the Code of Federal Regulations* and the other *applicable parts in subchapter B of Chapter I of Title 50*, and I certify that the information submitted in this application for a permit is complete and accurate to the best of my knowledge and belief I understand that any false statement herein may subject me to the criminal penalties of 18 U S C 1001.

Signature of applicant/Principal Officer for permit (No photocopied or stamped signatures) Date of signature (mm/dd/yyyy)

3/16/2020

Please continue to next page

OMB Control No 1018-0093
Expires 08/31/2020

E. EXPORT/RE-EXPORT/IMPORT/INTERSTATE AND FOREIGN COMMERCE/TAKE OF ANIMALS (Live/samples/parts/products) (CITES and/or ESA)

Allow at least 90 days for the application to be processed. Applications for endangered species permits must be published in the Federal Register for a 30-day public comment period.

Complete all questions on the application. Mark questions that are not applicable with "N/A". If needed, use separate sheets of paper. On all attachments or separate sheets you submit, indicate the application question number you are addressing. If you are applying for multiple specimens, be sure to indicate which specimen you are addressing in each response.

NOTE: The import of live southern white rhinoceros from South Africa and Swaziland must meet specific CITES criteria for an import permit to be issued. If you are requesting authorization for the import of these species, please ensure that you respond to question 14 below.

Electronic submission of inventories, photographs, and receipts: Some applications contain extensive inventories and /or a large number of photographs or receipts. You may provide electronic versions of the documents. Such a submission will assist the processing of your application since it may reduce data entry by the U.S. Fish and Wildlife Service. If you wish to provide information electronically, once you have received an application number via the e-mailed acknowledgment letter, e-mail your information to Permits@fws.gov. Be sure to include the application number provided in the acknowledgment e-mail that will be sent to you when we receive your application.

☐ I will be submitting documents electronically.

1. Name and address where you wish the permit to be mailed, **if different from page 1**. If you would like expedited shipping, please enclose a self-addressed, pre-paid, computer-generated, courier service airway bill. If unspecified, all documents will be mailed via regular mail through the U.S. Postal Service.

2. Who should we contact if we have questions about the application (name, phone number, and e-mail)?

   Rae Lynn Haliday, CRM, Registrar, halliday@stlzoo.org, (314) 799-5132

3. Have you or any of the owners of the business (if applying as a business, corporation, or institution), been assessed a civil penalty or convicted of any criminal provision of any statute or regulation relating to the activity for which the application is filed; been convicted, or entered a plea of guilty or nolo contendere, for a felony violation of the Lacey Act, the Migratory Bird Treaty Act, or the Bald and Golden Eagle Protection Act; forfeited collateral; OR are currently under charges for any violation of the laws mentioned above?

   ■ No ☐ Yes

   If you answered "Yes" to Question 3, provide: a) the individual's name; b) date of charge; c) charge(s); d) location of incident; e) court, and f) action taken for each violation. Please be aware that a "Yes" response does not automatically disqualify you from getting a permit.

4. What activity are you requesting authorization to carry out (Indicate appropriate activities):

☐ EXPORT ☐ RE-EXPORT ☑ IMPORT ☐ TAKE (e.g., cull, lethal harvest)
☐ INTERSTATE COMMERCE ☐ FOREIGN COMMERCE

Note: Interstate Commerce permits authorize the sale of endangered and threatened species across State lines, but only for activities that will contribute to enhancing the propagation or survival of that species. Interstate commerce activities with wildlife require the buyer to obtain a permit prior to the sale or offer for sale.

5. For **EACH** animal/specimen involved in the proposed activity provide: See Attached for #5-18

a. Scientific name (genus, species, and, if applicable, subspecies)	**b. Common name**	**c. Birth/ Hatch Date** *(mm/dd/yyyy)* (approximate of actual unknown)	**d. Wild or captive-born**	**e. Quantity**	**f. Gender** (male or female, if known), if	**g. Permanent markings**, if alive (e.g., tattoo, ID #, microchip #, scars)	**h. Type of sample or product** (e g., blood, tissue, DNA)
EXAMPLE: *Pan troglodytes*	Chimpanzee						
See attached excel spreadsheet for species							
See attached excel spreadsheet for species							
See attached excel spreadsheet for species							
See attached excel spreadsheet for species							

6. The current location of the specimen(s) (address and country):

Name:

Address:

City:

State/Province:

County, Postal Code:

7. Recipient/Sender:

- If **export**, provide name and address of the recipient in the foreign country.
- If **re-export**, provide the name and address of the recipient in the foreign country.
- If **import**, provide name and address of the exporter in the foreign country.
- If **interstate or foreign commerce**, provide name and address of the proposed seller/supplier.

Name:

Address:

City:

State/Province:

County, Postal Code:

SOURCE OF SPECIMEN (answer question 8 or 9 for **EACH** animal/specimen involved, as appropriate).

8. For captive-bred animals or animal(s) from which the specimen(s) are/were obtained, provide a signed and dated statement from the breeder that includes the following:
    a. Scientific name (genus, species, and, if applicable, subspecies) and common name;
    b. Name and address of the facility where the animal was bred and born;
    c. Birth/hatch date (mm/dd/yyyy), and, if applicable, identification information;
    d. Location (name of facility, address, city, State, postal code) of parental stock;
    e. A statement that the animal was bred at the above facility;
    f. Documentation demonstrating the history of transactions (e.g., chain of custody or ownership of the animal).
9. For **EACH** animal/specimen **taken from the wild**, provide the following:
    a. Scientific name (genus, species, and, if applicable, subspecies) and common name;
    b. Specific location of where, when, and by whom (name and address) the specimen was removed from the wild;
    c. Purpose of removal and length or approximate length of time held in captivity. Discuss issues such as the method of collection, was the collection done as part of a larger study, were animals returned to the wild after sampling, and did any mortalities or injuries occur due to collection or holding;
    d. If and how any remuneration, either financial or in-kind, was provided for taking or capturing animals or for the collection of samples.
    e. Your efforts to use captive specimens (e.g., captive-born, captive-held), or parts thereof, in lieu of taking animals from the wild.
    f. Copies of your foreign or domestic collecting permit, license, contract or agreement;
    g. Documentation showing that the specimen(s) was/were legally obtained by the applicant; and
    h. Copies of any applicable State, Tribal, Federal, or Foreign government permits or licenses that authorized the removal of this animal from the wild.

JUSTIFICATION FOR REQUESTED ACTIVITY.

10. Provide a detailed statement justifying the proposed activity, particularly the following:

    a. Describe the purpose of your proposed activity. For example, if the purpose is scientific research, attach a copy of your research proposal outlining the purpose, objectives, methods (e.g., specific information on survey/collection methods, sampling regime, equipment to be used), and whether similar work has already been done or is currently being done. If the purpose includes conservation education, provide copies of educational materials (e.g., handouts, text of signage or public presentations), and include the purpose and objectives of the proposed activity. If the purpose is for propagation for conservation purposes (including culling as part of herd management), provide a description of how the species will be propagated and the disposition of progeny, as well as long-term goals of the breeding program, how the breeding program is managed to maintain genetic vitality, and information on any cooperative breeding programs or agreements that are/will be established, including any future plans for re-introduction.

    b. Description of the technical expertise of each person (please also include CV or resume), as it relates to the proposed activities. If the proposed activity involves live animals, include the experience of each animal caretaker working with the species.

    c. Copies of contracts, agreements or other documents that identify persons involved and dates of activities for which authorization is being requested.

11. A statement on how the activities will **enhance or benefit the wild population** (e g , in-situ and ex-situ projects).

12. If live specimens are to be held in captivity as part of the proposed activity:

    a. Provide a detailed description (e.g., size, construction materials, protection from the elements) and photographs or diagrams (no blueprints, please) clearly depicting the existing facilities **where the wildlife will be maintained.** If the specimens will be housed at multiple facilities, either immediately or within the next year, provide a full description of each facility. If you are unsure of which facilities may be receiving specimens (e.g., final decisions on placement have not been made), please indicate likely candidates and the mechanism that will be used to determine recipient facilities;

    b. A statement of the specific technical experience of CV or resume available to the recipient(s) for maintaining and propagating live specimens of the same or similar species;

    c. The number of years each species has been maintained at the facility;

    d. The number of births by year for each species for the last 5 years; and

    e. Mortalities at the facility with these or similar species in the last 5 years, causes of such mortalities, and steps taken to avoid or decrease such mortalities.

IMPORTS, EXPORTS, OR RE-EXPORTS.

13. For shipment of LIVE specimens, the transport conditions for animals must comply with the CITES Guidelines for Transport of Live Animals or, in the case of air transport, with the International Air Transport Association (IATA) live animal regulations (contact airline for information). As such, describe:

    a. The type, size, and construction of any shipping container; and

    b. The arrangements for watering or otherwise caring for the wildlife during transport.

14. For import of live southern white rhinoceroses from South Africa and Swaziland, a determination that the importing facility meets the CITES "appropriate and acceptable destination" annotation must be made. Therefore, provide written documentation demonstrating that the proposed activity would promote *in situ* conservation of the species. **Note:** ***For any permit authorizing trade of live rhinoceroses under an "appropriate and acceptable destination" annotation, the rhinoceros horn from these animals may not enter commercial trade and the animal may not be sport hunted.***

15. **For import of LIVE CITES Appendix-I listed marine mammal species**, provide a copy of your FWS or NOAA Fisheries permit or authorization.

16. For import of CITES **Appendix-I listed species**, provide information to show the import is not for primarily commercial purposes as outlined in Resolution Conf. 5.10 .

17. For export of CITES **Appendix-I listed species**, provide a copy of the CITES import permit, or evidence one will be issued by the Management Authority of the country to which you plan to export the specimen(s). In accordance with Article III of the CITES treaty, it is required that import permits are issued before the corresponding export permit.

18. If the specimen is being **re-exported** (e.g., exporting a specimen that was previously imported into the United States), provide:

    a. A copy of the canceled CITES export or re-export document issued by the appropriate CITES office in the country from which the wildlife was imported (if applicable); and

    b. A cleared copy of Form 3-177, wildlife Declaration for Import (hard copy or electronic release); **OR**

    c. If you did not make the original import, provide a copy of the importer's documents outlined above and the invoice or other documentation that shows you acquired the wildlife from the original importer or history of transactions which demonstrate chain of ownership.

All international shipment(s) must be through a designated port. A list of designated ports (where an inspector is posted) is available. If you wish to use a port not listed, please contact the Office of Law Enforcement for a Designated Port Exemption Permit (form 3-200-2).

ESA/CITES I Import Application
Saint Louis Zoo
March 16, 2020

ATTACHMENT

5. List of species and samples, see **Enclosure #2.**

6. **Current Location of the specimens (address and country):**

Enterprise for the Conservation of the Zapata Swamp, Zapata Crocodile Farm
Address: Cienaga de Zapata, Matanzas 43100, Cuba

7. **Recipient/Sender:** This is an import.

Exporter in Cuba:
Etiam A Pérez Fleitas, MSc
Specialist in Exotic Fauna, Wildlife and Research
Enterprise for the Conservation of Zapata Swamp
Cienaga de Zapata, Matanzas 43100, Cuba

8. N/A

9. For each animal/specimen taken from the wild, providing the following:

a. *Crocodylus rhombifer* Cuban crocodile
Crocodylus acutus American crocodile

b. Samples were collected from farmed Cuban crocodiles located at the Zapata Crocodile Farm and samples will continue to be collected over the next 3 years by Jamie Palmer, Lauren Augustine or other members of the team. American crocodile samples from captive individuals have not yet been sampled. Samples will be collected from free-living Cuban crocodiles and free-living American crocodiles in the Zapata Swamp, Cuba collected by Gustavo Sosa Rodriguez, veterinarian, Enterprise for the Conservation of the Zapata Swamp.
Address: Cienaga de Zapata, Matanzas 43100, Cuba.

c. Samples are collected from both wild (free-living) Cuban and American crocodiles and those in human care from the Zapata Crocodile Farm. Samples collected and proposed to be exported to the US are: scale clippings, whole blood in cryovials, plasma in cryovials, serum in cryovials, blood smears on glass slides fixed in methanol, whole blood dried on Whatman Filter Paper (FTA cards) and swabs collected from the mouth, cloaca and eyes of Cuban and American crocodiles. These swabs are plastic shaft, cotton tip swabs to for DNA extraction to do infectious disease diagnostics. This sampling is part of a collaborative project between the Saint Louis Zoo and the Zapata Crocodile Farm, with which

we have a current MOU (**Enclosure #3**). No animals will be removed from either the wild or the Zapata crocodile farm. We will collect samples and then release animals within 45 minutes of handling. To date, no mortalities or injuries have occurred due to collection or holding (n=93).

d. As part of our research group's collaboration with the Zapata Crocodile Farm, we contribute financially to shared sampling trips and provide equipment and training where appropriate.

e. Samples are collected from captive animals at the Zapata Crocodile Farm as a comparison to the free-living samples. An approved IACUC (**Enclosure #4**) in in place for all sample collection from the Saint Louis Zoo Animal Usage committee. We also have work visas from the Cuban government for any non-Cuban collecting samples. Collecting data on both free-living and captive crocodiles is necessary to fully understand the health of Cuban crocodiles as it relates to the conservation of this critically endangered species.

f. See approvals for collection activities attached as **Enclosure #s 5a-c.**

g. See approvals for collection activities attached as **Enclosure #s 5a-c.**

h. CITES export permit pending.

10. Provide a detailed statement justifying the proposed activity, particularly the following:

a. Purpose of Proposed Activity: This work is research-based and working through a One Health framework in order to assist in the conservation of the Cuban crocodile, while taking into account the social and economic realities of the population around the Zapata swamp. We are also using this population of crocodiles as an indicator species of environmental health. Through our health work, we will better understand the overall health of this large predator in order to identify areas of further research throughout the swamp for the overall health of all species present. SEE ATTACHED FUNDED GRANT PROPOSAL FOR METHODS AND OTHER DETAILS as **Enclosure #s 6a-b.**
All educational materials used are included in extra material for the grant.

b. Lauren Augustine, MS – Lauren Augustine is the Curator of Herpetology at the Saint Louis Zoo, the Studbook Keeper for Cuban crocodiles and a member of the IUCN SSC Crocodile Specialist Group. See resume attached as **Enclosure #7.**

Dr. Sharon L. Deem is a wildlife veterinarian/epidemiologist and the Director of the Saint Louis Zoo Institute for Conservation Medicine.

Sharon will serve as the veterinary advisor for crocodile health evaluations and will work with Dr. Rodriguez to develop veterinary protocols for the ZCF crocodiles. See CV attached as **Enclosure #8.**

Jamie Palmer, MS is the field and lab technician for the Institute for Conservation Medicine. Jamie will be the field health technician for this project and will focus on the health sample collection and hematologic and serologic evaluation of samples as well as the biomaterial storage for molecular diagnostics. Both Sharon and Jamie have experience conducting health evaluation in the field and are experts on sample collection, processing, diagnostics and storage.

See CV attached as **Enclosure #9.**

See CV attached for Etiam A Perez Fleitas, MSc as **Enclosure #10.**

See CV attached for Gustavo Sosa Rodriguez as **Enclosure #11.**

c. See MOU attached as **Enclosure #3.**

11. Importing biomaterial from captive and free-living Cuban and American crocodiles into the US will allow for molecular diagnostics to identify infectious diseases that might present in each group. Since one of the primary goals of the Cuban team at the Zapata Crocodile Farm is to release farm-raised crocodiles into the swamp, we need to know what pathogens may potentially be released along with these introductions and if they will be novel for the free-living population present. These diagnostics cannot be performed in Cuba currently. Otherwise we would prioritize all testing to be performed there. These reintroductions into the swamp are crucial to maintain genetic diversity and increase population levels given the many threats to the free-living population currently limiting their numbers.

12. N/A

13. N/A, biological samples.

14. N/A

15. N/A

16. The biological samples would be imported for the primary purpose of research if a permit is approved and issued and is a non-commercial activity.

17. N/A

18. N/A

Enclosure #1

Internal Revenue Service

District
Director

Department of the Treasury
P.O. Box 1123, Central Station
St. Louis, Missouri 63188

St. Louis Zoological Park
Forest Park
St. Louis, Missouri 63110

Person to Contact:
S. Robertson
Telephone Number:
314-425-6286
Refer Reply to:
EP/EO:Tech:Service Unit
Date:
MAR 23 1978

Gentlemen:

This is in response to your application seeking status as an organization exempt from Federal income tax under Section 501(c)(3) of the Internal Revenue Code.

Since your organization is an instrumentality of the State of Missouri, it is an organization as described in Section 115 of the Internal Revenue Code of 1954 which provides, in part, as follows:

"Gross income does not include—

(1) income derived from any public utility or the exercise of any essential governmental function and accruing to a State or any political subdivision thereof, or the District of Columbia; or

(2) income accruing to the government of any possession of the United States or any political subdivision thereof.

Contributions made to you for exclusively public purposes are deductible by the donors for Federal income tax purposes in the manner and to the extent provided in Section 170 of the Internal Revenue Code.

This is an advisory letter.

Sincerely yours,

R. C. Yurkewitz

District Director

State of Missouri

EXEMPTION FROM MISSOURI SALES AND USE TAX ON PURCHASES

Issued to:

ZOOLOGICAL PK SUBDIST OF METRO ZOOLOGICAL PK/MUSEU
FOREST PARK
ST LOUIS MO 63110

Missouri Tax ID Number: 12623491

Effective Date: 07/11/2002

Your application for sales/use tax exemption status has been approved pursuant to Section 144.030.2, RSMo. This letter is issued as documentation of your exempt status.

Purchases by your Agency are not subject to sales or use tax if within the conduct of [illegible] exempt functions and activities. When purchasing under this exemption, furnish all sellers or vendors a copy of this letter. This exemption may not be used by individuals for personal purchases.

A contractor may purchase [illegible] construction materials exempt from sales tax when fulfilling a written contract with your Agency only if your Agency issues a project exemption certificate and the contractor takes purchases as agent in accordance with the provisions of section 144.062, RSMo.

Sales by your Agency are subject to applicable state and local sales taxes. If you engage in the business of selling tangible personal property or taxable services at retail, you must obtain a Missouri Retail Sales Tax License and collect and remit sales tax.

This is a sentence exemption subject to [illegible] changes and review by the Director of Revenue. If your Agency ceases to qualify as an exempt entity, this exemption will cease to be valid. This exemption is [illegible] transferable. It is an exemption from sales tax only and is not an exemption from real or personal property tax.

Any alteration to this exemption letter renders it invalid.

If you have any questions regarding the use of this letter, please contact the Division of Taxation and Collection, P.O. Box 3380, Jefferson City, MO 65105-3380, phone 573-751-2836.

Enclosure #2 - Species + Sample List

Crocodylus rhombifer	Cuban Crocodile	unknown	wild	400	unknown	unknown	Whole blood (400 3mL samples in 3mL collection tubes, 400 1.8mL samples in 1.8mL collection tubes), serum (400 3mL samples in 3mL collection tubes, 400 1.8mL samples in 1.8mL collection tubes), blood smears (2400 microscope slides), Plasma(400 3mL samples in 3mL collection tubes, 400 1.8mL samples in 1.8mL collection tubes), dried blood on filter paper (400 cards with dried whole blood), scute
Crocodylus acutus	American Crocodile	unknown	wild	400	unknown	unknown	Whole blood (400 3mL samples in 3mL collection tubes), serum (400 3mL samples in 3mL collection tubes), blood smears (2400 microscope slides), Plasma (400 3mL samples in 3mL collection tubes), dried blood on filter paper (400 cards with dried whole blood), scute clippings (400 scute clippings in small ziplog bags),
Crocodylus rhombifer	Cuban Crocodile	unknown	captive	400	unknown	unknown	Whole blood (400 3mL samples in 3mL collection tubes, 400 1.8mL samples in 1.8mL collection tubes), serum (400 3mL samples in 3mL collection tubes, 400 1.8mL samples in 1.8mL collection tubes), blood smears (2400 microscope slides), Plasma(400 3mL samples in 3mL collection tubes, 400 1.8mL samples in 1.8mL collection tubes), dried blood on filter paper (400 cards with dried whole blood), scute

Enclosure #3- MOU

Saint Louis Zoo
WildCare Institute

ECOCIENZAP
Empresa para la Conservación de la Ciénaga de Zapata

MEMORANDUM OF AGREEMENT

between

Saint Louis Zoo WildCare Institute
One Government Drive
St. Louis, Missouri 63144 USA

and

Enterprise for the Conservation of the Zapata Swamp, Zapata Crocodile Farm
Ciénaga de Zapata,
Matanzas 43100, Cuba

covering

Crocodile Conservation and Research in Cuba

Saint Louis Zoo
WildCare Institute

ECOCIENZAP
Empresa para la Conservacion de la Ciénaga de Zapata

MEMORANDUM OF AGREEMENT FOR THE OPERATION OF THE CROCODILE CONSERVATION AND RESEARCH PROGRAM --2019-2022

This Memorandum of Agreement defines the objectives and expectations of each partner in the operation of the Saint Louis Zoo WildCare Program for Crocodile Conservation in Cuba. Partners are the Saint Louis Zoo (SLZ), One Government Dr, St. Louis, MO 63110, USA, and The Enterprise for the Conservation of the Zapata Swamp (ZCF) located in Ciénaga de Zapata, Matanzas 43100, Cuba. We agree to the below terms for three years, June 1, 2019 until May 31, 2022.

Purpose
We agree to work together with the primary purpose of supporting wildlife conservation efforts at the Zapata swamp and Zapata Crocodile Farm, Cuba through wildlife research, animal management, biological monitoring, capacity building, educational programs, and other associated tasks.

Objectives
SLZ and ZCF have mutually decided on the following items:

- We agree to follow all laws and regulations relevant to work performed in Cuba. Any required permits will be obtained from the appropriate authorities before any in-country work is conducted by SLZ staff. All invited participants from outside organizations are required to agree to the same.
- We agree to meet high ethical standards regarding the credibility and integrity of scientific research (including following best practices to prevent research misconduct and to determine authorship for scientific publications) and the copyright laws of each country. Any invited participants from outside organizations shall be required to agree to the same.
- We agree to sufficiently support the program so far as reasonably possible. Neither SLZ nor ZCF shall be under any obligation to cover new expenses for this program. If new projects develop during the three-year agreement, partners involved are required to acquire external grants or other sources in order to finance the projects.
- Any disagreement arising from the interpretation or application of this MOA is to be resolved amicably and expeditiously through mutually decided means.
- Acknowledgement of both partners, SLZ and ZCF, will be provided in any written publication or oral presentation on the work described in Appendix A.

See Appendix A for research objectives.

MOA Institutional Representatives

SLZ		ZCF	
Lauren Augustine	**Jamie Palmer**	**Etiam Pérez-Fleitas**	**Gustavo Sosa Rodriguez**
laugustine@stlzoo.org	palmer@stlzoo.org.	rhombifer@nauta.cu	Gustavo.sosa@nauta.cu

We agree to meet at least once per year to discuss program expenses funded by SLZ and prioritize goals for the following year. Representatives can change at any time with the signed agreement of all other signing representatives. SLZ and ZCF representatives will make decisions together, with equal voting rights, on everything related to MOA funded staff, operations, and strategic direction. SLZ managing partners agree to abide by ZCF policies and will consult with ZCF on any programmatic decisions.

Saint Louis Zoo
WildCare Institute

ECOCIENZAP
Empresa para la Conservación de la Ciénaga de Zapata

Budget & Finance

- Funds are provided by the Saint Louis Zoo WildCare Institute, Saint Louis Zoo Institute for Conservation Medicine, Saint Louis Zoo Herpetology Department and through in-kind support or grants acquired each year.
- These funds are held in the United States at SLZ. Any grants or donations received for this work will be held in this same account. Spending of any additional funds will be agreed upon by MOA representatives.
- SLZ will transfer funds to ZCF from SLZ twice a year, and more frequently if necessary.
- ZCF will provide written documentation for SLZ each time money is transferred for record keeping. ZCF will manage all funds in accordance with its accounting practices, policies of ZCF, and all applicable Cuban laws. We will provide an annual expense report for all spending at the end of each calendar year for SLZ and ZCF.

See Appendix B for full budget.

MOA Termination/Modification

This MOA may be terminated with no further financial obligations owed or amended at any time by either partner institution, but must be provided in writing by the institution representatives with two months notification to the other partners. Signatures of all representatives are required.

Liability and legal status

This document is not a legally binding partnership and there are no legal repercussions should the partnership be terminated. We agree that in case of any dispute relating to the items listed in this MOA, we will put our best efforts to achieve an agreeable solution for the benefit of Cuban Crocodile conservation.

Once signed by all institutional representatives, this document serves as an agreement to the terms listed below for three years beginning August 1, 2019 until May 31, 2022. It may be extended by written confirmation by all institution representatives.

Enterprise for the Conservation of the Zapata Swamp, Zapata Crocodile Farm (ZCF)

Signature _____ Date 11/7/2019

Signature _____ Date 11/7/2019

Saint Louis Zoo (SLZ)

Signature _____ Date 11/7/19

Signature _____ Date 11/7/19

Appendix A. Research Objectives:

1. Evaluate the health of the captive breeding group of Cuban crocodiles at the ZCF
2. Evaluate the heath of free-living crocodilians, including reintroduced individuals
3. Determine the diet of free-living crocodiles in the Zapata Swamp
4. Develop nutritional profiles for free-living crocodiles in the Zapata Swamp
5. Evolve the captive husbandry of all individuals at the ZCF
6. Improve egg incubation procedures and diet provided to farm raised individuals

Appendix B. 2019 Program Budget

Category	Secured from WildCare Institute	Secured from AZA Conservation Grant	Funds Pending	2019 Program Budget
Travel	$ 2,000.00	$ 6,340.00		$ 5,000.00
Research	$ 2,000.00	$ 11,058.50		$ 20,000.00
Operation	$ 5,000.00	$ 1,135.00	$ 1,600.00	$ 10,000.00
Educational outreach materials	$ 700.00			$ 1,000.00
Communication	$ 300.00			$ 500.00
Total	$ 10,000.00	$ 18,533.50	$ 1,600.00	$ 36,500.00

*$6,135 will be allocated to the farm for costs associated with the operation of the farms crocodile breeding facility and $700 will be allocated for education outreach materials within and around the ZCF.
**$13,058 will be allocated as needed for research projects and research related equipment.
***$300 a year will be used to provide internet access to the Biologist and Veterinarian at ZCF.

Enclosure 4 - IACUC Approval

Saint Louis Zoo
Animals Always*

March 1, 2018

Lauren Augustine
Saint Louis Zoo
St. Louis, MO 63110

Re: IACUC Application 18-06

Your proposal, "*Collaborating to improve conservation of the critically endangered Cuban crocodile*", has been approved by the Saint Louis Zoo's Institutional Animal Care and Use Committee. This approval is valid for three years from this date. If the project design is altered during that time, an amended application will have to be submitted. If the project extends beyond three years, you will need to submit an application for renewal.

Please let me know if you have any questions, and good luck with your research.

Sincerely,

Corinne P. Kozlowski, Ph.D.
Endocrinologist
Chair, Saint Louis Zoo IACUC
Reproductive and Behavioral Sciences Department
Saint Louis Zoo
314 646-4762
kozlowski@stlzoo.org

SAINT LOUIS ZOO
RESEARCH ANIMAL USE PROPOSAL FORM

In compliance with federal laws, regulations, and policy governing the use of non-human, vertebrate species for scientific research and/or instruction, the Saint Louis Zoo's Institutional Animal Care and Use Committee (IACUC) is responsible for reviewing research protocols to assure the humane treatment of vertebrate animals. This review is necessary for compliance with provisions of the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals, the Animal Welfare Act, federal granting agencies of the PHS, and all other applicable research animal welfare laws and regulations.

Prior to the initiation of any research animal activity, the IACUC must review and approve a completed Saint Louis Zoo Authorization to Use Animals in Research application, which follows. The IACUC welcomes inquiries about technical or humane aspects of the proposed research.

The completed Authorization application should be submitted to Dr. Corinne Kozlowski, Saint Louis Zoo, preferably by e-mail to expedite review (kozlowski@stlzoo.org, or by conventional mail to: 1 Government Drive, St. Louis, MO 63110. Copies are then distributed to IACUC members for review, which is usually completed within two weeks. The Committee may: 1) approve; 2) approve with conditions imposed; 3) request further information; or 4) withhold approval. The investigator will be notified in writing of protocol disposition by the chairperson of the IACUC.

Approval will only apply to the project as submitted. The maximum approval period is three years from the date of approval. Annual reviews of previously approved protocols are required.

Enclosure #54

SAINT LOUIS ZOO
AUTHORIZATION TO USE ANIMALS IN RESEARCH

Application Date: 1/10/2018

Study Title: Status, Conservation and Ecology of the Crocodilians in Cuba

Applicant Name and Affiliation: Lauren Augustine, Curator of Herpetology, Saint Louis Zoo

Applicant's Certification

I am familiar with and will comply with the legal standards of animal care and use established under federal and state laws and policies, (e.g., PHS policy, Animal Welfare Act, the "Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training," and the standards set forth in the "Guide for the Care and Use of Laboratory Animals").

I certify that I am familiar with, experienced and technically capable of performing all animal manipulations and procedures described herein; that I assume responsibility for the supervision and training of any person who performs work on this project; or that I have made arrangements (documented herein) for such work to be performed by knowledgeable and experienced people.

I further certify that all the information provided in, or attached to, this form is true and accurate as of the date submitted. Any revisions to animal care and use as outlined in this protocol will be immediately submitted in writing to the IACUC for review prior to implementation.

DETAILED INFORMATION

Check below as applicable and complete only the sections (A-C) that are relevant to your project. Sections that do not apply to your project should not be included in your document.

A. NON-SURGICAL PROCEDURES **(Pertains to all experimental protocols excluding surgical procedures and field studies involving wild animals).**

____ NO or ____ YES (complete Part II, Section A)

B. SURGICAL PROCEDURES **(Pertains to any surgical procedure, including non-survival surgery and surgery on wild animals. If other procedures are performed on animals prior to or after surgery, complete section A or C and other applicable sections).**

____ NO or ____ YES **(complete Part II, Section B)**

C. FIELD STUDIES INVOLVING WILD ANIMALS
(Also complete sections B, D and/or E, if applicable).

____ NO or __X__ YES **(complete Part II, Section C)**

Enclosure #56

SAINT LOUIS ZOO
AUTHORIZATION TO USE ANIMALS IN RESEARCH

PART I - GENERAL INFORMATION

A. PERSONNEL

Federal animal welfare laws, regulations, and policy require appropriate training and experience of all persons using vertebrate animals in research. List all persons (investigators, veterinarians, students, technicians, etc.) who will perform any technique with live animals. Along with each person's name, title, institutional affiliation, and phone number, state their experience to perform the specific techniques/procedures using animals described in this Authorization or how training will be obtained.

Lauren Augustine[1], MSc, Etiam Pérez Fleitas[2], MSc, Gustavo Sosa Rodríguez[3], MSc, Yoamel Milián-García[4], PhD, Jessica Castellanos-Labarcena[5], BSc

[1]Curator of Herpetology
Saint Louis Zoo
One Government Drive, Saint Louis, MO 63110

[2]Specialist in Exotic Fauna, Wildlife and Researcher
Cuban crocodile breeding farm
Enterprise for Conservation of the Zapata Swamp
Ciénaga de Zapata, Matanzas, Cuba

[3]Crocodile specialist and veterinarian
Cuban crocodile breeding farm
Enterprise for Conservation of the Zapata Swamp
Ciénaga de Zapata, Matanzas, Cuba
Phone: (+53) 45 987249

[4]Associate Postdoctoral Researcher at the Conservation Genetics Group, University of Havana, Cuba
International Visiting Researcher at the University of British Columbia, Kelowna, Canada
Calle 25 # 455 entre J e I, Vedado, La Habana, Cuba, CP: 10400

[5]Associate Graduate Student at the Conservation Genetics Group, University of Havana, Cuba
Visiting International Graduate Student at the University of British Columbia, Kelowna, Canada
Calle 25 # 455 entre J e I, Vedado, La Habana, Cuba, CP: 10400

B. STUDY TITLE

Status, Conservation and Ecology of Cuban Crocodilians

C. ANIMALS

1) List genus, species and common name, plus number of animals to be used for the total project (three year maximum).

Crocodylus rhombifer, Cuban crocodile
Crocodylus acutus, American crocodile
All encountered crocodilians will be processed for this study, between 600-800 animals total

2) Have these animals been used in any previous experiments? __X__ yes ____ no If yes, provide a brief description.

There have been ongoing mark-recapture studies in the Zapata Swamp since the 1970's. There is the potential for a

Enclosure # 5c

Matanzas July 24, 2019

61st Anniversary of the Revolution

This is authorization for the request made by the Flora and Fauna Group to have 6 US citizens and one Ecuadorian travel to Cuba from November 4-12, 2019 to the Zapata hatchery for Crocodiles

Names: Kelvin Alvarez, Kevin Torregrosa, Gordon Brian Henley, Karl Guyton, and Ainoa Nieto Claudin, Jamie Palmer, Lauren Augustine.

The level of visit is given by special advisor

Greetings

Ricardo Menendezl Chapelin

Regional delegate of the ministry of agriculture, Matanzas.

Work program

Visitor Name:

Lauren Augustine

Jamie Palmer

Kelvin Alvarez

Kevin Torregrosa

Gordon Brian Henley

Karl Guyton

Country: United States

Visitor Name: Ainoa Nieto Claudin

Country: Ecuador

Work Schedule

Day 11/4 – Symposium "wetlands 2019" opening of the workshop "Science, management and conservation of the crocodile in Cuba:

Day 11/5 – 11/7 – conference and presentation of conference

Day 11/8 – 11/10 – sample collection, processing and storage in the Zapata crocodile hatchery.

Day 11/12 – depart for the US.

Signed by the Vice president of the Department of Flora and Fauna

Enclosure # 6a-b

recapture.

D. PROPOSAL

1) Briefly describe the background and specific goals of this project (cite key references, as appropriate).

Cuba contains two distinct genetic lineages of crocodilians, the Cuban crocodile, *Crocodylus rhombifer*, and the American crocodile, *Crocodylus acutus* (Milian-Garcia et al., 2011). Endemic to the main island of Cuba, *C. rhombifer* is critically endangered (IUCN, 2017) and considered one of the most threatened crocodilians in the world (de Sola, 1930; Rodriguez-Soberón et al., 2000; Ramos-Targarona et al., 2008, 2010; Trutnau and Sommerlad, 2006; Varona, 1986). Threatened by illegal hunting, habitat modifications and high levels of hybridization with *C. acutus (*49.1%; Milian-Garcia *et al.*, 2015*)*, *C. rhombifer* is unlikely to sustain current population levels without conservation action. Management practices currently include captive propagation for repatriation and mark-recapture studies within the Zapata Swamp. Today, there is an estimated 5,700 *C. rhombifer* left in approximately 30,000 hectares of the Southwestern tip of the Zapata Peninsula (Ramos- Targarona, 2013).

With a much larger distribution, *C. acutus* occurs on the Atlantic and Pacific coasts of Mexico, Central America, and northern South America, as well as many Caribbean islands, including Cuba (Thorbjarnarson, 1989). Populations are in decline through much of this range due to prior over-exploitation, and this species is listed as Vulnerable by the IUCN (IUCN, 2017). Genetics studies have found that the C. *acutus* lineage present in Cuba is genetically distinct from other Mainland *C. acutus* populations (Weaver et al, 2008; Milian-Garcia et al., 2011; 2015; 2017).

Recent investigations have focused on the widespread hybridization of *C. rhombifer* with *C. acutus* in the Zapata Swamp (Milian-Garcia et al., 2011; 2015; 2017; Weaver et al., 2008) with few studies evaluating the biology and natural history of these Cuban species in the last decade. As *C. rhombifer* is considered one of the most morphologically, ecologically, and behaviorally distinct crocodilians (Thorbjarnarson et al., 2008), and the Cuban *C. acutus* is genetically distinct from Mainland populations (Milian-Garcia et al., 2011; 2015; Weaver et al., 2008), an increased understanding of the distribution, habitat use, diet, health, and nest ecology is a priority for the effective conservation management of crocodilians in Cuba.

There are, however, several challenges to studying wild crocodilian populations in Cuba. The Zapata Swamp, located in the Matanzas Province, is the largest wetland in the Caribbean at 452,000 hectares (Borhidi et al. 1993, Ramos-Targarona et al., 1996) and considered one of Cuba's most endangered ecosystems (Wotzkow, 1998). Although ongoing studies have been implemented since the early 1970s, limited resources and challenging topography (low water levels and dense vegetation) make many areas of the swamp inaccessible to biologists (Ramos et al., 1996).

This study aims to utilize unmanned aerial systems (drones) in conjunction with mark-recapture studies to survey the Zapata Swamp and the reintroduction site recently populated with *C. rhombifer*. In addition to aerial surveys for crocodilians, drones will be employed to search for crocodile mound nests during the peak nesting season. Data on the distribution, health, diet, nest ecology and habitat will be collected during field excursions. This information will enhance our understanding of *C. rhombifer* and *C. acutus* within this restricted range.

2) Write a brief but complete description of the proposed use of each species, including procedures. What will be done with the animals? How will they be affected, changed or altered?
NOTE: Additional detail will be requested regarding specific techniques (Part II, Section A) and surgical procedures (Part II, Section B).

The goals of this research are to support crocodile conservation in Cuba. This research has five main objectives:

1) Document the current distribution and habitat use of wild and reintroduced crocodilians in Zapata Swamp through mark-recapture and aerial surveys. Results will determine potential differences between age classes, sex and species seasonally. Drones will also evaluate reintroduction sites and the distribution of crocodilians in remote areas.
2) Investigate the diet and seasonal prey use of crocodilians. Stomach contents will be used to determine seasonal use of prey items, and potential differences between species, geographic locations and age

classes. Differences in diet could correlate with behavioral differences known to exist between these species.

3) Evaluate the health of wild crocodilian populations. In situ health monitoring of wildlife species is becoming increasingly important tool for conservation (Atkins et al., 2010). Blood biochemistry will be analyzed to acquire baseline values for wild populations and develop guidelines for evaluating captive specimens.
4) Study nest phenology and clutch characteristics. Despite their critical status, there is little known about the reproductive biology of *C. rhombifer*. To date, less than 20 nests have been located in the Zapata Swamp (*per. comm.* E. Pérez Fleitas) and most reproductive data on *C. rhombifer* have been collected from captive specimens (Augustine et al., 2017; Augustine and Watkins, 2015; Dinets, 2011; Milian-Garcia et al., 2016). With considerable genetic differentiation between *C. acutus* populations and high levels of hybridization, the nest phenology of these species could provide valuable information for understanding future trends in these populations.
5) Develop an educational video. Using video footage from drone surveys, the team will work with a media specialist to create a bilingual educational video for use in Cuba. An educational video depicting the ecological value of crocodilians in Cuba will promote conservation through increased awareness.

Crocodiles will be hand-captured (Ramos-Targarona et al., 1996) and the following data will be collected: body weight, total length, snout-vent length, head length and width, and tail girth measurements. Animals will be sexed via cloacal examination (Brazaitis, 1968); animals not yet marked will be marked via scute-clippings from the tail (Richardson et al., 2002), a technique that has already been employed with the crocodilians in Zapata Swamp (Ramos, et al., 1996). Clippings will be kept for genetic analysis (Milian-Garcia et al., 2015; Milian-Garcia et al., 2011). Blood will be collected from the supravertebral vessel (the occipital sinus) or from the caudal tail vein in with a 19-25 gauge needle depending on size of the specimen and location of sample collection. Biochemistry will be performed on whole blood using a VetScan2 (Abaxis Inc., Union City, California 94587, USA) and Reptilian Profile Plus Cartridge (AST, BA, CK, UA, GLU, PHOS, CA++, TP, ALB, GLOB, K+, Na+). Blood samples will be for future research.
Once in hand, crocodiles under two meters in total length will have their stomach's flushed using a manual hand pump. This method has been proven by Taylor (1978) and used widely with crocodilians (Brantly, 1989; Platt et al., 1990). Stomach contents will be preserved and returned to the Crocodile Farm for examination.
With little information on the nesting ecology of wild *C. rhombifer*, the following data will be collected at accessible nest sites: nest dimensions and materials, egg cavity dimensions, distance from water, temperature, clutch characteristics and data on the female guarding the nest. If possible, nest sites will be revisited to assess hatching success.

3) Experimental Design (Answer a or b below, as appropriate for your proposed study.) N/A
For each experiment:

a. State the number of animals requested and justification for this number.
In the field they capture up to 30 crocs in a day, but generally average around 10. So that around 600 crocodiles for four trips of 15 days. Although I am hoping that the drones increase this number to around 800.

b. Identify the experimental and control groups, including sample size.

c. Describe specific data to be collected, and where appropriate, methods of analysis.

The goals of this research are to support crocodile conservation in Cuba. This research has five main objectives:

1) Document the current distribution and habitat use of wild and reintroduced crocodilians in Zapata Swamp through mark-recapture and aerial surveys. Results will determine potential differences between age

classes, sex and species seasonally. Drones will also evaluate reintroduction sites and the distribution of crocodilians in remote areas.

This will be done through aerial surveys and mark-recapture surveys. Crocodiles will be hand-captured (Ramos-Targarona et al., 1996) and the following data will be collected: body weight, total length, snout-vent length, head length and width, and tail girth measurements. Animals will be sexed via cloacal examination (Brazaitis, 1968); animals not yet marked will be marked via scute-clippings from the tail (Richardson et al., 2002), a technique that has already been employed with the crocodilians in Zapata Swamp (Ramos, et al., 1996). Clippings will be kept for genetic analysis (Milian-Garcia et al., 2015; Milian-Garcia et al., 2011) and other possible research purposes such as stable isotope analysis for nutritional information in the future

2) Investigate the diet and seasonal prey use of crocodilians. Stomach contents will be used to determine seasonal use of prey items, and potential differences between species, geographic locations and age classes. Differences in diet could correlate with behavioral differences known to exist between these species.

Dietary data on *C. rhombifer* are lacking, with early reports finding fresh-water gar, *Lepisosteus tristoechus* and Hutia, *Capromys conga*, in the intestinal tracks of dissected individuals (de la sola, 1930). Once in hand, crocodiles under two meters in total length will have their stomach's flushed using a manual hand pump. This method has been proven by Taylor (1978) and used widely with crocodilians (Brantly, 1989; Platt et al., 1990). Stomach contents will be preserved in 10% formalin and returned to the Crocodile Farm for examination

Procedure: Once the captured the animal will be restrained with rope and have their mouths secured. After the measurements and photographs are taken the animals stomach will be flushed. For stomach flushing several biologists will hold the croc down while another unties the mouth. The jaws will be held shut during this process. Once the mouth is no longer secured the handler on top of the head will restrain the crocodiles neck while the other releases the mouth. If the mouth does not open a gentle tap on the top of the head will cause the croc to open it mouth. A piece of appropriately sized PVC (with a piece of rope tied around it) will be placed in the crocs mouth and the jaws will again be secured around the PVC allowing for safe stomach flushing. The hose-Heimlich method involves inserting a hose carefully down the esophagus and into the crocodile's stomach. A water pump is used to gently fill the crocodile stomach with water. With the hose still in place and running, a person beside the specimen vigorously squeezes its belly up towards its spine and forward in a motion analogous to the Heimlich maneuver. A mixture of stomach contents and water is expelled, thus emptying the stomach. One the procedure is over the crocodile will have its mouth released and the small rope will be used to pull the PVC out.

3) Evaluate the health of wild crocodilian populations. In situ health monitoring of wildlife species is becoming increasingly important tool for conservation (Atkins et al., 2010). Blood biochemistry will be analyzed to acquire baseline values for wild populations and develop guidelines for evaluating captive specimens.

-Blood will be collected from the supravertebral vessel (the occipital sinus) or from the caudal tail vein in with a 19-25 gauge needle depending on size and location. Biochemistry will be performed on whole blood using a VetScan2 (Abaxis Inc., Union City, California 94587, USA) and Reptilian Profile Plus Cartridge (AST, BA, CK, UA, GLU, PHOS, CA++, TP, ALB, GLOB, K+, Na+). Extra blood samples will also be stored for future use in Lithium Heparin vials and Cry-vials.

4) Study nest phenology and clutch characteristics. Despite their critical status, there is little known about the reproductive biology of *C. rhombifer*. To date, less than 20 nests have been located in the Zapata Swamp (per. comm. E. Pérez Fleitas) and most reproductive data on *C. rhombifer* have been collected from captive specimens (Augustine et al., 2017; Augustine and Watkins, 2015; Dinets, 2011; Milian-Garcia et al., 2016). With considerable genetic differentiation between *C. acutus* populations and high levels of hybridization,

the nest phenology of these species could provide valuable information for understanding future trends in these populations.

-Locating nests within the swamp is difficult. Two field excursions will take place during nesting season and drones will be used to increase search efforts. The following data will be collected at accessible nest sites: nest dimensions and materials, egg cavity dimensions, distance from water, temperature, clutch characteristics and data on the female guarding the nest. If possible, nest sites will be revisited to assess hatching success.

5) Develop an educational video. Using video footage from drone surveys, the team will work with a media specialist to create a bilingual educational video for use in Cuba. An educational video depicting the ecological value of crocodilians in Cuba will promote conservation through increased awareness.

-Video footage taken by the drones will be reviewed by biologists for crocodiles and nest counts, as well provide footage for the development of an education video. This video will demonstrate the ecological value of crocodilians in the Zapata ecosystem and will educate consumers on the harm of crocodile poaching.

E. DUPLICATION OF RESEARCH

The Animal Welfare Act requires that the principal investigator give written assurance that the proposed research is not unnecessarily duplicative.

Does the proposed research duplicate any previous work? ____ yes __X__ no

If yes, explain.

F. ALTERNATIVES TO THE USE OF ANIMALS

The Animal Welfare Act requires that the principal investigator consider alternatives to procedures that may cause more than momentary or slight pain or distress to the animals and provide a written narrative description of the methods and sources used to determine that alternatives are not available. The minimal written narrative should include: the databases searched or other sources consulted, the date of the search and the years covered by the search, and the key words and/or search strategy used by the Principal Investigator. The narrative should be such that the IACUC can readily assess whether the search topics were appropriate and whether the search was sufficiently thorough. See **Appendix 1** for categories of procedures and what are considered associated levels of discomfort.

1) Will procedures be used that cause more than momentary or slight pain or distress to the animals?
__X__yes ____no

If yes, identify procedure(s), and describe methods to be used to alleviate pain or distress.

The capture of the crocodiles in addition to the collection of samples will cause some pain and distress to the animals. These techniques are used widely with crocodilians and have not caused any long-term problems. With the expertise involved in this project, the procedures will happen as quickly as possible to minimize any discomfort. Animals will not be held longer than 1 hour.

2) **Methods and Sources:** What procedures and sources did you use to determine that alternatives to Painful procedures were not available or appropriate? Check all the resources below that were used to search the literature or provide a narrative explanation in the space provided. While it will not be unusual for several databases or information sources to be used, there is no specific requirement for multiple searches or the use of certain databases.

Databases and computer searches: Check the database(s) used to conduct a search of the current scientific literature and the inclusive dates searched.

Databases	Inclusive Dates	Databases	Inclusive Dates
___Agricola	_____	____ Medline	_____
___Biological Abstracts	_____	____ Toxline	_____
___Science Citation Index	_____	____ Bioethics Line	_____
___Biosis	_____	____ National Agri. Library	_____
___CRIS	_____	__X__ Other (List):	_Web of Science, Google Scholar, Crocodile Specialist Group Website (resources), __Oct-Dec 2017_____

List the keywords and/or search strategy: ____Cuban Crocodile, Crocodile ecology; nesting; reintroduction; diet; wildlife health; mark-recapture_____

Information services and other literature sources:

___ Center for Alternatives to Animal Testing (CAAT) http://www.sph.jhu.edu/~altweb.
___ Animal Welfare Information Center (301)504-6212 awic@nalusda.gov
___ Lab Animal Welfare Biblio. (NLM)
___ *Laboratory Animal Science* Journal
___ *Alternatives to Laboratory Animals* Journal (FRAME, U.K.)
___ Quick Biblio. Series (AGRICOLA)
___ U.C. Center for Animal Alternatives (www.vetmed.ucdavis.edu/Animal_Alternatives/training.htm)
___ Other (List):

Knowledge of field/consultants:

__X_ Direct contact with investigators in field (please describe: e.g., professional meetings, journal reviews, memberships):

__X_ Consultation with expert in the area of investigation (briefly describe name, position, and area of expertise):

The PI's are the experts. In addition we have been consulting with Natalia Rossi (WCS Cuba Manager) and Toby Ramos (Cuban Field Biologist) to ensure proper channels are used to export the supplies needed from the US into Cuba.

Other methods or sources used:

PART II, SECTION A

A. NON-SURGICAL PROCEDURES

1) Give the location where the procedures will be performed.

In the field

2) Identify individuals performing the procedure, if other than the principal investigator.

All PI's will be involved in the procedures. Gustavo, a veterinarian, will be responsible for blood draws.

3) Will any anesthetics, tranquilizers or analgesics be used? ____ yes __X__ no
If yes, describe use, and give dosages.

4) Methods/Techniques
Complete all applicable sections below. Be specific, and provide details as necessary.

____ Special diet: ____ deficient, ____ additive, ____ liquid, ____ pellet, ____ meal, ____ other (describe)? Who will be responsible for manufacture, purchase, storage, and feeding of the animals? Include details.

____ Injections: substance, site, concentration, volume, frequency, needle (gauge, length, catheter), etc.

__X__ Blood collection: site, volume, frequency, method (syringe, catheter, needle hub), needle gauge, anesthetic.

Blood will be collected from the supravertebral vessel (the occipital sinus) or from the caudal tail vein in with a 19-25 gauge needle depending on size and location. Biochemistry will be performed on whole blood using a VetScan2 (Abaxis Inc., Union City, California 94587, USA) and Reptilian Profile Plus Cartridge (AST, BA, CK, UA, GLU, PHOS, CA++, TP, ALB, GLOB, K+, Na+). Extra blood samples will also be stored for future use in Lithium Heparin vials and Cry-vials. Total volume of blood collected will not exceed 0.5 % of body weight (Mader, 2006) and in most cases will be far less. A 3 ml syringe with a 1.5" 19 or 20 gauge needle will be used for blood collection.

____ Urine/feces collection: voided, catheter, metabolism cage, frequency, duration

___X_ Physical restraint: method, duration, frequency, adaptation

Animals will be captured with a rope or a dog noose poll. The Cuban biologists are highly skilled at restraining and securing the mouth of these dangerous crocodiles in the field. They will use the rope to secure the jaws from a safe distance. Once the rope is around the jaws animals will be further secured by the field crew with ropes. They will be held no longer than an hour. Each crocodile will only be captured one time.

____ Food/water deprivation: duration, frequency, extent (total/partial)

____ Altered environment: temperature, humidity, light, extent, etc.

____ Other (Include details.)

PART II, SECTION B

B. SURGICAL PROCEDURES N/A

1) SURGERY

All surgeries must be conducted aseptically and in accordance with the Guide and veterinary standards.

a. Will multiple surgeries be performed? ____ yes ____ no If yes, provide rationale:

b. How will health status of animals be assessed before initiation of procedure (e.g. , physical exam)?

c. Describe the operative procedure. Include patient preparation, anesthesia/analgesia, site of incision, surgical manipulation, size and placement of catheter, device implantation, suture type, estimated time, anesthetic recovery, post-operative care, etc.

d. State the name of person performing surgery.

e. Describe the qualifications of the person(s) performing surgery.

f. State the location where surgery will be performed.

2) ANESTHESIA N/A

a. State the name of person(s) administering anesthesia (if different from person (s) performing surgery).

b. Describe the qualifications of the person(s) administering anesthesia.

c. Will animals be fasted or water withheld prior to surgery? ____ yes ____ no If yes, describe.

d. Anesthetic protocol: Include name of drug, dose, route, and other information as necessary.

1. Pre-anesthetic drug(s)

2. Induction drug(s)

3. Maintenance drug(s)

4. Paralytics or muscle relaxant(s). If used, explain how anesthesia/analgesia will be monitored.

5. Fluids

6. Describe procedures to be used to monitor anesthetized animal, including depth of Anesthesia (e.g., withdrawal reflex, palpebral reflex) and physiologic state (e.g., temperature, heart rate, respiratory rate)

3) POST-OPERATIVE CARE

a. Who will monitor the animal until it completely recovers from anesthesia, and where will the animal recover?

b. How often will animal(s) be monitored during recovery? What specifically will be monitored (e.g., temperature, heart rate, respiratory rate, capillary refill time, hydration)?

c. What is the anticipated duration for recovery from anesthesia?

d. What postoperative complications can be reasonably anticipated?

e. After recovery and during experimental study, what criteria will be used to assess pain, distress, and discomfort? (Post-surgical observations of behavior, appetite and body temperature should be recorded at least daily for three days postoperatively).

f. Is significant post-operative pain, distress and/or discomfort anticipated? ____ yes ____ no
If yes, what measures will be used to alleviate post-operative pain, distress, and/or discomfort? If analgesics are used, provide name of drug, dosage, route and frequency of administration.

PART II, SECTION C

C. FIELD STUDIES

1) List any permits required.

There will be permits required to work in the Zapata Swamp and to Collect Samples. My Cuban Colleagues are working on these permissions. Additionally we are requesting permission to export the equipment into Cuba from the Cuban government s well as the US department of Commerce (https://www.bis.doc.gov/) A request for a license has been submitted.

2) List the study site(s).

Five Field Site locations: Punta Arena (22°11'4, 6461 N; 81°34'4, 6736 W); Estamento (22°11'55,8616 N; 81°38'6, 4764 W); Zanja del 9 (22°11'57,4375 N; 81°42'24, 1301 W); Zanja del 10 (22°11'51,9220 N; 81°44'29, 4112 W); Estero del Pino (22°13'57,2031 N; 81°50'29, 4960 W)

3) The field study described will be (check all that apply):

____ Observation of free living animals

__X__ Live capture and release

____ Non-survival collection.

4) Field Study Techniques: Complete the following questions that are relevant to your project.

a. Please give a short description of observation technique(s).

Biologists will utilize unmanned aerial systems, drones, to survey remote areas of the swamp and reintroduction sites for crocodiles. This technology will allow for more frequent surveys and access to more remote areas of the Swamp providing distribution and habitat use data that would be otherwise be unattainable. The video footage will be reviewed by biologists.

b. Describe method(s) of capture to be used, including devices to be used, frequency with which these devices will be checked, estimated maximum time animals will be restrained before release, and precautions which will be taken to reduce non-target captures.

Yoamel, Etiam and Gustavo are unique qualified to work on this Project as they have conducted field work with crocodilians in Cuba previously. They are well versed in field work, have a good understanding of the species biology and are well-equipped to handle these aggressive crocodiles.
Ropes, dog catch poles and other supplies will be used to restrain crocodiles. The Cuban biologists are highly skilled at restraining and securing the mouth of these dangerous crocodiles in the field. They will use the rope to secure the jaws from a safe distance. Once the rope is around the jaws animals will be further secured by the field crew.

c. If drugs are to be used, indicate which drug(s), reason for use, dosage, route, and frequency of administration, and who will administer drug(s).

N/A

d. If marking procedures are used, please describe.

All animals captured will be part of an ongoing mark-recapture study. Animals not yet marked will be marked via scute-clippings from the tail. This technique involves the removal of vertical tail scutes in a unique combination (Richardson et al., 2002) and has already been employed with the crocodilians in Zapata Swamp (Ramos, et al., 1996).

e. If a telemetry package is to be attached, describe the weight and size of the total package, type of antenna (including length), and method of attachment. Also, describe the procedure for removal of the package from the animal.

N/A

f. If blood or other tissue samples are to be taken, describe procedure(s) to be used, including number, frequency, and weight/volume of sample(s) to be taken.

Clippings will be kept for genetic analysis (Milian-Garcia et al., 2015; Milian-Garcia et al., 2011). Blood will be collected from the heart in juveniles, and from the sublingual or caudal vein in sub-adult and adult animals. Biochemistry will be performed on whole blood using a VetScan2 (Abaxis Inc., Union City, California 94587, USA) and Reptilian Profile Plus Cartridge (AST, BA, CK, UA, GLU, PHOS, CA++, TP, ALB, GLOB, K+, Na+).

Gustavo, a veterinarian, will collect whole blood using a 3 ml syringe and 19-20 g needle depending on size of animal. Total volume of blood collected will not exceed 0.5 % of body weight (Mader, 2006).

g. If animals are housed, indicate where, type of housing, and the length of time they will be housed.

If a crocodile is captured near a nest site they will restrained until the nest is processed. The processing of the animal and the nest should take less than 1 hour. Animal will have their eyes covered and be physically restrained during this time. The covering of the eyes and pressure of the restraint will cause a calming effect.

h. Indicate where captured animals will be released. If animals are transported, indicate the method of transportation. If release is at a site other than the site of capture, justify.

Animal will be captured, processed and released all within the same area. We may need to move the animals to a safe area for processing, particularly if they are captured in the water or in dense vegetation, but this should not be more than .5 miles from the capture site and animals will be returned.

CONSERVATION GRANTS FUND

Association of Zoos & Aquariums

2018 AZA CONSERVATION GRANTS FUND

Application Instructions

DEADLINE

This 2018 Conservation Grants Fund (CGF) electronic application must be used for all proposals. Completed applications must be submitted via email no later than **5:00 p.m. EDT on 15 March 2018.** An auto-response email with a time-stamp will confirm receipt of the application.

Incomplete applications, or applications received after 5:00 p.m. EDT on 15 March 2018, ***regardless of cause,*** *will NOT be eligible for consideration.* **NO DEADLINE EXCEPTIONS WILL BE MADE.**

MEMBERSHIP

The Principal Investigator (PI) and all Co-Investigators (CIs) *must be individual AZA members* at the Professional Associate, Professional Affiliate, Professional Fellow, or Student level. Institutional membership does not count as individual membership and individual members at the Friend level are not eligible. Other participants actively involved in the completion of the project should be listed as collaborators and are not required to be AZA members. To apply for membership, visit *https://www.aza.org/individual-membership*.

FUNDING TIMELINE

All CGF projects must be completed within 12 months. CGF grants are intended to serve as seed money to attract additional funding and proposals should request funds only for this one year period. Identical components of a project will not be funded for more than two grant cycles; however, funding requests for different components of the same project may be applied for in subsequent grant cycles.

All CGF proposals undergo a thorough two-tiered review process as outlined at *https://www.aza.org/cgf-selection-process*. Applicants will be notified of funding decisions in early September 2018 and funds will be available 1 October 2018. CGF funds can only be used for proposal expenses incurred on or after the award date. Expenses incurred prior to the award date will not be covered by CGF funds.

APPLICATION GUIDELINES

The CGF application and all supplemental forms are posted on the CGF webpage at: *http://www.aza.org/cgf-information-for-applicants/*. These electronic documents contain form fields that must be completed and submitted electronically via email to: *CGFapp@aza.org*. *All application materials must be in electronic format. No hard copies of any application materials will be accepted.*

It is strongly recommended that you save your completed application and supplemental forms on a hard drive as a backup. *Only* completed applications, submitted by the deadline defined above, will be reviewed. Applicants will be informed electronically if their application is incomplete.

APPLICATION INSTRUCTIONS AND CHECKLIST: All completed CGF application materials must be submitted **in one email** by the deadline identified above and include the following:

CGF Application: The application is one electronic document consisting of the three sections outlined below. All sections must be complete in order for the application to be considered complete. The application must be submitted as a Microsoft Word document titled **"Application"** and attached to your CGF Application email.

Applications submitted in Portable Document Format (PDF) will NOT be eligible for consideration. **NO EXCEPTIONS WILL BE MADE.**

Note that "spell checker" and "track changes" functions cannot be used in this form. AZA strongly recommends that applicants compose the content for their Project Abstract and Project Proposal in a separate document to make use of these features, and then copy and paste the final text into the form fields. When composing in a separate document, be aware of character limitations. If the copied text exceeds the character limit when pasted into a form field, *all text exceeding the character limitation will be cut off and will not appear in the final proposal.*

Also note that certain formatting such as italics, bold, and underlining, is unavailable due to the application format. AZA recommends the use of numbering and spacing to emphasize important points in the text.

- ☒ **Cover Sheet.** Fill in the text fields for the project title, amount requested, and PI and CI information. Choose *two* project categories from the given list. Include a project abstract no longer than 1,500 characters, including spaces.

- ☒ **Project Proposal.** Text fields are provided for responses to questions 1-13. Fields have a limit on the number of characters that may be used in order to keep the application concise. Character limits, including spaces, are stated following each question. If a question is not applicable to your proposal, write "N/A" in the field but *do not leave any form fields blank,* as this may delay processing of your application.

- ☒ **Budget.** Required budgetary information includes:

  - ☒ Detailed Project Budget. Detail how the budget will be allocated to specific items and indicate which funding source will pay for each item. State the total project budget, the amount requested from CGF, and other financial support applied for or received. Each of these amounts should reflect the one year duration of the project. Funding decisions are announced in early September and CGF funds are to be used for work from the announcement date forward. Expenses incurred prior to the announcement will *not* be covered by CGF funds.

  - ☒ Budget Justification. Provide an explanation of why specific major items are essential to the project and reasonable in cost.

Required Attachments: The following must be attached to your CGF Application email:

- ☒ **Curricula Vitae.** A curriculum vitae (CV) is required for **each** PI and CI listed on the Cover Sheet and must follow the format stated in these guidelines. CVs must not exceed a **maximum** length of two letter-sized (8.5 by 11 inch) pages each and must be typed in a legible font size (12 point recommended); each side of the paper counts as one page. CVs may be attached for collaborators but are not required. Each CV must be submitted as a separate document entitled, **"CV *Investigator's Last Name.*"** *CVs that exceed the maximum length will be cut off at the second page.*

- ☒ **Statement of Institutional Support Forms.** Electronically signed *Statements of Institutional Support* from the CEO(s)/Institutional Director(s) (not the COO, General Curator, Vice President, Dean, or Department Director) of the PI's institution and **EACH** CI institution *and* collaborating institution must be attached to the CGF Application email as separate documents titled **"SIS**

***Institution's Name.*"** The *Statement of Institutional Support* form can be found with the rest of the CGF Application materials on the AZA website identified above.

Applicants wishing to include support letters from entities *other than* PI and CI institutions, collaborating institutions, or AZA Animal Programs may submit such items as appendices.

Note that letters of support from PI and CI institutions and collaborating institutions will not be accepted in lieu of the *Statement of Institutional Support* form. In addition, letters of support/endorsement **from AZA Animal Programs (Taxon Advisory Groups, Species Survival Plans®, etc.)** are not accepted although coordination with AZA Animal Programs is encouraged and should be described in Question 8. In order to assure Animal Program review of all relevant CGF submissions, AZA Program Leaders will serve as expert reviewers in the CGF application review process and may express their support for a proposal at that time.

☐ **Permits.** If permits are required to complete your proposed project, you must attach an electronic copy of each to your CGF Application email. Each permit attached to the CGF Application email must be titled **"Permit #."** *If you are not able to obtain a required permit before submitting this proposal, you must submit it by 15 June 2018 to ensure award eligibility.*

☐ **Proposal Resubmission Form.** If a proposal for this project was previously submitted for CGF funding and rejected, the revised proposal *must* include a completed *Proposal Resubmission Form* as an attachment on the CGF Application email. This attachment must be submitted as a Microsoft Word document titled **"Resubmission Form"** and attached to your CGF Application email. *Resubmission forms submitted in Portable Document Format (PDF) will not be accepted.* The form can be found with the rest of the CGF Application materials on the AZA website identified above.

Note: Proposals that fail to provide all of the items identified in the above checklist in the correct format will not be reviewed.

Non-Required Attachments: The following attachments to your CGF Application email are optional:

☒ **Citations (recommended).** Citations/references for statements made in the Project Proposal should be included in a separate document titled **"Citations"** and attached to the CGF Application email.

☐ **Appendices.** Appendices are allowed, but may only *clarify*, and not *supplement*, information in the narrative. For example, photos or diagrams would be acceptable, but not videos or publications. Appendices must be attached to the CGF Application email titled **"Appendix #."**

Note: Appendices that do not adhere to these guidelines will be removed from the proposal prior to review.

SUBMISSION INSTRUCTIONS

By submitting your application, you agree, if funded, to abide by the Grant Terms and Conditions posted on the CGF website at *http://www.aza.org/cgf-information-for-applicants/*.

Proposals must be submitted electronically using the 2018 CGF Application and related forms via a **single email, with the proposal title as the subject line,** to *CGFapp@aza.org* no later than 5:00 p.m. EDT on 15 March 2018. Hard copies of any application materials or applications received after this deadline will not be accepted *regardless of cause.*

AZA's email system accepts messages up to 8 MB in size. In cases when applications are too large to be accepted in one email, AZA will accept the application submission in two separate emails, provided that the same proposal title is identified in the subject line of each.

The 2018 CGF Application email **must** include the following attachments: CGF Application (this completed form), CVs for each Principal and Co- Investigator, Statements of Institutional Support for each PI and CI institution and collaborating institution, and, if applicable, a Proposal Resubmission form. The Application email may also include citation and appendices attachments.

Auto-response emails will be sent to applicants confirming receipt of the application package. If an auto-response is not received, please resubmit the application. If an applicant submits more than one proposal, s/he should ensure that an auto-response was received for *each* submission. If submission problems arise, contact the AZA office at 301-562-0777. If you submit your application after the 5:00 p.m. deadline, you may still receive an auto-response from the CGF Application inbox; however, your proposal will not be reviewed.

Applications which fail to follow submission instructions or are time-stamped after the deadline will not be considered and applicants will be notified that their application is inadmissible.

APPLICATION ASSISTANCE

The CGF website (*http://www.aza.org/cgf-information-for-applicants/*) contains a wealth of information to help applicants compose a competitive proposal.

Proposals received before 7 March will be reviewed by AZA staff to ensure that the application is completed correctly. Early submission allows time for AZA staff to inform applicants if problems are noted in time for resubmission. Please note that AZA staff does not review early proposals for content.

CONSERVATION GRANTS FUND

Association of Zoos & Aquariums

2018 AZA CONSERVATION GRANTS FUND
Cover Sheet

Project Number:
For AZA use only

Title of Project: Collaborating to Improve Conservation Efforts for the Critically Endangered Cuban crocodile
Amount Requested: $18,536.00 (round to the nearest whole dollar)
Project Start Date: 10/15/2018 **End Date:** 10/15/2019
(CGF funding is for one year only, beginning no earlier than the award date)

Principal Investigators: Each Principal Investigator (PI) and Co-Investigators (CI) *must be an individual AZA member at the time of application* at the Professional Associate, Professional Affiliate, Professional Fellow, or Student level. Institutional membership does not count as individual membership. Other participants should be listed as collaborators on this form.

A Curriculum Vitae (CV) is required for each PI and CI, and a Statement of Institutional Support (SIS) form is required for each PI and CI Institution.

1. **Principal Investigator (PI) Name and Title:** Lauren Augustine
   CV Attached? ☒ (required – no more than 2 pages)
   Checking this box indicates agreement to the CGF Terms and Conditions (required; available at: *http://www.aza.org/cgf-information-for-applicants/* ☒
   Individual AZA Member Number: 325950 (required)
   Institution/Organization: Saint Louis Zoo
   Statement of Institutional Support Form Attached? ☒ (required)
   Institutional Address: One Government Drive Saint Louis MO 63110
   Phone: 314-646-4827 **E-mail:** laugustine@stlzoo.org

2. **Co-Investigator (CI) Name and Title:** Kevin Torregrosa
   CV Attached? ☒ (required – no more than 2 pages)
   Checking this box indicates agreement to the CGF Terms and Conditions (available at: *http://www.aza.org/cgf-information-for-applicants/* ☒ (required)
   Individual AZA Member Number: 6984060 (required)
   Institution/Organization: Wildlife Conservation Societies Bronx Zoo
   Statement of Institutional Support Form Attached? ☒ (required)
   Institutional Address: 2300 Southern Blvd
   Phone: 718-220-5042 **E-mail:** ktorregrosa@wcs.org

3. **Co-Investigator (CI) Name and Title:** Sharon Deen
   CV Attached? ☒ (required – no more than 2 pages)
   Checking this box indicates agreement to the CGF Terms and Conditions (available at: *http://www.aza.org/cgf-information-for-applicants/* ☒ (required)
   Individual AZA Member Number: 1713815 (required)
   Institution/Organization: Saint Louis Zoo
   Statement of Institutional Support Form Attached? ☒ (required)
   Institutional Address: One Government Drive, Saint Louis MO 63116
   Phone: 314-646-4708 **E-mail:** deem@stlzoo.org

Note: If additional Co-Investigators need to be included, add their information in a separate document titled **"Additional Co-Investigators"** and include it as an attachment to your CGF Application email.

Collaborating Institutions or Organizations: A collaborating institution is defined as any institution actively involved in the design or completion of the project. Funding institutions *not* actively involved in project design or completion should be listed in the "Grant/Matching Support" section of the Project Budget and need not be listed as collaborators.

List all collaborating institutions below, including the PI's and CI's institutions listed on the Cover Sheet, as well as those associated with the personnel listed in Question 6, and attach a Statement of Institutional Support form for each collaborating institution to the CGF Application email.

Collaborating Institution Names:

Saint Louis Zoo *Statement of Institutional Support* Form Attached? ☒ (required)

Enterprise for Conservation of the Zapata Swamp *Statement of Institutional Support* Form Attached? ☒ (required)

Smithsonian National Zoo *Statement of Institutional Support* Form Attached? ☒ (required)

Wildlife Conservation Society *Statement of Institutional Support* Form Attached? ☒ (required)

Statement of Institutional Support Form Attached? ☐ (required)

Note: If additional Collaborating Institutions or Organizations need to be included, add their information in a separate document titled "**Additional Collaborators**" and include it as an attachment to your CGF Application email.

Project Categories (choose two that best describe the project):

☒ Management/Breeding (*Ex situ*)
☐ Research
☐ Conservation Education
☒ Animal Health
☐ Field Conservation (*In situ*)
☐ Animal Welfare

Project Abstract (limit 1,500 characters with spaces):

The Association of Zoos and Aquariums (AZA) manages an important genetic reservoir for the critically endangered Cuban crocodile (Crocodylus rhombifer) since a major threat to wild populations is hybridization with the American crocodile (Crocodylus acutus). A recent meeting in Cuba highlighted the need for in situ support to conserve these unique species. Although ongoing studies have been implemented, starting in the 1970s, logistical and financial challenges have limited crocodile research and captive propagation in Cuba. Current conservation measures include the captive propagation of genetically pure Cuban crocodiles at the Zapata Crocodile Farm (ZCF). Repatriations have occurred in the easternmost part of the Zapata Peninsula, an area devoid of American crocodiles. This project aims to support the ZCF by providing supplies, expertise, and funding for improved husbandry and healthcare of their over 4,000 crocodiles. A pilot trip in August 2018 and a second trip in late-May or early-June 2019 will focus on evaluating the health, diet and reproductive output of the captive breeding population. Comprehensive health evaluations will provide baseline data for evaluating the health and husbandry of this captive population. Additionally experts from AZA facilities will evaluate diet, reproductive output and incubation. This project will utilize the skills of AZA staff to provide support to the ZCF in their efforts to conserve the critically endangered Cuban crocodile.

2018 AZA CONSERVATION GRANTS FUND

Project Proposal

1. Describe the conservation and/or management significance of the project, the context within which the project takes place, and the specific targets (e.g., species, managed populations, habitats, or ecological processes). Explain why the project is timely, how it addresses a current critical need, and how it is compatible with the purposes of the CGF, as stated at: *http://www.aza.org/cgf-faq/*. **LIMIT 5,000 CHARACTERS with spaces**

Endemic to the main island of Cuba, the Cuban crocodile (Crocodylus rhombifer) is critically endangered (IUCN, 2017) and considered one of the most threatened crocodilian species in the world (de Sola, 1930; Varona, 1986; Rodriguez-Soberón et al., 2000; Trutnau and Sommerlad, 2006; Ramos-Targarona et al., 2008; 2010). Threatened by illegal hunting, habitat modifications, and high levels of introgression with American crocodiles (Crocodylus acutus) (49.1%; Milian-Garcia et al., 2015), Cuban crocodiles are unlikely to sustain current population levels without conservation action. Management practices currently include captive propagation for population augmentation and reintroduction into areas where the species is locally extinct, and some research to better understand species ecology and evolutionary trajectory. Today, there is an estimated 5,700 Cuban crocodiles left in the wild (Ramos- Targarona, 2013).

Recent investigations have focused on the widespread hybridization of Cuban crocodiles with American crocodiles (Weaver et al., 2008; Milian-Garcia et al., 2011; 2015; 2017) resulting in the management of a pure breeding group of Cuban crocodiles at the Zapata Crocodile Farm (ZCF) for repatriation. The breeding group at the ZCF consist of 227 Cuban crocodiles and is an important strong hold for the species, but limited resources have thwarted captive husbandry, threatening the long term maintenance of this valuable breeding group. Problems exist with ability to acquire adequate appropriate food items, egg incubation temperature, and reproductive output.

The AZA Crocodilian Advisory Group (CAG) began managing the North American population of Cuban crocodiles in 1993, and in conjunction with managed captive reproduction, began collaborations with Cuban biologists to conserve wild populations. For political reasons the involvement of US zoos in Cuba has been minimal over the last two decades. In 2017, a meeting in Cuba highlighted some of the conservation priorities for this species and connected stakeholders. Representatives from AZA institutions, the IUCN SSC Crocodile Specialist Group and local Cuban organizations attended this meeting. Priorities were determined for the future of crocodile conservation in Cuba and included improved maintenance of the captive population to ensure the production of healthy individuals for repatriation.

The stakeholder meeting focused on improving captive husbandry and Kevin Torregrosa, from the Wildlife Conservation Society (WCS), recently visited the ZCF and identified areas of immediate concern. These include assessing the health of the breeding population and providing support for improved husbandry, particularly from a nutritional standpoint. To that end, the primary focus of this project will be to conduct comprehensive health evaluations, disease screening, and husbandry evaluation on the wild-caught, breeding stock of Cuban crocodiles housed at the ZCF.

During a trip planned for August 2018, we will conduct baseline health evaluations on 50 individuals from this breeding group and examine the ZCF's diet. These preliminary data will be used to elucidate the current health and nutritional status of a small percentage of the breeding group to provide valuable guidance for the type of support needed to improve healthcare and husbandry on our follow-up trip. We are requesting funding for a second trip to the ZCF in late-May to early-June, 2019 to continue evaluating the captive breeding group's health as well as the reproductive output of the population. An additional 50 crocodiles will receive health assessments at this time and we will evaluate the breeding groups reproductive output. Cuban crocodiles nest in April through May providing PIs the opportunity to collect valuable data on nest phenology and clutch characteristics. An increased understanding of this groups reproductive output is critical to the continued conservation efforts, so the team will be evaluating fertility, development and incubation in order to determine potential areas for improvement.

In order to provide evidence-based recommendations for improving animal welfare through husbandry, this study aims to evaluate the health, nutrition and captive reproduction of the captive breeding group of Cuban crocodiles at the ZCF. As AZA programs strive to develop sustainable captive populations and support in situ conservation work of imperiled species through education outreach, field conservation and financial contributions to conservation organizations, this project aligns with the mission of the contributing organizations as well as AZA. This project will better connect the AZA Cuban crocodile Species Survival Plan with the in situ conservation work. The ongoing maintenance of the captive population in Cuba demonstrates the dedication and persistence of the Cuban biologists working with this species. With support from AZA institutions, we hope to magnify the conservation impact of the ZCF.

2. Explain the goal(s) and objective(s) of the proposed project. Goals should be linked to the targets and their desired status in the long-term. Objectives should state the immediate results that are necessary to meet the long-term goal(s). Both goals and objectives should be measurable, time limited, and specific. If the

proposal is a request to fund part of a larger project, the described objectives should focus on the part for which CGF funding is being requested during the one-year duration, while providing some context regarding the larger effort. **LIMIT 4,750 CHARACTERS with spaces**

This study is one part of a larger plan for US institutions to better support the crocodile conservation efforts of the ZCF, located in the Manazas Province just outside the Zapata Swamp, the largest wetland in the Caribbean at 452,000 hectares (Borhidi et al. 1993, Ramos-Targarona et al., 1996) and one of Cuba's most endangered ecosystems (Wotzkow, 1998). We will assess health and husbandry practices at the ZCF using the following primary objectives:

1) Determine baseline health parameters for the adult Cuban crocodile population at the ZCF (n=227);

2) Determine prevalence of significant diseases within the captive population at ZCF, both infectious and non-infectious;

3) Assess the current diet and provide techniques for locally viable improvements given our knowledge of diets for this species in US institutions;

4) Review reproductive output and egg incubation to determine potential areas of improvement. Primarily assessing developmental rates and incubation temperature as problems already identified by ZCF staff; and

5) Develop priorities and needs for our continued involvement. Identify priority areas at the ZCF that can be improved through the expertise and resources of AZA institutions

A primary concern of the ZCF at this time is the management of their breeding group (n=227). As wild-caught founders, this population is critical to the conservation of Cuban crocodiles. Emerging infectious diseases are an increasing threat to wildlife populations (Daszak et al., 1999) making health assessment of captive breeding groups an important component of conservation propagation (Deem et al., 2001, Deem and Harris, 2017). To that end, in late-May or early-June, 2019 we will travel to Cuba to evaluate baseline health parameters of 50 crocodiles from the captive breeding group at the ZCF. These data will be combined with health data collected during a pilot study in August 2018, making the total number of evaluated crocodiles 100. Each crocodile will receive a thorough physical examination by a veterinarian, and blood will be collected for biochemistry and hematologic analysis, as well as swabs, plasma and whole blood for storage for later pathogen detection using molecular diagnostics. Fecal samples from the group enclosure will be opportunistically collected and screened for parasites and stored for antibiotic resistant gene detection. Samples for disease screening will be stored for analysis in a future trip. The data collected will elucidate potential shortcomings of the current husbandry practices, providing valuable guidelines for improvement.

Husbandry experts from the US will work with ZCF staff to evaluate husbandry shortcomings. This information will be used to develop strategies for improved captive care and ultimately the production of healthy, genetically valuable individuals for repatriation. A primary focus will be on nutrition as dietary data on wild Cuban crocodiles is lacking, with early reports finding fresh-water gar and hutia in the intestinal tracks of dissected individuals (de Sola, 1930). Current diet of the captive specimens is cow viscera once a week and, if possible, fish, viscera, skin and blood of cattle or horse meat, but the latter food items are never guaranteed. The lack of bones and whole prey is concerning and has been identified as a problem by ZCF staff.

Lastly, the reproductive output of this breeding group and incubation of eggs are other areas identified as challenges to this conservation program. Infertility rates for wild crocodilians range from 1.7- 15% (Pooley, 1969; Crawshaw and Schaller, 1980; Deitz and Hines, 1980; Kushlan and Mazzotti, 1989; Thorbjarnarson, 1989; Allsteadt, 1994; Hussain, 1996; Platt and Thorbjarnarson, 2000; Platt et al., 2008), however are often much higher in captivity (Elsey, et al., 1990). Developmental rates (fertility) in captive Cuban crocodiles have been reported at anywhere from 0-97% in three females over a six year period at the Smithsonian's National Zoo (Augustine and Watkins, 2015; Augustine, 2017), and environmental stressors were determined to play a role in these low and varying levels (Augustine per. data). With low developmental rates and no control over incubation temperature, the production of animals for release is a challenge at the ZCF. By utilizing what we have learned from the AZA population of Cuban crocodiles, we may advance the current practices in Cuba with evidence based data.

This trip will be the second of what we hope to be a long term collaboration and commitment of US Zoos in Cuba. The conservation efforts of the ZCF need our support. This project is an important link from fence to field for this AZA program.

3. Explain the methodology for this project and why it is appropriate. If this is a research project, clearly state the hypothesis and how it will be tested; if this is a conservation education or professional training project, describe the methods as they relate to the target audience, number of people that will be reached, etc. **LIMIT 7,000 CHARACTERS with spaces**

Staff from AZA institutions in the US will travel to Cuba in May/June, 2019 to work with the ZCF staff. A minimum of 50 adult crocodiles from the breeding population housed at the ZCF will be hand-restrained for physical examinations and biomaterial collection (Ramos-Targarona et al., 1996). Morphometric data will be collected, including total length, snout-vent length, head length and width, and tail girth. Cloacal examination will be used to determine sex of each individual

(Brazaitis, 1968). Physical examinations by a veterinarian will be performed. Blood will be collected from the supravertebral vessel (the occipital sinus) or from the caudal tail vein using a 19-22 g, 1.5 – 2 inch needle (all adult crocodilians over 45 kg) on a 6ml syringe (Jacobson, 1984). Total volume of blood collected will not exceed 5 % of body weight (Mader, 2006) and in most cases will be far below this value. Cloacal swabs will be collected from each crocodile and stored in cryovials. Feces will be collected and placed into a 30 ml nalgene tube for any crocodile that defecates during handling and opportunistically within the enclosures.

Lab Diagnostics: Biochemistry profiles will be performed on whole blood using a VetScan2 (Atkins et al., 2010) and Reptilian Profile Plus Cartridge (AST, BA, CK, UA, GLU, PHOS, CA++, TP, ALB, GLOB, K+, Na+). Hematology diagnostics will be performed (e.g., packed cell volume, total solids, and white blood cell counts and differentials). Plasma and whole blood will be stored at -20° for future testing (Mycoplasma spp., Chlamydia spp., parapoxvirus, herpesvirus, West Nile virus, adenovirus) and 100ul of blood will be stored in formalin for future hematologic evaluation. Cloacal swabs will be stored at -20° for future infectious disease testing. Blood will also be stored long-term on FTA cards for future studies. Fecal flotations to detect endoparasite eggs and direct smears for identification of protozoan parasite burden will be performed on all feces the day of collection. Positive fecal samples will be saved in 10% formalin or 70% ethanol for potential parasite species identification and future genetic analysis. All biomaterial from the August 2018 field trip and samples collected in May/June 2019 will be stored at ZCF for molecular diagnostics in Cuba as the US based team does not have CITES permits for this species. No biomaterials will be brought back to the US.

Using the Saint Louis Zoo's mobile lab, DNA for pathogen testing will be extracted on site from cloacal and mouth swabs using the Qiagen DNeasy Purification Kit (Qiagen, Valencia, CA) and quantified using a Qubit 2.0 fluorometer (Thermo Fisher Scientific, Waltham, MA, USA). We will test for the most relevant pathogens for Cuban crocodiles using conventional PCR protocols for adenovirus spp. (Wellehan et al. 2004), Mycoplasma spp. (Rebelo et al. 2011), and chlamydia (Condon and Oakey 2007). We will test for pan-flaviviruses including West Nile viruses using reverse transcriptase quantitative PCR (RT-qPCR) methods (Moureau et al. 2008). We will test for poxviruses using conventional PCR only if lesions are present (Li et al. 2010). These pathogens will be studied using generalist ("universal") assays, and then followed up with specific assays if a positive result is confirmed, allowing for the detection and identification of known and possible novel agents. Transporting the mobile diagnostic lab to the site of the animals allows us to obtain a diagnosis of infection as quickly as possible and obviates the requirement of moving animal tissue off site.

Husbandry: Husbandry experts will work with ZCF staff to identify current and future needs and any areas (housing, infrastructure, maintenance) where improvements can be implemented. Two areas of focus have been identified by Kevin Torregrosa and ZCF Staff:

Diet Evaluation: The current diet of the captive specimens at the ZCF is cow viscera once a week and, if possible, fish, viscera, skin and blood of cattle or horse meat, is given. This diet is not adequate as it is missing several important nutritional qualities. Nutritional problems often seen in crocodilians include calcium deficiencies, vitamin B1 deficiency, steatitis or the necrosis of fatty tissue, gout caused by excess protein, hypoglycemia or low blood sugar, and the introduction of parasites and salmonella (Britton, 2010). The primary concern with the ZCF current diet is the lack of bones which can cause osteomalacia with kyphoscoliosis of the vertebral column, soft and flexible jaws, and diaphanous teeth (Huchzermeyer, 1986). A deficiency of Vitamin E, common in crocodilians fed fish, can lead to fat necrosis and pansteatitis (Foggin, 1992). Diet options such as Mazuri® Crocodile biscuits (Land O'Lakes Purina Feed LLC, Richmond, IN 47374, USA) and vitamin supplementation are being considered, but nutritional advice will be sought from zoo nutritionists upon return from these trips.

Review Reproduction and Incubation: Current incubation practices at the ZCF are resulting in skewed sex ratios, with many more females than males. This is not adequate for the sustainability of the captive breeding population or for reintroductions. During this trip, husbandry experts from the US will work with the ZCF to assess nest phenology, reproductive output and fertility rates of the captive population. Additionally, a plan to improve temperature control for incubation will be developed. At this time a list of supplies and appropriate AZA staff will be identified for the following trip. As AZA institutions employ a variety of skilled staff, this project aims to utilize all disciplines to support the ZCF in conserving Cuban crocodiles.

Data Analysis: All sample diagnostics that can be performed immediately will be done at the ZCF during this trip and biomaterials (e g. plasma, whole blood and cloaca swabs stored at -20°, blood on FTA filter paper, feces in formalin or ethanol, and blood smears stored at room temperature) will be stored at ZCF for future molecular diagnostics. Health data from the 50 animals sampled in August 2018 will be combine with the additional 50 animals processed on this trip and provide data for making recommendations for improved welfare will be provided to the ZCF staff. Descriptive statistical data on the 100 animals assessed will provide a clear picture of the health of this captive population. These data will be compared to the baseline health parameter used for crocodilian management in AZA facilities. These data will be written up for publication in an appropriate peer reviewed journal. Starting with this funding, we plan to form a long term collaboration that supports Cuban crocodile conservation and the Cuban biologists who have dedicated their lives to this unique species.

4. If previous CGF funding was obtained for this or a related project, summarize relevant findings and identify how they relate to the current proposal. **LIMIT 1,000 CHARACTERS with spaces**

N/A

5. Describe the timeline in which components of the project will be completed within the one-year project duration. Use of bulleted/numbered lists is encouraged. **LIMIT 1,500 CHARACTERS with spaces**

October 2018: Funding awarded
October-Feb. 2019: Equipment purchase, planning with in-country NGOs, visas and licenses for travel and equipment export acquired
March 2019:Travel preparation including flights, transfers, etc
May/June 2019: Travel to Cuba, perform health exams, sample collection & testing
June- August 2019: Data entry and analysis
August-October 2019: Manuscript preparation for peer reviewed journal, communicate findings to stakeholders and collaborators. Prepare for the IUCN SSC Crocodilian Specialist Group meeting 2020

6. Define the project team by identifying the personnel included for this project, their roles, qualifications, and the key skills they bring. Discuss the PI and each CI listed on the Cover Sheet and any collaborators (persons actively involved in the completion of the project). Each collaborator's institution should be listed under **Collaborating Institutions or Organizations** on the application Cover Sheet. **LIMIT 2,500 CHARACTERS with spaces**

US Team Members:
Lauren Augustine is the Curator of Herpetology at the Saint Louis Zoo, the Studbook Keeper for Cuban crocodiles and a member of the IUCN SSC Crocodile Specialist Group.
Kevin Torregrosa is the Collections Managers at the Wild Life Conservation Societies Bronx Zoo, previously Curator of Herpetology at the Saint Augustine Alligator Farm and course instructor for the AZA Crocodilian biology and Management class.
Kyle Miller is a keeper in the Department of Herpetology at the Smithsonian's National Zoological Park.
All three of these PI's have been working with crocodilians in a captive setting for over 10 years. They are experts in captive husbandry and handling
Dr. Sharon L. Deem is a wildlife veterinarian/epidemiologist and the director of the Saint Louis Zoo Institute for Conservation Medicine. Sharon will serve as the veterinary advisor for crocodile health evaluations and will work with Dr. Rodriguez to develop veterinary protocols for the ZCF crocodiles.
Jamie Palmer is the field and lab technician for the Institute for Conservation Medicine. Jamie will be the field health technician for this project and will focus on the health sample collection and hematologic and serologic evaluation of samples as well as the biomaterial storage for molecular diagnostics.
Both Sharon and Jamie have experience conducting health evaluation in the field and are experts on sample collection, processing, diagnostics and storage.

Cuban Team Members:
Etiam Pérez Fleitas is a biologist at the ZCF and is pursuing his PhD on Cuban crocodile ecology. Etiam is a Cuban crocodile expert and has extensive experience with capture and restraint as well as crocodile behavior. He will be primarily responsible for the logistics involved with the trip and leading the capture and restraint of the crocodiles at the ZCF.
Gustavo Sosa Rodríguez is the veterinarian at the ZCF. Gustavo will be working with Jamie to conduct health evaluations, drawing blood and assessing crocodile health. He will also work with Sharon on developing veterinary protocols.
Dr. Yoamel Milian Garcia conducted the genetic evaluation of the Cuban crocodiles within the breeding group at the ZCF. He will be instrumental in organizing the in country logistics and collaborating with University of Havana.
All individuals will be responsible for collecting and analyzing data, and ensuring deliverables such as peer review journal articles and professional presentations are achieved.

7. Describe the project's monitoring and evaluation plans. Explain how the goals and objectives of the project will be met, which indicators will be used, and how those indicators will be measured. If this project has an educational or professional training component, the educational impact should be discussed (ideally including impacts on conservation-related knowledge, attitudes/affect, and behavior). Evaluation plans may be quantitative or qualitative. **LIMIT 3,000 CHARACTERS with spaces**

In this project we plan to use the results of the health screening, nutritional assessment and reproductive evaluation to determine health status of this captive breeding population and make recommendations for improved welfare. Results will elucidate current problems with captive husbandry, including nutritional deficiencies, and provide a baseline for improving the health, welfare and reproductive success of this captive population.

Field surveys to assess the distribution, health and ecology of free-living crocodile populations in Cuba are also being planned. The field data will fill the gaps in knowledge about the health and diet of wild Cuban crocodiles. This research will play a major role in evaluating the captive population, especially pertaining to pathogen detection within each population, nutritional needs of Cuban crocodilians and the natural reproductive ecology of this species. A more thorough natural history of Cuban crocodiles will prove vital for future reintroduction site assessment and the success of repatriations that have already occurred.

The impacts of these changes should be evident in animal behavior, survival and reproductive fitness. Currently, the ZCF has lower developmental rates than what is expected with crocodilians. This may be impacted by the welfare of the adult group and will be used as an indicator of improved health over time. The continued monitoring by ZCF staff will provide the means for evaluating any changes implemented based on this study. Historical information provided by ZCF staff will provide useful as we evaluate future health and reproductive success of this population. More immediately, we will be able to observe changes in reproductive output and hatching success within the next 12-24 months. Nutritional and environmental changes have been documented to improve reproductive output in other species of crocodilians (Elsey et al., 1990).

In long-lived species like the Cuban crocodile, long-term studies are incredibly important for a full understanding of overall health and reproductive success at a population level. The continued collaboration between AZA facilities and the ZCF staff will ensure the management changes are implemented and monitored for long-term success. The goal of captive propagation is to maximize reproductive output, maintain high genetic diversity and manage a sustainable population. This project will advance our understanding of crocodilians at ZCF and aid in the implementation of appropriate conservation management strategies.

8. Describe how the project is connected to a relevant AZA animal/conservation/education program or institution, and / or reflects the priorities of the AZA Board (e.g., sustainability of managed populations, SAFE: Savings Animals From Extinction) or of related Animal Programs or SAFE Species programs. **LIMIT 1,000 CHARACTERS with spaces**

The AZA manages the population of Cuban crocodiles through a Species Survival Plan and Studbook. This program was started in 1993 and originally included in situ conservation efforts as well as population management. More recently several important publications have resulted from the data collected at AZA institutions with this species (Dinets, 2011; Augustine and Watkins, 2015; Augustine et al., 2017; Augustine, 2017). For political reasons, the involvement of US biologists in Cuba has been minimal. A 2017 meeting held in Cuba reconnected Cuban and American biologists with the goal of developing priorities to conserve this unique species. Priorities from that meeting were outlined, resulting in vigorous renewed support of Cuban colleagues. Our approach is to utilize the expertise of AZA zoological facilities' staff as a resource for our Cuban collaborators and the conservation efforts of the ZCF. This exemplifies direct conservation impact of an AZA program.

9. Explain and identify the means and timeline of how the key results and lessons of the project will be disseminated and shared. Key internal and external audiences should be identified and a communication strategy should be included. **LIMIT 1,500 CHARACTERS with spaces**

In addition to this funding request, we are seeking funding for an in situ study to investigate the health, reproduction and diet of free-living Cuban crocodiles. Data collected will provide guidelines for the development of more appropriate husbandry techniques at ZCF. The maintenance of a healthy breeding population of crocodiles for propagation is paramount to the long-term success of this species.

The preliminary health data collected in August 2018 will provide a baseline for continued data collection in 2019. The results of these analyses will be shared with stakeholders and used to develop recommendations and priorities for the ZCF. A follow-up trip in late 2019 will provide the support needed to implement the proposed changes. Therefore the combined in situ/ex situ data is an example of the fence to field work that AZA institutions must do to ensure healthy and thriving populations of both assurance animals under human care and free-living animals that may fulfill their ecological roles.

The results of this study will give ZCF staff the ability to improve welfare of the animals in their care, developing evidence-based husbandry standards and veterinary protocols. An article will be written for the AZA Connect magazine and our findings will be presented at the IUCN SSC Crocodile Specialist Group Meeting in 2020. As there is a paucity of information on this species, we anticipate publishing a number of referred articles from this work in the scientific literature.

10. Have all the necessary permits been obtained for the project?

a) ☐ Yes ☒ No ☐ Not Applicable

If yes, list the permits here and attach one electronic copy of each to your CGF Application email. Attachments should be titled **"Permit #."**

b) If the necessary permits have not yet been obtained, please explain why. Pending permits must be obtained and submitted to AZA by 15 June 2018.

Travel visas need to be acquired 80 days prior to travel, and we have started this process for the August, 2018 trip. A license to export the veterinary equipment into Cuba will be requested from the Department of Commerce-BIS and will be reviewed by OFAC Licensing Official as soon as funding is secured. This process can take several months, but will be initiated in October of 2018 for the trip in May/June 2019.
An IACUC has been submitted and approved by the Saint Louis Zoo.

11. If research animals are to be purchased for the project, indicate and justify the destination of the animal(s) after completion of the research. **LIMIT 750 CHARACTERS with spaces**

N/A

12. If this is a multi-year project, identify the funding strategy for subsequent years. **LIMIT 750 CHARACTERS with spaces**

This collaborative project aims to support Cuban crocodile conservation through evidence based management and the development of long term relationships between individuals and institutions invested in this species and its habitat. We have also sought funding for a sister project to investigate the health, reproduction and diet of free-living Cuban crocodiles. Data from wild populations will be used in the development of more appropriate management guidelines at the ZCF, improving repatriation efforts by releasing the healthiest possible animals and reducing the risk pathogen transmission between populations. Each year priorities will be determined and the appropriate funding sources will be identified to continue supporting our colleagues

13. **Past CGF Support (previously called Conservation Endowment Fund or CEF).** If any of the proposal's Principal or Co-Investigators listed on the Cover Sheet have received previous CGF support, complete the required information below for each.

a) Name of Investigator: Sharon Deem Year of Award: 2013 Amount of Award: 20,834
Project Title: Human health benefits associated with visiting zoological institutions
Were all required reports (annual/final) submitted? ☒ Yes ☐ No

b) Name of Investigator: Sharon Deem Year of Award: 2006 Amount of Award: 15,571
Project Title: Ecology and health status of maned wolves living in Brazilian and Bolivian National Parks
Were all required reports (annual/final) submitted? ☒ Yes ☐ No

Note: If additional awards need to be included, add their information to a separate document titled **"Past CGF Projects"** and include it as an attachment with your CGF Application email.

2018 AZA CONSERVATION GRANTS FUND

Project Budget

BUDGET CYCLE

All funding requests from CGF must be for a maximum period of one year only. Funding decisions are announced in early September and expenses incurred prior to the award date will not be covered by CGF funds. CGF funds are to be used within one year from the project start date and forward.

DETAILED BUDGET

A detailed budget sheet is provided below and information should be separated into CGF and non-CGF costs. List under each category the budget items and method of calculation for each (e.g., 2 persons x 10 days x $25/day), as well as probable sources of support. The following should be listed as **separate** budget items:

- airfares
- lodging
- vehicle rental (automobiles, planes, boats)
- fuel
- per diem
- equipment over $500
- supplies, services (lab analyses, editing)
- pharmaceuticals
- shipping/postage
- printing
- personnel costs

CGF *does not* fund the following: Tuition, university fees, or fringe benefits associated with graduate students or other project personnel; administrative costs (including institutional overhead and submission costs for the publication of journal articles); travel unrelated to completion of the project (conference presentation expenses, travel to meetings, etc.); planning meetings that define, rather than implement, conservation/management/education goals.

CGF *does not* fund salaries for project personnel other than graduate students, technicians, and start-up positions established solely for the purpose of completion of the project.

Note: Recipients of CGF grants are obligated to inform AZA (CGF@aza.org) of any pending or overlapping grants received. If such grants are received, the CGF Scientific Advisory Committee may recommend that the CGF award amount be reduced or refunded.

Note: If additional budget items need to be included, add this information in a separate document titled **"Additional Budget Items"** and include it as an attachment with your CGF Application email.

Budget Items Form:

Budget Item	Method of Calculation (e.g., 2 persons x 10 days x $25/day)	CGF-Requested Amount	Non-CGF Requested Amount (if applicable)	Date Expected from Non-CGF Source (if applicable and not yet received)	Name of Non-CGF Source (e.g., Grant Fund, Matching)	Total Expense (CGF+Non-CGF)
Vetscan2 machine for chemistry profiles	1 x $6,000.00	$6,000.00	$			$6,000.00
Vetscan2 reptiles rotors	60 rotors x $25.16/rotor	$1,509 60	$			$1,509.60
500 gram Scale	1 x $165.00	$165.00	$			$165.00
Portafuge	1 x $475.00	$475.00	$			$475.00
Freezer (-20 degree, manual defrost)	1 x $685.00	$685.00	$			$685.00
Refractometer	1 x $128.50	$128.50	$			$128.50
Sodium Heparin	2 x $4.24	$8.48	$			$8.48
Slides	6 x $3.75/box	$22.50	$			$22.50
Slide boxes	6 x $16.50	$99.00	$			$99 00
Swabs	3 x $18.64/box	$55.92	$			$55 92
Sample storage boxes	5 x $10/box	$50.00	$			$50 00
FTA cards	1 x $496.00/box of 100	$496.00	$			$496.00
Diff Quick Stain	1 x $47.74	$47.74	$			$47.74
Copelin Jars	3 x $40.00	$120.00	$			$120.00
Vacutainer tubes	2 x $85.77/box	$171.54	$			$171.54
Differential counter	1 x $201 00	$201.00	$			$201.00
Capilary Tubes/Critoseal	1 x $31.11	$31.11	$			$31.11
6cc Syringes	3 x $8.52/box	$25.56	$			$25 56
Needles	2 x $8.00 /box of 100	$16.00	$			$16.00
3 ft. Std. Ketch-All Animal Control Pole	4 x $83.90	$335.60	$			$335.60
Guaze	2 x $3.71	$7.42	$			$7.42
Cryovials for swab 1.8ml	1 x $218/box of 200	$218.00	$			$218.00
Fecal floatation slide	1 x $80.00	$80.00	$			$80.00
Cryvials for plasma storage 3.6ml	1 x $111.93/box of 75	$111.93	$			$111.93
Visa Costs	4 persons x 1 trip x $50.00/visa	$200.00	$			$200.00
International Travel	4 persons x 1 trip x $500 00/flight	$2,000.00	$			$2,000.00
Housing in Cuba	4 persons x 15 days	$2,100.00	$			$2,100.00

	x $35.00/day					
Per Diem in Cuba	4 persons x 15 days x $34.00/day	$2,040.00	$			$2,040.00
Additional budget items	attachment	$1,135.00	$			$1,135.00
	TOTAL PROJECT BUDGET (round to nearest whole dollar)	**$18,536.00**	**$**			**$18,536.00**

BUDGET JUSTIFICATION

For each line item listed in the CGF Budget Items Form, justify why the items are critical for completion of the project and how the cost of each item was determined. If the lifespan of equipment costing over $500 exceeds that of the grant period, also detail and justify who will assume ownership of the item. **LIMIT 2,500 CHARACTERS with spaces**

The budget includes equipment and supplies needed to preform comprehensive health evaluations on crocodilians at ZCF. The ZCF currently does not have the equipment or supplies needed for this type of work. Budget lines for capture and restraint equipment and a freezer for sample storage are included as well. All supplies and equipment will come into Cuba from the US with appropriate licenses and will remain in Cuba at the ZCF for future use. The ZCF will assume ownership of all equipment with the goal of developing a laboratory on site. Funds will support training for ZCF staff as well as educational materials for future use. Travel related costs for PI and CI travel to Cuba is included as expert staff are required to help with the capture and restraint of crocodiles, sample collection, health sample diagnostics, and site evaluation. Although the ZCF staff are well versed in crocodilian capture, they require more individuals for an undertaking such as this. Furthermore, the ZCF staff veterinarian is limited by resources and time. A veterinarian and veterinary technician from the Institute for Conservation Medicine at the Saint Louis Zoo will serve as veterinary advisors to the ZCF staff veterinarian in future health evaluations.

ASSOCIATION OF ZOOS & AQUARIUMS

8403 Colesville Road, Suite 710
Silver Spring, MD 20910-3314
301-562-0777 tel 301-562-0888 fax
www.aza.org

September 4, 2018

Lauren Augustine
Curator of Herpetology
Saint Louis Zoo
One Government Drive
Saint Louis, MO 63110

CGF File Number: 18-1518

Dear Ms. Augustine,

I am pleased to inform you that the AZA Board of Directors has awarded you $18,536.00 from the Conservation Grants Fund (CGF) in support of your proposal, "Collaborating to Improve Conservation Efforts for the Critically Endangered Cuban Crocodile." Out of a total of sixty-four proposals representing nearly $1.3 million in requests, the AZA Board of Directors approved seventeen projects for funding, totaling more than $356,000 in awards.

Since 1995, Disney has generously provided significant financial support to CGF, totaling over $3.3 million. Your proposal will be either partially or fully funded by the Disney Conservation Fund.

CGF awards are granted to the organization of the principal investigator. To receive this award, contact AZA (cgf@aza.org) to request the funds and include a completed copy of the attached W-9 form for your employer organization, identifying its IRS category and providing its complete address. If the address the funds should be mailed to is different from the address on the W-9 form, please notify AZA in the same message you request the funds. Funds will be available for disbursement beginning October 1, 2018, and all funds must be disbursed no later than December 31, 2018.

Copies of the CGF *Grant Terms and Conditions* that you agreed to when submitting your application, along with the *Grant Financial Report*, template are enclosed. We ask that you include your CGF file number with all correspondence. Please note that you will have reporting responsibilities to the Disney Conservation Fund, which will be sent to you via email, in addition to your normal CGF reporting requirements. We will send you a reminder as reporting deadlines approach to let you know exactly when the AZA and Disney reports will be due.

Please do not hesitate to contact us at cgf@aza.org if you have any questions about CGF grant administration. Congratulations, and good luck!

Sincerely,

Shelly Grow
Vice President, Conservation and Science

Enclosure # 7

Lauren Augustine

[redacted] Laugustine@stlzoo.org

Education

Masters, Conservation Science and Policy, December 2016,
George Mason University
Animal Behavior and Conservation: classes towards a Masters, 2010-2011
Hunter College
Bachelor of Science, Ecology and Environmental Biology, December 2004,
University of North Carolina, Asheville

Work Experience

Curator of Herpetology, **Saint Louis Zoo**, August 2017- Present
WildCare Director, Ron Goellner Center for Hellbender Conservation, August 2017- Present
WildCare Director, Center for the Conservation of Ecuadorian Herpetofauna, June 2019- Present
Animal Keeper, **Smithsonian National Zoological Park**, July 2011- July 2017
President, **The Foundation for The Conservation of Salamanders (FCSal)**, August 2011-Present
Wild Animal Keeper, **Wildlife Conservation Society**, Bronx Zoo, May 2008-June 2011
Animal Keeper, **Maryland Zoo in Baltimore**, March 2006-April 2008

Professional Affiliations

Smithsonian Research Associate
IUCN SSC Crocodile Specialist Group Member
Association of Zoos and Aquariums (AZA) member
AZA Crocodile Advisory Group Steering Committee
Turtle Survival Alliance (TSA) member
Society for the Study of Amphibians and Reptiles (SSAR) member
The Chelonian Research foundation (CRF) member
Turtle and tortoise preservation group (TTPG) member

Grants Awarded

[redacted]

2 Clark Waldram Fund [redacted]
Association of Reptilian and Amphibian Veterinarians (ARAV) [redacted]
AZA Conservation Grant Fund [redacted]
Living Earth Collaborative Grant [redacted]
FONZ Conservation Grant [redacted]
Crocodile Advisory Group Grant [redacted]
AAZK Travel Grant
Polar Bears Internationals Grant [redacted]
NCAAZK Travel Grant [redacted]
AAZK Research Grant [redacted]
Smithsonian Enrichment and Training Committee Grant [redacted]
AAZK Research Grant [redacted]
AAZK Conservation/Preservation/Restoration Gran [redacted]

Special Recognition/ Awards

AAZK Nico van Strien Leadership in Conservation Award 2016
AAZK Mazuri Animal Nutrition Award 2015
AAZK The Lutz Ruhe Meritorious Achievement - Professional of the Year 2014
AAZK Excellence in Journalism Award 2014
AAZK Certificate of Merit in Zoo Keeper Education 2014
AAZK Merit in Conservation Award 2013

Selected Publications

Augustine, L. 2009. Husbandry training with an exceptional South African crocodile. ABMA Wellspring 10:2-3.
Mendyk, R.W., **L. Augustine**, and G. Montague. 2010. *Plethodon cinereus* (Red-backed Salamander). Leucism. Herp.Review 41: 189-190.
Augustine, L. 2011. Putting training to work in a large animal capture. ABMA Wellspring 12:36-38.

Augustine, L. 2011. An overview of reptile and amphibian enrichment at the Bronx Zoo. AAZK keeper's forum. 38(11): 566-657.
Augustine, L. 2011. Lemur tree frog (*Hylomantis lemur*) egg and tadpole development at the Bronx Zoo. IRCF reptiles and amphibians. 18.4:63-64.
Augustine, L. and R.W. Mendyk. 2012. *Cuora galbinifrons* (Indochinese Box Turtle) Post-copulatory sniffing behavior. Herp. Review 43(2): 264.
Augustine, L and R.W. Mendyk. 2012. The *Cuora galbinifrons* Studbook: A model for understanding studbook challenges. AAZK Keeper's Forum, 39(7):334-337.
Augustine, L and M. Baumer. 2012.Training a Nile crocodile to allow for collection of blood at the Wildlife Conservation Society's Bronx Zoo. Herp. Review. 43:432-435.
Hellmuth, Heidi, **Lauren Augustine**, Barbara Watkins, and Katharine Hope, DVM. 2012. Using operant conditioning and desensitization to facilitate veterinary care with captive reptiles. Veterinary Clinics of North America; Exotic Animal Training and Learning 15(3): 425-443.
Gerrtis, J. and **L. Augustine.** 2013.Multiple snakes, multiple problems. ABMA Wellsprings, 13(1): 9-10.
Gerrtis, J. and **L. Augustine.** 2013. Multiple snakes, multiple problems. AAZK Animal Keeper's Forum, 40(7): 318-319.
Augustine, L., V. Titus and D. Foster. 2013. Color recognition as a management tool in a female Nile crocodile (Crocodylus niloticus) at the Wildlife Conservation Society's Bronx Zoo. Herpetological Review, 44(3): 446-447.
Augustine, L. 2013. North American Regional Studbook, Flower back box turtle, Cuora galbinifrons Studbook. The Smithsonian National Zoological Park, Washington, D.C. 59pp.
Augustine, L. 2014. Bridging the gap in Reptile and Amphibian Conservation. AAZK Animal Keepers Forum. 41(11): 304-306.
Mendyk, R.W., **L. Augustine**, and M. Baumer. 2014. On the thermal husbandry of monitor lizards. Herp. Review 45(4): 61.
Augustine, L. and B. Watkins. 2015. Reproductive Behavior and Longevity in 2.3.0 Cuban Crocodiles, *Crocodylus rhombifer*, at the Smithsonian National Zoological Park. Zoo Biology 34:278-284.
Augustine, L., M. Shirley and M. Eschenbrenner. Project Mecistops: conserving West African crocodiles. AAZK Keeper's forum 42(5): 152-153.
Augustine, L, R. Saunders, K, Pryes, M. Evans and K. Lovich. 2015. *Crocodylus rhombifer* (Cuban crocodiles). Aggressive behavior. Herp. Review. 46(2):207-208
Augustine, L., K. Miller, G. Burghardt. 2015. *Crocodylus rhombifer* (Cuban crocodile). Play behavior 46 (2): 208-209.
Claunch, N. and **L. Augustine.** 2015. Morphological description of Spindly Leg Syndrome (SLS) in Golden Mantella, *Mantella aurantiaca* at the Smithsonian National Zoological Park. Journal of herpetological medicine and surgery 25(3-4): 72-77.
Augustine, L. and R. Saunders. 2015. *Pyxis arachnoides arachnoides* (common spider tortoise). Eggshell repair. Herpetological Review 46(4): 544-545.
Augustine, L., K. Terrell, C. Petzinger, B. Nissen and M. Maslanka. 2015. Nutritional analysis of hellbender, *Cryptobranchus alleganiensis*, diets in captivity and in the wild. Herp. Review
Mendyk,R., M. Baumer, **L. Augustine**, and B. Herrelko. 2016. A Comparative Assessment of Varanid Lizard (Reptilia: Squamata) Thermal Husbandry in Zoos and Private Collections: Disparate Ideologies or a Paradigm Disconnect? Proceedings of the International World Conference on Monitor Lizards
Savage, A. E., K. A. Terrell, B. Gratwicke, N. M. Mattheus, **L. Augustine**, R.C. Fleischer. 2016. Reduced immune function predicts disease susceptibility in frogs infected with a deadly fungal pathogen. Conservation Physiology. 4 (1): cow011;doi:10.1093/conphys/cow011.
Augustine, L. 2016. *Crocodylus rhombifer* (Cuban crocodile). Suspension Incubation. Herp. Rev. 47(2): 243.
Murphy, J.B., M. Evans, **L. Augustine** and K. Miller. 2016. Behaviors of the Cuban crocodile. Herp. Rev. 47(2):235-240.
Della Togna, G., V. L. Trudeau, B. Gratwicke, M. Evans, **L. Augustine**, H. Chia, E. J. Bronikowski, J. B. Murphy and P. Comizzoli. 2016. Effects of hormonal stimulation on the concentration and quality of excreted spermatozoa in the critically endangered Panamanian golden frog (*Atelopus zeteki*). http://dx.doi.org/10.1016/j.theriogenology.2016.12.033.
Augustine, L. 2017. Providing the appropriate photoperiods to reptiles in captivity. AAZK Animal Keepers Forum, 44(1&2): 60-61.
Augustine, L., K. Pryes and M. Evans. 2017. Social behavior in captive Cuban crocodiles *(Crocodylus rhombifer)* at the Smithsonian's National Zoological Park. Herpetological Review. 48(1):75-82.
Augustine, L. 2017. Oocyte Membrane-bound Sperm Detection and its application for the Conservation and Management of Crocodilians. Zoo Biology. DOI: 10.1002/zoo.21367
Augustine, L. 2017. Progressing Crocodilian Captive Management at the Crocodile Advisory Group Meeting AKF 44(4):120.
Augustine, L. and S. Hallager. 2017. Using Advanced Reproductive Technologies to Assess Avian and Reptilian Infertility. AKF 44(6):170-172.
Augustine, L., A.G. Stern, G.S. Rodrigues and E.P. Fleitas. 2018. *Crocodylus rhombifer* (Cuban Crocodile) subcaudal scale irregularities. Herpetology Notes 11: 621-623.
Murphy, J., R. Mendyk, K. Miller, and **L. Augustine.** 2018. Tales of Monitor Lizard Tails and Other Perspectives. Herpetological Review. 50(1):178-201.
Jarvis, P., and **L. Augustine.** 2018. *Cuora bourreti* (Bourret's Box Turtle). Brumation, Oviposition and Incubation. Herpetological Review. 48(3):286-287.
Augustine, L. 2019. AZA North American regional studbook, Bourret's box turtle studbook, *Cuora bourreti* studbook. The Saint Louis Zoo, Saint Louis 37 pp.
Augustine, L. 2019. AZA North American regional studbook, Flower-back box turtle studbook, *Cuora galbinifrons* studbook. The Saint Louis Zoo, Saint Louis 63pp.

Augustine, L. 2019. AZA North American regional studbook, Southern Vietnamese box turtle studbook, *Cuora picturata* studbook. The Saint Louis Zoo, Saint Louis 25pp.

Augustine, L. B.C. Moore, V. Waller, S.D. Bailey, A. Kartik and K. Guyton II. 2018. Copulatory Directional Asymmetry and Implications for Crocodylian Reproduction. 164-171pp In: Crocodiles. Proceedings of the 25th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland, Switzerland.

Augustine, L. and N. Haislip. 2019. Husbandry and reproduction of the Indochinese box turtle *Cuora galbinifrons*, Bourret's box turtle *Cuora bourreti*, and the Southern Vietnam box turtle *Cuora picturata* in North America. International Zoo Yearbook. 53:1-12. DOI:10.1111/izy.12214

Miller, K.L., S. Castañeda Rico, C. R. Muletz-Wolz,M.G. Campana, N. McInerney, **L. Augustine**, et al. 2019. Parthenogenesis in a captive Asian water dragon (*Physignathus cocincinus*) identified with novel microsatellites. PLOS ONE 14(6): e0217489. https://doi.org/10.1371/journal.pone.0217489

Augustine, L. 2019. AZA North American regional studbook, Cuban crocodile, Crocodylus *rhombifer*, studbook. The Saint Louis Zoo, Saint Louis 57pp.

Moore, B., W. Firti and **L. Augustine**. In press. Crocodylian conservation and evolution insights from an anatomical and histological examination of phalli from male false gharial (*Tomistoma schlegelii*). Anatomia, Histologia, Embryologia.

Augustine, L., K. Miller, A. Peters, A. Franklin, C. Steinbeiser, J. Brown and N. Prado. In press. Impacts of Season and Reproductive status on Fecal Reproductive and Adrenal Steroid Metabolites in Zoo Cuban Crocodiles (*Crocodylus rhombifer*). Zoo Biology.

Enclosure #8

CURRICULUM VITAE
SHARON L. DEEM, DVM, PhD, DACZM

PERSONAL INFORMATION

Work Address
One Government Drive
Saint Louis Zoo
Saint Louis, MO 63110
Tele: 314 646 4708
Fax: 314 646 5539
Email: deem@stlzoo.org

EDUCATION

Diplomate American College of Zoological Medicine, 1998
Residency in Wildlife and Zoological Medicine, 1997
University of Florida

Ph.D. in Veterinary Sciences (Epidemiology), 1994
University of Florida

Doctorate of Veterinary Medicine, 1988
Virginia-Maryland Regional College of Veterinary Medicine

Bachelor of Science in Biology, 1985
Virginia Polytechnic Institute and State University

WORK EXPERIENCE (present)

January 2011-present	Director Institute for Conservation Medicine Saint Louis Zoo Saint Louis, Missouri
January 2014-present	Adjunct Associate Professor College of Veterinary Medicine University of Missouri – Columbia Columbia, Missouri
September 2007-present	Adjunct Associate Professor University of Missouri – Saint Louis Saint Louis, Missouri
May 2000-present	Veterinarian and Advisory Board Member Volunteers for Wildlife, Inc., Huntington, New York

PROFESSIONAL POSITIONS (2017)

Veterinary Advisor	Jaguar Species Survival Program
Member, Wildlife Health Specialist Group	The World Conservation Union
Associate Editor	Journal of Zoo and Wildlife Medicine
President	American College of Zoological Medicine
Vice Chair, Animal Health Committee	Association of Zoos and Aquariums

CURRICULUM VITAE
SHARON L. DEEM, DVM, PhD, DACZM

FELLOWSHIPS/GRANTS (awarded for total of [redacted])

54 awarded within the field of conservation medicine (full list available upon request)

INTERNATIONAL VETERINARY EXPERIENCE:

2019	KENYA, USA, GALAPAGOS
2018	USA, GALAPAGOS
2017	USA, GALAPAGOS
2016	USA, KENYA, PERU, GALAPAGOS
2015	CHILE, GALAPAGOS, KENYA, MADAGASCAR, USA
2014	GALAPAGOS, USA
2013	GALAPAGOS, MADAGASCAR, USA
2012	KENYA, MADAGASCAR, USA
2011	KENYA
2007-2010	GALAPAGOS
2005- 2007	GABON
2007	BOLIVIA
2006	MYANMAR, GABON, BOLIVIA
2005	GABON, SAINT KITTS AND NEVIS
2004	THAILAND, MYANMAR, USA
2003	CONGO
2002	SAINT VINCENT ISLAND, USA, BOLIVIA, GABON, CONGO
2001	PERU, BOLIVIA, COSTA RICA, USA, CENTRAL AFRICAN REPUBLIC, GABON
2000	COLOMBIA, CONGO, NICARAGUA, BOLIVIA, ARGENTINA, PERU
1999	MONGOLIA, NICARAGUA, BOLIVIA, CONGO, CENTRAL AFRICAN REPUBLIC
1991-1993	ZIMBABWE
1991	KENYA
1986	ZIMBABWE

PUBLICATIONS: (full list available on request)

Refereed: 40 first author, 73 co-author

Non-refereed:

Dissertation: 1 for PhD
Books: Introduction to One Health: An Interdisciplinary Approach to Planetary Health (2019)
Book Chapters: 22 senior author, 6 co-author
Manuals: 3 senior author, 3 co-author
Papers: 23 senior author, 4 co-author
Book Reviews: 5 senior author
Brochures: 2 senior author
Proceedings: 40 senior author, 29 co-author
Abstracts/Posters: 8 senior author, 22 co-author

Enclosure 9

Jamie Palmer
Institute for Conservation Medicine, Saint Louis Zoo
One Government Drive, St. Louis, MO 63110
Jpalmer@stlzoo.org
(314) 646-4731

Education

University of Missouri –St. Louis, St. Louis, MO 63121. Graduate School of Arts and Sciences
M.S., December 2011. Biology: Ecology, Evolution and Systematics
San Francisco State University, San Francisco, CA 94132. School of Arts and Sciences
B.S., May 2005. Biology: Emphasis in Zoology

Employment

02/2013 – Present. Technician, Institute for Conservation Medicine (ICM), Saint Louis Zoo, St. Louis, MO
07/2007 – 07/2009. **Keeper**, Ungulates, Saint Louis Zoo, St. Louis, MO
05/2005 – 07/2007. **Keeper**, Quarantine Unit, Animal Health Department, Saint Louis Zoo, St. Louis, MO

Peer - reviewed Publication

Palmer, J.L., Brenn-White, M., Blake, S., and Deem, S.L. Mortality in Three-Toed Box Turtles (*Terrapene mexicana triunguis*) at Two Sites in Missouri. Front. Vet. Sci. 6:412. 2019

Palmer, J.L., S. Blake, J.F.X. Wellehan Jr., A.L. Childress, S.L. Deem. Clinical *Mycoplasma* sp. Infections in Free-living Three-toed Box Turtles (*Terrapene carolina triunguis*) in Missouri, USA. *Journal of Wildlife Diseases* 52(2). 2016

Palmer, J.L., T.F. McCutchan, F.H. Vargas, S.L. Deem, M. Cruz, D.A. Hartman, P.G. Parker. Seroprevalence of Malarial Antibodies in Galapagos Penguin (*Spheniscus mendiculus*). *Journal of Parasitology* 99(5): 770-776. 2013

Boers KL, Allender MC, Novak LJ, **Palmer J**, Adamovicz L, Deem SL. Assessment of hematologic and corticosterone response in free-living eastern box turtles (*Terrapene carolina carolina*) at capture and after handling. Zoo Biology. 2019; 1–10.

Dunay, E., Apakupakul, K., Leard, S., **Palmer, J.L.**, and Deem, S.L. 2018. Pathogen Transmission from Humans to Great Apes is a Growing Threat for Primate Conservation. EcoHealth 15(1): 148-162. 2018

Catenacci, L.S., Nunes-Neto, J., Deem, S.L., **Palmer, J.L.**, Travassos-da Rosa, E.S., and Tello, J. S. 2018. Diversity patterns of hematophagous insects in Atlantic forest fragments and human-modified areas of southern Bahia, Brazil. Journal of Vector Ecology. 43: 293-304.

Research Experience

2018 – present: PI – WildCare Institute Program for the Conservation of Crocodiles in Cuba **Health program coordinator & Field/Lab Technician.** Assessing the health of captive and free-living Cuban crocodiles (*Crocodylus rhombifer*) at the Zapata Crocodile Farm, Cuba.

Co-PI: Lauren Augustine, MSc. Curator of Herpetology, Saint Louis Zoo

2013 - present. **Field & Lab Technician.** St. Louis Box Turtle Project. Health evaluation and Movement Ecology study of native box turtles in Missouri.
PI: Sharon Deem, PhD. DVM, Dipl ACZM Director, Institute for Conservation Medicine

2017 - present. **Program coordinator & Field/Lab Technician.** Health Evaluation of Snapping Turtles (*Chelydra serpentina serpentina*) in an Urban Park.
PI: Jamie Palmer, MS., Technician Institute for Conservation Medicine

June 2016. **Field and Lab Technician.** Health Evaluations of Humboldt Penguins (*Spheniscus humboldti*) at Punta San Juan, Peru.
PI: Sharon Deem, PhD. DVM, Dipl ACZM Director, Institute for Conservation Medicine

2014, 2016. **Lab technician.** Galapagos Tortoise Movement Ecology Programme.
PI: Stephen Blake, PhD. Max Planck Institute for Ornithology, Sharon Deem, PhD, DVM, Dipl ACZM. Director, Institute for Conservation Medicine

2009 - 2011. **Master's Thesis.** "Seroprevalence of Malarial Antibodies in Galapagos Penguins (*Spheniscus mendiculus*)"
Advisor: Patricia Parker, PhD. Des Lee Professor of Zoological Studies, University of Missouri – St. Louis

2005. **Research Assistant.** San Francisco State University "Biological Assessment of Green Sturgeon in Sacramento- San Juaquin Watershed"
PI: Carlos E. Crocker, PhD. Assistant Professor, San Francisco State University

2003 - 2004. **Research Assistant.** San Francisco State University "Bee Diversity in Restored Habitats in the Presidio, San Francisco"
PI: John Hafernik, Ph.D. Professor, Biology Department, San Francisco State University

Presentations at Professional meetings

Title: Health and movement of Box Turtles in Missouri.
Missouri Natural Resources Conference, Lake of the Ozarks, Missouri, January 2018

Title: Health Threats to Urban and Rural Box Turtles in Missouri
Turtle Survival Alliance annual conference, Charleston, South Carolina, May 2017

Title: Health Assessments of Urban and Rural Box Turtles in Missouri
North American Box Turtle Workshop, University of Illinois, Champane-Urbana, IL, May 2016

Title: Seroprevalence of malarial antibodies in Galapagos penguins (*Spheniscus mendiculus*)

Joint meeting of the Cooper Society, the Wilson Ornithological Society and the Association of Field Ornithologists, Kearney, Nebraska March 2011

Title: Conservation Medicine and One Health: The role of zoo vet techs
Annual Association of Zoo Veterinary Technicians (AZVT), Jekyl Island, Georgia, September 2014

Enclosure # 10

CURRICULUM VITAE

ETIAM ARTURO PÉREZ-FLEITAS, MSc
Specialist in Exotic, Wild Fauna and Researcher
Cuban crocodile Breeding Farm
Enterprise for Conservation of the Zapata Swamp, Cuba

PERSONAL DATA

Last Name, First Name: Pérez-Fleitas, Etiam Arturo
Nationality: [redacted]
Institutional mail address: Cuban crocodile Breeding Farm, Enterprise for Conservation of the Zapata Swamp, Ciénaga de Zapata, Matanzas 43100, Cuba.
Phone number: [redacted]
E-mail: rhombifer@nauta.cu

ACADEMIC TITLES

- ✓ Bachelor of Science (B.Sc.) (Major: Biology). Faculty of Biology, University of Havana, Havana, Cuba, 2002.
  Averaged academic index: 4,49 (On the basis of 5 as highest mark in each).
  Title of the B.Sc. thesis: "Characterization of the community of fishes of the coral reef of Guanabo."

- ✓ Master of Science (M.Sc.) (Master in Zoology and Animal Ecology) Faculty of Biology, University of Havana, Havana, Cuba, 20014.Thesis entitled: "Distress calls of *Crocodylus rhombifer* and *Crocodylus acutus* (Crocodylia: Crocodylidae) in Cuba"

STUDENT MENTEES

Post Graduate:
Gustavo Sosa Rodríguez, MSc (Major: Animal Reproduction) 2015.

PUBLICATIONS

1. Milián-García Y, Jensen E.L, Ribalta Mena S, **Pérez Fleitas E.**, Sosa Rodríguez G., Guerra Manchena L, Espinosa López G. and Russello M. A. (2016) Genetic evidence for multiple paternity in the critically endangered Cuban crocodile (*Crocodylus rhombifer*). Amphibia- Reptilia DOI: 10.1163/15685381-00003056.

2. Morera, V.; Fernández, A.; Puentes, C.; **Pérez, E.**; Sosa, G.; Guerra, L.; Santana, F. y Milian, Y. (2016): Evaluation of plasmatic proteinogram of Cuban crocodile (*Crocodylus rhombifer*). Bionatura 3(1): 107-117.

3. Milián-García Y, Ramos-Targarona R, **Pérez-Fleitas E**, Sosa-Rodríguez G, Guerra-Manchena L, Alonso-Tabet M, Espinosa-López G and Russello M.A (2014) Genetic evidence of hybridization between the critically endangered Cuban crocodile and the American crocodile: implications for population history and *in situ / ex situ* conservation. Heredity. 114(3),272–280. (featured in the cover of the Journal)

4. Purón Gusmeli, CA.; Rodríguez, G.S.; Dominguez López, H.A.; **Pérez Fleitas, E.** y Rodríguez Sosa, V.M. (2014): Ketamina efectiveness like general anesthetic in *Crocodylus rhombifer* specimens. Revista electrónica de Veterinaria. 15(3).

PRESENTATIONSATSCIENTIFICMEETINGNS

1. V International Workshop of Crocodile of Cuba,2017. Zapata Swamp, Matanzas, Cuba.

"Role of the Cuban crocodile breeding farm at Zapata Swamp in the conservation of the *Crocodylus rhombifer*" (oral presentation)

2. 5thNationalSymposium of Administration, Management and Sustainable use of the natural resource. Pinar del Río, Cuba. November, 2016

"Monitoring of crocodile populations in a nesting place at Zapata Swamp" (oral presentation)

3. IX International Symposium on Wetlands. Zapata Swamp, Matanzas, Cuba. November 12-15, 2013.

"Distress calls of *Crocodylus rhombifer* and *Crocodylus acutus* (Crocodylia: Crocodylidae) in Cuba" (oral presentation)

4. 8th International Convention on Environment and Development. 3rd Congress on Management of Ecosystems and Biodiversity. Havana International Conference Center. July 4-8, 2011.

"Behavior patterns of *Crocodylus rhombifer* in the Crocodile breeding Farm at Zapata Swamp" (oral presentation)

5. 3rdNationalSymposium of Administration, Management and Sustainable use of the natural resource. Ciego de Ávila, Cuba. November, 2012

"Regulating variables of the incubation period of Cuban crocodiles" (oral presentation)

6. 7th World Congress of Herpetology. Vancouver, Canada (2012)

"Genetic assessment of the Critically Endangered Cuban crocodile to inform *in situlex situ* conservation" (poster)

7. III International Workshop of the Cuban Crocodile,2009. Zapata Swamp, Matanzas, Cuba.

"The Cuban crocodile breeding Farm at Zapata Swamp and conservation of the *Crocodylus rhombifer*" (oral presentation)

8. VIII Latin-American Congress of Herpetology. Matanzas, Cuba. November, 2008.

"Cuban crocodile growth under different conditions of alimentation at the breeding Farm of Zapata"

POSTGRADUATESTUDIES

Titles of post-grade courses taken so far:

- ✓ Advance biostatistics for ecologist- Course2011-2012
- ✓ Biogeography- Course2011-2012
- ✓ Herpetology- Course 2011-2012
- ✓ Topic of advance Ecology- Course2011-2012
- ✓ Seminar of research- Course2011-2012
- ✓ Biogeography- Course2011-2012
- ✓ Reproduction biology of Amphibian and Reptiles-Course2011-2012
- ✓ Methods of work in Ecology- Course2011-2012
- ✓ Principles of Zoological Taxonomy-Course 2010-2011
- ✓ Biodiversity-Course 2010-2011
- ✓ Reading, writing and communication of the Science-Course 2010-2011
- ✓ Methodology of the research- Course2010-2011

UNDERGRADUATE TEACHING EXPERIENCE

2004-2006 Instructor professor at University of Matanzas, conference of Methodology of research.

PARTICIPATION IN INTERNATIONAL PROJECTS

2016-2017 Evaluation of the potential impacts of the climatic change on the biodiversity and development of strategies of adaptation in two regions of fragile ecosystems in Cuba

2011 Application for a regional approach to the management of the marine and coastal protected zones in the Archipelagos of the south of Cuba

AWARDS ANDRECOGNITIONS

- **2017** Award of the Cuban National Academy of Science for the participation on the Conservation Genetics studies on Cuban crocodiles.
- **2015**Outstanding paper of the academic year in the area of Natural Science at the University of Havana. Paper entitled: "Genetic evidence of hybridization between the critically endangered Cuban crocodile and the American crocodile: implications for population history and *in situlex situ* conservation" (Distinction)

Matanzas, Cuba, July19th, 2017. Etiam Arturo Pérez Fleitas

Enclosure # 11

CURRICULUM VITAE

Gustavo Sosa Rodríguez, MSc

Crocodile specialist and Veterinarian
Cuban crocodile Breeding Farm
Enterprise for Conservation of the Zapata Swamp

Phone number: [redacted]
Email: gustavo.sosa@nauta.cu

ACADEMIC TITLES

- ✓ Bachelor of Science (B.Sc.) Faculty of Veterinary, Agrarian University of Havana, Cuba, 2010.

- ✓ Master of Science (M.Sc.) (Master in Animal Reproduction) Research Center for Animal Improvement, Havana, Cuba, 20014.Thesis entitled: "Reproductive behavior of Crocodylus rhombifer females at Zapata breeding farm"

PUBLICATIONS

1. Milián-García Y, Jensen E.L, Ribalta Mena S, Pérez Fleitas E., **Sosa Rodríguez G.**, Guerra Manchena L, Espinosa López G. and Russello M. A. (2016) Genetic evidence for multiple paternity in the critically endangered Cuban crocodile (*Crocodylus rhombifer*). Amphibia- Reptilia DOI: 10.1163/15685381-00003056.

2. Morera, V.; Fernández, A.; Puentes, C.; Pérez, E.; **Sosa, G.**; Guerra, L.; Santana, F. y Milian, Y. (2016): Evaluation of plasmatic proteinogram of Cuban crocodile (*Crocodylus rhombifer*). Bionatura 3(1): 107-117.

3. Milián-García Y, Ramos-Targarona R, Pérez-Fleitas E, **Sosa-Rodríguez** G, Guerra-Manchena L, Alonso-Tabet M, Espinosa-López G and Russello M.A (2014) Genetic evidence of hybridization between the critically endangered Cuban crocodile and the American crocodile: Implications for population history and *in situ / ex situ* conservation. Heredity. 114(3),272–280. (featured in the cover of the Journal)

4. Purón Gusmeli, CA.; Rodríguez, G.S.; Dominguez López, H.A.; Pérez Fleitas, E. y **Rodríguez Sosa, G.** (2014): Ketamina efectiveness like general anesthetic in *Crocodylus rhombifer* specimens. Revista electrónica de Veterinaria. 15(3).

PRESENTATIONS AT SCIENTIFIC MEETINGNS

1. V International Workshop of Crocodile of Cuba,2017. Zapata Swamp, Matanzas, Cuba.
2. IX International Symposium on Wetlands. Zapata Swamp, Matanzas, Cuba. November 12-15, 2013.
3. 7th World Congress of Herpetology. Vancouver, Canada (2012)
4. III International Workshop of the Cuban Crocodile,2009. Zapata Swamp, Matanzas, Cuba.
5. VIII Latin-American Congress of Herpetology. Matanzas, Cuba. November, 2008.
6. I International Workshop of Crocodile of Cuba, 2000. Varadero, Matanzas, Cuba.

PARTICIPATION IN INTERNATIONAL PROJECTS

2016-2017 Evaluation of the potential impacts of the climatic change on the biodiversity and development of strategies of adaptation in two regions of fragile ecosystems in Cuba

2011 Application for a regional approach to the management of the marine and coastal protected zones in the Archipelagos of the south of Cuba

AWARDS ANDRECOGNITIONS

- **2017** Award of the Cuban National Academy of Science for the participation on the Conservation Genetics studies on Cuban crocodiles.
- **2015**Outstanding paper of the academic year in the area of Natural Science at the University of Havana. Paper entitled: "Genetic evidence of hybridization between the critically endangered Cuban crocodile and the American crocodile: implications for population history and *in situlex situ* conservation" (Distinction)

CITES Permit 71918D

Cate, Emily B <emily_cate@fws.gov>

Fri 9/11/2020 10:27 AM

To: haliday@stlzoo.org <haliday@stlzoo.org>

Good morning Rae,

I have your application dated 03/16/2020, received 03/18/2020, for the proposed importation of biological samples collected from Cuban crocodiles (*Crocodylus rhombifer*) and American crocodiles (*Crocodylus acutus*) in Cienaga de Zapata, Cuba. We apologize for the delay in processing your application.

Please provide the following information so that I may continue to process your application:

1. Can you please clarify if you are planning to import stomach samples that are referenced in the research proposal? If so, will the samples be contained in vials? If not, please specify how the samples will be packaged. For the request, I see scale clippings (in ziplock bags), whole blood (in cryovials), plasma (in cryovials), serum (in cryovials), blood smears (on glass slides), whole dried blood (on FTA cards), and swabs collected from the mouth, cloaca, and eyes. Can you also clarify if the swabs will be stored in vials?
2. Please provide any applicable Cuban collection permits received.
3. Please provide a signed and dated breeder's statement from Zapata Crocodile Farm for the two species. It is my understanding that samples will be collected from both wild and captive bred Cuban and American crocodiles. Please ensure the breeder's statement contains the information requested in question 8 of the application.

Please let me know if you have any questions or concerns.

In accordance with 50 CFR 13.11(e), if the requested information is not received by this office by **October 26, 2020**, your application will be abandoned and administratively closed Once a file is closed you will need to submit a new application and all required fees for the Service to consider your proposed activity. Please refer to permit number 71918D in your correspondence

Regards,
Emily

Emily Cate | Permits Biologist
U.S. Fish and Wildlife Service | International Affairs
Division of Management Authority | Branch of Permits
5275 Leesburg Pike, MS:IA
Falls Church, VA 22041 3803

[EXTERNAL] Fw: CITES Permit 71918D

Rae Lynn Haliday <Haliday@stlzoo.org>

Fri 9/25/2020 10:23 AM

To: Cate, Emily B <emily_cate@fws.gov>

Emily, prior to our phone call this afternoon, see the back and forth I have had with our researcher. I feel like they are making it more complicated than what you've asked for that's why I want to talk through it with you on the phone and you can confirm either way and specifically what you need from what they have provided in the email below.

Thanks,

Rae

From: Jamie Palmer <jpalmer@stlzoo.org>
Sent: Monday, September 21, 2020 8:03 AM
To: Rae Lynn Haliday <Haliday@stlzoo.org>; Sharon Deem <deem@stlzoo.org>; Kathy Zeigler <zeigler@stlzoo.org>; Lauren Augustine <laugustine@stlzoo.org>
Subject: RE: CITES Permit 71918D

RAE -
Sorry, I'm a bit confused and would love some clarification. So this is the information you still need from me in order to move forward, correct?

So I need to draft a letter signed by the Cuban partner with this information of only the samples already collected?

And because we would like to continue to bring samples, will I just do this each time we plan to travel?

f I can't get hatch date, but have approximate age, would that suffice?

Lastly, since you need this for each specimen collected, may I make a sheet for each animal and list the samples we want to import from each animal? Or do I need to do a doc for each sample?

have approximately up to 5 samples from 45 crocodiles over two years. Each sample listed separately or together per animal?

A lot of questions I know, but want to get what is needed the first time to not add to the confusion and get this moving.

Lastly – I do not have a date of import or even an estimate given COVID. And the Cubans will not have the paperwork on their end until right before we move the samples. They also cannot get me any documentation from the government as all offices are closed down due to the pandemic.

SOURCE OF SPECIMEN (answer question 8 or 9 for EACH animal/specimen invotved, as appropriate).

8. For captive-bred animals or animal(s) from which the specimen(s) arelwere obtained, provide a signed and dated statement from the breeder that includes the following:
a. Scientiflc name (genus, species, and, if applicable, subspecies) and common name;
b. Name and address of the facility where the animal was bred and borni
c. Birth/hatch date (mm/dd/yyyy), and, if applicable, identification information;
d. Location (name of facility, address, city, State, postal code) of parental stock;
e. A statement that the animal was bred at the above facilityi
f. Documentation demonstrating the history of transactions (e.g , chain of custody or ownership of the animal).

Thanks Rae,
J

From: Rae Lynn Haliday
Sent: Tuesday, September 15, 2020 3:54 PM
To: Jamie Palmer; Sharon Deem; Kathy Zeigler; Lauren Augustine
Subject: Re: CITES Permit 71918D

I just emailed the application to you Jamie. I still need to upload to DocuWare under the new department name we established for Research done under ICM.

Rae

From: Jamie Palmer <jpalmer@stlzoo.org>
Sent: Tuesday, September 15, 2020 1:23 PM
To: Rae Lynn Haliday <Haliday@stlzoo.org>; Sharon Deem <deem@stlzoo.org>; Kathy Zeigler <zeigler@stlzoo.org>; Lauren Augustine <laugustine@stlzoo.org>
Subject: RE: CITES Permit 71918D

Rae,

A few more answers for you.

Can you please remind me where I can find the document we were given with the questions needing answers for the CITES permit. I can't find it while not at my office and need to look to see what question 8 includes. The doc I have saved is only our answers to the questions and I don't see where it says which type of permit we requested. I feel pretty sure we asked for a multi-year permit. Would have been odd for us not to.

That said – we would like to obtain a multi-year master permit. The only samples we currently have in Cuba that we would like to bring back are of captive farm crocodiles. The team in Cuba will collect wild samples when possible and then we would bring them back as needed.
We would like to bring the already collected samples back during our next trip to Cuba, likely in 2021. But if we can get a multi-year permit, that would be ideal!

2. Please provide any applicable Cuban collection permits received. HERE IS THE RESPONSE FROM OUR PARTNER AT ZAPATA
   We don't need a permit to collect samples on the farm. However, we have to apply for a sample export permit if we want to send samples abroad from Cuba. When we request for that permission we must

provide the passport information of the person who is carrying them Then, we have to request it only when we have decided the person, country of destination, and approximate dates of the trip.

3. Please provide a signed and dated breeder's statement from Zapata Crocodile Farm for the two species. WORKING ON THIS WITH CUBANS BUT NOT SURE THEY WILL HAVE SOMETHING LIKE THIS TO SHARE It is my understanding that samples will be collected from both wild and captive-bred Cuban and American crocodiles YES Please ensure the breeder's statement contains the information requested in **question 8 of the application.** I DON'T HAVE THE DOC THAT STATES WHAT QUESTION 8 NEEDS.

Jamie Palmer, MS
Technician, Institute for Conservation Medicine
Saint Louis Zoo
One Government Drive, St Loui , MO 63110
(314) 646-4731 | jpalmer@stlzoo.org | stlzoo.org/icm
Follow the Zoo on Facebook | Twitter | Instagram | YouTube | Pinterest

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From: Rae Lynn Haliday
Sent: Monday, September 14, 2020 2:30 PM
To: Jamie Palmer; Sharon Deem; Kathy Zeigler; Lauren Augustine
Subject: Re: CITES Permit 71918D

Remind me if you can, was this for a one time import or did you have me request a multi-year master permit? If we requested a multi-year, multiple imports permit, then we need to answer all questions specific to any work that was outlined in the proposal across the 3-5 years requested. If the prosposal indicated stomach samples would be collected and imported, it doesn't matter which year, they sitll need the full details and documentation if they are going to approve everything requested.

Please confirm accordingly.

Thanks,

Rae

From: Jamie Palmer <jpalmer@stlzoo.org>
Sent: Monday, September 14, 2020 2:24 PM
To: Rae Lynn Haliday <Haliday@stlzoo.org>; Sharon Deem <deem@stlzoo.org>; Kathy Zeigler <zeigler@stlzoo.org>; Lauren Augustine <laugustine@stlzoo.org>
Subject: RE: CITES Permit 71918D

Rae Lynn,
We will get this information to you asap. We need to talk to our Cuban partners and pull the permits we have.
Here are the answers to number 1 in all caps - just for clarity, not because I'm yelling 😊

1. Can you please clarify if you are planning to import stomach samples that are referenced in the research proposal? WE DO NOT CURRENTLY HAVE STOMACH SAMPLES TO IMPORT. THIS PART OF THE STUDY DIDN'T OCCUR YET If so, will the samples be contained in vials? WHEN COLLECTED, YES, SAMPLES WILL BE FROZEN, STORED IN 30 MILLILITER NALGENE SCREW-TOP VIALS. If not, please specify how the samples will be packaged. For the request, I see scale clippings (in ziplock bags), whole blood (in cryovials), plasma (in cryovials), serum (in cryovials), blood smears (on glass slides), whole dried blood (on FTA cards), and swabs collected from the mouth, cloaca, and eyes. Can you also clarify if the swabs will be stored in vials? SWABS IN CRYOVIALS AS WELL. ALL SAMPLES WILL BE FROZEN ON WET ICE FOR TRANSPORT IF THAT IS USEFUL INFORMATION AS WELL.

Jamie Palmer, MS
Technician, Institute for Conservation Medicine
Saint Louis Zoo
One Government Drive, St. Louis, MO 63110
(314) 646-4731 | jpalmer@stlzoo.org | stlzoo.org/icm
Follow the Zoo on Facebook | Twitter | Instagram | YouTube | Pinterest
Sent from Mail for Windows 10

From: Rae Lynn Haliday
Sent: Monday, September 14, 2020 2:05 PM
To: Sharon Deem; Jamie Palmer; Kathy Zeigler
Subject: Fw: CITES Permit 71918D

Sharon, please see the request below from the biologist that is reviewing the Cuban sample import app.

Please forward the information to me so I can send on to the biologist and update the file.

Thank you,

Rae

From: Cate, Emily B <emily_cate@fws.gov>
Sent: Friday, September 11, 2020 9:27 AM
To: Rae Lynn Haliday <Haliday@stlzoo.org>
Subject: CITES Permit 71918D

Good morning Rae,

I have your application dated 03/16/2020, received 03/18/2020, for the proposed importation of biological samples collected from Cuban crocodiles (*Crocodylus rhombifer*) and American crocodiles (*Crocodylus acutus*) in Cienaga de Zapata, Cuba. We apologize for the delay in processing your application.

Please provide the following information so that I may continue to process your application:

4. Can you please clarify if you are planning to import stomach samples that are referenced in the research proposal? If so, will the samples be contained in vials? If not, please specify how the samples will be packaged. For the request, I see scale clippings (in ziplock bags), whole blood (in cryovials), plasma (in cryovials), serum (in cryovials), blood smears (on glass slides), whole dried blood (on FTA cards), and swabs collected from the mouth, cloaca, and eyes. Can you also clarify if the swabs will be stored in vials?
5. Please provide any applicable Cuban collection permits received.
6. Please provide a signed and dated breeder's statement from Zapata Crocodile Farm for the two species. It is my understanding that samples will be collected from both wild and captive-bred Cuban and American crocodiles. Please ensure the breeder's statement contains the information requested in question 8 of the application.

Please let me know if you have any questions or concerns.

In accordance with 50 CFR 13.11(e), if the requested information is not received by this office by **October 26, 2020**, your application will be abandoned and administratively closed. Once a file is closed you will need to submit a new application and all required fees for the Service to consider your proposed activity. Please refer to permit number 71918D in your correspondence.

Regards,
Emily

Emily Cate | Permits Biologist
U.S. Fish and Wildlife Service | International Affairs
Division of Management Authority | Branch of Permits
5275 Leesburg Pike, MS:IA
Falls Church, VA 22041-3803

[EXTERNAL] Re: CITES Permit App - 71918D - Follow-up

Rae Lynn Haliday <Haliday@stlzoo.org>

Mon 10/5/2020 7:42 AM

To: Cate, Emily B <emily_cate@fws.gov>

1 attachments (383 KB)

Zapata statement.pdf;

Good morning Emily, please find attached the statement you requested below. Let me know if this is sufficient to meet the request for information you sent us on the PRT# 71918D.

Best,

Rae

From: Cate, Emily B <emily_cate@fws.gov>
Sent: Tuesday, September 29, 2020 10:50 AM
To: Rae Lynn Haliday <Haliday@stlzoo.org>
Subject: CITES Permit App - 71918D - Follow-up

Good afternoon Rae,

Thank you for our phone conversation as well as the additional information provided last Friday. Per our conversation, I am listing the items that we still need in order to move forward with processing your application.

1. We will need a signed breeder's statement for both species from Zapata farm. Per our call, it is not necessary to obtain a breeder's statement for each individual animal; rather, you may submit one that states that all of the animals being used/will be for the study that are captive-bred were bred and born at the farm (this is my understanding, but please correct me if I am wrong). You may also list both species on the same breeder's statement.

Please let me know if you have any questions or concerns.

Regards,
Emily

Emily Cate | Permits Biologist
U.S. Fish and Wildlife Service | International Affairs
Division of Management Authority | Branch of Permits
5275 Leesburg Pike, MS:IA

Falls Church, VA 22041-3803

ECOCIENZAP
Empresa para la Conservación de la Ciénaga de Zapata

Pablo Bouza Rodríguez

General Director

Enterprise for the Conservation of the Zapata Swamp

We acknowledge that all of the Cuban crocodiles (*Crocodylus rhombifer*) and American crocodiles (*Crocodylus acutus*) that are currently and will be part of this study that are listed as captive-bred and born at the Cuban Crocodile Breeding Farm,Enterprise for the Conservation of the Zapata Swamp.

Sincerely,

Pablo Bouza Rodríguez

General Director

ECOCIENZAP
Empresa para la Conservación de la Ciénaga de Zapata
DIRECCIÓN GENERAL