FWS Form 3-200-41 (Rev. 01/2020)
U.S. Department of the Interior

OMB Control No. 1018-0093
Expires 08/31/2023

CAPTIVE-BRED WILDLIFE REGISTRATION (U.S. Endangered Species Act)

☐New ☒Reissue/Renew ☐Amendment

Complete Sections **A or B**, and C, D, and E of this application. U.S. address may be required in Section C.**

A. Complete if applying as an individual

1.a. Last name	1.b. First name	1.c. Middle name or initial	1.d. Suffix

2 Date of birth (mm/dd/yyyy)	5.a. Telephone number	5.b. Alternate telephone number	6. E-mail address

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)
DNCR State of North Carolina	NC Zoo

2. Tax identification no.	3.a. Description of business, agency, Tribe, or institution	3.b. Website URL (if applicable)
56-6062189	zoological institution	nczoo.org

4.a. Principal officer (P.O.) last name	4.b. P.O. first name	4.c. P.O. middle initial	4.b. P.O. Title
Simmons	Lois	P	Director & CEO

5. Primary contact name	6. Primary e-mail address
Alecia Benware	alecia.benware@nczoo.org

7.a. Business telephone number	7.b. Alternate phone no.	8.a. Primary contact telephone no.
336-879-7606	336-879-7620	336-879-7606

C. All applicants complete address information

1.a. Physical address (Street address; Apartment #, Suite #, or Room #; no P.O. Boxes)
4401 Zoo Parkway

1.b. City	1.c. State	1.d. Zip code/Postal code	1.e. County/Province	1.f. Country
Asheboro	NC	27205	Randolph	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

D. All applicants MUST complete

1. Include a check or money order, payable to the U.S. FISH AND WILDLIFE SERVICE, **a nonrefundable processing fee** [50 CFR 13.11(d)(4)]. 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))

2. If you are requesting a reissue/renew/amendment, what is your permit/file number? MA 13035D-0

3. 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.

Lois Patricia Simmons Director & CEO — 02/12/2024

The individual/principal officer of the business must print and sign the application. (No photocopied or stamped signatures) — Date (mm/dd/yyyy)

** Further instructions for the above application may be found on our ePermits website. See the last page for information on the Privacy Act, Paperwork Reduction Act, Estimated Burden, and Freedom of Information Act aspects of this application form.

Mail your application(s) to Division of Management Authority, Branch of Permits, MS:IA 5275 Leesburg Pike, Falls Church, VA 22041-3803.

OMB Control No. 1018-0093
Expires 08/31/2023

E. CAPTIVE-BRED WILDLIFE REGISTRATION (U.S. Endangered Species Act)

Please use the following application for all CBW requests. The CBW registration was designed to facilitate export, re-import, and interstate and foreign commerce of exotic species that are captive born in the U.S. Obtaining a registration under the permitting regulations found at 50 CFR 17.21(g) means that otherwise prohibited activities are allowed for the purpose of enhancing the propagation or survival of the species (conservation breeding). Therefore, your application must show how your activities will either enhance organized breeding programs or *in situ* projects to enhance the survival of the species in the wild. Loans and donations are not prohibited by the Act.

All applicants must complete Part 1 of the application. A CBW Registration remains valid for five years and may be renewed once for a total validity of ten years, after which the CBW Registration number will be retired and you must apply for a new CBW Registration. If a renewal application is submitted thirty days or more prior to the CBW Registration expiring, the applicant may continue to conduct previously authorized activities during the renewal process. However, if the application is submitted fewer than thirty days prior to expiration, activities must cease at the time the registration expires until the renewal process is completed.

- **For New applications and amendments**, complete Part 2 of the application. You may renew your CBW once after 5 years, but after a CBW registration has been valid for 10 years, you must submit a complete new application responding to all questions.

*** **Please note:** *If you have a change of mailing address, you must notify the Service within 10 days. If your facilities move, you will need to apply for an amendment.*

- **To renew your CBW** (it has been less than 10 years since you submitted a completely new application), complete Part 3 of this application.

- **If you maintain exotic wildlife in a natural setting, such as a ranch,** complete Part 1 and Part 4 only of the application.

Electronic submission of inventories, photographs, and receipts/invoices: For hard copy applications, if you wish to provide information electronically, please include a flash drive containing this information with your physical application.

Part 1: All Applicants Must Complete

1. Name and address where you wish the permit to be mailed, if different from physical address. 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 the U.S. Postal Service.

   4401 Zoo Parkway Asheboro, NC 27205

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

   Dustin Smith 336-879-7620 dustin.smith@nczoo.org; Alecia Benware 336-879-7606 alecia.benware@nczoo.org

3. Have you or your client (if a broker applying on behalf of your client), 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.

   NA

4. Provide copies of any license or registration under the Animal Welfare Act regulations of the U.S. Department of Agriculture (9 CFR 2) (if required) and/or any State license or registration required to maintain or breed the species requested in Part 2 or Part 3 below. If available, provide a copy of your last two (2) USDA AWA inspection reports.

5. The exact location(s), including address(es), where the wildlife requested in this application will be maintained. If more than one location exists, list all that apply. NOTE: You must report any change in address or location of facilities to the Division of Management Authority within 10 days of such change taking place.

   see attachments

6. Provide a current inventory, including those out on loan, for each of the exotic ESA-listed species you are requesting to include or have already been approved to hold (if currently holding a valid CBW registration) on your CBW registration.

7. Attach a brief resume for all senior animal care staff or personnel that will be working with or maintaining each species, including the number of years' experience with this species or similar species.

Part 2: New Application, Amendment, or Renewal of CBW which are older than 10 years:

FOR EACH SPECIES BEING REQUESTED for inclusion in a registration, whether a new application or amendment, complete each of the following questions. Signify that you have read each question by writing "N/A" if non-applicable. If submitting hard copy pages, please indicate the species and the application question number you are addressing.

8. The scientific name (genus, species and, if applicable, subspecies) and common name of each species for which you wish to be registered.

   NA

9. Provide the name, address, and CBW registration number of the person(s) or institution(s) from whom you plan to acquire the wildlife, including the sale or loan agreements for the specimens. If currently unknown, describe your efforts, including documentation, to acquire appropriate specimens for your breeding efforts.

   NA

10. Indicate if there is an organized breeding program that you are currently involved with or if you have communicated with other breeding organizations regarding your potential participation in those programs. Provide documents to show you are currently involved with a breeding program or include any communication you have had with breeding organizations that you wish to be involved.

    NA

11. Provide a description of how your proposed activities are going to facilitate captive breeding for conservation purposes of this species, **including your long-term goals for your breeding program and intended disposition of any progeny. Be specific.**

    NA

12. Provide a detailed description and documentation showing how your captive population is being managed to maintain its genetic vitality. If you do not currently maintain a sufficient number of specimens for each species being requested to successfully maintain the genetic viability of the species, you must participate in an organized breeding program. Please identify this program and provide documentation describing the objectives and goals of the program, and confirmation that you are a participant in this program.

    NA

13. If your activities include the holding of surplus animals (i.e., not currently needed in and not being bred) for an organized breeding program, document how your acquisition of such wildlife will relieve crowding at the locations from which the wildlife will be obtained, and thereby assist the breeding program for the species involved. Provide documentation that you are a participant in an organized breeding program where the holding of surplus wildlife has been identified as a necessary objective of the breeding program. Provide a description of how you will restrict/control breeding at your facility.

    NA

14. For each requested species, provide a description of your experience in maintaining and propagating the requested species or similar species, including:

    a. The number of years you or the facility has/have maintained the requested species or similar species.

    NA

    b. During the past five years, how many (by species, by year) successful births/hatchings of each requested species or similar species have occurred at your facility? How many survived beyond 30 days?

    NA

    c. How many mortalities of requested species or similar species have occurred at your facility during the past five years? What were the causes? What measures have you taken to prevent future mortality?

    NA

15. Provide a detailed description, including size, construction materials, and protection from the elements, as well as photographs and detailed diagrams (no blueprints) clearly depicting your existing facilities, including space for future progeny, where the wildlife will be maintained.

    NA

Part 3: Applications to Renew CBW registrations that are 5 years old or less:

All CBW registrants are required to submit an annual report on activities conducted at the facility over the previous year, as well as a current inventory of all species covered under the registration. If you have already responded to the following questions in your annual report, please note that in your answer to the question.

16. Have there been any changes to your operation such as reconstruction or new construction, new facilities, or other physical changes? If yes, please describe them.

    We have a new exhibit being constructed, design schematics/drawings attached. This space should be completed and available for animal use in 2024/2025 and open to the public in 2026.

17. Have there been any changes to senior staff or personnel changes that would affect how your operation handles the species included in the registration? If yes, please describe these changes.

    No changes that would impact our management. We have the same primary staff as previously.

18. Have there been any changes to your inventory that have not been reflected in your annual reports or the current inventory list provided to the Service? If yes, please describe these changes.

    No

19. Is there any additional information that you believe the Service should be aware of in regards to your operation, facilities, inventory, or business model?

    We are in the process of building a new exhibit for the species, which is outlined throughout.

Part 4: Applications for wildlife that is maintained in a natural setting:

20. Provide a specific description of how your proposed activities are going to facilitate captive breeding for conservation purposes of this species **including your long-term goals for your breeding program and intended disposition of any progeny. Be specific.**

21. How often do you conduct surveys of your wildlife? NA

22. How do you determine and identify which specimens are surplus to your operation?

    NA

23. What is the approximate maximum number of specimens of each species your facility can support?

    NA

24. What are you doing to prevent predation of stock?

    NA

25. Provide a detailed description as well as photographs clearly depicting your existing facilities, including space for future progeny, where the wildlife will be maintained.

    NA

Section W1

NCDOR
Web-Fill
4-22

E-595E
Streamlined Sales and Use Tax Certificate of Exemption

Do not send this form to the Streamlined Sales Tax Governing Board or the NC Department of Revenue. Send the completed form to the seller and keep a copy for your records. This is a multi-state form for use in the states listed. Not all states allow all exemptions listed on this form. The purchaser is responsible for ensuring it is eligible for the exemption in the state it is claiming the tax exemption from. Check with the state for exemption information and requirements. The purchaser is liable for any tax and interest, and possible civil and criminal penalties imposed by the state, if the purchaser is not eligible to claim this exemption.

1 ☐ Check if this certificate is for a single purchase. Enter the related invoice/purchase order # _____

2 A. Purchaser's name
NC DEPARTMENT OF NATURAL AND CULTURAL RESOURCES

Please print

B. Business address	City	State	Country	Zip code
4605 MAIL SERVICE CENTER	RALEIGH	NC	WAKE	27699

C. Name of seller from whom you are purchasing, leasing, or renting

D. Seller's address	City	State	Country	Zip code

3 **Purchaser's type of business.** Check the number that describes your business.

- ☐ 01 Accommodation and food services
- ☐ 02 Agricultural, forestry, fishing, and hunting
- ☐ 03 Construction
- ☐ 04 Finance and insurance
- ☐ 05 Information, publishing, and communications
- ☐ 06 Manufacturing
- ☐ 07 Mining
- ☐ 08 Real estate
- ☐ 09 Rental and leasing
- ☐ 10 Retail trade
- ☐ 11 Transportation and warehousing
- ☐ 12 Utilities
- ☐ 13 Wholesale trade
- ☐ 14 Business services
- ☐ 15 Professional services
- ☐ 16 Education and health-care services
- ☐ 17 Nonprofit organization
- ☑ 18 Government
- ☐ 19 Not a business
- ☐ 20 Other *(explain)* _____

4 **Reason for exemption.** Check the letter that identifies the reason for the exemption.

- ☐ A Federal government *(department)* _____
- ☑ B State government *(name)* NC DNCR
- ☐ C Tribal government *(name)* _____
- ☐ D Foreign diplomat # _____
- ☐ G Resale # _____
- ☐ H Agricultural production # _____
- ☐ I Industrial production/manufacturing # _____
- ☐ J Direct pay permit # _____
- ☐ K Direct mail # _____
- ☐ L Other *(explain)* _____

5 **Identification (ID) number.** Enter the ID number as required in the instructions for each state in which you are claiming an exemption. If claiming multiple exemption reasons, enter the letters identifying each reason as listed in Section 4 for each state.

	ID Number	State/Country	Reason		ID Number	State/Country	Reason
AR				NV			
GA				OH			
IA				OK			
IN				RI			
KS				SD			
KY				TN			
MI				UT			
MN				VT			
NC	56-6062189	NC		WA			
ND				WI			
NE				WV			
NJ				WY			

6 **Sign and Date.** *I declare that the information on this certificate is correct and complete to the best of my knowledge and belief.*

Signature of authorized purchaser	Print name here	Title	Date
Joshua Davis	Joshua Davis	CFO	4-24-23

Phone number	E-mail address
919 814 6725	joshua.davis@ncdcr.gov

Part 1: question 4

Expiration Date: 01-05-2025

United States Department of Agriculture

Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Animal Care

This is to certify that
NORTH CAROLINA ZOOLOGICAL PARK

is a licensed Class C - Exhibitor
under the

Animal Welfare Act

(7 U.S.C. 2131 et seq.)

Certificate No. 55-C-0007

Customer No. 3229

Maximum Number Of Animals Authorized: **300**

Authorized Dangerous Animal Group(s): **Group 5 Non-Human Primates; Group 6 Non-Human Primates; Exotic/Wild Felines and Hybrids; Exotic/Wild Canids and Hybrids; Bears; Mega-Herbivores**

Elizabeth Goldentyer

Deputy Administrator

APHIS FORM 7007 (JUL 2019)

Part 1: question 4

United States Department of Agriculture
Animal and Plant Health Inspection Service

[redacted]

Inspection Report

North Carolina Zoological Park
4401 Zoo Pkwy.
Asheboro, NC 27205

Customer ID: **3229**
Certificate: **55-C-0007**
Site: 001
NORTH CAROLINA ZOOLOGICAL PARK

Type: ROUTINE INSPECTION
Date: 04-DEC-2018

No non-compliant items were identified during this inspection, which took place Dec. 3-4, 2018. .

This inspection and exit interview were conducted with facility representatives.

[redacted]

United States Department of Agriculture
Animal and Plant Health Inspection Service

Customer: 3229
Inspection Date: 04-DEC-18

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
3229	55-C-0007	001	NORTH CAROLINA ZOOLOGICAL PARK	04-DEC-18

Count	Scientific Name	Common Name
000003	*Atelerix albiventris*	FOUR-TOED HEDGEHOG (MOST COMMON PET HEDGEHOG)
000004	*Bison bison*	AMERICAN BISON
000020	*Canis rufus*	RED WOLF
000009	*Ceratotherium simum*	WHITE RHINOCEROS
000015	*Cervus elaphus canadensis*	ELK
000002	*Cynomys ludovicianus*	BLACK-TAILED PRAIRIE DOG
000026	*Desmodus rotundus*	COMMON VAMPIRE BAT
000003	*Equus quagga*	BURCHELL'S / GRANT'S / CHAPMAN'S / PLAINS ZEBRA
000002	*Felis margarita*	SAND CAT
000021	*Gazella thomsonii*	THOMSON'S GAZELLE
000003	*Giraffa camelopardalis*	GIRAFFE
000007	*Gorilla gorilla*	WESTERN GORILLA
000002	*Hystrix africaeaustralis*	CAPE PORCUPINE
000014	*Kobus ellipsiprymnus*	COMMON WATERBUCK
000003	*Kobus megaceros*	NILE LECHWE
000003	*Lemur catta*	RING-TAILED LEMUR
000004	*Leopardus pardalis*	OCELOT
000002	*Lontra canadensis*	NORTH AMERICAN RIVER OTTER
000006	*Loxodonta africana*	AFRICAN ELEPHANT
000001	*Lynx rufus*	BOBCAT
000001	*Mephitis mephitis*	STRIPED SKUNK
000004	*Nanger dama*	ADDRA GAZELLE
000010	*Oryx beisa*	EAST AFRICAN ORYX (BEISA ORYX)
000016	*Pan troglodytes*	CHIMPANZEE
000004	*Panthera leo*	LION
000019	*Papio hamadryas*	HAMADRYAS BABOON
000002	*Phoca vitulina*	HARBOR SEAL
000004	*Potamochoerus porcus*	RED RIVER HOG
000003	*Procavia capensis*	ROCK HYRAX
000002	*Puma concolor*	PUMA / MOUNTAIN LION / COUGAR
000003	*Tragelaphus eurycerus*	BONGO
000015	*Tragelaphus spekii*	SITATUNGA
000010	*Tragelaphus strepsiceros*	GREATER KUDU
000003	*Ursus americanus*	NORTH AMERICAN BLACK BEAR
000002	*Ursus arctos horribilis*	GRIZZLY BEAR
000002	*Ursus maritimus*	POLAR BEAR
000002	*Varecia rubra*	RED RUFFED LEMUR
000002	*Vulpes lagopus*	ARCTIC FOX
000002	*Vulpes zerda*	FENNEC FOX
000002	*Zalophus californianus*	CALIFORNIA SEA LION

United States Department of Agriculture
Animal and Plant Health Inspection Service

Customer: 3229
Inspection Date: 04-DEC-18

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
3229	55-C-0007	001	NORTH CAROLINA ZOOLOGICAL PARK	04-DEC-18

Count	Scientific Name	Common Name
000258	**Total**	

Part 1: question 4

[redacted]

United States Department of Agriculture
Animal and Plant Health Inspection Service

Inspection Report

NORTH CAROLINA ZOOLOGICAL PARK

4401 ZOO PKWY.
ASHEBORO, NC 27205

Customer ID: **3229**

Certificate: **55-C-0007**

Site: 001
NORTH CAROLINA ZOOLOGICAL PARK

Type: ROUTINE INSPECTION

Date: 21-SEP-2021

No non-compliant items identified during this inspection.

This inspection and exit interview were conducted with facility representatives.

[redacted]

United States Department of Agriculture
Animal and Plant Health Inspection Service

Customer: 3229
Inspection Date: 21-Sep-2021

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
3229	55-C-0007	001	NORTH CAROLINA ZOOLOGICAL PARK	21-SEP-2021

Count	Scientific Name	Common Name
000021	*Papio hamadryas*	HAMADRYAS BABOON
000007	*Gorilla gorilla*	WESTERN GORILLA
000016	*Pan troglodytes*	CHIMPANZEE
000001	*Phoca vitulina*	HARBOR SEAL
000002	*Ursus maritimus*	POLAR BEAR
000002	*Vulpes lagopus*	ARCTIC FOX
000035	*Canis rufus*	RED WOLF
000002	*Panthera leo*	LION
000002	*Puma concolor*	PUMA / MOUNTAIN LION / COUGAR
000002	*Felis margarita*	SAND CAT
000002	*Leopardus pardalis*	OCELOT
000001	*Lynx rufus*	BOBCAT
000001	*Hystrix africaeaustralis*	CAPE PORCUPINE
000002	*Nanger dama*	ADDRA GAZELLE
000017	*Gazella thomsonii*	THOMSON'S GAZELLE
000014	*Kobus ellipsiprymnus*	COMMON WATERBUCK
000003	*Tragelaphus eurycerus*	BONGO
000008	*Tragelaphus spekii*	SITATUNGA
000008	*Tragelaphus strepsiceros*	GREATER KUDU
000003	*Equus quagga*	BURCHELL'S / GRANT'S / CHAPMAN'S / PLAINS ZEBRA
000003	*Potamochoerus porcus*	RED RIVER HOG
000005	*Bison bison*	AMERICAN BISON
000002	*Ursus americanus*	NORTH AMERICAN BLACK BEAR
000043	*Desmodus rotundus*	COMMON VAMPIRE BAT
000007	*Loxodonta africana*	AFRICAN ELEPHANT
000003	*Giraffa camelopardalis*	GIRAFFE
000002	*Lontra canadensis*	NORTH AMERICAN RIVER OTTER
000009	*Ceratotherium simum*	WHITE RHINOCEROS
000001	*Mephitis mephitis*	STRIPED SKUNK
000002	*Varecia rubra*	RED RUFFED LEMUR
000015	*Cervus elaphus canadensis*	ELK
000003	*Lemur catta*	RING-TAILED LEMUR
000018	*Oryx beisa*	EAST AFRICAN ORYX (BEISA ORYX)
000002	*Echinops telfairi*	LESSER MADAGASCAR HEDGEHOG TENREC
000002	*Monodelphis domestica*	GREY SHORT-TAILED OPOSSUM
000001	*Erethizon dorsatum*	NORTH AMERICAN PORCUPINE
000002	*Oryctolagus cuniculus*	DOMESTIC RABBIT / EUROPEAN RABBIT
000269	**Total**	

Species Inspected

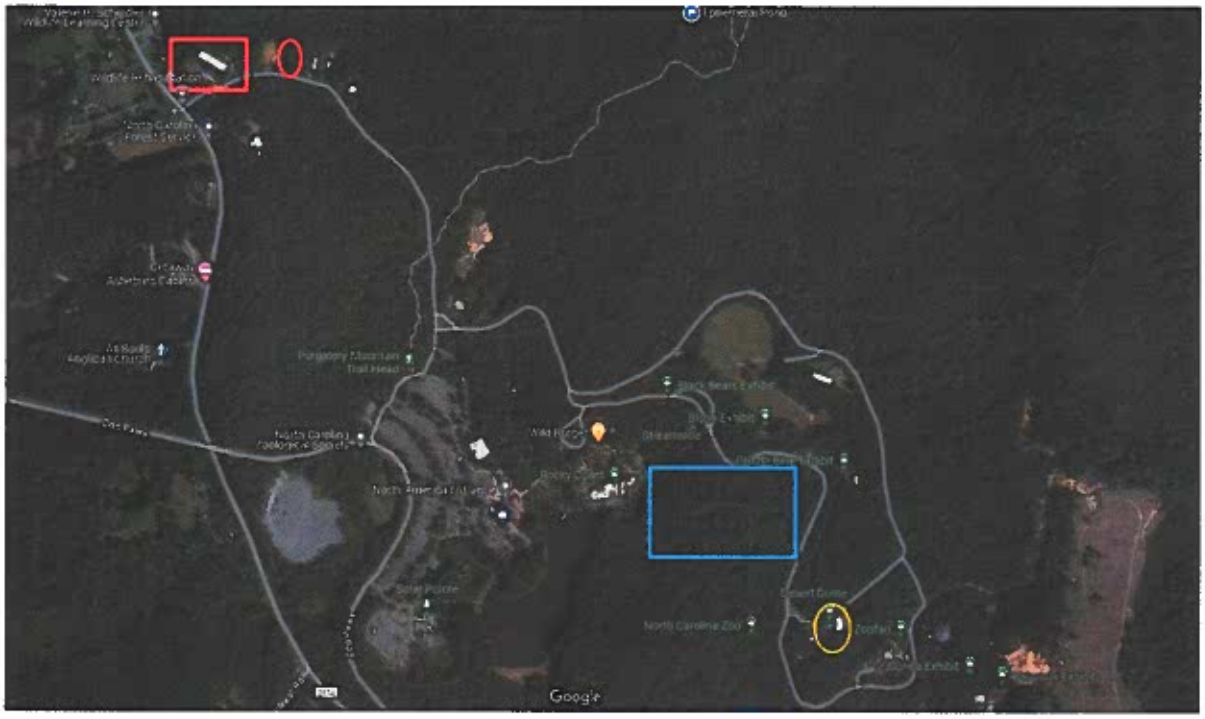
Cust No	Cert No	Site	Site Name	Inspection
3229	55-C-0007	001	NORTH CAROLINA ZOOLOGICAL PARK	21-SEP-2021

Part 1: question 5

The address of these facilities is 4401 Zoo Parkway Asheboro, NC 27205 for the main zoo and 2723 Old Cox Rd for the Veterinary Hospital. Komodo Dragons will be housed in four general areas at the zoo over the next 5 years. Initially, and for health exams/procedures, they will be housed in the veterinary hospital. This is in the red rectangle on the two maps. We will also use a space currently called "Tigger's Rest" which is outlined in the red circle (although hidden by tree canopy) for temporary holding during Asia construction. We will also display a Komodo dragon in our Desert building, outlined in a yellow circle, until Asia construction is completed. Lastly, Komodo Dragons will ultimately be maintained on a permanent basis in our Asia expansion. This area is outlined in a blue rectangle. At the veterinary hospital, they are housed in concrete stalls with galvanized mesh, or, within the treatment rooms. Both areas have secondary containment. Within "Tigger's Rest" they are contained by stainless steel mesh and concrete when indoors, whereas the outdoor holding space is stainless steel mesh. At the desert building, they are contained in mesh, glass, and concrete rockwork. Within the Asia expansion, they will be housed in any/all of the following spaces: outdoor exhibit, contained with mesh, glass, and rockwork; indoor exhibit constructed of concrete and glass, outdoor holding constructed of mesh and concrete walls, and the indoor holding space constructed of concrete and FRP.

MAPS ON REVERSE

Part 1: question 5



Report Start Date
Jan 01, 2024

Taxon Report Varanus komodoensis

Report End Date
Feb 09, 2024

SPECIES 360

CQF21-11935 | Local ID: 41608

Individual	Komodo dragon/Ora	Endangered (EN)	Varanus komodoensis

Date in	Acquisition - Vendor/Local ID	Phy	Own	Reported By	Disposition - Recipient/Local ID	Phy	Own	Date out
Oct 27, 2021	Birth/Hatch	In	In	SAN ANTON / B21037	Loan Out To ASHEBORO/41608	Out	-	Jan 02, 2024
Jan 03, 2024	Loan In From Sender: SAN ANTON/B21037 Vendor: SAN ANTON/B21037	In	-	ASHEBORO / 41608	-	-	-	-

Sex/Contraception	Female / -	Birth Type	Captive Birth/Hatch
Hybrid Status	Not a hybrid	Birth Location	San Antonio Zoological Gardens & Aquar
Enclosure	ASHEBORO	Birth Date/Age	Oct 27, 2021 / 2Y,3M,13D
Rearing	-	Local ID	[41608/ASHEBORO]
Dam	[GAN: MIG12-28883010 | S19041/SAN ANTON]		
Sire	[GAN: 20453895 | G07034/SAN ANTON]		

Feb 09, 2024 North Carolina Zoo

EDUCATION

MAY 2001
BACHELOR OF ARTS, UNIVERSITY OF SOUTH FLORIDA

MAY 1998
ASSOCIATE OF ARTS, ST PETERSBURG COLLEGE

PROFESSIONAL AFFILIATION & ROLES

2023-PRESENT – STEERING COMMITTEE MEMBER, AZA SNAKE TAG
2022-PRESENT – SECTION EDITOR-HERPETOCULTURE, HERPETOLOGICAL REVIEW

2021-PRESENT – AT-LARGE AFFILIATE, NORTH CAROLINA WILDLIFE RESOURCES COMMISSION NONGAME WILDLIFE ADVISORY COMMITTEE

2021 – PRESENT – CHAIR, AZA AMPHIBIAN TAG

2020-PRESENT – BOARD MEMBER, SILVER BOA TRUST

2019-PRESENT – MEMBER, IUCN SNAKE SPECIALIST GROUP

2010-PRESENT – PUERTO RICAN CRESTED TOAD STUDBOOK KEEPER, AZA

2014-PRESENT –STEERING COMMITTEE MEMBER, AZA AMPHIBIAN TAG

JANUARY 2011-PRESENT – VICE COORDINATOR, PUERTO RICAN CRESTED TOAD CONSERVANCY

JANUARY 2014–2018 – CENTRAL AMERICAN RIVER TURTLE STUDBOOK KEEPER, AZA

2008-2014 –SECRETARY, AZA AMPHIBIAN TAG

GRANTS & FINANCIAL AWARDS

2023– INSTITUTE OF MUSEUM AND LIBRARY SERVICES, [redacted]HE AMPHIBIAN CONSERVATION AND BIOBANKING NETWORK: A ONE PLAN APPROACH TO COLLECTIONS CARE & MANAGEMENT. SUBAWARDEE THROUGH MISSISSIPPI STATE UNIVERSITY
2022– USFWS COOPERATIVE AGREEMENT, [redacted]VIRGIN ISLAND BOA CONSERVATION PROGRAM
2021– USFWS COOPERATIVE AGREEMENT, [redacted]- VIRGIN ISLAND BOA CONSERVATION PROGRAM
2019/2020– USFWS COOPERATIVE AGREEMENT, [redacted]- VIRGIN ISLAND BOA CONSERVATION PROGRAM
MAY 2013 – MOHAMED BIN ZAYED SPECIES CONSERVATION FUND, [redacted]- LAMANAI HICATEE CONSERVATION INITIATIVE
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PROJECTS & PROGRAMS

2011 TO PRESENT – PUERTO RICAN CRESTED TOAD RECOVERY PROJECT - ONGOING RESEARCH TRIPS TO PUERTO RICO TO PARTICIPATE IN MULTIPLE ASPECTS OF THE PUERTO RICAN CRESTED TOAD (*PELTOPHRYNE LEMUR*) RECOVERY PROGRAM.

AUGUST 2007 - DEC 2014 - FORMED THE FLORIDA REPTILE AND AMPHIBIAN WORKING GROUP (FRAWG). DEVELOPED GROUP TO INCREASE THE COLLABORATION AND COMMUNICATION AMONG FLORIDA AZA INSTITUTIONS AND THE FWC, AS WELL AS THE ACADEMIC FIELD AND NGOS. THROUGH DECEMBER 2014, THERE WERE 21 MEETINGS AND 4 WORKSHOPS REPRESENTING OVER 120 PEOPLE FROM ~22 INSTITUTIONS AND THE GROUP IS STILL IN OPERATION.

MARCH 2012 TO DEC 2017 – BELIZE PROJECT – THIS MULTI-FACETED PROJECT INCLUDES A COMMUNITY CAT PROGRAM TO CONDUCT RESEARCH ON THE 5 SPECIES OF NEOTROPICAL FELIDS IN BELIZE AND AN EDUCATION PROGRAM. FOLLOWING THE SAME MODEL, WE STARTED THE *LAMANAI HICATEE CONSERVATION INITIATIVE*, WORKING WITH THE CENTRAL AMERICAN RIVER TURTLE (*DERMATEMYS MAWII*), LOCALLY KNOWN AS THE HICATEE.

DECEMBER 2012 TO DECEMBER 2014 – BOA CONSTRICTOR MONITORING AND MANAGEMENT PROJECT – THIS COLLABORATIVE EFFORT BETWEEN ZOO MIAMI AND FWC WAS DESIGNED TO LEARN MORE ABOUT THE POPULATION ECOLOGY OF THE INTRODUCED BOA CONSTRICTOR (*BOA CONSTRICTOR SPP.)* AT THE CHARLES DEERING ESTATE IN SE MIAMI-DADE COUNTY.

JULY 2012 TO DEC 2014 – SOUTH FLORIDA INVASIVE SPECIES MONITORING – CONDUCTED RESEARCH THROUGH TRACKING AND TRAPPING OF THE ARGENTINE BLACK AND WHITE TEGU (*SALVATOR MERIANAE*) AND THE OUSTALET'S CHAMELEON (*FURCIFER OUSTALETI*).

APRIL 2011 TO DEC 2014 – EVERGLADES INVASIVE REPTILE AND AMPHIBIAN MONITORING PROGRAM (EIRAMP). COOPERATIVE PROJECT WITH UNIVERSITY OF FLORIDA TO DETECT INVASIVE SPECIES OF REPTILES AND AMPHIBIANS AS AN EARLY DETECTION PROGRAM THROUGH MONTHLY SURVEYS OF APPROXIMATELY 10 ROUTES THROUGHOUT THE EVERGLADES WATERSHED IN MIAMI-DADE, BROWARD, AND WEST PALM BEACH COUNTIES.

JANUARY 2005 & 2007 - PANAMANIAN GOLDEN FROG (ATELOPUS ZETEKI) SURVEYS WITH VARIOUS MEMBERS OF PROJECT GOLDEN FROG AND MET WITH LOCAL ZOOS AND FACILITIES TO FIND THE LOCATION FOR THE NOW CONSTRUCTED EL VALLE AMPHIBIAN CONSERVATION CENTER (EVACC).

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NEWS/MEDIA:

PHOTOS USED BY PRINT AND ONLINE MEDIA, INCLUDING CNN, MIAMI HERALD, OUTDOOR LIFE MAGAZINE, AND DOZENS OF OTHER MEDIA OUTLETS.

Part 1: question 7

Christopher J. Shupp
[redacted]
Asheboro, NC 27205
[redacted]

Education: **Delaware Valley College**, Doylestown, PA
Bachelor of Science Degree – May 1997
Major: Small Animal Science and Conservation

Tropical Ecology Course
Jatun Sacha Foundation - Bilsa Biological Station, Ecuador - January 2001

AZA Crocodilian Biology and Captive Management School
St. Augustine, FL- May 2003

AZA Amphibian Management School
Detroit, MI – October 2013

Training opportunities at other facilities: Cleveland Metroparks Zoo, The Detroit Zoo and Sylvan Heights Waterfowl, Scotland Neck, NC

Activities: Member (including president 2005/2006 & treasurer 2014) of the North Carolina Chapter of the American Association of Zoo Keepers (AAZK).

Active member of NC PARC and NC Herpetological Society

Participated in the 2005 International Conference on Environmental Enrichment (ICEE)

Participated in the 2005 Reptile and Amphibian Training and Enrichment (RATE) workshop

Work Experience:

2001 - **North Carolina Zoo**, Asheboro NC
Animal Management Supervisor, Cypress Swamp / Desert 2015-
Keeper II, Cypress Swamp 2002-2014, and TLC Australia 2001-2005

Animals:

- Cougar (including rearing of 1.2 wild orphaned kittens), American alligator, Louisiana pine snake (SSP), amphibians, turtles, owls & waterfowl
- Cross trained with sister sections housing polar bear, harbor seal, sea lion, black / grizzly bear, red wolf, bison & elk
- Australia / TLC (domestics) Animal collection including: Australia (2003-2005) – red kangaroos, red-necked and parma wallabies, Major Mitchell's cockatoo, eclectus parrot, kookaburra, lorikeet, several species of python, monitor lizards, lizards & frogs TLC (2001-2003) – sheep, goats, guinea hogs, cattle, rabbits & chickens
- Participated in all aspects of a transition from a domestic animal area to that of Australian animals – animal acquisitions/dispositions, exhibit planning

Daily:

- Work as part of a team to ensure the daily husbandry of a diverse animal collection is carried out in a safe and efficient manner
- Research and formulate diets
- Maintain thorough observations and records
- Draft work area SOP's for the Cypress Swamp collection
- Established training programs for cougars and American alligators
- Incubated and hatched several species including: Louisiana pine snake (SSP),various turtles/tortoises, American alligators and amphibians

Supervisory:

- Temporary Cypress Swamp/Australia supervisor from Feb. 1, 2005 – June 1, 2005 while the supervisor position was vacant. Communication link between work unit, curators, vets, and other zoo departments. Represented the work unit in the weekly collection management and other related meetings. Drafted monthly work schedule for work unit. Prepared work orders for maintenance and design needs.
- Train and supervise new keepers and interns
- Adult leader of 4-H Zoo Crew, supervising a 4-H group (ages 13-17) based out of the NC Zoo (2001-2005)

Education work:

- Coordinate with multiple divisions the planning of an annual "Amphibian Awareness" event, focusing on amphibian conservation.
- Developed wetlands presentation for "Keeper in the classroom" program for school children K-12.
- Implemented the AZA conservation FrogWatch program at the NC Zoo.

Committees:

- Served as one of two keeper representatives to the Behavioral Management committee (2011-2012), and developed a keeper subcommittee to address and identify program needs.
- Served on the Environmental Management System (EMS) team (2008-2010)

1996 to 2001 **Claws and Paws Wild Animal Park**, Lake Ariel, PA
Animal Keeper/ Head Reptile Keeper/ Supervisor of Seasonal Petting Zoo Attendants

- Animal collection (includes, but not limited to): tiger, snow leopard, serval (including hand rearing of 1.1), African leopard, bobcat, lynx and cougar,
- Responsible for daily husbandry of collection
- Supervised petting zoo attendants in their daily tasks
- Trained new keepers
- Presented daily keeper talks and animal shows

1995 to 1997 **Delaware Valley College – Small Animal Science Center**, Doylestown, PA
Animal Technician

- Ensured that the laboratory was in compliance with USDA regulations

- Responsible for daily husbandry of herp collection, marmosets and rodents
- Maintained accurate species and equipment inventory
- Established an enrichment program for a colony of common marmosets
- Prepared a holding facility for ~45 hatchling corn snakes and then maintained them for approximately the next year.

1986 to 1994 **Quiet Valley Living Historical Farm**, Stroudsburg, PA
Tour Guide and Farm Hand

- Performed daily tasks of cleaning, feeding/watering, milking and maintenance of livestock (includes, but not limited to): sheep, goats, mules, horses, pigs, cattle, rabbits and poultry
- Visitor interaction, presenting a historical interpretation of 18th / 19th century farm life through first person characterization.

References

Ryan De Voe – Clinical Veterinarian, Disney's Animal Kingdom
Phone (336) 301-4409

Mike Lubbock – Director, Sylvan Heights Waterfowl
Phone (252) 826-5038

Part 1: question 7

Ezra.Ellis@nczoo.org • 336-209-4970

Ezra Ellis

Qualifications

- Over 25 years of experience in the Zookeeping field.
- SCUBA certified
- Experienced in developing small life support systems for fish, performing water quality checks and resolving associated problems.
- Possess good mechanical troubleshooting skills.
- Extremely well versed in animal husbandry standards, management practices, and natural histories of collection animals.
- Experienced in safe handling practices of venomous reptiles and large carnivorous lizards.
- Possess a strong work ethic, the ability to adapt and problem solve quickly when faced with new challenges.
- As Keeper II, responsible for training, mentoring and overseeing performance of Keeper I's and intern in the section.
- Acts as liaison between staff and maintenance department, filling out and tracking completion of work orders.
- Experienced in writing SOP's and protocols.
- Exhibits excellent communication skills in keeper talks, interviews and general Q&A interactions with zoo patrons.

Professional Experience

Zoo Keeper II–North Carolina Zoo, • Asheboro, NC February 2000– Present

- Provide daily care for a diverse collection of reptiles, amphibians, invertebrates, fish, birds and mammals.
- 25 years of experience providing daily husbandry and handling a diverse collection of venomous reptiles.
- 2.5 years of experience providing daily husbandry and behavior management for multiple Komodo dragons.
- Develop, write, and implement SOP's pertaining to daily operations, breeding protocols and hibernaculum management.
- Collaborate with co-workers, curators, and vet staff to share information and establish the best possible standards of care.
- Train and mentor new employees and interns.
- Conduct keeper talks and participate in interviews.

Zoo Keeper I- North Carolina Zoo, Asheboro, NC• October 1997– February 2000

- Provided daily care for a collection of reptiles, amphibians, birds, fish and mammals, including venomous species.
- Used SCUBA to clean and maintain collections in the main exhibit tank.
- Maintained and developed life support systems.
- Participated in the collection of wild specimens for exhibit purposes.
- Had daily visitor interactions in the public areas answering questions.

Field Technician–HERAC Inc., Greensboro, NC• June 1997– October 1997

- Set up work sites for field studies
- Aided in the carrying out of field studies.
- Collected, packed, shipped and transported samples to labs in accordance with EPA guidelines.
- Performed data collection and recording of data in accordance with EPA guidelines.
- Performed general office duties.

Part-Time Zoo Keeper–Greensboro Science Center, Greensboro, NC• May 1996 – June 1997

- Provided care for a wide range of Taxa.
- Prepared diets, fed animals and made observations of any abnormalities.
- Cleaned and maintained animal enclosures.
- Interacted with patrons giving educational talks to classes and small groups

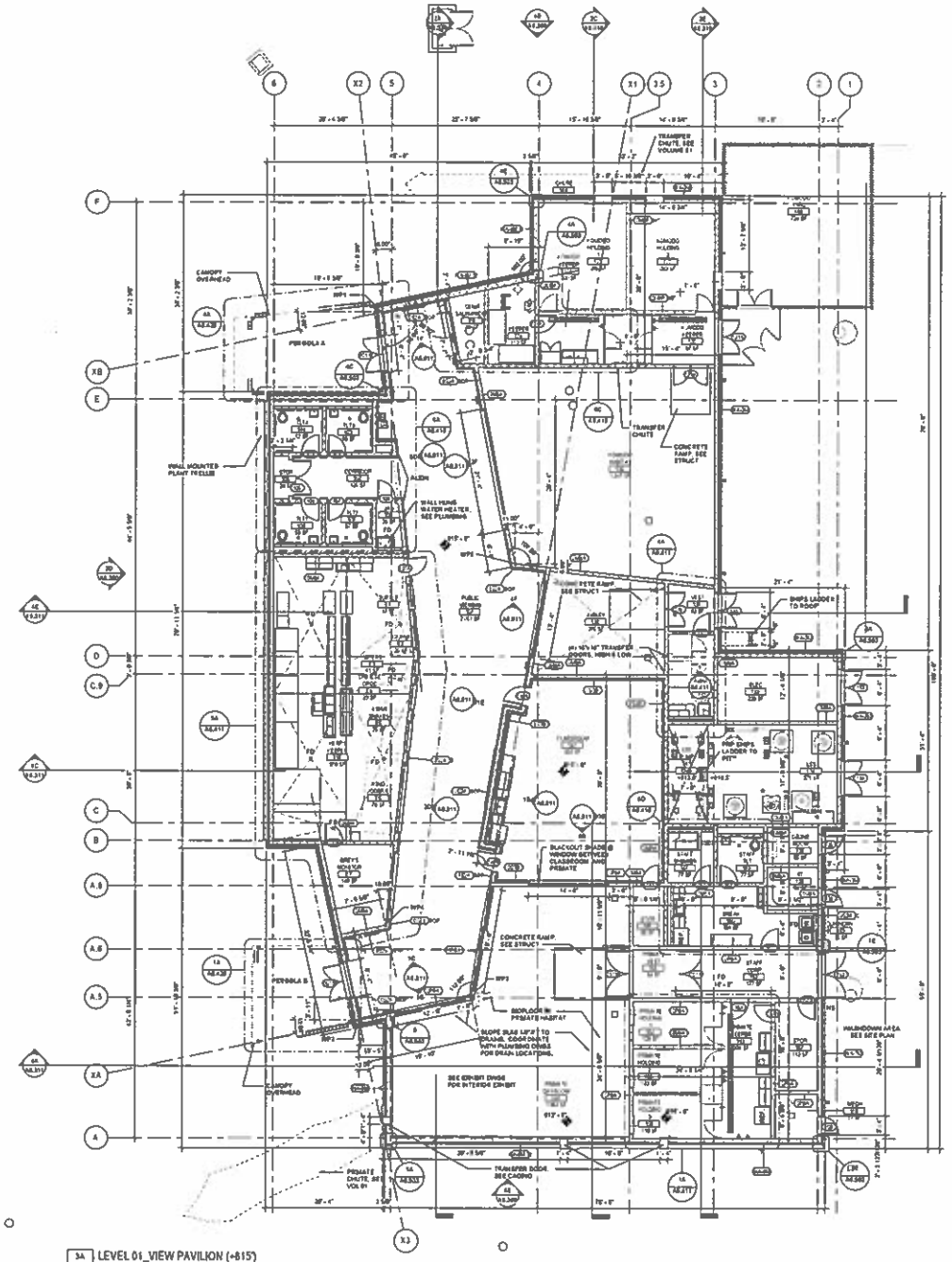
Programming and Software Skills

Basic skills in relation to use of Microsoft word, excel, email, and research functions.

Education

Bachelor of Science– Guilford College, Greensboro, NC ▪ 1997
High School Diploma– Southern Guilford High School, Greensboro, NC ▪ 1993

NOT FOR CONSTRUCTION



3A LEVEL 01_VIEW PAVILION (+815')
A6.100 1/8" = 1'-0"

GENERAL NOTES

1. ALL DIMENSIONS MARKED "CLR" OR "MC" SHALL BE PROVIDED
2. SEE SHEET A6.600 FOR PARTITION TYPES.
3. SEE SHEET A6.610 FOR DOOR TYPES AND DETAILS
4. PROVIDE CONTROL JOINTS ON GYP. BD. ASSEMBLIES PER SPECIFICATIONS AND WHERE SHOWN.
5. EXTEND WALLS TO DECK ABOVE STOREFRONT SYSTEMS AND GLASS WALL PARTITIONS.
6. REVIEW DOCUMENTS AND VERIFY DIMENSIONS AND FIELD CONDITIONS PRIOR TO COMMENCEMENT OF WORK. IF APPLICABLE, CONFIRM THAT WORK IS BUILDABLE AS SHOWN. ANY CONFLICTS OR OMISSIONS SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECT FOR CLARIFICATION PRIOR TO THE PERFORMANCE OF WORK IN QUESTION.
7. COORDINATE AND PROVIDE METAL OR RATED SOLID WOOD BLOCKING AT FIRE TREATED IN PARTITIONS AND CEILING FOR MILLWORK, WALL AND CEILING ATTACHED ITEMS AS SPECIFIED.
8. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS GOVERN. ALL PARTITION LOCATIONS, DIMENSIONS AND TYPES, DOOR AND WINDOW LOCATIONS SHALL BE AS SHOWN ON PARTITION PLAN. IN CASE OF CONFLICT, NOTIFY ARCHITECT.
9. COORDINATE WITH OWNER THE SCHEDULE FOR TELEPHONE, DATA, SECURITY AND AUDIO VISUAL INSTALLATIONS.
10. PARTITIONS AT BUILDING PIER METER SHALL BE CENTERED ON CENTER LINE OF COLUMN OR WINDOW MULLION UNLESS OTHERWISE NOTED.
11. PROVIDE PARTITION TYPE WITH THE HIGHEST STC AND/OR ACOUSTICAL PERFORMANCE RATING WHERE MORE THAN ONE PARTITION TYPE IS INDICATED. PARTITIONS SHALL BE HEAD CONDITION 'A' UNLESS OTHERWISE NOTED.
12. OFFSET ELECTRICAL AND TELEPHONE OUTLETS 6" MINIMUM IN SEPARATE STUD WALL CAVITIES.
13. SEE E0X SERIES SHEETS FOR EXHIBIT INSTALLATIONS.

REFERENCE ELEVATION NOTE

1. REFERENCE ELEVATIONS SHOWN FOR AS BUILT ARE RELATIVE TO SURVEYED CAD ELEVATIONS AS FOLLOWS
2. REFERENCE ELEVATION 00.00' = CIVIL 815.00'
3. ALL GRADING INFORMATION IS SHOWN FOR REFERENCE ONLY (NIC) AND MUST BE CONFIRMED WITH ST DWGS.

⊕ 12,825 SF

0 4' 8' 16' 32'

NOT FOR CONSTRUCTION

LITTLE

www.littleonline.com

clr DESIGN

CLR design, p.a.

North Carolina ZOO ASIA EXHIBIT

PRELIMINARY NOT FOR CONSTRUCTION

CONSTRUCTION DOCUMENTS

NO.	REVISION	DATE

EPC

KG

REVIEWED

NORTH CAROLINA ZOO ASIA EXHIBIT - VIEW PAVILION

SCD PROJECT #18-14441-02A

111-6401-04

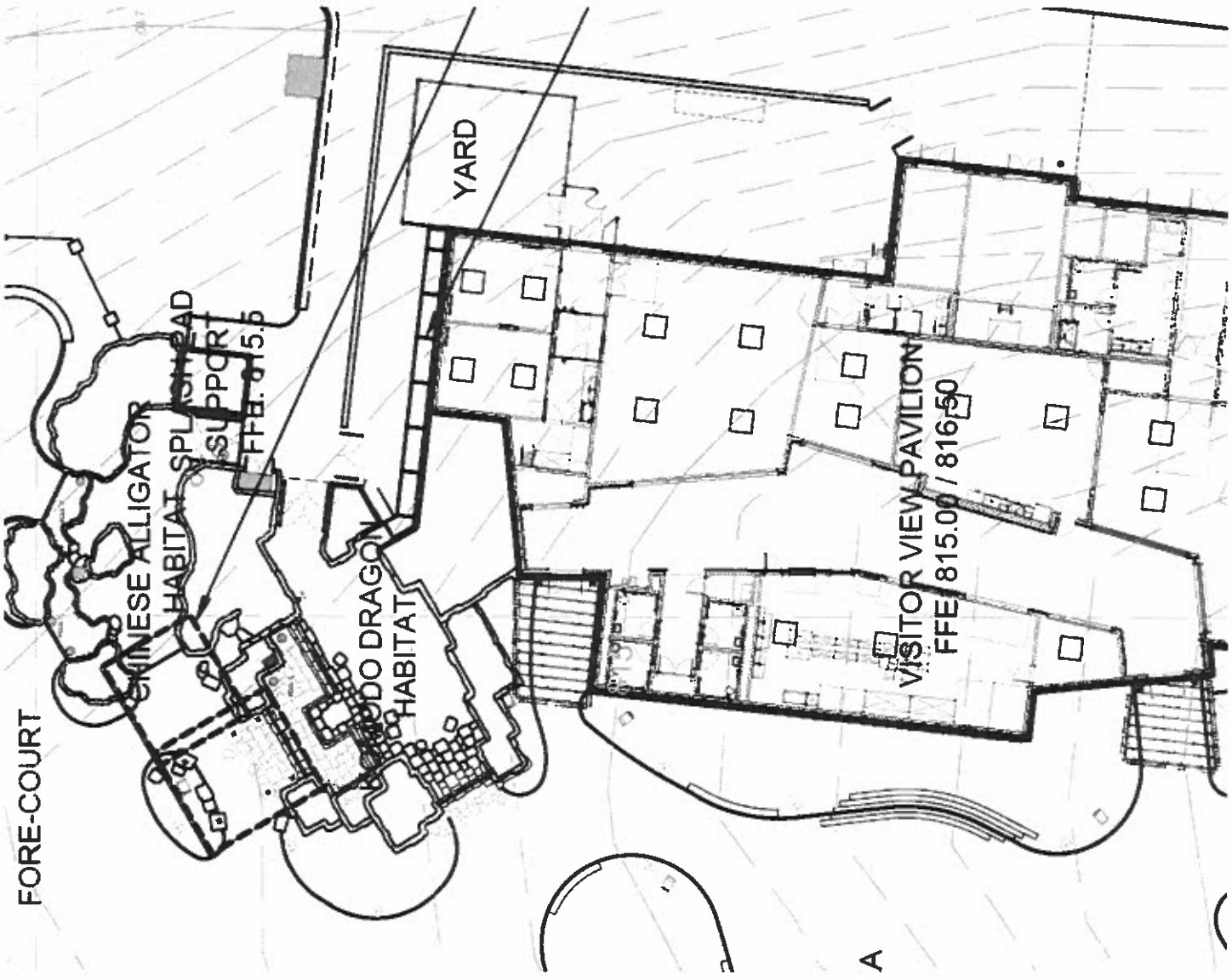
VIEW PAVILION - FLOOR PLAN - LEVEL 01

A6.100

6/29/2020 1:29:50 PM C:\Users\kg.stallings\Documents\111640104-ACZ-ASIA-A-VISITOR VIEW PAVILION-r20_kg.stallings.rvt

Part 3: Question 16

Part 3: question 16



Alecia Benware
Registrar, NC Zoo
4401 Zoo Parkway
Asheboro, NC 27205

7021 0950 0002 0790 7667

02/13/2024
US POSTAGE $010.40
ZIP 27205
041M11452418

Division of Management Authority
Branch of Permits, MS:I
5275 Leesburg Pike
Falls Church, VA 22041-3803

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

Captive-Bred Wildlife Registration Annual Report for Calendar Year 2019
(due by March 31 of following year)

This information includes activities of all species/subspecies *listed on your registration*, even if they are on loan. **Note**: **Attach a year-end inventory of the listed species (quantity and sex).** This form may be copied. Use of this form is not mandatory; however, the same information must be submitted if using an alternate form. Additional information may be attached to the report.

Permittee: North Carolina Zoo

Permit number: MA13035D-0

Address: 4401 Zoo Parkway, Asheboro NC 27205

(If location/address has changed since last year, indicate new location and date of change)

Provide the following information for all activities for the species/subspecies listed on your registration:

Type Of Activity[1]	Date Of Activity[2]	Quantity Sex[3] (M/F/?)	Scientific Name[4]	Common Name	Permit No./Name/Complete Address[5]	Comments
Example: Loan out	4/12/02	1.0	Elephas maximus	Asian elephant	Sunland Zoo and Park	Reason for Death
Loan In	11/14/18	0.1	Varanus Komodensis	Komodo dragon	Los Angeles Zoo	
Loan In	11/14/18	1.0	Varanus Komodensis	Komodo dragon	Los Angeles Zoo	

Provide a year-end inventory of all specimens covered under your registration by quantity and sex. Include all specimens that are currently on loan outside your facility.

E-MAIL or Mail YOUR REPORT TO: Permits@fws.gov (Reference "CBW Annual Report for PRT #MA13035D-0 in Subject Line) **OR** mail to: Division of Management Authority, Branch of Permits, 5275 Leesburg Pike, MS-IA, Falls Church, VA 22041-3803.

1 Type of activity: Report any activity that affects the number of specimens maintained at your facility -- Births, deaths (include causes and for euthanasia, include reason for euthanasia in comment column) at your facilities, and then list other types of activities (purchase, sale, loan , donation, gift, trade, export).
2 Date of activity is date it occurred, not necessarily the date specimen was born or transferred.
3 Sex (1.0 = Male; 0.1=female; 0.0.1 = Unknown sex).
4 Include only non-native species listed as Endangered or Threatened under the U.S. Endangered Species Act.
5 CBW Registration number and/or name and address of other CBW registrant involved in the transaction.

Form 3-200-41a

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

Captive-Bred Wildlife Registration Annual Report for Calendar Year 2020
(due by March 31 of following year)

RCVD MAR 9 2021

This information includes activities of all species/subspecies *listed on your registration*, even if they are on loan. **Note**: **Attach a year-end inventory of the listed species (quantity and sex).** This form may be copied. Use of this form is not mandatory; however, the same information must be submitted if using an alternate form. Additional information may be attached to the report.

Permittee: North Carolina Zoo

Permit number: MA13035D-0

Address: 4401 Zoo Parkway, Asheboro NC 27205

(If location/address has changed since last year, indicate new location and date of change)

Provide the following information for all activities for the species/subspecies listed on your registration:

Type Of Activity[1]	Date Of Activity[2]	Quantity Sex[3] (M/F/?)	Scientific Name[4]	Common Name	Permit No./Name/Complete Address[5]	Comments
Example: Loan out	4/12/02	1.0	Elephas maximus	Asian elephant	Sunland Zoo and Park	Reason for Death
Loan IN	11/14/18	0.1	Varanus komodensis	Komodo dragon	Los Angeles Zoo	
Loan IN	11/14/18	1.0	Varanus komodensis	Komodo dragon	Los Angeles Zoo	

Provide a year-end inventory of all specimens covered under your registration by quantity and sex. Include all specimens that are currently on loan outside your facility.

E-MAIL or Mail YOUR REPORT TO: Permits@fws.gov (Reference "CBW Annual Report for PRT #MA 13035D-0 in Subject Line) **OR** mail to: Division of Management Authority, Branch of Permits, 5275 Leesburg Pike, MS-IA, Falls Church, VA 22041-3803.

1 Type of activity: Report any activity that affects the number of specimens maintained at your facility -- Births, deaths (include causes and for euthanasia, include reason for euthanasia in comment column) at your facilities, and then list other types of activities (purchase, sale, loan , donation, gift, trade, export).
2 Date of activity is date it occurred, not necessarily the date specimen was born or transferred.
3 Sex (1.0 = Male; 0.1=female; 0.0.1 = Unknown sex).
4 Include only non-native species listed as Endangered or Threatened under the U.S. Endangered Species Act.
5 CBW Registration number and/or name and address of other CBW registrant involved in the transaction.

Report Start Date
Jan 01, 2021

Detailed Inventory Report for

Varanus komodoensis/Komodo dragon/Ora

Report End Date
Mar 02, 2021

Taxonomy	Beginning	Births	Acquisitions	Change	Deaths	Dispositions	Ending Status
Varanus komodoensis			**CITES: I,A/IUCN: Vulnerable (VU)**				**Komodo dragon/Ora**
Owned And Onsite	0.0.0	0.0.0	0.0.0	0	0.0.0	0.0.0	0.0.0
In On Loan	1.1.0	0.0.0	0.0.0	0	0.0.0	0.0.0	1.1.0
Out On Loan	0.0.0	0.0.0	0.0.0	0	0.0.0	0.0.0	0.0.0

Summary Specimen Counting:

	Beginning	Births	Acquisitions		Deaths	Dispositions	Ending Status
Owned And Onsite	0.0.0	0.0.0	0.0.0		0.0.0	0.0.0	0.0.0
In On Loan	1.1.0	0.0.0	0.0.0		0.0.0	0.0.0	1.1.0
Out On Loan	0.0.0	0.0.0	0.0.0		0.0.0	0.0.0	0.0.0
Groups *	0.0.0	0.0.0	0.0.0		0.0.0	0.0.0	0.0.0
Colonies	0.0.0	0.0.0	0.0.0		0.0.0	0.0.0	0.0.0

Institution Inventory Taxonomic Summary:

Reptilia

Owned	0 Individuals, 0 Species
On Site	2 Individuals, 1 Species
Groups *	0 Individuals, 0 Species
Colonies	0 Individuals, 0 Species

* = May not add across due to census count entries. In addition, you may have to check "Include Group Split / Merge Transactions" in order to see accurate acquisitions/dispositions in cases where individuals and groups were merged into groups.

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

Captive-Bred Wildlife Registration Annual Report for Calendar Year 2021
(due by March 31 of following year)

This information includes activities of all species/subspecies *listed on your registration*, even if they are on loan. **Note**: **Attach a year-end inventory of the listed species (quantity and sex).** This form may be copied. Use of this form is not mandatory; however, the same information must be submitted if using an alternate form. Additional information may be attached to the report.

Permittee: North Carolina Zoo

Permit number: MA13035-D-0

Address: 4401 Zoo Parkway, Asheboro NC 27205

(If location/address has changed since last year, indicate new location and date of change)

Provide the following information for all activities for the species/subspecies listed on your registration:

Type Of Activity[1]	Date Of Activity[2]	Quantity Sex[3] (M/F/?)	Scientific Name[4]	Common Name	Permit No./Name/Complete Address[5]	Comments
Example: Loan out	4/12/02	1.0	Elephas maximus	Asian elephant	Sunland Zoo and Park	Reason for Death
Loan In	11-14-2018	0.1	Varanus komodensis	Komodo dragon	Los Angeles Zoo	Still at NC Zoo
Loan Return	3-24-2021	1.0	Varanus komodensis	Komodo dragon	Returned to LA Zoo	Loan returned

Provide a year-end inventory of all specimens covered under your registration by quantity and sex. Include all specimens that are currently on loan outside your facility.

E-MAIL or Mail YOUR REPORT TO: Permits@fws.gov (Reference "CBW Annual Report for PRT #MA13035D-" in Subject Line) **OR** mail to: Division of Management Authority, Branch of Permits, 5275 Leesburg Pike, MS-IA, Falls Church, VA 22041-3803.

1 Type of activity: Report any activity that affects the number of specimens maintained at your facility – Births, deaths (include causes and for euthanasia, include reason for euthanasia in comment column) at your facilities, and then list other types of activities (purchase, sale, loan , donation, gift, trade, export).
2 Date of activity is date it occurred, not necessarily the date specimen was born or transferred.
3 Sex (1.0 = Male; 0.1=female; 0.0.1 = Unknown sex).
4 Include only non-native species listed as Endangered or Threatened under the U.S. Endangered Species Act.
5 CBW Registration number and/or name and address of other CBW registrant involved in the transaction.

TCW17-22198 | Local ID: 41381

Individual — **Komodo dragon/Ora** — **Endangered (EN)** — ***Varanus komodoensis***

Date in	Acquisition - Vendor/Local ID	Phy	Own	Reported By	Disposition - Recipient/Local ID	Phy	Own	Date out
Oct 18, 2017	Birth/Hatch	-	In	LOSANGELE / 994606	-	-	-	-
-	-	-	-	LOSANGELE / 994606	Loan Out To (Change in Reported Holder) ASHEBORO/41381	-	-	Nov 14, 2018
Nov 14, 2018	Loan In From Sender: FORTWORTH/210330 Vendor: LOSANGELE/994606	In	-	ASHEBORO / 41381	-	-	-	-

Sex/Contraception	Female / -	Birth Type	Captive Birth/Hatch
Hybrid Status	Not a hybrid	Birth Location	Fort Worth Zoological Park
Enclosure	TIGSREST	Birth Date/Age	Oct 18, 2017 / 4Y,0M,30D
Rearing	-	House Name	[Marigold/ASHEBORO]
Dam	[GAN: MIG12-28883012 | 992680/LOSANGELE]	ID Elsewhere	[210330/ASHEBORO]
Sire	[A10269 / DENVER]	Local ID	[41381/ASHEBORO]
		Transponder	[603 012 007/[Leg/Left]/ASHEBORO]

TCW17-22196 | Local ID: 41382

Individual — **Komodo dragon/Ora** — **Endangered (EN)** — ***Varanus komodoensis***

Date in	Acquisition - Vendor/Local ID	Phy	Own	Reported By	Disposition - Recipient/Local ID	Phy	Own	Date out
Oct 12, 2017	Birth/Hatch	-	In	LOSANGELE / 994604	-	-	-	-
-	-	-	-	LOSANGELE / 994604	Loan Out To (Change in Reported Holder) ASHEBORO/41382	-	-	Nov 14, 2018
Nov 14, 2018	Loan In From Sender: FORTWORTH/210323 Vendor: LOSANGELE/994604	In	-	ASHEBORO / 41382	Loan Return To Owner LOSANGELE/994604	Out	-	Mar 24, 2021
Mar 24, 2021	Loan Return to Us Sender: ASHEBORO/41382	In	-	LOSANGELE / 994604	-	-	-	-

Sex/Contraception	Male / -	Birth Type	Captive Birth/Hatch
Hybrid Status	Not a hybrid	Birth Location	Fort Worth Zoological Park
Enclosure	-	Birth Date/Age	Oct 12, 2017 / 4Y,1M,5D
Rearing	-	House Name	[Monte'/ASHEBORO]
Dam	[GAN: MIG12-28883012 | 992680/LOSANGELE]	ID Elsewhere	[210323/ASHEBORO]
Sire	[A10269 / DENVER]	Local ID	[41382/ASHEBORO]
		Transponder	[603 013 085/[Leg/Left]/ASHEBORO]

[EXTERNAL] CBW Annual Report for PRT #MA13035-D-)

Jarvis, Karen <karen.jarvis@nczoo.org>

Thu 1/13/2022 10:33 AM

To: Permits, FWHQ <permits@fws.gov>

Here is our annual report for our CBW. Let me know if you need any additional information.

Thank you!
Karen

Karen Jarvis
Registrar, Animal Section
North Carolina Zoo
336.879.7606
Karen.Jarvis@nczoo.org

4401 Zoo Parkway | Asheboro, NC 27205

Facebook Twitter Instagram YouTube

FWS Form 3-200-41a (Rev. 01/2020)
U.S. Department of the Interior

OMB Control No. 1018-0093
Expires 08/31/2023

Captive-Bred Wildlife Registration (CBW) Annual Report

Due: March 31st of the following year

Email to: managementauthority@fws.gov referencing "CBW Annual Report YYYY for CBW # MA#####" in subject line.

Permittee Name: NC Zoo **Reporting Year:** 2023 **CBW Permit #:** MA 13035D-0

Complete this form (all three tables) for **ALL live, non-native, ESA-listed species, captive-bred in the U.S., covered under your current CBW registration for the above reporting year** (including individuals you have on loan with another facility, or on loan with you). Do not include non-native ESA-listed species that were not covered on your CBW permit during this year.

Year-end Inventory

Scientific Name (Genus, species, and *if applicable*, subspecies)	**Common Name**	**Quantity**	**Sex/Age Ratio** (male.female.unknown sex, 10.5.2)	**# Births over the reporting year**	**# Deaths over the reporting year**	**Approx Death Date(s) and Cause of Death(s)** (attach necropsy report, as needed)
EXAMPLE: *Loxodonta Africana*	African Elephant	17	10.5.2.	2	1	Aug 2019, old age
Varanus komodensis	Komodo dragon	0.1	0.1	0	0	NA

Use of this form is not mandatory. *If using an alternate form, ensure it encompasses the same information. Additional information may be attached to the report.*

OMB Control No. 1018-0093
Expires 08/31/2023

Activities Conducted

CBW holder is required to disclose **ALL interstate and intrastate purchases, sales, trades, and/or exports** involving species listed under their CBW that occurred during the reporting year.

Scientific Name	Common Name	Activity (Interstate or intrastate purchases, sales, and/or exports)	Date of Activity (mm/dd/yyyy)	Quantity & Sex/Age (males.females.unknown sex, 10.8.3)	Name and Address of the other party Involved in the transaction (include country if an export)	CBW # of Registrant Involved in Activity	Identification Information (e.g., studbook #'s, microchip #'s, band #s, etc.)
EXAMPLE: *Loxodonta Africana*	African elephant	Interstate purchase	04/12/2019	1.0.0	Sunland Zoo and Park, 300 Leopard Way, Miami, FL	MA#####	Studbook #: 152

Use of this form is not mandatory. *If using an alternate form, ensure it encompasses the same information. Additional information may be attached to the report.*

OMB Control No. 1018-0093
Expires 08/31/2023

Loans/Gifts/Donations Conducted

CBW holder is required it disclose **ALL loans, donations, and gifts** involving species listed under their CBW that occurred during the reporting year.

Scientific Name	**Common Name**	**Activity** (loans, donations, and gifts)	**Date of Activity** (mm/dd/yyyy)	**Quantity & Sex/Age** (males.females.unknown sex, 10.8.3)	**Name and Address of the other party Involved in the transaction**	**Information on transferred Animal(s)** (studbook #'s, microchip #'s, band #'s, tattoo #'s, etc.)
EXAMPLE: *Loxodonta Africana*	African elephant	loan	4/12/2019	1.0.0	Sunland Zoo and Park, 300 Leopard Way, Miami, FL	Studbook # 305 Tattoo yellow 6

Use of this form is not mandatory. *If using an alternate form, ensure it encompasses the same information. Additional information may be attached to the report.*

Report Start Date
Jan 01, 2024

Taxon Report Varanus komodoensis

Report End Date
Feb 09, 2024

SPECIES 360

CQF21-11935 | Local ID: 41608

Individual | **Komodo dragon/Ora** | **Endangered (EN)** | **Varanus komodoensis**

Date in	Acquisition - Vendor/Local ID	Phy	Own	Reported By	Disposition - Recipient/Local ID	Phy	Own	Date out
Oct 27, 2021	Birth/Hatch	In	In	SAN ANTON / B21037	Loan Out To ASHEBORO/41608	Out	-	Jan 02, 2024
Jan 03, 2024	Loan In From Sender: SAN ANTON/B21037 Vendor: SAN ANTON/B21037	In	-	ASHEBORO / 41608	-	-	-	-

Sex/Contraception	Female / -	Birth Type	Captive Birth/Hatch
Hybrid Status	Not a hybrid	Birth Location	San Antonio Zoological Gardens & Aquar
Enclosure	ASHEBORO	Birth Date/Age	Oct 27, 2021 / 2Y,3M,13D
Rearing	-	Local ID	[41608/ASHEBORO]
Dam	[GAN: MIG12-28883010 | S19041/SAN ANTON]		
Sire	[GAN: 20453895 | G07034/SAN ANTON]		

Feb 09, 2024 North Carolina Zoo

Galarreta, Angela A

From: Benware, Alecia O <alecia.benware@nczoo.org>
Sent: Friday, June 28, 2024 9:40 AM
To: Galarreta, Angela A
Cc: Smith, Dustin C
Subject: RE: [External] CSTASK2178243 - Federal Fish and Wildlife Permit Renewal Request (13035D)
Attachments: CBW 2022 Annual Report.pdf; VP Design - NCZ 2024.pdf; dragonkomodoyellowssp2021final-1e10d996.pdf

Follow Up Flag: Flag for follow up
Flag Status: Flagged

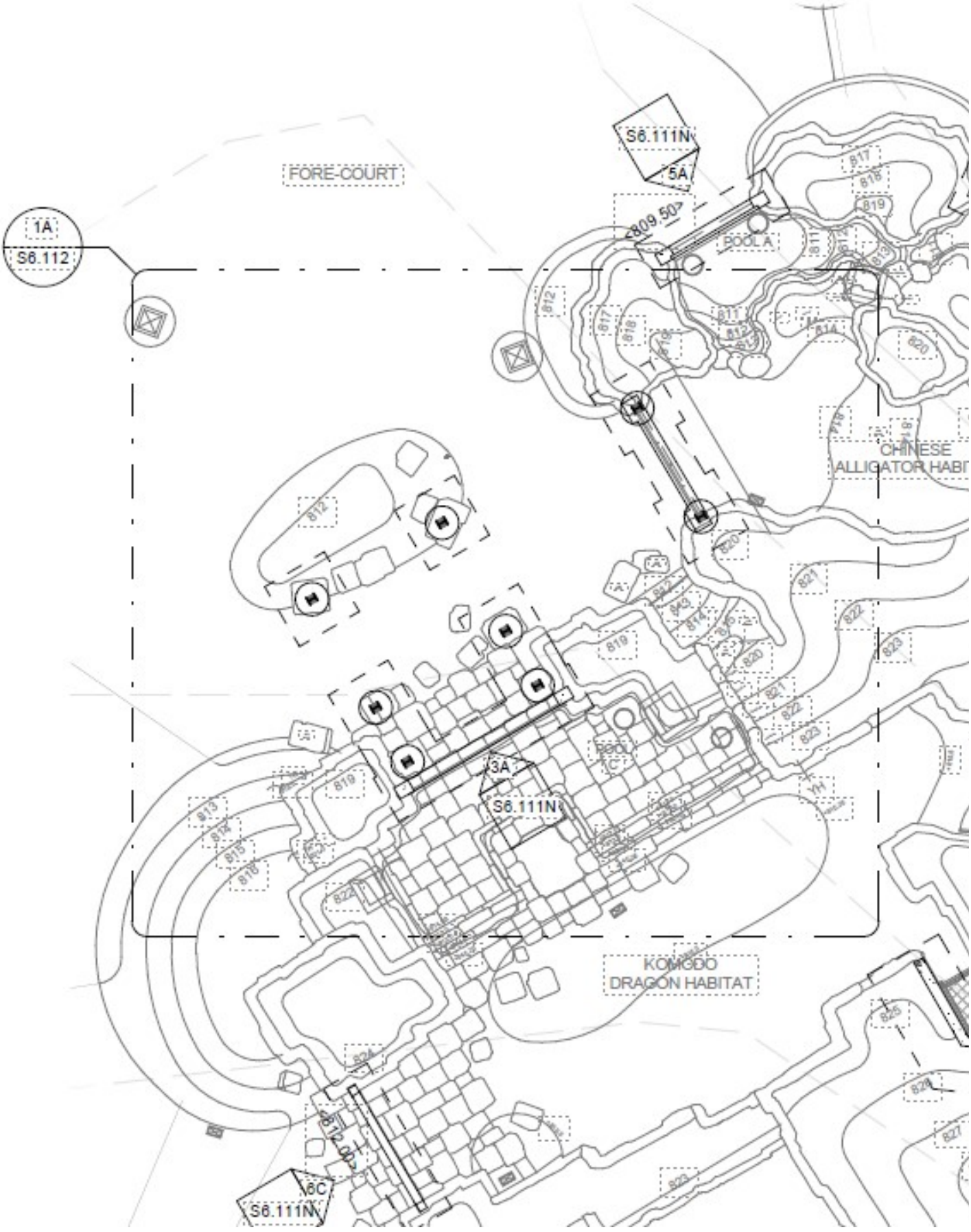
Good morning Angela,

Attached is the most recent Komodo transfer plan, however, this was when we needed to send out our dragons due to a shift in construction timing. We told the SSP we needed animals but were waiting on new dates to pursue animals. The newest BTP is being worked on now, which should be done later this summer/fall. We can share that once its complete.

The current Komodo dragon we have was a recommended transfer from the Komodo Dragon SSP coordinator (Kevin Torregrosa - Bronx Zoo) from San Antonio to NCZ. We also received a recommendation to receive a male from Bronx Zoo (all per email).

As for holding space, we are still using the desert dome space for the Komodo dragon as of now. We hope to transition to the new space later this year. The new exhibit will be in our Asia complex, which is still under construction, it includes the following:

- Indoor Exhibit - 1,347 sq ft. Walls are concrete on three sides, floor, and roof are also concrete. Front is glass.
- Outdoor Exhibit - ~1100 sq ft. Walls are concrete with smooth surfaces and designed with cantilevers to eliminate risk of climbing. Front is glass. Shift area is enclosed chain-link fence.
- Outdoor Holding - 724 sq ft. Walls, floor, and roof are all chain-link with a safety porch of chain link.
- Indoor Holding space (x2) - ~300 sq ft each. three walls, roof, and floor are concrete with a mesh front.


FORE-COURT
1A
S6.112
S6.111N
5A
809.50
POOL A
CHINESE
ALLIGATOR HABI
3A
S6.111N
POOL C
KOMODO
DRAGON HABITAT
6C
S6.111N

As a member of the Komodo Dragon SSP, we are interested in both exhibiting and breeding Komodo dragons once we have received our second individual, and they are of appropriate size. Due to the need to properly manage the population genetics, there is always the potential to send our animals to other facilities and/or receive animals from other facilities. Due to this constant need for potential movement of dragons, we are in need of the CBW should there be a need for commerce. While most facilities don't require any financial transactions, there are some that do require this (Los Angeles Zoo for example, due to their government regulations).

Please let us know if you need any further information for this application.

Best,

Alecia Benware

She/Her
Registrar | Animal Section

Office: 336-879-7606 | alecia.benware@nczoo.org

NCZoo.org | 4401 Zoo Parkway | Asheboro, NC 27205

From: Galarreta, Angela A <angela_galarreta@fws.gov>
Sent: Tuesday, June 25, 2024 1:15 PM
To: Benware, Alecia O <alecia.benware@nczoo.org>
Cc: Smith, Dustin C <Dustin.Smith@nczoo.org>
Subject: [External] CSTASK2178243 - Federal Fish and Wildlife Permit Renewal Request (13035D)

Hello,

We are in receipt of your application to renew the Captive-bred Wildlife registration (CBW), 13035D, for the komodo monitor (*Varanus komodoensis*) under the U.S. Endangered Species Act (ESA). The processing of your application cannot be completed because we require the following information:

1. A copy of your annual report for activities conducted in 2022. It is possible this report was submitted but for whatever reason, it was not saved to the file.
2. A copy of the current AZA SSP for the Komodo monitor demonstrating your inclusion. We are aware that these plans are updated frequently so we would like to verify that you are still an active participant.

3. Please clarify if the temporary holding spaces you describe are different from those described in your original application for this CBW. The original application described the enclosures as being in the "desert dome building" and off exhibit holding in the "lizard room". Is this different from the temporary holding spaces you describe in the current application as the "Desert building" or "Tigger's rest". If so, please provide a detailed description including size, construction materials, and protection from the elements as well as photographs and detailed diagrams (not blueprints) clearly depicting these facilities.

4. Based on existing annual reports, no interstate commerce or exports under this CBW were reported. There are only reports of loans if any activities were conducted at all. Unless done in the course of commercial activity in interstate or foreign commerce, loans or donations are not prohibited activities under the ESA. Could you provide us further explanation on what is your need for a CBW at this time.

In accordance with 50 CFR 13.11(e), if the requested information is not received by this office within 45 calendar days of the date of this email, ***August 9, 2024,*** *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.*

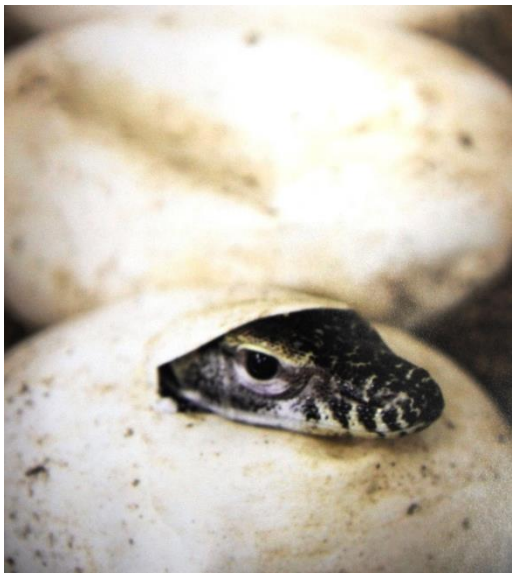
Thank you,

Angela Galarreta, M.S. (she/her)
Senior Biologist
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, Virginia, 22041-3803, USA

https://www.fws.gov/program/international-affairs
https://fwsepermits.servicenowservices.com/fws/

Population Analysis & Breeding and Transfer Plan

Komodo Dragon (*Varanus komodoensis*)
AZA Species Survival Plan®
Yellow Program



AZA Species Survival Plan® Coordinator
Don Boyer, Bronx Zoo / Wildlife Conservation Society
(dboyer@wcs.org)

AZA Studbook Keeper
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4 October 2021

PMC Population Management Center

LINCOLN PARK ZOO.

ASSOCIATION OF ZOOS & AQUARIUMS

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Acknowledgments

The Komodo Dragon SSP planning meeting was held via online zoom conferencing on 30 June 2021 and was attended by the following:

Chris Baker, Memphis Zoo
Don Boyer, Bronx Zoo/WCS
John Andrews, AZA PMC at LPZ

Cover photo courtesy of Chris Baker, Memphis Zoo

This plan was prepared and distributed with the assistance of the
Planning Coordinator and Research Assistant at the
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Description of Population Status

Species Survival Plan® for the Komodo Dragon (*Varanus komodensis*)

Introduction: The current Komodo Dragon SSP population consists of 113 animals (72 males, 41 females, and 0 unknown sex) distributed among 59 facilities. The Lizard Taxon Advisory Group (TAG) has set the target population size for this population to be 150 animals (2019 Regional Collection Plan). Under AZA's current sustainability designations, this Program qualifies as a Yellow SSP.

Comprehensive genetic and demographic analyses of the AZA Komodo Dragon Studbook (Current to 1 June 2021) were performed in June 2021, resulting in the current Breeding and Transfer Plan. Software used includes PMx V. 1.6.2.20200804 and ZIMS for Studbook (14 June 2021 Release Date). Recommendations produced in this report supersede those made in previous reports.

Analytical Assumptions and Exclusions: The living Komodo Dragon SSP population has 70% known pedigree before any exclusions or assumptions are applied. Pedigree assumptions were made to resolve unknown pedigree for analysis. Of special note, several individuals were produced from parthenogenesis from the last report and new individuals from recent hatches (See list in Appendix A). Parentage for parthenogenesis males was altered to include "HAPLOID" in the sire field to calculate genetic statistics as accurately as possible. None of these animals were excluded from the potentially breeding population at this time. A total of fourteen (12.2) dragons were excluded for reasons outlined in Appendix C. Following the application of analytical assumptions and exclusion of non-breeding animals, the potentially breeding population of Komodo dragons is 100 dragons (61.39.0) with 100% known and certain pedigree (Table 1).

Demography: The first Komodo dragons recorded in a North American facility occurred in 1926 when two animals were brought from Indonesia to the Bronx Zoo. Dragons were sporadically held in low numbers from that time until the current population was established in the early 1990s, and numbers grew sharply at the start of successful breeding (Figure 1). The population has exhibited growth since 1994, but zoo hatches have been inconsistent. As Komodo dragons may have variable, large clutch sizes, the population has gone through several cycles of boom hatch years, followed by several years with zero hatches as exhibits are already filled by previous years' hatches (Figure 1). The population is slightly declining by an average of 1.3% (λ = 0.987) from 2016 – 2020 with a range of annual growth observed (-6.6% to 6%). Recent decreasing growth is likely a result of low hatches, and increased exports and deaths compared to inputs over the past five years. To maintain the current population, the population needs to produce an average of 6 to 8 hatches or imports per year (Table 3).

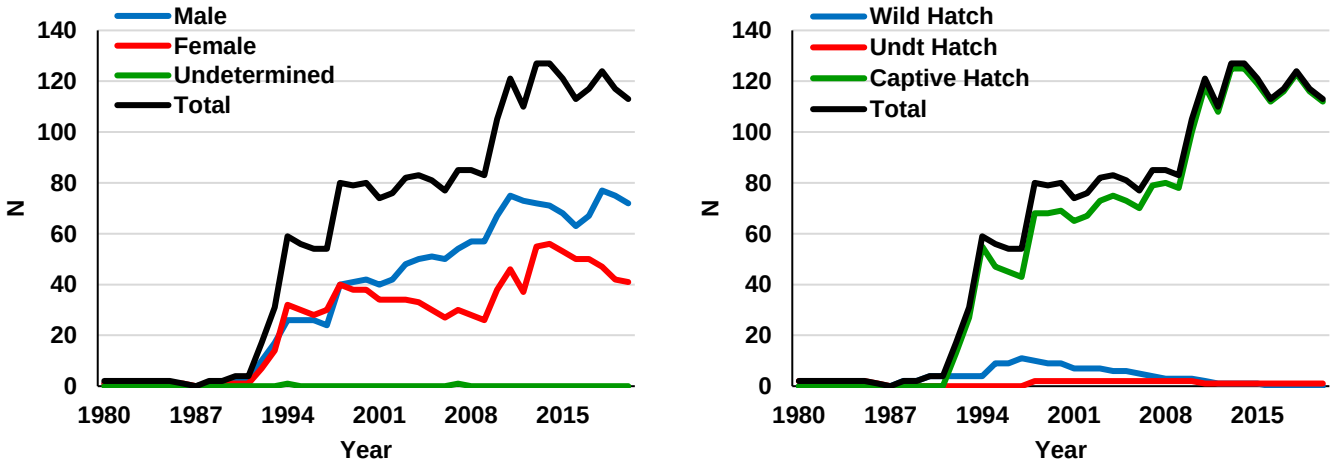

Figure 1: Census of the Komodo Dragon SSP from 1980 to present by sex (left) and hatch type (right) (Data current to 1 June

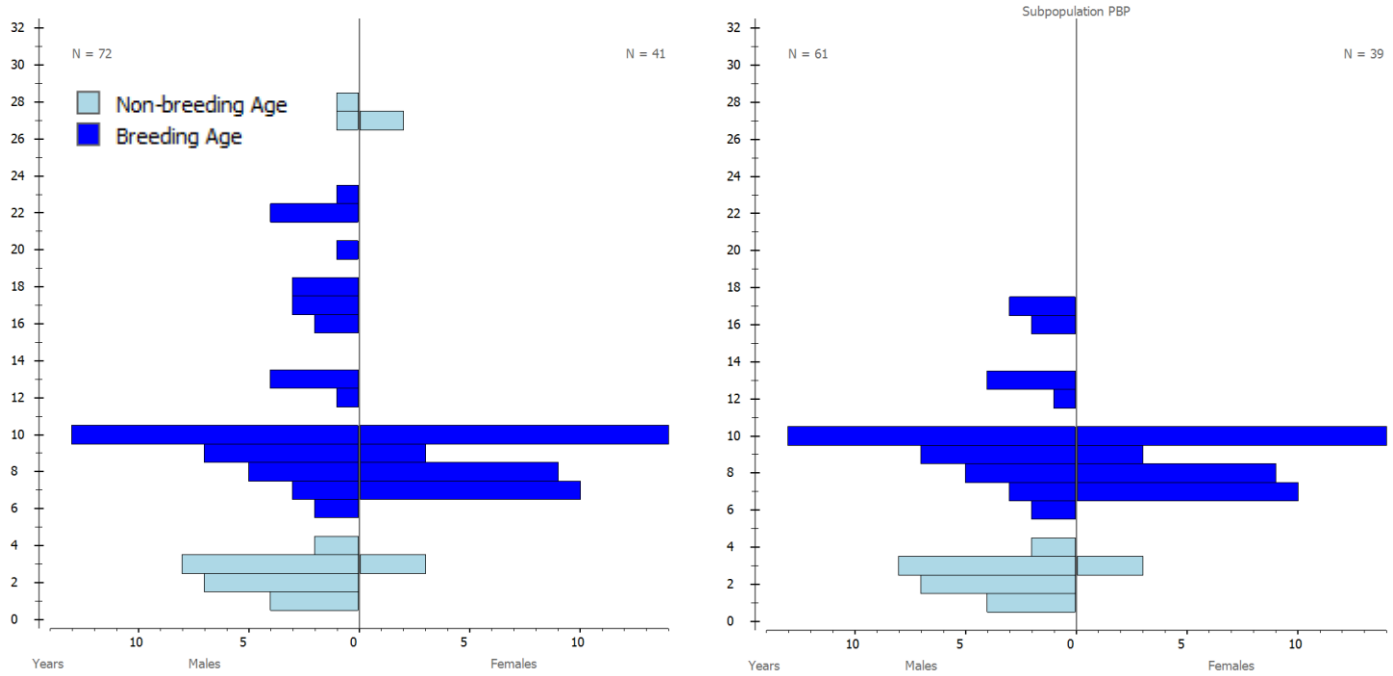

Figure 2: Age distribution of the total population (left) and the potentially breeding population (right) (data current to 1 June 2021).

Table 1: *Demographic status of the Komodo Dragon SSP population, according to studbook data current to 1 June 2021.*

Demography Summary		
Current size of SSP population (N) – Total (Males.Females.Unknown Sex)	113 (72.41.0)	
Number of individuals excluded from genetic analyses	14 (12.2)	
Population size following exclusions	99 (60.39.0)	
Target population size (Kt) from Lizard TAG *2019* RCP	150	
Mean generation time (T, years)	10.1	
Population growth rates (λ; lambda)*: Life Table / 5-year / Projected	1.05 / 0.987 / 1.041	
Survival/Mortality	**Males**	**Females**
Observed first year mortality rate (Q_x)	0.12	0.10
Median life expectancy (MLE), excluding first year mortalities (years) (from PopLink Survival Statistics Report (https://www.aza.org/species-survival-statistics))	19.5	12.9
Observed maximum longevity (L_x)	28 (SB#39)	30 (SB#117)
Reproduction		
Observed reproductive age range	5–19	6–17
Incubation time	265	
Median clutch size hatched	6.6 (1–24)	

* Life table (N.America; 1960 – present); 5-year from studbook census; Projected from PMx stochastic 20-year projections

Komodo dragons can have potentially large clutches with a range of 1–24 eggs. For the SSP population, the average number of dragons hatched from clutches is ~6.6/clutch, though this number may be influenced by management. Incubation is long at 265 days and for the purposes of analysis, the inter-hatch interval was set at 20 days after discussions with the Program Leader and Studbook Keeper. Reproductive maturity generally begins as early as 5 years for males and 6 years for females, though these numbers may be influenced by body size as well. The oldest female to reproduce was 17 years of age and oldest male was 19.

The inter-hatch interval was changed in the true data for the purposes of planning. In previous analysis, the interval was set at 20 days given the possibility of hatchlings emerging from eggs over the course of several days. True data may be permanently set to this in the future, but the default value of 3 days remains the current interval for the studbook. Reproductive maturity is dependent on age and body size together, thus, an animal that is of sufficient size could potentially become mature prior to the stated ages in Table 1.

Genetics: The pedigree is 100% known following application of analytical pedigree assumptions and exclusions. Based on the analytical data, the SSP is descended from 13 founders with 0 potential founders remaining (Figure 3). The gene diversity of the population is 91.81%%, which is equivalent to that found in 6 founders (FGE = 6.11). Typical AZA program goals include thresholds for tolerance of gene diversity loss over time; 90% gene diversity retention for 100 years is a common management goal. Decreases in gene diversity below 90% of that in the founding population have been associated with reproduction increasingly compromised by, among other factors, lower birth/hatch weights, smaller litter/clutch sizes, and greater neonatal mortality in some species.

Based on current population parameters and recent growth rate trends, gene diversity is projected to decline to 23.8% over the next 100 years if the current population grows to the RCP target size of 150 at its projected growth rate of 1.047%. Altering growth rates or increasing target sizes had negligible impacts on gene diversity retention and were not shown in potential projections. The most impactful management strategy to retain diversity long term for this population is to increase the number of breeders in the population with decedents (Ne/N). The current Ne/N ratio is 0.0269 and this default was used in default projections. When increasing Ne/N to 0.10, gene diversity at the end of 100 years is much higher at 64.9%. Focusing on diversifying the individuals breeding in the current population is of high importance for the population.

Table 2: *Population size, genetic status, and projections for the Komodo Dragon SSP population.*

Genetics Summary*			
	2018	**2021****	**Potential**
Founders	*13*	13	0
Founder genome equivalents (FGE)	*6.39*	6.11	10.52
Gene diversity (GD %)	*92.18*	91.81	95.25
Population mean kinship (MK)	*0.0782*	0.0819	--
Mean inbreeding (F)	*0.0506*	0.1559	--
Effective population size (N_e/N)	*0.0653*	0.0269	--
Percentage of pedigree known before / after assumptions and exclusions	*65 / 100*	70 / 100	--
Percentage pedigree certain after assumptions and exclusions	*100*	100	--
Projections			
Years to 90% gene diversity	*3*	1	4
Years to 10% loss of gene diversity	*17*	8	35
Gene diversity at 100 Years (%)	*49*	23.8	64.9
Gene diversity in 10 generations (%)	*--*	24.1	65.2
	Assuming λ = 1.03, Target size = 150, T = 9.6, Starting population size = 123	Assume λ = 1.047, Target size = 150, T = 9.9, Starting population size = 113	Assume λ = 1.04, Target size = 150, T = 9.9, Starting population size = 113 Ne/N = 0.10

*Genetic statistics may not be comparable across years due to changes in software and parameters used for projections from year to year.
**Pedigree assumptions were created for this population and may over- or under-estimate genetic statistics shown in this table.

The SSP continues to investigate the possibility of importing new bloodlines from Indonesia. While inbreeding is high in the SSP and relatedness among other regional populations is high, imports alone will not improve gene retention long term. Using default parameters, if the SSP imporits four founders from indonesia (or any unrelated dragons), gene diverstity at the end of 100 years is only 25.2%. This represents less than a 2% increase in gene diversity retention. Therefore, imports will be most useful combined with strategies that increase the effective population size ratio (Ne/N) mentioned above (i.e., increasing the diversity of individuals breeding in the population).

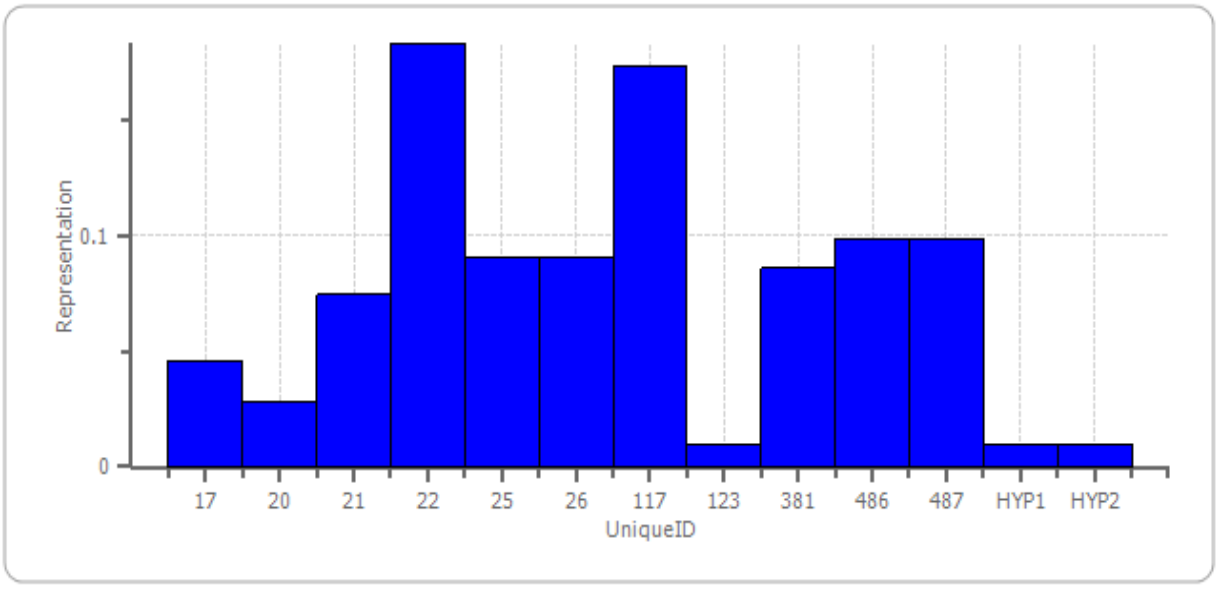

Figure 3: Founder representation distribution of the analytical Komodo Dragon SSP population (Data current to 1 June 2021).

Recommendation Outcomes: The website PMCTrack calculates the outcomes fo SSP recommendations by comparing Breeding and Transfer Plan recommendations to births/hatchesand transfers recorded in the studbook (Figure 4). There are many reasons that recommendations might not be fulfilled, including interim recommendations issued by the SSP Coordinator; these reasons can be captured using PMCTrack Outcomes Surveys. SSP participants are always encouraged to attempt to fulfill recommendations and to communicate successes and failures to the SSP Coordinator. Of the recommendations proprosed in the 2018 Breeding and Transfer Plan, 0% of the BREED WITH recommendations were fulfilled, and 38% of SEND TO recommendations were fulfilled as requested by 23 June 2021. SSP participants are always encouraged to attempt to fulfill recommendations and communicate sucesses and challenges to the SSP Coordinator.

Some potentially confounding breeding from Parthenogenesis may not be scored correctly in PMCTrack. Animals hatched from parthenoganesis may represent unfulfilled or unrecommended breeding in the population.

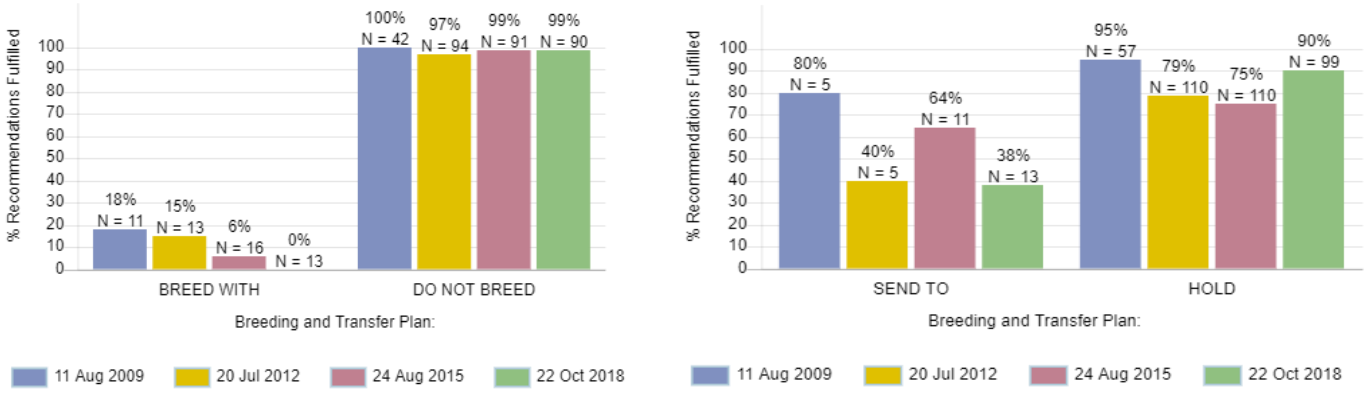

Figure 4: Recommendation outcomes by transfers (left) and breeding (right) for the past Komodo Dragon SSP Breeding and Transfer Plans. *N* represents the number of recommendations scored for each recommendation type, per plan, and the number represents the percentage recommendations fulfilled. Please visit PMCTrack.org or contact pmctrack@lpzoo.org for more information or with any questions.

Management Strategies: This is a 3-year plan (2021 – 2024). Interim recommendations will continue to be made as needed until another full set of recommendations are produced. Recommendations contained in this plan supersede all previous recommendations.

Table 3: Historic reproduction and future population goals.

Current Reproductive Goals Summary		
	Number of Hatches Needed per Year over the next 3 Years	**Target Population Size**
To maintain current population size (λ = 1.00)	7	113
To grow to the TAG's recommended target population size in 3 years (Kt = 150; λ = 1.09)	19–22	150
Reproductive Goals Summary from the Last BTP (2018)		
Number of females recommended to breed	14	
Number of hatches since then	13**	
Average Number of Births/Hatches in the SSP Population		
Average number of hatches / deaths per year, from the past five years	5.2 / 5.2	
Average number of Imports / exports for AZA per year, from the past five years	1.0 / 2.6	

Three institutions produced offspring since the last Breeding & Transfer Plan, however, all thirteen dragons produced were hatched from only three dams via parthenogenesis. While this is very interesting it presents challenges to management and skews the population with more males of higher mean kinship. Parthenogenesis is not a reason to exclude animals from potential breeding in this species at this time.

Sex determination of eggs is a useful tool recommended for any female with a clutch. Testing to identify sex of individuals in the egg will allow for better management of sex ratios and potentially help test for parthenogenesis. A useful article is available in Herpetological Review showing details of techniques on how to properly extract blood for testing incubating eggs (Recchio and Kasielke, 2017; See Appendix B for citation).

At this time, the SSP:

1. **Recommends 22 females for breeding at 20 facilities. More breeding pairs were recommended than previous reports due to low hatch rates from 2018 to present.**
    a. Institutions recommended to breed are expected to hold offspring for at least 6 months.
    b. Breeding institutions are asked to remain in contact with the SSP Coordinator to carefully plan how many eggs to hatch from laid clutches.
    c. Determining sex in egg is possible and useful for managing the sex skew in this population. **Please contact the SSP Coordinator or the Studbook Keeper for a PDF copy of the article outlining the proper techniques for egg sexing.**

2. **Recommends 20 transfers to establish new pairs and meet facility requests.**
    a. More transfers than normal were recommended in an attempt to recruit new and more varied breeders.
    b. Two transfers are sending animals outside of the SSP.

3. **In 2015, a Population Viability Analysis (PVA) was completed for the Komodo Dragon SSP.** A PVA is a computer model that projects the likely future status of a population and is used to evaluate the long-term sustainability of a population under various management strategies. Summary results from this analysis can be found on the AZA website along with the full report.

4. The SSP requests that all suspected parthenogenesis hatches be genetically tested. The SSP has a designated lab recommended to be used for sex and parthenogenesis testing of Komodo dragons for the Program. For any questions on specific testing requirements please contact the SSP Coordinator and/or lab listed below for testing and shipping instructions. Please send samples to:

    John Wood, Pisces Molecular, 1600 Range St. Suite 201, Boulder, CO 80301. Phone: 303-546-9300.

5. All institutions are asked to keep in contact with the Studbook Keeper, Chris Baker, from Memphis Zoo, when updates are available for your dragons.
    a. **Non-ZIMS users are asked to continue with data submission of their respective taxon reports**.

Breeding and Transfer Recommendations by Facility

ABQBIOPK

Albuquerque BioPark Zoo

903 Tenth St. SW, Albuquerque, New Mexico 87102-4098, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
522	R19001	F	7	HOLD	ABQBIOPK	BREED WITH	515	
515	A19133	M	8	RECEIVE FROM	DENVER	BREED WITH	522	

AKRON

Akron Zoological Park

500 Edgewood Ave., Akron, Ohio , United States

Facility Note: The SSP recommends breeding if possible.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
458	101041	F	10	HOLD	AKRON	BREED WITH	472	Medical concerns
472	101663	M	9	HOLD	AKRON	BREED WITH	458	

ALLENWOOD

Clyde Peeling's Reptiland

18628 US Route 15, Allenwood, Pennsylvania 17810, United States

Facility Note: The SSP recommends an exchange of females with the Bronx to allow for breeding per institutional request. Please contact the SSP Coordinator during the comment period.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
431	2169	M	13	HOLD	ALLENWOOD	BREED WITH	537	
441	1812	F	10	SEND TO	NY BRONX	DO NOT BREED		
537	H19034	F	7	RECEIVE FROM	NY BRONX	BREED WITH	431	

ASHEBORO

North Carolina Zoological Park

4401 Zoo Parkway, Asheboro, North Carolina 27205-9416, United States

Facility Note: Thank you for working with the SSP. A transfer to phase out of the Program has been recommended per request.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
549	41381	F	3	SEND TO	NZP-WASH	DO NOT BREED		Future breeder

ATLANTA

Zoo Atlanta

800 Cherokee Ave. SE, Atlanta, GA 30315-1440, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
439	B06301	M	10	HOLD	ATLANTA	DO NOT BREED		

AUDUBON

Audubon Zoo

6500 Magazine Street, New Orleans, Louisiana 70118, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
414	101996	M	16	HOLD	AUDUBON	DO NOT BREED		

BIRMINGHM

Birmingham Zoo

2630 Cahaba Road, Birmingham, Alabama ,

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
564	321003	M	2	HOLD	BIRMINGHM	DO NOT BREED		

BOISE

Zoo Boise

355 N Julia Davis Dr., Boise, ID 83706, USA

Facility Note: The SSP has several animals that can be placed for exhibit. Please communicate in the comment period if replacement animals should be identified.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
291	200012	M	22	HOLD	BOISE	DO NOT BREED		Excluded from genetic analysis

BREVARD

Brevard Zoo

8225 N. Wickham Rd, Melbourne, Florida 32940, United States

Facility Note: The SSP is trying to diversify the number of animals breeding and prioritize genetically important males. For these reasons, the Program is requesting this animal be sent to Disney for breeding and a replacement male from Denver is available. Please comment on these recommendations in the comment period.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
427	18039	M	13	SEND TO	DISNEY AK	BREED WITH	[448|519]	
557	A17268	M	3	RECEIVE FROM	DENVER	DO NOT BREED		Replacement exhibit animal

BROWNSVIL

Gladys Porter Zoo

500 Ringgold Street, Brownsville, Texas 78520, United States

Facility Note: The current pair is recommended to breed – if there are any compatibility issues, please contact the SSP Coordinator in the comment period.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
485	L00451	M	9	HOLD	BROWNSVIL	BREED WITH	514	
514	L00438	F	8	HOLD	BROWNSVIL	BREED WITH	485	

BUFFALO

Buffalo Zoo

300 Parkside Avenue, Buffalo, New York 14214, United States

Facility Note: The SSP may request this animal be used elsewhere in the population in the future for breeding.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
536	R18022	M	6	HOLD	BUFFALO	DO NOT BREED		Genetically important future breeder

BUSCH TAM

Busch Gardens Tampa Bay

3605 Bougainvillea Ave., Tampa, Florida 33612, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
480	65507	F	9	HOLD	BUSCH TAM	DO NOT BREED		

CALGARY

Calgary Zoo, Garden & Prehistoric Park

1300 Zoo Road NE, Calgary, Alberta T2E 7V6, Canada

Facility Note: The SSP is working on export strategies for Canadian facilities to work to fill facility needs. More to come as new information becomes available.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
538	109251	M	7	HOLD	CALGARY	DO NOT BREED		
540	109252	M	7	HOLD	CALGARY	DO NOT BREED		

CHATTANOG

Chattanooga Zoo at Warner Park

301 N Holtzclaw Ave, Chattanooga, Tennessee 37404-2823, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
459	3175	F	10	HOLD	CHATTANOG	BREED WITH	491	
491	3100	M	10	HOLD	CHATTANOG	BREED WITH	459	
569	3251	M	1	SEND TO	WACO	DO NOT BREED		Transfer occurred in comment period
570	3253	M	1	SEND TO	SHARKREEF	DO NOT BREED		Filling request for additional exhibit animal

CINCINNAT

Cincinnati Zoo & Botanical Garden

3400 Vine St, Cincinnati, Ohio 45220-1399, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
404	309027	M	18	HOLD	CINCINNAT	DO NOT BREED		Excluded from genetic analysis

COLUMBIA

Riverbanks Zoo and Garden

500 Wildlife Parkway, Columbia, South Carolina 29202-1060, United States

Facility Note: The SSP is requesting an exchange of males to allow for breeding. Please contact the SSP Coordinator in comment period concerning these recommendations.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
475	11400	F	9	HOLD	COLUMBIA	BREED WITH	518	
476	11399	M	9	SEND TO	GREEN NSC	DO NOT BREED		
518	2016116	M	8	RECEIVE FROM	GREEN NSC	BREED WITH	475	

COLUMBUS

Columbus Zoo and Aquarium

PO Box 400, Powell, Ohio 43065-0400, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
442	316013	M	10	HOLD	COLUMBUS	BREED WITH	528	
528	316036	F	7	HOLD	COLUMBUS	BREED WITH	442	

DENVER

Denver Zoological Garden

City Park, Denver, Colorado 80205, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
515	A19133	M	8	SEND TO	ABQBIOPK	BREED WITH	522	
555	A17267	F	3	HOLD	DENVER	DO NOT BREED		
557	A17268	M	3	SEND TO	BREVARD	DO NOT BREED		Replacement exhibit animal
560	A18231	M	2	SEND TO	LUFKIN	DO NOT BREED		
562	A17269	M	3	HOLD	DENVER	DO NOT BREED		
572	A20022	M	1	SEND TO	ST AUGUST	DO NOT BREED		Filling request for additional exhibit animal

DISNEY AK

Disney's Animal Kingdom

1200 N. Savannah Circle E., Lake Buena Vista, Florida 32830, United States

Facility Note: The SSP is recommending a male be transferred here for breeding per request. Previously we recommended transferring a female to TORONTO to fill requests for breeding. While international transfers are difficult, we would like to continue to try to send an animal to Canada. SB519 would be the ideal candidate, however, breeding with incoming male is recommended until transfers can be secured.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
445	140593	M	10	SEND TO	METROZOO	BREED WITH	511	
448	140594	F	10	HOLD	DISNEY AK	BREED WITH	427	
519	140174	F	7	SEND TO	TORONTO	BREED WITH	427	Continue to try to export if possible. Attempt to breed Brevard male if desired until Toronto exports are possible.
427	18039	M	13	RECEIVE FROM	DISNEY AK	BREED WITH	[448|519]	

EL PASO

El Paso Zoo

4001 East Paisano Drive, El Paso, Texas 79905, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
566	202204	M	2	HOLD	EL PASO	DO NOT BREED		

EVANSVLLE

Mesker Park Zoo

1545 Mesker Park Drive, Evansville, Indiana 47720, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
516	313004	F	8	HOLD	EVANSVLLE	DO NOT BREED		
517	313003	F	8	HOLD	EVANSVLLE	DO NOT BREED		

FORTWORTH

Fort Worth Zoological Park

1989 Colonial Pkwy., Fort Worth, Texas , United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
462	207507	M	10	HOLD	FORTWORTH	BREED WITH	527	
556	210326	F	3	HOLD	FORTWORTH	DO NOT BREED		
527	13H049	F	7	RECEIVE FROM	MEMPHIS	BREED WITH	462	

FRESNO

Fresno Chaffee Zoo

894 W Belmont Ave, Fresno, California 93728-2891, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
456	204063	M	10	HOLD	FRESNO	BREED WITH	513	
513	209059	F	8	HOLD	FRESNO	BREED WITH	456	

FT WAYNE

Fort Wayne Children's Zoo

3411 Sherman Blvd, Fort Wayne, Indiana 46808-1594, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
83	94155	F	27	HOLD	FT WAYNE	DO NOT BREED		Excluded from genetic analysis

GREEN NSC

Greensboro Science Center

4301 Lawndale Drive, Greensboro, North Carolina 27455, United States

Facility Note: The SSP is requesting an exchange of males to put a genetically important male in a breeding situation. Please contact the SSP Coordinator concerning these recommendations in comment period.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
518	2016116	M	8	SEND TO	COLUMBIA	BREED WITH	475	
476	11399	M	9	RECEIVE FROM	COLUMBIA	DO NOT BREED		

HONOLULU

Honolulu Zoo

Honolulu Zoo, Honolulu, Hawaii 96815-4011, United States

Facility Note: It is acceptable to try to pair SB#39 and attempt to breed with #451, though offspring may be unlikely given the males advanced age. The SSP can also identify a replacement male as a potential breeder in the future as a replacement when needed.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
39	930250	M	28	HOLD	HONOLULU	DO NOT BREED		Excluded from genetic analysis
451	215071	F	10	HOLD	HONOLULU	DO NOT BREED		
488	212070	M	10	HOLD	HONOLULU	DO NOT BREED		

HOUSTON

Houston Zoo, Inc.

1513 Cambridge St., Houston, Texas 77030, United States

Facility Note: Both males at this facility are genetically important and may be requested for breeding in the future. 424 was given a breeding rec to reflect that some breeding visits have been done with San Antonio female. No transfer is recommended unless future breeding attempts are desired.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
424	23290	M	13	HOLD	HOUSTON	BREED WITH	493	Genetically Important male
534	28902	M	7	HOLD	HOUSTON	DO NOT BREED		Genetically important male

JACKSONVL

Jacksonville Zoo and Gardens

370 Zoo Parkway, Jacksonville, Florida 32218-5769, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
401	407319	M	18	HOLD	JACKSONVL	DO NOT BREED		Excluded from genetic analysis
490	417354	M	10	HOLD	JACKSONVL	BREED WITH	512	
512	413321	F	8	HOLD	JACKSONVL	BREED WITH	490	

KNOXVILLE

Knoxville Zoological Gardens

3500 Knoxville Zoo Drive, Knoxville, Tennessee 37914, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
502	5876	M	9	HOLD	KNOXVILLE	DO NOT BREED		Genetically Important male
558	5836	M	2	HOLD	KNOXVILLE	DO NOT BREED		Genetically Important male

LOSANGELE

Los Angeles Zoo & Botanical Gardens

5333 Zoo Dr., Los Angeles, California , United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
550	994604	M	3	HOLD	LOSANGELE	DO NOT BREED		

LOUISVILL

Louisville Zoological Garden

1100 Trevilian Way (40213), Louisville, Kentucky 40233-7250, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
553	302288	M	3	HOLD	LOUISVILL	DO NOT BREED		

LOWRY

ZooTampa at Lowry Park

1101 West Sligh Ave., Tampa, Florida 33604, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
454	303615	F	10	HOLD	LOWRY	BREED WITH	501	
501	303556	M	9	HOLD	LOWRY	BREED WITH	454	

LUFKIN

Ellen Trout Zoo

402 Zoo Circle, Lufkin, Texas , United States

Facility Note: An additional animal is recommended to transfer here for exhibit purposes.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
66	10002	F	27	HOLD	LUFKIN	DO NOT BREED		Excluded from genetic analysis
560	A18231	M	2	RECEIVE FROM	DENVER	DO NOT BREED		

MEMPHIS

Memphis Zoological Garden & Aquarium

2000 Prentiss Place, Memphis, Tennessee 38112, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
381	21842	M	23	HOLD	MEMPHIS	DO NOT BREED		Excluded from genetic analysis
392	22166	M	20	SEND TO	TBD	DO NOT BREED		Excluded from genetic analysis. Sending outside of the SSP
450	19H020	F	10	HOLD	MEMPHIS	DO NOT BREED		
527	13H049	F	7	SEND TO	FORTWORTH	BREED WITH	462	
539	17H065	F	7	HOLD	MEMPHIS	BREED WITH	541	
541	R16002	M	4	RECEIVE FROM	VA MSC	BREED WITH	539	

METROZOO

Zoo Miami

12400 SW 152nd Street, Miami, Florida 33177-1499, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
298	98R062	M	22	HOLD	METROZOO	DO NOT BREED		Excluded from genetic analysis
437	19R081	F	10	HOLD	METROZOO	DO NOT BREED		
511	13R015	F	8	HOLD	METROZOO	BREED WITH	445	
551	18R085	M	3	HOLD	METROZOO	DO NOT BREED		
554	18R086	M	3	HOLD	METROZOO	DO NOT BREED		
445	140593	M	10	RECEIVE FROM	DISNEY AK	BREED WITH	511	

MINNESOTA

Minnesota Zoological Garden

13000 Zoo Blvd, Apple Valley, Minnesota 55124, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
499	14370	M	9	HOLD	MINNESOTA	DO NOT BREED		
500	13471	M	9	HOLD	MINNESOTA	DO NOT BREED		

MOODY

Aquarium & Rainforest at Moody Gardens

1 Hope Blvd., Galveston, Texas 77554, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
452	6109	F	10	HOLD	MOODY	DO NOT BREED		
453	6110	M	10	HOLD	MOODY	DO NOT BREED		

NASHV ZOO

Nashville Zoo at Grassmere

3777 Nolensville Rd., Nashville, Tennessee , United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
489	5539	M	10	HOLD	NASHV ZOO	BREED WITH	[524|523]	
523	4457	F	7	HOLD	NASHV ZOO	BREED WITH	489	Backup female if previous is unsuccessful.
524	4455	F	7	HOLD	NASHV ZOO	BREED WITH	489	Prioritized female for breeding

NY BRONX

Bronx Zoo/Wildlife Conservation Society

2300 Southern Boulevard, Bronx, New York 10460, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
449	H10138	M	10	HOLD	NY BRONX	DO NOT BREED		
497	H16002	M	10	HOLD	NY BRONX	DO NOT BREED		
537	H19034	F	7	SEND TO	ALLENWOOD	BREED WITH	431	
559	H19021	M	2	SEND TO	SAN FRAN	DO NOT BREED		Filling request for additional exhibit animal
561	H19020	M	2	HOLD	NY BRONX	DO NOT BREED		
441	1812	F	10	RECEIVE FROM	NY BRONX	DO NOT BREED		

NZP-WASH

Smithsonian National Zoological Park

3001 Connecticut Ave NW, Washington, DC 20008, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
300	306897	M	22	HOLD	NZP-WASH	DO NOT BREED		Excluded from genetic analysis
549	41381	F	3	RECEIVE FROM	ASHEBORO	DO NOT BREED		Future breeder with current male
568	307862	M	1	HOLD	NZP-WASH	DO NOT BREED		

OKLAHOMA

Oklahoma City Zoological Park

2101 NE 50th St, Oklahoma City, Oklahoma 73111, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
446	780603	F	10	HOLD	OKLAHOMA	BREED WITH	508	
508	780905	M	8	HOLD	OKLAHOMA	BREED WITH	446	

PHOENIX

Phoenix Zoo

455 N Galvin Parkway, Phoenix, Arizona 85008, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
434	12567	M	12	HOLD	PHOENIX	BREED WITH	504	
504	12210	F	8	HOLD	PHOENIX	BREED WITH	434	

PROVIDNCE

Roger Williams Park Zoo

1000 Elmwood Ave., Providence, Rhode Island , United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
520	300297	F	7	HOLD	PROVIDNCE	DO NOT BREED		

SAN ANTON

San Antonio Zoological Gardens & Aquarium

3903 N. St. Mary's Street, San Antonio, Texas 78212-3199, United States

Facility Note: The SSP has given a breeding recommendation for SB493 to reflect previous breeding exchanges. Any hatches from 493 will thus be given “fulfilled” recommendation status for breeding.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
88	970530	M	27	HOLD	SAN ANTON	DO NOT BREED		Excluded from genetic analysis
493	S19041	F	10	HOLD	SAN ANTON	BREED WITH	424	Female bred after short visit from HOUSTON male

SAN FRAN

San Francisco Zoological Gardens

1 Zoo Road, San Francisco, California 94132, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
509	319001	F	8	HOLD	SAN FRAN	DO NOT BREED		
559	H19021	M	2	RECEIVE FROM	NY BRONX	DO NOT BREED		Filling request for additional exhibit animal

SANDIEGOZ

San Diego Zoo

PO Box 120551, San Diego, California , United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
481	912104	F	9	HOLD	SANDIEGOZ	BREED WITH	406	
406	4003216	M	17	RECEIVE FROM	SANDIEGOZ	BREED WITH	481	

SD-WAP

San Diego Zoo Safari Park

15500 San Pasqual Valley Rd, Escondido, California , United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
406	4003216	M	17	SEND TO	SANDIEGOZ	BREED WITH	481	

SEATTLE

Woodland Park Zoo

5500 Phinney Ave. N., Seattle, Washington 98103, United States

Facility Note: The SSP has recommended a male to be sent outside of the SSP and open space per facility request. Please contact the SSP Coordinator for further instructions on transfer recommendation.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
507	204691	M	8	HOLD	SEATTLE	DO NOT BREED		
543	207016	M	3	SEND TO	TBD	DO NOT BREED		Exporting out of the SSP Transfer happened in comment period
552	207017	M	3	HOLD	SEATTLE	DO NOT BREED		

SHARKREEF

Shark Reef at Mandalay Bay

3950 Las Vegas Blvd. South, Las Vegas, NV 89119-1006, USA

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
309	575	M	22	HOLD	SHARKREEF	DO NOT BREED		Excluded from genetic analysis
535	UNDET	M	6	HOLD	SHARKREEF	DO NOT BREED		
570	3253	M	1	RECEIVE FROM	CHATTANOG	DO NOT BREED		Filling request for additional exhibit animal

SIOUX FAL

Great Plains Zoo

805 S Kiwanis Ave, Sioux Falls, SD 57104, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
435	4221	F	10	HOLD	SIOUX FAL	DO NOT BREED		

ST AUGUST

St. Augustine Alligator Farm

999 Anastasia Blvd, St. Augustine, Florida 32080, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
447	A18006	F	10	HOLD		DO NOT BREED		
572	A20022	M	1	RECEIVE FROM	DENVER	DO NOT BREED		Filling request for additional exhibit animal

SYRACUSE

Rosamond Gifford Zoo at Burnet Park

One Conservation Place, Syracuse, New York 13204-2504, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
510	R19013	F	8	HOLD	SYRACUSE	DO NOT BREED		

TOLEDO

Toledo Zoological Gardens

PO Box 140130, Toledo, Ohio 43614-0130, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
503	12847	M	8	HOLD	TOLEDO	BREED WITH	521	
521	12732	F	7	HOLD	TOLEDO	BREED WITH	503	

TORONTO

Toronto Zoo

361A Old Finch Ave., Scarborough, Ontario M1B 5K7, Canada

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
409	39159	M	17	HOLD	TORONTO	DO NOT BREED		
519	140174	F	7	RECEIVE FROM	TORONTO	BREED WITH	427	Continue to try to export if possible.

TUCSON

Reid Park Zoo

1100 S Randolph Way, Tucson, Arizona , United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
567	R20038	M	2	HOLD	TUCSON	DO NOT BREED		

TULSA

Tulsa Zoo

6421 E. 36th St. North, Tulsa, Oklahoma , United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
463	16519	M	10	HOLD	TULSA	BREED WITH	494	High Priority for breeding
494	17688	F	10	HOLD	TULSA	BREED WITH	463	High Priority for breeding

VA MSC

Virginia Aquarium and Marine Science Center

717 General Booth Blvd, Virginia Beach, VA , 23451-4811

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
402	R06016	M	18	HOLD	VA MSC	DO NOT BREED		Excluded from genetic analysis
416	R07001	M	16	HOLD	VA MSC	DO NOT BREED		Excluded from genetic analysis
541	R16002	M	4	SEND TO	MEMPHIS	BREED WITH	539	
542	R16003	M	4	HOLD	VA MSC	DO NOT BREED		

W ORANGE

Turtle Back Zoo

560 Northfield Ave, West Orange, New Jersey 7052, United States

Facility Note: This male is genetically important and the SSP may request use of this animal in the population for breeding in the future. Please contact the SSP if breeding is possible at your facility or future exchanges are possible if requested.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
432	6072	M	13	HOLD	W ORANGE	DO NOT BREED		Genetically Important

WACO

Cameron Park Zoo

1701 N. 4th St., Waco, TX 76707-2463, USA

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
411	R00616	M	17	HOLD	WACO	DO NOT BREED		
569	3251	M	1	RECEIVE FROM	CHATTANOG	DO NOT BREED		Transfer occurred in comment period

Appendices

A. Analytical Assumptions

HYPOTHETICAL SPECIMENS			
SB ID	**Sire**	**Dam**	**Notes**
HYP1	WILD	WILD	Master Analytical Notes: To represent hypothetical sire of 537,538, 539, & 540 hatched at COLCHESTER in 2013.
HYP2	WILD	WILD	

ANALYTICAL DATA

SB ID	Field	TRUE	Overlay	Notes
381	Dam	UND	WILD	Individual was confiscated by the USFWS coming from Indonesia and is assumed to be wild-born and unrelated to the North American SSP population.
	Sire	UND	WILD	
486	Dam	UND	WILD	Assumed wild parentage for the purposes of these analyses - look into Indonesian records to check any connections with European or North American dragon populations.
	Sire	UND	WILD	
487	Dam	UND	WILD	Assumed wild parentage for the purposes of these analyses - look into Indonesian records to check any connections with European or North American dragon populations.
	Sire	UND	WILD	
547	Dam	UND	HYP1	Parents are identified with local IDs from private breeder. Only two animals in the studbook originate from this breeder so therefore assigned a hypothetical set of parents of HYP1 / HYP2 with assumed wild parents. GLADAR is from the Canary Islands and likely were originally sourced from PRAGUE animals but unsure at this time. For this planning - HYPs were assigned, however, future revisions may be necessary if new pedigree information is confirmed.
	Sire	UND	HYP2	
569, 570, 568	Sire	UND	HAPLOID	Confirmed Partho males from CHATTANOG, DAM = 459. ZIMS for Studbooks does not allow an entry of HAPLOID in the sire field in overlay mode, thus, edits were made directly to the ZIMS file for PMx.
560, 572, 558, 559, 561	Sire	UND	HAPLOID	Confirmed Partho males from DENVER, DAM = 493. ZIMS for Studbooks does not allow an entry of HAPLOID in the sire field in overlay mode, thus, edits were made directly to the ZIMS file for PMx.
498, 564, 566, 567	Sire	UND/ NONE	HAPLOID	Confirmed Partho males from DENVER, DAM = 408. ZIMS for Studbooks does not allow an entry of HAPLOID in the sire field in overlay mode, thus, edits were made directly to the ZIMS file for PMx.
431, 432	Sire	NONE	HAPLOID	Confirmed Partho males from SEDGWICK, DAM = 94. ZIMS for Studbooks does not allow an entry of HAPLOID in the sire field in overlay mode, thus, edits were made directly to the ZIMS file for PMx.
536, 535	Sire	NONE	HAPLOID	Confirmed Partho males from WACO, DAM = 429. ZIMS for Studbooks does not allow an entry of HAPLOID in the sire field in overlay mode, thus, edits were made directly to the ZIMS file for PMx.

B. Summary of Data Exports

Studbook Name	Dragon, Komodo (Varanus komodoensis)
Studbook Currentness Date	1 June 2021
Studbook Software and version #	ZIMS for Studbooks (14 June 2021 Release)
Overlay Name (if applicable)	"PMC2021"
PMx version #	version 1.6.2.20200804
.fed file	AZA Filters applied to genetics; North America applied to Demography
Descriptive Survival Statistics Report	1) report is archived with PMC/AZA and Median Life Expectancy can be viewed here: https://www.aza.org/species-survival-statistics

PMx Project: Dragon_3PM
Created: 2021-06-30 by PMx version 1.6.2.20200804
File: C:\PMxProjects\Dragon_3PM.pmxproj
Description: Planning Meeting Project with new Haploid edits to ZIMS file.

Primary data file
Data File Name: zims.zims
Common Name: Komodo dragon/Ora
Scientific Name: Varanus komodoensis
Data Source: ZIMS for Studbooks
Studbook Name: Dragon, Komodo (Varanus komodoensis)
Exported On: 2021-06-30
Software version: ZIMS for Studbooks 3.0
Current Through: 2021-06-01
Compiled By: Chris Baker
Scope: AZA
Dates: 1990-01-01 to 2021-06-30
Location:
Association: AZA / Association of Zoos & Aquariums (AZA)
Other Filters: Status = Living
User: John Andrews

Moves data file
Data File Name: genetic.csv
Common Name: Komodo dragon/Ora
Scientific Name: Varanus komodoensis
Data Source: ZIMS for Studbooks
Studbook Name: Dragon, Komodo (Varanus komodoensis)
Exported On: 2021-06-30
Software version: ZIMS for Studbooks 3.0
Current Through: 2021-06-01
Compiled By: Chris Baker
Scope: AZA
Dates: 1990-01-01 to 2021-06-30
Location:
Association: AZA / Association of Zoos & Aquariums (AZA)
Other Filters: Status = None
User: John Andrews

Moves data file
Data File Name: demographic.csv
Common Name: Komodo dragon/Ora
Scientific Name: Varanus komodoensis
Data Source: ZIMS for Studbooks
Studbook Name: Dragon, Komodo (Varanus komodoensis)
Exported On: 2021-06-30
Software version: ZIMS for Studbooks 3.0
Current Through: 2021-06-01
Compiled By: Chris Baker
Scope: AZA

Dates: 1990-01-01 to 2021-06-30
Location: North America
Association:
Other Filters: Status = None
User: John Andrews

Locations data file
Data File Name: location.txt

Demographic input files
Census1 file: Exchcens.txt

6 births to parents with unknown ages have been added in proportion to known aged parents.
This is 2% of TOTAL births (N=258)

Selected population was changed from the originally imported data.

In text Citations:

Recchio, I. and Kasielke, S. 2017. Successful Blood Collection Technique for Sex Determination of Incubating Komodo Dragon (*Varanus komodoensis*) Eggs at the Los Angeles Zoo. Herpetological Review 48(2): 366 – 368.

C. Animals Excluded from Genetic Analyses

SB ID	Age	Sex	Location	Reason
39	28	M	HONOLULU	AGE
66	27	F	LUFKIN	AGE
83	27	F	FT WAYNE	AGE
88	27	M	SAN ANTON	AGE
291	22	M	BOISE	AGE
298	22	M	METROZOO	AGE
300	22	M	NZP-WASH	AGE
309	22	M	SHARKREEF	AGE
381	24	M	MEMPHIS	AGE
392	20	M	MEMPHIS	AGE
401	18	M	JACKSONVL	AGE
402	18	M	VA MSC	AGE
404	18	M	CINCINNAT	AGE
416	10	M	VA MSC	Medical

D. Life Tables

Px = survival; Qx = mortality; Lx = cumulative survivorship; Mx = fecundity; Ex = life expectancy; Vx = expected future reproduction,
At Risk (Qx and Mx) = number of animals corresponding values are estimated from.

MALES

Age	Px	Qx	Risk Qx	Lx	Mx	Risk Mx	Ex	Vx
0	0.89	0.12	123.69	1.00	0.00	123.69	---	1.06
1	1.00	0.00	117.94	0.89	0.00	117.94	---	1.18
2	0.99	0.01	111.56	0.89	0.00	111.56	---	1.23
3	0.99	0.01	101.76	0.88	0.00	101.76	---	1.29
4	1.00	0.00	96.08	0.87	0.00	96.08	---	1.35
5	1.00	0.00	95.09	0.87	0.00	95.09	---	1.40
6	0.99	0.01	93.31	0.87	0.07	93.31	---	1.46
7	0.99	0.01	90.57	0.86	0.08	90.57	---	1.47
8	0.99	0.01	87.20	0.85	0.17	87.20	---	1.46
9	0.94	0.06	80.29	0.84	0.00	80.29	---	1.40
10	0.98	0.02	70.51	0.79	0.37	70.51	---	1.51
11	0.98	0.02	57.93	0.77	0.46	57.94	---	1.21
12	0.97	0.04	55.70	0.76	0.20	55.70	---	0.80
13	0.98	0.02	51.49	0.73	0.12	51.49	---	0.64
14	1.00	0.00	49.00	0.72	0.12	49.00	---	0.55
15	0.94	0.06	47.17	0.72	0.22	47.17	---	0.46
16	0.91	0.09	43.04	0.68	0.11	43.04	---	0.27
17	0.92	0.08	37.36	0.62	0.08	37.36	---	0.18
18	0.85	0.15	29.26	0.57	0.00	29.26	---	0.12
19	0.85	0.15	24.08	0.48	0.00	24.08	---	0.15
20	0.81	0.19	20.46	0.41	0.05	20.46	---	0.19
21	0.94	0.06	16.44	0.33	0.00	16.44	---	0.17
22	0.81	0.19	12.35	0.31	0.00	12.35	---	0.20
23	0.78	0.22	8.24	0.25	0.00	8.24	---	0.27
24	0.67	0.33	4.68	0.20	0.38	4.68	---	0.38
25	0.75	0.25	3.30	0.13	0.00	3.30	---	0.00
26	0.67	0.33	2.64	0.10	0.00	2.64	---	0.00
27	1.00	0.00	1.39	0.07	0.00	1.39	---	0.00
28	1.00	0.00	0.76	0.07	0.00	0.76	---	0.00
29	1.00	0.00	0.00	0.07	0.00	0.00	---	0.00
30	1.00	0.00	0.00	0.07	0.00	0.00	---	0.00
31	1.00	0.00	0.00	0.07	0.00	0.00	---	0.00
32	1.00	0.00	0.00	0.07	0.00	0.00	---	0.00

r = 0.039, λ = 1.04, Ro = 1.566, T = 11.4, N@20 = 114

FEMALES

Age	Px	Qx	Risk Qx	Lx	Mx	Risk Mx	Ex	Vx
0	0.90	0.10	108.41	1.00	0.00	108.41	13.55	1.05
1	0.99	0.01	95.22	0.90	0.00	95.22	13.31	1.18
2	1.00	0.00	91.55	0.89	0.00	91.55	12.37	1.26
3	0.99	0.01	88.73	0.89	0.00	88.73	11.43	1.34
4	1.00	0.00	87.43	0.88	0.00	87.43	10.49	1.43
5	0.98	0.02	88.35	0.88	0.00	88.35	9.59	1.54
6	0.98	0.02	86.48	0.86	0.18	86.48	8.79	1.67
7	0.93	0.07	79.26	0.84	0.36	79.27	8.18	1.66
8	0.92	0.08	62.90	0.78	0.59	62.91	7.77	1.49
9	0.98	0.02	55.06	0.72	0.41	55.06	7.13	1.01
10	0.92	0.08	47.92	0.71	0.09	47.92	6.43	0.67
11	0.82	0.18	29.94	0.65	0.50	29.94	6.23	0.71
12	0.85	0.15	24.46	0.53	0.00	24.46	6.28	0.26
13	0.96	0.04	22.71	0.45	0.05	22.71	5.87	0.31
14	0.91	0.10	19.77	0.43	0.11	19.77	5.23	0.30
15	0.68	0.32	16.39	0.39	0.06	16.39	5.28	0.25
16	0.77	0.23	11.08	0.27	0.00	11.08	5.96	0.28
17	0.80	0.20	8.16	0.21	0.38	8.16	6.33	0.38
18	0.88	0.13	7.35	0.17	0.00	7.35	6.40	0.00
19	0.71	0.29	6.37	0.15	0.00	6.37	6.75	0.00
20	1.00	0.00	5.00	0.10	0.00	5.00	6.90	0.00
21	0.60	0.40	3.68	0.10	0.00	3.68	7.38	0.00
22	1.00	0.00	3.00	0.06	0.00	3.00	8.50	0.00
23	1.00	0.00	3.00	0.06	0.00	3.00	7.50	0.00
24	1.00	0.00	3.00	0.06	0.00	3.00	6.50	0.00
25	1.00	0.00	3.00	0.06	0.00	3.00	5.50	0.00
26	1.00	0.00	3.00	0.06	0.00	3.00	4.50	0.00
27	1.00	0.00	1.82	0.06	0.00	1.82	3.50	0.00
28	1.00	0.00	1.00	0.06	0.00	1.00	2.50	0.00
29	1.00	0.00	1.00	0.06	0.00	1.00	1.50	0.00
30	0.00	1.00	0.00	0.06	0.00	0.00	1.00	0.00
31	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00

r = 0.058, λ = 1.06, Ro = 1.669, T = 8.8, N@20 = 114

E. Ordered Mean Kinship List

These lists are current to June 2021 and values are subject to change with any hatch, death, import, export, inclusion, exclusion, or changes in pedigree or pedigree assumptions. Unknown sexed animals appear on both the male and female side of the mean kinship list and are designated by grey highlights in the table.

Population MK = 0.0819
(as indicated by the black line)

Male					Female				
Stbk#	**MK**	**Known**	**Age**	**Location**	**Stbk#**	**MK**	**Known**	**Age**	**Location**
538	0.0347	1	7	CALGARY	537	0.0347	1	7	NY BRONX
540	0.0347	1	7	CALGARY	539	0.0347	1	7	MEMPHIS
431	0.0402	1	13	ALLENWOOD	494	0.0518	1	10	TULSA
432	0.0402	1	13	W ORANGE	493	0.0644	1	10	SAN ANTON
541	0.0468	1	4	VA MSC	458	0.0812	1	10	AKRON
542	0.0468	1	4	VA MSC	549	0.0812	1	3	ASHEBORO
424	0.0492	1	13	HOUSTON	555	0.0812	1	3	DENVER
427	0.0492	1	13	BREVARD	556	0.0812	1	3	FORTWORTH
434	0.0492	1	12	PHOENIX	504	0.0855	1	8	PHOENIX
534	0.0492	1	7	HOUSTON	509	0.0855	1	8	SAN FRAN
406	0.0508	1	17	SD-WAP	510	0.0855	1	8	SYRACUSE
409	0.0508	1	17	TORONTO	511	0.0855	1	8	METROZOO
488	0.0518	1	10	HONOLULU	512	0.0855	1	8	JACKSONVL
489	0.0518	1	10	NASHV ZOO	513	0.0855	1	8	FRESNO
490	0.0518	1	10	JACKSONVL	514	0.0855	1	8	BROWNSVIL
491	0.0518	1	10	CHATTANOG	516	0.0855	1	8	EVANSVLLE
497	0.0518	1	10	NY BRONX	517	0.0855	1	8	EVANSVLLE
535	0.0567	1	6	SHARKREEF	524	0.0855	1	7	NASHV ZOO
536	0.0567	1	6	BUFFALO	527	0.0855	1	7	MEMPHIS
414	0.0663	1	16	AUDUBON	528	0.0855	1	7	COLUMBUS
558	0.0694	1	2	KNOXVILLE	459	0.0883	1	10	CHATTANOG
559	0.0694	1	2	NY BRONX	435	0.1045	1	10	SIOUX FAL
560	0.0694	1	2	DENVER	437	0.1045	1	10	METROZOO
561	0.0694	1	2	NY BRONX	441	0.1045	1	10	ALLENWOOD
572	0.0694	1	1	DENVER	446	0.1045	1	10	OKLAHOMA
499	0.0804	1	9	MINNESOTA	447	0.1045	1	10	ST AUGUST
500	0.0804	1	9	MINNESOTA	448	0.1045	1	10	DISNEY AK
501	0.0804	1	9	LOWRY	450	0.1045	1	10	MEMPHIS
502	0.0804	1	9	KNOXVILLE	451	0.1045	1	10	HONOLULU
463	0.0812	1	10	TULSA	452	0.1045	1	10	MOODY
543	0.0812	1	3	SEATTLE	454	0.1045	1	10	LOWRY
550	0.0812	1	3	LOSANGELE	475	0.1045	1	9	COLUMBIA
551	0.0812	1	3	METROZOO	480	0.1045	1	9	BUSCH TAM
552	0.0812	1	3	SEATTLE	481	0.1045	1	9	SANDIEGOZ
553	0.0812	1	3	LOUISVILL	519	0.1045	1	7	DISNEY AK
554	0.0812	1	3	METROZOO	520	0.1045	1	7	PROVIDNCE
557	0.0812	1	3	DENVER	521	0.1045	1	7	TOLEDO
562	0.0812	1	3	DENVER	522	0.1045	1	7	ABQBIOPK
503	0.0855	1	8	TOLEDO	523	0.1045	1	7	NASHV ZOO
507	0.0855	1	8	SEATTLE					
508	0.0855	1	8	OKLAHOMA					
515	0.0855	1	8	DENVER					
518	0.0855	1	8	GREEN NSC					
411	0.0915	1	17	WACO					
568	0.0934	1	1	NZP-WASH					

Male					Female				
Stbk#	**MK**	**Known**	**Age**	**Location**	**Stbk#**	**MK**	**Known**	**Age**	**Location**
569	0.0934	1	1	CHATTANOG					
570	0.0934	1	1	CHATTANOG					
462	0.0942	1	10	FORTWORTH					
439	0.1045	1	10	ATLANTA					
442	0.1045	1	10	COLUMBUS					
445	0.1045	1	10	DISNEY AK					
449	0.1045	1	10	NY BRONX					
453	0.1045	1	10	MOODY					
456	0.1045	1	10	FRESNO					
472	0.1045	1	9	AKRON					
476	0.1045	1	9	COLUMBIA					
485	0.1045	1	9	BROWNSVIL					
564	0.1282	1	2	BIRMINGHM					
566	0.1282	1	2	EL PASO					
567	0.1282	1	2	TUCSON					

F. Definitions

Management Terms (as of January 2019)

Green Species Survival Plan® (Green SSP) Program – A Green SSP Program has a population size of 50 or more animals and is projected to retain 90% gene diversity for a minimum of 100 years or 10 generations. Green SSP Programs are subject to AZA's Full Participation and Sustainability Partner Policies.

Yellow Species Survival Plan® (Yellow SSP) Program – A Yellow SSP Program has a population size of 50 or more animals but cannot retain 90% gene diversity for 100 years or 10 generations. Yellow SSP participation by AZA facilities is voluntary. Yellow SSP Programs are subject to AZA's Sustainability Partner Policy.

Red Species Survival Plan® (Red SSP) Program – A Red SSP Program has a population size of twenty or more animals managed among three or more participating AZA facilities. If a population does not meet these minimum criteria, but has an IUCN designation of Critically Endangered, Endangered, or Extinct in the Wild, and the TAG has developed three goals to sustain this population, then the population will be considered a Red SSP Program. Red SSPs cannot retain 90% gene diversity for 100 years or 10 generations and participation by AZA facilities is voluntary. Red SSP Programs are subject to AZA's Sustainability Partner Policy.

Sustainability Partners – AZA Animal Population Management (APM) Committee approved wildlife facilities that regularly exchange animals with AZA-accredited facilities and certified related facilities, typically as part of the Species Survival Plan® (SSP) Program Breeding and Transfer Plan or other SSP Program management process.

Full Participation – AZA policy stating that all AZA accredited facilities and certified related facilities having a Green SSP animal in their collection are required to participate in the collaborative SSP planning process (e.g., provide relevant animal data to the AZA Studbook Keeper, assign an Institutional Representative who will communicate facility wants and needs to the SSP Coordinator and comment on the draft plan during the 30-day review period, and abide by the recommendations agreed upon in the final plan).

All AZA member facilities and Animal Programs, regardless of management designation, must adhere to the AZA Policy on Responsible Population Management and the AZA Code of Professional Ethics. For more information on AZA policies, see https://www.aza.org/board-approved-policies-and-position-statements.

Demographic Terms

Age Distribution – A visual representation of the numbers or percentages of individuals in various age and sex classes.

Ex, Life Expectancy – The average years of further life for an animal in age class x.

Lambda (λ) or Population Growth Rate – The proportional change in population size from one year to the next. A lambda of 1.11 means an 11% per year increase; a lambda of 0.97 means a 3% decline in size per year. The three lambdas highlighted in this BTP are: 1) Life Table, from the PMx life tables, the change in the population based on the demographic regional and date window exported from the studbook, the life table lambda is the rate at which the population would be expected to grow (in the future) given the birth and death rates reported in the life tables and assuming a stable age distribution (does NOT factor in imports or exports); 2) 5-year, from the studbook census, the 5-year lambda is calculated from observed changes in population size over the last 5 years and includes births, deaths, imports and exports; and 3) Projected, from the PMx stochastic 20-year projections (includes confidence intervals), models how the population is predicted to grow or decline over the next 20 years given the birth and death rates from the life tables and the age structure of the current population.

lx, Age-Specific Survivorship – The probability that a new individual (e.g., age 0) is alive at the *beginning* of age *x*. Alternatively, the proportion of individuals which survive from birth to the beginning of a specific age class.

Mean Generation Time (T) – The average time elapsing from reproduction in one generation to the time the next generation reproduces. Also, the average age at which a female (or male) produces offspring. It is not the age of first reproduction. Males and females often have different generation times.

Median Life Expectancy (MLE) – The 'typical' age at which an average animal is expected to live, excluding those that were born and died on the same day. This is the age at which Lx = 0.5, meaning that 50% are expected to die before that age and 50% after that age. A Survival Statistics Library is maintained for most AZA Animal Programs on the AZA website: https://www.aza.org/species-survival-statistics

Maximum Longevity – The maximum age at which we have observed a species to live. If the oldest observed animal is currently living, we do not yet know the maximum longevity.

Mx, Fecundity – The average number of same-sexed offspring born to animals in that age class. Because studbooks typically have relatively small sample sizes, studbook software calculates Mx as 1/2 the average number of offspring born to animals in that

age class. This provides a somewhat less "noisy" estimate of Mx, though it does not allow for unusual sex ratios. The fecundity rates provide information on the age of first, last, and maximum reproduction.

Px, Age-Specific Survival – The probability that an individual of age *x* survives an age class; is conditional on an individual being alive at the beginning of the age class. Alternatively, the proportion of individuals that survive from the beginning of one age class to the next.

Qx, Mortality – The probability that an individual of age *x* dies during an age class (Qx = 1-Px). Alternatively, the proportion of individuals that die during an age class. It is calculated from the number of animals that die during an age class divided by the number of animals that were alive at the beginning of the age class (i.e., "at risk").

Risk (Qx or Mx) – The number of individuals that have lived during an age class. The number “at risk” is used to calculate Mx and Qx by dividing the number of births and deaths that occurred during an age class by the number of animals at risk of dying and reproducing during that age class.

Target Population Size (TPS) – The desired number of SSP animals to be held across AZA and approved partner facilities over a specific, stated timeframe. This number is determined with consideration for program roles and goals (genetic, demographic, and others), logistical constraints, spatial competition with other TAG-managed species, and other population-specific concerns. Target Population Size is determined by the Taxon Advisory Group (TAG) and published in their Regional Collection Plan (RCP).

Vx, **Reproductive Value –** The expected number of offspring produced this year and in future years by an animal of age *x*.

Genetic Terms

Allele – Alternate forms of DNA at a particular position in a genome (genetic locus). Alleles represent the most basic form of genetic diversity.

Gene Diversity (GD) – The probability that two alleles randomly sampled from the same genetic locus across a population are not identical by descent. Gene diversity is calculated relative to a population’s founders, which are assumed to be unrelated and not inbred, and is the proportional diversity retained by the current, descendant population.

Effective Population Size (Inbreeding N_e) – The size of a randomly mating population of constant size with equal sex ratio and a Poisson distribution of family sizes that would (a) result in the same mean rate of inbreeding as that observed in the population, or (b) would result in the same rate of random change in allele frequencies (genetic drift) as observed in the population. These two definitions are identical only if the population is demographically stable (because the rate of inbreeding depends on the distribution of alleles in the parental generation, whereas the rate of allele frequency drift is measured in the current generation).

Founder – An individual obtained from a source population (often the wild) that has no known relationship to any individuals in the derived population (except for its own descendants).

Founder Genome Equivalents (FGE) – The number of wild-caught individuals (founders) that represent the same amount of gene diversity as does the population under study. The gene diversity of a population is 1 - 1 / (2 * FGE).

Founder Representation – The proportion of the alleles in the living, descendant population that are derived from that founder.

Inbreeding Coefficient (F) – The probability that the two alleles present at an individual’s genetic locus are identical by descent (i.e., both alleles originated from an ancestor common to both the individual’s parents).

Mean Kinship (MK) – The mean (or average) kinship coefficient between an animal and all animals (including itself) in the living, captive-born population. An individual’s mean kinship is a measure of how well its alleles are represented within a population. Animals with low mean kinships have few relatives, are from under-represented founder lineages, and have transmitted few of their alleles to the next generation; these individual should be prioritized for breeding to slow a population’s gene diversity loss.

Percent Known – The percentage of an animal's genome that is traceable to known founders. Thus, if an animal has an UNK sire, its % Known = 50. If it has an UNK grandparent, its % Known = 75.

Percent Certain – The percentage of the living individuals’ pedigree that can be completely identified as *certain:* (exact identity of both parents is known) and traceable back to known founders. Individuals that are 100% *certain* do not have any MULTs or UNKs in their pedigree. *Certainty* represents a higher degree of knowledge than *Known* and therefore is always less than or equal to *Known.*
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G. AZA Animal Population Management (APM) Committee Disclaimers

as of June 2019

This Animal Program is currently a Yellow SSP and recommendations proposed are non-binding – participation is voluntary. Transfers to non-AZA facilities must comply with each facility's acquisition/transfer policy, in accordance with the AZA Policy on Responsible Population Management. APM Committee-approved Sustainability Partners are expected to agree and abide by AZA's Code of Professional Ethics, SSP Full Participation Policy, Policy on Responsible Population Management, and Accreditation Standards related to animal care and welfare.

H. Directory of Institutional Representatives

IR Name	Mnemonic - Institution Name	Email Address
Tony Baez	ABILENE - Abilene Zoological Gardens	tony.baez@abilenetx.gov
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I. Descriptive Survival Statistics Report

Komodo Dragon Studbook
Varanus komodoensis
Studbook data current as of 4/1/2021

Compiled by Chris Baker

PopLink Studbook filename: Komodo_2021
PopLink User Who Exported Report: Jandrews
Date of Export: 6/28/2021 12:00:00 AM
Data Filtered by: Locations = N.AMERICA AND StartDate = 1/1/1990 AND EndDate = 6/28/2021
PopLink Version: 2.5.2

REPORT OVERVIEW:

Based on this analysis, if a Komodo Dragon survives to its first birthday, its median life expectancy is 19.5 years for males and 12.9 years for females. Please see the body of the report for more details.

BACKGROUND ON ANALYSES:

These analyses were conducted using animals that lived during the period 1 January 1990 to 28 June 2021 at institutions within N.AMERICA. The analyses mainly focus on survival statistics from 1 year (e.g. excluding any individuals that did not survive past their first birthday). These statistics most accurately reflect typical survival for animals which can be seen on exhibit in zoos and aquariums.

This report summarizes survival records of individuals housed at zoological facilities for a specific geographic range and time period; these records trace an individual's history from birth or entry into the population to death, exit out of the population, or the end of the time period. As such, this history only reflects standard practices - including management, husbandry, and acquisition/disposition practices - for the specified time period and geographic range. Thus, the report contents should be viewed with some caution as they may not fully reflect current and newly emerging zoo and aquarium management techniques or practices. For example, if the population has not been maintained in zoos and aquariums long enough to have many adults living into old age, median life expectancy will likely be an underestimate until more data accrue in older age classes. Thus, users of these reports should recognize that the results produced will likely vary over time or depending on the subset of data selected.

For many species, including humans, survival statistics often differ for males and females. For this population, male and female data were robust enough to detect statistical differences[1] in survival statistics. These results therefore include separate statistics for males and females; individuals whose sex is unknown are proportionally included in calculations.

SUMMARY OF ANALYSES:

SURVIVAL STATISTICS

	Female	Male
# of individuals with partial or full lifespans used in analysis	117	134
# of individuals which had died by 28 June 2021 (analysis end date)	52	45
% of individuals which had died by 28 June 2021	44.4%	33.6%
median life expectancy assuming an individual survives to its first birthday (years)	12.9	19.5
95% confidence interval for median (years)	11.7 to 15.3	18.1 to 21.5
only 25% of animals live beyond this age (years)	16.3	23.7
First-year (infant) survival	98.3%	81.8%
maximum longevity (years)	30.1	28.8

See footnotes 1, 2, 3, 4, and 5 for definitions of terminology used in this table.

The **median life expectancy**[2] for Komodo Dragon was statistically different between males and females, with **males having a significantly higher median life expectancy**. Given the quality of the data - how many animals are in the database and how many have died - there is a 95% chance that the true median for each sex falls within the 95% confidence intervals displayed in the table.

The table also lists the ages which only 25% of Komodo Dragon can be expected to survive past and the first-year (infant) survival[3] rates. The year after birth/hatching is a period of relatively low survival for many species and life histories.

The **maximum longevity**[4] observed for Komodo Dragon females is based on an individual which was DEAD as of the analysis end date (studbook number 117, sex = Female, origin = Wild Hatch, birth date estimate = None). The maximum longevity observed for Komodo Dragon males is based on an individual which was CENSORED as of the analysis end date (studbook number 39, sex = Male, origin = Captive Hatch, birth date estimate = None).[5]

The correct interpretation of these statistics is that, if it survives the first year of life, the 'typical' male Komodo Dragon will live 19.5 years and the typical female will live 12.9 years; that half of all Komodo Dragon can be expected to die before they reach the male and female median life expectancies and half will live longer than that; that only 25% of all male Komodo Dragon can be expected to live to 23.7 years and females to 16.3 years; and that it is rare but possible for male Komodo Dragon to live 28.8 years and female Komodo Dragon to live 30.1 years.

The median life expectancy, confidence interval, first-year survival, and maximum longevity may change as more data are accumulated, the population's age structure changes, or management practices improve.

While both median life expectancy and maximum longevity are discussed in this report, it is more appropriate to rely on median life expectancy to place the age of any one individual in context. To put these statistics in perspective, median life expectancy from age one for people in the United States is 77.5 years and the maximum longevity (documented worldwide) is 122 years[6]. Therefore, if a person lived to be 85 years old, the appropriate context is that they lived well beyond the median life expectancy (77.5), not that they fell short of the maximum longevity (122).

DATA QUALITY

The PopLink Survival Tool uses five data quality measures to determine whether data are robust enough to make reliable estimates of key survival parameters. **The subsets of male and female data for this population passed all of the following data quality tests:**

Can the median life expectancy be calculated? **PASS**

Is the sample size (number of individuals at risk) greater than 20 individuals at the median? **PASS**

Is the 95% Confidence Interval (CI) bounded? **PASS**

Is the sample size in the first age class of analysis (e.g. the first day of analysis) greater than 30 individuals? **PASS**

Is the length of the 95% CI < 33% of the maximum longevity? **PASS**

PopLink data validation was last run on 4/12/2021. This validation found 66 errors, including 5 high priority errors, 61 medium priority errors, and 0 low priority errors. These errors may or may not directly affect the data in this analysis.

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[1] Statistical significance was determined by comparing 84% confidence intervals around median life expectancy for males and females, with 1 unknown sex individuals proportionally incorporated into the analysis. For this population, non-overlapping confidence intervals indicated that male and female medians were significantly different. See the PopLink manual for more details.

[2] The statistics analyzed for this report (median life expectancy, 95% confidence limits, and age to which 25% of individuals survive) exclude any individuals who did not survive to their first birthday; these individuals are excluded because this Report is focused on providing median survival estimates for the typical individual that survives the vulnerable infant stage. In other words, this report answers the question, 'how long is this species expected to live once it has reached its first birthday?' For this studbook, 28 individuals died before their first birthday and were excluded from these analyses.

For all animals that survive to their first birthday, 50% will die before the median life expectancy in this report and 50% die after. Note that the median life expectancy obtained from population management software (PM2000, PMx, ZooRisk) or from life tables in Breeding and Transfer Plans (e.g. where Lx = 0.5) will be lower because it includes these individuals that did not survive to their first birthday in order to project the correct number of births needed. See the PopLink manual for more details.

[3]For reference, first-year survival is provided. For this studbook and the selected demographic window, 28 individuals did not survive to their first birthday and were excluded from the estimates provided above (median life expectancy, 95% confidence limits, and age to which 25% of individuals survive).

[4] Maximum longevity is the age of the oldest known individual for this species, living or dead. It is not necessarily the biological maximum age, but only reflects the individuals included in the dataset.

[5] Censored individuals are individuals whose deaths have not been observed as of the end of the analysis window, including individuals who 1) are still alive as of the end date, 2) exited the geographic window before the end date (through transfer or release), or 3) were lost-to-follow up before the end date.

[6] Median life expectancy for people is estimated from: Xu, Jiaquan, Kochanek KD, Murphy SL, and Tejada-Vera B. 2007. Deaths: Final Data for 2007. National vital statistics reports; vol 58 no 19. Hyattsville, MD: National Center for Health Statistics. Jeanne Calment of France was the oldest documented and fully validated human and died at 122 years and 164 days; from: http://www.grg.org/Adams/Tables.htm. Accessed August 9, 2007.

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FWS Form 3-200-41a (Rev. 01/2020)
U.S. Department of the Interior

OMB Control No. 1018-0093
Expires 08/31/2023

Captive-Bred Wildlife Registration (CBW) Annual Report

Due: March 31st of the following year

Email to: managementauthority@fws.gov referencing "CBW Annual Report YYYY for CBW # MA#####" in subject line.

Permittee Name: NC Zoo **Reporting Year:** 2022 **CBW Permit #:** MA13035D-0

Complete this form (all three tables) for **ALL live, non-native, ESA-listed species, captive-bred in the U.S., covered under your current CBW registration for the above reporting year** (including individuals you have on loan with another facility, or on loan with you). Do not include non-native ESA-listed species that were not covered on your CBW permit during this year.

Year-end Inventory

Scientific Name (Genus, species, and *if applicable*, subspecies)	**Common Name**	**Quantity**	**Sex/Age Ratio** (male.female.unknown sex, 10.5.2)	**# Births over the reporting year**	**# Deaths over the reporting year**	**Approx Death Date(s) and Cause of Death(s)** (attach necropsy report, as needed)
EXAMPLE: *Loxodonta Africana*	African Elephant	17	10.5.2.	2	1	Aug 2019, old age
Varanus komodensis	Komodo dragon	0	0.1	0	0	loan transfer to Smithsonian National Zoological Park

***Use of this form is not mandatory**. If using an alternate form, ensure it encompasses the same information. Additional information may be attached to the report.*

OMB Control No. 1018-0093
Expires 08/31/2023

Activities Conducted

CBW holder is required to disclose **ALL interstate and intrastate purchases, sales, trades, and/or exports** involving species listed under their CBW that occurred during the reporting year.

Scientific Name	**Common Name**	**Activity** (Interstate or intrastate purchases, sales, and/or exports)	**Date of Activity** (mm/dd/yyyy)	**Quantity & Sex/Age** (males.females.unknown sex, 10.8.3)	**Name and Address of the other party Involved in the transaction** (include country if an export)	**CBW # of Registrant Involved in Activity**	**Identification Information** (e.g., studbook #'s, microchip #'s, band #s, etc.)
EXAMPLE: *Loxodonta Africana*	African elephant	Interstate purchase	04/12/2019	1.0.0	Sunland Zoo and Park, 300 Leopard Way, Miami, FL	MA#####	Studbook #: 152
Varanus komodensis	Komodo dragon	loan transfer	04/21/2022	0.1.0	Smithsonian National Zoological Park, 3001 Connecticut Ave NW, Washington, DC 20008	Los Angeles Zoo CBW# MA11986D-0	transponder: 603 012 007 left leg
		loan transfer					

Use of this form is not mandatory. *If using an alternate form, ensure it encompasses the same information. Additional information may be attached to the report.*

OMB Control No. 1018-0093
Expires 08/31/2023

Loans/Gifts/Donations Conducted

CBW holder is required it disclose **ALL loans, donations, and gifts** involving species listed under their CBW that occurred during the reporting year.

Scientific Name	**Common Name**	**Activity** (loans, donations, and gifts)	**Date of Activity** (mm/dd/yyyy)	**Quantity & Sex/Age** (males.females.unknown sex, 10.8.3)	**Name and Address of the other party Involved in the transaction**	**Information on transferred Animal(s)** (studbook #'s, microchip #'s, band #'s, tattoo #'s, etc.)
EXAMPLE: *Loxodonta Africana*	African elephant	loan	4/12/2019	1.0.0	Sunland Zoo and Park, 300 Leopard Way, Miami, FL	Studbook # 305 Tattoo yellow 6

Use of this form is not mandatory. *If using an alternate form, ensure it encompasses the same information. Additional information may be attached to the report.*

Report Start Date
Jan 01, 2022

Taxon Report Varanus komodoensis

Report End Date
Dec 16, 2022

SPECIES 360

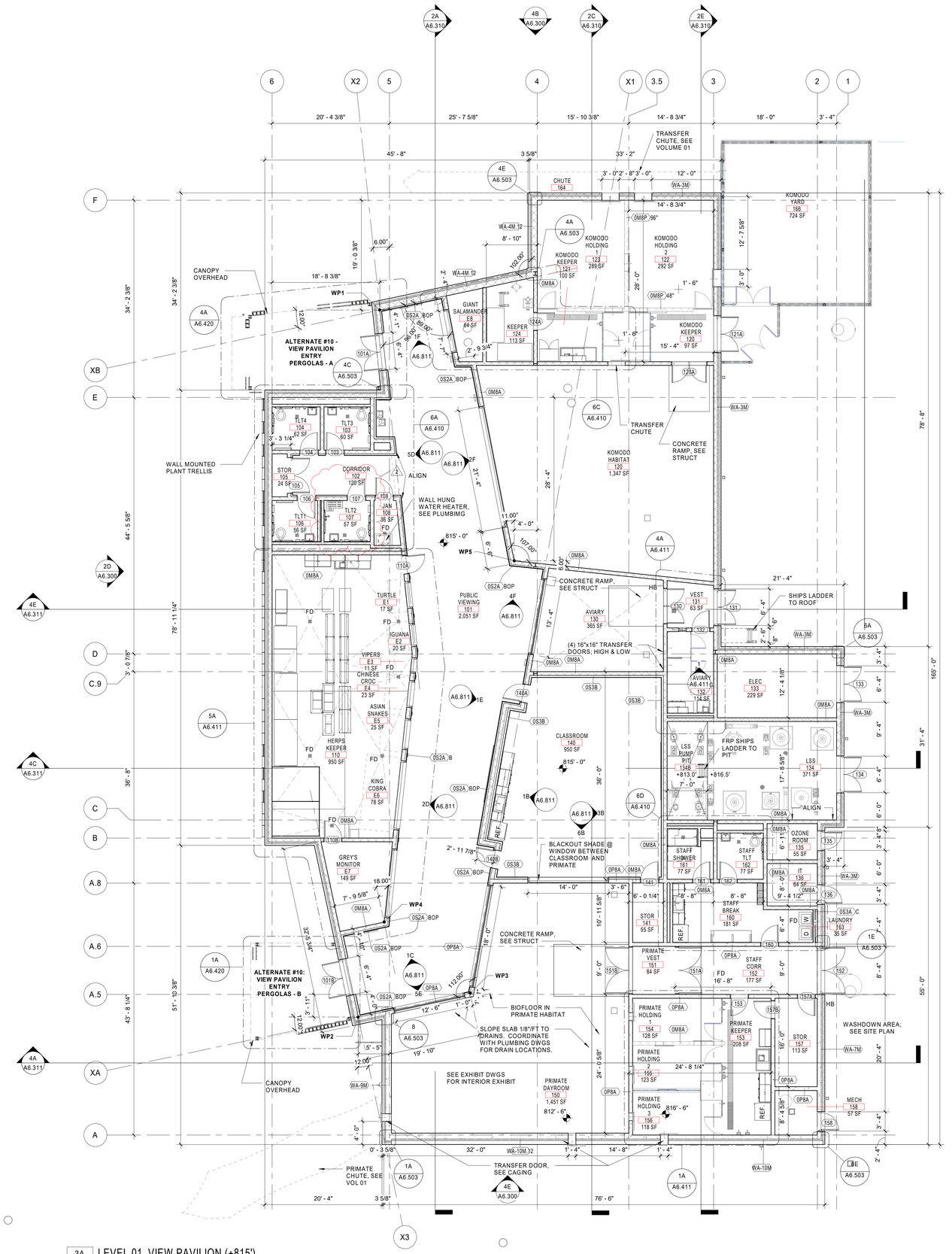
TCW17-22198 | Local ID: 41381

Individual — **Komodo dragon/Ora** — **Endangered (EN)** — **Varanus komodoensis**

Date in	Acquisition - Vendor/Local ID	Phy	Own	Reported By	Disposition - Recipient/Local ID	Phy	Own	Date out
Oct 18, 2017	Birth/Hatch	-	In	LOSANGELE / 994606	-	-	-	-
-	-	-	-	LOSANGELE / 994606	Loan Out To (Change in Reported Holder) ASHEBORO/41381	-	-	Nov 14, 2018
Nov 14, 2018	Loan In From Sender: FORTWORTH/210330 Vendor: LOSANGELE/994606	In	-	ASHEBORO / 41381	Loan Transfer To NZP-WASH/307930	Out	-	Apr 21, 2022
-	-	-	-	LOSANGELE / 994606	Loan Out To (Change in Reported Holder) NZP-WASH/307930	-	-	Apr 21, 2022
Apr 21, 2022	Loan Transfer From Sender: ASHEBORO/41381 Vendor: LOSANGELE/994606	In	-	NZP-WASH / 307930	-	-	-	-

Sex/Contraception	Female / -	Birth Type	Captive Birth/Hatch
Hybrid Status	Not a hybrid	Birth Location	Fort Worth Zoological Park
Enclosure	-	Birth Date/Age	Oct 18, 2017 / 5Y,1M,28D
Rearing	-	House Name	[Marigold/ASHEBORO]
Dam	[GAN: MIG12-28883012 | 992680/LOSANGELE]	ID Elsewhere	[210330/ASHEBORO]
Sire	[A10269 / DENVER]	Local ID	[41381/ASHEBORO]
		Transponder	[603 012 007/[Leg/Left]/ASHEBORO]

Dec 16, 2022 — North Carolina Zoo



3A A6.100 LEVEL 01_VIEW PAVILION (+815')

1/8" = 1'-0"

12,825 SF

0 4' 8' 16' 32'

GENERAL NOTES

1. ITEMS NOTED AS "BY OTHERS" OR "NIC" SHALL BE PROVIDED BY OWNER OR UNDER SEPARATE CONTRACT.
2. SEE SHEET **A6.010** FOR PARTITION TYPES.
3. SEE SHEET **A6.910** FOR DOOR TYPES AND DETAILS
4. PROVIDE CONTROL JOINTS ON GYP. BD. ASSEMBLIES PER SPECIFICATIONS AND WHERE SHOWN.
5. EXTEND WALLS TO DECK ABOVE STOREFRONT SYSTEMS AND GLASS WALL PARTITIONS.
6. REVIEW DOCUMENTS AND VERIFY DIMENSIONS AND FIELD CONDITIONS WHEN APPLICABLE. CONFIRM THAT WORK IS BUILDABLE AS SHOWN. ANY CONFLICTS OR OMISSIONS SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECT FOR CLARIFICATION PRIOR TO THE PERFORMANCE OF WORK IN QUESTIONS.
7. COORDINATE AND PROVIDE METAL OR RATED SOLID WOOD BLOCKING (FIRE TREATED) IN PARTITIONS AND CEILING FOR MILLWORK, WALL AND CEILING ATTACHED ITEMS AS SPECIFIED.
8. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS GOVERN. ALL PARTITION LOCATIONS, DIMENSIONS AND TYPES, DOOR AND WINDOW LOCATIONS SHALL BE AS SHOWN ON PARTITION PLAN. INCASE OF CONFLICT, NOTIFY ARCHITECT.
9. COORDINATE WITH OWNER, THE SCHEDULE FOR TELEPHONE, DATA, SECURITY AND AUDIO VISUAL INSTALLATIONS.
10. PARTITIONS AT BUILDING PERIMETER SHALL BE CENTERED ON CENTER LINE OF COLUMN OR WINDOW MULLION, UNLESS OTHERWISE NOTED.
11. PROVIDE PARTITION TYPE WITH THE HIGHEST UL AND/OR ACOUSTICAL PERFORMANCE RATING WHERE MORE THAN ONE PARTITION TYPE IS INDICATED. PARTITIONS SHALL BE HEAD CONDITION 'A' UNLESS OTHERWISE NOTED.
12. OFFSET ELECTRICAL AND TELEPHONE OUTLETS 16" MINIMUM IN SEPARATE STUD WALL CAVITIES.
13. SEE EXH SERIES SHEETS FOR EXHIBIT INSTALLATIONS.

REFERENCE ELEVATION NOTE

1. REFERENCE ELEVATIONS SHOWN FOR A8 SERIES ARE RELATIVE TO SURVEYED/CIVIL ELEVATIONS AS FOLOWS:
2. REFERENCE ELEVATION 00.00' = CIVIL 815.00'
3. ALL GRADING INFORMATION IS SHOWN FOR REFERENCE ONLY UNO AND MUST BE CONFIRMED WITH ST DWGS.

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North Carolina Zoo

ASIA EXHIBIT

CERT. NO. 50033
REGISTERED ARCHITECTURAL CORPORATION
LITTLE DIVERSIFIED ARCHITECTURAL CONSULTING, INC.
A NORTH CAROLINA PROFESSIONAL CORPORATION
CHARLOTTE, N.C.

04/13/22

KELLY A. GORDON
REGISTERED ARCHITECT
10578
NORTH CAROLINA
CHARLOTTE, NC

ISSUE FOR
BID SET

ISSUE DATE
02/16/22

REVISIONS

NO.	REASON	DATE
2	ADDENDUM #2	03/25/22

PROJECT TEAM
PRINCIPAL IN CHARGE
TB
PROJECT MANAGER
KG
DESIGN TEAM
TE/AS/ED

PROJECT NAME
NORTH CAROLINA ZOO
ASIA EXHIBIT - VIEW PAVILION

SCO PROJECT #16-14441-02A

PROJECT NO.
111-6401-04

SHEET TITLE
VIEW PAVILION - FLOOR PLAN - LEVEL 01

SHEET NUMBER
A6.100