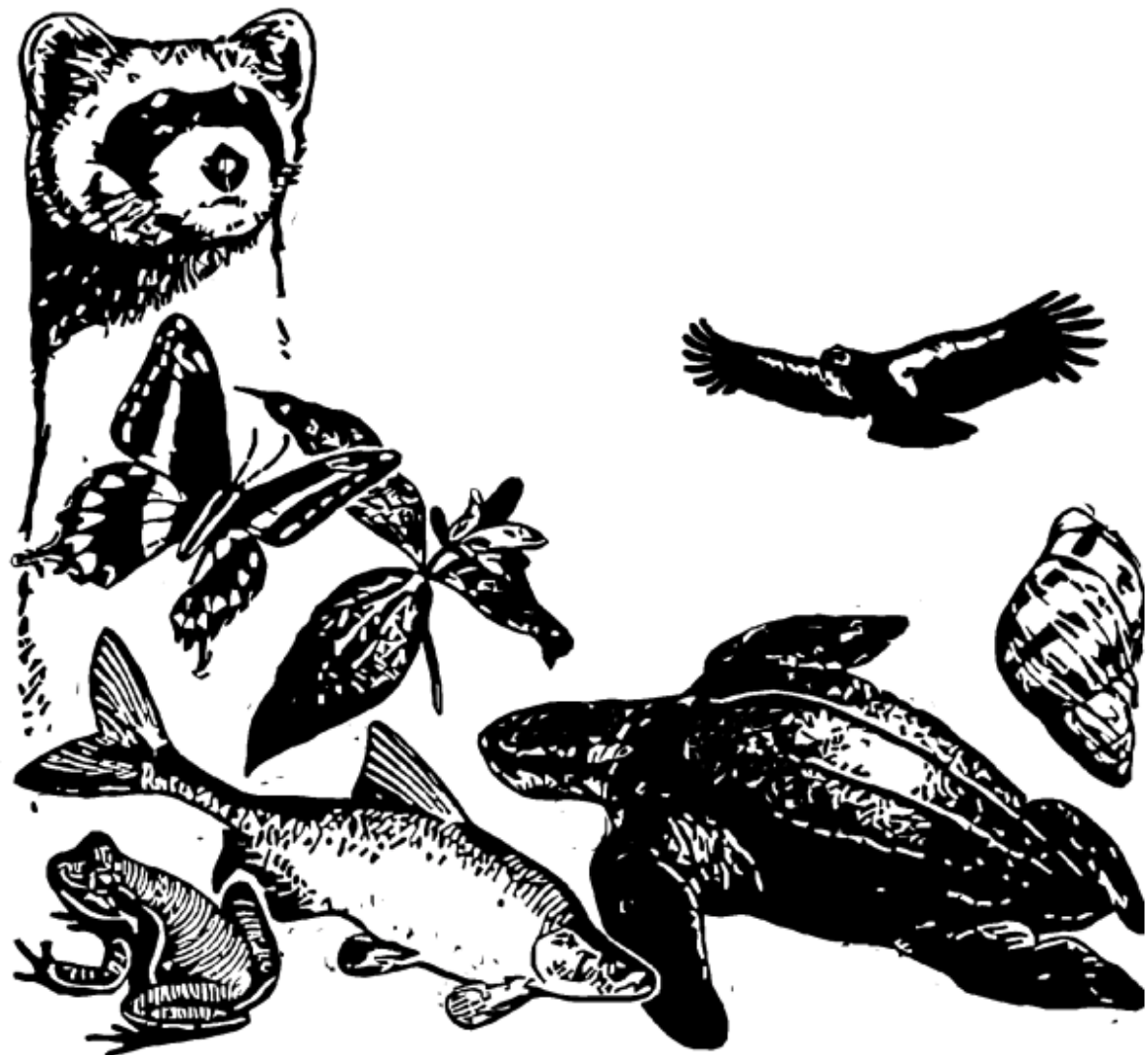


Virgin Island tree boa Conservation Measures

Virgin Islands Tree Boa

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U.S. FISH AND WILDLIFE SERVICE CARIBBEAN ECOLOGICAL SERVICES FIELD OFFICE

Conservation Measures for the Virgin Islands tree boa (*Chilabothrus granti*) Last Revised: October 2023

The endangered Virgin Islands (VI) tree boa (*Chilabothrus granti*, formerly *Epicrates monensis granti*) is a small, slender, nocturnal, arboreal non-venomous snake. The VI boa does not pose any life threatening danger to human beings. Although considered docile, some individuals might try to bite if disturbed or during capture and handling. Newborn and juveniles are a light grey with brown to black blotches along their bodies, and darken as they mature into adults. Adults may reach between 3 to 4 feet in length.



Within U.S. jurisdiction, VI boas are found on the northeast side of Puerto Rico, Culebra Island, east end of St. Thomas, and on a few offshore cays. They are also found in some islands in the British Virgin Islands. VI boas generally live in xeric (dry) habitat, which is characterized by poor rocky soils, in scrub woodland or subtropical dry forest with high density of interdigitating branches and vines connecting adjacent tree canopies. The VI boa is difficult to detect in the wild and can be found moving among branches, vines, and crawling on the ground at night. During the day, they are mostly sheltered and out of sight. Some individuals have been found in or close to houses, especially if near their habitat.

All construction projects should avoid affecting the VI boa and its habitat. Thus, the U.S. Fish and Wildlife Service (Service) has developed the following conservation measures with the

purpose of assisting others to avoid and minimize adverse impacts to the species and its habitat. These recommendations may be incorporated into development projects. Depending on the project, additional conservation measures can be implemented besides the ones presented in this document.

Conservation Measures for Puerto Rico:

1. Inform all project personnel about the potential presence of the VI boa in areas where the proposed work will be conducted. A pre-construction meeting should be conducted to inform all project personnel about the need to avoid harming this species as well as penalties for harassing or harming boas. An educational poster or sign with photo or illustration should be displayed at the project site.
2. Prior to any construction activity, including removal of vegetation and earth movements, the boundaries of the project area and areas to be excluded and protected should be clearly marked in the project plan and in the field in order to avoid further habitat degradation into forested and conservation areas.
3. Once areas are clearly marked and prior to any construction activity, including removal of vegetation and earth movements, biologists or experienced personnel should survey the areas to be cleared to ensure that no boas are present within the work area.
4. The VI boa is considered more active at night. Thus, in order to maximize VI boa detection, the species can be searched for the night(s) prior to any vegetation clearing starts according to the construction plan.
5. Once the area has been searched for VI boas, vegetation should first be cleared by hand to the maximum extent possible. Vegetation should first be cut about one meter above the ground, prior to the use of heavy machinery for land clearing. Once land is cleared by hand, this will allow boas present on site to potentially move away on their own to adjacent available habitat.
6. For all boa sightings (dead or alive), record the time and date of the sighting and the specific location where it was found. VI boa data should also include a photo of the animal (dead or alive), relocation site GPS coordinates, the time and date, and comments on how the boa was detected, and its behavior.
7. If a VI boa is found within any of the working or construction areas, activities should stop at the area where the VI boa is found, and information recorded accordingly (see #6). **Do not capture the boa.** If boas need to be moved out of harm's way, , designated personnel shall immediately contact Puerto Rico Department of Natural and Environmental Resources (PRDNER) Rangers for safe capture and relocation of the animal (PRDNER phone #s: 787-724-5700, 787-230-5550, 787-771-1124). If immediate relocation is not an option, project-related activities at this area must stop until the boa moves out of harm's way on its own. If a VI boa is captured by the PRDNER, record the

name of the PRDNER staff and information on where the VI boa will be taken. This information should be reported to the Service.

8. Measures should be taken to avoid and minimize VI boa casualties by heavy machinery or motor vehicles being used on site. Any heavy machinery left on site (in staging areas) or near potential VI boa habitat (within 50 meters of potential boa habitat), needs to be thoroughly inspected each morning before work starts to ensure that no boas have sheltered within engine compartments or other areas of the equipment. If VI boas are found within vehicles or equipment, do not capture the animal and let it move on its own or call PRDNER Rangers for safe capture and relocation of the animal (see #7).
9. VI boas may also enter or occur within debris piles. Measures should be taken to avoid and minimize boa casualties associated with sheltering in debris piles as a result of project activities. Debris piles should be placed in areas farthest away from forested areas. Prior to moving, disposing or shredding, debris piles should be carefully inspected for the presence of boas. If debris piles will be left on site, we recommend they be placed in an undisturbed area.
10. If the event a dead VI boa is found, immediately cease all work in that area and record the information accordingly (see #6). If the VI boa was accidentally killed as part of the project actions, please include information on what conservation measures had been implemented and recommendations on what will be done to avoid further killing more individuals. A dead VI boa report should be sent by email (see contacts below) to the Service within 48 hours of the event. If possible, place the dead VI boa in a container or bag and frozen for later collection by the Service (José Cruz-Burgos, Endangered Species Coordinator, mobile 305-304-1386, email: jose_cruz-burgos@fws.gov) or another partner.
11. Projects must comply with all state laws. Please contact the PRDNER for further guidance.

Conservation Measures for the USVI:

1. Contact Government of the Virgin Islands, Department of Planning and Natural Resources, Division of Fish and Wildlife (DFW) at (340) 775-6762, for consultation.
2. DFW will come out for an on-site discussion. They will need a copy of your building plans or a narrative of your intended project. DFW will coordinate via email so that all developers, owners, contractors, and other agencies, can follow along and provide input.
3. DFW will conduct a short VI boa training session for all individuals conducting hand clearing. This will involve discussions on what to do if a boa is encountered as well as boa identification. This can be done any time prior to hand clearing but is often preformed the first day on site. Photographs of the VI boa are to be prominently displayed at the site.

4. At least 5 days prior to the use of heavy equipment on the site, the site vegetation may be cut by hand. Any stone walls or naturally occurring rock piles must be carefully dismantled by hand as these are refuges for the snake. This will allow any boas present to vacate the site without injury.
5. Only hand clearing of vegetation is to be performed. This allows the use of chainsaws cutting vegetation down to less than 36 inches off the ground.
6. If a VI boa is found within any of the working or construction areas, activities should stop at the area where the VI boa is found. If boas need to be captured immediately to continue work and avoid harming the boa during the project activities, designated personnel shall immediately contact the DFW for safe capture and relocation.
7. DFW should be notified of any snakes observed.
8. Another site visit will be performed by DFW to confirm that hand clearing has been completed to our standards. The waiting period clock starts after inspection.
9. The site is to be left undisturbed for 5 days prior to the use of heavy machinery. However manual work may continue to be performed during this time and any vegetation may be moved by hand.
10. Use of heavy equipment is only permitted to start after the agreed upon date.

If you have any questions regarding the comments above, please contact the USFWS Monday to Friday 8am-4:30pm:

- José Cruz-Burgos, Endangered Species Coordinator
 - Email: jose_cruz-burgos@fws.gov
 - Office phone 786-244-0081 or mobile 305-304-1386

Amended Programmatic Biological Opinion (Version 1.1)

Recurrent development, infrastructure, and maintenance projects under the jurisdiction of the Federal Emergency Management Agency (FEMA), Federal Transportation Authority (FTA), Federal Highway Administration (FHA), U.S. Department of Housing and Urban Development (HUDS), USDA Rural Development (RD), U.S. Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), USDA Natural Resources Conservation (NRCS) and/or Federal Communication Commission (FCC) in Puerto Rico and the U.S. Virgin Islands

FWS Log #: MM-173



Prepared by:

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MUNIZ
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EXECUTIVE SUMMARY

This Endangered Species Act (ESA) amended Programmatic Biological Opinion (PBO) of the U.S. Fish and Wildlife Service (Service) addresses urban and rural developments, as well as reconstruction and maintenance projects in Puerto Rico and U.S. Virgin Islands (USVI) funded or authorized by the Federal. These Actions are of Federal Nexus under the jurisdiction of the Federal Emergency Management Agency (FEMA), Federal Transportation Authority (FTA), Federal Highway Administration (FHA), U.S. Department of Housing and Urban Development (HUD), USDA Rural Development (RD), USDA Natural Resources Conservation Service (NRCS), U.S. Army Corps of Engineers (USACE), Environmental Protection Agency (EPA) and other Federal agencies. The Actions addressed in this PBO occur recurrently. The above agencies have previously consulted with the Service through Blanket Letters or informal consultations for most projects. However, after coordination with our Regional Office (RO), we are required to exempt the take resulting from the capture and relocation of the Puerto Rican boa (PR boa) and the Virgin Islands tree boa (VI boa) through a Biological Opinion as part of the formal consultation under Section 7 of the Act. Moreover, FEMA determined that the Actions listed below are likely to adversely affect the Puerto Rican boa and the Virgin Islands tree boa. Thus, we developed this PBO to cover all actions, including FEMA's and the other Federal agencies that have previously consulted or will consult in the future with the Service. Projects from any Federal agency that meet the conditions specified below, or that the Service determines will have similar effects on the Puerto Rican boa and Virgin Islands tree boa, may be appended to this programmatic consultation. This PBO concludes that the Actions are not likely to jeopardize the continued existence of these species. Neither the Puerto Rican boa nor the Virgin Islands tree boa have designated critical habitat. This conclusion fulfills the requirements applicable to the Actions for completing consultation under §7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended, with respect to these species. Any Action not covered by this PBO that may affect the PR boa and the VI boa will need consultation with the Service on a case-by-case basis. This PBO does not apply to any other federally listed species or designated critical habitat, therefore, Federal agencies are required to consult with the Service for proposed projects that may affect other federally listed species.

The PBO includes an Incidental Take Statement (ITS; Section 6) that requires the Federal Agency and the Recipient to implement reasonable and prudent measures (Section 6.3) that the Service considers necessary or appropriate to minimize the impacts of anticipated taking on the listed species. Incidental taking of listed species that is in compliance with the terms and conditions (Section 6.4) of this statement is exempted from the prohibitions against taking under the ESA. This PBO (version 1.1) includes amended terms and conditions (Section 6.4, T&C 1) and monitoring and reporting requirements (Section 6.5).

In the Conservation Recommendations section, the PBO outlines voluntary actions that are relevant to the conservation of the listed species addressed in this PBO.

Reinitiating consultation is required if the Federal Agency and the Recipient retains discretionary involvement or control over the Action (or is authorized by law) when:

- (a) the amount or extent of incidental take is exceeded;

- (b) new information reveals that the Actions may affect listed species or designated critical habitat in a manner or to an extent not considered in this PBO;
- (c) the Actions are modified in a manner that causes effects to listed species or designated critical habitat not considered in this PBO; or
- (d) a new species is listed or critical habitat designated that the Actions may affect.

The Service will re-evaluate this programmatic consultation as required, to ensure that its continued application will not result in unacceptable effects on the Puerto Rican boa and the Virgin Islands tree boa.

CONSULTATION HISTORY

This section lists key events and correspondence during the course of this consultation with FEMA, as well as previous consultations with other Federal agencies. A complete administrative record of this consultation is on file in the Caribbean Ecological Services Field Office (CESFO).

Consultation with FEMA:

- 2017-09-05 Hurricane Irma struck the USVI and Puerto Rico.
- 2017-09-07 FEMA declared the USVI as an active disaster zone due to the strike of Hurricane Irma.
- 2017-09-10 FEMA declared Puerto Rico as an active disaster zone due to the strike of Hurricane Irma.
- 2017-09-20 Hurricane María struck the USVI and Puerto Rico.
- 2017-09-20 FEMA declared Puerto Rico and the USVI as an active disaster zone due to the strike of Hurricane María.
- 2017-11-06 The Service provided a technical assistance letter with BMPs as per emergency ESA consultation process including BMPs for recovery efforts of the electric systems in Puerto Rico to minimize and avoid impacts to listed species. The consultation process covered the emergency work to be performed by PREPA, and the USACE under Mission Assignment with FEMA.
- 2018-02-18 FEMA requests clarification of the BMPs and inclusion of additional work.
- 2018-03-15 The Service consulted and provide BMPs for the power lines in Rio Abajo Forest.
- 2018-03-18 The Service issued an addendum to the BMPs to include restoration action in addition to emergency actions.

- 2018-02-28 As part of a programmatic consultation under section 7 of the ESA with the Service to address impacts caused by natural disasters, FEMA developed a Matrix that included all their actions and the effects of those actions on federally listed species in Puerto Rico and the USVI. The purpose of the Matrix is to expedite the consultation process between FEMA and the Service given the large number of projects for the recovery of both Puerto Rico and the USVI as part of the disaster declarations due Hurricanes Irma and María.
- 2019-06-25 FEMA sent a letter to the Service requesting concurrence on the informal programmatic section 7 consultation using the Matrix.
- 2019-07-19 The Service sent a letter to FEMA concurring with the programmatic consultation and the use of the Matrix for effects determinations.
- 2020-05-08 The Service sent an email to FEMA proposing changes to the Matrix as part of the annual reporting requirements stipulated in the 2019-07-19 concurrence letter.
- 2020-07-22 The Service requested guidance to the Service's RO in Atlanta on the implementation of conservation measures developed during the programmatic consultation for the PR boa and VI boa that would result in a not likely to adversely affect determination for both species.
- 2020-10-07 The Service sent an email to FEMA informing that based on guidance from the RO, the conservation measures for the PR and VI boas, required to be modified since the capture and relocation of these species constitute take (as defined by the ESA) needed to be exempted by a Biological Opinion (BO) through a formal consultation under section 7 of the ESA.
- 2020-10-07 FEMA sent an email to the Service agreeing with the modifications and supporting the writing of this BO.
- 2023-07-24 The Service amended the first version of this Programmatic BO dated June 23, 2022, by revising the Terms and Conditions 1 (T&C 1) under Section 6.4 and Monitoring and Reporting Requirements under Section 6.5.1.

Previous Consultations with Other Federal Agencies:

- 2013-01-14 The Service issued a Blanket Clearance Letter for Federally sponsored projects to the HUD with the purpose of facilitate the evaluation of projects located on urbanized areas, vacant lots covered by grassland and/or disturbed scrubs in the U.S. Caribbean.
- 2013-01-14 The Service issued a Blanket Clearance Letter for Federally sponsored projects to the FHA with the purpose of facilitate the evaluation of projects located on

urbanized areas, vacant lots covered by grassland and/or disturbed scrubs in the U.S. Caribbean.

- 2014-07-24 The Service issued a Blanket Clearance Letter for Federally sponsored projects to the FEMA with the purpose of expedite the consultation process on Hazard Mitigation and Public Assistance Grant for project activities that typically result in no adverse effects to federally listed species in the U.S. Caribbean.
- 2018-02-09 The Service concurred with NRCS biological assessment consultation for the recovery of agricultural lands impacted by Hurricanes Irma and María.

BIOLOGICAL OPINION

1. INTRODUCTION

A biological opinion (BO) is the document that states the findings of the U.S. Fish and Wildlife Service (Service) required under section 7 of the Endangered Species Act of 1973, as amended (ESA), as to whether a Federal action is likely to:

- jeopardize the continued existence of species listed as endangered or threatened; or
- result in the destruction or adverse modification of designated critical habitat.

As explained in the Consultation History above, a section 7 consultation with FEMA was the trigger to develop this BO. However, given there are other Federal agencies working on actions that also are likely to result in take of both PR and VI boas in the form of capture and relocation, we decided to develop a Programmatic Biological Opinion (PBO). A PBO addresses multiple actions on a program and/or regional basis, thus achieving efficiencies in the process. The Federal actions addressed in this PBO are urban and rural development, as well as reconstruction and maintenance projects in Puerto Rico and USVI funded or authorized by the Federal Emergency Management Agency (FEMA), Federal Transportation Authority (FTA), Federal Highway Administration (FHA), U.S. Department of Housing and Urban Development (HUD), USDA Rural Development (RD), USDA Natural Resources Conservation Service (NRCS), U.S. Army Corps of Engineers (USACE), Environmental Protection Agency (EPA) and other Federal agencies, hereafter the Action Agency. For the purposes of this PBO, all individual projects will be collectively referred to as the Actions. This PBO considers the effects of the Actions on the endangered Puerto Rican boa (listed as *Epicrates inornatus*, but currently recognized as *Chilabothrus inornatus*; PR boa) and the endangered Virgin Islands tree boa (listed as *Epicrates monensis granti*, but currently recognized as *Chilabothrus granti*; VI boa). Neither species has designated critical habitat, thus will not be addressed in this PBO. Information in this PBO regarding the PR boa and the VI boa has been summarized from the final Species Status Assessment (SSA) for the PR boa and the final SSA for the VI boa (Service 2018, 2021).

BO Analytical Framework

A BO that concludes a proposed Federal action is *not* likely to *jeopardize the continued existence* of listed species and is *not* likely to result in the *destruction or adverse modification* of critical habitat fulfills the Federal agency's responsibilities under §7(a)(2) of the ESA.

“Jeopardize the continued existence means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR §402.02).

“Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species” (50 CFR §402.02).

The Service determines in a BO whether we expect an action to satisfy these definitions using the best available relevant data in the following analytical framework (see 50 CFR §402.02 for the regulatory definitions of *action*, *action area*, *environmental baseline*, *effects of the action*, and *cumulative effects*).

- a. *Proposed Action*. Review the proposed Federal action and describe the environmental changes its implementation would cause, which defines the action area.
- b. *Status*. Review and describe the current range-wide status of the species or critical habitat.
- c. *Environmental Baseline*. Describe the condition of the species or critical habitat in the action area, without the consequences to the listed species caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early consultation, and the impacts of State or private actions which are contemporaneous with the consultation.
- d. *Effects of the Action*. Predict all consequences to species or critical habitat caused by the proposed action, including the consequences of other activities caused by the proposed action, which are reasonably certain to occur. Activities caused by the proposed action would not occur but for the proposed action. Effects of the action may occur later in time and may include consequences that occur outside the action area.
- e. *Cumulative Effects*. Predict all consequences to listed species or critical habitat caused by future non-Federal activities that are reasonably certain to occur within the action area.
- f. *Conclusion*. Add the effects of the action and cumulative effects to the environmental baseline, and in light of the status of the species, formulate the Service's opinion as to whether the action is likely to jeopardize species or adversely modify critical habitat.

2. PROPOSED ACTIONS

On an annual basis, the number of developments, infrastructure and maintenance projects funded or authorized by FEMA, HUD, FTA, FHA, RD, USACE, EPA, NRCS and other Federal agencies will largely be influenced by funding availability and needs. Some of the actions occur on a recurring basis and some due to an emergency response after a disaster. In general, the Actions reviewed under this PBO entails the maintenance, repair, and/or improvement of already existent infrastructure and/or that falls within existing footprint or urbanized areas, vacant lots covered by grassland and/or shrub vegetation, among others. However, there might be Actions that entail new constructions, expansions, or extension beyond existing footprints on already disturbed areas, within existing rights of ways (ROWS) or in undisturbed forested habitat. Actions that fall under this PBO are projects that may adversely affect the PR boa and the VI boa, either by take of individuals and/or temporary disturbance or permanent loss of habitat. The following Actions resulting from projects that meet the descriptions specified below are covered by this PBO. Any other project that the U.S. Fish and Service determines will have similar effects on the PR boa and the VI boa, may be appended to this programmatic consultation.

Any Action not covered by this PBO that may affect the PR boa and the VI boa will need consultation with the Service on a case-by-case basis. This PBO does not apply to any other federally listed species or designated critical habitat not specifically included in this PBO. Therefore, Federal agencies are required to consult with the Service for proposed projects that may affect other federally listed species.

A. Development projects:

- a. Residential;
 - i. Rebuilding, demolition and/or replacement of houses or buildings (public and private).
 - ii. Elevation of residential homes and associated structures and utilities occurring on disturbed and regularly maintained property, including the staging of equipment.
- b. Commercial;
 - i. Demolition and/or replacement of commercial building to restore the facility to its pre-disaster condition.
- c. Parks and recreational areas;
 - i. Repair and/or replacement of recreational structures (bleachers, playground equipment, pools, tennis courts, basketball courts, gazebos, baseball diamonds, gymnasium equipment, bath houses, kiosks, picnic tables, etc.).
- d. New construction work which expands the footprint of an existing structure and occurs entirely on disturbed, regularly maintained, upland, including the staging of equipment.

B. Infrastructure projects:

- a. Utility and Telecommunication: new and existing towers and associated infrastructure (e.g., facilities, roads)

- i. Excavation, repair and/or replacement of utility lines and associated appurtenances.
 - ii. Maintenance of access roads to utility facilities and associated structures, and telecommunication towers.
 - iii. Construction of telecommunication facilities within disturbed areas.
 - b. New road construction and maintenance and associated structures within ROWs;
 - i. Repair, improvement, replacement of roads, bridges and highways.
 - ii. Construction of gutters and sidewalks along existing roads.
 - iii. Rehabilitation of facilities of an already established Public Transportation System (signs, sidewalks and ramps, bus stops and existing routes).
 - iv. Expansion of Public Transportation facilities.
 - v. New construction of facilities for Public Transportation System.
 - vi. In-kind replacement of eroded sections of non-beach fill including soil, gravel, crushed stone, gravel, soft armoring with biomaterials.
 - vii. Repair and/or replacement of a hardened roadway or pedestrian walkway and associated structures (retaining walls, guard rails, curbs, elevation, road signs, lampposts, traffic signals, etc.).
 - c. Repair and/or replace coastal structures;
 - i. Boardwalks.
 - ii. Repair or replacement of coastal wetlands.
 - d. Repair and/or replacement of a fence.
 - e. Repair and/or replacement water structures;
 - i. Storm water management facility
 - ii. Engineered shoreline and/or bank stabilization structure.
 - iii. Bridge, culvert or storm water outfall.
 - iv. Engineered drainage channel.
 - f. Installation of a permanent, back-up emergency generator and/or quick connect switch, and all associated structures (e.g., concrete pad, electrical connections, etc.).

C. Maintenance projects

- a. Redistribution/grading of beach material from adjacent sources
- b. Dredging/clearing of an engineered drainage channel which does not alter the channel's pre-disaster width, depth, grade, or course, provided that bank vegetation is kept intact.
- c. Clearing and snagging with the intent to reduce risk for further flood damage by removing storm mediated vegetative debris and sediments from streams channels to restore flow capacity.
- d. Streambank stabilization, clearing and snagging and/or critical area planting with the intent of restoration flow capacity of artificial and natural waterways to mitigate flood risk.
- e. Debris removal on natural or improved waterways.
- f. Woody and structural debris removal on agricultural lands.
- g. Hydroseeding/mulching over recently placed fill.
- h. Post hurricane debris removal.

The main activities within the proposed Actions are listed below. These types of activities pose danger to the boas as they are secretive animals, are slow movers, and typically hide under debris piles and dense vegetation. However, both PR boas and VI boas could be safely removed out of harm's way and relocated into a safe location. Thus, this PBO covers the capture and relocation of PR and VI boas to remove them from harm's way when engaging on any of the actions described below. For all activities associated to the Actions, the Service has added terms and conditions to minimize any harm to boa individuals (See terms and conditions below.). Therefore, engaging on any of the following actions requires following Terms and Conditions stated in section 6.4 of this PBO.

2.1. Construction work:

Construction activities related to rebuilding, repairing, replacing, or installations will be conducted on a needed basis. Many of the construction activities do not extend outside current existent footprint, or outside already disturbed areas. Nevertheless, some actions may require extension or expansion from existing footprint, and therefore, areas surrounding the original project footprint may be negatively impacted, such as forested areas. The preparation of this areas for construction may require the use of heavy machinery (see clearing area below). Additionally, heavy machinery might be use for transportation of construction materials and other construction activities, which could result on the impact to boa individuals. Heavy machinery also needs to be stored during not working hours (See staging areas below).

2.2. Demolition:

Demolition associated to infrastructure that is no longer functioning or has been damaged, will be conducted based on needs. This activity does not extend outside existent footprint. Boas may use infrastructures as shelters and might be injured or killed during demolition activities.

2.3. Staging areas:

Staging areas are places where equipment, a temporary field office, and/or materials are temporarily stored or located in preparation for the construction, repair, demolition or maintenance work. These areas are typically cleared and located within or adjacent to the Action site. Equipment left on staging areas overnight might function as shelters for boas, and individuals would likely be injured or killed the following day as a result of equipment operation.

2.4. Vegetation and debris management:

Clearing, access road maintenance and other activities that entails removing above-ground vegetation or debris, generally takes place within pre-marked areas necessary for the proposed Action. However, there might be Actions that might entail expansions beyond existing footprints and might require clearing of forested vegetation, of already previously disturbed land, for which the use of heavy machinery might be needed for site preparation and/or debris removal. Access road maintenance when done by hand does not require heavy machinery, but it

does impact habitat by removing vegetation. Boa individuals present in the area might be injured or killed during vegetation and debris management using heavy machinery.

2.5. Other Activities Caused by the Actions:

A BO evaluates all consequences to species or critical habitat caused by the proposed Federal action, including the consequences of other activities caused by the proposed action, that are reasonably certain to occur (see definition of “effects of the action” at 50 CFR §402.02). Additional regulations at 50 CFR §402.17(a) identify factors to consider when determining whether activities caused by the proposed action (but not part of the proposed action) are reasonably certain to occur. These factors include, but are not limited to:

- (1) past experiences with activities that have resulted from actions that are similar in scope, nature, and magnitude to the proposed action;
- (2) existing plans for the activity; and
- (3) any remaining economic, administrative, and legal requirements necessary for the activity to go forward.

Although the species’ natural habitat is not expected to be impacted, urban expansion into rural, forested habitat may increase human-boa interactions, which can negatively affect individual boas. Human-boa conflicts, such as roads, persecution by humans, and predation by domestic and invasive species are considered limiting factors for the PR boa and VI boa, particularly if adjacent to forested suitable habitat. Actions that occur within purely and entirely developed areas that are not adjacent or within forested suitable habitat, are not expected to affect the species.

2.6. Action Area

The action area (AA) is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR §402.02). Delineating the AA area is necessary for the Federal action agency to obtain a list of species and critical habitats that may occur in that area, which necessarily precedes any subsequent analyses of the effects of the action to particular species or critical habitats.

Since this PBO collectively evaluates a large number of individual projects, the AA includes all projects related to the Actions throughout all of Puerto Rico and the U.S. Virgin Islands, and is hereafter referred to as the Programmatic AA.

It is practical to treat the AA for a proposed Federal action as the spatial extent of its direct and indirect “modifications to the land, water, or air” (a key phrase from the definition of “action” at 50 CFR §402.02). Indirect modifications include those caused by other activities that would not occur but for the action under consultation. The AA determines any overlap with critical habitat, but none has been designated for this species. For the PR boa and VI boa, the AA establishes the

bounds for an analysis of individuals' exposure to action-caused changes, but the subsequent consequences of such exposure to those individuals are not necessarily limited to the AA.

3. SOURCES OF CUMULATIVE EFFECTS

A BO must predict the consequences to species caused by future non-Federal activities within the AA, *i.e.*, cumulative effects. "Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 CFR §402.02). Additional regulations at 50 CFR §402.17(a) identify factors to consider when determining whether activities are reasonably certain to occur. These factors include, but are not limited to, existing plans for the activity; and any remaining economic, administrative, and legal requirements necessary for the activity to go forward.

Since this programmatic biological opinion considers all Puerto Rico and U.S. Virgin Islands as the AA, non-Federal activities are expected to occur within the range of various Federally protected species, including the PR and VI boa, and will contribute to cumulative effects to the species. Species with small population sizes, endemic locations, or slow reproductive rates will generally be more susceptible to cumulative effects. Cumulative effects will be further analyzed at the local landscape scale, as appropriate, during a step-down ESA Section 7(a)(2) consultation, when site- and species-specific information is reviewed by local Service biologists familiar with the project area and the biology of local species.

4. PUERTO RICAN BOA AND VIRGIN ISLANDS TREE BOA

This section provides the Service's biological opinion of the Actions for the PR boa and VI boa.

4.1. Status of PR boa and VI tree boa:

This section summarizes best available information about the biology and condition of the endangered PR boa and VI boa throughout their range, that are relevant to formulating an opinion about the Actions. The Service published its decision to list the PR boa as endangered in 1970 (35 FR 16047). For the VI boa, the Service published its decision to list the species as endangered in 1970 (35 FR 16047), and again under a different taxonomic classification in 1979 (44 FR 70677). A Species Status Assessment (SSA) was recently completed for the VI boa and compiles the most recent information available for this species (available online at <https://ecos.fws.gov/ecp/species/3247>) (Service 2018). Similarly, an SSA is being completed for the PR boa and compiles the most recent information for the species. The following information in the subsections below was obtained from those SSAs.

4.1.1. Species Description

The PR boa is a large (on average 3 to 6 feet (ft)), semi-arboreal and nonvenomous snake with color variations from tan to very dark brown and some black body markings. Dorsal coloration of the PR boas is variable and has been described from tan to reddish brown to very dark brown, with several dark bars or spots along its body, and juveniles may have reddish color (Rivero

1998). Body markings are usually more pronounced in neonates and juveniles, but those markings tend to fade with age (Joglar 2005). The ventral scales also vary from gray to dark brown (Rivero 1998).

The VI boa is a medium length (on average 2-3 ft), slender, nonvenomous snake. Adults are gray-brown with dark brown blotches that are partially edged with black, and may feature a blue-purple iridescence on their dorsal surface; the ventral surface is creamy white or yellowish white. Neonates on the other hand have an almost greyish-white body color with black blotches. The head is arrow-shaped, with a blunt nose and silvery eyes.

4.1.2. Life History

The actual life span of the PR boa in the wild is unknown, but there are captive records over 20 years and suggestions that they might live between 20 and 30 years (Rivero 1998). Courtship and mating for the PR boa is considered seasonal and reproduction in the wild appears to be mostly biennial. Although there can be some variability on when the PR boa reproductive activity starts, research suggests that courtship for most *Chilabothrus* (also *Epicrates*) starts in February (Tolson 1994) and that mating for most PR boas is reported to occur at the beginning of the wet season, from late April to May (Tolson and Henderson 1993). Young PR boas are born after a gestation period of approximately 5-6 months (Huff 1978, Rivero 1998). Puente-Rolón (2012) reported PR boa courtship occurring between March and May, while most parturition occurs from August to November. Thus, the reproductive cycle of the PR boa is synchronized with the seasonal patterns of precipitation and temperature in Puerto Rico (Huff 1978, Tolson and Henderson 1993, Puente-Rolón 2012).

For the VI boa, much of what is known about its life history comes from studies in captivity. Life spans in captivity often exceed 20 years, and can exceed 30 years, but typical life spans in the wild are not known. Females breed biennially, but studies have suggested that annual breeding may occur in some conditions. Courtship behaviors and copulation occur from February through May, and interaction with conspecifics of the opposite sex appears to be necessary for reproductive cycling. The gestation period, observed from a single known copulation between two individuals, is about 132 days (Tolson 1989). VI boas give birth to live young from late August-October to litters of 2-10 young, and litter size increases with female body size.

Both VI and PR boas are considered mostly nocturnal but can also be active during the day. The two species forage, bask, and disperse using trees but use terrestrial refugia as well. The VI boa forages at night by gliding slowly along small branches in search of sleeping lizards. While PR boa uses both ambush and active foraging modes. The primary prey for the VI boa is Anole lizards (*Anolis* sp.) but can also consume other prey such as small birds, green iguana hatchlings and mice and rats. For PR boa adults, the main food source are rats, but may include other prey such as bats, lizards, birds (including domestic fowl), and frogs.

4.1.3. Distribution and Abundance

The PR boa is endemic to Puerto Rico, where it has been reported in all the 78 municipalities. However, we do not know the specific details of these accounts or if they represent isolated occurrences in some municipalities. Despite several anecdotic reports of large snakes in Vieques Island, there is surprisingly only one confirmed PR boa sighting within the west side of the Vieques National Wildlife Refuge from 2010 (Barandiaran 2014, Service, pers. comm.). Reynolds and Henderson (2018) do suggest the species was likely extirpated from Vieques, but do not provide further explanation. There is also only one confirmed PR boa sighting from Culebra Island in 2013, but genetic analysis suggests it may have been introduced by humans from Puerto Rico (Reynolds and Puente-Rolón 2014), which could have been the same case for the Vieques sighting. Based on the available information, it is unlikely that there is a PR boa population in either Vieques or Culebra. The PR boa neither occur in any other offshore islands such as Mona, Monito or Desecheo Islands, etc.

In general, the PR boa is considered more abundant now than at the time of listing (1970) and more abundant in the karst region of northern Puerto Rico, and less abundant in the dry southern region of the Island (Rivero 1998). Available density estimates for the PR boa range from 1.24 to 5.6 boas/ha (Mulero-Oliveras 2019, Ríos-López and Aide 2007, Tolson 1997). A recent population model for PR boa suggests a current island-wide estimated population size of more than 30,000 PR boas (Tucker et. al 2020).

The VI boa is endemic to Puerto Rico and the Virgin Islands (U.S. and British). Presently, the species is known to occur on 6 islands in Puerto Rico and USVI: the eastern Puerto Rican islands of Cayo Diablo, Culebra, and Cayo Ratones (introduced); Río Grande on the Puerto Rican mainland; and St. Thomas and an offshore cay in USVI (introduced). The species is also known or thought to occur, either presently or historically, on Tortola Island, Jost Van Dyke, Guana Island, Necker Cay, Great Camanoe, and Virgin Gorda of the British Virgin Islands, but data and confirmed observations are severely limited.

In St. Thomas, the VI boa seems to be restricted to the extreme eastern end where the climate is drier and hotter than other regions of the island. In 1991, a conservative estimate of 300-400 VI boas in St. Thomas was suggested, all within rapidly dwindling habitat (Tolson 1991). In 2009, the abundance of the species in its range within the US jurisdiction was estimated to be at approximately 1,300 - 1,500 boas (Service 2009). A more recent estimate of fewer than 100 VI boas in St. Thomas was made using genetic analysis (Reynolds et al. 2015). However, these population estimates are sporadic, limited, and uncertain. There are no areas within the range of the VI boa on St. Thomas that are protected and managed for conservation.

4.1.4. Conservation Needs and Threats

Where PR and VI boas occur close to urban settlements, development threatens their populations. Consequences of human expansion on boa habitat include habitat loss and fragmentation, as land is deforested for urban and tourism development, areas of suitable habitat are increasingly isolated from each other. Direct impacts on boas include roadkill, predation by domestic and feral cats associated with human populations, predation or competition with other

exotic snake species, and/or persecution by humans. Also, the species are affected by inadequate translocations, emergent diseases, post-hurricane debris management, and by the effects of climate change, particularly increasing sea levels, and frequency of intense hurricanes. Conservation actions that have benefited the VI boa include captive breeding and subsequent reintroductions, and rat eradication efforts. For the PR boa, conservation actions include designation of protected areas all over Puerto Rico, research, and implementation of conservation measures during development projects. Other influential factors include negative public attitudes towards snakes, need for education and outreach, genetics (i.e., inbreeding), and the financial resources and political will to carry out conservation (Service 2018).

4.2. Environmental Baseline for VI and PR boas

This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the PR and VI boas, its habitat, and ecosystem within the Programmatic AA. The environmental baseline is a “snapshot” of both species’ condition in the Programmatic AA at the time of the consultation and does not include the effects of the Actions under review.

4.2.1. Action Area Numbers, Reproduction, and Distribution

The Actions occur island wide in Puerto Rico and the U.S. Virgin Islands, and varies yearly based upon need, funding, agency, and/or disaster occurrence. Therefore, the species’ occurrence within a project’s AA will depend on the project’s location.

The PR boa is currently thought to be more abundant than at the time of listing and has a wide distribution in Puerto Rico, but not uniformly abundant. Available density estimates for the PR boa range from 1.24 to 5.6 boas/ha (Mulero-Oliveras 2019, Ríos-López and Aide 2007, Tolson 1997) depending on the landscape in which they occur, with lower expected densities within urban landscapes. The PR boa is known to occur within both urban and rural landscapes, particularly if associated to forested areas. Thus, AAs in urban and rural areas within or adjacent to forested areas, would be more likely to encounter this species.

The VI boa has a more limited distribution in Puerto Rico and the USVI. In Puerto Rico, there are 4 known populations: one in the municipality of Río Grande, another on Culebra Island, and the offshore cays of Cayo Diablo and Cayo Ratonés. In the USVI, the species is limited to the eastern half of St. Thomas and an offshore cay in the USVI. All of the known populations of the VI boa are considered relatively small and their current population trends are considered either declining, potentially declining, or unknown (Service 2018). The VI boa also occurs in habitat patches encroached by developed areas, therefore any AA within the reported locations of the species and near suitable habitat patches would be more likely to encounter this species.

Both the PR and VI boa are considered primarily active at night, mostly arboreal, and have a low detection probability due to their cryptic behavior and inactivity while sheltering. All of the boa’s life stages from neonate to adult may be encountered depending on the specific location of the AA. Both species may also be found within undocumented areas of occurrence, particularly if the areas present suitable habitat.

4.2.2. Action Area Conservation Needs and Threats

Human activity such as urbanization, road construction, and development, has caused habitat modification and degradation, resulting on habitat fragmentation, boa displacement, and increased human-boa interactions that may result in detrimental effects to the species. Thus, the need for effective implementation of management strategies (e.g., habitat protection and enhancement, search for boas within AAs, and implementation of an appropriate boa relocation program) to reduce those detrimental effects (see Section Terms and Conditions).

Under this PBO, the AA lies within public and private land in both rural and urban landscapes, including, but not limited to forested lands, wetlands, creeks, rivers, and coastal habitats. Although most of the Actions covered under this PBO are within existent footprints on already disturbed areas, some are within or adjacent to forested habitat that may harbor suitable habitat for the PR and VI boa. Actions that occur within purely developed areas and are not within or adjacent to forested habitat, should have minimal to no impact on the species. Impacts could be greater for actions which expand or extend beyond the existing footprint, particularly those that occur within or adjacent to forested areas where boas are prone to occur. Impacts may also apply to areas that have been previously abandoned, including buildings or structures where vegetation has overgrown. Potential impacts can also be expected from those AA that have accumulated debris piles which needs to be removed or shred, particularly if debris piles are placed within or near forested and/or abandoned areas. Boas are known to enter buildings or other structures, as well as use debris piles to seek food or shelter, and thus, care should be taken as well in order to avoid and minimize potential effects on the species.

4.3. Effects of the Actions on the PR and VI boas

In a BO for a listed species, the effects of the proposed action are all reasonably certain consequences to the species caused by the action, including the consequences of other activities caused by the action. Activities caused by the action would not occur but for the action. Consequences to species may occur later in time and may occur outside the AA.

We identified and described the activities included in the proposed Action in section 2.1. We identified and described other activities caused by the proposed Actions in section 2.2. Our analyses of the consequences caused by each of these activities follows.

4.3.1. Construction Work

Change Caused by the Activity: Construction work could result in permanent loss of PR and VI boa habitat within the AA. Additionally, any construction that requires the use of heavy machinery could result on the direct killing of a boas. Construction could also expand from existing footprints, impacting forested habitat nearby and, therefore, boa habitat.

Exposure to the Change: We expect all PR and VI boas (adults and juveniles) within the range of an AA to be exposed during the proposed activity and, after construction is completed if boas venture into the developed AA.

Consequences Resulting from Exposure: Individual PR and VI boas (adults or juveniles) within an AA could be either be killed or injured due to activities related to construction, for example: as heavy machinery move through the AA or construction material is transported and deposited in the AA. Also, the area would no longer provide habitat for the boas, thus reducing overall habitat available for the species.

4.3.2. Demolition

Change Caused by the Activity: Demolition of existing structures could result on the direct killing of the boas by use of heavy machinery or falling debris.

Exposure to the Change: We expect all PR and VI boas (adults and juveniles) within the range of an AA to be exposed during the proposed activity. However, we do not expect a high abundance of PR and VI boas because the AAs have already been disturbed.

Consequences Resulting from Exposure: Individual PR and VI boas (adults or juveniles) within an AA could be either be killed or injured as demolition is being completed. Any PR and VI boa killed as a result of an Action would reduce the species' population number, recruitment potential, and likely the genetic variability of the species.

4.3.3. Staging areas

Change Caused by the Activity: Staging areas are mainly areas near the AA cleared (see Land clearing below) to maintain equipment and other heavy machinery. Additionally, this machinery is sometimes used by boas as shelters, threatening their survival.

Exposure to the Change: The individuals will be exposed to these threats while the Action is being completed.

Consequences Resulting from Exposure: Individual PR and VI boas (adults or juveniles) within an AA could be either be killed or injured as vegetation and debris piles are cleared or can also be relocated out of harm's way if found before disturbance. Also, the area would no longer provide habitat for the boas, thus reducing overall habitat available for the species. Any PR and VI boas killed as a result of an Action would reduce the species' population number, recruitment potential, and likely the genetic variability of the species.

4.3.4. Vegetation and debris management

Change Caused by the Activity: Land clearing, vegetation management and debris removal could result in permanent loss of PR and VI boa habitat within an AA and surrounded areas. For example, the use of heavy machinery for land clearing will result in habitat loss and can also cause direct killing to the boas. Similarly, vegetation management without the use of heavy machinery, could also result on habitat loss or direct boa individual kills.

Exposure to the Change: We expect all PR and VI boas (adults and juveniles) within the range of an AA to be exposed during the proposed activity and, after construction is completed if boas

venture into the developed AA. However, we do not expect a high abundance of PR and VI boas because most AAs have already been disturbed.

Consequences Resulting from Exposure: Individual PR and VI boas (adults or juveniles) within an AA could be either be killed or injured as vegetation and debris piles are cleared or can also be relocated out of harm's way if found before disturbance. Also, the area would no longer provide habitat for the boas, thus reducing overall habitat available for the species. Any PR and VI boas killed as a result of an Action would reduce the species' population number, recruitment potential, and likely the genetic variability of the species.

4.3.5. Other Activities Caused by the Action

PR and VI boas may return to the AA during construction and operation. The Actions that increase human-boa interaction also increase the possibility of injury and death of individual boas. For example, boas could be injured or killed by cars, poachers, humans, and domestic animals. In addition, human activity will attract exotic mammals such as cats, further increasing risk to the boas.

4.3.6. Summary

The proposed Actions may cause adverse effects on the PR boa and VI boa by accidental injury or death from construction activities, vegetation and debris management, demolitions and preparation of staging areas as well as having heavy machinery overnight in the AA or nearby. Boas are expected to be impacted on AAs close to forested habitat compared to urban areas and on those Actions that require extending existing footprint. Consequences include a reduction in the species' abundance. Therefore, we expect captures and relocations to occur in the future in order to remove boa individuals out of harm's way.

4.4. Cumulative Effects on the VI and PR boa

Cumulative effects include the effects of future Commonwealth, Territory, local or private actions that are reasonably certain to occur in the AAs considered in this PBO. Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Since actions will occur within all Puerto Rico and U.S. Virgin Islands in unknown areas, cumulative effects are likely to occur. Therefore, cumulative effect will be reviewed case by case during the project review and the approval to be covered under this amended PBO.

4.5. Conclusion for VI and PR boa

In this section, we summarize and interpret the findings of the previous sections (status, baseline, effects, and cumulative effects) relative to the purpose of the PBO for the VI boa and PR boa, which is to determine whether the Action is likely to jeopardize its continued existence.

Status

The PR and VI boas are both considered endangered throughout their range. Nevertheless, the PR boa is considered a habitat generalist and have a broad distribution in Puerto Rico, particularly in the northern karst region. Loss of habitat and fragmentation due to urban development and human expansion is one of the major factors that affect these species.

Baseline

According to the information provided, any Action completed within urban areas and not surrounded by forested habitat, is not likely to hold boas or have a high abundance of PR or VI boas. In contrast, Actions that occur in rural areas or have nearby forested areas are likely to hold a greater abundance of PR and VI boas.

Effects

The proposed Action may directly affect the PR and VI boa through injury or death caused by mechanized land clearing or debris removal, construction, boas hidden on engine vehicle compartment, and demolition. Thus, consequences include a potential loss of individuals. Capture and relocation of boas is an effective nonlethal mechanism of removing individuals out of harm's way. Although quantifying the number of PR boas and VI boas taken through nonlethal relocation is difficult because boas are not uniformly distributed, and we have no way of knowing how exactly many future projects will occur or where they will occur, we used species behavior, distribution, population size estimates and previous consultations, to estimate boa individual take in the form of capture and relocation (see section Amount or Extent of Take).

Cumulative Effects

Cumulative effects will be evaluated on a case-by-case basis.

Opinion

After reviewing the status of both the PR boa and VI boa, both species have demonstrated to be resilient to stochastic events and based on their current known distribution, estimated population numbers, environmental baseline for the AA, the effects of the Actions, and the cumulative effects, it is the Service's biological opinion that level of expected take, in the form of capture and relocation, is not likely to jeopardize the continued existence of either PR boa or VI boa.

5. CRITICAL HABITAT FOR VI AND PR BOA

There is no federally designated critical habitat for the PR boa nor VI boa.

6. INCIDENTAL TAKE STATEMENT

ESA §9(a)(1) and regulations issued under §4(d) prohibit the take of endangered and threatened fish and wildlife species without special exemption. The term “take” in the ESA means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (ESA §3(19)). In regulations, the Service further defines:

- “harm” as “an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering;” (50 CFR §17.3) and
- “incidental take” as “takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the Recipient” (50 CFR §402.02).

Under the terms of ESA §7(b)(4) and §7(o)(2), taking that is incidental to a Federal agency action that would not violate ESA §7(a)(2) is not considered prohibited, provided that such taking is in compliance with the terms and conditions of an incidental take statement (ITS).

The Actions considered in this PBO include terms and conditions to avoid and minimize impacts as outlined in Section 2 of this document. This includes the capture and relocation of boa found on AAs, and which are in harm’s way. Because the capture and relocation of boas is the result of an otherwise lawful action, such capture and relocation is considered incidental take, and no section 10a1A permit for such capture and relocation is required.

Through this statement, the Service exempts take from this Action as described and contemplated by this PBO from being considered prohibited take under section 9. Exception to the prohibitions against trapping, capturing, or collecting listed species.

For the exemption in ESA §7(o)(2) to apply to the Action considered in this PBO, the Federal Agency and the Recipient must undertake the non-discretionary Reasonable and Prudent Measure and their Terms and Conditions described below. These terms and conditions must become binding conditions of any permit, contract, or grant issued for implementing the Action. Consistent with ESA section 7(b)(4)(C)(iv), the Federal Agency and the Recipient has a continuing duty to regulate the Action activities covered by this ITS. The Federal Agency is responsible for the Action activities covered by this ITS that are under its control and are not under their jurisdiction. The protective coverage of §7(o)(2) may lapse if the Federal Agency and the Recipient fails to:

- assume and implement the terms and conditions; or
- require a permittee, contractor, or grantee to adhere to the terms and conditions of the ITS through enforceable terms that are added to the permit, contract, or grant document.

In order to monitor the impact of incidental take, the Federal Agency and the Recipient must report the progress of the Action and its impact on the species to the Service as specified in this ITS.

6.1. Amount or Extent of Take

This section specifies the amount or extent of take of listed wildlife species that the Action is reasonably certain to cause. Based on the Effects of the Action analysis above, the Service anticipates that take in the form of capture and relocation of boas is likely to occur as a result of the proposed Actions.

For PR boa, we estimate that as many as 20 individuals may be relocated per year. We reached this number based on the total number of boas that were encountered (dead and alive) during the island-wide debris management project after Hurricane María (Service 2021). This is the maximum number of PR boas ever encountered for one island-wide project. Due to species cryptic nature and island-wide distribution we expect that no more than 20 PR boas will be encountered per year for all projects.

For VI boa, we estimate that 5 VI boa individuals may be relocated per year. This number is based on a previous Biological Opinion (Service 2020). We have no information of this species ever been encountered in previous projects where section 7 consultations have been conducted. Due to species limited distribution, and small population size we expect that no more than 5 VI boas will be encountered per year for all projects.

Table 6-1 identifies the species, life stage(s), estimated number of individuals, and the section of the PBO that contains the supporting analysis. We describe procedures for monitoring take that occurs during Actions' implementation for the PR and VI boa in section 6-4.

As shown in Table (6-1), the Service exempts take in the form of capture and relocation of 20 PR boa individuals and 5 VI boa individuals, only if it aims to remove the individuals from harm's way during projects implementation.

Table 6-1. Estimates of the amount of take (# of individuals) caused by the Actions by species, life stage, and form of take, collated from the cited BO effects analyses.

Common Name	Life Stage	# Of Individuals	Form of Take	BO Effects Analysis Section
PR boa	Adult or juvenile	20	Capture or Release	No Jeopardy
VI boa	Adult or juvenile	5	Capture or Release	No Jeopardy

6.2. Effect of take

In the accompanying biological opinion, population models for PR boa suggest a population density ranging from 1 to 6 individuals per hectare for the entire island of Puerto Rico (Service 2021). With regards to VI boa, population estimates are uncertain. However, the species is distributed throughout 6 islands in Puerto Rico and USVI, and at Virgin Gorda in British Virgin Islands. Several intents of population estimate have been made for the VI boa throughout its

range. In 1991, a conservative estimate of 300-400 VI boas in St. Thomas was suggested, all within rapidly dwindling habitat (Tolson 1991). In 2009, the abundance of the species within its range in U.S. jurisdiction was estimated to be approximately 1,300 - 1,500 individuals (Service 2009). A more recent estimate of fewer than 100 VI boas in St. Thomas was made using genetic analysis (Reynolds et al. 2015). However, these population estimates are sporadic, limited, and uncertain.

Both species have demonstrated to be resilient to stochastic events and based on their current known distribution and estimated population numbers, the Service determined that the level of expected take is not likely to result in jeopardy of either species.

6.3. Reasonable and Prudent Measures

The Service believes the reasonable and prudent measures (RPMs) described in this section for PR and VI boas are necessary or appropriate to minimize the impacts, (*i.e.*, the amount or extent) of incidental take caused by the Actions.

RPM 1. The Service requires the Federal Agency and Recipient to ensure projects are conducted and operated as designed, planned, documented, and reported.

RPM 2. The Service requires the Federal Agency and Recipient to strictly follow Terms and Conditions below while capturing, handling, transporting, temporary holding, and relocating PR and VI boas in order to minimize the risk of injury and mortality to the species.

6.4. Terms and Conditions

In order for the exemption from the take prohibitions of §9(a)(1) and of regulations issued under §4(d) of the ESA to apply to the Action, the Federal Agency and the Recipient must comply with the terms and conditions (T&Cs) of this statement, provided below, which carry out the RPMs described in the previous section. These T&Cs are mandatory. As necessary and appropriate to fulfill this responsibility, the Federal Agencies must require any permittee, contractor and recipient to implement these T&Cs through enforceable terms that the Federal Agency include in the permit, contract, or grant document.

T&C 1 (RPM 1). The Service and the Federal Agency will ensure take levels do not exceed levels anticipated in this PBO.

1. Inform all project personnel about the potential presence of the PR and VI boa in areas where the proposed work will be conducted and provide training session on PR and VI boa identification. A pre-construction meeting will be conducted to inform all project personnel about the need to avoid harming these species. An educational poster or sign with photo or illustration of these species will be displayed at the project site.
2. Prior to any construction activity, including removal of vegetation and earth movements, the boundaries of the project area and areas to be excluded and protected will be clearly

marked in the project plan and in the field in order to avoid further habitat degradation outside of the AA.

3. Once areas are clearly marked, and right before the use of heavy machinery and any construction activity (including removal of vegetation and earth movement), a biologist or designated project personnel with experience on these species will survey the areas to be cleared to verify the presence of any PR or VI boa within the AA. If a PR or VI boa is found during the search, it should be captured and managed as per #6 below. Once the removal of vegetation begins, the biologist or designated personnel must remain at the work site and be ready to capture any boa that might be in harm's way as the result of the habitat disturbance (see #6).
4. For VI boas, once the area has been searched, vegetation will be cut about one meter above ground prior to the use of heavy machinery for land clearing. Cutting vegetation by hand will allow VI boas present on site to move away on their own to adjacent available habitat. If there is no suitable habitat adjacent to the project site, any VI boa found will be relocated accordingly (see #6).
5. For all boa sightings (dead or alive), record the time and date of the sighting and the specific location where it was found. Data will also include a photo of the animal (dead or alive), relocation site GPS coordinates, the time and date of the relocation, and comments on how the animal was detected and its behavior.
6. If any PR or VI boa (dead or alive) is found within the AA and on harm's way, the action will stop at that area and information recorded (see #5). If a PR or VI boa is located within harm's way, all attempts will be made to immediately safely capture the animal (refer to T&C 2). PR boas will be safely captured and relocated at least 1km within suitable habitat (forested) and away from construction areas. PR boa relocation sites will be pre-determined before the project starts and sites shared with the Service for revision and concurrence. Relocation of PR boas will be conducted by trained and designated personnel and will not harm or injure the captured boa. If any VI boa is found, do not relocate. Capture and temporary hold the individual accordingly (refer to T&C 2). Contact the Puerto Rico Department of Natural and Environmental Resources (PRDNER) Rangers immediately if in Puerto Rico (787-724-5700, 787-230-5550, 787-771-1124) or contact the USVI Department of Planning and Natural Resources (DPNR), Division of Wildlife, immediately if in St. Thomas (340-775-6762, 340-773-1082). The Action may continue at other work sites within the AA where no PR and VI boas have been found. If immediate relocation of PR boa by the project biologist or designated personnel is not an option, project related activities at this area will stop until the boa moves out of harm's way on its own or call the Puerto Rico Department of Natural and Environmental Resources (PRDNER) Rangers for safe capture and relocation of the animal (787-724-5700, 787-230-5550, 787-771-1124). The potential use of the PRDNER staff for these purposes should be coordinated with them at least 30 days before the project starts. If a PR boa is captured by the PRDNER, record the name of the PRDNER staff and information on where the PR boa will be relocated.

7. Measures will be taken to avoid and minimize PR boa and VI boa casualties by heavy machinery or motor vehicles being left in the AA. Any heavy machinery left on site (staging areas) or near potential PR or VI boa habitat will be thoroughly inspected each morning before work starts to ensure that no boas have sheltered within engine compartments or other areas of the heavy machinery. If a PR boa or VI boa is found within vehicles or heavy machinery, boas will be safely captured accordingly (refer to T&C 2). If not possible, the animal will be left alone until it leaves the vehicle or machine by itself.
8. The PR boa and VI boa may seek shelter within debris piles. Measures should be taken to avoid and minimize boa casualties associated with sheltering in new debris piles as a result of project activities. New debris piles should be placed in areas farthest away from forested areas. Prior to moving, disposing, or shredding, debris piles should be carefully inspected for the presence of PR boas and VI boas. If debris piles will be left on site, we recommend they be placed in an undisturbed area.
9. In the event a PR boa and VI boa is found dead within the project footprint, the Federal Agency and the Recipient must contact the Service to appropriately dispose the animal.
10. Should the forms of take reach the amount of exempted take (Table 6-1) during the Action, the Federal Agency and the Recipient shall terminate the authorized activities and contact the Service within 24 hours in order to reinitiate consultation. The Service and the Federal Agency and the Recipient will re-consult to determine whether authorized activities should continue as proposed and whether modifications or stipulations are warranted.
11. If a PR boa or a VI boa is accidentally injured or killed during capture and relocation activities during the Action, the Federal Agency and the Recipient shall terminate the authorized activities and contact the Service within 24 hours in order to reinitiate consultation. The Service and the Federal Agency and the Recipient will re-consult to determine whether authorized activities should continue as proposed and whether modifications or stipulations are warranted.
12. The contact information for the Service must be followed: Fish and Wildlife Biologist: Jan P. Zegarra at jan_zegarra@fws.gov, 786-933-1451; Endangered Species Program Coordinator: Jose Cruz at Jose_Cruz-Burgos@fws.gov, 305-304-1386. All reporting must be submitted at caribbean_es@fws.gov.

T&C 2 (RPM 2). The Service requires the Federal Agency to follow standard procedures while capturing, handling, transporting, temporary holding, relocating and tracking VI boas in order to minimize the risk of injury and mortality to the species.

- A. The Federal Agency and the Recipient shall identify who will capture PR or VI boas and assess and determine if a boa has been injured as a result of project activities, and if it is in need of veterinary care or rehabilitation. If an injured PR boa or VI boa is in need of veterinary care or rehabilitation, the Federal Agency and the Recipient

shall immediately seek veterinary care for the animal and inform the Service within 24 hours of the event.

- B. The Federal Agency must ensure that any permitted individuals, contractor, recipients or cooperators follow proper procedures and methods for capturing, handling, temporary holding, relocating of the PR and VI boa. The following procedures will be followed:
- i. All PR and VI boas shall be handled safely to avoid injury. The preferred method of capture is by hand, although a snake hook or stick may also be used if snake is uncatchable by hand, or in order to help move the snake into a safer position for capture.
 - ii. All PR and VI boas may be temporarily held during and/or relocation purposes. Boas will be handled as little as possible, and they shall not be kept for more than three days since the day of capture. Temporary holding of boas will be in burlap bags (1 boa per bag) and/or secured containers, which must be placed in cool dry areas that are not in direct sunlight or extreme temperatures. Burlap bags shall be placed inside a container with other boas each inside their own burlap bag and labeled properly. All containers shall be well-ventilated and with a secure lid to avoid boas from escaping.
 - iii. Only qualified, experienced personnel, with a required State and Federal applicable permits may place PIT tag injections. PIT tags may be subcutaneously injected mid-body using sterile syringes. When injecting tags, keep needle parallel to the boa's body and do not force the needle into the muscle tissue or between the ribs. Snakes greater than 400 mm (15.7 in) in length, but that weigh less than 100 grams (3.5 oz), may be PIT tagged with a 5 mm (0.19 in.) PIT tag. An 8 mm (0.31 in) PIT tag may be used for all snakes that weigh over 100 grams (3.5 oz).
 - iv. The Federal Agency and the Recipient and/or contractors shall obtain all necessary permit(s) from the corresponding State agency for capturing, handling, transporting, temporary keeping, relocating and tracking PR and VI boas.

6.5. Monitoring and Reporting Requirements

In order to monitor the impacts of incidental take, the Federal Agency and the Recipient must report the progress of the Action and its impact on the species to the Service as stated in the ITS section above (50 CFR §402.14(i)(3)). This section provides the specific instructions for such monitoring and reporting (M&R), including procedures for handling and disposing of any PR and VI boas killed or injured. These M&R requirements are mandatory.

As necessary and appropriate to fulfill this responsibility, the Action Agency must require any permittee, contractor, or grantee to accomplish the M&R through enforceable terms that the Action Agencies include in the permit, contract, or grant document. Such enforceable terms must include a requirement to immediately notify the Service if the amount or extent of incidental take specified in this ITS is exceeded during Actions' implementation.

6.5.1. PR and VI Boa

M&R 1. The Federal Agency and the Recipient will ensure that incidental take levels will be minimal.

- A. For all PR and VI boa sightings (dead or alive), the Action Agency shall ensure that an effective monitoring and reporting method is established. Reporting shall include the following and should injury or mortality occurred during the Action, the Federal Agency and the Recipient shall contact the Service within 24 hours of the event:
 - i. Date, time and location (latitude/longitude) of the sightings and relocation sites.
 - ii. Size, weight and sex (if possible) of the PR and VI boa.
 - iii. A photograph of the snake as found or after capture.
 - iv. Description of how and what caused the take in the case of injury or death.
 - v. Description of any additional conservation measures that may be implemented to further avoid and minimize take.

M&R 2. Disposition of Dead or Injured boas

- A. Disposition of dead animals must be immediately coordinated with the Service for appropriate disposal of the animal.
- B. The Service may request some dead specimens of PR boa and all for VI boa. The Federal Agency and the Recipient shall coordinate the delivery of such specimen to the Service.
- C. In case of an injured boa, the Federal Agency and the Recipient must seek veterinary care for the animal and inform the Service within 24 hours of the event.

7. CONSERVATION RECOMMENDATIONS

§7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by conducting conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary activities that an action agency may undertake to avoid or minimize the adverse effects of a proposed action, implement recovery plans, or develop information that is useful for the conservation of listed species.

We have not identified actions the Service could take, on a programmatic basis, to address Section 7(a)(I) that are not part of its normally mandated mission. However, previous consultations have incorporated conservation measures for both PR and VI boa. Those conservation measures could be implemented during the actions covered by this PBO. This will be decided on a project-by-project basis by the action agency and the FWS when the FWS is reviewing a project for coverage under this PBO.

8. REINITIATION NOTICE

Formal consultation for the Action considered in this BO is concluded. Reinitiating consultation is required if the Federal Agency and the Recipient retains discretionary involvement or control over the Action (or is authorized by law) when:

- a. the amount or extent of incidental take is exceeded;
- b. new information reveals that the Action may affect listed species or designated critical

- habitat in a manner or to an extent not considered in this PBO;
- c. the Action is modified in a manner that causes effects to listed species or designated critical habitat not considered in this PBO; or
 - d. a new species is listed or critical habitat designated that the Action may affect.

In instances where the amount or extent of incidental take is exceeded, the Action Agency is required to immediately request reinitiating the formal consultation.

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