Jilamito Hydropower Project
Complementary Studies

Critical Habitat, Legally Protected
and Internationally Recognized Areas

Final Report

Project # 0363579

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List of Acronyms

Acronym	Meaning in English
ADE-CODEFOR	Protected Areas Department of the State Forestry Administration of the Honduran Forestry Development Corporation (Replaced by the ICF in 2008)
AZE	Alliance for Zero Extinction
CR	Critically Endangered
DAC	Qualitative Environmental Diagnosis (*Diagnóstico Ambiental Cualitativo*)
DMU	Discrete management unit
EN	Endangered
ERM	Environmental Resources Management
ESIA	Environmental and Social Impact Assessment
GN	Guidance Note
IIC	Inter-American Investment Corporation
ICF	Forestry Conservation Institute
IFC	International Finance Corporation
INGELSA	Investments in Electrical Generation, S.A.
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
LC	Least Concern
masl	Meters above sea level
MIF	Multilateral Investment Fund
NE	Not Evaluated
PROLANSATE	Foundation for the Protection of Lancetilla, Punta Sal and Texíguat
PS	Performance Standard (IFC)
RVS	Wildlife Refuge (*Reserva de Vida Silvestre*)
UNESCO	Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura

1.0 Introduction

1.1 Background

INEGELSA is seeking financing from the Inter-American Investment Corporation (IIC) and the Multilateral Investment Fund (MIF or FOMIN) to develop a 14.9-MW hydropower project on the Jilamito river in the Atlántida Department of the northern Honduras (the Project). A portion of the Project's area of influence includes a portion of the Buffer Zone of the Texíguat Wildlife Refuge (RVS), a legally protected area under national legislation. Also, the Project is located in the western portion of the Cordillera Nombre de Dios mountain range, a documented hotspot for amphibian and reptile diversity in Central America and home to a number of endemic species, some of which are categorized as Endangered (EN) or Critically Endangered (CR) by the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species.

INGELSA has retained ERM to develop additional information for the Project in order to provide the IIC with responses to outstanding questions regarding the compliance of the Project with the International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability (PS). ERM's scope of services includes a Critical Habitat Assessment using the criteria of IFC PS 6 on Biodiversity Conservation and Sustainable Management of Living Resources (PS 6).

1.2.1 General Objective

The general objective of this report is to provide the IIC with a well-grounded argument for the Project's compliance with PS 6 requirements for projects in areas of critical habitat and legally protected and internationally recognized areas, including a discussion of a general approach for a Biodiversity Action Plan designed to achieve net gains for critical habitat-qualifying biodiversity values and the RVS Texíguat.

1.2.2 Specific Objectives for Critical Habitat

- Determine if the Jilamito project is located within Tier 1 critical habitat according to PS 6 criteria for such;
- Determine if the Jilamito project is reasonably likely to meet the PS 6 requirements for activities in critical habitats; and
- Propose measures that will bring net gains to the species and ecological process which may qualify the area as critical habitat.

1.2.3 Specific Objectives for Legally Protected and/or Internationally Recognized Areas

- Determine if the Jilamito project meets the PS 6 requirements for projects in legally protected areas and/or areas recognized internationally for high biodiversity value (e.g., a key biodiversity area or KBA).
- Propose measures to enhance the aims of the RVS Texiguat and to protect the species for which the area has been designated as a KBA.

2.0 Identification of Priority Biodiversity Values

Table 1 below summary the list of priority biodiversity values identified within the Atlántida side of the RVS Texiguat based on review of the available information and online data sources.

Table 1. - Priority Species of the Atlántida Side of the RVS Texíguat (Source: ERM, 2016). CR=Critically Endangered; EN=Endangered; LC=Least Concern; NE=Not Evaluated; GH=Endemic to Guatemala and Honduras; H=Endemic to Honduras; ND=Endemic to the Cordillera Nombre de Dios; T=Endemic to the Texíguat area. Asterix indicates species not evaluated by IUCN but category determined by Townsend *et al.* 2012 based on IUCN criteria.

Species	IUCN 2016	Endemic	Restricted	DMU
Plants				
Haptanthus hazlettii	NE	T	Y	Known only from slopes of Cordillera Nombre de Dios range between Mataras and Jilamito rivers.
Amphibians				
Salamanders				
Bolitoglossa cf. *porrasorum*	CR*	T	Y	Only known from RVS Texíguat
Nototriton sp.	CR*	T	Y	Only known from RVS Texíguat
Frogs and Toads				
Craugastor aurilegulus	EN	H	Y	Occurs in nine DMUs according to IUCN distribution map, with global Extent of Occurrence <5,000 km² and Area of Occupancy probably <500 km². Elevations from 50 to 1,500 masl.
Duellmanohyla salvavida	**CR**	H	Y	Occurs in three DMUs according to IUCN distribution map, with global Area of Occupancy probably <10 km². Elevations from 90 to 1,400 masl.
Incilius leucomyos	EN	H	Y	Occurs in two DMUs according to IUCN distribution map, with global Extent of Occurrence <5,000 km². Elevations from 0 to 1,600 masl. Project is located in the larger DMU which accounts for >75% of known Extent of Occurrence.
Plectrohyla chrysopleura	CR	ND	Y	Two DMUs. Was known only from one locality (Cerro Búfalo) according to IUCN, 930-1,550 masl . Texíguat population is only other known locality.
Ptychohyla spinipollex	CR	ND	Y	Occurs in three DMUs according to IUCN distribution map, with global Extent of Occurrence <5,000 km²

Species	IUCN 2016	Endemic	Restricted	DMU
				and Area of Occupancy probably <500 km². Elevations from 160 to 1,580 masl.
Squamata				
Lizards				
Anolis kreutzi	CR*	T	Y	Only known from RVS Texíguat, both in Yoro and Atlántida. Found near La Liberación between 1,030-1,200 masl.
Anolis loveridgei	EN	H	Y	One DMU with global Extent of Occurrence of 704 km² according to IUCN.
Anolis yoroensis	EN*	ND	Y	Two DMUs?
Snakes				
Bothriechis guifarroi	CR*	T	Y	Known definitively only from Atlántida side of RVS Texíguat, 1,015-1,450 masl. Tentatively identified specimens from Yoro side of RVS Texíguat and from PN Pico Bonito.
Geophis damiani	CR	T	Y	Known only from three specimens, all from RVS Texíguat, of which one was collected along trail from Jilamito Nuevo to La Liberación at ca. 1,075 masl.
Ninia pavimentata	LC	GH	Y	Extent of Occurrence is estimated at 22,000 km² according to IUCN, but not including Honduras, where it is known only from three localities, all above 1,000 masl.
Tantilla olympia	CR*	T	Y	Known only from one specimen from RVS Texíguat, collected on trail from Jilamito Nuevo to La Liberación at ca. 1,150 masl.
Birds				
Dendroica chrysoparia	EN	W	Y	Neotropical migrant. Breeding range is 19,700 km² but that is exclusively in the United States. This species winters from SE Mexico to Nicaragua, primarily in upland forest habitats.
Mammals				
Ateles geoffroyi	EN	W	N	Widespread Central American species.
Tapirus bairdii	EN	W	N	Widespread Central American species.

3.0 Critical Habitat

3.1 Conceptual Framework

International Finance Corporation Performance Standard 6 defines "critical habitat" as areas with high biodiversity value, such as:

- habitat of significant importance to Critically Endangered and/or Endangered species;
- habitat of significant importance to endemic and/or restricted-range species;
- habitat supporting globally significant concentrations of migratory species and/or congregatory species; and
- highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

Furthermore, PS 6 establishes the following requirements for activities in critical habitats:

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;
- The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

3.2 Methodology

3.2.1 Study Area

The present critical habitat assessment is focused on the northern side of the Cordillera Nombre de Dios in the Atlántida Department of Honduras, more specifically on the Jilamito river basin and the area surrounding the RVS Texíguat. This area was once nearly entirely forested is very humid, supporting dense tropical forests and large numbers of species of amphibians.

PS 6 requires that biodiversity be considered at the scales of landscapes or ecosystems, not merely at the scale of the project footprint or area of influence. For the assessment of critical habitats, PS 6 used a concept based on the identification of "discrete management units" (DMUs). These DMUs should be ecologically-sensible for the species, habitat, or ecological process. Some wide-ranging species with continuous or diffuse distributions or species with very small ranges may have only a single DMU.

3.2.2 Information Reviewed

ERM reviewed the project's *Diagnóstico Ambiental Cualitativo* (DAC) (AMBITEC, 2013), published scientific studies, the RVS management plan, and online databases. While the DAC contains minimal information on the biodiversity of the Project area of influence, there has been a concerted effort by a team of US-based and Honduran biologists to study the amphibian and reptile fauna of the RVS Texíguat and the Cordillera Nombre de Dios more broadly, summarized largely by Townsend et al. (2012). This research provides sufficient basis for the identification of the RVS Texíguat as critical habitat for various species as well as for a unique ecosystem with examples of key evolutionary processes.

3.2.3 Critically Endangered and/or Endangered Species

The Guidance Note (GN) to IFC PS 6 distinguishes two tiers of critical habitats, of which Tier 1 is of greatest concern and Tier 2 is of lesser concern. The RVS Texíguat is a Tier 1 critical habitat for CR and EN species due to the following:

- It includes habitat required to sustain 10% or more of the known population of the following IUCN Red List species:
  - *Duellmanohyla salvavida* – CR
  - *Incilius leucomyos* – EN
  - *Plectrohyla chrysopleura* – CR
  - *Ptychohyla spinipollex* – CR
  - *Anolis loveridgei* – EN
  - *Geophis damiani* – CR

- It includes habitat with known, regular occurrences of the following IUCN-listed CR or EN species where that habitat is one of 10 or fewer DMUs globally for the species:
  - *Craugastor aurilegulus* – EN
  - *Duellmanohyla salvavida* – CR
  - *Incilius leucomyos* – EN
  - *Plectrohyla chrysopleura* – CR
  - *Ptychohyla spinipollex* – CR
  - *Anolis loveridgei* – EN
  - *Geophis damiani* – CR

There is no question that the forests of the upper Jilamito basin and the RVS Texíguat qualify as Tier 1 critical habitats for a number of Critically Endangered and Endangered species. Wilson *et al.* (2012) found that the RVS Texíguat was the protected area with the highest number of CR amphibian and reptile species in Honduras, 10 out of the total of 47 CR species in the country. We note here that some of these species are known only to date from the Yoro side of the RVS Texíguat (*Craugastor saltauris, C. stadelmani, Nototriton tomarorum,* and *Omoadiphas texiguatensis*).

An additional endangered species reported by the DAC the the IUCN-Endangered Geoffroy's spider monkey (*Ateles geoffroyi*), which given its large range in Central America is not likely to qualify the RVS Texíguat as a critical habitat for this species.

3.2.3 Endemic and/or Restricted Range Species

Townsend *et al.* (2011) conclude "that the La Liberación region, i.e., the moderate altitudes of the windward slope of RVS Texíguat, is part of a triumvirate of herpetofaunal endemism in Honduras." Their work in this area and on the leeward slope of RVS Texíguat (summarized in Townsend et al. 2010a) and in Parque Nacional Pico Bonito (summarized in McCranie & Castañeda 2005) reveals that 33 of the 94 endemic species of amphibians and reptiles known from Honduras (Townsend & Wilson 2010, Townsend & McCranie 2011, Townsend et al. 2011a) occur in these three areas of the Cordillera Nombre de Dios. They note that Honduras is the country that features Central America's highest level of herpetofaunal endemism. Furthermore, these authors note they "expect that continued fieldwork on the windward slope of RVS Texíguat will serve to enhance this area's standing, as [they] are only beginning to explore Honduras' herpetofaunal 'lost world.'"

Under PS 6, a Tier 1 critical habitat for endemic/restricted range species is defined as a "habitat known to sustain ≥ 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species (e.g., a single-site endemic)." For the RVS Texíguat, this applies to the following species as detailed by Table 1 above:

- *Anolis kreutzi*
- *Geophis damiani*
- *Tantilla olympia*

A Tier 2 critical habitat for endemic/restritced range species sustains least one percent but less than 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species, where data are available and/or based ib expert judgement. The RVS Texíguat qualifies as Tier 2 critical habitat for the following species:

- *Craugastor aurilegulus*
- *Duellmanohyla salvavida*
- *Incilius leucomyos*
- *Plectrohyla chrysopleura*
- *Ptychohyla spinipollex*
- *Anolis loveridgei*
- *Anolis yoroensis*
- *Botriechis guifarroi*

In regards to endemic species of flora, the DAC mentions the shrub *Haptanthus hazlettii* as a priority species for protection. This species is the only member of its genus and was first discovered in 1980 and not found again until 2010 near the Mataras or Matarras river (located in the foothills of the Cordillera Nombre de Dios to approximately 8 km west of the Project area) at an elevation of ca. 300 masl (Shupinov & Shupinov, 2011). This monotypic genus is presumed to be endemic to the area around its only known locality and is considered potential in the Project area of influence. According to Sosa (2016), *H. hazlettii* has now been identified from the localities of Los Olivos, Jilamito Nuevo, La Sirena river (Mezapita), and the trail that leads to La Liberación.

3.2.4 Migratory and/or Congregatory Species

While a preliminary list of birds from 2010 reported 24 species of migratory birds (Mejía & Herrera, 2010), including the EN *Dendroica chrysoparia*, the RVS Texiguat is not known to be a site of importance (i.e., known to sustain at least 1 percent of the global population at any point of the species' life cycle) for any migratory or congregatory species of birds. Also, the Transmission Line does not traverse any areas known to be of importance for any migratory or congregatory species of birds.

According to the *DAC, the* Jilamito river downstream of the proposed powerhouse site contains populations of the widespread migratory fish *Joturus pichardi* (cuyamel) and *Agonostomus monticola* (tepemechín). The Jilamito basin does not meet the criteria for critical habitats for such species given that it unlikely to sustain at least 1 percent of the global population of any migratory or congregatory species. *Joturus pichardi* is found The cuyamel and tepemechín are found along the coast and inland waters of the Gulf of Mexico and the Atlantic slope of Central America, as well as in the West Indies and Florida (Froese & Pauly, 2016). *Agonostomus monticola* is found from along the Atlantic coast from North Carolina to Venezuela, including the West Indies (Froese & Pauly, 2016).

3.2.5 Highly Threatened and/or Unique Ecosystems

As discussed above, the Project is located in a region that has been identified as a Central American, if not global, hotspot for strict endemic restricted-range amphibian and reptile species found nowhere else in Honduras or in the world, which qualifies it as a unique ecosystem. Also, the higher elevation humid forests are considered highly threatened in Honduras.

3.2.6 Key Evolutionary Processes

Townsend *et al.* (2012) described the windward side of the RVS Texiguat as a "premontane hotspot for herpetological endemism" based on the presence of 14 species of amphibians and reptiles endemic to Honduras and considered to be "among the most significant regions of herpetofaunal endemism in nuclear Central America". This reflects the history of evolutionary processes that have led to high degrees of diversification and speciation, e.g., the presence of an isolated area of mid- to high-elevation habitats that is now inhabited by species not found elsewhere.

3.3 Conclusions on the Presence of Critical Habitat

The forest ecosystems of the Cordillera Nombre de Dios are unquestionably clear examples of critical habitats as defined by PS based on their significance for the survival or persistence of Endangered and Critically Endangered species, endemic and restricted range species, highly threatened and unique ecosystems, and key evolutionary processes. INGELSA fully recognizes the high biodiversity value of the Jilamito watershed and the broad landscape of the Cordillera Nombre de Dios and is committed to developing and implementing actions that will bring net gains to these biodiversity values.

3.4 Compliance with PS Requirements for Critical Habitats

3.4.1 Absence of Viable Alternatives

Paragraph 17 of PS 6 requires that no other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical. This requirement can be a stopping point for the project depending on how "the project" is defined. If the project is defined simply as generation of hydroelectric energy for distribution to the Honduran national grid, it may be argued that INGELSA could have selected a river basin that does not place the project in critical habitat. If conservation of a high biodiversity area is considered to part of the project objectives, then this creates a different scenario and makes the selection of the Jimalito river basin an appropriate alternative.

The selection of Jilamito alternative was based on historical changes on energy demands and energy alternatives in Honduras and the Honduran Atlantic Coast. During the last decade, Honduras energy generation was based on 80% of fossil fuel. However, in the middle of the last decade, oil prices suffered a significant increase from USD$18/barrel to more than USD$100/barrel. Therefore, costs of energy generation in Honduras were also increased affecting the national economy and industry. Moreover, the National Electric Energy Company (ENEE-Empresa Nacional de Energía Eléctrica) has reported that the Honduran Atlantic Coast has suffered rationing of electricity for several years. These rationing of energy are being solved with the use of diesel power plants which will continue operating until the hydropower projects in the area are built. The interconnection studies conducted across the Honduran Atlantic Coast by ENEE estimate that the Jilamito Hydropower Project will produce savings between USD$3.2 Million and USD$11.2 Million for the following 10 years after it starts operating. The exact amount on savings will depend on power generation and demand. Considering all these aspects, INGELSA looked for energy alternatives based on renewal energy sources such as hydropower with the objective to sell energy exceedances to the National Interconnected System (Sistema Interconectado Nacional) and meet energy demands in the Honduran Atlantic Coast. At that time, INGELSA visited the Ministry of Natural Resources and Environment (SERNA) to obtain a list of available sites for development of hydropower projects in which Mezapa and Jilamito watersheds are included.

It is also important to highlight the design alternatives selected that avoid or minimize impacts to biodiversity such as limiting the construction of access roads and using a suspended cable car (i.e., a "teleférico") to access the upper reaches of the Proeject and the selection of a run of river design that minimizes loss of riparian and terrestrial habitats.

3.4.2 No Measurable Adverse Impacts

PS 6 requires that the project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values. Based on the know distributions of the species in question and the ecological processes upon which these species depend, it is unlikely that the Project will result in "measureable adverse impacts" on an ecologically-meaningful scale. GN102 notes that "the intention behind the current language is to encourage projects to work with recognized external ecologists and species specialists in defining critical habitat based on the biodiversity values triggering that critical habitat designation, not based on an imposed artificial project boundary in a landscape/seascape (i.e., the project site/concession area)". This means that while at the project footprint level there may be measurable adverse impacts, such impacts may not be significant at broader scales that are ecologically meaningful for a particular species or ecosystem. The losses of terrestrial and aquatic habitats in the Project footprint amount to ecologically insignificant impacts at the species level for the even the most range-restricted endemic species of the RVS Texíguat or Cordillera Nombre de Dios.

3.4.3 No Net Reduction in Populations of CR or EN Species

PS 6 requires that the project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time. The CR and EN species known or expected to occur within the footprint of the Project all are found in other portions of the RVS Texíguat or the Cordillera Nombre de Dios. No species have ranges restricted to or largely concentrated within the Project footprint.

3.4.4 Biodiversity Monitoring and Evaluation Program

PS 6 requires that a robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program. INGELSA is committed to developing and implementing such a program in consultation with the IIC and species specialist to ensure that the Project complies with PS 6 requirements from activities in critical habitat, including producing measurable net gains.

4.0 Legally Protected Areas and Internationally Recognized Areas

4.1 Legally Protected Areas

The *Refugio de Vida Silverste Texíguat* (Texíguat Wildlife Refuge) was created in November 1987 by *Decreto 87-87 de Bosques Nublados*. The RVS has an area of 16,000 ha based on the map published with the 1987 decree. The objective of the RVS is "the protection of the existence of definitive species of wildlife" and its principal function is "to assure the perpetuity of species, populations or habitats of wildlife and to serve scientific or recreational purposes, and when counter to the primordial objective, the controlled use of some species can be allowed." (PROLANSATE, no date). According to Wilson *et al.* (2013), "measures needed are greater resources to refuge operations as well as policies to prevent forest destruction" and "as of 2012, this refuge is under imminent threat of complete destruction."

The Protected Areas Department of the State Forestry Administration of the Honduran Forestry Development Corporation (ADE-CODEFOR) emitted a technical determination ("*Dictamen Técnico*") in 2006 that the proposed water uptake structure was located within the Buffer Zone ("*Zona de Amortiguamiento*") of the RVS Texíguat and that the powerhouse was located outside of the boundary of the RVS Texíguat. The map provided as Annex 10 of the 2013 *Diágnostico Ambiental Cualitativo* indicates that the dam/reservoir, pressure tank, and a portion of the conduction pipe are located within the RVS Texíguat Buffer Zone. None of the proposed Project infrastructure are located in the Core Zone ("*Zona Núcleo*") of the RVS Texíguat.

Article 358 of the *Reglamento General de la Ley Forestal, Áreas Protegidas y Vida Silvestre, Decreto No. 031-2010* permits the development of hydroelectric projects with capacity of up to 15 MW in a Protected Area Buffer Zone, if the area has its corresponding delimitation and approved Management Plan (IFC/DAP, 2009). The proposed Project is designed to have a nominal capacity of 14.90 MW and is thus within the permissible capacity for a hydroelectric project in a Buffer Zone. Article 360 of the same rule requires that the decision to approve such developments be taken in consideration of the opinions of the respective Consultative Councils (i.e., Municipal and Community Forestry, Protected Areas, and Wildlife).

INGELSA was granted an Operation Contract for the Generation of Electric Energy by the National Congress of Honduras, *Decreto No. 343-2013,* published in the official gazette on 12 June 2014. This contract states that the State of Honduras "considers the Plant and its facilities as part of the management plan of said areas, for which it will protect the areas necessary for such purpose, including core zones, buffer zones, watersheds and micro-watersheds, forests, protected areas, as well as the area of the influence of the Plant, reducing and controlling the current practices of cutting trees and burning by the local residents of the related zones; limiting according the feasibility and environmental impact studies, the installation and operation of companies with mining, agricultural, industrial, construction, irrigation, deforestation, livestock, electrical generation, and other activities that may affect, impede, or diminish the capacity of the Electrical Generator to develop the project or its operation or expansion." While this contract does not specifically reference to Project's location in a Protected Area, it does

creates requirements relating to the protecting the Jilamito basin from further land clearing and developments.

The Project will not involve the construction of an access road or a transmission line within the RVS Texíguat. However, a narrow trail will be maintained along the path of the conduction pipe to permit access for maintenance.

In compliance with PS 6 requirements and as part of the Biodiversity Action Plan process, INGELSA is developing a plan for engagement with the managers and other stakeholders of the RVS Texíguat, including the ICF, PROLANSATE, Dr. Josiah Townsend, and other parties. INGELSA will advise the ICF that no changes to the boundaries or categorization of the RVS Texíguat should be proposed during the life of the project without the prior consent of the IIC, given the sensitivities of lenders to associated reputational risks with such changes. This engagement plan will seek to develop activities that will enhance the conservation of the RVS Texíguat in accordance with the objectives of the institutional and academic stakeholders.

Enforcement of management plans and rules relating to protected areas in Honduras is recognized as weak. In consultation with stakeholders and as part of the Biodiversity Action Plan process, INGELSA will develop a plan to enhance the protection of the RVS Texíguat from illegal deforestation, timber extraction, poaching, and other unauthorized activities. INGELSA will vigilantly enforce access restrictions to the Project area throughout the lifetime of the project.

INGELSA will provide logistical support to researchers in the RVS Texíguat by providing lodging and laboratory space in the Project facilities.

INGELSA security personnel will control unauthorized access and activities and report such activities to the national authorities for enforcement actions as necessary.

4.2 Key Biodiversity Areas

The IUCN has identified the Texiguat KBA on based on the presumed presence of a significant population of a globally threatened and endemic species known only to be found in a limited area, the frog *Isthmohyla insolita*. However, Townsend *et al.* (2010, 2012) could not find this frog either at its type locality on the leeward side or near La Liberación on the windward side of the RVS in apparently suitable habitats. This area would also qualify as a KBA for various other species such as the snake *Geophis damiani* and restricted-range species not evaluated or categorized as CR or EN by IUCN (such as *Anolis kreutzi* or *Bothriechis guifarroi*).

4.3 Alliance for Zero Extinction Areas

Similarly, an AZE Area has been delineated for *Isthmohyla insolita.* The IIC has financed projects in AZE Areas in Central America in the past 5 years. While recognized as examples of

key biodiversity areas that may be considered irreplaceable, the impacts of the Jilamito project and its Biodiversity Action Plan will bring net gains over the lifetime of the project.

4.4 Compliance with Requirements for Legally Protected and Internationally Recognized Areas

The Project does not require any modification of the RVS boundaries or zoning. As discussed above, hydropower projects with capacity up to 15 MW are expressly permitted in Protected Area Buffer Zones by Article 358 of the General Regulations of the Forestrty Law, for areas with approved management plans. ERM understands that the RVS has a management plan prepared by PROLANSATE and that the INGELSA and its contractors will act in a manner consistent with this plan.

ERM understands that INGELSA intends to engage PROLANSATE, the ICF, and other stakeholders, including scientific research institutions, to develop the Biodiversity Action Plan for the Project, which will specifically seek to promote enhance to aims of the RVS Texíguat, which includes the species for which the area has been identified as a KBA and AZE Area, and to more effective manage the area.

5.0 Recommendations for a Biodiversity Action Plan

INGELSA will develop a Biodiversity Action Plan (BAP) to demonstrate its approach to biodiversity conservation and the measures it will undertake to achieve net gains for the critical-habitat triggering species and ecosystems of the Jilamito project area of influence. The BAP should be developed in consultation with the managers of the RVS Texíguat (the ICF and PROLANSATE) and other stakeholders.

5.1 Pre-Construction Baseline Surveys

Prior to the start of land disturbing activities, INGELSA should perform surveys of terrestrial and aquatic biodiversity in the Project footprint and control sites to develop a baseline for the Project area of influence that will serve to establish restoration targets and conditions for evaluating future trends.

5.2 Quantification of Losses and Gains

Biodiversity losses resulting from the construction and operation of the Project will include:

- Habitat loss (measured in hectares or square meters) from construction of infrastructure and facilities.
- Mortality of individuals of priority species
- Displacement and disturbances of individuals of priority species that may result short-term reductions in fitness.

Biodiversity gains from the Project's implementation of the Biodiversity Action Plan will include:

- Averted loss of habitats resulting from illegal activities (e.g., deforestation for agriculture and livestock) within the RVS Texiguat and the Project's legal area of influence.
- Restoration of degraded areas through reforestation with native species in cooperation with local communities.
- Enhanced management of the RVS Texíguat through support to patrolling and enforcement, monitoring of key biodiversity and ecological indicators of the RVS Texíguat objectives, and support for continued research on the area's biodiversity and ecological processes.

5.3 Access Control and Prevention of Forest Conversion in the RVS Texíguat

Habitat loss is the primary threat to the endemic flora and fauna of the Cordillera Nombre de Dios and the RVS Texíguat. This loss is largely the result of conversion of forest for agriculture and livestock.

The Project is located in a steep and mountainous terrain of difficult access. INGELSA will construct a 7.7-km access road from the town of Mezapita to the powerhouse an elevation of 245 masl, outisde of the RVS Texíguat and the forested uplands. Beyond this point, materials will be transported to the upper portions of Project by a cable car system, helicopter, or mules. This will elimiminate potential for influx into the RVS Texíguat as a result of the Project. Furthermore, the Project will support patrolling of the protected area with its area of influence to ensure land use restrictions are respected and the forest ecosystems are protected from illegal activities.

5.4 Control of Invasive Species

The Project will monitor and take efforsts to control or erradicate invasive species in its area of direct influence. It will not use exotic species in revegetation works.

5.6 Biodiversity Monitoring and Evaluation Program

INGELSA will proactively track the status of the biodiversity in the Project area of influence and the effectiveness to the mitigations applied. Thes program will be developed and implemented in consultation and collaboration with local stakeholders. It will include the promotions of applied research that will support the management of the RVS Texíguat and include support for a field station for researchers and monitors.

6.0 References

AMBITEC. 2013. *Diagnóstico Ambiental Cualitativo "Hidroeléctrico Jilamito"*. 95 pp.

BirdLife International. 2016. Species factsheet: *Dendroica chrysoparia*. Downloaded from http://www.birdlife.org on 04/10/2016. Downloaded from http://www.birdlife.org on 04/10/2016.

Cruz G & Wilson LD. 2004. *Duellmanohyla salvavida*. The IUCN Red List of Threatened Species 2004: e.T55311A11288474. http://dx.doi.org/10.2305/IUCN.UK.2004.RLTS.T55311A11288474.en. Downloaded on 04 October 2016.

Cruz G, Wilson LD, & Casteñeda F. 2004. *Plectrohyla chrysopleura*. The IUCN Red List of Threatened Species 2004: e.T55872A11365700. http://dx.doi.org/10.2305/IUCN.UK.2004.RLTS.T55872A11365700.en. Downloaded on 04 October 2016.

Cruz G, Wilson LD, & McCranie R. 2004. *Ptychohyla spinipollex*. The IUCN Red List of Threatened Species 2004: e.T55918A11391648. http://dx.doi.org/10.2305/IUCN.UK.2004.RLTS.T55918A11391648.en. Downloaded on **04 October 2016**.

Cruz G, Wilson LD, & McCranie R. 2010. *Craugastor aurilegulus*. The IUCN Red List of Threatened Species 2010: e.T56442A11479043. http://dx.doi.org/10.2305/IUCN.UK.2010-2.RLTS.T56442A11479043.en. Downloaded on 04 October 2016.

Cuarón AD, Morales A, Shedden A, Rodriguez-Luna E, de Grammont PC, & Cortés-Ortiz L. 2008. *Ateles geoffroyi*. The IUCN Red List of Threatened Species 2008: e.T2279A9387270. http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T2279A9387270.en. Downloaded on 04 October 2016.

Froese R & Pauly D. Editors. 2016. *FishBase*. http://www.fishbase.org

García M, Jordan C, O'Farril G, Poot C, Meyer N, Estrada N, Leonardo R, Naranjo E, Simons Á, Herrera A, Urgilés C, Schank C, Boshoff L, & Ruiz-Galeano M. 2016. *Tapirus bairdii*. The IUCN Red List of Threatened Species 2016: e.T21471A45173340. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T21471A45173340.en. Downloaded on 04 October 2016.

ICF/DAP. 2009. *Normativas para el Manejo de Zonas de Amortiguamiento en Áreas Protegidas.* Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre/Departamento de Áreas Protegidas, Tegucigalpa. 49 pp.

Mejía M & Herrera J. 2010. *Aves de RVS Texiguat.* https://hondubirding.wordpress.com/2010/04/14/aves-de-rvs-texiguat/

Sosa, A. 2016. El descubrimiento de una planta única con una historia única… (8 febrero, 2016). http://hondurasisgreat.com/el-descubrimiento-de-una-planta-unica-con-una-historia-unica/

Townsend JH, Wilson, M Medina-Flores, E Aguilar-Urbina, BK Atkinson, CA Cerrato M., A Contreras-C., LN Gray, LA Herrera-B., IR Luque-M., M McKewy- Mejía, A Portillo-A., AL Stubbs, & JD Austin. 2012. A premontane hotspot of herpetofaunal endemism on the windward side of Refugio de Vida Silvestre Texíguat, Honduras. *Salamandra* 48(2): 92–114.

Townsend, JH, Medina-Flores, M, Wilson, LD, Jadin, RC, & Austin, JD. 2013. A relict lineage and new species of green palm-pitviper (Squamata, Viperidae, Bothriechis) from the Chortís Highlands of Mesoamerica. *ZooKeys* 298:77-105.

Townsend, JH, Wilson, LD, Medina-Flores, M, & Herrera-B., LA. 2013. A New Species of Centipede Snake in the *Tantilla taeniata* Group (Squamata: Colubridae) from Premontane Rainforest in Refugio de Vida Silvestre Texíguat, Honduras. *Journal of Herpetology* 47(1)191-200.

Wilson LD & Cruz G. 2004. *Incilius leucomyos*. The IUCN Red List of Threatened Species 2004: e.T54690A11175905. http://dx.doi.org/10.2305/IUCN.UK.2004.RLTS.T54690A11175905.en. Downloaded on 04 October 2016.

Wilson LD, Townsend JH, & Luque I. 2013. *Geophis damiani*. The IUCN Red List of Threatened Species 2013: e.T29457A2790328. http://dx.doi.org/10.2305/IUCN.UK.2013-2.RLTS.T29457A2790328.en. Downloaded on 30 September 2016.

Wilson LD, Luque-Montes IR, Alegría AB, & Townsend JH. El componente endémico de la herpetofauna hondureña en peligro crítico: priorización y estrategias de conservación. *Revista Latinoamericana de Conservación* 2(2)-(3)1:47-67.