

Conservation Action Plan for
Platymantis insulatus

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BACKGROUND

Species

Scientific name: *Platymantis insulatus*.

Common names: Gigantes forest frog, Gigantes limestone frog, Gigantes wrinkled ground frog.

Photo



Platymantis insulatus

Photo credit:https://en.wikipedia.org/wiki/Island_forest_frog#/media/File:Platymantis_insulatus01.jpeg Orig

Photo taken by Pierre Fidenci - <http://calphotos.berkeley.edu>

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Conservation status

IUCN: Critically-endangered (IUCN Amphibian Specialist Group, 2018).

Philippines National List of Threatened Terrestrial Fauna: Critically-endangered (Gonzalez et al., 2018).

Distribution, population size and trends

Platymantis insulatus has a naturally small, isolated range, limited to the Gigantes Island group. Historically, it was known from just three locations within the Gigantes Islands (Ferner et al, 2000), none of which occur within a protected area. We have found no literature concerning actual numbers of population sizes, nor has the entirety of the Gigantes islands been surveyed for this species. Bucol et al (2010) found the species on four Gigantes Islands, and stated that it was abundant in areas containing appropriate habitat, but it is believed that as habitat continues to be destroyed from timber extraction and mining operations, the population of *P. insulatus* is decreasing. The species was found on only four of the eight Gigantes Islands surveyed in 2014 (Philippines Red List Assessment Workshop May 2017). The truth is, little is known about true population sizes and trends; a thorough survey of this species needs to be conducted in conjunction with all in-situ and ex-situ conservation actions.

Habitat and ecology

Platymantis insulatus has unique habitat requirements, as it utilizes both karst cave systems and tropical/subtropical dry/moist forests in the vicinity of the caves. Bucol et al (2010) observed that it appears that adults reproduce within the cave systems, but both adults and juveniles venture out into the forest for feeding. The species is a direct-developer, and females are known to carry up to 48 eggs, but further aspects of this species reproductive biology are unknown.

Primary threats

The primary threats to this species are deforestation, climate change, and damage to cave ecosystems on Gigantes as a result of guano mining, tourism, and graffiti/vandalism (Foundation for the Philippine Environment, 2013; IUCN Amphibian Specialist Group, 2018, Gonzalez et al., 2018). It is unlikely that threats will be mitigated in the near future, hence the need for an ex-situ conservation program.

Conservation measures required

The Conservation Needs Assessment for *Platymantis insulatus* can be found at:

<https://conservationneeds.org/AssessmentResults.aspx?AssessmentID=2011&SpeciesID=4981&CountryID=137&AspxAutoDetectCookieSupport=1>

The Needs Assessment states that there is a possibility that the species is extinct in the wild, and recommends more intense field work to determine population dynamics, as well as a “Plan B” of a captive assurance colony.

Possible in-situ threat mitigations/conservation actions:

Short-term:

- Meet with local citizens and landowners, as well as the Department of the Environment and Natural Resources, to address concerns about conservation projects (prevent “NIMBY”), gather them at the table and make them stakeholders in the conservation of *Platymantis insulatus*.
- Develop partnerships with landowners for reforestation projects.
- Public education initiatives aimed at tourists, e.g., “responsible tourism”.

Mid-term:

- Reforestation initiatives- partner with other NGOs, identify nurseries for native tree stock, obtain seedlings, secure community involvement in replanting and caring for seedlings, monitor growth of trees.
- Economic alternatives to charcoal- Finding alternatives to charcoal production will be necessary. This will likely involve consultation with economic advisors.
- Release of captive bred *P. insulatus* into the wild (see below).

Long-term:

- Via partnership with the DENR and local landowners, appropriate habitat should be identified and set aside as a protected area.

While Project Palaka and the UPLB intends to spearhead conservation efforts for *Platymantis insulatus*, it is neither possible nor desirable for us to undertake every

conservation effort ourselves. We intend to partner with local citizens, as well as grassroots NGOs such as Foundation for the Philippine Environment, in order to ensure threat mitigation projects are realized. When necessary, we will also reach out to international organizations such as WWF and the Nature Conservancy; their partnership may be necessary when it comes time to create protected areas for the species.

In regards to ex-situ conservation actions, we propose to create an assurance colony containing representatives of *P. insulatus* from all four known islands as soon as possible (no later than Nov. 2019). Medium and long-term plans hinge on the success of captive breeding and the introduction of offspring back to the Gigantes Islands during/after in-situ conservation actions. Owing to the remoteness of Gigantes and the difficulty of organizing conservation efforts in the Philippines, Project Palaka feels that the entirety of the captive breeding/introduction project will take approximately 5-10 years, including post-introduction population monitoring.

Current protection

Platymantis insulatus does not occur within any protected areas. The habitat for *P. insulatus* on Gigantes islands are threatened by deforestation, habitat destruction, and potentially, tourism. Once the current state of habitat degradation is assessed (See “Conservation measures required”), appropriately sized reforestation/habitat restoration projects can be designed. These projects would be designed with input from Project Palaka staff, experts at the UPLB, international specialists (as needed), the Philippines DENR, and local stakeholders on Gigantes (landowners and business owners). Having a portion of Gigantes declared a protected area would be ideal, but this process would require navigating the legal system of the Philippines and would likely take several years, but we consider it to be “on the table”. However, for the immediate future, there are no guarantees that in-situ habitat can be effectively protected, and developing an ex-situ population is paramount.

Current and previous conservation actions

We have been unable to locate records of any previous conservation actions for *Platymantis insulatus*. The Foundation for the Philippine Environment has been working since 2015 to promote the conservation of cave ecosystems on the islands, but this has been limited to mostly public outreach, and there has been no species-specific conservation actions undertaken.

Knowledge gaps

There is a significant amount of information that is still needed concerning our understanding of *Platymantis insulatus*. The full extent of the species’ range within Gigantes is not yet known; neither is the true size of the population. The extent to which the species utilizes caves vs forests, and for what reasons, is not fully understood, though generally it is believed that caves are mostly utilized for reproduction and protection, and forests for finding food, though this needs more study (Bucol et al, 2010).

Challenges and obstacles

There are significant obstacles to overcome in order to achieve the goals of this action plan, but they are not insurmountable. They are categorized as follows:

1. Lack of knowledge- With so little (and somewhat contradictory information) available about this species, it is likely that this action plan will have to undergo subsequent revisions as more robust population data is gathered during the twice-yearly monitoring trips.

2. Organizational challenges- Obtaining permits takes time in the Philippines; we plan to start the application process in June 2019 to ensure we are able to begin field work on time. Additionally, travel to and from Gigantes requires careful advanced planning. A significant amount of budgetary requirements may be used not only by moving staff members to and from the study sites, but securing quick, safe transport for the founder animals off Gigantes and back to the Project Palaka facilities in Laguna province. This will likely require the hiring of aircraft, a quicker but more expensive method of travel than boat.
3. Efficacy of in-situ conservation actions- While Gigantes Islands are becoming a more popular tourist destination, the majority of the people living there are extremely impoverished. In order to ensure that any in-situ conservation measures (reforestation, designation of protected places, etc) are anything other than stop-gap measures, underlying socioeconomic issues must be addressed. That is why we intend to partner with Foundation for the Philippine Environment, which not only addresses environmental issues, but has already begun working with government officials on Gigantes to develop sustainable tourism and other economic opportunities for Gigantes residents.

Budget and funding sources

Project Cost Estimates:

Ex-situ: \$6,800 per year, five year total \$34,000

In-situ: \$7,255 year one, approx. \$3,000 per year thereafter, five year total \$19,255

*Staff compensation: \$6,000 year one; \$24,000 per year thereafter, five year total \$102,000

Year one total: \$14,055

Five year project total (without staff compensation):\$53,255

(Please note, we hope to eventually secure enough funding to run this project for a full decade. We believe that one reason that ex-situ projects can fail is shortness of duration- ending ex-situ efforts before the species is truly reestablished)

Additional funding sources: We have already applied to the Mohamed bin Zayed Species Conservation Fund for funding for year one of this project, for the purposes of covering field work. Applicants are allowed to reapply for subsequent years, with a maximum award amount of \$25,000 per year. We also intend to apply for second and third year extension grants from Amphibian Ark. For long-term operations (after year three), we are in talks to partner with institutions in the US, for the possibility of obtaining a small endowment. Such an endowment would also be used to pay staff members.

* Regarding staff compensation- Project Palaka will be working with additional threatened species of reptiles and amphibians (housed separately), and as such, money from other grants will be used for staff compensation. Any endowments received will also be used in part for staff compensation.

PRIORITY ACTIONS

In situ conservation actions

Habitat management, restoration and/or protection

As soon as possible, a comprehensive assessment of this species should be undertaken, including not only a population survey, but an updated habitat and threat assessment. The species was last assessed in 2017, when the IUCN Amphibian SSG stated that the population trends were decreasing, but that true population sizes were unknown. There is no evidence to indicate that any threats to the species have been abated in the past two years.

Gigantes islands are listed as a priority conservation area in the Philippines (Foundation for the Philippine Environment, 2019), however, there are no protected areas and conservation measures taken to date focus mainly on poverty reduction (ibid), which fuels deforestation for the making of charcoal.

Threat mitigation

Realistically, any in-situ threat mitigation will take years to organize, obtain relevant permits, and successfully execute; this underscores the need for an ex-situ component (see below). As an example, all tourism on Boracay Island was shut down from April-September 2018, to allow for environmental restoration efforts. This came only after years of complaints from local citizens concerning water quality, as well as algal blooms that grew to the extent that they threatened tourism.

Once the nature and extent of threats are better quantified, planning can begin for removal of threats. Currently, the most significant threats known to the species is habitat destruction through deforestation and poorly managed tourism.

Distribution surveys

With virtually no knowledge of the true extent of the species' range within Gigantes, comprehensive surveys of the islands need to be undertaken. It will likely take time to survey all islands completely. Project Palaka plans to search at least one new area in Gigantes during each population monitoring visit, and will not consider an area thoroughly searched until it has been visited at least twice (preferably three times). We also plan to train local volunteers to assist in searching, which will allow for more ground to be covered in a given search.

Population and conservation status monitoring

Project Palaka intends to conduct population counts every six months in order to obtain long-term population data, as well as information about population fluctuations and the impact of climate change on this species. Population monitoring will begin in Oct/Nov. 2019, when we conduct an initial population assessment and collect founders for the ex-situ breeding program. The sites designated at that time as monitoring sites will be counted again in April/May 2020. The monitoring will continue twice yearly, every Oct/Nov. and April/May. Monitoring will be conducted by Project Palaka staff, trained UPLB students, and local personnel designated and trained to assist with field work.

The DENR will also be invited to join us in the field whenever they desire. Some monitoring sites will be used to release captive-bred individuals, others will be kept as "control" sites, in order to determine the extent to which our ex-situ component is helping maintain or raise population levels. Exact size of transects/plots will be determined after initial assessment in 2019. Counts will be conducted using a standard mark/recapture techniques.

Ex situ conservation actions

Captive management

We assert that a captive breeding program is needed in the immediate future in order to protect *Platymantis insulatus*. The purpose of a captive breeding program will be two-fold:

1. To develop an assurance colony in the event that in-situ conservation, including threat mitigation, is not enacted in time to prevent localized extinctions.
2. To develop a reintroduction/headstarting program to increase local populations of the species, in an effort to compliment in-situ conservation practices.

Ideally, we hope to collect animals from each of the four islands where *Platymantis insulatus* was confirmed in 2014. Due to space limitations at the start of this project, we intend to start with 12-15 breeding pairs from each island. As Project Palaka grows (current expansion is scheduled for late 2020-early 2021), additional founders may be taken to expand the program, if warranted. If sufficient individuals of *P. insulatus* are not found on a given island, additional frogs will be collected from other islands, ensuring the total number of 48-60 breeding pairs of frogs. If the species has been found to have been extirpated from a site previously known to contain *P. insulatus*, that area will be selected for possible reintroduction efforts.

To our knowledge, *Platymantis insulatus* is not currently kept in captivity, nor is there any indication that it has ever been the focus of an ex-situ conservation project. Project Palaka will spearhead the captive breeding program for *P. insulatus*, in partnership with the UPLB Museum of Natural History. When appropriate, we will coordinate with Avilon Zoo in Quezon City and the National Museum of Natural History in Manila; both organizations have an excellent reputation for supporting scientifically-based conservation efforts.

In order to maintain the genetic integrity of our captive *P. insulatus* population, Project Palaka will utilize the guidelines set forth by the Association of Zoos and Aquariums. This management begins at the individual level. Every frog in the captive population, the following information will be recorded (taken and modified from Schad, 2008):

- Individual identification (markings, photos, individual housing)
- Parentage- mother and father (for captive-born individuals)
- Sex
- Birth/hatch date, location, and origin
- If wild caught, record date, site location, possible relationship to other wild caught individuals and date animal entered captivity.
- If zoo/aquarium born, record parents and their wild caught locations
- Enclosure composition (i.e., who housed with whom, in breeding situation or not)

This information will be used to ensure that inbreeding and line breeding do not occur. Individuals from different islands will not be bred together, as it is currently assumed that the subpopulations of *P. insulatus* on each island are isolated and there is no drift (Bucol et al., 2010). This is in keeping with the AZA guidelines for captive populations of amphibians (Schad, 2008), which state that any husbandry conducted for purposes of release should ensure that captive breeding programs do not impact the target species' genetics in a manner inconsistent with what would occur in the wild. The procurement of additional founders after the eventual expansion of Project Palaka will further ensure genetic diversity of the colony.

Capacity building for *ex situ* management

The Philippines contains many skilled herpetologists, as well as a significant number of individuals trained in captive animal husbandry, owing to the number of ex-situ projects and zoos in the country. Accomplished researchers such as Dr. Leticia Espiritu-Afuang and Dr. J.C. Gonzalez work at the UPLB and are associated in some capacity with Project Palaka. Others, such as Noel Rafael of Aviron Zoo and Dr. Arvin Diesmos of the National Museum of Natural History have consulted with Project Palaka in the past. Project Palaka is the first ex-situ amphibian conservation project in the Philippines, and as such, will be the organization responsible for training future personnel in ex-situ conservation.

We aim to accomplish this by establishing a training program for UPLB students. In addition to *Platymantis insulatus*, Project Palaka will house (separately) colonies of analog species such as *Platymantis corrugatus*, an IUCN least-concern species, to allow students to practice and perfect ex-situ techniques before working their way up to more threatened species such as *P. insulatus*. This will allow for a “learning curve” for students, without risking critically-endangered species of amphibians.

Develop husbandry guidelines

Currently, there are no captive husbandry guidelines or protocols for *Platymantis insulatus*. However, Project Palaka has successfully maintained analog *Platymantis* species, such as *Platymantis corrugatus*, *Platymantis luzonensis*, and *Platymantis dorsalis*. Our findings are not yet published, but we developed successful protocols for maintaining colonies of *Platymantis* that are customized to the local infrastructure and supply issues in Laguna province. Generally speaking, the husbandry protocols were adapted from those used at the Panama Amphibian Rescue and Conservation project in Gamboa, Panama, where Norman Greenhawk learned ex-situ conservation techniques.

Project Palaka housed *Platymantis spp.* individually, in appropriately sized plastic containers with artificial environments within (forest floor, arboreal, etc.). For breeding attempts, these direct-developing frogs were paired in a terrestrial setup with a false bottom, allowing for the circulation of water to simulate the rainy season without inundating the animals. *P. insulatus* will be kept in similar setups, tailored to their unique habitat requirements. These setups will be adjusted over time as necessary, as we learn more information about the captive needs of this species. Project Palaka will be responsible for developing the captive care protocols for *Platymantis insulatus*, and will publish them in an open-access journal or technical manual to allow their dissemination to other conservation organizations.

Ex situ research

As *Platymantis insulatus* is a karst/cave-dwelling species, and has been the focus of little research, there are likely to be several “unknown unknowns” about this species. Captive conditions will need to meet the habitat requirements, and will likely have to be modified throughout the project as we better come to understand the species and its reactions to captivity. Currently, we are unaware of any disease concerns for *P. insulatus*, but these and other issues may come to light once the project begins, and appropriate research will be conducted as necessary. Project Palaka and UPLB Museum of Natural History will spearhead any research necessary, coordinating and partnering with the UPLB College of Veterinary Medicine as needed.

Supplementation/translocation

Currently, Project Palaka only plans to reproduce *Platymantis insulatus* in captivity for the purposes of releasing captive-bred individuals at the locations where their respective founders were collected. Fieldwork in late 2019 may yield sites suitable for supplementation/translocation, and if so, this action plan will be updated.

Reintroduction strategy

We intend to begin reintroduction in 2021. Prior to release into the wild, Project Palaka will coordinate with members of the UPLB College of Veterinary Medicine to determine that all animals being released are healthy and disease free; specifically, animals will be tested for nematodes and other internal parasites, and will be examined to determine that they are of a sufficient, healthy weight. Project Palaka and UPLB students will release animals during planned monitoring trips, ideally in the April/May monitoring season. Animals will be marked via toe clip for mark-recapture surveys (as will wild frogs identified in surveys).

When a group of captive animals are released at a given site, this will require a slightly extended monitoring session during that trip. Animals will be released after the population count for that season has been conducted. Then, after release, an additional count will be conducted approximately one week later in order to gather post-release population data. As Project Palaka will conduct monitoring every six months, any frogs released will be part of the population counted in subsequent counts, and their clippings will identify them as such.

In addition to release sites, Project Palaka will conduct population monitoring at sites that contain *P. insulatus*, but have not been selected for reintroduction. This way, while we will not be able to tell which frogs at subsequent counts are offspring of released frogs, we can compare total population sizes at release sites against “control” sites, in order to better determine the impact of the ex-situ conservation initiative. We currently plan to continue monitoring for a 10 year periods, should sufficient funding be available.

Education and awareness

Public education and raising awareness

There is virtually no environmental education in the Philippines until post-secondary education. Project Palaka plans to conduct monthly herpetological and conservation oriented outreach to local schools in Laguna province, from grades K-12. These outreach programs will involve the use of appropriate live animals with a designation of IUCN Least-concern. Additionally, we plan to engage with other NGOs to develop a public education campaign specifically about endangered amphibians such as *Platymantis insulatus*. Within the Gigantes islands, public outreach may yield positive results, as the local government is looking to increase tourism focused on the biodiversity of the islands. We will also look into developing an outreach for schools in Gigantes that will be conducted during our monitoring visits, but this idea has not yet been developed. Lastly, once the ex-situ breeding program is well underway, Project Palaka will look at the feasibility of donating animals not fit for the breeding program to an educational display at Avilon zoo.

Community and stakeholder engagement

This plan has been developed solely by Project Palaka, and as such, should be seen only as a beginning outline of the work that needs to be done. Project Palaka is open to collaboration with all Philippine NGOs, as well as government agencies such as the DENR. We firmly believe that the success of any conservation initiative for *Platymantis insulatus* will need to involve local landowners, local politicians, citizens, and NGOs such as Foundation for the Philippine Environment. Indeed, while Project Palaka and UPLB will be solely responsible for the ex-situ conservation of *P. insulatus*, we will need additional personnel to assist with threat mitigation such as reforestation efforts. Project Palaka is committed to bringing all stakeholders to the table, and will update this section as needed.

Exit strategy

There are circumstances that might necessitate the ending of conservation efforts for *Platymantis insulatus*. They are as follows:

1. A comprehensive assessment of the Gigantes Islands yields data that the populations of *P. insulatus* are larger than expected and are not facing any significant threats (unlikely, but possible given the lack of population data for this species). Alternatively, the initial assessment shows that the species has already gone extinct.
2. Multiple releases of animals into the wild yield a sustained or increased population, to such an extent the continued release of captive-raised animals reaches a point of diminishing returns, financially speaking.
3. Funding for the program runs out.
4. In-situ threat mitigation fails and the species becomes extinct in the wild during the course of this project.

For circumstances 1-3, the majority of captive animals will be released, with the exception of those that will be continued to be held in captivity for educational or research purposes. Those animals that remain in captivity will be cared for by Project Palaka or donated to an appropriate zoo or university. In the event of circumstance #4, conservation efforts will not cease, but will instead focus on increasing the captive population of *P. insulatus* as much as possible, including setting up additional breeding programs in partnership with other institutions, both in the Philippines and abroad. If threat mitigation fails completely, then there is a possibility that for the foreseeable future, *P. insulatus* will remain only in captivity until a time that habitat damage can be reversed, not unlike *Atelopus zeteki* in Panama.

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