

# IUCN Red List and Amphibian Ark Conservation Needs Assessment Workshop: An effort for the Second Global Amphibian Assessment



Parque Zoológico y Jardín Botánico Nacional Simón Bolívar  
San José, Costa Rica  
9-13 September, 2019

## FINAL REPORT



Rodríguez, J., Chaves, G., Neam, K., Luedtke, Carrillo, L., Bolaños, F. & Matamoros, Y. (Eds). 2020. IUCN Red List and Amphibian Ark Conservation Needs Assessment Workshop: An effort for the Second Global Amphibian Assessment. 9-13 September, 2019. Parque Zoológico y Jardín Botánico Nacional Simón Bolívar, San José, Costa Rica. IUCN SSC Amphibian Specialist Group and IUCN SSC Conservation Planning Specialist Group (CPSG Mesoamerica).

**Cover picture:** *Agalychnis annae*. Eduardo Bolaños.

A collaboration between IUCN SSC Amphibian Specialist Group, Amphibian Ark, Biology School of Universidad de Costa Rica, Fundación Pro Zoológicos, and IUCN SSC Conservation Planning Specialist Group (CPSG Mesoamerica).

IUCN encourages meetings, workshops and other fora for the consideration and analysis of issues related to conservation and believes that reports of these meetings are most useful when broadly disseminated.

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**Section I  
Agenda**

**IUCN Red List and Amphibian Ark Conservation Needs Assessment Workshop**  
**9-13 September 2019**



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**Location details**

**Hotel Don Carlos**  
 Calle 9, San José Province  
 San José, Costa Rica

**Zoológico Nacional Simón Bolívar**  
 Av 11 entre Calles 7 & 9  
 San José, 10101, Costa Rica

**Schedule**

Date & time	Activity	Location	Details
<b>Sunday 8</b>			
<b>Arrival day</b>			
13:00	Hotel check-in	Hotel Don Carlos	If applicable
<b>Monday 9</b>			
08:00 - 10:00	<b>Workshop</b> <ul style="list-style-type: none"> <li>• Introductions and orientation</li> <li>• IUCN Red List training</li> <li>• AZE training</li> </ul>	Zoológico Simón Bolívar	
10:00 - 10:30	-- <i>Coffee break</i> --		
10:30 - 12:00	<ul style="list-style-type: none"> <li>• Conservation Needs Assessment training</li> <li>• Group discussion: <i>key threats to Costa Rican amphibians</i></li> </ul>		
12:00 - 13:00	-- <i>Lunch</i> --		
13:00 - 15:00	Species assessments		
15:00 - 15:30	-- <i>Coffee break</i> --		
15:30 - 18:00	Species assessments		
<b>Tuesday 10</b>			
08:00 - 10:00	Species assessments	Zoológico Simón Bolívar	
10:00 - 10:30	-- <i>Coffee break</i> --		
10:30 - 12:00	Species assessments		
12:00 - 13:00	-- <i>Lunch</i> --		
13:00 - 15:00	Species assessments		
15:00 - 15:30	-- <i>Coffee break</i> --		
15:30 - 18:00	Species assessments		

<b>Wednesday 11</b>			
08:00 - 10:00	Species assessments	Zoológico Simón Bolívar	
10:00 - 10:30	-- <i>Coffee break</i> --		
10:30 - 12:00	Species assessments		
12:00 - 13:00	-- <i>Lunch</i> --		
13:00 - 15:00	Species assessments		
15:00 - 15:30	-- <i>Coffee break</i> --		
15:30 - 17:00	Species assessments		
19:00 - 21:00	-- <i>Social activity</i> --	Zoológico Simón Bolívar	<i>Observe nocturnal species, e.g. Agalychnis annae</i>
<b>Thursday 12</b>			
08:00 - 10:00	Species assessments	Zoológico Simón Bolívar	
10:00 - 10:30	-- <i>Coffee break</i> --		
10:30 - 12:00	Species assessments		
12:00 - 13:00	-- <i>Lunch</i> --		
13:00 - 15:00	Species assessments		
15:00 - 15:30	-- <i>Coffee break</i> --		
15:30 - 18:00	Species assessments		
<b>Friday 13</b>			
08:00 - 10:00	Species assessments	Zoológico Simón Bolívar	
10:00 - 10:30	-- <i>Coffee break</i> --		
10:30 - 12:00	Species assessments		
12:00 - 13:00	-- <i>Lunch</i> --		
13:00 - 15:00	Species assessments		
15:00 - 15:30	-- <i>Coffee break</i> --		
15:30 - 18:00	Group discussion: <i>preliminary results and next steps for the conservation of Costa Rican amphibians</i>		
<b>Saturday 14</b>			
09:30	<b>Departure day</b>		

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**Section II  
Executive summary**

## **IUCN Red List and Amphibian Ark Conservation Needs Assessment Workshop: An effort for the Second Global Amphibian Assessment**

### **Summary**

Costa Rica has 215 amphibian species known to science, of which 53 have been re-assessed under a threatened category of the IUCN Red List. While EN and VU species tend to be threatened by habitat loss and pollution, the CR and CR(PE) species tend to be threatened by elements hard to control or mitigate, such as climate change and the amphibian chytrid fungus, *Batrachochytrium dendrobatidis* (*Bd*). Regular conservation assessments have shown many amphibian species keeping the same conservation status through time, the majority of which are LC species. This suggests that their habitat is stable, they are able to adapt to environmental changes over time, or that any population declines are not severe enough to meet the IUCN thresholds for the NT or VU categories. Species in the DD category are often difficult to find because of an isolated distribution, fossorial or arboreal (canopy) habits, or taxonomy issues that may affect their conservation status or even the validity of the name. Although the number of EX species is low, there is still an important number of CR and CR(PE) which could be a sign that the conservation actions in place are not enough and these species would need more targeted actions such as further levels of *in situ* protection and in certain instances *ex situ* assurance populations.

### **Introduction**

The Amphibian Red List Authority of the IUCN SSC Amphibian Specialist Group (ASG) is undertaking the second Global Amphibian Assessment (GAA2) to evaluate the conservation status of amphibians around the globe. This is an effort to update the results of the first GAA of 2004. Part of this effort included a workshop held in Costa Rica to update the global IUCN Red List assessments of the country's species. Amphibian Ark (AArk) also conducted Conservation Needs Assessments (CNAs) (Johnson et.al., 2018) to identify priority species and their immediate conservation needs. Finally, sites that meet The Alliance for Zero Extinction (AZE) criteria were reviewed; each of these key sites hold the last remaining populations of one or more EN or CR species.

This workshop was organized by the ASG, AArk, and the Biology School of Universidad de Costa Rica, with the collaboration of Conservation Breeding Specialist Group (CPSG Mesoamerica) and Fundación Pro Zoológicos (FUNDAZOO). It was held at the Simón Bolívar National Zoo and Botanical Garden during September 9-13, 2019. Thirty-eight participants from 18 organizations that work with amphibians attended.

In this report, the results of the GAA2 are compared with the results from the 2014 National Assessment and the existing data on the IUCN Red List (as of December, 2019). This comparison highlights new information about the species and threats that have changed their conservation status over time. For more information about the IUCN Red List and its criteria,

please review “IUCN Red List Categories and Criteria Version 3.1 Second edition” (IUCN 2012) and the Annex information present in this report.

## Results

The number of species reported for Costa Rica has steadily increased between assessments (IUCN Red List website: 194, 2014 National Assessment: 199, GAA2: 215). After eliminating species that are listed as probably extant, but have not been reported in the country, but including the introduced species *Lithobates catesbeianus* which is thought to be extinct at present for Costa Rica, there are 215 species reported in the country (Table 1).

Of the total number of species assessed, 53 were under a threatened category, of these, 18 of which are endemic. About half of these species (28) were assessed as threatened under the criterion B, related to a small global extent of occurrence and ongoing declines or extreme fluctuation, or criterion D2, related to a small area of occupancy or number of locations. The other species (25) were assessed under criteria A and C, related to past, present and/or future population decline, or D, related to very small population size. Species assessed as VU and EN, tend to be listed under criterion B with threats related to habitat loss and pollution. In contrast, CR and CR(PE) species tend to be listed under criteria C and D. Many of them suffered enigmatic declines in the past, related to *Batrachochytrium dendrobatidis* (*Bd*) infections and probably climate change, and are now either surviving in very low numbers or are possibly extinct (Tables: 1, 2 and 3). A large number of species stayed in the same category between the three assessments (124). Many species remained as LC (96) which could be an indicator of the role of protected areas in the conservation of many of these species, together with the ability to adapt to changes in the environment. However, unfortunately, some species (14) remained in the CR, CR(PE) category, mainly due to small population numbers and/or ongoing decline (Criteria C and D) (Tables: 1 and 2).

Sixty one species (61) changed categories between the existing data on the IUCN Red List and the 2019 global workshop, without including species assessed only in one of the workshops, but including *Gastrotheca cornuta* that still needs more information from other countries to have a definitive assessment. These changes are mostly because of new information on distribution, abundance, threats, and taxonomy (see Tables: 1 and 3), either in Costa Rica or other countries where the species occur. Several of these species have an isolated distribution. Increased survey effort and data collection can influence the evaluation of the species, highlighting the importance of more continuous monitoring to help avoid sudden changes in their conservation status between evaluations.

Unfortunately, two (2) species that were considered as CR in the previous analysis are now considered EX (Table 1). However, one that was considered EX in 2004 and 2014 has been rediscovered (*Craugastor escoces*). Some species that had not been recorded for a long time and were considered as CR in the 2014 workshop (5) were re-categorized as CR(PE) in this workshop, and will probably be considered EX if they are not found during targeted surveys in the near future (Tables: 1, 2 and 3).

Information on some species (18) is scarce or too uncertain, requiring an assessment of DD. Six of these (6) have kept this category across the current IUCN, 2014, and 2019 assessments. This group of species has either a difficult to access distribution, fossorial or arboreal (canopy) habits that make them difficult to study, or taxonomic issues that may affect their conservation status or even the recognition of the species name (Tables 1, 2 and 3).

The evaluation of the Amphibian Ark Conservation Needs Assessment highlighted 54 species that are priorities for *in situ* conservation, 170 species for *in situ* research, 12 species for *ex situ* rescue, 4 species for husbandry research, 1 species for mass reproduction in captivity, 7 species for conservation education (diurnal and colorful species), 12 species for biobanking and 24 species with no conservation needs. For more detailed information, visit [conservationneeds.org/default.aspx](http://conservationneeds.org/default.aspx).

The 2017 AZE online consultation process identifies nine (9) amphibian trigger species in Costa Rica (see <https://zeroextinction.org/site-identification/2018-global-aze-map/>):

*Atelopus chirripoensis*

*Nototriton major*

*Bolitoglossa compacta*

*Oedipina altura*

*Craugastor fleishmanni*

*Oedipina grandis*

*Craugastor taurus*

*Oedipina paucidentata*

*Incilius holdridgei*

The updated IUCN Red List categories from the 2019 workshop led to the proposal of several additional trigger species and eliminated other ones because the updated Red List categories make it such that the AZE criteria are no longer met. The list of proposals has been sent for consideration by the Alliance and will be available on the AZE website on a future update.

### **Literature cited**

Johnson, K., Baker, A., Buley, K., Carrillo, L., Gibson, R., Gillespie, G., Lacy, R., and Zippel, K. (2018). A process for assessing and prioritizing species conservation needs: going beyond the Red List. *Oryx*. 1-8. 10.1017/S0030605317001715.

IUCN. (2012). *IUCN Red List Categories and Criteria: Version 3.1. Second edition*. Gland, Switzerland and Cambridge, UK: IUCN. iv + 32pp.

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**Section III  
Tables**

**Cuadro 1:** Análisis del estado de conservación de las especies de anfibios según: Sitio web de UICN, Taller Nacional de Costa Rica (2014) y GAA 2 (2019). NE: No Evaluado, LC: Preocupación Menor, NT: Casi Amenazado, VU: Vulnerable, EN: En Peligro, CR: En Peligro Crítico, CR (PE): En Peligro Crítico (Posiblemente Extinto), EX: Extinto. Para una explicación sobre el significado de los criterios referirse al Anexo y las Categorías y Criterios de la Lista Roja de la UICN: Versión 3.1 (UICN 2012).

Familia	Especie	Sitio web UICN	Criterios	Costa Rica (2014)	Criterios	GAA 2 (2019)	Criterios
Aromobatidae	<i>Allobates talamancae</i>	LC		LC		LC	
Bufo	<i>Atelopus chiriquiensis</i>	CR	A2ace	CR	A2ace	EX	
Bufo	<i>Atelopus chirripoensis</i>	CR	D	CR	D	DD	
Bufo	<i>Atelopus senex</i>	CR	A2ace	CR	A2ace	EX	
Bufo	<i>Atelopus varius</i>	CR	A2ace	CR	A2ace	CR	A2ace
Bufo	<i>Incilius aucoinae</i>	LC		LC		LC	
Bufo	<i>Incilius chompipe</i>	VU	D2	VU	D2	EN	B1ab(iii)
Bufo	<i>Incilius cocifer</i>	LC		LC		LC	
Bufo	<i>Incilius coniferus</i>	LC		LC		LC	
Bufo	<i>Incilius epioticus</i>	LC		LC		VU	B1ab(iii)
Bufo	<i>Incilius fastidiosus</i>	CR	A2ace	CR	A2ace	CR(PE)	D
Bufo	<i>Incilius guanacaste</i>	DD		DD		EN	B1ab(i,ii,iii)
Bufo	<i>Incilius holdridgei</i>	CR	D	CR	D	CR	D
Bufo	<i>Incilius luetkenii</i>	LC		LC		LC	
Bufo	<i>Incilius melanochlorus</i>	LC		LC		LC	
Bufo	<i>Incilius periglenes</i>	EX		EX		EX	
Bufo	<i>Incilius valliceps</i>	LC		LC		LC	
Bufo	<i>Rhaebo haematiticus</i>	LC		LC		LC	
Bufo	<i>Rhinella horribilis</i>	LC		LC		LC	
Caecilia	<i>Caecilia volceni</i>	NE		NE		LC	
Caecilia	<i>Oscaecilia osae</i>	DD		DD		LC	
Centrolenidae	<i>Cochranella euknemos</i>	LC		LC		LC	
Centrolenidae	<i>Cochranella granulosa</i>	LC		LC		LC	
Centrolenidae	<i>Espadarana prosoblepon</i>	LC		LC		LC	
Centrolenidae	<i>Hyalinobatrachium chirripoi</i>	LC		LC		LC	
Centrolenidae	<i>Hyalinobatrachium colymbiophyllum</i>	LC		LC		LC	

Familia	Especie	Sitio web UICN	Criterios	Costa Rica (2014)	Criterios	GAA 2 (2019)	Criterios
Centrolenidae	<i>Hyalinobatrachium diana</i>	NE		NE		LC	
Centrolenidae	<i>Hyalinobatrachium fleischmanni</i>	LC		LC		LC	
Centrolenidae	<i>Hyalinobatrachium talamancae</i>	LC		LC		LC	
Centrolenidae	<i>Hyalinobatrachium valerioi</i>	LC		LC		LC	
Centrolenidae	<i>Hyalinobatrachium vireovittatum</i>	DD		LC		LC	
Centrolenidae	<i>Sachatamia albomaculata</i>	LC		LC		LC	
Centrolenidae	<i>Sachatamia ilex</i>	LC		LC		LC	
Centrolenidae	<i>Teratohyla pulverata</i>	LC		LC		LC	
Centrolenidae	<i>Teratohyla spinosa</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor aenigmaticus</i>	NE		NE		NT	
Craugastoridae	<i>Craugastor andi</i>	CR	A2ace	CR	A2ace	CR(PE)	D
Craugastoridae	<i>Craugastor angelicus</i>	CR	A2ace	CR	A2ace	CR	C2a(ii)
Craugastoridae	<i>Craugastor bransfordii</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor catalinae</i>	CR	A2ace	CR	A2ace	CR(PE)	D
Craugastoridae	<i>Craugastor crassidigitus</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor cuaquero</i>	DD		DD		DD	
Craugastoridae	<i>Craugastor escoces</i>	EX		EX		CR	C2a(ii)
Craugastoridae	<i>Craugastor fitzingeri</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor fleischmanni</i>	CR	D	CR	D	CR	C2a(i)
Craugastoridae	<i>Craugastor gabbi</i>	NE		NE		LC	
Craugastoridae	<i>Craugastor gollmeri</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor gulosus</i>	CR	D	DD		CR(PE)	D
Craugastoridae	<i>Craugastor megacephalus</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor melanostictus</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor mimus</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor noblei</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor obesus</i>	CR	D	CR	B1ab(iv)	CR	C2a(i)
Craugastoridae	<i>Craugastor persimilis</i>	VU	B1ab(iii)	LC		LC	
Craugastoridae	<i>Craugastor phasma</i>	DD		DD		CR(PE)	D
Craugastoridae	<i>Craugastor podiciferus</i>	NT		NT		LC	
Craugastoridae	<i>Craugastor polyptychus</i>	LC		LC		LC	

Familia	Especie	Sitio web UICN	Criterios	Costa Rica (2014)	Criterios	GAA 2 (2019)	Criterios
Craugastoridae	<i>Craugastor ranoides</i>	CR	A2ace	CR	A2ace	CR	A2ace
Craugastoridae	<i>Craugastor rayo</i>	DD		DD		EN	B1ab(iii)
Craugastoridae	<i>Craugastor rhyacobatrachus</i>	EN	B1ab(iii,v)	CR	B1ab(iii,iv)	CR(PE)	D
Craugastoridae	<i>Craugastor rugosus</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor stejnegerianus</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor talamancae</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor taurus</i>	CR	A2ace	CR	A2ace	EN	B1ab(iii)
Craugastoridae	<i>Craugastor underwoodi</i>	LC		LC		LC	
Craugastoridae	<i>Craugastor zunigai</i>	NE		NE		LC	
Craugastoridae	<i>Pristimantis altae</i>	NT		LC		LC	
Craugastoridae	<i>Pristimantis caryophyllaceus</i>	NT		NT		LC	
Craugastoridae	<i>Pristimantis cerasinus</i>	LC		LC		LC	
Craugastoridae	<i>Pristimantis cruentus</i>	LC		LC		LC	
Craugastoridae	<i>Pristimantis gaigei</i>	LC		LC		LC	
Craugastoridae	<i>Pristimantis moro</i>	LC		LC		LC	
Craugastoridae	<i>Pristimantis pardalis</i>	NT		LC		LC	
Craugastoridae	<i>Pristimantis ridens</i>	LC		LC		LC	
Craugastoridae	<i>Pristimantis taeniatus</i>	LC		LC		LC	
Craugastoridae	<i>Strabomantis bufoniformis</i>	LC		LC		EN	A4ace
Dendrobatidae	<i>Dendrobates auratus</i>	LC		LC		LC	
Dendrobatidae	<i>Oophaga granulifera</i>	VU	B1ab(iii)	VU	B1ab(iii)	VU	B1ab(iii,v)
Dendrobatidae	<i>Oophaga pumilio</i>	LC		LC		LC	
Dendrobatidae	<i>Phyllobates lugubris</i>	LC		LC		LC	
Dendrobatidae	<i>Phyllobates vittatus</i>	EN	B1ab(iii)	EN	B1ab(iii)	VU	B1ab(iii)
Dendrobatidae	<i>Silverstoneia flotator</i>	LC		LC		LC	
Dendrobatidae	<i>Silverstoneia nubicola</i>	NT		CR	B1ab(iv)	VU	A2ace
Dermophiidae	<i>Dermophis costaricense</i>	DD		DD		DD	
Dermophiidae	<i>Dermophis glandulosus</i>	DD		LC		LC	
Dermophiidae	<i>Dermophis gracilior</i>	DD		DD		DD	
Dermophiidae	<i>Dermophis occidentalis</i>	DD		LC		LC	
Dermophiidae	<i>Dermophis parviceps</i>	LC		LC		LC	

Familia	Especie	Sitio web UICN	Criterios	Costa Rica (2014)	Criterios	GAA 2 (2019)	Criterios
Dermophiidae	<i>Gymnopsis multiplicata</i>	LC		LC		LC	
Eleutherodactylidae	<i>Diasporus amirae</i>	NE		NE		LC	
Eleutherodactylidae	<i>Diasporus diastema</i>	LC		LC		LC	
Eleutherodactylidae	<i>Diasporus hylaeformis</i>	LC		LC		LC	
Eleutherodactylidae	<i>Diasporus tigrillo</i>	DD		DD		NT	
Eleutherodactylidae	<i>Diasporus ventrimaculatus</i>	VU	D2	LC		LC	
Eleutherodactylidae	<i>Diasporus vocator</i>	LC		LC		LC	
Eleutherodactylidae	<i>Eleutherodactylus coqui</i> <sup>†</sup>	LC		LC		LC	
Eleutherodactylidae	<i>Eleutherodactylus johnstonei</i> <sup>†</sup>	LC		LC		LC	
Eleutherodactylidae	<i>Eleutherodactylus planirostris</i> <sup>†</sup>	NE		NE		LC	
Hemiphractidae	<i>Gastrotheca cornuta</i>	EN	A4ace	EN	B1ab(iv)	Mayor análisis	
Hylidae	<i>Agalychnis annae</i>	EN	B1ab(iii)	LC		VU	B1ab(iii)
Hylidae	<i>Agalychnis callidryas</i>	LC		LC		LC	
Hylidae	<i>Agalychnis lemur</i>	CR	A4ace	CR	A4ace	CR	A2ace
Hylidae	<i>Agalychnis saltator</i>	LC		LC		LC	
Hylidae	<i>Agalychnis spurrelli</i>	LC		LC		LC	
Hylidae	<i>Boana rosenbergi</i>	LC		LC		LC	
Hylidae	<i>Boana rufitela</i>	LC		LC		LC	
Hylidae	<i>Cruziohyla calcarifer</i>	LC		LC		LC	
Hylidae	<i>Cruziohyla sylviae</i>	NE		NE		LC	
Hylidae	<i>Dendropsophus ebraccatus</i>	LC		LC		LC	
Hylidae	<i>Dendropsophus microcephalus</i>	LC		LC		LC	
Hylidae	<i>Dendropsophus phlebodes</i>	LC		LC		LC	
Hylidae	<i>Duellmanohyla lythrodes</i>	EN	B1ab(iii)	DD		EN	B1ab(iii)
Hylidae	<i>Duellmanohyla rufiocularis</i>	LC		LC		LC	
Hylidae	<i>Duellmanohyla uranochroa</i>	EN	D	LC		VU	B1ab(iii)
Hylidae	<i>Ecnomiohyla bailarina</i>	NE		NE		NT	
Hylidae	<i>Ecnomiohyla fimbrimembra</i>	EN	B1ab(iii)	EN	B1ab(iii)	VU	B1ab(iii)
Hylidae	<i>Ecnomiohyla miliaria</i>	VU	B1ab(iii)	VU	B1ab(iii)	LC	
Hylidae	<i>Ecnomiohyla sukia</i>	NE		LC		LC	
Hylidae	<i>Ecnomiohyla veraguensis</i>	NE		NE		VU	B1ab(iii,V)

Familia	Especie	Sitio web UICN	Criterios	Costa Rica (2014)	Criterios	GAA 2 (2019)	Criterios
Hylidae	<i>Hyloscirtus colymba</i>	NT		CR	A4ace	EN	A2ace
Hylidae	<i>Hyloscirtus palmeri</i>	LC		LC		LC	
Hylidae	<i>Isthmohyla angustilineata</i>	CR	A2ae	CR	A2ae	CR	C2a(i)
Hylidae	<i>Isthmohyla calypsa</i>	CR	A2ace	CR	A2ace	CR(PE)	D
Hylidae	<i>Isthmohyla debilis</i>	CR	A2ace	CR	A2ace	CR	C1
Hylidae	<i>Isthmohyla lancasteri</i>	LC		LC		LC	
Hylidae	<i>Isthmohyla picadoi</i>	NT		LC		LC	
Hylidae	<i>Isthmohyla pictipes</i>	EN	B1ab(iii,v)	EN	B1ab(iii,v)	CR	C2a(i)
Hylidae	<i>Isthmohyla pseudopuma</i>	LC		LC		LC	
Hylidae	<i>Isthmohyla rivularis</i>	CR	A2ace	CR	A2ace	EN	C2a(i)
Hylidae	<i>Isthmohyla tica</i>	CR	D	CR	D	CR	C2a(i)
Hylidae	<i>Isthmohyla xanthosticta</i>	DD		DD		DD	
Hylidae	<i>Isthmohyla zeteki</i>	NT		LC		VU	B1ab(iii)
Hylidae	<i>Osteopilus septentrionalis</i> <sup>†</sup>	LC		LC		LC	
Hylidae	<i>Ptychohyla legleri</i>	EN	B1ab(iii)	EN	B1ab(iii)	EN	B1ab(iii)
Hylidae	<i>Scinax boulengeri</i>	LC		LC		LC	
Hylidae	<i>Scinax elaeochroa</i>	LC		LC		LC	
Hylidae	<i>Scinax staufferi</i>	LC		LC		LC	
Hylidae	<i>Smilisca baudinii</i>	LC		LC		LC	
Hylidae	<i>Smilisca manisorum</i>	NE		NE		LC	
Hylidae	<i>Smilisca phaeota</i>	LC		LC		LC	
Hylidae	<i>Smilisca puma</i>	LC		LC		LC	
Hylidae	<i>Smilisca sila</i>	LC		LC		LC	
Hylidae	<i>Smilisca sordida</i>	LC		LC		LC	
Hylidae	<i>Tlalocohyla loquax</i>	LC		LC		LC	
Hylidae	<i>Trachycephalus "vermiculatus"</i>	NE		NE		LC	
Hylidae	<i>Tripurion spinosus</i>	LC		LC		NT	
Leptodactylidae	<i>Engystomops pustulosus</i>	LC		LC		LC	
Leptodactylidae	<i>Leptodactylus fragilis</i>	LC		LC		LC	
Leptodactylidae	<i>Leptodactylus insularum</i>	LC		LC		LC	
Leptodactylidae	<i>Leptodactylus melanonotus</i>	LC		LC		LC	

Familia	Especie	Sitio web UICN	Criterios	Costa Rica (2014)	Criterios	GAA 2 (2019)	Criterios
Leptodactylidae	<i>Leptodactylus poecilochilus</i>	LC		LC		LC	
Leptodactylidae	<i>Leptodactylus savagei</i>	LC		LC		LC	
Microhylidae	<i>Ctenophryne aterrima</i>	LC		LC		LC	
Microhylidae	<i>Hypopachus variolosus</i>	LC		LC		LC	
Microhylidae	<i>Hypopachus pictiventris</i>	LC		LC		LC	
Plethodontidae	<i>Bolitoglossa alvaradoi</i>	EN	B1ab(iii)	EN	B1ab(iii)	VU	B1ab(iii)
Plethodontidae	<i>Bolitoglossa aurae</i>	NE		NE		DD	
Plethodontidae	<i>Bolitoglossa aureogularis</i>	NE		LC		LC	
Plethodontidae	<i>Bolitoglossa bramei</i>	DD		LC		LC	
Plethodontidae	<i>Bolitoglossa cerroensis</i>	LC		LC		LC	
Plethodontidae	<i>Bolitoglossa colonea</i>	LC		LC		LC	
Plethodontidae	<i>Bolitoglossa compacta</i>	EN	B1ab(iii)	LC		EN	B1ab(iii)
Plethodontidae	<i>Bolitoglossa diminuta</i>	VU	D2	DD		LC	
Plethodontidae	<i>Bolitoglossa epimela</i>	DD		DD		DD	
Plethodontidae	<i>Bolitoglossa gomezi</i>	DD		LC		EN	B1ab(iii)
Plethodontidae	<i>Bolitoglossa gracilis</i>	VU	D2	LC		LC	
Plethodontidae	<i>Bolitoglossa kamuk</i>	NE		DD		VU	D2
Plethodontidae	<i>Bolitoglossa lignicolor</i>	VU	B1ab(iii)	LC		LC	
Plethodontidae	<i>Bolitoglossa marmorea</i>	EN	B1ab(iii)	LC		EN	B1ab(iii)
Plethodontidae	<i>Bolitoglossa minutula</i>	EN	B1ab(iii)	LC		EN	B1ab(iii)
Plethodontidae	<i>Bolitoglossa nigrescens</i>	EN	B1ab(iii)	EN	B1ab(iii)	DD	
Plethodontidae	<i>Bolitoglossa obscura</i>	VU	D2	DD		DD	
Plethodontidae	<i>Bolitoglossa pesrubra</i>	VU	A2ace	VU	A2ace	LC	
Plethodontidae	<i>Bolitoglossa pygmaea</i>	NE		NE		VU	D2
Plethodontidae	<i>Bolitoglossa robinsoni</i>	NE		LC		DD	
Plethodontidae	<i>Bolitoglossa robusta</i>	LC		LC		LC	
Plethodontidae	<i>Bolitoglossa schizodactyla</i>	LC		DD		LC	
Plethodontidae	<i>Bolitoglossa sombra</i>	VU	D2	VU	D2	NT	
Plethodontidae	<i>Bolitoglossa sooyorum</i>	EN	B1ab(iii,v)	EN	B1ab(iii,v)	EN	B1ab(v)
Plethodontidae	<i>Bolitoglossa splendida</i>	NE		DD		DD	
Plethodontidae	<i>Bolitoglossa striatula</i>	LC		LC		LC	

Familia	Especie	Sitio web UICN	Criterios	Costa Rica (2014)	Criterios	GAA 2 (2019)	Criterios
Plethodontidae	<i>Bolitoglossa subpalmata</i>	EN	B1ab(v)	LC		LC	
Plethodontidae	<i>Bolitoglossa tica</i>	EN	B1ab(iii)	LC		DD	
Plethodontidae	<i>Nototriton abscondens</i>	LC		LC		LC	
Plethodontidae	<i>Nototriton costaricense</i>	NE		NE		DD	
Plethodontidae	<i>Nototriton gamezi</i>	VU	D2	LC		LC	
Plethodontidae	<i>Nototriton guanacaste</i>	VU	D2	VU	D2	LC	
Plethodontidae	<i>Nototriton major</i>	CR	B1ab(iii)	LC		EN	B1ab(iii)
Plethodontidae	<i>Nototriton matama</i>	NE		LC		LC	
Plethodontidae	<i>Nototriton picadoi</i>	NT		LC		LC	
Plethodontidae	<i>Nototriton richardi</i>	NT		LC		LC	
Plethodontidae	<i>Nototriton tapanti</i>	VU	D2	LC		LC	
Plethodontidae	<i>Oedipina alfaroi</i>	VU	B1ab(iii)	VU	B1ab(iii)	VU	B1ab(iii)
Plethodontidae	<i>Oedipina alleni</i>	LC		LC		LC	
Plethodontidae	<i>Oedipina altura</i>	CR	B1ab(iii)	CR	B1ab(iii)	DD	
Plethodontidae	<i>Oedipina berlini</i>	NE		NE		LC	
Plethodontidae	<i>Oedipina carablanca</i>	EN	B1ab(iii)	LC		EN	B1ab(iii)
Plethodontidae	<i>Oedipina collaris</i>	DD		DD		DD	
Plethodontidae	<i>Oedipina cyclocauda</i>	LC		LC		LC	
Plethodontidae	<i>Oedipina gracilis</i>	EN	A2ac	EN	A2ac	EN	C2a(i)
Plethodontidae	<i>Oedipina grandis</i>	EN	B1ab(iii,v)	LC		EN	B1ab(iii)
Plethodontidae	<i>Oedipina nimaso</i>	NE		DD		DD	
Plethodontidae	<i>Oedipina pacificensis</i>	LC		LC		LC	
Plethodontidae	<i>Oedipina paucidentata</i>	CR	B1ab(iii)	CR	B1ab(iii)	DD	
Plethodontidae	<i>Oedipina poelzi</i>	EN	A2ace; B1ab(iii)	EN	A2ace; B1ab(iii)	EN	B1ab(iii)
Plethodontidae	<i>Oedipina pseudouniformis</i>	EN	B1ab(iii,v)	LC		DD	
Plethodontidae	<i>Oedipina savagei</i>	DD		LC		VU	B1ab(iii)
Plethodontidae	<i>Oedipina uniformis</i>	NT		LC		LC	
Ranidae	<i>Lithobates catesbeianus</i> <sup>†</sup>	EX**		EX**		EX**	
Ranidae	<i>Lithobates forreri</i>	LC		LC		LC	
Ranidae	<i>Lithobates taylori</i>	LC		LC		LC	

Familia	Especie	Sitio web UICN	Criterios	Costa Rica (2014)	Criterios	GAA 2 (2019)	Criterios
Ranidae	<i>Lithobates vaillanti</i>	LC		LC		LC	
Ranidae	<i>Lithobates vibicarius</i>	VU	D1	NT		EN	C2a(i)
Ranidae	<i>Lithobates warszewitschii</i>	LC		LC		LC	
Rhinophrynidae	<i>Rhinophrynus dorsalis</i>	LC		LC		LC	

†: Especies introducidas.

\*\* : *Lithobates catesbeianus* , aunque se considera LC en otros lugares, para Costa Rica se considera EX.

**Table 2:** Summary of number of species according to IUCN Conservation Category according to: IUCN Red List webpage, Costa Rican National Assessment Workshop (2014) and GAA 2 (2019).

Category	IUCN Red List website	Costa Rica (2014)	GAA 2
DD	18	19	18
LC	100	133	134
NT	11	3	5
VU	16	7	14
EN	22	10	20
CR/CR(PE)	24	24	19
EX	3**	3**	4**
To be determined	0	0	1
<b>Total</b>	<b>194</b>	<b>199</b>	<b>215</b>

\*\* : Including *Lithobates catesbeianus* (see Table 1).

**Table 3:** Sample of comments made during the workshop, notes collated by Jorge Rodríguez.

Family	Species	Comments
Bufo	<i>Incilius chompipe</i>	Primary forest species. A recent record in Cerro Dantas (2018). It is also known in Concepción (San Isidro de Heredia) and PN V. Turrialba (2013). Locally abundant in Cerro Chompipe, Cascajal and Concepción. However, the city is slowly expanding into its habitat, losing portions of primary and secondary forest. It is recommended to increase the habitat of the species. Taxonomic studies are recommended to see how close it is to <i>I. epioticus</i> .
Bufo	<i>Incilius fastidiosus</i>	Species with enigmatic decline. It is a difficult species to find due to its semi-fossorial habits and its distribution is difficult to access. Visits to different sites of its historical distribution have been made since 2015 (sites within PN La Amistad, ZP Las Tablas) but without success. Its drastic decrease is hypothetically associated with <i>Bd</i> in synergy with climate change. The recent Kamuck record may be another species (juvenile of <i>I. aucoinae</i> ). More search effort and protection of suitable habitat is recommended. Species recommended for <i>ex situ</i> population.
Bufo	<i>Incilius guanacaste</i>	It is the rarest species in the <i>Incilius epioticus</i> group. In 2014, 12 individuals were found in PN V. Rincón de la Vieja and in 2018, three more in PN V. Miravalles. A potential threat may be climate change as its habitat is found in moist remnants that if they become drier, the species could not disperse elsewhere. Therefore, it is also a recommended species for <i>ex situ</i> conservation. More population monitoring and genetic studies are recommended.
Bufo	<i>Incilius holdridgei</i>	Species with enigmatic decline. Its distribution area is reduced to a few km <sup>2</sup> of Cerro Chompipe in Heredia. The species is of open areas, with fossorial habits and under leaf litter, and the reproductive sites are small puddles on roadsides. It was rediscovered after 35 years in the same historical locality. A permanent monitoring of this population finds at least 8 individuals per sample. A population of no more than 50 adult individuals is estimated. The conversion of open areas to forest reduces their main habitat. The species could be affected by <i>Bd</i> and by the reduction of annual precipitation. The Holdridge Conservation Project was established in 2017 to give environmental education to the inhabitants of the neighboring areas of the species area. This project unsuccessfully attempted to establish an <i>ex situ</i> population because the individuals were affected by <i>Bd</i> .
Bufo	<i>Incilius periglenes</i>	It is a species with enigmatic decline. Endemic to Monteverde. Despite being considered extinct since the late 1980s, explorations are continued every year to locate relict populations. A Monteverde monitoring group has been able to detect other declined species in the area, but has not been successful in locating this species.
Caecilia	<i>Caecilia volcani</i>	Common species on the Atlantic zone, although due to its fossorial habits it is not easily observable. It has been located in EB La Tirimbina, Rara Avis, Finca Las Brisas and Costa Rican Amphibian Research Center. It is believed to be found elsewhere. It is considered common when the proper methodologies are used to search for it. Records between 2003-2016. It tolerates a certain degree of degradation since they have been seen in rural gardens.
Caecilia	<i>Oscaecilia osae</i>	This species is from PN Corcovado, where it is found from the beach to the forest. Because it is a fossorial species, it is not easy to detect. Despite the fact that there are few collections, it has been seen in several photographs uploaded on internet sites.

Family	Species	Comments
Centrolenidae	<i>Cochranella euknemos</i>	In 2011, three subpopulations were found in the northern and eastern slopes of PN V. Turrialba and one individual in 2013. The sites are outside the area protected by the National Park. Since then, no new visits have been made, partly due to the difficulty of reaching the sites. It was threatened by deforestation in PN V. Turrialba, but has currently ceased. The only protected population is in PN Braulio Carrillo.
Centrolenidae	<i>Hyalinobatrachium chirripoi</i>	It was discussed in relation to its taxonomic status. It is being researched whether it can be synonymize with <i>H. colymbiphylum</i> .
Centrolenidae	<i>Hyalinobatrachium colymbiphylum</i>	It was discussed in relation to its taxonomic status. It is being researched whether it can be synonymize with <i>H. chirripoi</i> .
Centrolenidae	<i>Hyalinobatrachium diana</i>	One new locations is reported in Braulio Carrillo. It is a species with complex behavior and activity, making the status of its populations difficult to assess. It requires riparian forests to survive.
Craugastoridae	<i>Craugastor aenigmaticus</i>	There are no major threats identified in Costa Rica. Common at different sites that include protected areas.
Craugastoridae	<i>Craugastor andi</i>	Species with enigmatic decline. It has not been seen again in historical locations, despite a constant monitoring effort: RB San Ramón, El Silencio Rain Forest and Nectandra Cloud Forest Reserve. There is a recent report in the Bosque Eterno de los Niños that needs to be confirmed. It may be present on other sites that are private and with restricted access. Continuous monitoring is recommended.
Craugastoridae	<i>Craugastor angelicus</i>	It is a species of the <i>Craugastor punctariolus</i> group that suffered enigmatic decline in the 1980s. The last confirmed reports in Monteverde were in the 1980s, despite constant monitoring of the area. In 2016 Brian Kubicki discovered a relict population of the species in Cordillera de Tilarán. Further research on the possible threats that made it disappear is recommended (for the entire <i>C. punctariolus</i> group). It is a species that could be put into captivity using <i>C. punctariolus</i> and <i>C. taurus</i> as analogous species.
Craugastoridae	<i>Craugastor catalinae</i>	It is a species of the <i>Craugastor punctariolus</i> group that suffered enigmatic decline in the 1980s. Recent visits (2015-2019) to Las Alturas de Cotón have not detected individuals. One individual collected in 1990 was <i>Bd</i> positive, indicating that it may have been affected by chytridiomycosis.
Craugastoridae	<i>Craugastor cuaquero</i>	It is a species of the <i>Craugastor punctariolus</i> group that suffered an enigmatic decline in the 1980s. There are no population data since the species is known only by the holotype. In 2001 a record of an individual was reported in the Cacao volcano, but the identity is not confirmed. The workshop's expert group considers that it may have been a confusion with <i>C. fitzingeri</i> .
Craugastoridae	<i>Craugastor escoces</i>	It is a species of the <i>Craugastor punctariolus</i> group that suffered enigmatic decline in the 1980s. A relict population was discovered in 2016 within the PN Juan Castro Blanco. Between 2017-2019, 1-2 individuals have been seen per visit. They are believed to tolerate disturbance by being a kind of forest edge seen on grass-covered ground. Currently, there are individuals in captivity within an <i>ex situ</i> conservation program at the Biology School of the University of Costa Rica.
Craugastoridae	<i>Craugastor fleischmanni</i>	It is a species of the <i>Craugastor punctariolus</i> group that suffered an enigmatic decline in the 1980s. A relict population was discovered in 2010 on the slopes of PN V. Barva. However, it has not appeared in the monitoring that has been carried out since 2013 at RB San Ramón, PN V. Poás, Cascajal and PN Tapantí. It is recommended to continue monitoring. <i>Bd</i> has been detected in 92 museum individuals, so its decline may have been influenced by chytridiomycosis.

Family	Species	Comments
Craugastoridae	<i>Craugastor gabbi</i>	Recently described species from <i>Craugastor stejnegerianus</i> populations above 400 masl from the South Pacific. A population has recently been registered in the Alturas de Cotón, Las Tablas. It is a common species found in protected areas.
Craugastoridae	<i>Craugastor gulosus</i>	It is a rare and difficult to detect species that is not believed to adapt to altered habitats. <i>Bd</i> is believed to be a possible major factor in the decline, but may also include other factors such as climate change. Specific efforts have been made to find it (2007, 2016) but without any success. Still, more visits to the areas of its historical distribution are recommended. It is a candidate species for an <i>ex situ</i> program with <i>C. megacephalus</i> as an analogous species.
Craugastoridae	<i>Craugastor obesus</i>	It is another rare and difficult to detect species that is not believed to adapt to altered habitats. It is a candidate species for an <i>ex situ</i> program with <i>C. megacephalus</i> as an analogous species.
Craugastoridae	<i>Craugastor persimilis</i>	Its taxonomic status is currently being resolved. Its distribution appears preliminary to be restricted to the south of the Caribbean slope. It can live in different types of forest and in abandoned plantations (cocoa, coffee, bananas). Pesticides used on banana and pineapple plantations can pose a threat. It is not considered rare, but it can be confused with other species of the <i>Craugastor podiciferus</i> group that are sympatric.
Craugastoridae	<i>Craugastor podiciferus</i>	Its taxonomic status is currently being resolved. Part of the populations in its historical distribution have now been elevated to species status ( <i>C. zunigai</i> from PILA and Las Tablas, <i>C. aenigmaticus</i> from Cerro Uthyum). Despite this, it is still an abundant and widely distributed species. It is found in the Cordillera de Guanacaste, Cordillera de Tilarán, the Caribbean versant of Cordillera Volcánica Central and Cordillera Talamanca, in addition, it increased its distribution to the Changuinola River (Panama) with the synonymy with <i>C. jota</i> . No major threats to its distribution are found.
Craugastoridae	<i>Craugastor ranoides</i>	It is a species of the <i>Craugastor punctariolus</i> group that suffered enigmatic decline in the 1980s. Although historically it had a wide distribution in the middle and high areas of the country, it is currently found only in Península de Santa Elena. Santa Elena (through models) is thought to be a climate haven against <i>Bd</i> , at least seasonally. Individuals have also been seen to have high levels of bacteria that negatively affect <i>Bd</i> . The population of Santa Elena has recently undergone drastic population changes, becoming undetectable in places where it used to be common. This drastic decrease may be due to the <i>Bd</i> , which would at least partially contradict the above arguments. Also in Santa Elena, the presence of <i>ranavirus</i> has also been detected, but no tests have been done to detect it in the species. Further monitoring and research on the effects of climate, <i>Bd</i> and ranaviruses in the Santa Elena subpopulation is recommended.
Craugastoridae	<i>Craugastor rayo</i>	The species is considered to have taxonomic issues. It is considered to be an aberrant <i>C. fitzingeri</i> .
Craugastoridae	<i>Craugastor rhyacobatrachus</i>	It is a species of the <i>Craugastor punctariolus</i> group that suffered an enigmatic decline in the 80s. It has not been recorded in Costa Rica or Panama in recent decades despite being a highly worked area. Surveys have been made to look for it in PN Los Quetzales and PILA, without success.
Craugastoridae	<i>Craugastor stejnegerianus</i>	Its taxonomic status is currently being resolved. Part of the populations in its historical distribution have now been elevated to species status, such as the populations of the upper part of the South Pacific and the northernmost part bordering Panama, which now are <i>C. gabbi</i> . It is a very common species that tolerates some habitat degradation such as palm plantations, but the use of pesticides can be a threat.

Family	Species	Comments
Craugastoridae	<i>Craugastor taurus</i>	It is a species of the <i>Craugastor punctariolus</i> group that suffered an enigmatic decline in the 80s. Since 2000 it has been monitored, but only several subpopulations have been recorded along Punta Banco-Burica and entering Panama, living on the rocky walls of coastal streams located in a mosaic of farms. A reduction of around 80% of the historical distribution of the species is estimated, with a population density in Punta Banco-Burica of 1.38 individuals / 50 m <sup>2</sup> . It is probably a species sensitive to pollution. In 2012-2013 the presence of <i>Bd</i> was confirmed in infected individuals (80% of individuals) in Punta Banco, but it seems to be somewhat seasonal depending on the weather conditions (more presence in the rainy season) and it seems that the species has adapted to the presence of the chytrid fungus. The presence of ranavirus at the site has also been reported. The poisoning of rivers for shrimp fishing can be a threat to the species as well as the extraction and contamination of water. The expansion of agricultural and tourist activity in the area can affect the habitat of the species. Environmental education is recommended for the community in collaboration with NGOs, as well as continuous population monitoring of the population.
Craugastoridae	<i>Craugastor zunigai</i>	Recently separated from <i>C. podiciferus</i> . Abundant species found in protected areas. There are no major threats to the species.
Craugastoridae	<i>Pristimantis altae</i>	It is a common species, but it is only easily detectable by its call. It is from primary and secondary forest. It is found in several protected areas.
Craugastoridae	<i>Pristimantis caryophyllaceus</i>	Species with enigmatic decline in the 90s, in the upper part of its distribution. Currently it has become common in the upper part of its distribution, but not in the lower parts. It is recommended for research on the causes of its drastic population changes.
Craugastoridae	<i>Pristimantis moro</i>	It is a canopy species difficult to observe. Taxonomic research is recommended because it may be a species complex.
Craugastoridae	<i>Pristimantis pardalis</i>	Only found in forest. With the description of its call, now is known that is not so rare. There are no major threats. It is found in protected areas.
Craugastoridae	<i>Strabomantis bufoniformis</i>	South American species that reaches its northernmost distribution in the South Caribbean of Costa Rica. It has not been seen since 1978, despite various recent visits to its historical known locations.
Dendrobatidae	<i>Atelopus chiriquiensis</i>	It is a species with enigmatic decline. It has not been observed since 1996 despite more recent searches from 2014 to the present on different sites where it was collected. But the question remains whether it is extinct because its range is difficult to monitor. In addition to chytridiomycosis, the presence of trout in distribution, climate change, etc. may be other threats that act in synergy to decrease the species. Recent observations of relict populations of <i>A. varius</i> is an incentive to continue monitoring sites where this species has been seen.
Dendrobatidae	<i>Atelopus chirripoensis</i>	The species is known from a single individual (female) described in 2008, but collected in 1980. At the time of collection, the individual was in reproductive aggregation with other individuals of the species. Recent monitoring has been done without finding the species, but not continuously because its distribution is difficult to access (Cerro Chirripó Grande 3,400-3,500 masl). The last time an intense search effort was made was in the mid-1990s. The chytrid fungus is believed to be a potential threat due to its association with rapid declines in species of the genus.

Family	Species	Comments
Dendrobatidae	<i>Atelopus senex</i>	It is a species with enigmatic decline. It has not been observed since 1986 when a great effort was made to search for the species. More recent searches have been made between the 2000s and the present in points of its distribution such as PN Braulio Carrillo, PN Tapantí and Orosí, but without success. In addition to chytridiomycosis, other threats such as the presence of trout in the distribution, climate change, can act in synergy to decrease the species. Recent observations of <i>A. varius</i> is an incentive to continue monitoring sites where this species has been seen.
Dendrobatidae	<i>Atelopus varius</i>	Species with enigmatic decline until it was only found in two (2) localities in the late 90s. However, with more targeted search and monitoring, four (4) new sites have been found for a total of six (6) different places, both historical and new, such as: Las Tablas, Las Alturas de Cotón, Reserva Las Nubes, Hojochal, near San Isidro de Dota, La Luchita, Buenos Aires. All the recently reported localities are located on the Pacific Slope, with the largest subpopulation in Las Alturas de Cotón, which fluctuates from year to year.
Dendrobatidae	<i>Oophaga granulifera</i>	Species widely distributed in the Central and South Pacific. Currently, new localities have been found that have expanded the historical distribution of the species. These new towns include areas near the PN La Cangreja. Recently it is still observed in Punta Burica, Bahía Ballena, Savegre, Península de Osa (Corcovado, up to 900 masl), Manuel Antonio, Quepos, Parrita, Isla del Caño. Banana and pineapple plantations can be considered major threats, especially if there is continued use of pesticides. It is probably extracted from the wild to put them in captivity since it is very easy to breed.
Dendrobatidae	<i>Phyllobates vittatus</i>	It is a species with an aggregate distribution that is still commonly observed in the South Pacific of the country, such as Punta Banco and Bahía Drake. Although it is easy to breed in captivity, it is believed to continue to be illegally extracted from the wild.
Dendrobatidae	<i>Silverstoneia nubicola</i>	Species with enigmatic decline in the 1990s, although its populations were poorly monitored. There are observations from 2018 in Las Cruces.
Dermophiidae	<i>Dermophis costaricense</i>	The most recent records of the species are from the 1980s. Due to its fossorial habits it is rare to observe and also due to its morphology for an underground life, it can easily be confused with other species of the genus.
Dermophiidae	<i>Dermophis gracilior</i>	Very rare species due to its fossorial habits. In the Museum of Zoology, there is only a record of an individual with no collection data.
Dermophiidae	<i>Dermophis occidentalis</i>	It is a relatively common species despite being fossorial. Five (5) individuals have been found in La Cangreja in more than 20 visits made between 2010-2019. It can live in a variety of habitats including plantations and pastures. Even so, pineapple plantations due to its soil management could be a major threat.
Eleutherodactylidae	<i>Diasporus amirae</i>	Newly described species. Within the tink frogs group, it is possibly the scarcest and most difficult to locate because it sings sporadically under leaf litter located in hollows associated with ravines. Its distribution is restricted to Cerro Plátano and other hills east of it, within PILA.
Eleutherodactylidae	<i>Diasporus tigrillo</i>	Species with restricted distribution to Lari River, Limón. It only calls abundantly in areas with natural disturbance, caused by river flows. There are no known major threats. It is not known if it is affected by <i>Bd</i> .

Family	Species	Comments
Eleutherodactylidae	<i>Diasporus ventrimaculatus</i>	Species described for Valle del Silencio, where it occupies only a few square kilometers, but another population has recently been found in Cerro Uthyum. Both populations differ greatly in their biology, in Valle del Silencio it is an arboreal species while in Uthyum it is fossorial. Tourism may pose a threat, but its effect on population and habitat is unknown. Genetic research is recommended to study morphological and ecological variation.
Hemiphractidae	<i>Gastrotheca cornuta</i>	Canopy species that is observed sporadically. When a large search effort has been made, it has been found. There is a new record (2013) in indigenous reserve in Cerro Nimari (Matama), and it has continued to be heard or seen in the area between 2014 and 2018. Despite these sightings, the population remains low. It is believed to be susceptible to <i>Bd</i> and habitat loss. Species recommended for <i>ex situ</i> reproduction. It is also recommended new visits to different localities to find it.
Hylidae	<i>Agalychnis annae</i>	Species with enigmatic decline. Although the species has recovered, most of the localities are found in isolated green habitat sites within the cities (Parque Zoológico y Jardín Botánico Nacional Simón Bolívar (where historically it has always been present), Hotel Bougainvillea, Ciudad Universitaria Rodrigo Facio, Santa María de Dota, Cervantes, Cascajal, Heredia centro, Tres Ríos and Paraíso), but also in lower parts of Talamanca and in the PN Braulio Carrillo (near Zurquí). The existing information indicates that although the presence of <i>Bd</i> has been detected, infection has only been carried out in 2/47 individuals and it seems that they tolerate a high <i>Bd</i> load. There is illegal trade in Europe and in the country, but the impact on the population. Education is recommended so the people from the GAM know that the species exists in urban areas. Also, genetic analysis between different sites is recommended to determine if the subpopulations are too closely related to each other, to determine if the subpopulations of these sites are due to man-made releases or natural dispersal.
Hylidae	<i>Agalychnis callidryas</i>	It is the most photogenic frog species in the country and possibly the world. Despite being a very common species in ranariums, herpetariums and zoos, there has not been a reduction in their natural populations, being one of the most common species to find in almost all its extension.

Family	Species	Comments
Hylidae	<i>Agalychnis lemur</i>	<p>Species with enigmatic decline. It was once common on the Caribbean coast, but later was reduced to a single population located on the Cerro Alto Victoria, near Veragua Rainforest. Intentional introductions were made of this population in 2003 in Siquirres (Brian Kubicki). From there it has expanded to other nearby sites that are within its historical distribution. Among the places where it have been seen are Veragua Rainforest (apparently stable population), Las Brisas (Eric Berlin), near PN Barbilla where individuals were observed in 2004 and in Bajo Chirripó, Cabécar Indigenous Reserve. There is also a possible sighting in Fila Matama, Talamanca, but unconfirmed.</p> <p>In some of these new places, artificial reproductive sites are made for it to breed, an element that may be of interest if experts want to reintroduce it to historical sites with suitable and protected habitats, but where they have not been observed again or are decreasing. The species has been bred in captivity in Manchester which may be an important element when reintroducing. However, these individuals and those from the new sites come from the individuals introduced into Siquirres, so it is recommended to research genetic variability before proceeding to make a reintroduction plan for the species in its historical distribution.</p> <p>Another element to take into account is that the threats that have caused a decrease in the population are not clear, although it is thought that it is affected by the chytrid fungus, ranaviruses and possibly climate change, the real effect of these threats on the populations is unknown.</p>
Hylidae	<i>Agalychnis spurrelli</i>	Species with dispersed but very abundant populations. Individuals with <i>Bd</i> have been found but appear to be asymptomatic.
Hylidae	<i>Cruziohyla sylviae</i>	It recently separated from <i>C. calcarifer</i> , although they remain sympatric in part of its distribution. It uses holes in trees and permanent puddles (natural and artificial) to breed. Habitat loss for pineapple and banana plantations and the use of pesticides are considered major threats.
Hylidae	<i>Duellmanohyla lythodes</i>	It is considered a species with taxonomic problems, it could be an aberrant <i>D. rufioculis</i> . It has not been seen despite continuous visits to historical locations of its distribution.
Hylidae	<i>Duellmanohyla uranochroa</i>	Species with enigmatic decline. It was considered a common species but began to decline in the 1980s along Cordillera Volcánica Central (e.g. PN Tapantí, PN Juan Castro Blanco). It has recently been found again in Veragua Rainforest, Tuis de Turrialba and Monteverde. It has been reported in polluted bodies of water, suggesting that it tolerates some degree of habitat degradation, which may also be associated with the failure to report individuals infected with <i>Bd</i> . It is not believed to have major threats.
Hylidae	<i>Ecnomiohyla bailarina</i>	Canopy species, observed sporadically. It is found in the Kekoldi Indigenous Reserve (in Peje River), Cordillera de Talamanca (3 individuals), with possible but unconfirmed records in Manuel Antonio based on its calling. Breeds within bromeliads. Only seen in forest, thus it is believed to be sensitive to habitat disturbances.
Hylidae	<i>Ecnomiohyla fimbrimembra</i>	Canopy species, observed sporadically. There are records in Tilarán and Monteverde for 2012-2014. Many localities are protected.
Hylidae	<i>Ecnomiohyla miliaria</i>	Canopy species, observed sporadically. There are new reports in Esquipulas and El Castillo. Local threats include agriculture and pesticides.

Family	Species	Comments
Hylidae	<i>Ecnomiohyla sukia</i>	Canopy species, observed sporadically. It has been reported in multiple places, including: PN Braulio Carrillo, Soltis Center, Reserva Las Brisas, in San Ramón de Alajuela (not seen in RB San Ramón), Horquetas, PN V. Arenal, Cerro Cacho Negro, etc.
Hylidae	<i>Ecnomiohyla veraguensis</i>	Canopy species, observed sporadically. Found in Veragua Rainforest in 2013, its presence in Costa Rica is already confirmed in an article this year.
Hylidae	<i>Hyloscirtus colymba</i>	Species associated with stream currents. It has not been found in the country. The last visit to part of its distribution (Cerro Nimaso) was in 2014.
Hylidae	<i>Isthmohyla angustilineata</i>	Species with enigmatic decrease. The first record after its dramatic decline was in 2005 in Vara Blanca. There is also a verified photographic record from 2012 in Cerro Chompipe and collected individuals from Monteverde in 2013 and 2016, where it had not been seen in decades. On Cerro Chompipe it may be threatened because it is not protected and there is pressure for human settlements. There is a monitoring program in Monteverde. It is recommended to protect Alto del Roble (near Cerro Chompipe) as a Mixed Protection area. <i>Ex situ</i> conservation is recommended.
Hylidae	<i>Isthmohyla calypsa</i>	Species with enigmatic reduction. Last observation was in 2006 where individuals were found in Cerro Pando, near Las Tablas, in a difficult access site. In 2016 researchers returned to the same site but was not found. New visits to the site are recommended.
Hylidae	<i>Isthmohyla debilis</i>	It has been searched extensively since the 1980s at sites such as Río Macho and PN Tapantí (the latter site with much searching effort by Douglas Robinson, even before the 1980s), but without success. It is still searched on a regular basis, so it is probably extinct in Costa Rica. If found again, an <i>ex situ</i> breeding program is recommended, with <i>I. lancasteri</i> and <i>I. rivularis</i> as analog species to develop breeding protocols before making a program for the species itself.
Hylidae	<i>Isthmohyla picadoi</i>	Species that is found in different protected areas: PILA, PN V. Turrialba, PN Tapantí, etc. It is a species that lives in bromeliads and therefore depends on the forest.
Hylidae	<i>Isthmohyla pictipes</i>	Species with enigmatic decline. It was observed in the EB Los Nimbúlos in Cerro de la Muerte, also has records of one (1) female (2013) and two (2) individuals (2015) in Savegre. The known population for Cerro de la Muerte remains stable. Another site where it has been seen in 2019 and 2020 is the EB Cuericí. It is affected by Bd and trout that prey on their tadpoles.
Hylidae	<i>Isthmohyla rivularis</i>	Species with enigmatic decline. There are records of individuals in PN Tapantí between 2016-2018. In 2015 an individual was collected in Alto del Roble (Cerro Chompipe). A small subpopulation was found in Cerro Dantas during visits between 2015-2019. J. Arias found other individuals in 2017 in ZP Las Tablas and PN Tapantí. Individuals in PN Juan Castro Blanco have tested positive for <i>Bd</i> , as well as museum specimens. There is a continuous monitoring in PN Tapantí, PN Braulio Carrillo, PN Juan Castro Blanco and Monteverde. Currently, more habitat management and protection is recommended over <i>ex situ</i> management.
Hylidae	<i>Isthmohyla tica</i>	Species with enigmatic decline, but museum individuals do not present <i>Bd</i> . Individuals have been reported in Bosque Eterno de los Niños (2012, 2019), but with few individuals per visit. It appears to be a rare species on the site. Different visits have been made to other sites in its distribution without finding it. Another possible threat, <i>ranavirus</i> has been detected in Monteverde. <i>Ex situ</i> reproduction is recommended.
Hylidae	<i>Isthmohyla xanthosticta</i>	Species known from only one specimen. It could be a bad identification of <i>I. tica</i> or <i>I. rivularis</i> .

Family	Species	Comments
Hylidae	<i>Isthmohyla zeteki</i>	No major threats are identified in Costa Rica.
Hylidae	<i>Ptychohyla legleri</i>	New locality in San Lorenzo de Tarrazú. Populations are reported with the presence of individuals infected with <i>Bd</i> and <i>ranavirus</i> in EB Las Cruces, but no marked decrease in population has been observed. It seems to tolerate some degree of environmental disturbance.
Hylidae	<i>Smilisca manisorum</i>	It has taxonomic problems with <i>S. baudini</i> . Despite this, it is a common species that as long as there are natural or artificial bodies of water to breed, there are no visible effects on the subpopulations.
Hylidae	<i>Tripurion spinosus</i>	It was considered for a long time rare, but with information about its call, now is considered a common species. Even so, it is reported that in Monteverde there was a decrease. There are new reports such as Puerto Jiménez, San Vito and Las Brisas de La Alegría de Siquirres. In Rara Avis it is very common. Individuals infected with <i>Bd</i> and illegal pet trade have been reported.
Pletodontidae	<i>Bolitoglossa alvaradoi</i>	In 2016, an individual was found in Rainforest Adventure (near the PN Braulio Carrillo). There are also records in Veragua Rainforest (2013), Costa Rican Amphibian Research Center and RB San Ramón.
Pletodontidae	<i>Bolitoglossa aurae</i>	Only the holotype is known (Moravia de Chirripó, found in an orchid that fell from a dead tree) despite recent visits to the type locality and other nearby sites. The type locality experiences habitat loss due to different activities, but it is not known whether they represent major threats, since the known specimen was found on the edge of secondary forest. It is recommended to continue visiting its type locality and surrounding sites, looking for epiphytes on the trees.
Pletodontidae	<i>Bolitoglossa aureogularis</i>	There are no major threats in its known distribution in the Coén River, Talamanca, so the option with the highest threat category would be Near Threatened (NT).
Pletodontidae	<i>Bolitoglossa bramei</i>	Different localities attributed to <i>B. robinsoni</i> (e.g. Valle del Silencio), now belong to this species because of genetic studies, which increases its distribution. Also, new records are reported in 2015 and 2017. It has been found in both bromeliads and moss.
Pletodontidae	<i>Bolitoglossa cerroensis</i>	The last reported individual was in 2016 at the Mirador de los Quetzales (Reserva Tres de Junio). There have not been many targeted searches for the species recently, making them a major recommendation.
Pletodontidae	<i>Bolitoglossa colonnea</i>	Adaptable species that is not considered threatened.
Pletodontidae	<i>Bolitoglossa compacta</i>	It is still observed if a targeted search effort is done.
Pletodontidae	<i>Bolitoglossa diminuta</i>	It is still observed if a targeted search effort is done.
Pletodontidae	<i>Bolitoglossa epimela</i>	Rare species with taxonomic problems. The most recent record was in 2017 in Cerro Chitaría (Talamanca), the other most recent records are from the 80s despite continuous visits to its distribution. Taxonomic studies are required to individuals of PN Tapantí to know if they belong to this species. Type locality is a river canyon that still has forest.
Pletodontidae	<i>Bolitoglossa gomezi</i>	The species is common in Potrero Grande, Cerro Amuo and Tres Colinas (Talamanca).
Pletodontidae	<i>Bolitoglossa gracilis</i>	This species has been registered in the Vereh River basin and in the eastern part the PN V. Turrialba (1,300-1,700m asl), where between 10 and 20 individuals have been observed in 2012-2018. It has been seen in trees with moss in secondary forest and open areas for agricultural use. The greatest threat to the species appears to be herbicides, although individuals have been reported in areas where herbicides are sprayed. More protection is recommended in the eastern part of its distribution.

Family	Species	Comments
Pletodontidae	<i>Bolitoglossa kamuk</i>	Two populations are known, one in Cerro Kamuk and the other in Cerro Utyum (Talamanca), Buenos Aires de Puntarenas (1 individual in 2016). In its distribution there are wild fires during the dry season and it is believed that in the future climate change may increase these fire cycles.
Pletodontidae	<i>Bolitoglossa lignicolor</i>	It is common in the South Pacific and does not appear to have major threats.
Pletodontidae	<i>Bolitoglossa marmorea</i>	No recent targeted visits have been made for this species. Four (4) individuals were found in 1994. There are no major threats identified in its distribution.
Pletodontidae	<i>Bolitoglossa minutula</i>	An individual was found in 2016 in PILA at 1,500m asl, the only individual on the Caribbean slope. Despite several visits to its distribution, few individuals have been seen. More targeted search is recommended in Las Tablas. It is a species associated with moss.
Pletodontidae	<i>Bolitoglossa nigrescens</i>	There are taxonomic problems between this species with <i>B. sombra</i> and <i>B. obscura</i> . If all of them are grouped into a single species, its distribution could be larger. It had not been seen in the last 30 years, until a record appears on Cerro Tablazo in 2017. It is believed that it can adapt to certain disturbed habitats, but there is logging and agriculture in its distribution outside protected areas.
Pletodontidae	<i>Bolitoglossa obscura</i>	Taxonomic problems with <i>B. nigrescens</i> and <i>B. sombra</i> . There have not been many targeted searches for salamanders in the past few decades, and this species is no exception.
Pletodontidae	<i>Bolitoglossa pesrubra</i>	Species known for the Cerro de la Muerte and other nearby localities. During the 1990s, it experienced a decline at various sites along the South Interamerican Road, where it used to be very abundant. There are new records, since 2007 a recovery has been seen in historical locations and in 2019 this recovery continues to be seen. Its population size seems to be seasonal depending on the rainy season. Minor threats include small seasonal crops.
Pletodontidae	<i>Bolitoglossa pygmaea</i>	New records at Cerro Echandi. It is a species that seems restricted to paramo. In 2015, 2018, many individuals have been observed in Cerro Echandi (males, females and eggs), but in Biné (2018) only one.
Pletodontidae	<i>Bolitoglossa robinsoni</i>	It has taxonomic problems due to the fact that <i>Bolitoglossa bramei</i> specimens appear to have been included in its description, so some points further south of its distribution belong to this species. Thus, it would be restricted to Biné and Valle del Silencio (12 individuals in this last site). It is believed to be sensitive to habitat changes, but it is in PILA which is a large protected region. Climate change is not believed to be a major threat today.
Pletodontidae	<i>Bolitoglossa sombra</i>	Species very similar to <i>B. nigrescens</i> and <i>B. obscura</i> so there may be taxonomic changes. Uncommon species. The last record is from the Valle del Silencio (Cerro Quemado) in 2012.
Pletodontidae	<i>Bolitoglossa sooyorum</i>	Especie rara de la que se tenía registros por giras de OTS que ya no se hacen tan seguido a su distribución. No ha habido muchas visitas recientes dirigidas a la especie. En 2012, en un esfuerzo de búsqueda se encontró un individuo en Reserva Tres de junio (Mirador de los Quetzales).
Pletodontidae	<i>Bolitoglossa splendida</i>	It is only known from the holotype. It was collected in the Lori River, tributary of the Coén river (PILA).
Pletodontidae	<i>Bolitoglossa subpalmata</i>	It is reported in Bosque Eterno de los Niños, PN V. Poás and PN V. Turrialba. It is currently considered stable. For the 2004 workshop it was reported as a species in decline because a population in Cerro de La Muerte, later genetic analyzes separated this population from the species (now it belongs to <i>B. pesrubra</i> ), so it is currently considered abundant for a salamander.

Family	Species	Comments
Pletodontidae	<i>Bolitoglossa tica</i>	This species is found in different protected areas (Cerros Escazú, Cerro Las Vueltas, PN Tapantí). However, it is difficult to find despite targeted visits for the species. Leenders did find four individuals in 2015 (but without locality). Its habitat is well protected.
Pletodontidae	<i>Bolitoglossa schizodactyla</i>	In Costa Rica it is known only from a single specimen collected in 1984.
Pletodontidae	<i>Nototriton costaricense</i>	Only the holotype is known. It may be in disturbed areas. The threats to the species are unknown. Monitoring is recommended.
Pletodontidae	<i>Nototriton gamezi</i>	It has been found in la RB San Ramón and near Nectandra Cloud Forest Reserve. It is a very rare species found in mature forest.
Pletodontidae	<i>Nototriton guanacaste</i>	In 2014 or 2015, four (4) individuals were found in V. Cacao. There have not been many targeted visits to search for the species. Its habitat is well protected.
Pletodontidae	<i>Nototriton major</i>	A whole revision of the genus is being made and probably together with <i>N. matama</i> both are synonyms of <i>N. picadoi</i> . Fifteen to twenty (15-20) individuals were found near the type locality between 2012-2015 (Quebrada Platanillo). It has also been seen on Vereh River. It can be found on roadsides and pastures, but it is unknown how dependent it is on forest.
Pletodontidae	<i>Nototriton matama</i>	The population is believed to be stable due to the remoteness of the area (Fila Matama), which in turn limits visits to monitor its condition. More information about its taxonomy is needed to clarify its status. Probably together with <i>N. major</i> are synonyms of <i>N. picadoi</i> .
Pletodontidae	<i>Nototriton picadoi</i>	An individual was collected in the 2010s on the Caribbean slope of PN V. Turrialba. It has a certain degree of adaptability to habitat changes and is believed to have a broader distribution within Cordillera Volcánica Central.
Pletodontidae	<i>Nototriton richardi</i>	There is a new record in PN Juan Castro Blanco. There are no major threats to the species.
Pletodontidae	<i>Nototriton tapanti</i>	It has been seen again in the type locality and other sites in the eastern skirt of the PN V. Turrialba (2012-2013) and in PN Tapantí. It has been seen in sites that have moss near roads, which suggests some tolerance to sites with alterations such as open sites but with the presence of moss. It is kept under taxonomic investigation.
Pletodontidae	<i>Oedipina alfaroi</i>	Several recent visits have been made looking for it, but without success. Banana, pineapple and palm agriculture, as well as the application of pesticides, is increasing in its distribution and are considered major threats.
Pletodontidae	<i>Oedipina alleni</i>	Part of the populations of this species are described as a new species, <i>Bolitoglossa savagei</i> . It is a relatively common species, during the night it can be seen perching on the leaves less than a meter high, near streams.
Pletodontidae	<i>Oedipina altura</i>	They have only been collected at two sites near El Empalme, Cordillera de Talamanca and only three individuals are known, the last one was collected in 1985. There is not much effort of targeted visits so it cannot be confirmed if it is extinct or not. More effort of targeted visits is recommended.
Pletodontidae	<i>Oedipina berlini</i>	It is found in the Caribbean foothills of Cordillera Volcánica Central such as Veragua Rainforest, Rara Avis and Costa Rica Amphibian Research Center. There are no major identified threats.
Pletodontidae	<i>Oedipina carablanca</i>	The species is reported in places such as: Buenos Aires de Guápiles, Altos de Guayacán, Brisas de la Alegría de Siquirres, Pocora, Río Pacuare Forest Reserve. Pesticides can pose threats at certain sites like Pocora. Still, little information is believed to establish a specific conservation status.

Family	Species	Comments
Pletodontidae	<i>Oedipina collaris</i>	The most recent records date from 1947-1956 and none are from protected areas. There may be taxonomic doubts about the identity of the species.
Pletodontidae	<i>Oedipina gracilis</i>	There are reports on Isla Uvita in 2012.
Pletodontidae	<i>Oedipina grandis</i>	It is not known if it had an enigmatic decline, since due to its natural history it is difficult to find. However, its distribution includes Costa Rica and Panama and is reported in protected places, There is a record in PN Barú, Panama, in March 2019.
Pletodontidae	<i>Oedipina nimaso</i>	There have been no recent visits to the type locality (Cerro Nimaso), but there have been to other areas, however, there are no recent records. The threats are not well known, the type locality is located in a sparsely inhabited indigenous reserve, so it would be expected that there are no major threats.
Pletodontidae	<i>Oedipina paucidentata</i>	Species known only from their type locality in El Empalme, El Guarco, Cartago. No recent visits to confirm their presence have been made.
Pletodontidae	<i>Oedipina poelzi</i>	Few individuals are reported (Santa Cruz de Turrialba, Cerro Chompipe), but continuously throughout recent years (in forest edges along the road). However, it is believed that there is little information to establish a specific conservation status.
Pletodontidae	<i>Oedipina pseudouniformis</i>	There was a decrease between 1980-1990s but the causes are unknown. Two (2) individuals have recently been reported: Costa Rica Amphibian Research Center (Guayacán) and Reserva Las Brisas. There is also a report in La Selva. The northernmost population of the distribution may be <i>O. koehleri</i> , which was recently separated for Nicaragua. There is no evidence that farms and human settlements pose a major threat today. Genetic studies are recommended to define if it is endemic to Costa Rica.
Pletodontidae	<i>Oedipina savagei</i>	New records in Península de Osa (2009) where it is common. It has also been found in the Central Pacific (2012). In the Las Tablas Protective Zone, another individual was reported (2019) in the buffer zone. In Osa there are palm plantations but it is not known how it affects the population, species of this genus tend to tolerate this type of habitat. Coffee and pineapple crops as well as the use of pesticides can be considered threats, but coffee is in a small area of its distribution.
Pletodontidae	<i>Oedipina uniformis</i>	It is not known if it had an enigmatic decline, since due to its natural history it is difficult to find. However, it appears that subpopulations have been recovered at different sites. It is still observed in gardens and green places within cities.
Ranidae	<i>Lithobates catesbeianus</i>	This introduced species has not been observed again for several decades considering its characteristics of the species, easy to identify. Some authors and IUCN itself consider it extinct for the country.
Ranidae	<i>Lithobates vibicarius</i>	Species with enigmatic decline in the past. Current locations include Cerro Chompipe, Alto del Roble, Dantas, Bosque Eterno de los Niños, La Chumacera (Pérez Zeledón), RB San Ramón, RB Santa Elena y PN Juan Castro Blanco. <i>Ex situ</i> efforts have been made recently and it is still recommended that such effort be continued.
Ranidae	<i>Lithobates warszewitschii</i>	Species with enigmatic decrease that has recovered and probably increased its distribution in different localities of lowland areas (e.g. Golfito, RB Las Brisas), but in highland areas it is still not seen. It is currently considered a species complex.

**IUCN Red List and Amphibian Ark Conservation Needs  
Assessment Workshop: An effort for the Second Global  
Amphibian Assessment**

**Parque Zoológico y Jardín Botánico Nacional Simón Bolívar  
San José, Costa Rica  
9-13 September, 2019**

**Section IV  
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**IUCN Red List and Amphibian Ark Conservation Needs  
Assessment Workshop: An effort for the Second Global  
Amphibian Assessment**

**Parque Zoológico y Jardín Botánico Nacional Simón Bolívar  
San José, Costa Rica  
9-13 September, 2019**

**Section V  
Annex**

SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN AN IUCN RED LIST THREATENED CATEGORY (CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE).<sup>1</sup>

<b>A. Population size reduction.</b> Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	<b>Critically Endangered</b>	<b>Endangered</b>	<b>Vulnerable</b>
<b>A1</b>	≥ 90%	≥ 70%	≥ 50%
<b>A2, A3 &amp; A4</b>	≥ 80%	≥ 50%	≥ 30%
<p><b>A1</b> Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased.</p> <p><b>A2</b> Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p><b>A3</b> Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3].</p> <p><b>A4</b> An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p>	<i>based on any of the following:</i>		<p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.</p>
<b>B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)</b>			
	<b>Critically Endangered</b>	<b>Endangered</b>	<b>Vulnerable</b>
<b>B1. Extent of occurrence (EOO)</b>	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
<b>B2. Area of occupancy (AOO)</b>	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
<b>AND at least 2 of the following 3 conditions:</b>			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			
<b>C. Small population size and decline</b>			
	<b>Critically Endangered</b>	<b>Endangered</b>	<b>Vulnerable</b>
<b>Number of mature individuals</b>	< 250	< 2,500	< 10,000
<b>AND at least one of C1 or C2</b>			
<b>C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):</b>	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
<b>C2. An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions:</b>			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(ii) % of mature individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals			
<b>D. Very small or restricted population</b>			
	<b>Critically Endangered</b>	<b>Endangered</b>	<b>Vulnerable</b>
<b>D. Number of mature individuals</b>	< 50	< 250	<b>D1.</b> < 1,000
<b>D2. Only applies to the VU category</b> Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.	-	-	<b>D2.</b> typically: AOO < 20 km <sup>2</sup> or number of locations ≤ 5
<b>E. Quantitative Analysis</b>			
	<b>Critically Endangered</b>	<b>Endangered</b>	<b>Vulnerable</b>
<b>Indicating the probability of extinction in the wild to be:</b>	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

<sup>1</sup> Use of this summary sheet requires full understanding of the *IUCN Red List Categories and Criteria* and *Guidelines for Using the IUCN Red List Categories and Criteria*. Please refer to both documents for explanations of terms and concepts used here.