

International Trade in Amphibians:

A summary of the status, management, and trade in amphibians (*Amphibia* spp.) to support implementation of CITES Decision 19.197



Northern Glass Frog (*Hyalinobatrachium fleischmanni*), Cusuco National Park, Honduras.
Photo: Jonathan E. Kolby

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Executive Summary

Amphibians are the most threatened class of vertebrates globally (Luedtke et al. 2023). A recent Global Amphibian Assessment of over 8,000 amphibian species showed that 41% of assessed species are now categorised as Critically Endangered, Endangered, or Vulnerable in the IUCN Red List of Threatened Species, in comparison to those among birds (13%), mammals (27%), and reptiles (21%) (Re:wild, Synchronicity Earth, IUCN SSC Amphibian Specialist Group. 2023). Every year, millions of amphibians are traded internationally for a variety of uses ranging from pets to food to specimens for biological research. Sources range from industrial-scale farming to small hobbyist breeding operations as well as collection from the wild. Globally, there is little standardized data recording and reporting among the international trade in non-CITES listed amphibians. For this reason, evaluating the impacts of trade on most amphibian species is fraught with a lack of reliable information.

Three Decisions relating to the conservation of amphibians were adopted by the CITES Conference of the Parties at its 19th meeting (CoP19, Panama City, 2022), (Decisions 19.197-19.199) based on document CoP19 Doc. 60 on *Conservation of amphibians (Amphibia spp.)*. Of these decisions, 19.197 a. called for “interdisciplinary workshops for CITES Authorities and other relevant authorities and stakeholders about amphibian species in international trade...”. In working towards the fulfilment of Decision 19.197 a. and to create informational documents to support workshops on amphibian conservation, the CITES Secretariat requested technical expertise from the International Union for Conservation of Nature (IUCN), through the IUCN Species Survival Commission Amphibian Specialist Group, to perform background research and data collection to be presented as a workshop document that a) describes the trade in non-CITES listed amphibians, b) explores the emerging threat of diseases to traded amphibians, and c) reviews legislation relevant to the trade in amphibians as well as enforcement efforts to detect and deter illegal trade in amphibians.

Methods Summary

This report is divided into three sections, each responding to a different central theme called for through Decision 19.197 a). Data were collected through a survey circulated via a Notification to the Parties on 18 August 2023 (No. 2023/101), through amphibian trade data received from the United States Fish and Wildlife Service through a Freedom of Information Act Request submitted by the authors, review of published literature, and information drawn from available databases such as the IUCN Red List version 2022-2, AmphibiaWeb, CITES Trade Database and TRAFFIC's Wildlife Trade Portal. A strong focus on international amphibian trade recorded by the United States of America was required for this study because these records represent the only species-specific global database of official trade events in amphibian species that are not presently CITES-listed. Although these data were therefore confined to interactions between the United States of America and its trading partners, the study period involved imports and exports that involved over 100 countries and/or regions, providing the most comprehensive global summary from available records. The three main sections of this report are summarized as follows:

Section 1. A review of CITES and non-CITES listed amphibian species in international trade drawing largely from data recorded by the United States of America from 2015-2020, input received through a survey circulated via a Notification to the Parties (No. 2023/101), and a literature review. This section examines species and quantity-specific attributes of trade activity, and also provides a compilation of all species recorded in trade based on available records during this study period.

Section 2. A summary of national legislation relevant to the trade in amphibians, largely guided by input received through a survey circulated via a Notification to the Parties (No. 2023/101). This section also includes information about potential amphibian trade violations inferred by comparing trade data against regulatory controls described by respondents to the Notification.

Section 3. A literature review-based summary of the emerging threat of pathogens to amphibians, the role of international trade in spreading these pathogens and increasing extinction risks, and biosecurity opportunities to help reduce harm.

Terminology used in this report

To prevent confusion and misinterpretation, the following definitions describe how certain terms are used in this report:

Parties: In this report, the term “Parties” refers to the Parties to CITES.

Specimen: The trade in amphibians involves a variety of commodities, one of which is often described among trade data by the trade term “specimens.” This refers to material primarily traded for scientific research or museum applications and may include whole bodies, tissue or blood samples, skin swabs, and more. For the purpose of this report, the term “specimens” will be preceded by the word “scientific” when referring to the scientific context, unless otherwise stated. This denotes a more specific use of the term than how “specimen” is defined in the [CITES glossary](#) as: “Any animal or plant, whether alive or dead” and including “...for species included in Appendices I and II, any readily recognizable part or derivative thereof; and for species included in Appendix III, any readily recognizable part or derivative thereof specified in Appendix III in relation to the species.”

Taxonomical unit: The unique taxonomic descriptors used to record wildlife trade data among government records, ranging in specificity from “amphibians” to descriptions that provided a valid genus and species. This definition of taxonomical unit was applied to quantify the diversity of ways in which international amphibian trade was recorded among the USFWS LEMIS data.

Trade: Unless specifically described otherwise, use of the term “trade” throughout this report refers to international trade. If referring to domestic trade, then this will be specifically stated as “domestic trade”. This distinction is important because it refers to the sources of data that underpin relevant statements and analyses in the text; those about international trade are based on information sourced from the CITES Trade Database, customs trade records, or the United States LEMIS data whereas those about domestic trade are based on unique country and context specific data that would not normally appear among the three aforementioned data sources.

Highlights

Section 1. Amphibian Trade Assessment: A review of CITES and non-CITES listed amphibian species in international trade drawing largely from data recorded by the United States of America from 2015-2020, input received through a survey circulated via a Notification to the Parties (No. 2023/101), and a literature review.

- During the study period (2015-2020), at least 1,195 amphibian species were internationally traded according to information evaluated from the United States Fish and Wildlife Service's (USFWS) Law Enforcement Management Information System (LEMIS), representing approximately double the total quantity of species previously identified by researchers from LEMIS records. Of these species traded, 117 are listed in the CITES Appendices and 1,078 are not.
- Including further literature review and data sources, 126 additional amphibian species were identified in contemporary trade, for a cumulative presence of at least 1,321 species of internationally traded amphibians. This represents 15.3% of the 8,615 described amphibian species as of 2023.
- Based on our evaluation of LEMIS data, the top 10 species traded as individual live animals comprised 95.6% of all recorded amphibian trade, illustrating how the most frequent type of trade recorded (trade in live amphibians recorded in units of number) is predominated by relatively few species despite the high diversity of species affected by trade overall.
- Millions of amphibians are internationally traded annually, and 32 different categories have been used to describe this trade by the United States of America alone. Of these, the top five categories traded were live animals, bodies, scientific specimens, legs, and meat.
- During the study period, the top traded amphibian reported to species among LEMIS data (both by number and mass) was the American bullfrog (*Lithobates catesbeianus*) and this primarily involved animals imported to the United States of America from Taiwan, Province of China.
- Seventeen of 55 amphibian species evaluated as likely threatened by international trade that are not presently CITES-listed (Challender et al. 2023) were identified in this study. Of these 17 species, 80% of shipments consisted of just one species: *Ceratophrys ornata*. This species was listed as Near threatened by the IUCN Red List in 2004 and had a declining population trend. Of 33,460 traded individuals, 95% were reported as bred in captivity.
- A notable transition in reported sources of the salamander *Bolitoglossa dofleini* was observed, wherein nearly all animals traded during the study period were reported as bred in captivity but in years prior, most reported trade involved animals described as collected

from the wild in Honduras and Guatemala and re-exported. These trade events involved animals, both wild and captive bred, exported from Nicaragua, which is not a range State for this species.

- The species of top legally traded live amphibians coincided with those most frequently traded illegally. This primarily involved species assessed as Least Concern in the IUCN Red List. Based on USFWS LEMIS trade data, it appears that high amounts of illegal trade in live amphibians have not targeted threatened species that are otherwise prohibited from being traded lawfully.
- The trade in live amphibians represented the largest cumulative quantity of amphibians traded by volume of animals, but the trade in amphibians reported as scientific specimens affected the highest diversity of species among all reported categories of trade. The trade in amphibian scientific specimens affected 2.4 times more unique taxonomic units than the recorded trade in live amphibians, despite the frequent focus on live amphibians in previous trade reviews.
- The international trade in frogs for human consumption occurs at much greater volumes than that for all other purposes combined, although it involves relatively few species. Species traded as frog legs are often traded under incorrect scientific names as demonstrated through DNA testing of imported frog meat.
- The trade in frogs as frog legs conveys both direct and indirect threats to amphibian conservation. Firstly, accurate identification of species subjected to industrial volumes of trade is prevented by frequent mislabelling of species traded. Secondly, high densities of shipped animals from operations lacking biosecurity measures can facilitate the spread of deadly amphibian pathogens which negatively impacts species beyond only those traded.
- Evaluations of the international trade in non-CITES listed amphibians are constrained by the absence of data. Nearly all countries do not record international trade in non-CITES listed amphibians. Data that are captured are not recorded in a standardized fashion, posing additional challenges for measuring and quantifying trade.

Section 2. National Legislation Governing International Trade in Amphibians: Legislative Summary and Exploration of Potential and Confirmed Illegal Amphibian Trade Events

- According to survey respondents, very few countries have national legislation that governs the trade in amphibians specifically, but many do have regulations that govern the trade in wildlife more broadly which encompasses amphibians.
- The low level of detail associated with illegal amphibian trade events among data available for this study allowed some insight into species and types of amphibian commodities illegally traded but were insufficient to allow confirmation of whether the action that

triggered a violation occurred within the country of origin, export, or import, and whether the type of violation conveyed a negative conservation impact on the species or was instead administrative in nature.

- The majority of illegally traded amphibians did not involve live animals, but was instead primarily composed of bodies, medicinal products, legs, and scientific specimens.
- Among illegal wildlife trade data captured by TRAFFIC's Wildlife Trade Portal for events that occurred from 2015-2020, there were 29 different taxonomic units of amphibians illegally traded. These data combined both domestic and international trade records and involved interceptions made in 27 countries.

Section 3. Emerging Threat of Amphibian Diseases: Spread of Amphibian Pathogens Through the International Trade in Amphibians

- At least three emerging infectious pathogens of amphibians are presently circulating through the international trade in amphibians: amphibian chytrid fungus (*Batrachochytrium dendrobatidis*), salamander chytrid fungus (*Batrachochytrium salamandrivorans*), and ranavirus.
- At least 42% (503) of species observed in international trade have tested positive for one or more of these three pathogens.
- These pathogens all cause fatal diseases among susceptible amphibians. Their introduction to new regions has contributed towards population declines ranging from cyclical mass mortality events to extirpation of localized populations. The complete extinction of nearly 100 amphibian species is attributed to *Batrachochytrium dendrobatidis*.
- All three of these pathogens are very challenging if not impossible to treat and cure once amphibians develop infections. It is virtually impossible to safely eradicate these pathogens from amphibian habitats if spillover and establishment following importation occurs.
- Few countries have responded to this threat by enacting import trade restrictions to prevent the introduction of species likely to carry amphibian pathogens.
- Biosecurity measures that can help reduce the spread of amphibian pathogens through trade include activities such as diagnostic testing of commodities on import/export, maintaining amphibian breeding operations with entirely closed systems of production and husbandry, packing animals in lower densities to reduce pathogen transmission while they are in-transit, and disinfection of shipping materials post-import to prevent spreading viable infectious material domestically through fomites such as water, cartons, containers, and substrates.

Introduction

The class Amphibia contains over 8,000 species comprised mostly of frogs and toads, then salamanders and newts, followed by caecilians. These animals are extremely diverse in habitat occupancy and geographical distribution. They are found in terrestrial, arboreal, and freshwater landscapes, and span the globe from the rainforests of Brazil to the deserts of Australia. The skin of amphibians is highly permeable, allowing the exchange of liquids and gases to aid respiration. For this reason, they are also highly susceptible to the consequences of habitat degradation and emerging infectious diseases. Accordingly, amphibians are often described as “canaries in the coalmine” and declines in their populations can be representative of the concurrent decline of healthy functioning ecosystems. Global amphibian declines appear to have increased substantially during the 21st century due to the negative impacts of global climate change, habitat loss, pollution, emerging infectious diseases, the spread of invasive species, and overexploitation for national and international trade (Luedtke et al. 2023). Amphibians are often exposed to more than one of these stressors simultaneously, and ongoing research strives to disentangle these factors in order to better guide conservation management efforts to mitigate observed or anticipated population declines.

The present study examines several of these stressors to help identify species and regions where additional research, monitoring, or interventions might be necessary to ensure the trade in amphibians is legal, sustainable, and does not threaten the survival of species in the wild: 1) levels of international trade in amphibian species where trade is largely unregulated, 2) the presence of illegal and potentially illegal trade in amphibians that may indicate gaps or weaknesses in the legislative instruments or enforcement controls governing these activities to ensure trade is legal and sustainable and 3) the growing threat of emerging infectious diseases of amphibians as it pertains to international trade activities.

Millions of amphibians are traded annually for a variety of uses ranging from human and animal consumption to pets to subjects of scientific research. Trade varies in magnitude from local subsistence collection and consumption to the harvest of hundreds of thousands of frogs per shipment for exportation. Only a small proportion of the 8,000+ species of amphibians are presently CITES-listed; with 24, 351, and 5 species listed in CITES Appendix I, II, and III, respectively (CITES 2023). According to the IUCN Red List of Threatened Species, the class amphibia contains the highest proportion of species among evaluated vertebrates known to be threatened with extinction at 41% compared to that of birds (13%), mammals (27%) and sharks and rays (37%) (IUCN 2023). Many factors contribute towards processes that threaten wildlife

with extinction, but the international trade in amphibians has not yet been closely monitored nor comprehensively assessed.

CITES Decisions 19.197 to 19.199 on Conservation of amphibians (*Amphibia* spp.)

Concerns about the need for greater study and evaluation of the impacts of trade on amphibians were presented in CoP18 Document 62 by the CITES Management Authority of Panama at the 18th meeting of the CITES Conference of the Parties (CoP18; Geneva, 2019)². Following revisions, a set of decisions was adopted in the form of CITES Decisions 18.194 -18.196 on *Conservation of amphibians (Amphibia spp.)*. These decisions were not fulfilled between CoP18 and CoP19, but were revised and updated through Document CoP19 Doc. 60 at CoP19 in Panama City in November 2022, and adopted as the present CITES Decisions 19.197- 19.199 on *Conservation of amphibians (Amphibia spp.)*.

Decision 19.197 directed the Secretariat, in close consultation with the Animals Committee, to:

a) conduct one or more interdisciplinary workshops for CITES Authorities and other relevant authorities and stakeholders about amphibian species in international trade, including but not limited to the following objectives:

i) identify amphibian species that are in international trade and evaluate whether certain species or groups should be recommended for possible listing in the Appendices;

ii) share existing national legislation relevant to the trade in amphibians;

iii) evaluate whether current levels of trade are compatible with the conservation of these species in the wild;

iv) compile further data on harvesting levels of amphibians subject to high volumes of international trade;

v) explore the emerging threat of diseases to traded amphibians, including amphibian chytrid fungus and ranaviruses; and

vi) examine current enforcement efforts to deter and detect illegal and unreported

trade and identify additional actions needed; and

b) explore modalities to implement this Decision in a cost-effective manner, including through the organization of online events; and

c) report on the progress in the implementation of paragraph a) and b) above to the Animals Committee, including any relevant recommendations.

In working towards the fulfilment of Decision 19.197 a. and to create information documents to support a workshop on amphibian conservation, the CITES Secretariat requested technical expertise from the International Union for Conservation of Nature (IUCN), and specifically the IUCN Species Survival Commission Amphibian Specialist Group, to perform the required studies and data collection exercises which are presented in this report. The three sections of this report respond to the following elements of Decision 19.197: Section 1 responds to Decision 19.197 a)(i), a)(iii), and a)(iv), Section 2 responds to Decision 19.197 a)(ii) and a)(vi), and Section 3 responds to Decision 19.197 a)(v).

Summary of methodological approach and trade data sources

Studies to evaluate the international trade in amphibians are largely handicapped by the lack of species-specific data on the trade in non-CITES listed species. No standardized form of amphibian-specific data recording occurs internationally. Formerly, record of international trade in frog legs by customs was captured by the customs Harmonized System (HS) code 0208.20 specifically defined as, “Other meat and edible offal, fresh, chilled or frozen- frogs’ legs”. As of 2007, this code was no longer used and these frog leg data are now recorded with HS code 0208.90, “Other meat and edible offal, fresh, chilled or frozen- Other”. This change in amphibian-specific coding was reportedly made because the volume of trade in frog legs was not high enough to justify its continued use according to the World Customs Organization (Dittrich et al. 2017). Therefore, at present, no customs codes issued by the World Customs Organization exclusively describe the trade in amphibians. All live amphibians and their parts and products fall into the generalized “other” coding categories, such as the HS code 0106.39 which simply represents trade in “other live animals.” Individual countries may record commodities in greater detail in accordance with national-level customs controls.

A world-wide exception to the lack of species-specific information about amphibian trade is represented by the wildlife trade records compiled by the United States Fish and Wildlife Service

(USFWS) in their Law Enforcement Information Management System (LEMIS). Records of all trade in wildlife by the United States of America, including trade in non-CITES listed species, are often (but not always) collected with species-level identifications among the LEMIS database. Accordingly, because the aim of the present study was to help identify species in need of greater conservation attention, the United States' species-specific LEMIS data provided the level of detail necessary to characterize international amphibian trade activity by a major country of import and export. While the scope of these data are limited to the United States' trade interactions, the data provide a valuable snapshot of global trade phenomena as the United States of America plays an outsized role in international trade. US imports account for 13% of the value of global international imports (World Bank Group 2023). Other data obtained from the CITES trade database and TRAFFIC's Wildlife Trade Portal were used to complement LEMIS trade records, however their inherent constraints limited the value they provided. The Wildlife Trade Portal reflects "TRAFFIC's open-source wildlife seizure and incident data" and is reliant on volunteer data input for new entries (TRAFFIC 2023). The dataset had limited information relating to species-level seizure data for amphibians. The CITES database, on the other hand, provides a record of reported trade in a subset of species, those listed in the Appendices, but in doing so is prevented from recording trade in biodiversity beyond listed species (<https://cites.org/eng/disc/how.php>). In the limited time available, it was not possible to obtain the necessary authorisation to access the data from several other aggregate data sources, such as EU-TRACES and EU-TWIX. WorldWISE was excluded from inclusion in this review as over 70% of its contents are derived from preexisting CITES and LEMIS data (UNODC 2016). Because patterns of trade between the United States of America and other countries might differ substantially compared to the trade between other countries for which no species-specific international data are recorded or available, the results and conclusions stemming from this study should be precautionarily interpreted.

Trade statistics based on customs data were also explored for this report because substantial levels of trade in frog legs also occurs between countries outside of the United States of America, but since these data do not record the species traded, their conservation application was extremely limited. Levels of domestic harvest and trade for certain highly traded species were also considered when available, because although this report focuses on international trade, high levels of domestic trade in wild-collected amphibians are relevant to consider when evaluating the threat posed by additive levels of national and international trade. Information pertaining to illegal trade in amphibians were also examined and incorporated from records provided in TRAFFIC's Wildlife Trade Portal. In addition to these data, a questionnaire was circulated to CITES Parties and the public through CITES Notification No. 2023/101.

CITES Notification and questionnaire

Information on the status, management and trade in amphibians was requested through a questionnaire circulated via a Notification to the Parties on 18 August 2023 (No. 2023/101; see Annex 1). The survey was open for a total of three and a half weeks (27 days) and 52 responses were received.

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Section 1. Amphibian Trade Assessment: A Global Snapshot of International Trade in CITES and Non-CITES Listed Amphibians with the United States of America Between 2015 And 2020

1.1 Introduction

Amphibian trade data collection by the United States Fish and Wildlife Service

This case study focused on the international trade in amphibians as recorded by the United States Fish and Wildlife Service (USFWS) Office of Law Enforcement in their Law Enforcement Management Information System (LEMIS). Unlike most other countries where only international trade in CITES-listed species is recorded, the United States of America records nearly all trade in all wildlife species crossing its borders. This task is performed primarily by USFWS Wildlife Inspectors and to a lesser extent, by Special Agents. The main role of the Wildlife Inspector is to facilitate the movement of legal international wildlife trade while also identifying and intercepting any trade deemed to be illegal. In many countries, this task is instead performed by customs officers who police the trade for unlawful activity but who rarely record full scientific names of the traded wildlife. For this reason, the USFWS LEMIS data represent the most comprehensive global snapshot of international wildlife trade in non-CITES listed species at the granularity necessary to examine trade by individual species.

The source of species-level data that are entered into LEMIS originates from the United States requirement under the Endangered Species Act that all wildlife imported to or exported from the United States of America must be declared on a standard form. This declaration form requires the genus and species of wildlife traded as well as additional scientific and administrative data elements including but not limited to the species' country of origin, source of the wildlife (e.g. collected from the wild, bred in captivity, ranches, etc.), purpose of trade (e.g. commercial, personal, scientific, etc.), a categorical description of the wildlife (e.g. live animals, meat, leather products, etc.), the dates of import or export, and mode of transport. The full requirements and exemptions governing this data reporting procedure are detailed in [50 CFR 14](#), together with additional international wildlife trade requirements.

When shipments of amphibians are imported or exported from the United States of America, the declaration forms must be provided to Wildlife Inspectors. These officers examine the Form 3-177, together with additional required supporting documentation including invoices, packing lists, shipping airwaybills or bills of lading, and any special permits. Wildlife Inspectors then determine whether or not physical inspections of the amphibian shipments are necessary to verify

compliance with all applicable trade laws. Upon completion of the document and/or physical inspections, data provided on the 3-177 declaration forms is transferred to the USFWS LEMIS Declaration System.

It was beyond the scope of the present study to specifically identify, correct, and evaluate the potential range of errors embedded among the LEMIS data provided by USFWS, but edits were necessary on a case-by-case basis to clean and/or standardize certain data prior to analyses. This was performed sparingly, and only where little or no assumptions were made about the correct nature of these data. In all cases, the original data were retained, and new fields were assigned to store corrections.

Beyond those data captured in LEMIS, additional information about internationally traded species of non-CITES listed amphibians was captured through literature review and responses received from respondents to the amphibian trade questionnaires disseminated through the CITES Notification, and a summary of these data is provided in Annex 1 of this report.

1.2 Methods

LEMIS dataset used in this study & taxonomical standardization of trade records

LEMIS data are not automatically publicly released but can be provided for use in response to requests made under the Freedom of Information Act (FOIA), a federal law that affords the public the right to make requests for federal government records. Data used in this study were obtained from FOIA request number FWS-2022-000708, which was submitted by the authors on November 16th, 2021, and fulfilled on May 9th, 2022. The fulfilled request consisted of all LEMIS trade records for wildlife trade occurring from January 1, 2015 to December 31, 2020. Taxonomic data in LEMIS trade records are standardized using alphanumeric values between one and four digits (e.g. BRYC or HAO*). These values, called LEMIS species codes, encode characteristics including family and class. Trade records for amphibian species were isolated using a multi-step process. Trade records denoting amphibian species and less detailed amphibian taxonomic groups, such as genus and family, were identified by the “AMP” value assigned in the “Wildlife Cat” column and isolated. Records of amphibians were also identified where “Wildlife Cat” values denoted “OTH” and blank- or “null”- values. All records denoted by these two values were isolated and the Global Biodiversity Information Facility (GBIF) Species-lookup tool was used to detect amphibian taxonomic groups (<https://www.gbif.org/tools/species-lookup>).

The GBIF tool assigned values to identified amphibian nomenclature that could be used to filter and isolate taxonomic groups. All species records that could not be identified as amphibians nor explicitly determined to be irrelevant to this study were again isolated and manually verified against the GBIF species database. At this step, species records frequently included misspellings and other typos that prevented the GBIF Species-lookup tool from fully matching the nomenclature. All isolated amphibian taxonomic groups were combined into a single list, which was then used to match against and extract the corresponding LEMIS trade records. This resulted in the identification of 32,931 LEMIS trade records involving amphibians identified to the species level or higher. These records were used as the core of the present amphibian trade analyses.

Visualization of data in this report utilized LEMIS coding systems. This document describes the full list of codes and instructions provided by USFWS to the import/export community including wildlife description, purpose of trade, countries of origin and export, source of wildlife, and units of measure.

1.3 Cumulative summary of amphibian trade between 2015 and 2020

1.3.a. Number of amphibian shipments

This study included all identified shipments of internationally traded amphibians recorded by the United States of America from 1 January 2015 through 31 December 2020, and involved 32,931 rows of LEMIS data.

From 2015 through 2020, there were a total of 14,663 recorded shipments of amphibians traded internationally by the United States of America (Figure 1). The majority of these transactions involved importation (9,342; 63.7%) followed by exportation (5,314; 36.2%) and then transshipments (7; <0.1%). It should be noted that USFWS does not systematically require declaration and recordkeeping when non-CITES listed species are transhipped through the country, and therefore these seven recorded transshipments represent only a small fraction of those which occurred.

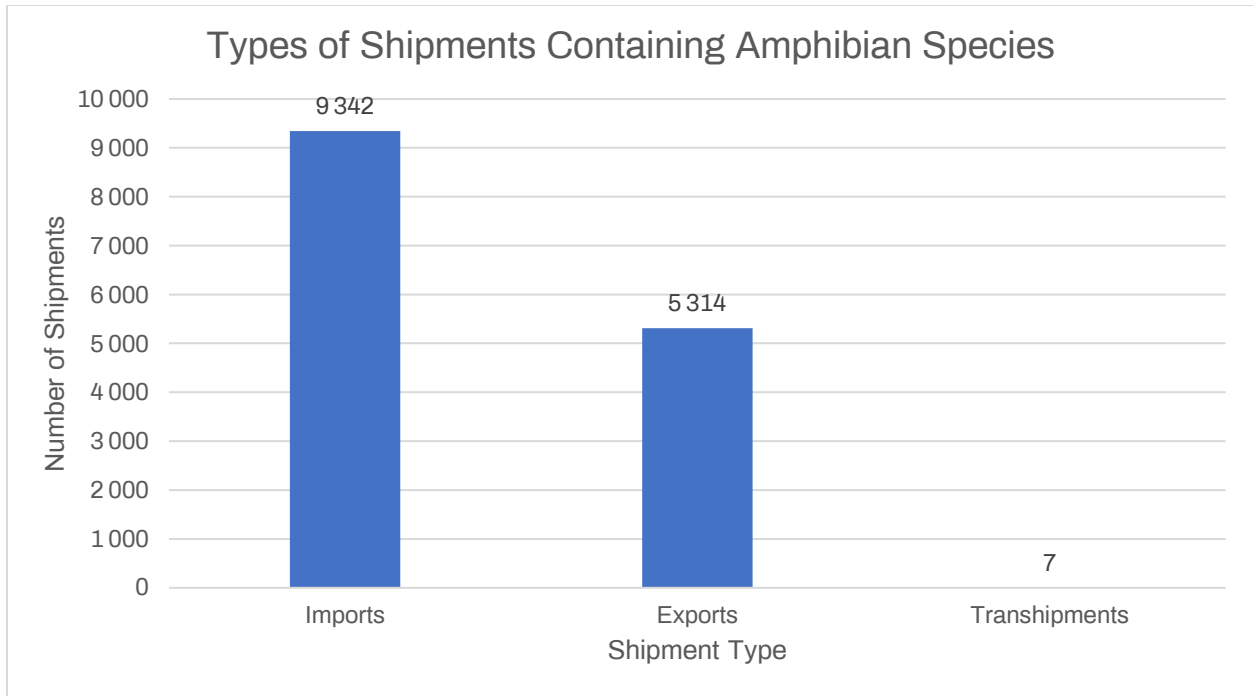


Figure 1: Number of amphibian shipments traded to and from the United States of America between 2015-2020 reported as imports, exports, and transshipments.

The number of shipments traded by the United States of America remained fairly constant across the study period, with an average of 2,443.83 shipments annually (Figure 2). It should be noted that impact of the COVID19 pandemic on global wildlife trade likely contributed towards reduction in trade observed between 2019 and 2020 and for this reason, some characteristics of amphibian trade in 2020 might represent outliers. Since more recent data were not available for use in this study, it is unknown whether post-COVID19 trade will demonstrate new characteristics.

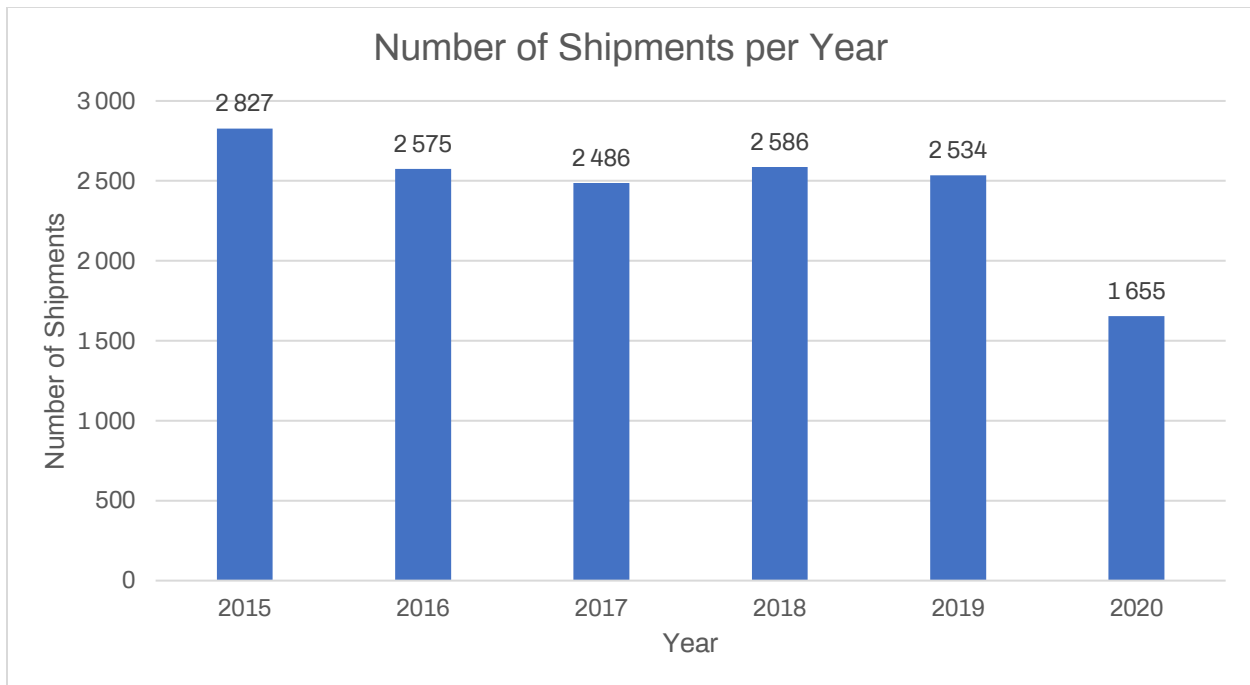


Figure 2: Number of amphibian shipments traded with the United States of America annually from 2015-2020.

As future trade patterns can vary from historical trade in unpredictable ways, observations based on the most recent five years of LEMIS data are informative, but a multiple year time lag often exists between when these data are recorded by USFWS and when the U.S. Department of the Interior's FOIA office is able to complete their data review process and insert required censorship of information protected under the Privacy Act. Therefore, this study incorporated the most recent data available, but also highlights the chronic limitation faced by all similar wildlife trade studies that show results based on data that are already several years old upon completion when the goal is to illustrate patterns of current trade that may threaten affected species.

For this reason, any patterns interpreted from LEMIS data that become the source of calls for amphibian trade policy changes should first be interrogated to answer the following questions: 1) Is this trade pattern likely not to have changed in the years following 2020? and 2): If this trade pattern no longer exists, would the policy in question still provide the intended positive outcome for the species? The answers to these questions will then help guide the collection and analyses of additional data, if necessary.

1.3.b. Number of amphibian species traded

Amphibians were recorded in LEMIS with varying levels of taxonomic specificity. Each record had an assigned LEMIS species code, ranging from a precise genus and species to only the genus, family, or class. In some cases, a LEMIS species code was not available for the species traded, and instead a placeholder called “scratchpad”, signified by species code value of “****” was entered, allowing USFWS to manually enter a genus and species rather than using a pre-existing standardized code. Each unique taxonomical combination of genus and species information was treated as one distinct taxonomical unit for the purposes of quantifying diversity of species traded (Figure 3). This approach resulted in the identification of 1,490 distinct taxonomical units of amphibians traded during the study period. Among these units, 1,279 were recorded with complete scientific names, although 33 of these were synonyms of other taxonomic units. Another 51 complete scientific names were unable to be verified when compared to the AmphibiaWeb or GBIF taxonomic databases. The remaining 218 taxonomical units which were recorded without full scientific names included naming systems that could have potentially represented any of the 8,000+ described species of amphibians, such as “all amphibians” and “non-CITES amphibians.” Accordingly, these 218 taxonomical units may have consisted of many additional species not identifiable among these data.

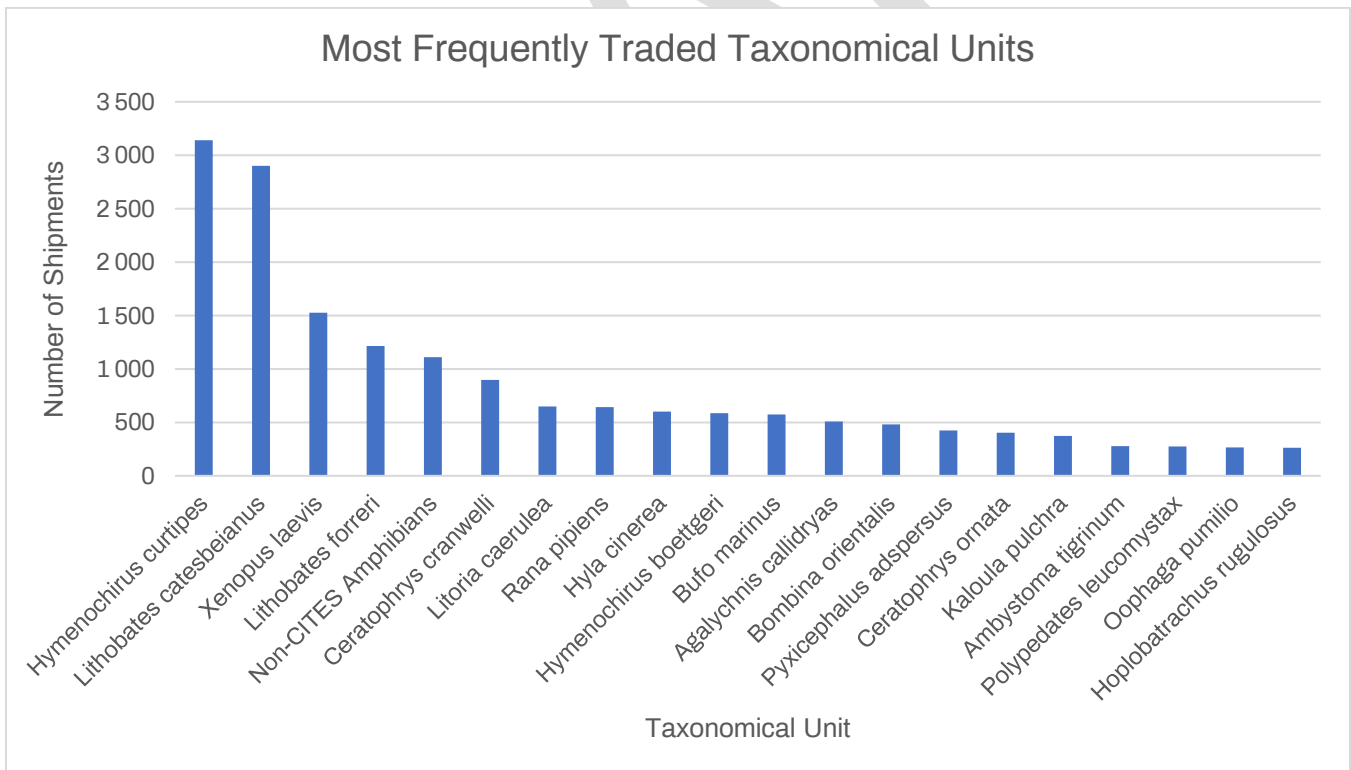


Figure 3: Number of shipments recorded by the United States of America with each unique taxonomical unit from 2015-2020: Top 20 taxonomical units displayed.

1.3.c. Types of amphibian commodities traded

Amphibians were recorded in LEMIS using 32 different description codes during the study period (Figure 4). Each description code denotes a different type of commodity, ranging from live amphibians to frog legs to amphibian bones and extracts. The top five most frequently recorded categories included: live amphibians, amphibian specimens, amphibian bodies, frog legs, and amphibian meat, and these together constituted 97% (14,218 of 14,663) of shipments traded. Most of the species-specific examinations in this study will explore trade in amphibians recorded with these top five most frequently recorded categories.

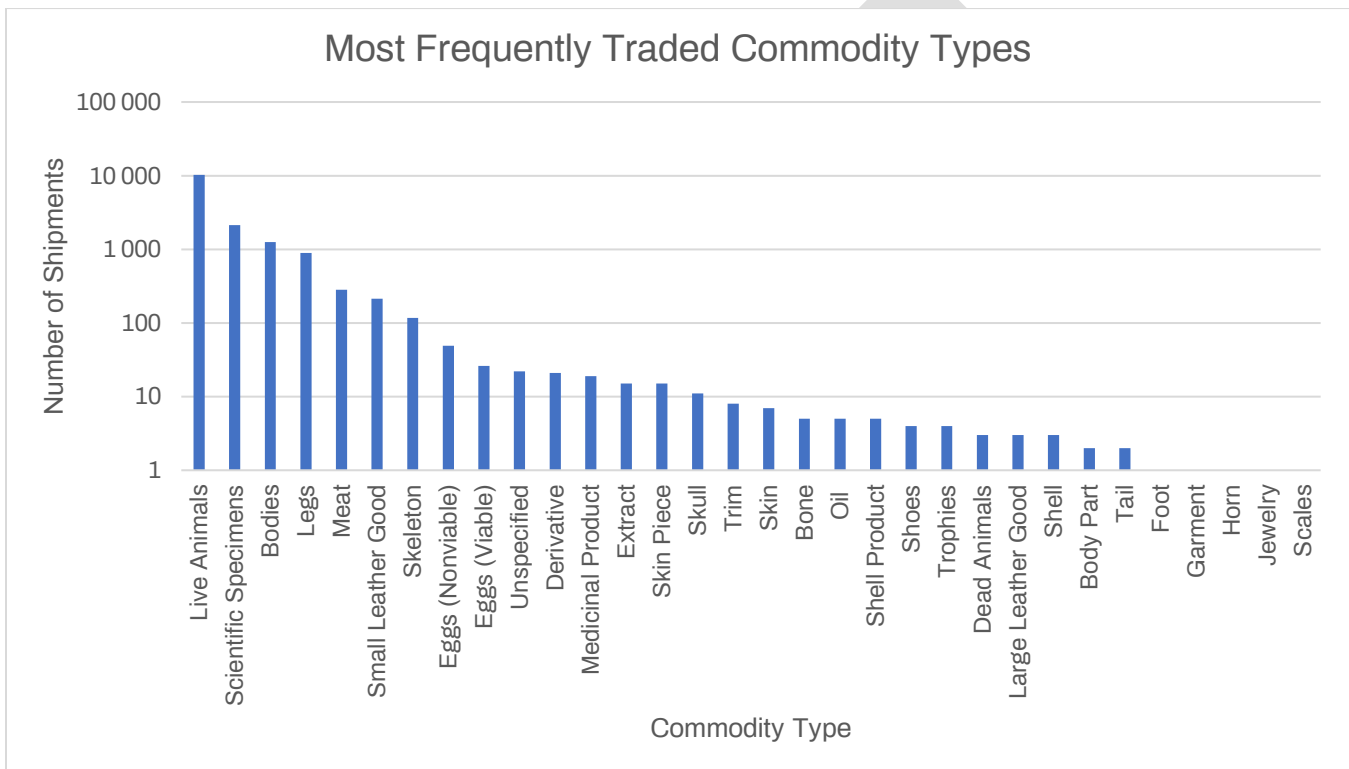


Figure 4: Number of amphibian shipments recorded by the United States of America as different amphibian commodity types from 2015-2020, based on USFWS LEMIS description codes.

Among all 32 LEMIS wildlife description codes recorded, eight allow for approximate quantification of individual amphibians (BOD, DEA, EGG, EGL, LIV, SKE, SKU, TRO) but the rest primarily code for parts and products where numbers of traded amphibians represented by these data are unclear. Examples where the number of amphibians impacted cannot be identified includes the trade in material described as amphibian leather products, scientific specimens, and medicinal products, among others.

1.3.d. Number of amphibians traded by commodity category

Among amphibian trade where the commodity was recorded in units of number rather than units of mass, live amphibians were the highest traded commodity among the 31 different description categories recorded (Figure 5). When parts, products, and live animals are all treated as equal, where one live animal represents one unit the same as one amphibian “meat” represents one unit, then live individual amphibians represented 90.1% of amphibians traded by the United States of America. The second most abundantly traded commodity was amphibian “bodies”, comprising 5.7% of traded amphibians, and the remaining 29 categories of amphibian parts and products comprised the remaining 4% of trade. Thus, just two of 31 commodities represented 95.8% of all traded amphibians recorded in units of number: live animals and amphibian bodies. Comparison between the number of shipments and the number of amphibians recorded with certain description codes revealed that three of the top five description codes in each group (Figures 4 and 5) overlapped: live amphibians, amphibian specimens, and amphibian bodies.

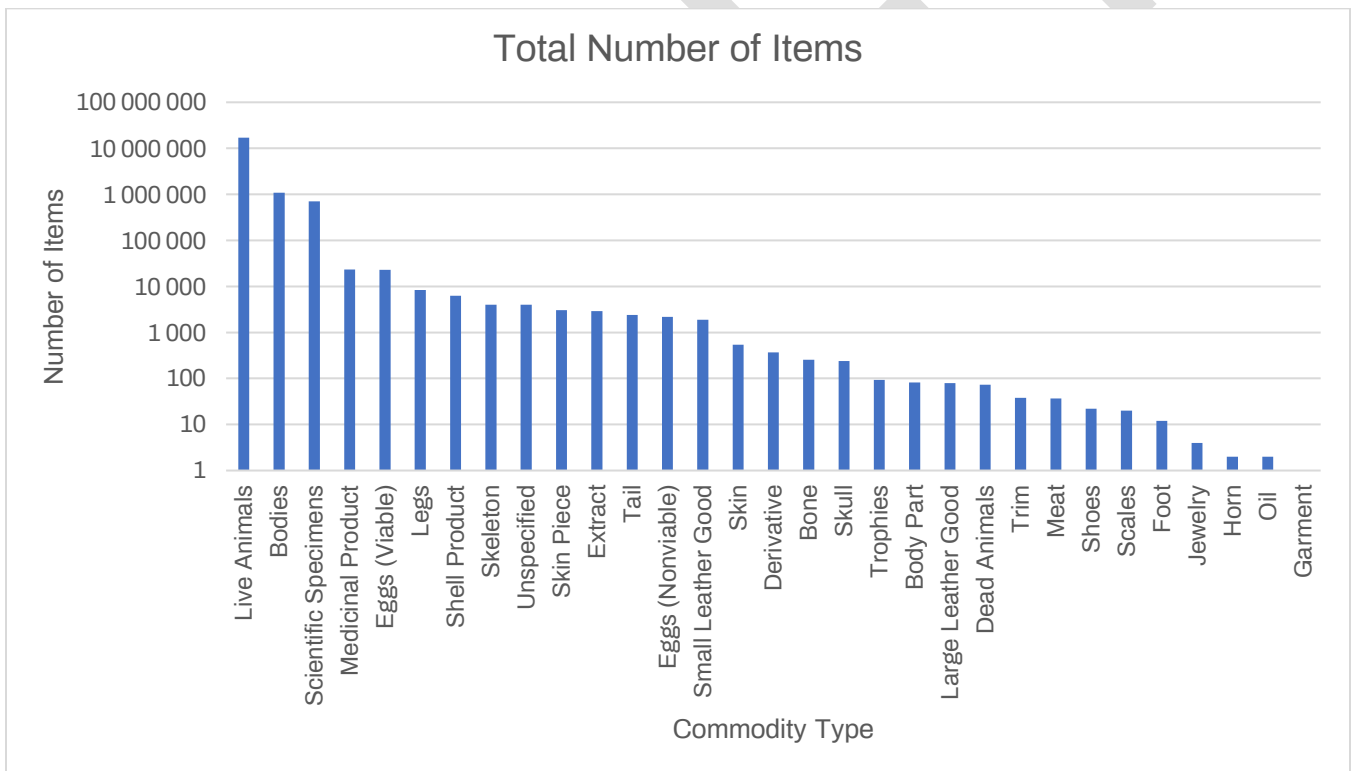


Figure 5: Relative categories of all traded live amphibians, and their parts and products, collectively recorded by the United States of America in units of number from 2015-2020.

1.3.e. Units of Measure Among Traded amphibians

Similar to how amphibians were recorded in LEMIS with 32 different ‘wildlife description codes’ as described above, they were also quantified using nine different units of measure (Figure 6) . This manner of recordkeeping and categorization caused difficulty in assembling a single

cumulative quantification of animals traded. For instance, a shipment containing 1,000 American bullfrogs (*Lithobates catesbeiana*) is sometimes recorded by USFWS as 1,000 individual live animals (recorded in units of number) but other times is recorded as 1,000 kilograms of meat, without any indications of the actual number of amphibians traded. This method of recording animals by weight rather than by number of animals is commonplace among customs records of international amphibian trade in frog legs, and this makes it particularly challenging to estimate the number of amphibians traded when masses of individual amphibians vary widely between individuals.

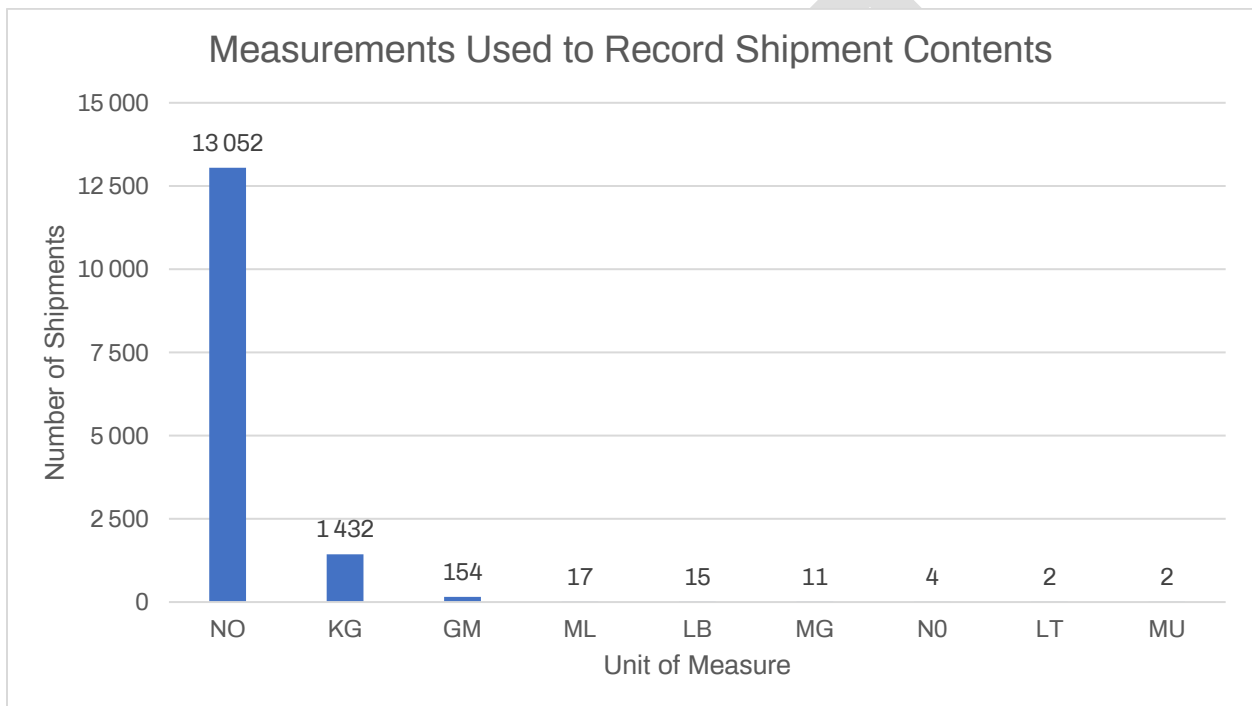


Figure 6: Number of amphibian shipments recorded by the United States of America using different units of measure from 2015-2020.

Over 90% of amphibian shipments traded by the United States of America (14,484 of 14,663) were recorded using just two of nine units of measure: 'No' (number of specimens) and 'Kg' (kilograms of specimens). As such, species-specific data analyses will focus on trade in amphibians recorded with either of these two units of measure (number of amphibians and kilograms of amphibians), as well as the five most common LEMIS wildlife description codes recorded (live amphibians, amphibian specimens, amphibian bodies, frog legs, and amphibian meat).

1.4 Cumulative summary of illegal amphibian trade between 2015 and 2020

1.4.a. All amphibian trade refused clearance by the United States of America

The majority of shipments (97.2%) that contained amphibians were cleared to enter commerce by the United States of America (Figure 7). The remaining 417 shipments were refused, or partially refused, clearance by the USFWS Office of Law Enforcement. These notations of refused clearance identified the presence of illegal trade because all wildlife lawfully traded must be provided clearance as per US wildlife trade regulations. However, it is important to note that additional illegal trade may have occurred that was either not identified by law enforcement officers or that was identified but not recorded with notations of refused clearance.

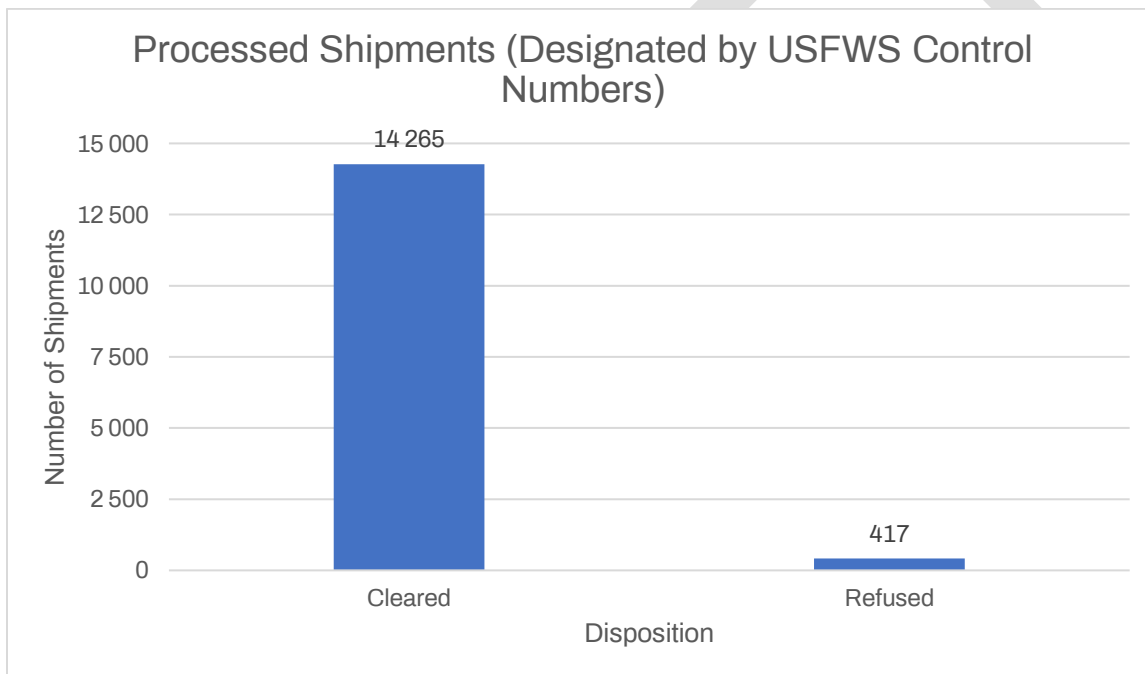


Figure 7: Number of shipments which contained amphibians refused clearance by the United States of America from 2015-2020.

1.4.b. Mixed shipments of legally and illegally traded amphibians

Individual shipments can sometimes contain multiple wildlife species and/or commodities. Legality and import or export clearance for each commodity within a shipment is reviewed alongside the accompanying document package. Among amphibian shipments traded by the United States of America, the majority were recorded as either entirely cleared or entirely refused, but 4.6% of shipments where refusal occurred also contained other amphibians that were deemed lawful and cleared to enter commerce (Figure 8). These combined shipments may have involved

circumstances where certain portions of a shipment might not have been declared, quantities permitted to be traded may have been exceeded, or required permits were invalid or absent altogether. These data suggest that when law enforcement officers perform inspections of amphibian shipments, partial inspections versus full inspections may fail to identify amphibians that were illegally present in the shipment.

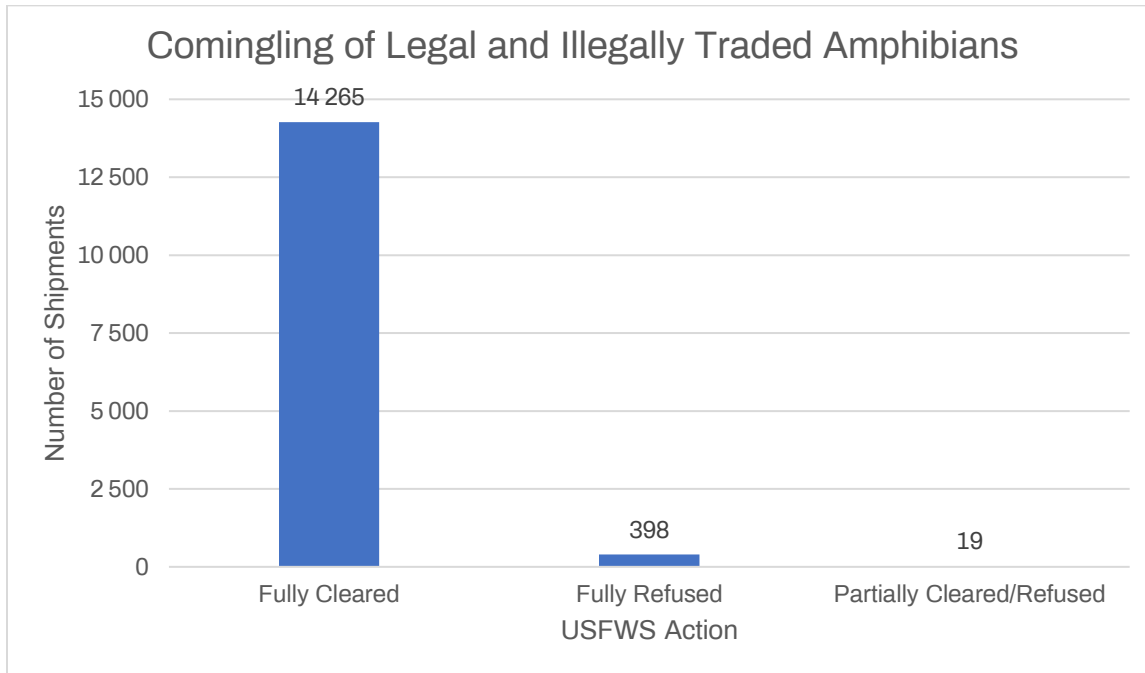


Figure 8: Number of amphibian shipments that were entirely provided clearance by the United States of America, entirely refused clearance, or that contained both cleared and refused clearance amphibians together, from 2015-2020.

For example, a shipment (Control Number 2016965114) imported from Panama contained 168 amphibian specimens for scientific research, which involved at least 17 species of frogs and salamanders, all collected from the wild. All specimens were provided clearance to enter the United States of America, except for one specimen of *Dendrobates auratus* and two specimens of *Andinobates minutus*, which were both refused clearance and re-exported, presumably to Panama.

1.4.c. Purpose of trade among illegally traded amphibian shipments

Shipments where animals were refused clearance by the United States of America mostly involved trade for personal use (57.3%), followed by commercial (39.6%) and scientific uses (2.2%) (Figure 9). A minimal number of refused shipments involved trade for biomedical and education purposes.

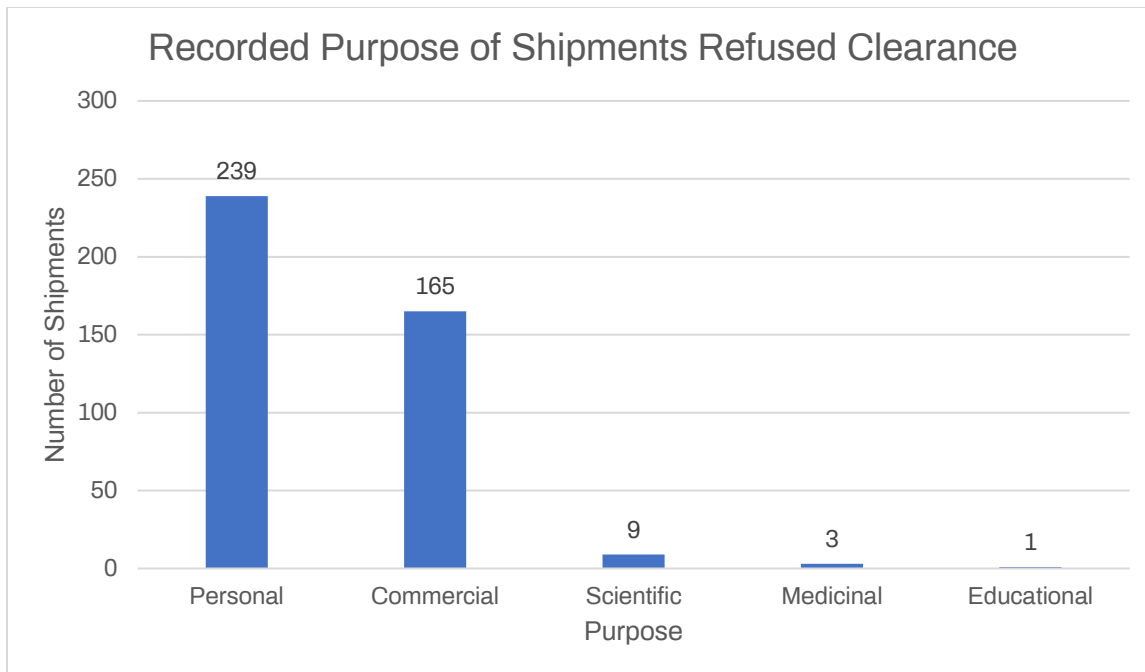


Figure 9: Purposes of trade of illegally traded amphibian shipments recorded by the United States of America from 2015-2020.

1.4.d. Sources of illegally traded amphibians

Of the 531 rows of LEMIS data which described the contents of amphibian shipments refused for clearance, the majority (48.2%) were recorded as originating from unknown sources (Figure 10). This “unknown” LEMIS source code means that no available information was presented for USFWS to be able to record the source of traded amphibians with confidence. It should be noted that USFWS also sometimes responds to these types of events by precautionarily recording the source as “wild.” Thus, the next most frequently recorded source code of “wild” (42.7%) should be interpreted with caution, as some portion of these may have been more accurately described as “unknown.” Regardless, more illegally traded amphibians are recorded to have involved animals collected from the wild than produced in captivity.

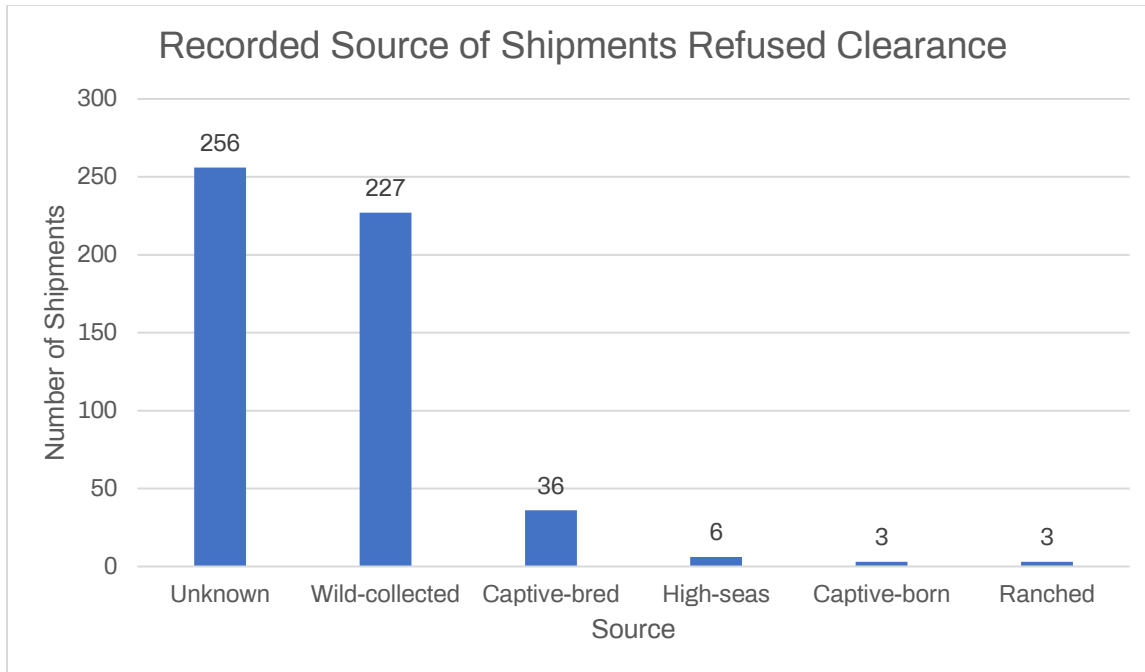


Figure 10: Frequency of reported sources of illegally traded amphibians recorded by the United States of America from 2015-2020.

During the study period, six illegal amphibian trade events were recorded by USFWS with LEMIS source code “X”, defined by USFWS as “Introduction from the sea.” Amphibians cannot be found living in the high seas, so this may have instead been intended to reflect “unknown”, for which source code “X” was recorded in error. Alternatively, these six instances might have genuinely involved marine wildlife erroneously recorded as amphibians.

1.4.e. Amphibian commodities most frequently illegally traded

Of the 531 rows of LEMIS data that describe the contents of refused clearance amphibian shipments 48.2% involved amphibian bodies recorded as “BOD” (Figure 11). This term is defined by USFWS as “Dead animal (whole animal).” It should be noted that these are not animals that were shipped alive and died in transit, which are coded differently (i.e. with LEMIS wildlife description code DEA). Instead, these are amphibians that were intentionally harvested and traded in a non-living state. This activity is associated with the use of amphibians as subjects for dissection exercises, as meat for human consumption, or as scientific specimens, among other possibilities. To a lesser extent, the illegal trade in bodies was followed by that in live amphibians at 21.8% of refused rows of LEMIS data, and then amphibian meat at 17.3%.

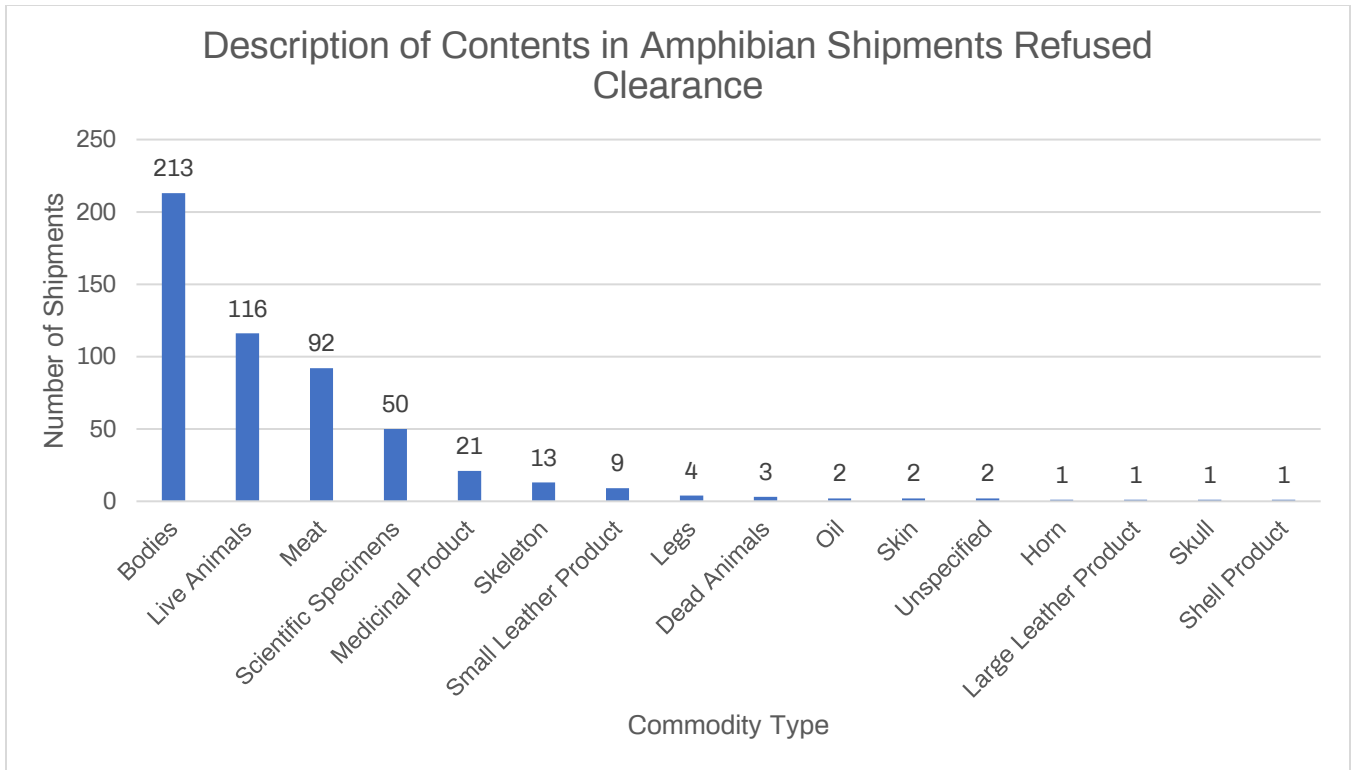


Figure 11: Frequency of illegal trade in different amphibian commodity types, based on USFWS LEMIS description codes, recorded by the United States of America from 2015-2020.

Because the number of rows of data represent trade events but do not always positively correspond to overall higher levels of traded animals, the most frequent category of illegal trade (amphibian bodies) was explored to consider whether it also involved the greatest quantity of individually reported animals (Figure 12).

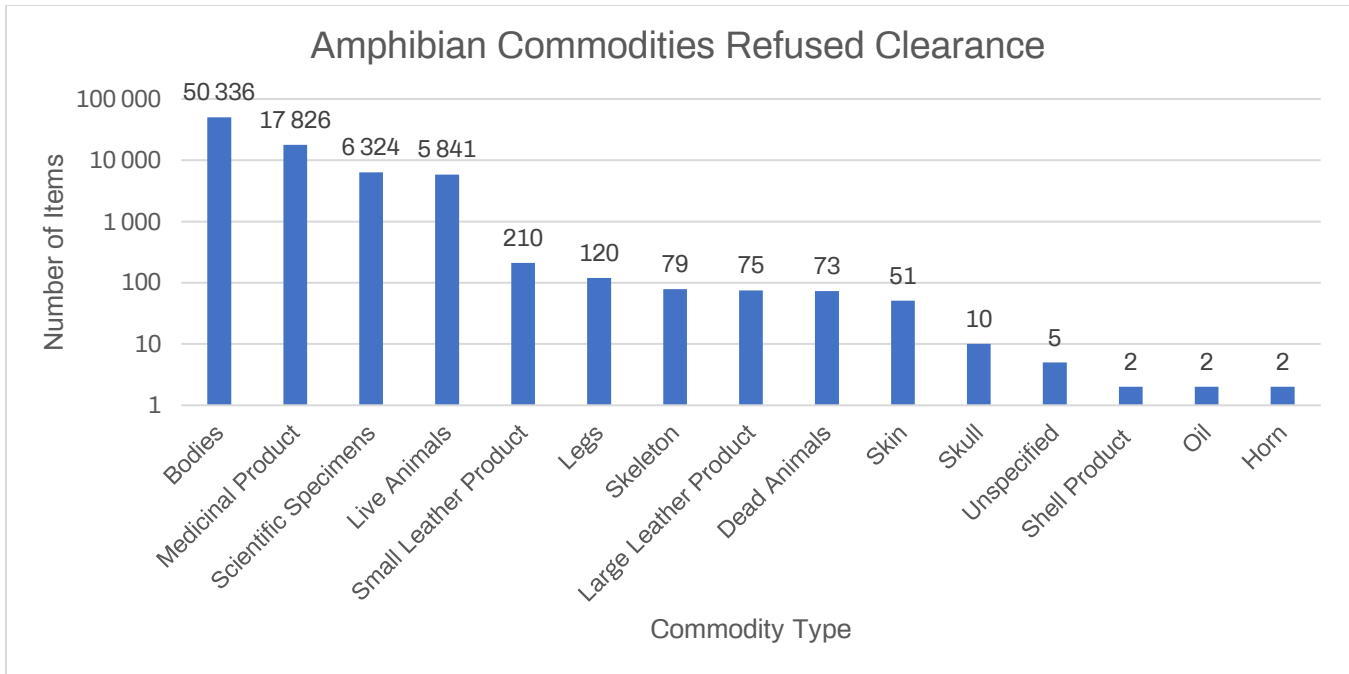


Figure 12: Total quantities of each illegally traded amphibian commodity based on USFWS LEMIS description codes and measured in units of number recorded by the United States of America from 2015-2020.

Most amphibians recorded in units of number that were refused clearance and deemed to have been illegally traded also involved material recorded as bodies (62.2%). Amphibian bodies were then followed by amphibians described as medicinals (22.0%). Illegally traded live amphibians represented only 7.2% of total animals individually recorded and refused clearance, although they represented the second most commonly refused clearance events, indicating that this trade sector is typified by relatively frequent but small shipments of illegally traded live amphibians. Most previous studies that have evaluated amphibian trade primarily focused on live animals (Mohanty and Measey 2019, Hughes et al. 2021, Connelly et al. 2023), and these data suggest that by doing so, a significant proportion of the illegal amphibian trade has been excluded from consideration.

1.4.f. Species most frequently illegally traded

Of 246,012.79 amphibians illegally traded, 135 taxonomical units were recorded. Despite the diversity, this trade was predominated by amphibians recorded with low taxonomic detail, with 51.0% described only as “Non-CITES Amphibians”, followed by 20.6% comprised of *Hoplobatrachus rugulosus* (Figure 13).

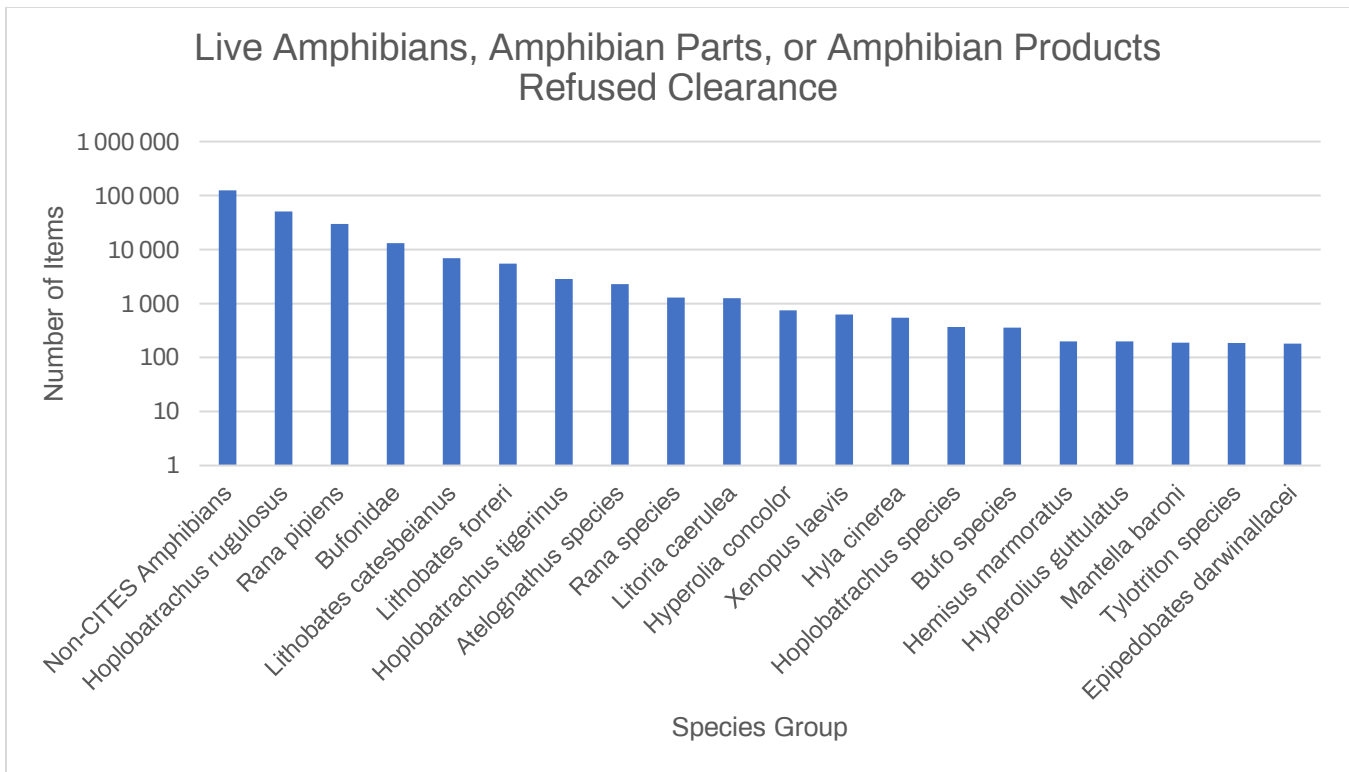


Figure 13: Cumulative quantities of all illegally traded live amphibians, their parts, and products for each taxonomical unit measured in units of number and recorded by the United States of America from 2015-2020: Top 20 taxonomical units displayed.

The top 20 taxonomical units comprised 98.7% of illegally traded amphibians recorded by the United States of America during the study period, whereas the remaining 1.3% was comprised of 115 taxonomical units. Of these top 20, only 13 were assigned with a full genus and species identification among the LEMIS records.

Twelve of 13 identified species among the top illegally traded amphibians are currently listed as Least Concern in the IUCN Red List and *Epipedobates darwinwallacei* has been recently assessed as Endangered (Table 1). Of the 12 listed as Least Concern, two are described as having decreasing populations, including the East Asian Bullfrog (*Hoplobatrachus rugulosus*) found native to six countries (Cambodia, China, Lao People's Democratic Republic, Myanmar, Thailand, and Viet Nam) and introduced to two (Malaysia and Philippines) and the Northern Leopard Frog (*Rana pipiens*) native to the United States of America and Canada. Among these 12 species, two are CITES-listed, both in Appendix II: the Indian Bullfrog (*Hoplobatrachus tigerinus*) endemic to Afghanistan, Bangladesh, India, Myanmar, Nepal, Pakistan and introduced to Madagascar and the Maldives and Baron's Mantella (*Mantella baroni*) endemic to Madagascar. The poison dart frog *Epipedobates darwinwallacei* endemic to Ecuador is also listed in CITES Appendix II.

Table 1: Top 20 illegally traded amphibian taxonomical units recorded by the United States of America from 2015-2020 and their IUCN Red List conservation status.

LEMIS Taxonomy (updated where possible)	IUCN Red List Taxonomy	IUCN Red List Category and Assessment Year	Population Trend	CITES Appendix
Non-CITES Amphibians	N/A (species not identified)	N/A	N/A	N/A
<i>Hoplobatrachus rugulosus</i>	<i>Hoplobatrachus rugulosus</i>	Least Concern (2020)	Decreasing	N/A
<i>Rana pipiens</i>	<i>Lithobates pipiens</i>	Least Concern (2021)	Decreasing	N/A
<i>Bufo</i> spp.	N/A (species not identified)	N/A	N/A	N/A
<i>Lithobates catesbeianus</i>	<i>Lithobates catesbeianus</i>	Least Concern (2020)	Increasing	N/A
<i>Lithobates forreri</i>	<i>Lithobates forreri</i>	Least Concern (2019)	Stable	N/A
<i>Hoplobatrachus tigerinus</i>	<i>Hoplobatrachus tigerinus</i>	Least Concern (2008)	Stable	II
<i>Atelognathus</i> spp.	N/A (species not identified)	N/A	N/A	N/A
<i>Rana</i> spp.	N/A (species not identified)	N/A	N/A	N/A
<i>Litoria caerulea</i>	<i>Litoria caerulea</i>	Least Concern (2021)	Stable	N/A
<i>Hyperolius concolor</i>	<i>Hyperolius concolor</i>	Least Concern (2013)	Increasing	N/A
<i>Xenopus laevis</i>	<i>Xenopus laevis</i>	Least Concern (2016)	Increasing	N/A

<i>Hyla cinerea</i>	<i>Dryophytes cinereus</i>	Least Concern (2020)	Stable	N/A
<i>Hoplobatrachus</i> species	N/A (species not identified)	N/A	N/A	<i>H. tigerinus</i> is listed under Appendix II
<i>Bufo species</i>	N/A (species not identified)	N/A	N/A	Some <i>Bufo</i> species are listed under Appendix I
<i>Hemisis marmoratus</i>	<i>Hemisis marmoratus</i>	Least Concern (2013)	Unknown	N/A
<i>Hyperolius guttulatus</i>	<i>Hyperolius guttulatus</i>	Least Concern (2013)	Unknown	N/A
<i>Mantella baroni</i>	<i>Mantella baroni</i>	Least Concern (2016)	Unknown	II
<i>Tylotriton</i> species	N/A (species not identified)	N/A	N/A	N/A
<i>Epipedobates</i> <i>darwinwallacei</i>	<i>Epipedobates</i> <i>darwinwallacei</i>	Endangered (2023*)	N/A	II

* The IUCN Red List assessment for *Epipedobates darwinwallacei* will be published in December 2023.

1.5 Detailed analysis of total species composition of international amphibian trade with the United States of America between 2015 and 2020

During the study period, 1195 amphibian species were recorded in international trade by the United States of America (Annex 2). Of these, 1,078 were not CITES-listed species. The top 10 traded species comprised 95.6% of all amphibians traded as individually counted live animals, illustrating that the trade was predominated by relatively few species despite the overall high diversity of species affected by trade.

Not all amphibians traded by the United States of America and recorded in LEMIS were described to species, and for this reason, the actual number of species traded may have been greater than what these available data indicate. Some trade events were recorded only with the genus, family, or class name while some others lacked all identifying information other than the description “Non-CITES Amphibian.” LEMIS frequently records taxonomical identification at levels higher than a full scientific name, such as “*Rana* species”, which could either represent a trade event that involved one species in the genus *Rana* (described as *Rana* sp.) or alternatively represent a trade event that involved multiple species within the genus *Rana* (more accurately described as *Rana* spp.). Given the condition of these data, it is not possible to make this differentiation. This lack of species-level identification affected 5,064 of the 32,931 rows of LEMIS data available for this study (Annex 2, digital version), It therefore should be noted that the species list presented in this report is a conservative representation of the trade in amphibians that took place from 2015-2020 and that an unknown number of additional amphibian species might be present among these data that cannot presently be described to species.

In the following sections, the composition of the top five most traded amphibian commodities are more closely examined: live amphibians, scientific specimens, amphibian bodies, frog legs, and amphibian meat, specifically doing so for shipments recorded using either of two units of measure: number of individuals and kilograms.

1.5.a. Species and quantities of live amphibians traded in units of number of animals

Methods note: Two units of measure were treated as equal in all analyses described as “number of amphibians.” These two units included “No” and “N0.” The zero in “N0” was interpreted to represent errors in the LEMIS data entry process because this is not a currently valid LEMIS unit of measure. It is reasonable to assume that zeros were accidentally entered instead of the letter “o”, and so all records that used either of these two codes were included in these analyses.

Of 17,077,150 total live amphibians traded, 72.5% were comprised of a single species: the American bullfrog (*Lithobates catesbeianus*). Of these, the majority were imported, with 0.016% of this 72.5% recorded as exported. The remaining 27.5% of live amphibians was comprised of 4,691,596 animals described by 538 different taxonomical units. Of these, 452 identified the amphibians to species and the remaining 86 described traded amphibians only to genus, or higher.

Among the top 20 traded live amphibian taxonomical units, 18 were recorded with a full scientific name, and all of these were listed as Least Concern in the IUCN Red List except for *Ceratophrys ornata*, which is listed as Near Threatened (Figure 14). Six of these 18 species were described as having decreasing populations, six were described as stable, three were described as increasing, and three were described as unknown (Table 2).

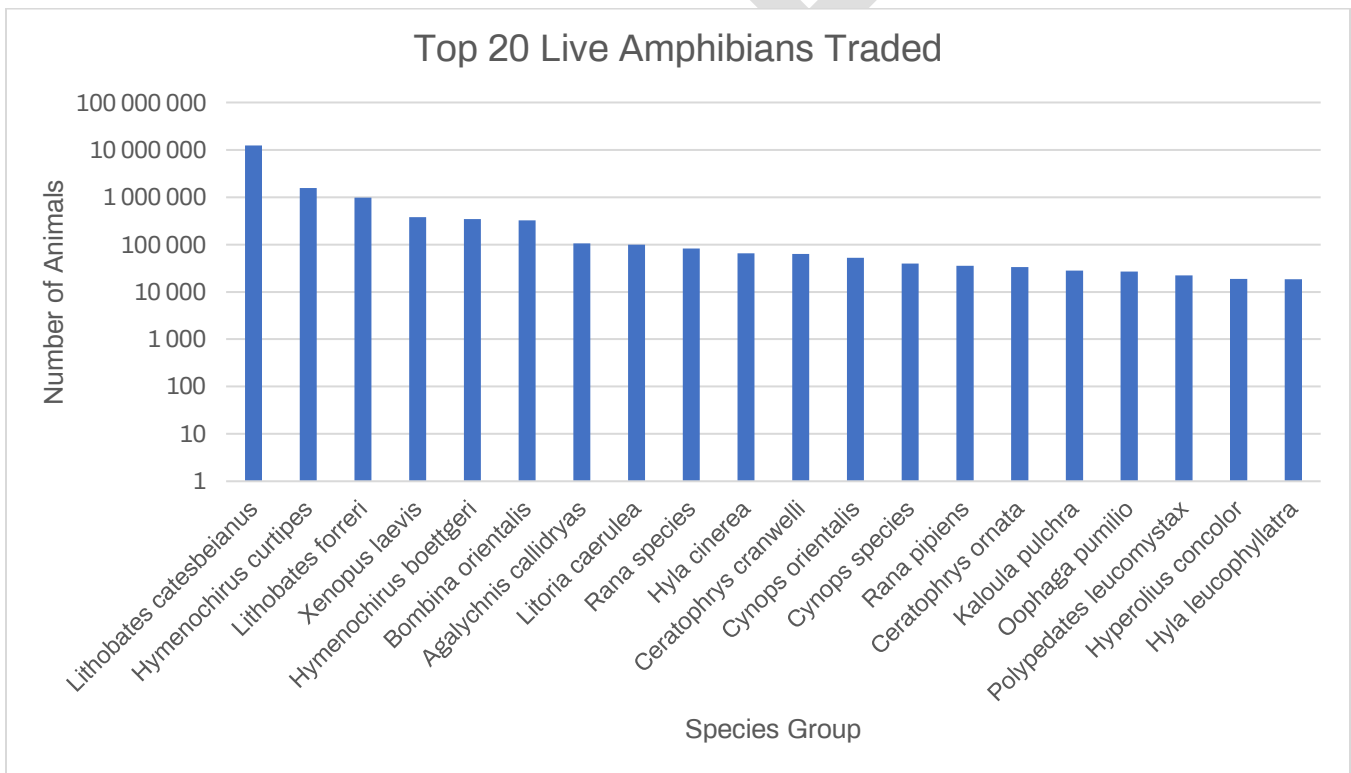


Figure 14: Quantities of highly traded live amphibians recorded by taxonomical unit and measured in units of number by the United States of America from 2015-2020: Top 20 taxonomical units displayed.

Taxonomic overlap was observed between species traded at high levels, both legally and illegally. Among the 20 top legally traded live amphibians recorded to species, seven were also present among the top illegally traded species. These seven included: *Xenopus laevis*, *Lithobates pipiens*,

Hyperolius concolor, *Lithobates forreri*, *Litoria caerulea*, *Hyla cinerea*, and *Lithobates catesbeianus*. It is likely that in some of these cases, highly traded species have been illegally traded due to negligence, rather than intent to circumvent the law, because these are not rare species prohibited from trade. The top traded live frog was the American bullfrog (*Lithobates catesbeianus*) and yet it was also the third most illegally traded amphibian that was recorded to species.

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Table 2: Top 20 amphibian taxonomical units traded as live animals recorded by the United States of America from 2015-2020 and their IUCN Red List conservation status.

LEMIS (updated possible)	Taxonomy where	IUCN Red List Taxonomy	IUCN Red List and Assessment Year	Population Trend	CITES Appendix
<i>Lithobates catesbeianus</i>		<i>Lithobates catesbeianus</i>	Least Concern (2020)	Increasing	N/A
<i>Hymenochirus curtipes</i>		<i>Hymenochirus curtipes</i>	Least Concern (2013)	Unknown	N/A
<i>Lithobates forreri</i>		<i>Lithobates forreri</i>	Least Concern (2019)	Stable	N/A
<i>Xenopus laevis</i>		<i>Xenopus laevis</i>	Least Concern (2016)	Increasing	N/A
<i>Hymenochirus boettgeri</i>		<i>Hymenochirus boettgeri</i>	Least Concern (2013)	Unknown	N/A
<i>Bombina orientalis</i>		<i>Bombina orientalis</i>	Least Concern (2019)	Decreasing	N/A
<i>Agalychnis callidryas</i>		<i>Agalychnis callidryas</i>	Least Concern (2016)	Decreasing	II
<i>Litoria caerulea</i>		<i>Litoria caerulea</i>	Least Concern (2021)	Stable	N/A
<i>Rana</i> species		N/A (species not identified)	N/A	N/A	N/A
<i>Hyla cinerea</i>		<i>Dryophytes cinereus</i>	Least Concern (2020)	Stable	N/A
<i>Ceratophrys cranwelli</i>		<i>Ceratophrys cranwelli</i>	Least Concern (2004)	Decreasing	N/A
<i>Cynops orientalis</i>		<i>Cynops orientalis</i>	Least Concern (2019)	Decreasing	N/A
<i>Cynops</i> species		N/A (species not identified)	N/A	N/A	N/A
<i>Rana pipiens</i>		<i>Lithobates pipiens</i>	Least Concern (2021)	Decreasing	N/A
<i>Ceratophrys ornata</i>		<i>Ceratophrys ornata</i>	Near Threatened (2004)	Decreasing	N/A
<i>Kaloula pulchra</i>		<i>Kaloula pulchra</i>	Least Concern (2020)	Stable	N/A
<i>Oophaga pumilio</i>		<i>Oophaga pumilio</i>	Least Concern (2014)	Unknown	II
<i>Polypedates leucomystax</i>		<i>Polypedates leucomystax</i>	Least Concern (2004)	Stable	N/A

<i>Hyperolius concolor</i>	<i>Hyperolius concolor</i>	Least Concern (2013)	Increasing	N/A
<i>Hyla leucophyllata</i>	<i>Dendropsophus leucophyllatus</i>	Least Concern (2004)	Stable	N/A

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If American bullfrogs are removed from the visualization in Figure 14, a clearer picture of trade volumes can be seen among the next most highly traded live amphibians (Figure 15).

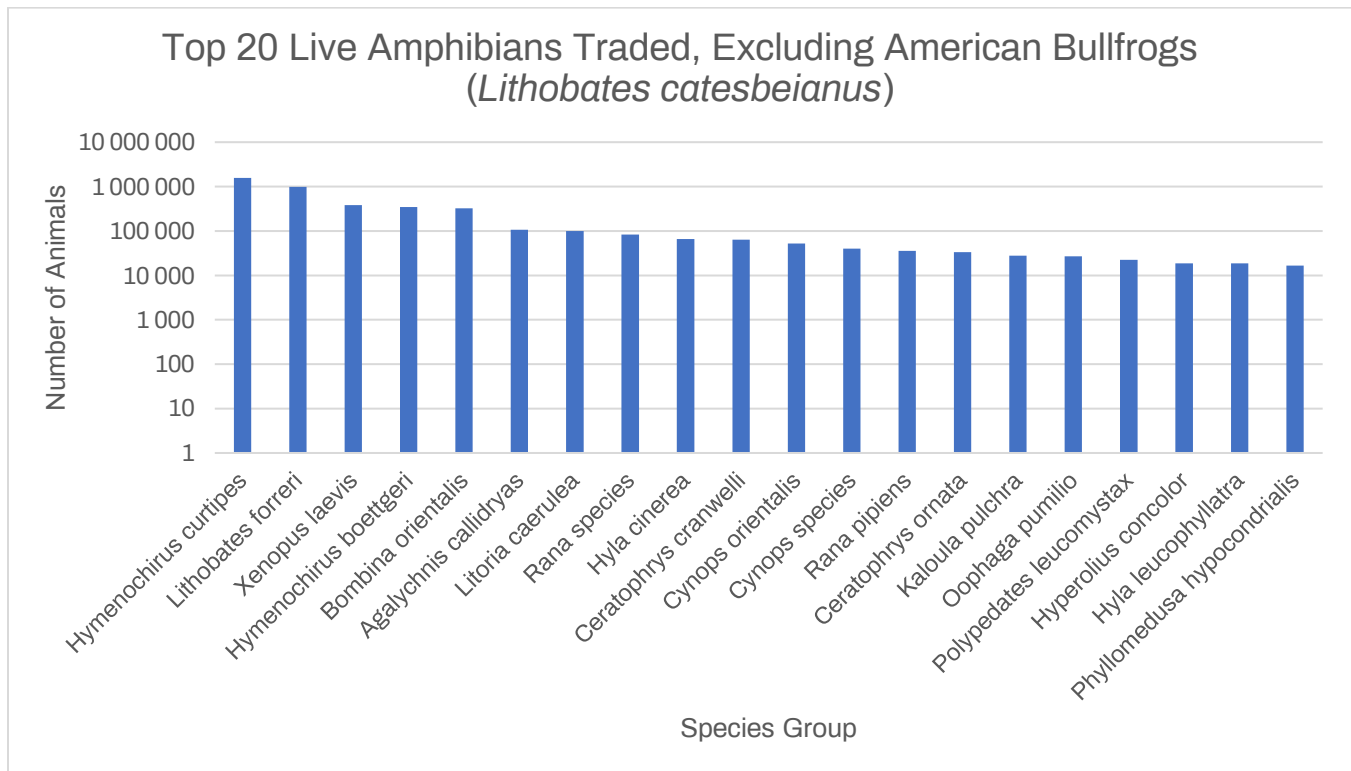


Figure 15: Quantities of highly traded live amphibians recorded by taxonomical unit and measured in units of number by the United States of America from 2015-2020, excluding American bullfrogs: Top 20 taxonomical units displayed.

Again, the quantity of the next most highly traded live amphibian, the western dwarf clawed frog (*Hymenochirus curtipes*), predominated that of all other traded species. Interestingly, examination of imported *H. curtipes*, both at the point of arrival and subsequently among United States pet stores, suggested that misidentification on commercial invoices and USFWS declarations may in some part be causing this species to be recorded when instead the similar Zaire dwarf clawed frog (*H. boettgeri*) is instead being traded (J. Kolby pers. Obs.).

Among the top traded live amphibians, 122,784 were not identified to species in the LEMIS trade data and were instead recorded as either "*Rana* species" or "*Cynops* species." Whether this means that the amphibians were not able to be positively identified by USFWS upon inspection, or whether instead they were identified but recorded with less specificity cannot be ascertained from these data. This involved 57 shipments of live amphibians, and all these amphibians were cleared to enter commerce with the exception of 14 newts recorded as "*Cynops* species", cumulatively refused from two of these 57 shipments.

Shipments recorded as “*Rana species*” involved extremely high quantity consignments imported to the United States of America, such as the two shipments that each contained 28,000 animals and a third containing 26,400 animals, all imported from Taiwan, Province of China and recorded as “ranching” frogs. It is not possible to confirm whether these were American bullfrogs (*Lithobates catesbeianus*) lawfully imported, or instead CITES Appendix II-listed Indian bullfrogs (*Hoplobatrachus tigerinus*), which may have been traded without required CITES documents. The Indian bullfrog is sometimes traded under its older taxonomical synonym *Rana tigerinus*, similar to how *Lithobates catesbeianus* is still recorded by USFWS under its older taxonomical synonym *Rana catesbeianus*.

Among the 20 most highly traded live amphibians by the United States of America, only two were CITES-listed species: the red-eyed tree frog (*Agalychnis callidryas*) and the strawberry poison dart frog (*Oophaga pumilio*), both of which are presently listed in CITES Appendix II.

Most countries do not record their international trade in non-CITES listed amphibians, and for this reason, it is difficult to characterize global international amphibian trade beyond involvement with the United States of America. If patterns of US amphibian trade are similar to those in other countries where comparable data are not recorded, it is plausible that the majority of internationally traded amphibians are likewise non-CITES listed species. This is important to consider when estimating the overall scale of live amphibians that might be in trade, in the absence of available records. For example, if the United States of America had only recorded their trade in CITES-listed species, as most countries do, then of the 17,078,150 traded live amphibians, records would only exist for the trade in 132,340 amphibians, leaving 99.2% of actual international trade virtually invisible. This poses an important frame of reference with respect to the international trade in live amphibians that may be occurring between other countries, but that is not being systematically recorded. Unfortunately, none of the presently existing customs Harmonized System (HS) codes record trade specific to amphibians, although some national customs authorities’ systems may still use deprecated WCO codes denoting trade in frog legs. When live amphibians are traded, they are assigned an HS code for “other live animals”, where even class level information is lost.

1.5.b. Species and quantities of live amphibians traded in units of kilograms

Of the 121 shipments of live amphibians recorded in units of kilograms, all except one were American bullfrogs (*L. catesbeianus*), cumulatively amounting to 1,012,000 kilograms (Figure 16).

Four additional kilograms of live amphibians were imported in a shipment described as “Non-CITES Amphibians.”

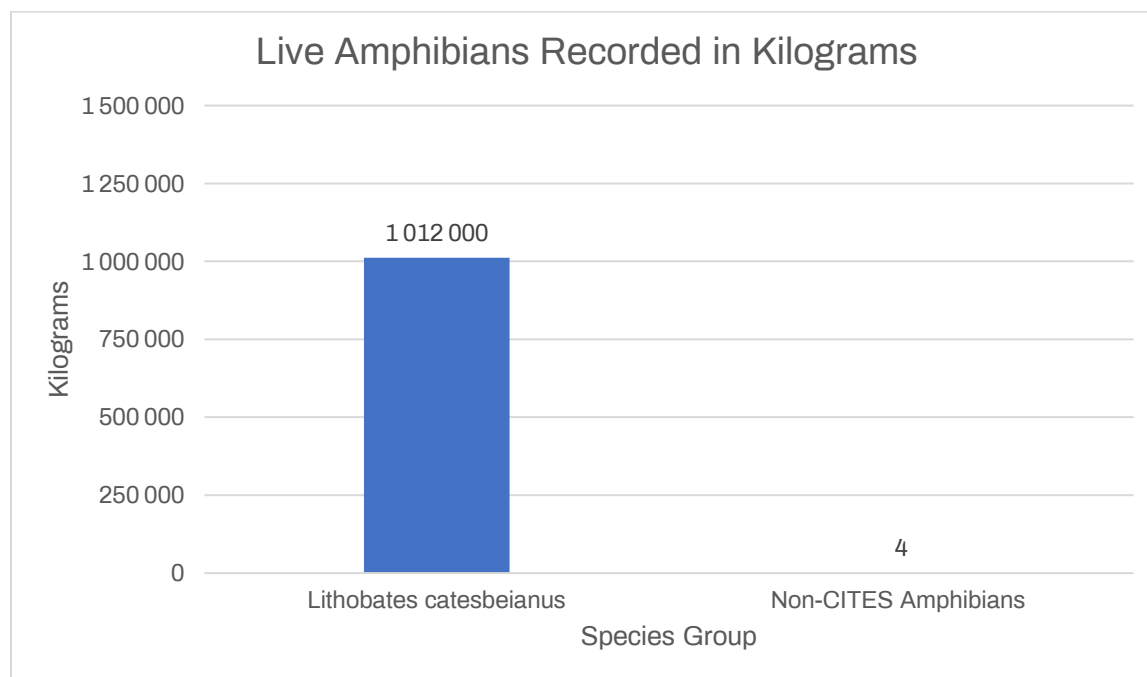


Figure 16: Quantity of traded live amphibians recorded in units of kilograms by the United States of America from 2015-2020.

1.5.c. Species and quantities of amphibian scientific specimens traded in units of number

Of 675,287 amphibian scientific specimens traded, 1,269 different taxonomical classifications were recorded. Despite this high taxonomical diversity, 84.2% of these traded specimens involved just two species: Forrer's grass frog (*Lithobates forreri*) with 518,824 specimens and the American bullfrog (*Lithobates catesbeianus*) with 37,469 specimens (Figure 17). It is likely that *L. forreri* and *L. catesbeianus* are being traded whole, for use in educational dissection exercises, whereas the majority of amphibian diversity traded as “scientific specimens” is likely traded as scientific material, ranging from whole amphibians for museum specimens to tissue samples for DNA analyses to skin swabs for disease surveillance.

The non-invasive skin swab methodology performed to collect samples for detection of emerging infectious pathogens like amphibian chytrid fungi involves trade in swabs that may have removed a small amount of skin cells and mucus from the amphibian. This surveillance method has been widely used across the past decade, and often involved sample collection in one country followed by diagnostic genetic analyses in another country. With respect to interpretation of LEMIS data and the impact of trade on affected species, it is not possible to differentiate, for example, between

scientific specimens traded as whole amphibians removed from the wild and scientific specimens traded as skin swabs with only portions of amphibian DNA present.

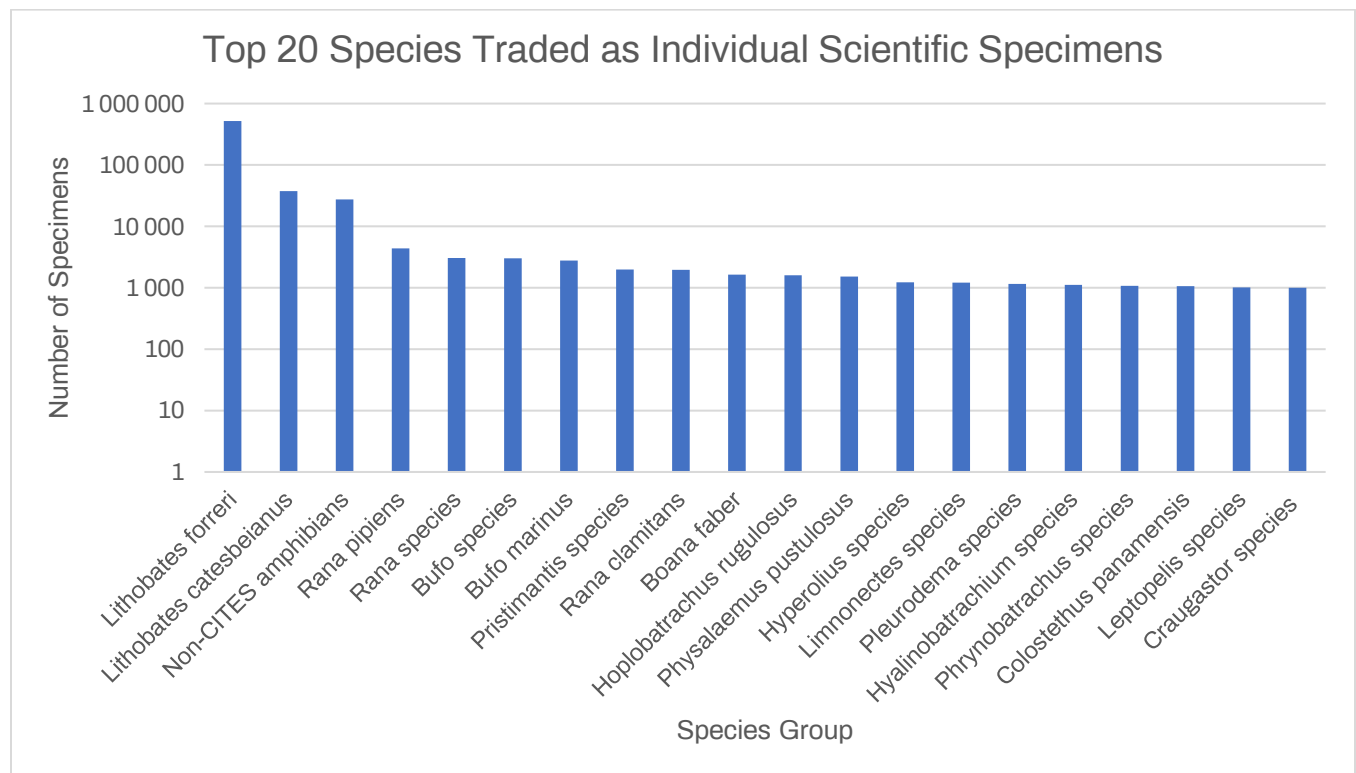


Figure 17: Quantities of amphibian taxonomical units traded as scientific specimens and measured in units of number, as recorded by the United States of America from 2015-2020: Top 20 taxonomical units displayed.

Among all categories of amphibian trade examined during the present study, the LEMIS description code “scientific specimen” was the description code assigned to the greatest percentage (84.8%) of taxonomical classifications (Figure 18). Therefore, although the trade in live amphibians represented the largest cumulative quantity of amphibians traded, the trade in amphibians reported as scientific specimens affected the most species. It may be more likely that species categorized as threatened on the IUCN Red List will be allowed to enter trade for scientific purposes, even when those same species might not be allowed to enter international trade for non-scientific or commercial purposes. This is notable because there appears to be a generalized perception that trade for scientific purposes does not threaten populations of species in the wild relative to the trade in animals for commercial purposes. The possible negative impact of scientific collection on threatened species should not be dismissed, particularly when species with small, isolated populations are traded and the consequence of collection is unknown.

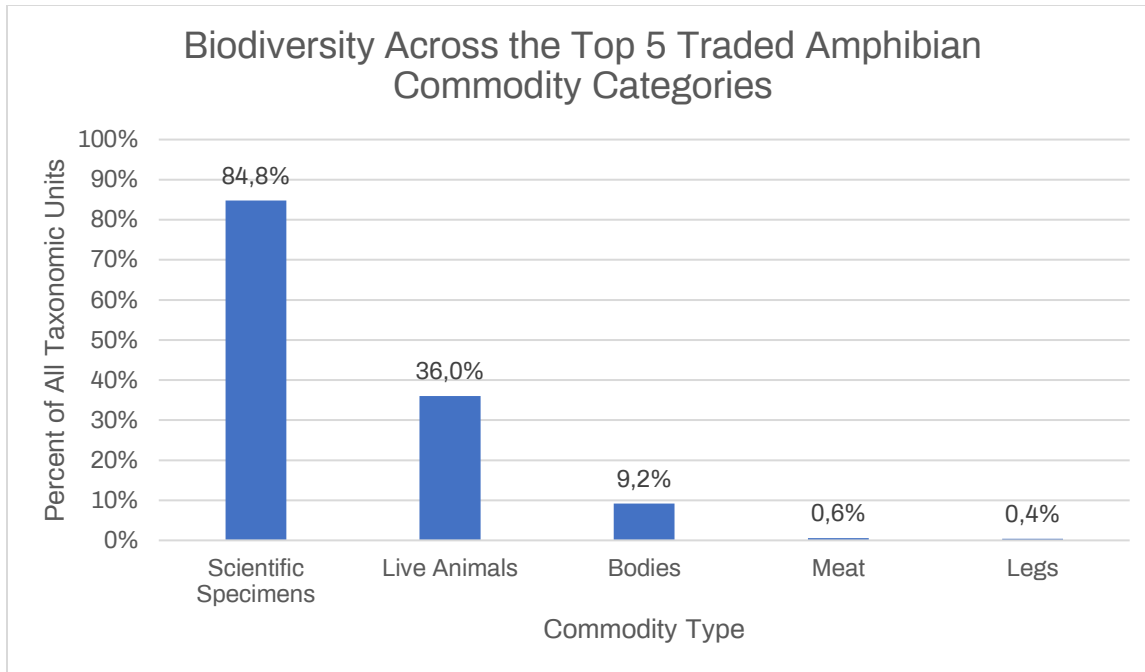


Figure 18: Proportions of total unique taxonomic units recorded in association with each of the top five traded amphibian commodity categories recorded by the United States of America from 2015-2020.

The trade in amphibian specimens affected 2.4 times more unique taxonomic units than the recorded trade in live amphibians, despite the frequent focus on live amphibians in previous trade reviews due to the larger total quantity of animals traded (Figure 19).

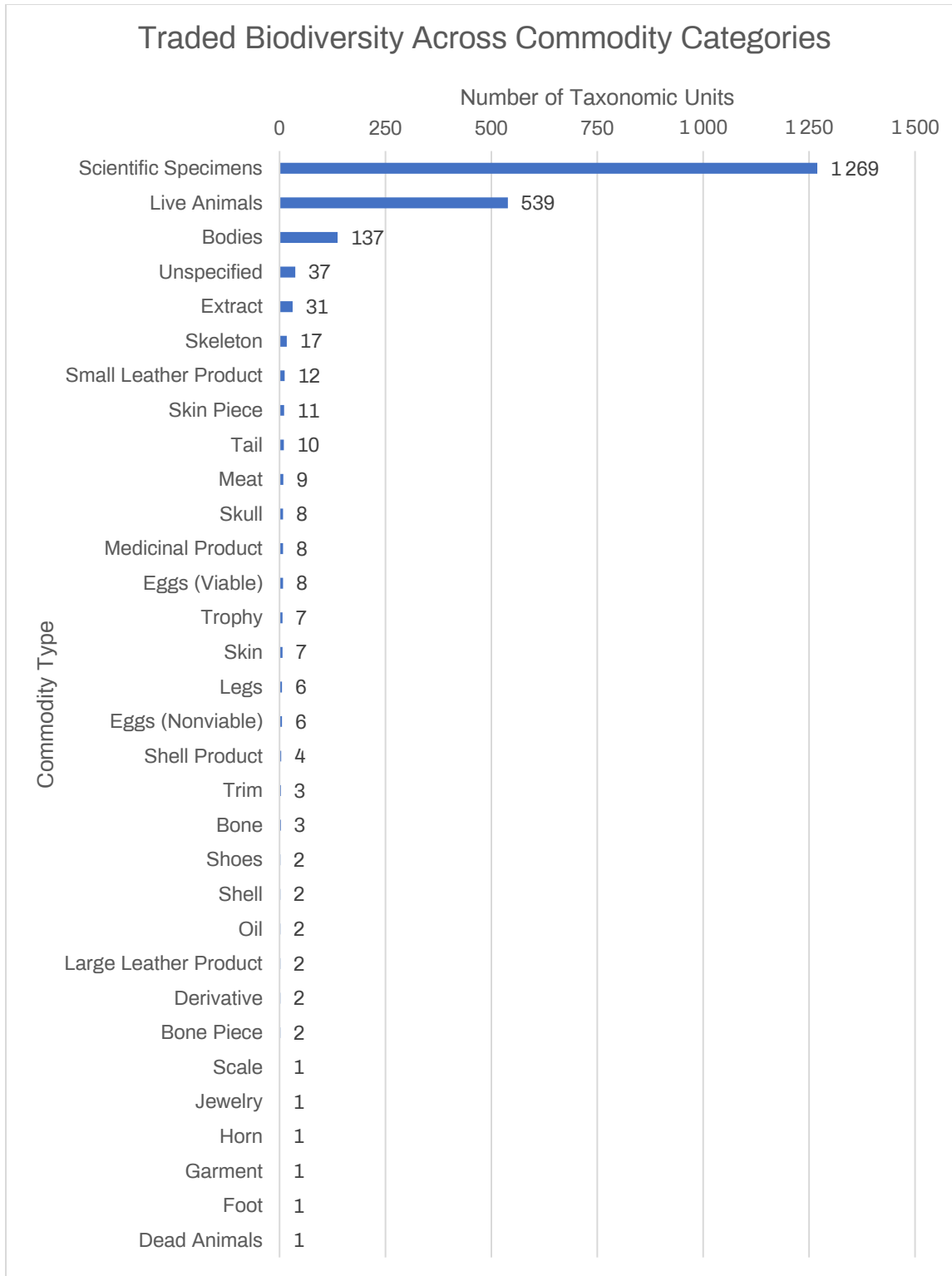


Figure 19: The number of unique taxonomical units recorded in association with each of the 32 different amphibian commodity categories recorded by the United States of America from 2015-2020.

Due to the high proportions of American bullfrogs (*L. catesbeianus*) and Forrer's grass frogs (*L. forreri*) among these data, removal of these two species from these visualizations provides a

clearer picture of trade volumes per unique taxonomic units among the next most highly traded amphibian specimens (Figure 20).

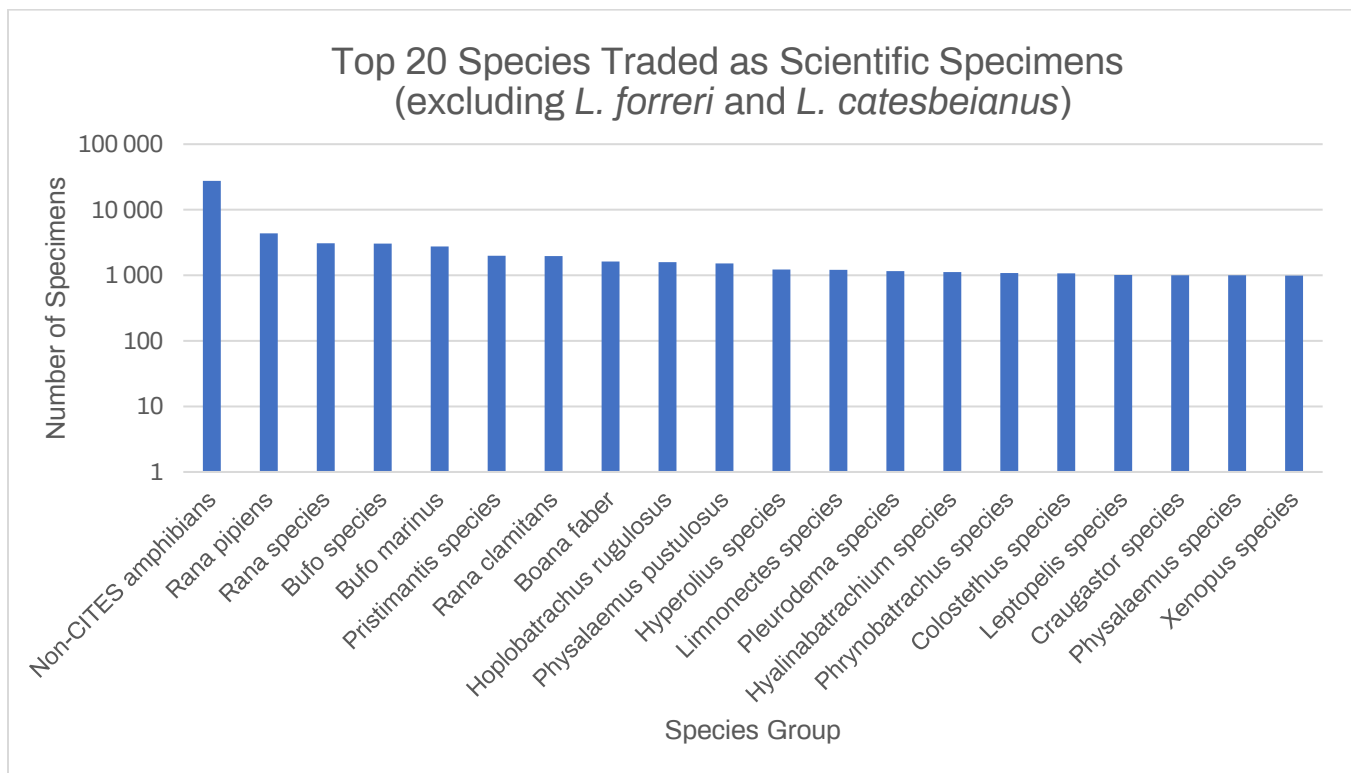


Figure 20: The top 20 traded unique taxonomical units of amphibian specimens, excluding *L. catesbeianus* and *L. forreri*, recorded by the United States of America from 2015-2020.

A minority of amphibian diversity traded as specimens was identified to species. Most taxonomic units were identified to genus or were described with even less specificity (i.e. “Non-CITES Amphibians”). USFWS Wildlife Inspectors are instructed to record all traded wildlife to species-level when CITES-listed species may be present among that taxonomical unit. For instance, *Atelopus zeteki* is listed in CITES Appendix I, but there are additional species within the genus *Atelopus* that are not CITES-listed, such as the traded *Atelopus spumarius*. Thus, for *Atelopus* shipments that are provided clearance to enter commerce, LEMIS data should not normally record these animals as “*Atelopus sp.*” or “Non-CITES Amphibians”. These taxonomic units would obscure trade in CITES-listed species where some shipments may contain *A. zeteki* and other *A. spumarius*. In this example, to ensure protected species are appropriately recorded and described in CITES Annual Reports, and to allow records of CITES and non-CITES species to be differentiated with confidence, all trade in any species of *Atelopus* should be recorded to the species-level in LEMIS. This is also necessary to prove that trade not accompanied by species permits, such as CITES export permits or injurious species import permits, did not in fact require permits. Although a relatively small proportion of amphibian species are CITES-listed or listed as

Endangered or Threatened under the United States Endangered Species Act, the prominence of non-specific amphibian recordkeeping among material traded as “specimens” makes it impossible to retrospectively ascertain whether imported shipments were traded in compliance with species-specific national and international laws.

Similar to how the trade in amphibians described as scientific specimens involved over double the number of unique taxonomic units than that for live amphibians, it is interesting to also note that the recorded purpose of trade as scientific was likewise reported for over double the species recorded for the next most frequent purpose, which was commercial trade (Figure 21).

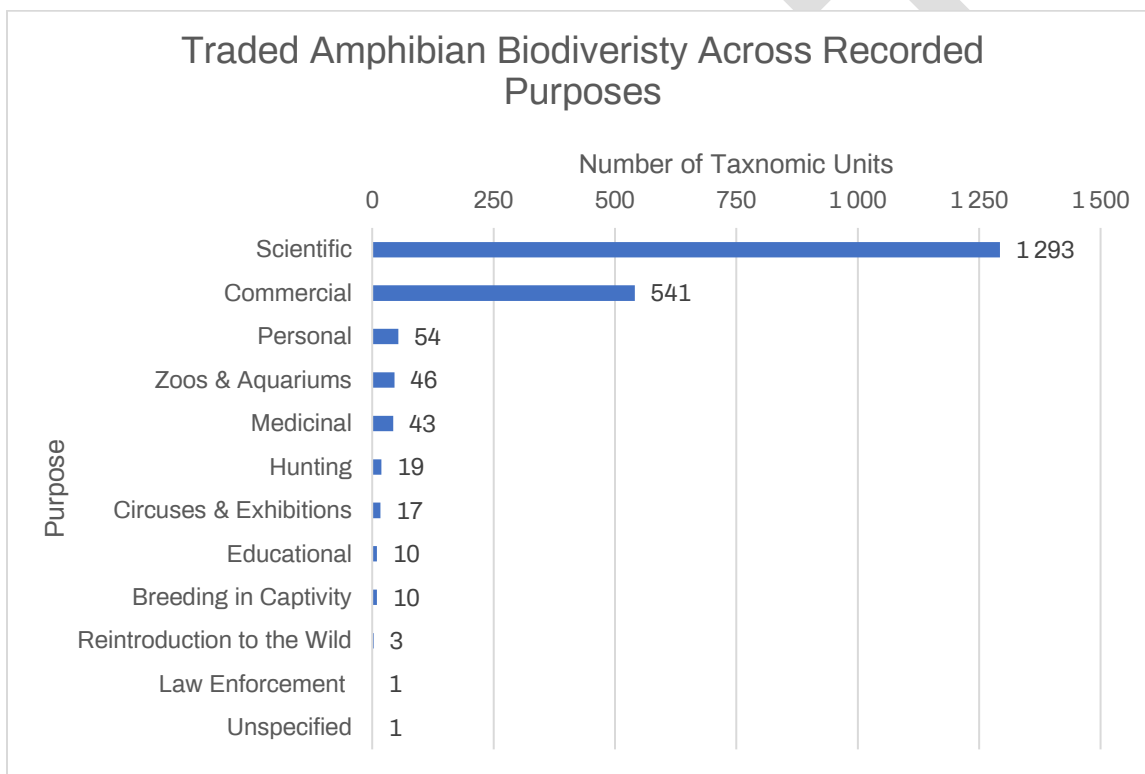


Figure 21: Number of unique taxonomic units that were recorded in association with each different purpose of amphibian trade recorded by the United States of America from 2015-2020.

1.5.d. Species and quantities of amphibian specimens traded in units of kilograms

In total, 161,529.7 kilograms of amphibian specimens were traded, and 99.6% was composed of two species: Forrer's grass frog (*Lithobates forreri*) and the American bullfrog (*Lithobates catesbeianus*) (Figure 22). Large volume shipments recorded in units of mass rather than providing a specific number of specimens are more likely to be commercial shipments destined for biological supply companies rather than by researchers for scientific purposes.

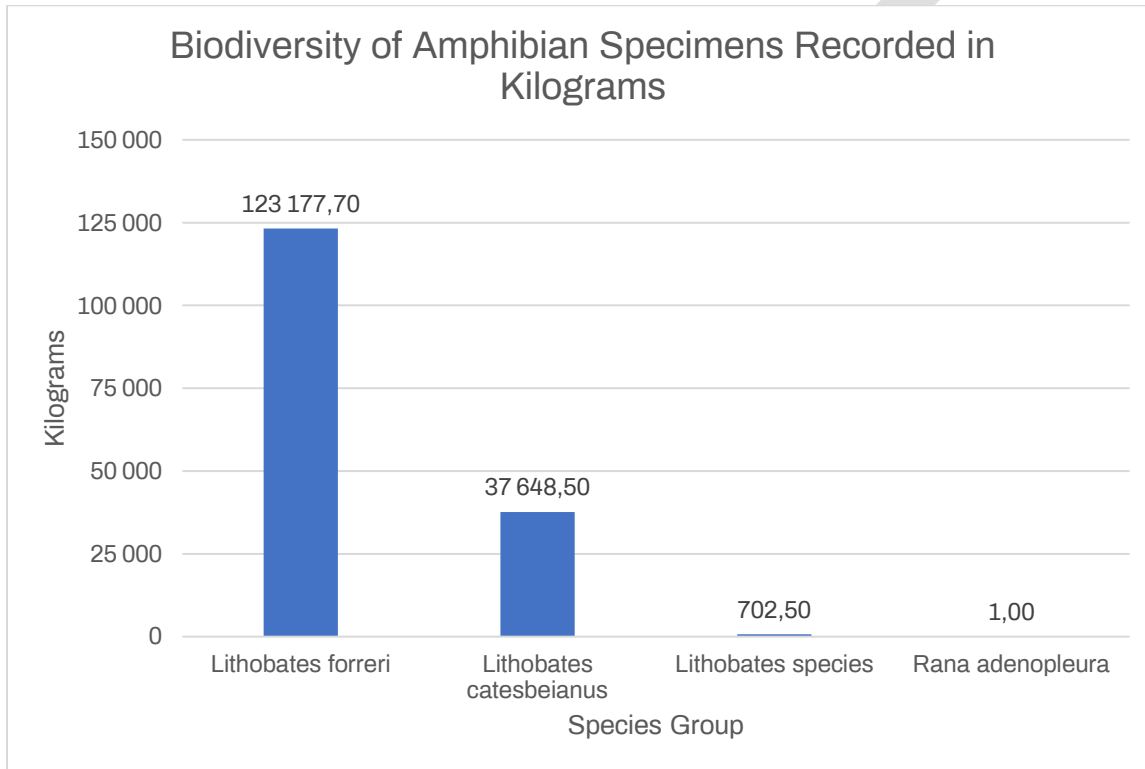


Figure 22: Total composition of scientific specimens by unique taxonomical units recorded in units of kilograms by the United States of America from 2015-2020.

1.5.e. Species and quantities of amphibian bodies traded in units of number

A total number of 1,079,030 individual amphibian “bodies” were traded during the study period. Although 136 taxonomical units were recorded, the majority (95.8%) of this trade involved the top three species traded: Forrer's grass frog (*Lithobates forreri*), Northern leopard frog (*Lithobates pipiens*), and the American bullfrog (*Lithobates catesbeianus*) (Figure 23).

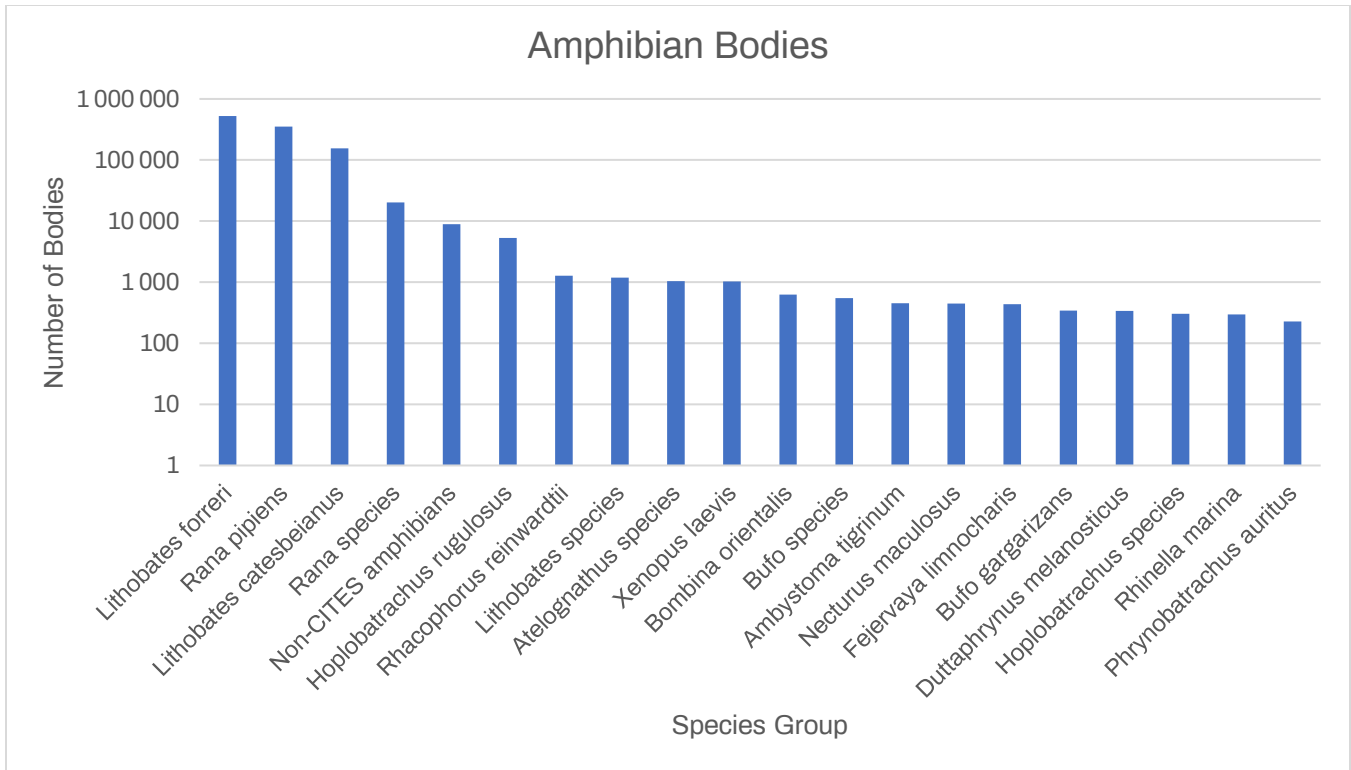


Figure 23: Taxonomical units and quantities of amphibian bodies traded in units of number recorded by the United States of America from 2015-2020: Top 20 taxonomical units displayed.

There is a lack of clarity associated with descriptions of wildlife traded as specimens versus dead bodies as well as the distinction between scientific and commercial purposes of trade. These details are important to acknowledge in the characterization of these segments of amphibian trade. For instance, all records of trade in dead bodies of Reinwardt's flying frog (*Rhacophorus reinwardtii*) recorded in LEMIS show commercial purposes, but if, for example, they were being sold for use in educational displays, this trade may have alternatively been described as educational or scientific purposes. Even live amphibians can be recorded as specimens for scientific purposes, as this is not explicitly prohibited by definition, blurring lines between the pet trade and the scientific trade. According to the IUCN Red List, “Small numbers [of *R. reinwardtii*] appear in the pet trade, but probably not at a level to constitute a major threat to the species.” (IUCN SSC Amphibian Specialist Group. 2022b) This trade in *R. reinwardtii* bodies might pose a new type of use of the species beyond what has been acknowledged among the amphibian experts consulted for this assessment.

1.5.f. Species and quantities of amphibian bodies traded in units of kilograms

In total, 1,945.73 kilograms of amphibians were traded as bodies (Figure 24). Three taxonomical groups predominated this segment of trade: “Non-CITES Amphibians” at 63.5%, the European common frog (*Rana temporaria*) at 18.2% and Chinese brown frog (*Rana chensinensis*) at 16.3%.

Estimates of frogs harvested should take into consideration the possibility that only a portion of dried frog oviducts and their surrounding fatty tissue was traded in shipments recorded as “bodies”. The volume of frogs harvested may be much greater if portions of each frog are reflected in these cumulative masses and not whole frog bodies as could otherwise be inferred.

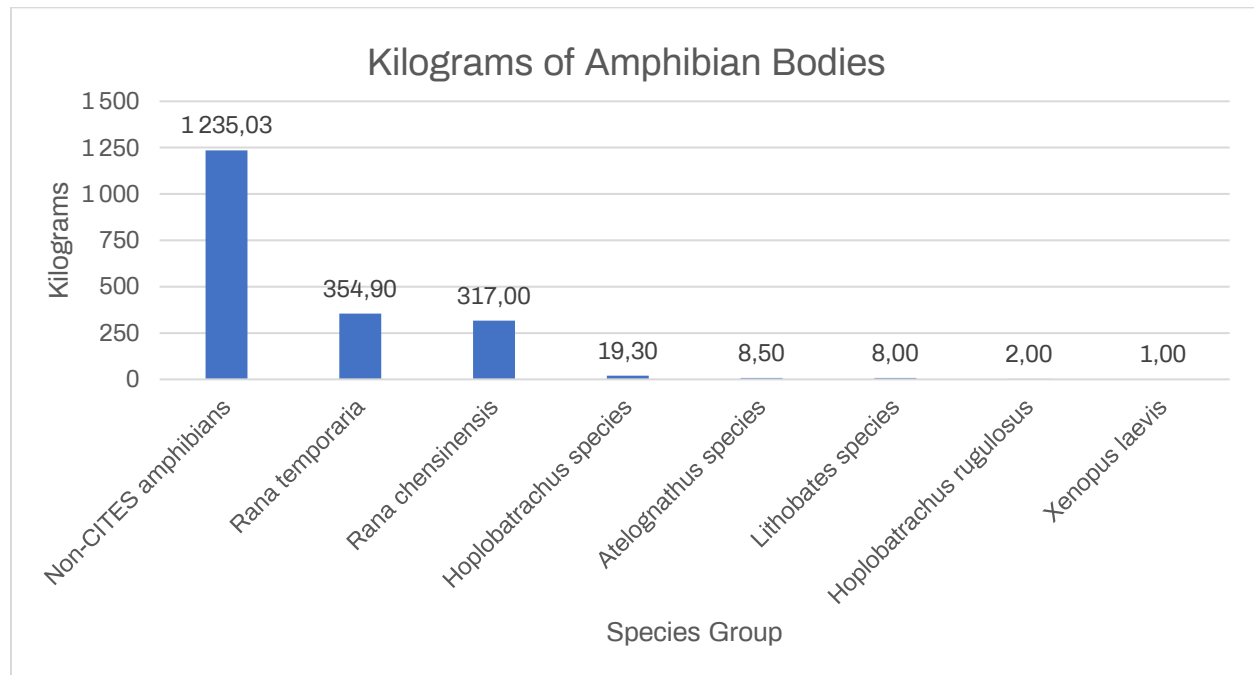


Figure 24: Taxonomical units and quantities of amphibian bodies traded in units of kilograms recorded by the United States of America from 2015-2020.

Furthermore, the much larger quantity of amphibian material described only as “Non-CITES Amphibians” could largely consist of the two species. In China, dried frog oviducts and their surrounding fatty tissue is regarded as a medicinal material called “hasma” and is sometimes also referred to as “snow frog fat” and “Chinese snow jelly.” This product is available in restaurants, supermarkets, and specialty stores that sell boxes of dried or frozen hasma and the species which often appears on the label is *R. chensinensis*. The main source of hasma production occurs in the provinces of Liaoning, Jilin, and Heilongjiang at the north-easternmost region of China (Uy 2023).

The skin of frogs harvested for hasma production has historically been treated as a waste product, but recent studies have shown that (Zhao et al. 2018) *R. chensinensis* skin collagen can be utilized as an alternative source of collagen with applications ranging from food to medical industries. Traditionally, domesticated bovine and porcine animals have served as the main sources of commercially extracted collagen, but concerns have emerged due to the risk of spreading diseases like bovine spongiform encephalopathy (Zhao et al. 2018). It is unknown

whether these industries have turned their focus towards *R. chensinensis* skin collagen, but this potentially added value might contribute towards increased harvest and consumption of frogs and as such warrants additional attention. Examples of hasma being advertised for sale and consumption in October 2023 can be found at: <https://tinyurl.com/4vuy3x2s> and <https://www.ebay.com/itm/275606890858>

1.5.g. Species and quantities of amphibian frog legs traded in units of number

The majority of frog legs were traded in units of kilograms, with only 8,202 recorded as number of legs (Figure 25). Among these, at least 96% were comprised of the American bullfrog (*L. catesbeianus*). Interestingly, 200 frog legs were recorded as traded from Red-eye tree frogs (*Agalychnis callidryas*). All 200 were traded in a single shipment imported to the United States of America from Costa Rica for scientific purposes. These frog legs, if genuinely traded for scientific purposes, would have been more appropriately coded as “specimens” than “frog legs”, since frog legs are usually associated with the connotation that they are being traded for human or animal consumption. It is unlikely that Red-eyed tree frogs are being treated as a food source.

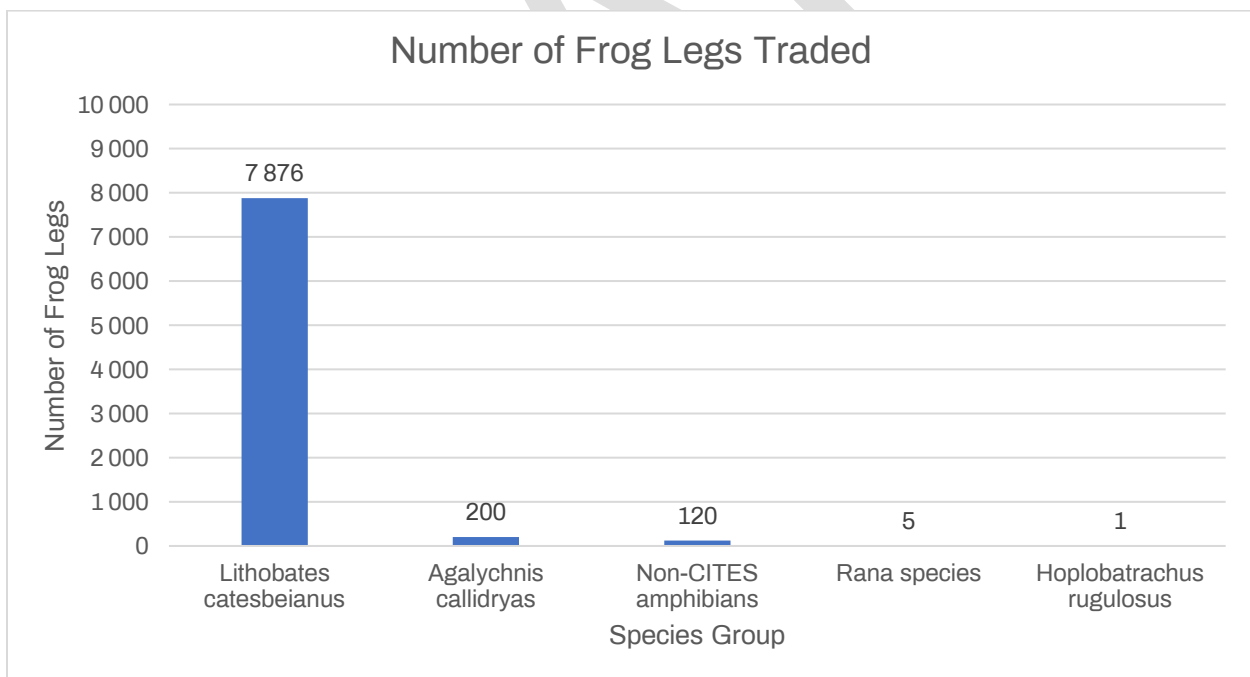


Figure 25: Taxonomical units and quantities of amphibian frog legs traded in units of number recorded by the United States of America from 2015-2020.

1.5.h. Species and quantities of amphibian frog legs traded in units of kilograms

Interpretation Note: Trade in frogs recorded in LEMIS as “legs” or “meat” might either include butchered frog legs or whole live frogs that become sold fresh. For this reason, units of measure

that describe the trade in frogs used for human consumption offer little clarity and may even hamper efforts to quantify the true number of frogs that have been traded. For example, based on the estimated mass of 0.31 kg for one adult *Lithobates catesbeiana* (Trochet et al. 2014), a shipment recorded as 2,000 kilograms of frog legs or frog meat may have contained approximately 6,452 live adult bullfrogs, but if this instead represented the mass of only butchered hind legs, then thousands more were actually traded. Challenges also apply to trade where the “number” of items traded was used as the unit of measure. For example, the same shipment of 2,000 live adult bullfrogs could alternatively become recorded as 2,000 bullfrog “meats” or “legs”, which again erases the ability to derive meaningful quantifications of animals actually traded as true numbers may range from those recorded to multiplications thereof.

During the study period, 15,946,590.01 kilograms of frog legs were traded, and only three species were recorded (Figure 26). The majority of this trade was comprised of American bullfrogs (*L. catesbeiana*), followed by the East Asian bullfrog (*Hoplobatrachus rugulosus*) and then the Indian bullfrog (*H. tigrinus*). The presence of *H. tigrinus* is of note, because although it is listed in CITES Appendix II and may be traded if accompanied by valid CITES documents, the entire quantity of 2,857 kilograms imported to the United States of America in October 2019 in a single shipment exported from Viet Nam was refused clearance by USFWS, denoting a violation of wildlife trade regulations. A query of the CITES Trade Database (on 24 September 2023) for all reported commercial trade in *H. tigrinus* during 2019 showed that this was the only reported international trade event for this species in that entire year. This event was reported by the United States of America in their CITES Annual Report, but not by Viet Nam in theirs. This shipment was recorded as “re-exported” from the United States of America back to Viet Nam. It is uncertain whether these frog legs (or live animals) were confiscated by Vietnamese authorities upon receipt.

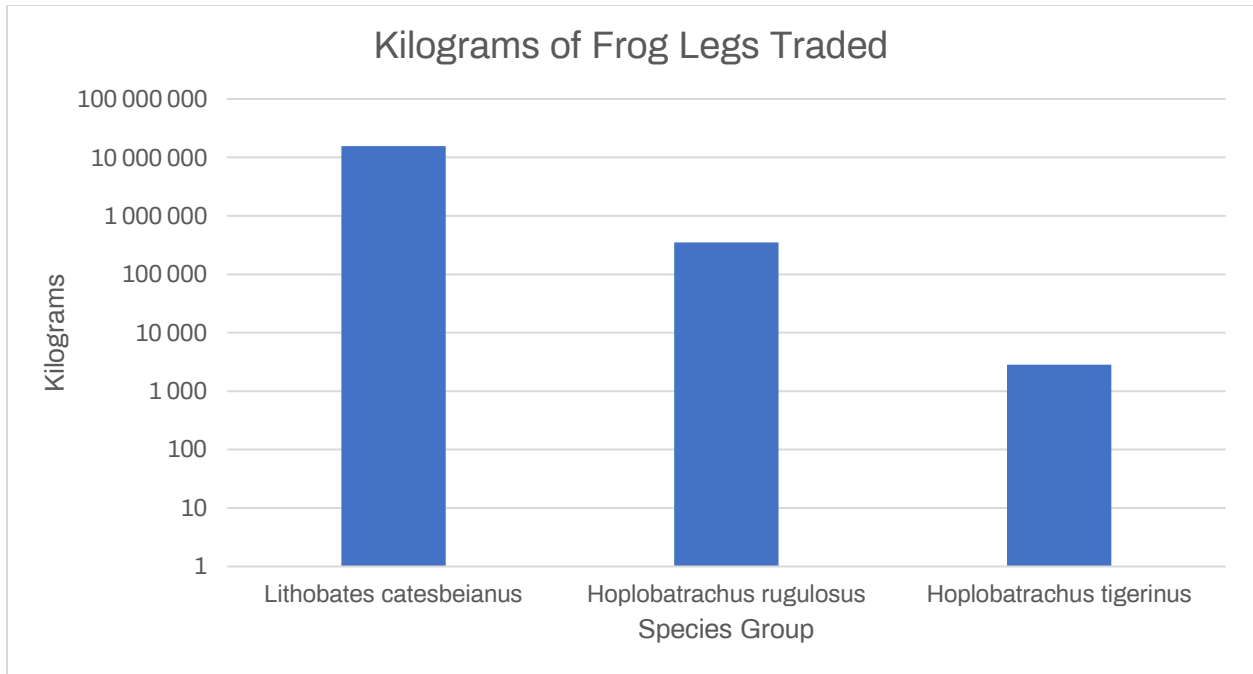


Figure 26: Taxonomical units and quantities of amphibian frog legs traded in units of kilograms recorded by the United States of America from 2015-2020.

1.5.i. Species and quantities of amphibian meat traded in units of number

Only 37 amphibian “meat products” were present among the LEMIS data, recorded across five imported shipments (Figure 27). Some of these records likely represent data recording errors because frogs in the genus *Albericus* are extremely small frogs, generally less than one inch in total size as adults, that are endemic to Papua New Guinea and Indonesia (Papua). It is therefore highly unlikely that this single shipment of *Albericus* species was imported as food. Furthermore, these frogs were exported from Thailand to the United States of America and recorded as having been collected from the wild in Thailand, which is not plausible for this species. It is therefore unknown what the true species, commodity type, country of origin, or source were for this shipment cleared for importation into the United States of America.

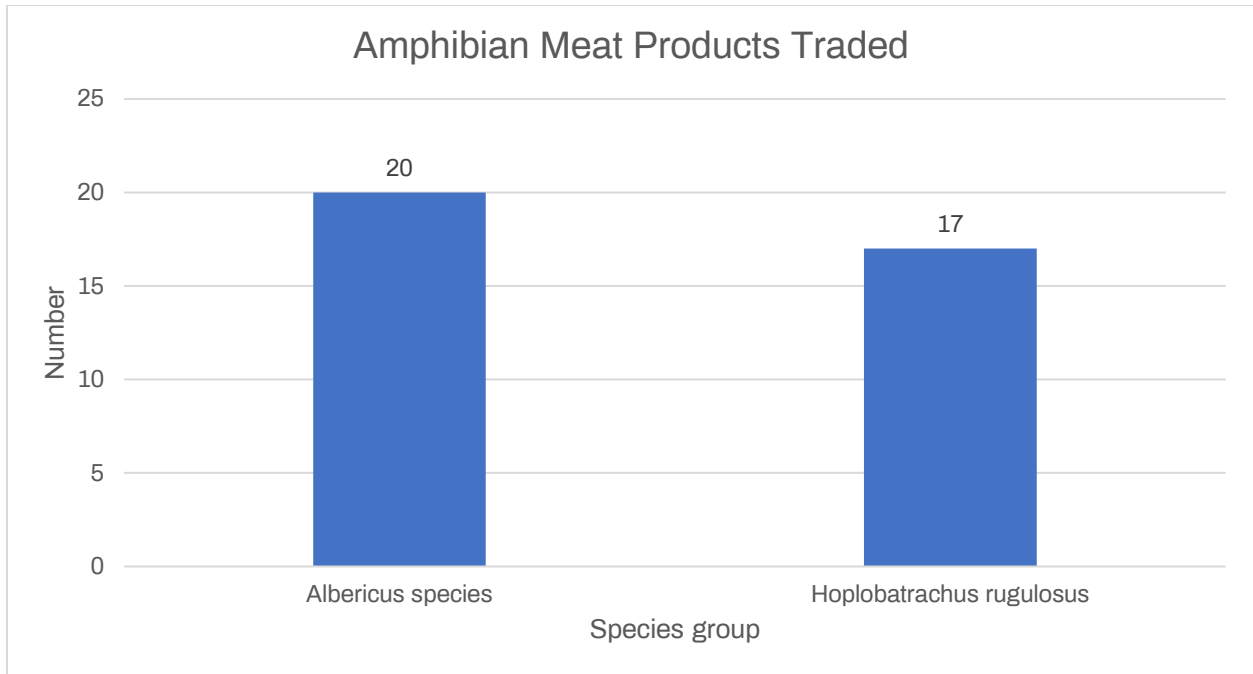


Figure 27: Taxonomical units and quantities of amphibian meat traded in units of number recorded by the United States of America from 2015-2020.

1.5.j. Species and quantities of amphibian meat traded in units of kilograms

A total of 2,448,320.52 kilograms of amphibian “meat products” were traded in addition to the 15 million kilograms of legs illustrated above (Figure 28). Similarly, as observed among “legs”, the same two species comprised the overwhelming majority of amphibian meat trade: American bullfrogs (*L. catesbeianus*), followed by the East Asian bullfrog (*Hoplobatrachus rugulosus*).

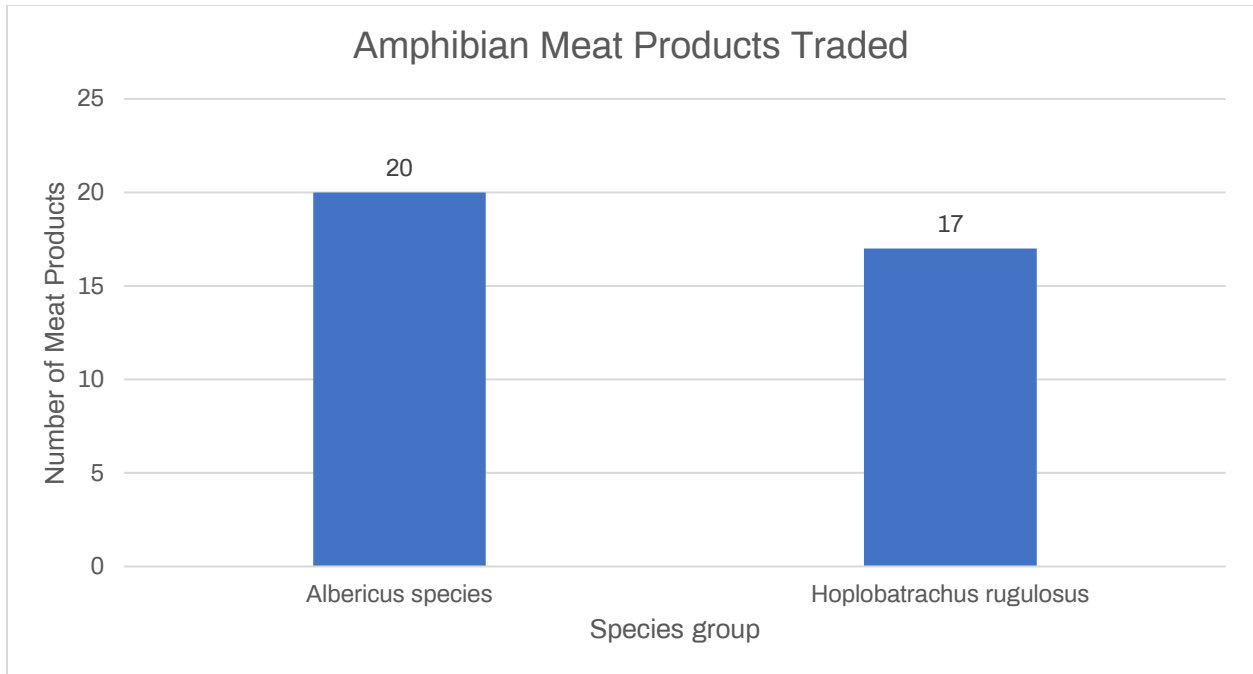


Figure 28: Taxonomical units and quantities of amphibian meat traded in units of kilograms recorded by the United States of America from 2015-2020.

Again, “*Albericus* species” appeared among these trade data with 11 kilograms imported, and as previously mentioned this is likely a data error but might warrant follow-up with Papua New Guinea and/or Indonesia to ensure the exports are legal. This assumes these are accurate records of trade in species endemic to the region. It is important to note that although the genus *Albericus* was recorded in LEMIS trade records, this is presently an invalid synonym for the genus *Choerophryne*.

Although the trade in American bullfrog meat dwarfs that of all other species, the trade in Pig frog (*Rana grylio*) meat is notable because this North American species was the first amphibian species to test positive for infection with ranavirus in Asia. The type of ranavirus identified in Pig frog farms in China is closely related to the ranavirus found in Chinese giant salamanders in Sichuan Province, and it is possible that the farming of these North American frogs in China has also infected Chinese giant salamander farms and become a threat to this species either through discharge of frog farm wastewater or through the feeding of infected frogs to these salamanders (Cunningham et al. 2015).

All trade in *R. grylio* involved meat that was imported from China, bred in captivity, and recorded in kilograms, except for a much smaller amount recorded as 28 individual frog bodies within one shipment imported from the wild in Thailand, and 68 individual live frogs collected from the wild in

the United States of America and exported through six shipments to European destinations. All trade in *R. grylio* was recorded as intended for commercial purpose and cleared by USFWS, excluding then one shipment that contained 28 bodies imported from Thailand. This shipment was recorded as intended for personal use, was refused clearance and then re-exported back to Thailand.

Due to the similarity in appearance between *L. catesbeianus* and *R. grylio*, it is possible that some degree of misidentification is present among these records of trade. Judging from studies that molecularly tested samples of meat collected from frog leg shipments exported from Asia, misidentification of species appears to be common (Dittrich et al. 2017; Ohler and Nicolas (2017) and this phenomenon warrants consideration in the interpretation of international amphibian trade data.

1.6 Top countries /regions of origin of international amphibian trade recorded by the United States of America (2015-2020)

1.6.a. Top 20 countries/regions of origin of traded amphibians recorded in units of number

Among all amphibians traded in units of number, 149 countries or regions of origin were recorded. The top five origins represented 89.0% of the total traded quantity, in descending order starting with the greatest: Taiwan, Province of China, Mexico, Ecuador, Indonesia, and Singapore. Among these, the top origin, Taiwan, Province of China alone represented 53.6% of the total volume of this trade (Figure 29).

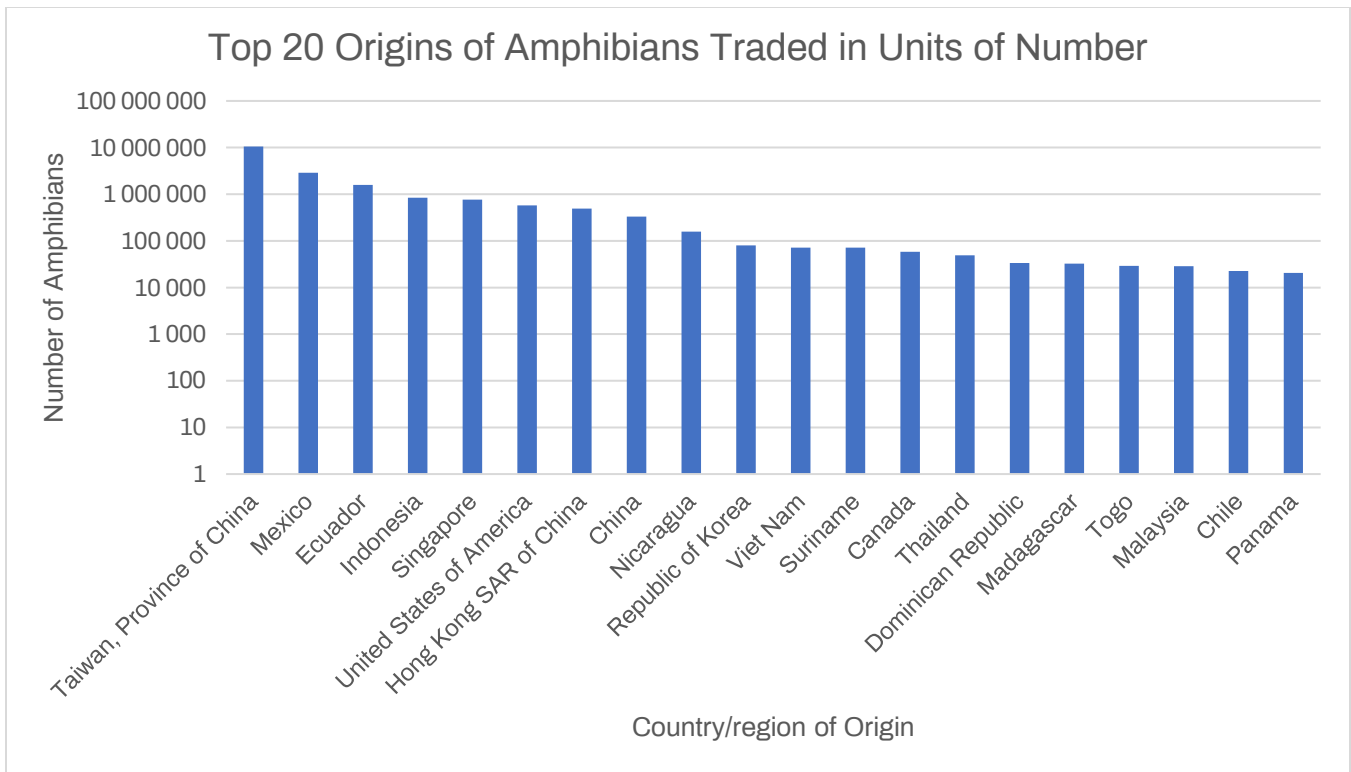


Figure 29: Countries/regions of reported origin of traded amphibians recorded in units of number by the United States of America from 2015-2020: Top 20 countries/regions displayed.

1.6.b. All countries / regions of origin of traded amphibians recorded in units of kilograms

Among all amphibians traded in units of kilograms, 16 countries / regions of origin were recorded (Figure 30). The top five origins represented 98.8% of the total traded quantity, in descending order starting with the greatest: mainland China, Viet Nam, Taiwan, Province of China, United States of America, and Mexico. Mainland China alone represented 81.2% of this trade activity.

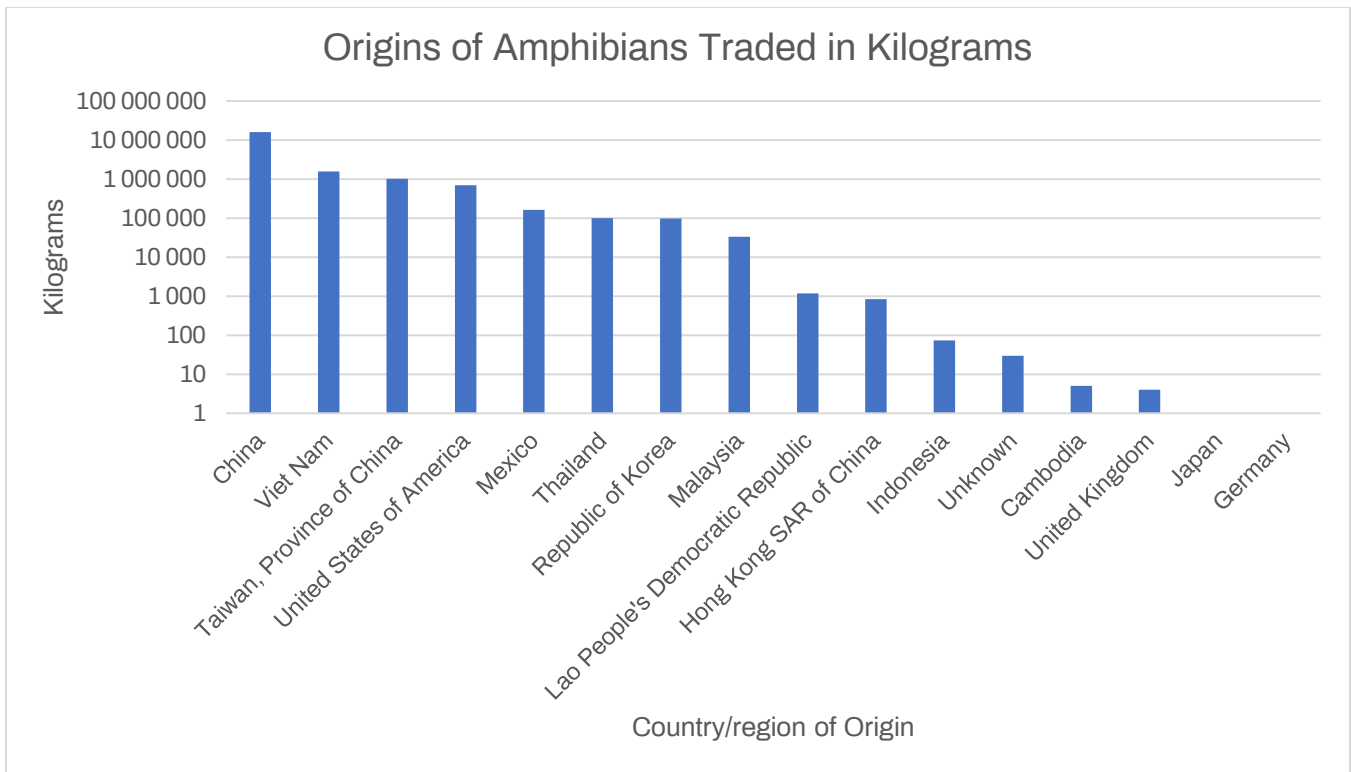


Figure 30: Countries / regions of reported origin of traded amphibians recorded in units of kilograms by the United States of America from 2015-2020.

1.6.c. Top 20 countries / regions of origin of traded amphibians recorded as live animals in units of number

As the top two traded amphibian commodities recorded in units of number were live animals and amphibian bodies, the main reported countries / regions of origin were further explored for these subdivisions to consider whether they mirrored or diverged from the collective attributes described above.

Among all amphibians traded as live animals in units of number, 72 countries /regions of origin were recorded, and the top five countries / regions of origin represented 88.6% of the total traded quantity (Figure 31). These five countries/ regions included each of the following origins identified from the earlier exercise where all amphibian commodities were combined: Taiwan, Province of China, Mexico, Ecuador, Indonesia, and Singapore. This time, Taiwan, Province of China predominated the origin of this trade sector.

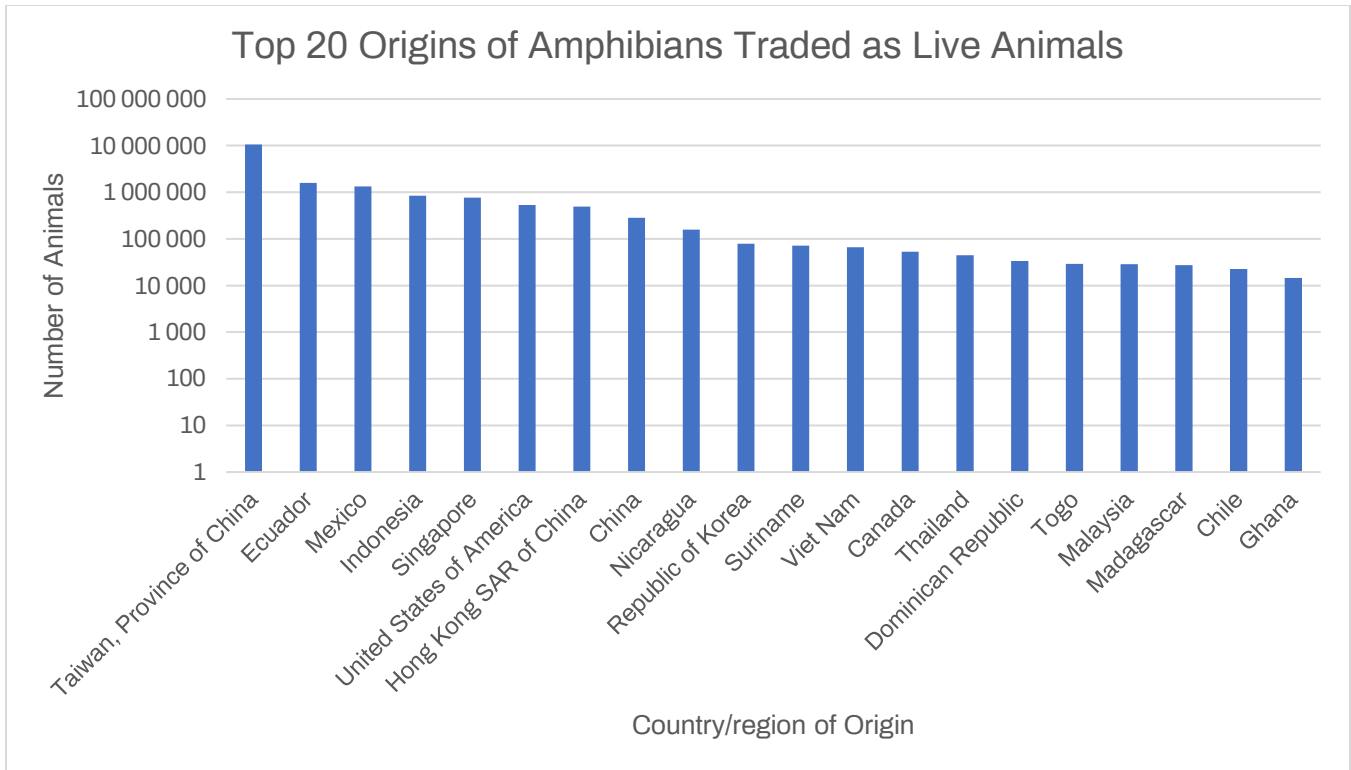


Figure 31: Countries /regions of reported origin of traded amphibians recorded as live animals in units of number by the United States of America from 2015-2020: Top 20 countries/regions displayed.

1.6.d. Top 20 countries of origin of traded amphibians recorded as bodies in units of number

Among all amphibians traded as bodies in units of number, the top five origins represented 99.3% of the total traded quantity, in descending order starting with the highest: Mexico, United States of America, China, Lao People’s Democratic Republic, and Thailand (Figure 32). Of note is the predominance of Mexico over all other countries or origin for traded amphibian bodies, alone representing the source of 95.2% of the total traded quantity.

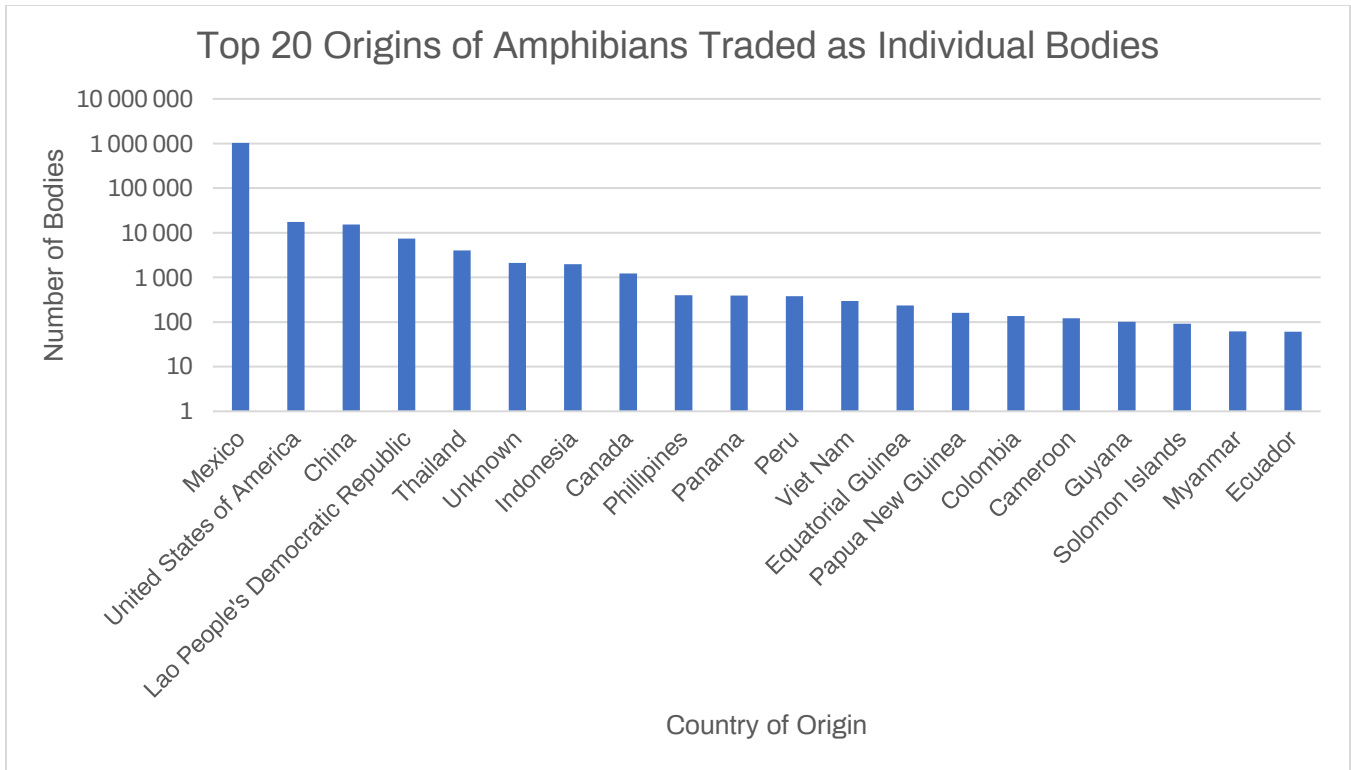


Figure 32: Countries /regions of reported origin of traded amphibians recorded as bodies in units of number by the United States of America from 2015-2020: Top 20 countries/regions displayed.

1.6.e. All countries of origin of traded amphibians recorded as frog legs in units of kilograms

The top two traded amphibian commodities recorded in units of kilograms were frog legs and amphibian meat. The main reported countries of origin were explored to consider whether the distribution of these shipments mirrored or diverged from the collective attributes described above for amphibians recorded in kilograms.

The trade in frog legs recorded in units of kilograms involved quantities many times greater than that of all other trade in amphibian commodities combined but was supplied by relatively few countries of origin (Figure 33). Of these seven countries, China was the reported origin for 91.3% of kilograms of frog legs.

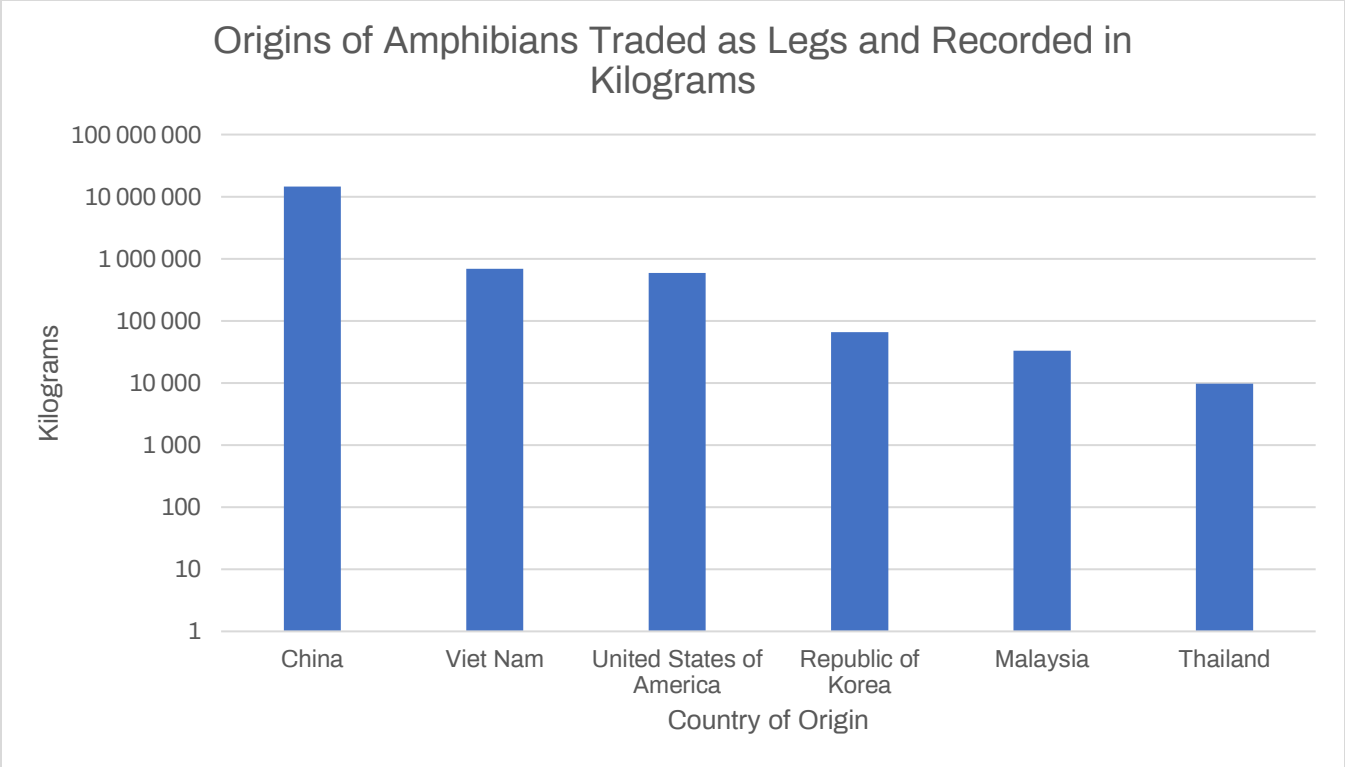


Figure 33: All reported countries /regions of origin of traded amphibians described as frog legs and recorded in units of kilograms by the United States of America from 2015-2020.

1.6.f. All countries/regions of origin of traded amphibians recorded as meat in units of kilograms

Among all amphibians traded as kilograms of meat, the top two origins represented 90.9% of the total traded quantity, involving China and Viet Nam, followed by the United States of America, Thailand, and Republic of Korea in much lesser quantities (Figure 34).

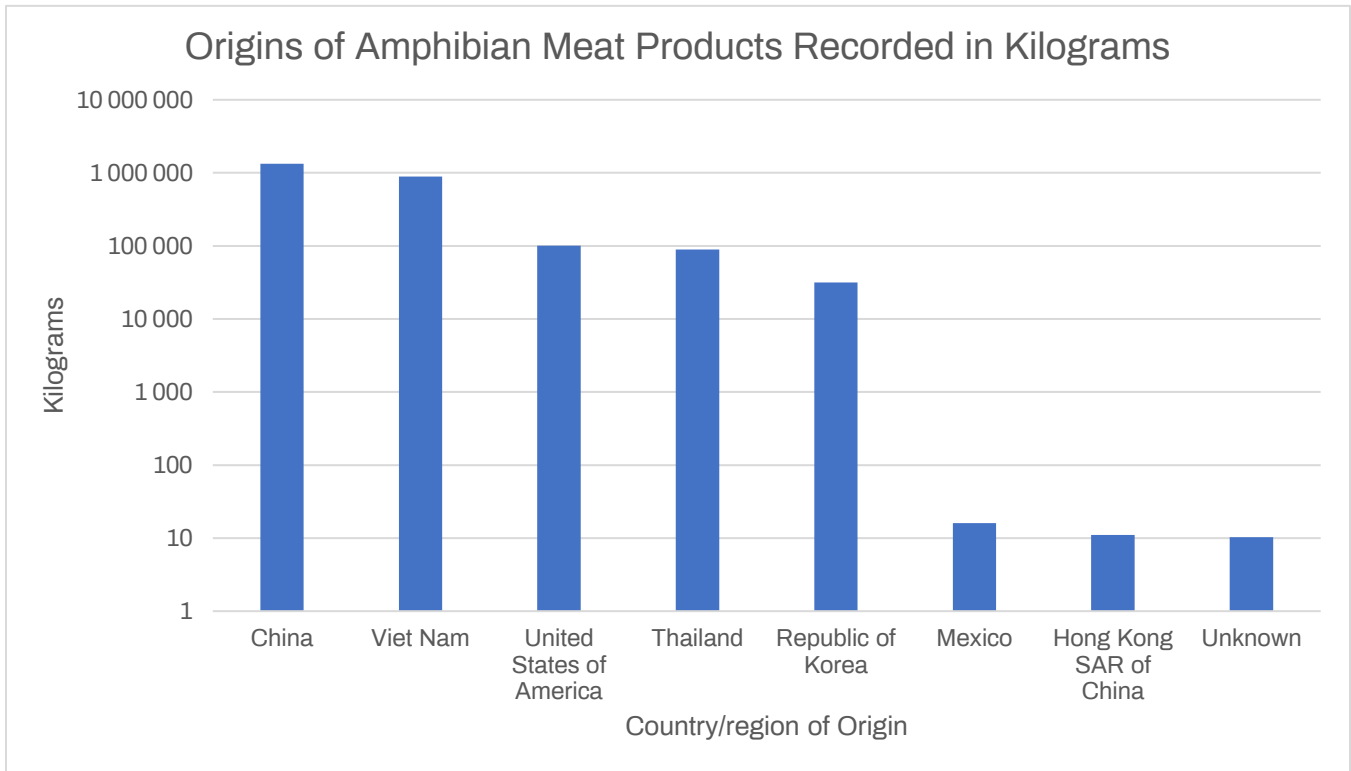


Figure 34: All reported countries / regions of origin of traded amphibians recorded as meat in units of kilograms by the United States of America from 2015-2020.

1.7 Sources and countries/regions of origin of highly traded species between 2015 and 2020

The recorded sources for the top five most highly traded amphibian species was explored among those recorded in LEMIS as numbers of live animals. Each of these was recorded to species level and included:

1. *Lithobates catesbeianus*
2. *Hymenochirus curtipes*
3. *Lithobates forreri*
4. *Xenopus laevis*
5. *Hymenochirus boettgeri*

Trade in these five species cumulatively included 15,652,866 live amphibians, 91.7% of all live amphibians internationally traded by the United States of America between 2015 and 2020 that were recorded as individual animals.

1.7.a. Numbers of live amphibians traded: *Lithobates catesbeianus*

Of the 12,385,554 traded live *L. catesbeianus*, the majority (66.1%) were bred in captivity (Figure 35). The remaining 31.2% were recorded as “ranching” followed by 2.7% recorded as wild sourced. Bullfrog farming is a common practice among some Asian countries (Auliya et al. 2023) and these data appear consistent with that practice (Figure 36), although it does not capture robust domestic markets, such as in Brazil (Schloegel et al. 2010). As this species has also escaped from captivity and established feral populations in countries where they are farmed, it is plausible that eggs and/or tadpoles are being collected from the wild and then raised in captivity in a ranching-type production system. However, for a species that is very easily bred in captivity and/or harvested from the wild as a non-native species, true-to-definition ranching of American bullfrogs seems unlikely.

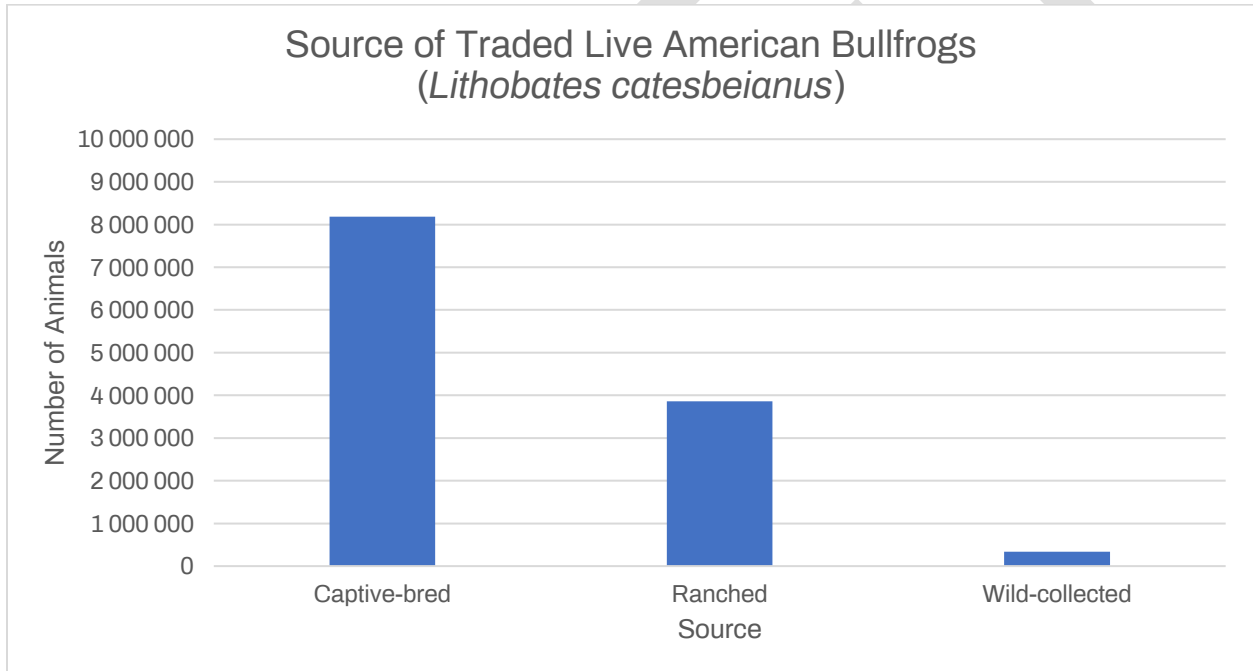


Figure 35: Reported sources of live traded *Lithobates catesbeianus* recorded in units of number by the United States of America from 2015-2020.

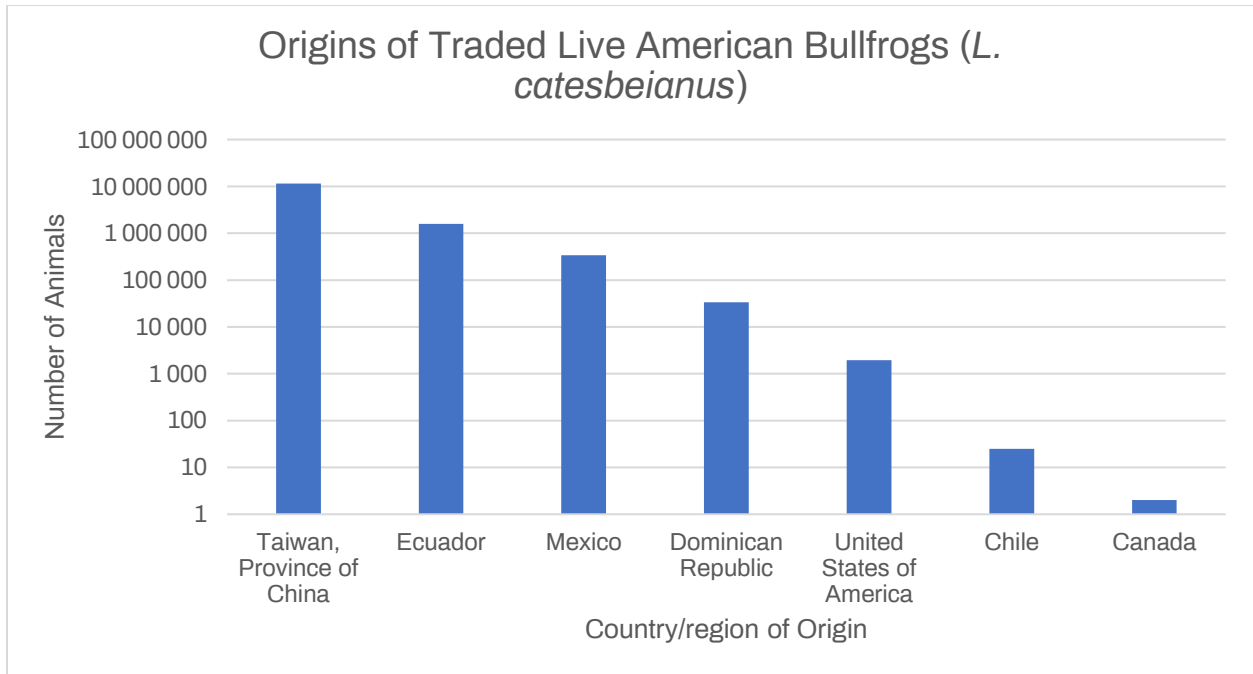


Figure 36: Reported country/region of origin of live traded *Lithobates catesbeianus* recorded in units of number by the United States of America from 2015-2020.

1.7.b. Numbers of live amphibians traded: *Hymenochirus curtipes*

Of the 1,561,476 traded *H. curtipes*, the majority (73.6%) were recorded as bred in captivity with the remainder collected from the wild (Figure 37). Upon closer examination of these data, all 411,655 animals recorded as collected from the wild were said to have been sourced from countries of origin where this species does not exist in the wild, most notably Singapore, from which 391,511 of these frogs were said to have been collected (Figure 38). This species is known to exist in the wild only in the Democratic Republic of the Congo, Congo and possibly in the Central African Republic (IUCN SSC Amphibian Specialist Group 2013). There are no recorded established feral populations in non-range countries/regions. It is therefore unknown why Singapore is being reported as a prominent country of origin for wild collected specimens of this African amphibian.

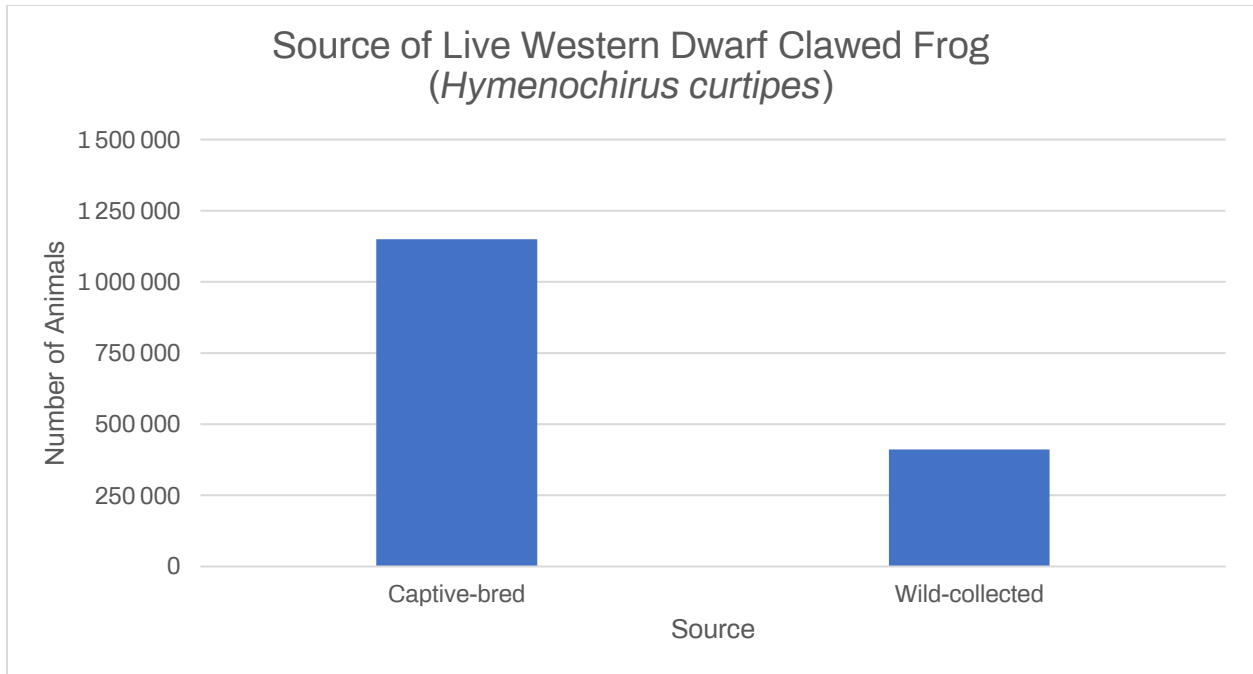


Figure 37: Reported sources of live traded *Hymenochirus curtipes* recorded in units of number by the United States of America from 2015-2020.

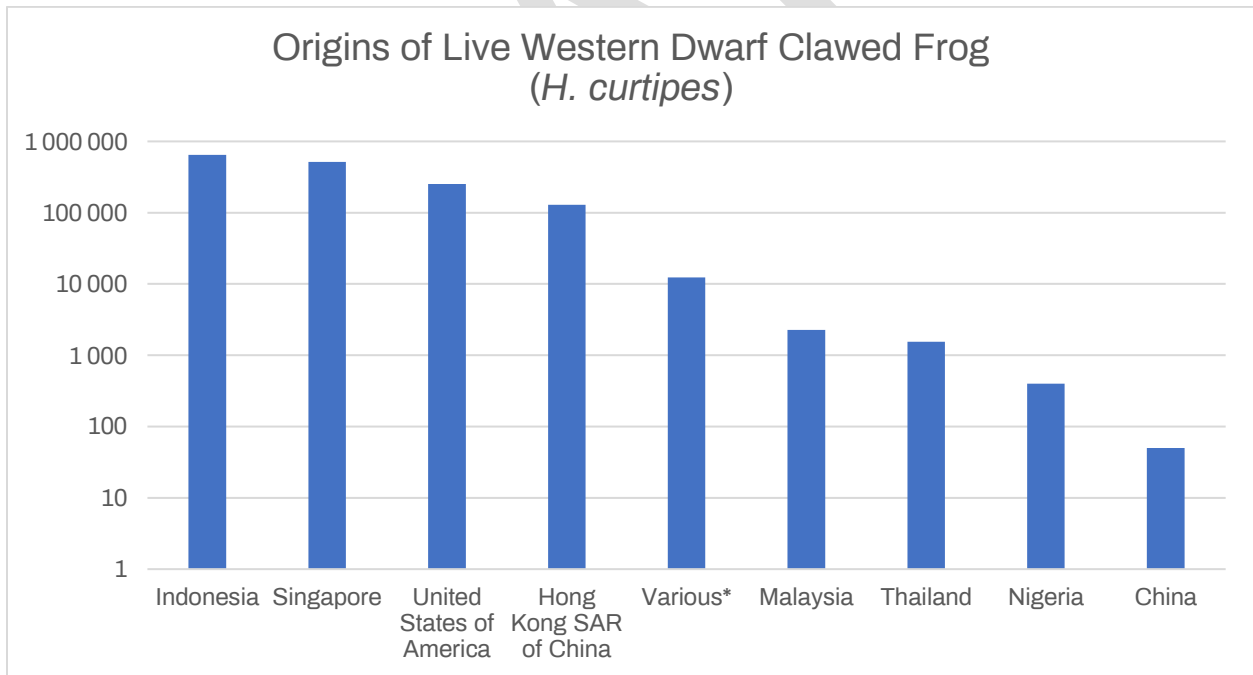


Figure 38: Reported country/region of origin of live traded *Hymenochirus curtipes* recorded in units of number by the United States of America from 2015-2020. Various reflects the use of a proxy ISO code, VS, used by the US Fish and Wildlife Service to denote shipments that contained animals from multiple origins which were not recorded individually.

It is also notable that wild-collected *H. curtipes* were recorded in LEMIS with the following countries/regions of origin: China, Hong Kong SAR of China, Indonesia, Nigeria, Thailand, and

the United States of America. None of these countries of origin appear to be plausible judging from the range of distribution of the species.

1.7.c. Numbers of live amphibians traded: Lithobates forreri

The entire amount of the 979,275 *L. forreri* traded by the United States of America was collected from the wild and the country of origin was recorded as Mexico. The national legislation of Mexico that governs wild collection of native wildlife for commercial exportation is prescribed through Article 53 of the Ley General de Vida Silvestre, where it states that the export of specimens, parts and derivatives of wild species requires authorization issued by Mexico's Secretariat of Environment and Natural Resources. Verification that necessary permissions are being granted by the appropriate authorities in Mexico for this high-volume trade in wild-collected *L. forreri* would be helpful to ensure this trade is being legally sourced and reported accordingly.

1.7.d. Numbers of live amphibians traded: Xenopus laevis

Of the 379,865 *X. laevis* traded, the majority (96.7%) were recorded as bred in captivity (Figure 39). Of the 3.3% that were recorded as collected from the wild and/or ranches, only 1,427 of 12,450 (11.5%) were sourced from countries where this species can be found in the wild (Figure 40). The non-range countries/regions recorded for 88.5% of the non-captive bred *X. laevis* included: Benin, China, Hong Kong SAR of China, and Singapore. As discussed with respect to *H. curtipes*, it is uncertain why amphibians are being recorded as wild-collected in countries where they are not known to be present in the wild.

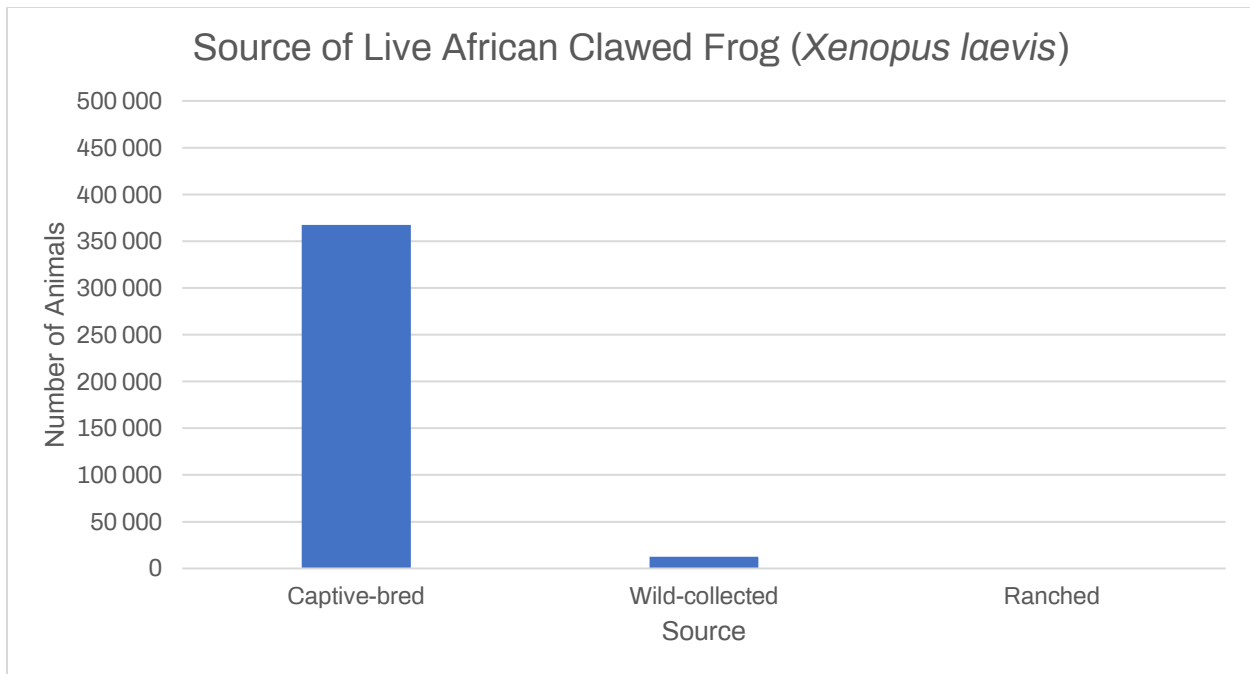


Figure 39: Reported sources of live traded *Xenopus laevis* recorded in units of number by the United States of America from 2015-2020.

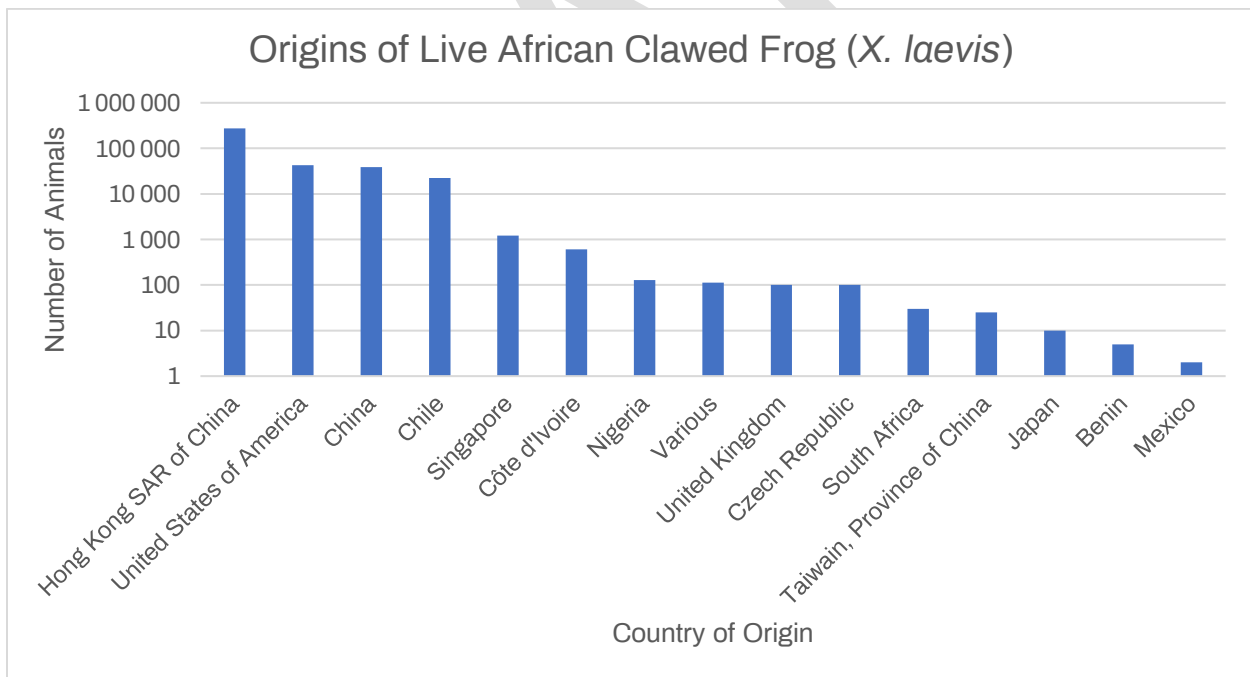


Figure 40: Reported country / region of origin of live traded *Xenopus laevis* recorded in units of number by the United States of America from 2015-2020. Various reflects the use of a proxy ISO code, VS, used by the US Fish and Wildlife Service to denote shipments that contained animals from multiple origins which were not recorded individually.

1.7.e. Numbers of live amphibians traded: *Hymenochirus boettgeri*

In contrast to the reported trade in *H. curtipes* where the majority of trade involved animals bred in captivity, of the 346,696 *H. boettgeri* traded, the majority (68.9%) were reportedly collected from the wild (Figure 41). Interestingly, the IUCN Red List assessment for this species states that, “Use and Trade: Most of the individuals in international trade are likely to be captive bred” (IUCN SSC Amphibian Specialist Group. 2014), while the LEMIS data suggest otherwise. Among those reported as collected from the wild, only 1,037 (0.4%) were from native countries of origin (Figure 42). Of these 1,037 frogs, all were recorded as having been collected from the wild in Nigeria. Meanwhile, the additional 237,730 wild-collected *H. boettgeri* were recorded from outside the documented distribution of this species in the wild, including: Singapore (97.4%), Indonesia (2.2%), and China (0.4%).

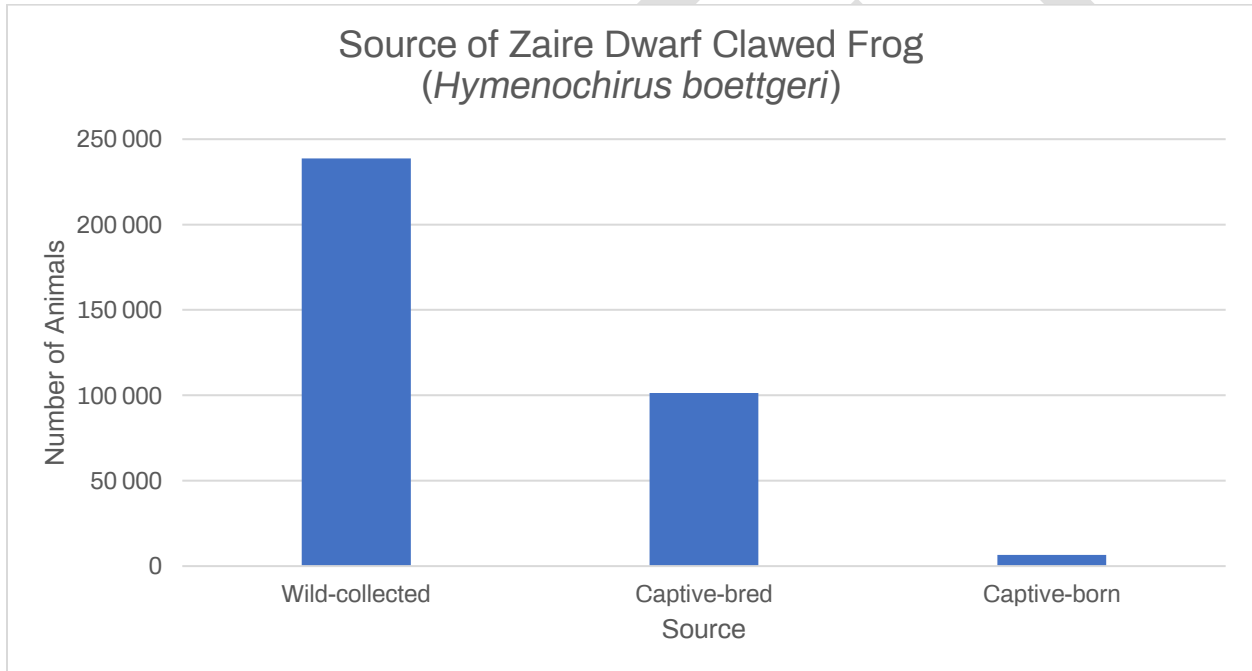


Figure 41: Reported sources of live traded *Hymenochirus boettgeri* recorded in units of number by the United States of America from 2015-2020.

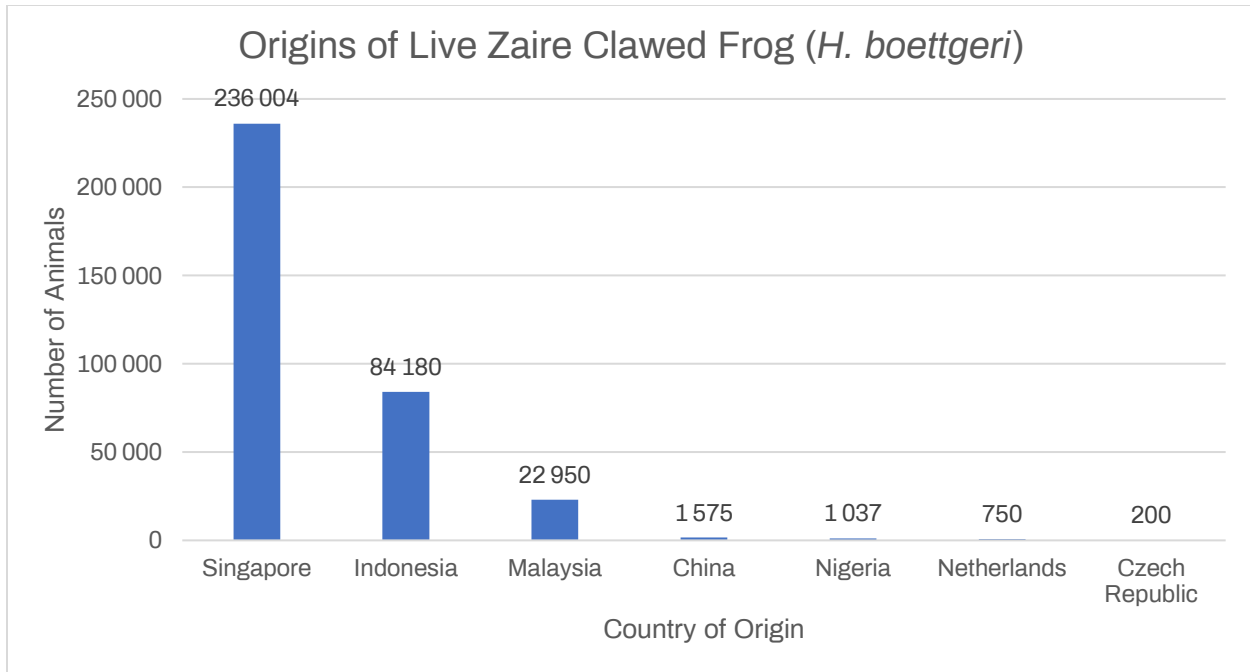


Figure 42: Reported country / region of origin of live traded *Hymenochirus boettgeri* recorded in units of number by the United States of America from 2015-2020.

1.7.f. Kilograms of live amphibians traded: *Lithobates catesbeianus*

Only two taxonomic categories traded by the United States of America were recorded in units of kilograms when live amphibians were traded: *Lithobates catesbeianus* and animals recorded as “Non-CITES amphibians.” These two categories included 1,012,004 kilograms of live amphibians, where over 99.9% were the American bullfrog (*Lithobates catesbeianus*) and 4 kilograms were recorded as “Non-CITES amphibians”. Due to the near total predominance of *L. catesbeianus* in this category, focus will be directed only at this one species.

Taiwan, Province of China was reported as the origin of 100% of live *Lithobates catesbeianus* traded in units of kilograms. Of the 1,012,000 kilograms of *L. catesbeianus* traded, the majority were recorded as ranched (89.1%), followed by those bred in captivity (10.2%) and those recorded using source code “F” (0.6%), which designates CITES-listed animals that were born in captivity in accordance with CITES Resolution Conf. 10.16 (Rev. CoP19) on *Specimens of animal species bred in captivity* (Figure 43). Because this is not a CITES-listed species, these 6,400 frogs may have been recorded with source code “F” in error. Among frogs declared as ranched, it is plausible that animals were taken from the wild and then raised in captivity, but 100% of this reported activity occurred outside the natural range of the species. Although bullfrogs from feral populations might indeed be the source, it is equally likely that ranching is not being performed

and that there is confusion among the proper assignment of source codes for animals produced in captivity.

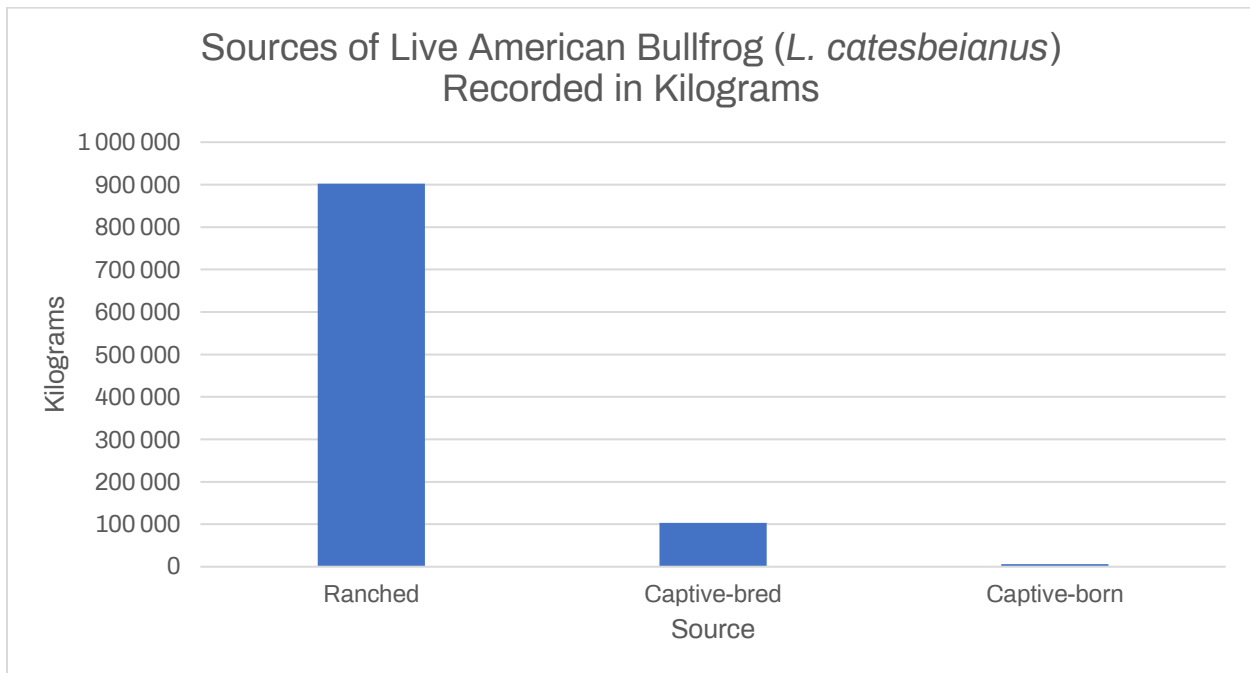


Figure 43: Reported sources of live traded *Lithobates catesbeianus* recorded in units of kilograms by the United States of America from 2015-2020.

It is curious that among live bullfrogs recorded in units of numbers of individuals versus units of kilograms there is a notable difference in reported source codes: those who traded bullfrogs by the *number of live animals* reported that 66.1% were bred in captivity, while among those who traded bullfrogs in *kilograms of live animals* reported that only 10.2% were bred in captivity. It is uncertain whether this indicates different circumstances under which live frogs are raised and harvested, or instead represents differences in how similar activities are being differently interpreted and reported by different traders.

1.8 Anomalous reported countries of origin and/or sources of traded amphibians

It was apparent that some combinations of reported countries of origin and source codes were sometimes not biologically possible. Some species were frequently reported as wild-collected from countries without documented wild populations. Therefore, an exploratory analysis was performed to consider the extent of anomalous records or possible errors across the 14,663 shipments of amphibians present in the LEMIS dataset used in this study (Figures 44-46). This analysis is then followed by a brief summary of the 50 most frequently traded amphibian species according to a combined query of the LEMIS and CITES databases the countries that export them (Table 3). Using species distributional range information from the IUCN Red List, shipments

where amphibians were recorded outside of their recognized country-level distributions and that were also explicitly described as wild-collected with the use of source code “W” were noted.

This approach represents a conservative evaluation of mismatches because the authors chose to only consider amphibians recorded as wild-collected and did not include other amphibians technically also collected from the wild but recorded with more ambiguous source codes, including those for ranched, and for animals born in captivity. For species with feral populations outside their native distribution ranges, records of trade were treated as true and accurate if recognized in their respective associated IUCN Red List assessments. For instance, it is plausible that the African clawed frog (*Xenopus laevis*) could be collected from the wild in Chile, France, Indonesia, Italy, Mexico, Portugal, the United Kingdom of Great Britain and Northern Ireland, and the United States of America; and not only from its native range within continental Africa (IUCN SSC Amphibian Specialist Group. 2020c).

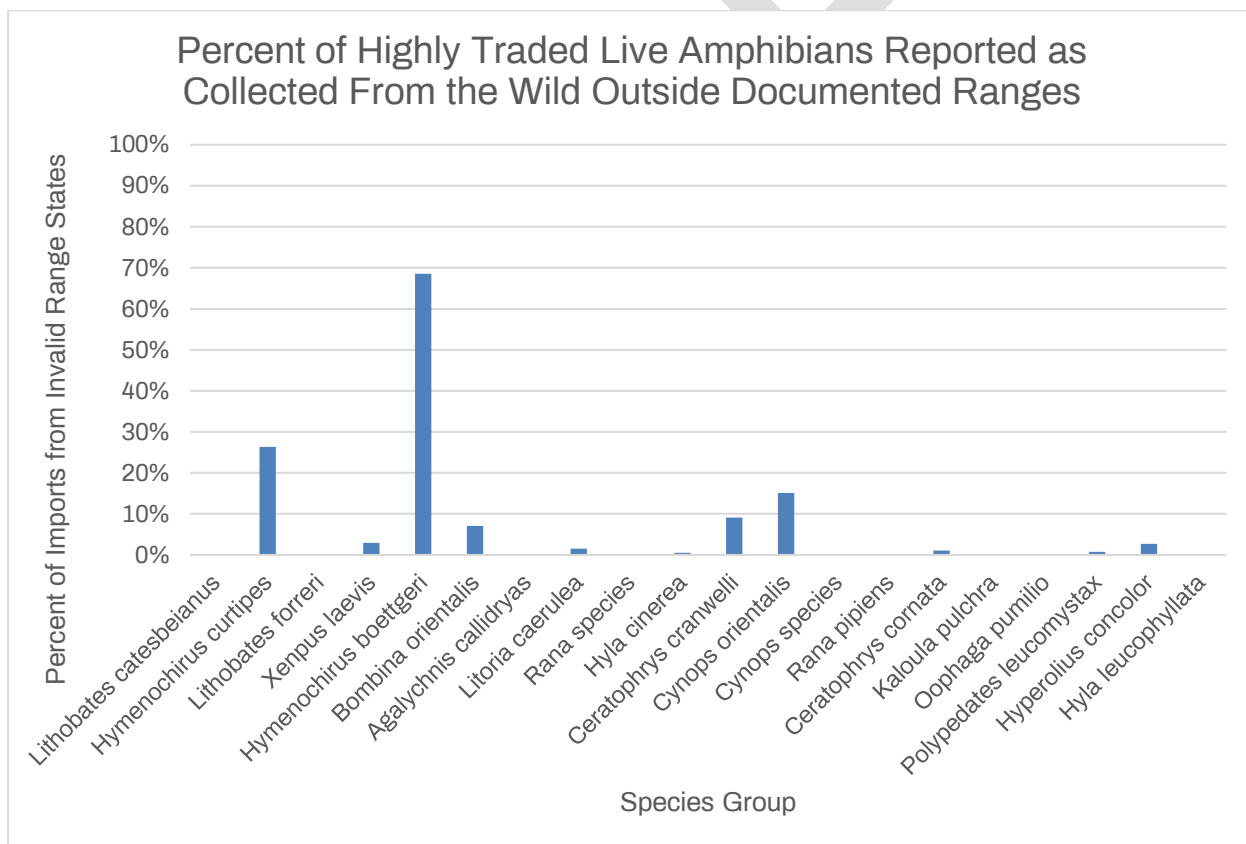


Figure 44: Percent of each of the top 20 most traded live amphibians (See Figure 14) that were recorded as collected from the wild from origins/regions outside their native and introduced ranges, according to distributional range information sourced from IUCN Red List. No shipments of this nature were identified for *R. forreri*, *A. callidryas*, or *O. pumilio* among trade in live animals recorded by the United States of America from 2015-2020.

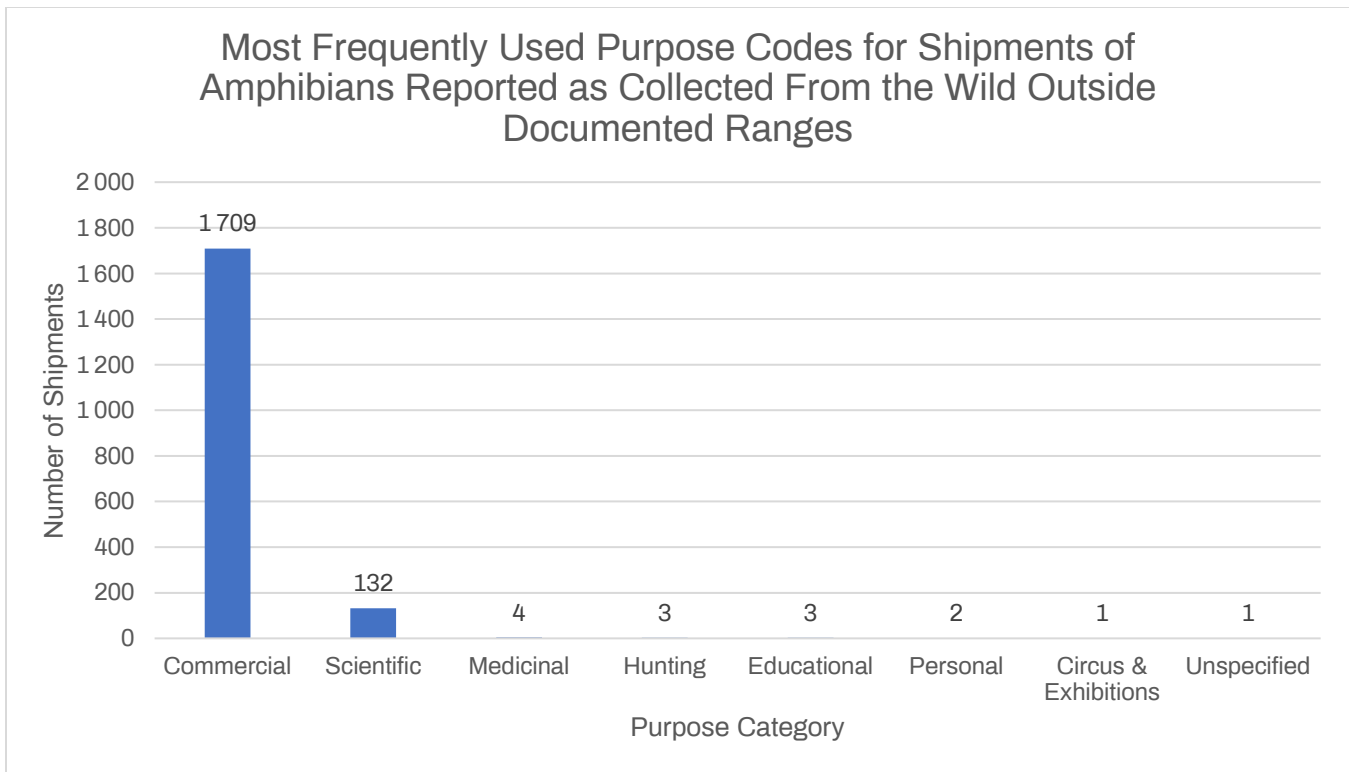


Figure 45: The overwhelming proportion of commercial shipments observed across this phenomenon indicate incorrect source descriptions could be affecting large quantities of individual taxa, an observation further supported by analyses.

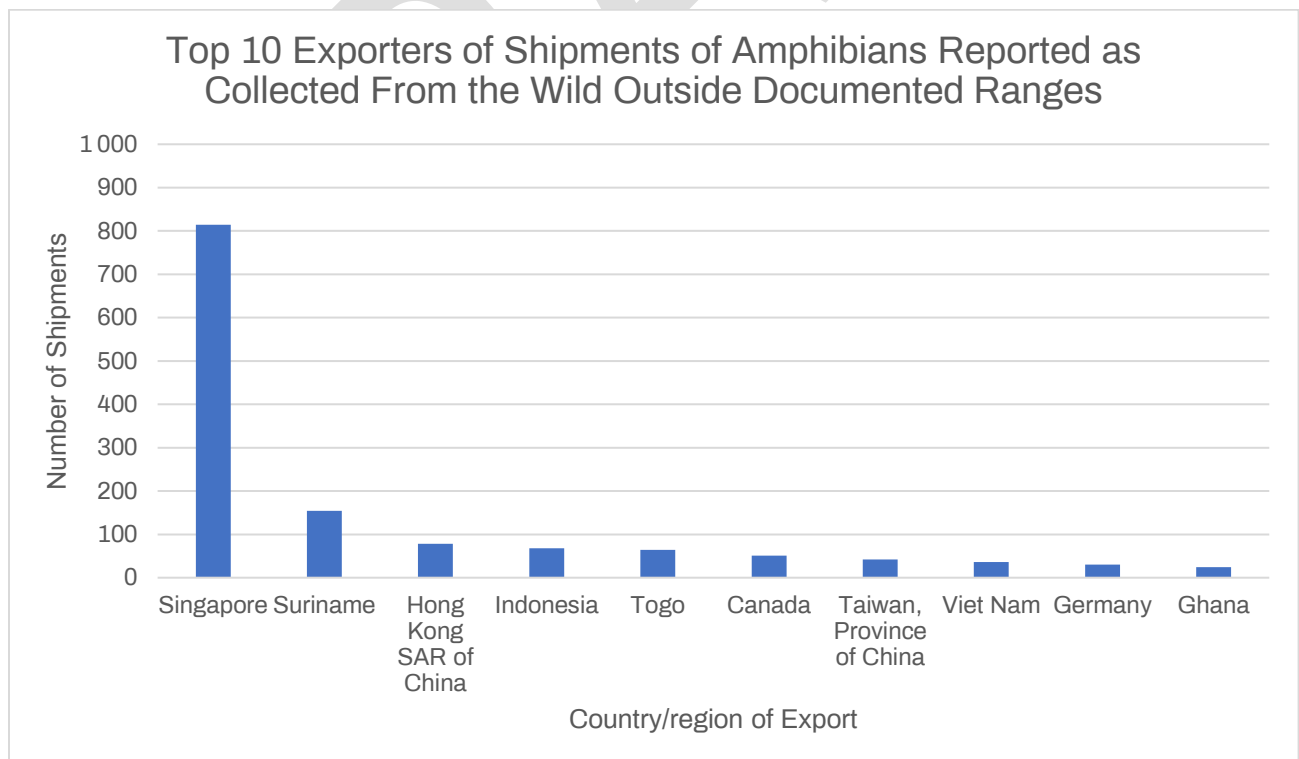


Figure 46: Amphibian shipments exported from Singapore dominated this observed phenomenon.

Explanations for these anomalous trade data are varied, but the following two considerations emerged during analysis which may help guide interpretation, conclusions, and responses thereof.

- 1.) The international trade in amphibians is not monitored with sufficient scientific scrutiny. Increased care is needed to ensure that records of trade accurately characterize true events. Throughout this report, and among other previously published wildlife trade summaries, considerable attention has been directed towards the need for improved record keeping of scientific names of traded species. However, the lack of accurate information associated with the trade in amphibians not only affects knowledge of the species traded, but also their sources and countries of origin. These additional components of trade are arguably of equal importance in the evaluation of the impact of trade on wild amphibian populations, particularly if portions of amphibians recorded as wild-collected were instead bred in captivity. Errors among recordkeeping are likely the source for most of these mismatches due to the apparent absence of scientific quality control and assurance protocols when shipments of wildlife are transcribed into data. Still, alternative scientifically plausible explanations might exist among some of these records.
- 2.) Records of trade in amphibians reported as wild-collected from countries not within their scientifically recognized range countries, if true and accurate, can denote previously undocumented populations that warrant further exploration. Some of these might involve distributional range extensions of native species previously unrecognized, while others might represent introduced species that have formed feral populations not yet documented.

Table 3: Summary of 50 most frequently traded amphibian species across both LEMIS and CITES databases combined (2015-2020). These data include only species that were traded as live animals and reported with the number of animals traded are included.

Family	Scientific Name	Common Name	IUCN Status	IUCN Assessment Year	CITES Appendix	Exporting Countries ISOCC	Native Region	Source	Number Shipmen
Phyllomedusidae	<i>Agalychnis callidryas</i>	Red-eyed Tree Frog	Least Concern	2020	II	CA, CH, CN, CR, CZ, DE, FR, NI, NL, NO, PA, US	Central America	CITES, LEMIS	539
Dendrobatidae	<i>Dendrobates auratus</i>	Green and Black Poison Frog	Least Concern	2020	II	CA, CN, CO, CR, CZ, DE, ES, GB, NI, NL, NO, PA, UA, US	Central America	LEMIS	323
Dendrobatidae	<i>Dendrobates tinctorius</i>	Dyeing Poison Frog	Least Concern	2010	II	AT, CA, CH, CZ, DE, FR, GB, GR, NL, SG, SR, UA, US	South America	LEMIS	323
Dendrobatidae	<i>Oophaga pumilio</i>	Strawberry Poison Frog	Least Concern	2015	II	CA, CR, DE, JE, NI, NL, NO, PA, US	Central America	CITES, LEMIS	296
Dendrobatidae	<i>Dendrobates leucomelas</i>	Yellow-banded Poison Dart Frog	Least Concern	2004	II	BE, CA, CZ, DE, ES, GB, GY, LV, NL, UA, US	Central America	CITES, LEMIS	184
Dendrobatidae	<i>Phyllobates terribilis</i>	Golden Poison Frog	Endangered	2017	II	CA, CH, CO, CZ,	South America	LEMIS	150

						DE, ES, FR, GB, JE, NL, UA, US				
Microhylidae	<i>Dyscophus guineti</i>	Sambavo Tomato Frog	Least Concern	2016	II	CA, CN, CZ, DE, FR, MG, NL, US	East Africa	LEMIS	146	
Centrolenidae	<i>Hyalinobatrachium fleischmanni</i>	Fleischmann's Glass Frog	Least Concern	2008	II	EC, NI, NO, PA, SR, US	Central America	LEMIS	140	
Mantellidae	<i>Mantella betsileo</i>	Betsileo Golden Frog	Least Concern	2017	II	CA, GB, MG, UA	East Africa	CITES, LEMIS	135	
Pelodyridae	<i>Mantella baroni</i>	Baron's Mantella	Least Concern	2016	II	MG, US	East Africa	LEMIS	127	
Dendrobatidae	<i>Ranitomeya fantastica</i>	Fanastic Poison Frog	Vulnerable	2018	II	CA, DE, NL,	South America	CITES	114	
Dendrobatidae	<i>Ranitomeya imitator</i>	Mimic Poison Frog	Least Concern	2013	II	CA, DE, NL, US	South America	CITES	104	
Pipidae	<i>Hymenochirus curtipes</i>	Western Dwarf Clawed Frog	Least Concern	2013	N/A	CA, CN, ID, MY, NG, SG, TH, US	Central Africa	LEMIS	2,836	
Ranidae	<i>Lithobates catesbeianus</i>	American Bullfrog	Least Concern	2020	N/A	BR, CA, CN, DO, EC, KR, MX, MY, NA, TH, TK	North America	LEMIS	2,745	
Pipidae	<i>Xenopus laevis</i>	African Clawed Frog	Least Concern	2020	N/A	BE, BJ, CA, CD, CG, CL, CN, CZ, DE, ES, FR, GB, IE, JP, KE, MX,	Southern Africa	LEMIS	1,484	

						NH, QA, SG	NL, RW,			
Ranidae	<i>Lithobates forreri</i>	Forrer's Grass Frog	Least Concern	2020	N/A	CN, MX, US	HN, NI,	Central America	LEMIS	1,195
Ceratophryidae	<i>Ceratophrys cranwelli</i>	Cranwell's Horned Frog	Least Concern	2004	N/A	BE, CN, FR, JP, SR, TH	CA, DE, GB, KR,	South America	LEMIS	849
Bufoidea	<i>Rhinella marina</i>	Cane Toad	Least Concern	2008	N/A	AU, BM, BZ, CR, EC, FR, GY, MS, NI, PE, PH, SB, US, VC	BB, BR, CA, DO, FJ, GF, IT, MX, PA, PG, PW, SR,	Central America, South America	LEMIS	656
Pelodyadidae	<i>Litoria caerulea</i>	Green Tree Frog	Least Concern	2021	N/A	AU, CN, FR, ID, IT, NA, PG, TH	CA, DE, NL, SG,	Oceania	LEMIS	634
Hylidae	<i>Hyla cinerea</i>	American Green Treefrog	Least Concern	2021	N/A	SR, US		North America	LEMIS	601
Ranidae	<i>Rana pipiens</i>	Northern Leopard Frog	Least Concern	2021	N/A	CA, CO, US	CN, MX,	North America	LEMIS	587
Pipidae	<i>Hymenochirus boettgeri</i>	Zaire Clawed Frog	Least Concern	2014	N/A	CM, CZ,	CN, ID,	Central Africa	LEMIS	585

						NA, NG, NL, SE, SG, US				
Bombinatoridae	<i>Bombina orientalis</i>	Oriental Fire-bellied Toad	Least Concern	2020	N/A	CA, CN, DE, KR, SG, US	East Asia	LEMIS	475	
Pyxicephalidae	<i>Pyxicephalus adspersus</i>	African Bullfrog	Least Concern	2013	N/A	CA, CN, FR, GB, MZ	Southern Africa	LEMIS	415	
Ceratophryidae	<i>Ceratophrys ornata</i>	Argentinean Horned Frog	Least Concern	2004	N/A	CA, CN, GB, JP, TH	South America	LEMIS	401	
Microhylidae	<i>Kaloula pulchra</i>	Malaysian Narrowmouth Toad	Least Concern	2020	N/A	CN, DE, GB, ID, LA, PH, TH, US, VN	Southeast Asia	LEMIS	372	
Bufonidae	<i>Duttaphrynus melanostictus</i>	Asian Common Toad	Least Concern	2004	N/A	CH, CN, DE, FI, ID, IT, KH, LA, MG, MM, NA, TH	South Asia, Southeast Asia	LEMIS	278	
Ambystomatidae	<i>Ambystoma tigrinum</i>	Western Tiger Salamander	Least Concern	2022	N/A	CA, GB, MX, US	North America	LEMIS	273	
Rhacophoridae	<i>Polypedates leucomystax</i>	Common Tree Frog	Least Concern	2004	N/A	BN, CA, CN, ID, KH, LA, PH, SG, TH	Southeast Asia	LEMIS	272	
Dicroglossidae	<i>Hoplobatrachus rugulosus</i>	Asian Peters Frog	Least Concern	2022	N/A	CN, LA, MM, PH, SG, TH, US, VN	East Asia, Southeast Asia	LEMIS	262	
Phyllomedusidae	<i>Pithecopus hypochondrialis</i>	Orange-legged Leaf Frog	Least Concern	2008	N/A	DE, US	South America	LEMIS	257	

Phyllomedusidae	<i>Phyllomedusa bicolor</i>	Giant Monkey Frog	Least Concern	2008	N/A	CA, GY, PE, US	ET, NL, SR,	South America	LEMIS	218
Pipidae	<i>Pipa pipa</i>	Surinam Toad	Least Concern	2015	N/A	GY, PE, US	NG, SR,	South America	LEMIS	202
Hylidae	<i>Dendropsophus leucophyllatus</i>	Triangle Treefrog	Least Concern	2008	N/A	PE, US		South America	LEMIS	187
Ceratophryidae	<i>Ceratophrys cornuta</i>	Surinam Horned Frog	Least Concern	2004	N/A	BE, CN, PE, SR	CA, JP,	South America	LEMIS	176
Ambystomatidae	<i>Ambystoma opacum</i>	Marbled Salamander	Least Concern	2021	N/A	US		North America	LEMIS	159
Microhylidae	<i>Phrynomantis bifasciatus</i>	Banded Rubber Frog	Least Concern	2013	N/A	BJ, GR, TG, US	GH, MZ, TZ,	Central Africa, Southern Africa	LEMIS	159
Ceratobatrachidae	<i>Cornufer guentheri</i>	Guenther's Triangle Frog	Least Concern	2019	N/A	CA, GB, SB	CN,	Oceania	LEMIS	151
Bufoidea	<i>Rhaebo guttatus</i>	Smooth-sided Toad	Least Concern	2008	N/A	CA, PE, US	GY, SR,	South America	LEMIS	144
Salamandridae	<i>Notophthalmus viridescens</i>	Eastern Newt	Least Concern	2020	N/A	CA, US	SE,	North America	LEMIS	130
Salamandridae	<i>Cynops orientalis</i>	Oriental Fire-bellied Newt	Least Concern	2020	N/A	CN, US	SG,	East Asia	LEMIS	128
Dendrobatidae	<i>Rhacophorus reinwardtii</i>	Reinwardt's Tree Frog	Least Concern	2022	N/A	CN, FR, ID	DE,	Southeast Asia	LEMIS	124
Amphiumidae	<i>Amphiuma tridactylum</i>	Three-toed Amphiuma	Least Concern	2021	N/A	US		North America	LEMIS	118
Ceratophryidae	<i>Ceratophrys aurita</i>	Brazilian Horned Frog	Least Concern	2020	N/A	BE, JP, US	DE,	South America	LEMIS	115
Phyllomedusidae	<i>Callimedusa tomopterna</i>	Tiger-striped Leaf Frog	Least Concern	2016	N/A	CA, PE, US	DE, SR,	South America	LEMIS	115
Ambystomatidae	<i>Ambystoma maculatum</i>	Spotted Salamander	Least Concern	2022	N/A	CA, US	GB,	North America	LEMIS	103

Hylidae	<i>Osteopilus septentrionalis</i>	Cuban Treefrog	Least Concern	2019	N/A	SX, US	Carribbean	LEMIS	103
Bufoidea	<i>Anaxyrus debilis</i>	Green Toad	Least Concern	2021	N/A	GB, MX, US	North America	LEMIS	102
Bufoidea	<i>Incilius alvarius</i>	Sonoran Dester Toad	Least Concern	2019	N/A	CA, US	North America	LEMIS	101
Bufoidea	<i>Anaxyrus terrestris</i>	Southern Toad	Least Concern	2021	N/A	US	North America	LEMIS	100

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1.9 Cumulative list of internationally traded amphibians including both present and previous studies

A comprehensive literature review was performed to identify additional amphibian species demonstrated to be internationally traded. Interestingly, the majority of literature results pertaining to the trade in amphibians were found to instead focus on the threat of emerging infectious diseases and the role of trade in spreading pathogens. Very few studies provided species-specific information that described international trade in non-CITES listed amphibians, but two studies were particularly noteworthy and included both, and their findings were integrated into the cumulative species list provided in the present report by comparing their traded species lists to that produced through the present analysis of 2015-2020 LEMIS data and adding those not already included (Mohanty and Measey 2019, Hughes et al. 2023). In total, this resulted in the addition of 126 species to the list of 1,195 species for a total of 1,321 internationally traded amphibian species, including both CITES and non-CITES listed species (Annex 2). Of these 1,321 total species traded, 89.2% are not CITES-listed. Brief summaries of these two previous studies are provided as follows.

Mohanty and Measey (2019) performed a literature review to assess the diversity of amphibian species in pet trade and the characteristics that predispose them to become commodities. Knowing that online literature reviews tend to exhibit bias towards English language articles, the authors supplemented their review with LEMIS data, and focused explicitly on import records tagged as “commercial”, “personal”, and “breeding in captivity”. The authors considered species traits such as body size, clutch size, and breeding mode, and included CITES traded status and IUCN conservation status as variables. The authors identified 443 species in the amphibian pet trade between 1971 to 2018 and identified taxonomic bias towards Caudata, and at the family level for *Dendrobatidae*, *Mantellidae*, *Hyperoliidae*, *Pipidae*, *Ambystomidae*, and *Salamandridae*. Of the predictive variables explored, only body size, range size, and breeding type had significant effects – “large body size” and “larval breeding” had the strongest positive effects on presence of a species in international pet trade (and volume of trade). Overall, the chosen species-traits considered in this analysis were poor predictors of trade volume in pet amphibians imported into the United States of America. Other variables were postulated to have greater strengths, such as socio-economic aspects of trade and various aesthetically pleasing species traits.

Hughes et al. (2023) considered how the lack of wildlife trade monitoring in unregulated amphibian species provides an underrepresentation of actual trade than what is occurring. To make up for this, the research team combined data from five sources (CITES, IUCN Red List, LEMIS, a web

crawl, and a literature review) to establish a baseline measure of all amphibian species identified in wildlife trade for use as meat, medicine, research, and pets. In total, 1,215 amphibian species were identified, with 909 being present in the international wildlife trade. The LEMIS database examined contained 587 species, the CITES database contained 137 species, and review of online advertisements identified 185 species. Uniqueness varied between the datasets: LEMIS 31% unique, CITES 4% unique, Online trade 30% unique. The vast majority of amphibians by volume were imported into the US for commercial purposes. Of those, 57% were recorded as captive sourced while 42% were recorded as sourced from the wild. These values varied by genera. Measures of uniqueness across datasets show that different data sources detected different species, and no predictors could be determined. In total, 413 species were used for meat, 805 species used as pets, and 122 species as medicine or for pharmacological research. Overall, 664 species were traded for research or breeding projects. This analysis omitted the use of amphibian leather for fashion and the use of amphibians as bait.

Because these cumulative data provide a total list of amphibian species identified in international trade, but do not provide an indication of the relatively frequency of trade in these species, the LEMIS data were further examined to reflect this. These data are provided in a table that illustrates the frequency of all traded species recorded in LEMIS by the United States of America from 2015-2020, based on the number of times a traded shipment was recorded to contain each species (Annex 3).

1.10 Amphibian species likely threatened by trade as per Challender et al. (2023) and not CITES-listed

A recent study proposed a methodology to apply information assembled through the IUCN's Red List of Threatened Species to identify species likely threatened by international trade that are not presently CITES-listed (Challender et al. 2023). Of the 904 species that were identified, 55 were species of amphibians. Seventeen of these 55 amphibian species were identified in trade among the LEMIS data used in this study (Table 4).

Table 4: Seventeen species of amphibians likely threatened by international trade that are not presently CITES-listed as per Challender et al. 2023.

<i>Atelopus varius</i>	<i>Ommatotriton ophryticus</i>
<i>Bolitoglossa dofleini</i>	<i>Osteopilus vastus</i>
<i>Ceratophrys ornata</i>	<i>Pachytriton archospotus</i>
<i>Ceratophrys stolzmanni</i>	<i>Pachytriton wuguanfui</i>

<i>Cynops pyrrhogaster</i>	<i>Plethodon petraeus</i>
<i>Kassina arboricola</i>	<i>Proteus anguinus</i>
<i>Laotriton laoensis</i>	<i>Rhacophorus calcaneus</i>
<i>Leptodactylus fallax</i>	<i>Rhacophorus helenae</i>
<i>Limnonectes blythii</i>	

Among these 17 species, 497 shipments were recorded, and 80.3% of these (399) involved just one of the 17 species (*Ceratophrys ornata*). Trade was recorded in units of number of individuals (rather than mass) for all of these species except one shipment of 50 mL of *Ommatotriton ophryticus*. Trade in the remaining 16 species involved 40,313 specimens (Figure 47) which were collectively recorded with eight different LEMIS description codes: BOD (dead whole animals), EGL (live eggs), LIV (live specimens), SKP (Skin piece (raw or tanned including scraps)), SPE (specimen (scientific or museum)), SPR (Shell product (mollusc or turtle)), TRI (Trim (shoe, garment, or decorative)), and UNS (unspecified).

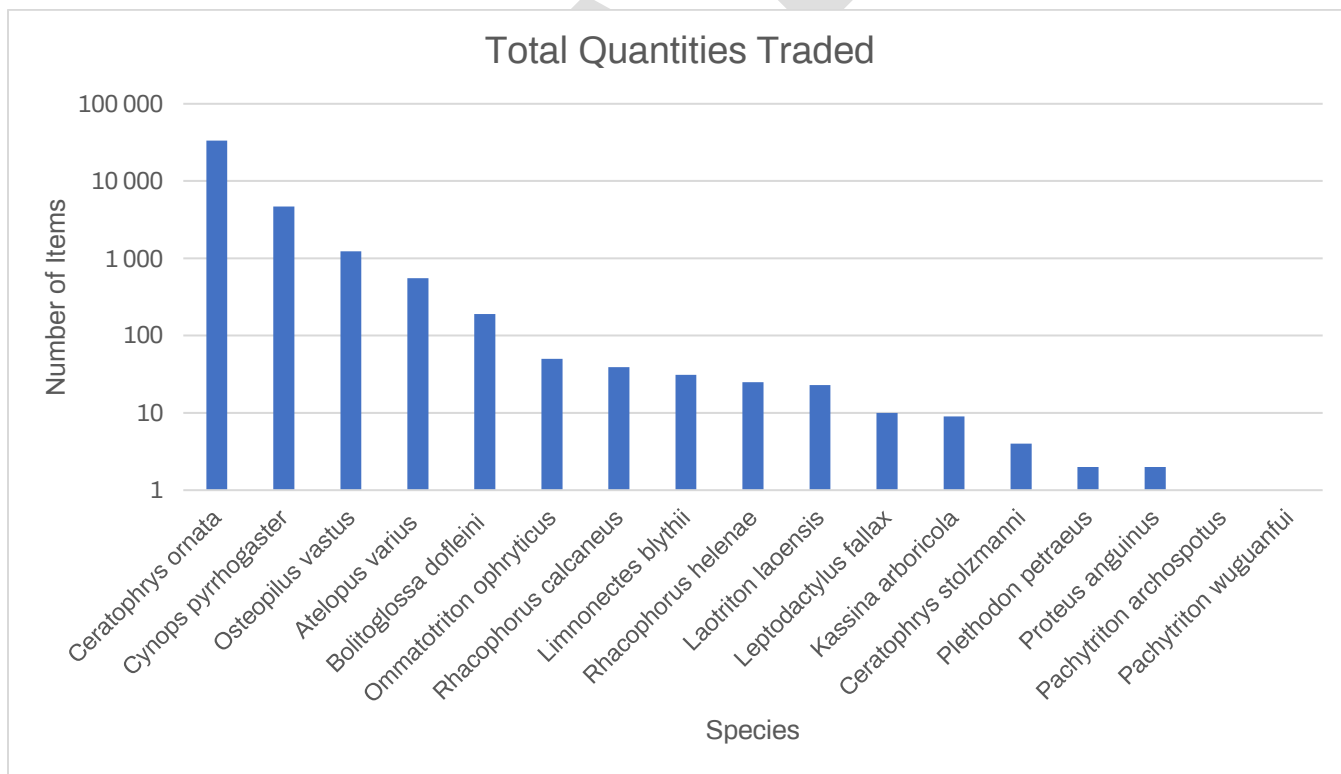


Figure 47: Cumulative quantity of trade in live amphibians, parts or products of species likely threatened by international trade presented by Challender et al. (2023) recorded by the United States of America from 2015-2020.

1.10.a. *Ceratophrys ornata* trade summary

The Argentinean Horned Frog (*Ceratophrys ornata*) is listed as Near Threatened by the IUCN Red List and had a declining population trend (Kwet et al. 2004). The majority of all traded *C. ornata* were recorded as live frogs (33,460 individuals). Most traded live *C. ornata* (95.9%) were reported as bred in captivity followed by those recorded as animals born in captivity (source code F) in accordance with CITES Resolution Conf. 10.16 (Rev) (3.0%) (Figure 48). As with examined data in previous sections, this is not a CITES-listed species, so it is likely that the 1,007 frogs recorded with source code “F” represents reporting errors. Therefore, some or all of these 1,007 frogs may have been collected from the wild and then raised in captivity, in addition to the 358 *C. ornata* reported as wild-collected. When layering reported country of origin data on top of source code data, it then becomes clear that wild collection was unlikely, as 975 of 1007 (96.8%) of frogs recorded with source code F reportedly originated within the United States of America, suggesting that either these frogs were bred in captivity outside their range of distribution or that source codes and/or country of origins are being incorrectly reported.

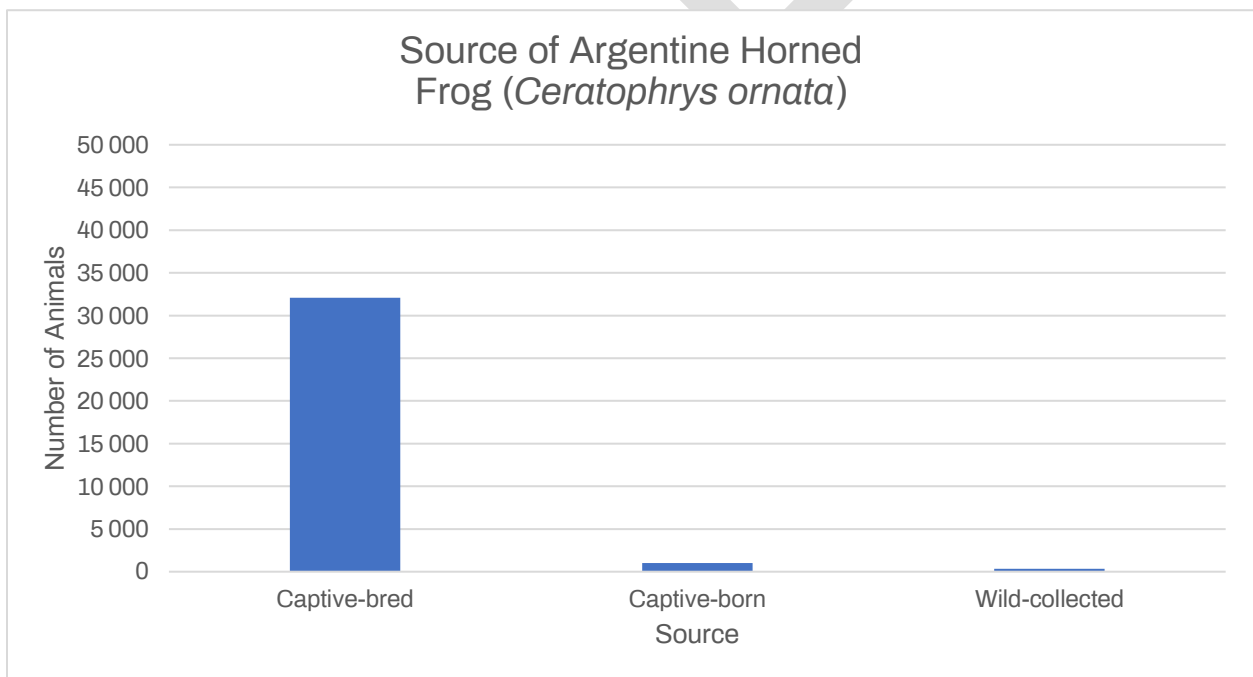


Figure 48: Reported sources of traded *Ceratophrys ornata* recorded by the United States of America from 2015-2020.

For the majority of *C. ornata* recorded as wild-collected, the reported origin is not within the species' range of distribution (Figure 49). As per the IUCN Red List, *C. ornata* is only native to Argentina, Brazil, and Uruguay (Kwet et al. 2004). LEMIS data include the following wild sources: United States of America, Thailand, Taiwan, Province of China and Brazil.

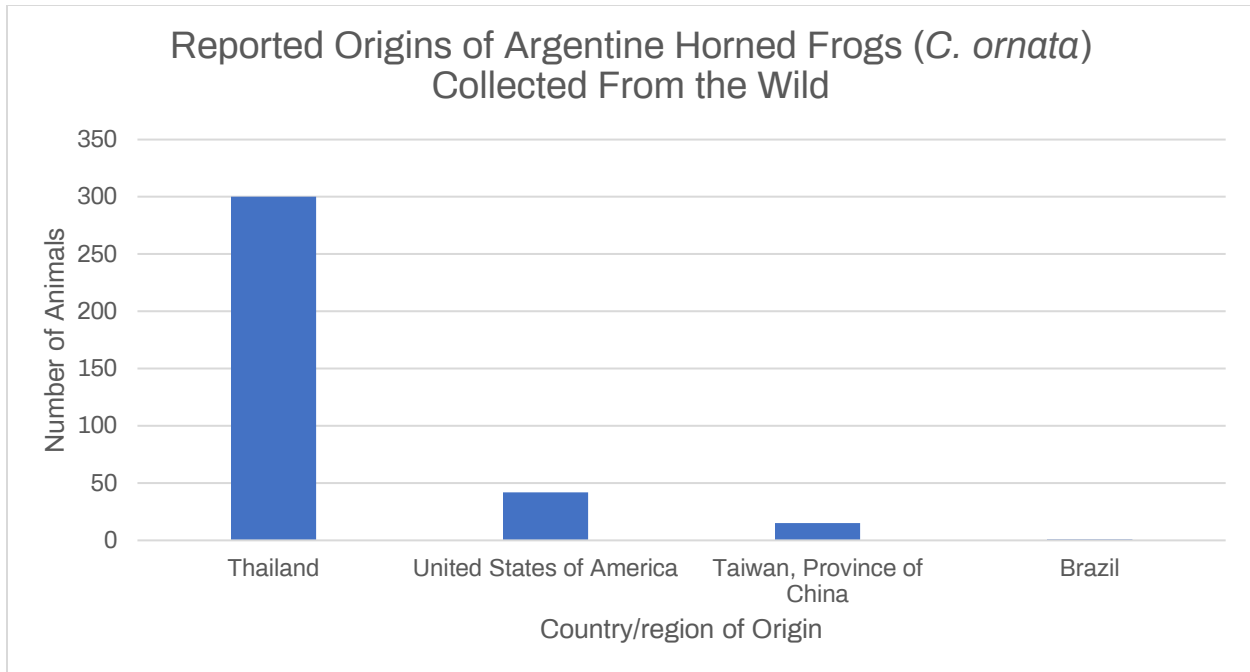


Figure 49: Reported country/region of origin of *Ceratophrys ornata* collected from the wild and recorded by the United States of America from 2015-2020.

A single specimen of wild-collected *C. ornata* traded from Brazil for scientific purposes represented the only record of trade sourced from an origin where this species is native.

The IUCN Red List assessment for this species stated that *C. ornata* is, “collected for the international pet trade and its eggs are sold internationally for scientific research. No data are available either on official trade or on illegal trade; captive breeding is probably high.” Among the data available for this study, international trade in eggs of *C. ornata* was not detected, as all trade was recorded either as live adult frogs or scientific specimens. Still, it is plausible that some animals recorded as live individuals were actually individual live eggs. It is similarly plausible that the trade in eggs is occurring without declaration.

Consistent with the IUCN Red List assessment stating that “captive breeding is probably high”, this appears to be supported by the LEMIS trade data. Still, due to the source code and country of origin discrepancies detected among these data for unknown reasons, confidence in the accuracy of these trade data is uncertain. During the study period, there were no records of trade in live specimens sourced from Argentina, Brazil, or Uruguay, the three range states of *C. ornata*. It may be worthwhile to explore whether any of these nations have authorized commercial collection and exportation of this species, and whether those in circulation can be demonstrated to have legal origins.

1.10.b. *Cynops pyrrhogaster* trade summary

The Japanese Fire-bellied Newt (*Cynops pyrrhogaster*) is listed as Near Threatened in the IUCN Red List and exhibits a decreasing population trend (IUCN SSC Amphibian Specialist Group. 2021). This species is endemic to Japan. Of the 4,679 traded *Cynops pyrrhogaster*, most were live newts (4,379) with the exception of one shipment that contained 300 live eggs. All live adult animals were traded for commercial purposes, except for three newts traded for personal use and the shipment of 300 live eggs that were declared as intended for scientific purposes. According to the IUCN Red List assessment, “This species is collected for the national and international pet trade. Individuals from the wild are constantly being traded on the internet as a pet. Only a small number are bred in captivity for research only (IUCN SSC Amphibian Specialist Group. 2021).” This information in the IUCN Red List assessment contradicts what is observed among these LEMIS data, which show the opposite: that the majority (89.6%) of traded *C. pyrrhogaster* were reported as bred in captivity for commercial purposes (Figure 50).

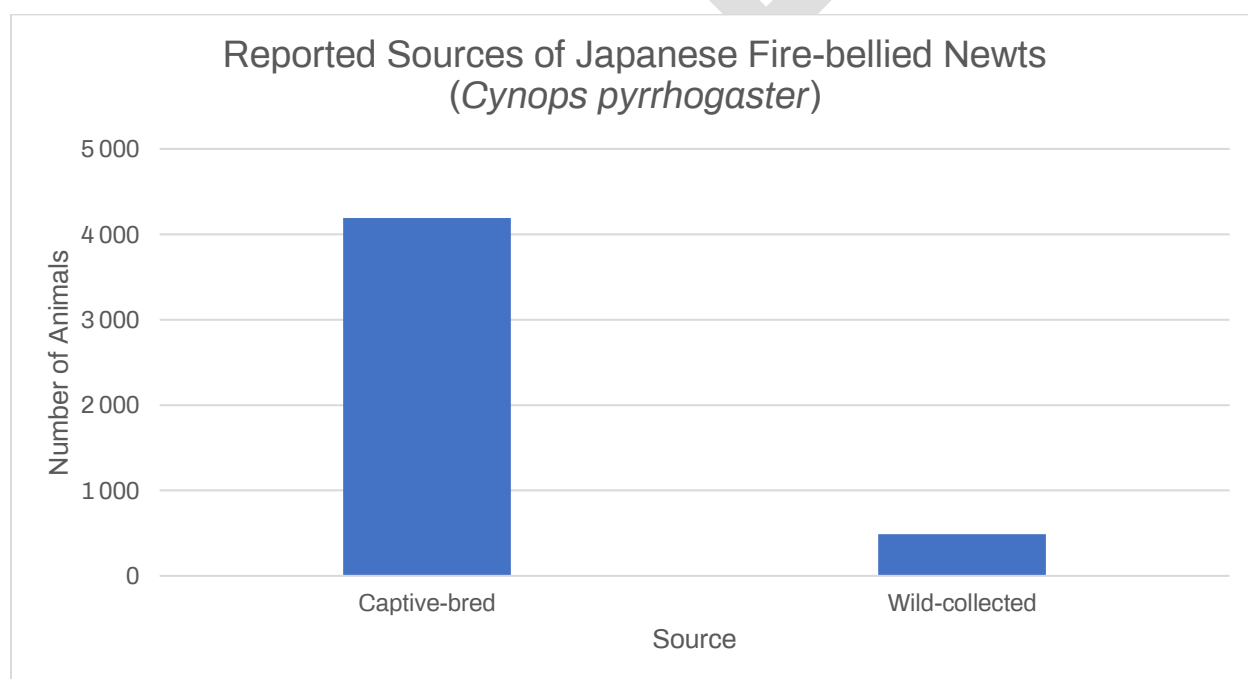


Figure 50: Reported sources of traded *Cynops pyrrhogaster* recorded by the United States of America from 2015-2020.

Of the 488 wild-collected specimens, 300 were live eggs for scientific purposes and the remaining 188 were live adults. Examination of the reported countries of origin for these wild-collected newts shows that 36.1% were declared as having been collected in the wild in countries/regions where this species is not native, including Hong Kong SAR of China (89.2%) and mainland China (10.8%). It is possible that these wild-collected newts were not *C. pyrrhogaster*, if genuinely collected from the wild in Hong Kong SAR of China and mainland China. Alternatively, they may

have been *C. pyrrhogaster* that were bred in captivity and incorrectly recorded as collected from the wild.

The IUCN assessment further states that, “Numerous newts are collected for sale and export to Europe for the pet trade, and this is considered a threat to the species.” It is therefore necessary to consider that the United States of America trade in primarily captive bred individuals could differ from that among other trading countries, such as those among the European Union, where trade between those countries might instead involve high proportions of wild-collected *C. pyrrhogaster*. If so, then wild populations of this species may be experiencing greater threat from trade than expressed by the United States LEMIS data.

In 2016, the United States of America implemented trade restrictions under the Lacey Act which prohibit the importation of 20 genera of salamanders due to the risk of introducing the deadly amphibian pathogen *Batrachochytrium salamandrivorans* (Bsal). This action included the genus *Cynops* and now prohibits all commercial importation of *C. pyrrhogaster*. All trade in this species recorded in LEMIS and described in this study occurred in 2016 and prior, except for the import of one live animal in 2017.

1.10.c. Osteopilus vastus trade summary

The Hispaniolan Giant Treefrog (*Osteopilus vastus*) is listed as Vulnerable by the IUCN Red List and its population trend is described as unknown (IUCN SSC Amphibian Specialist Group. 2022). This species is native to the Dominican Republic and Haiti. Of the 1,232 specimens of *O. vastus* traded by the United States of America, 100% were live frogs traded for commercial purposes, and of these, 100% were recorded as wild with Haiti as their country of origin (note: Haiti is not a Party to CITES). The IUCN Red List assessment describes its use and trade as follows: “It is being exported in small numbers for the pet trade in the United States of America (M. Rodriguez pers. comm. 2011),” and this appears consistent with the LEMIS trade data.

1.10.d. Atelopus varius trade summary

The Variable Harlequin Frog (*Atelopus varius*) is presently listed as Critically Endangered by the IUCN Red List and its population trend is described as unknown. (IUCN SSC Amphibian Specialist Group. 2020a). This species is native to Costa Rica and Panama. A major contributing factor to its population decline is the emerging infectious disease chytridiomycosis. Its presence in trade was described as follows in the IUCN Red List assessment: “It was collected by the thousands in

the 1970s and shipped to Germany as part of the international pet trade. It is still collected as part of the pet trade today, despite it being illegal (B. Gratwicke pers. comm. February 2017).”

The international trade in this species by the United States of America was reported to have been composed entirely of non-live animals and mostly wild animals (Figure 51). This trade primarily involved scientific specimens (362), followed by unspecified material (82), dead bodies (62), and skin pieces (46).

Although the trade in scientific specimens is often associated with purposes similarly described as scientific, the majority of trade in scientific specimens of *A. varius* (82.0%) were reportedly traded for commercial purposes. All material from *A. varius*, both from animals bred in captivity and those collected from the wild, originated in native range countries, with 99.1% sourced from Panama and the remainder from Costa Rica.

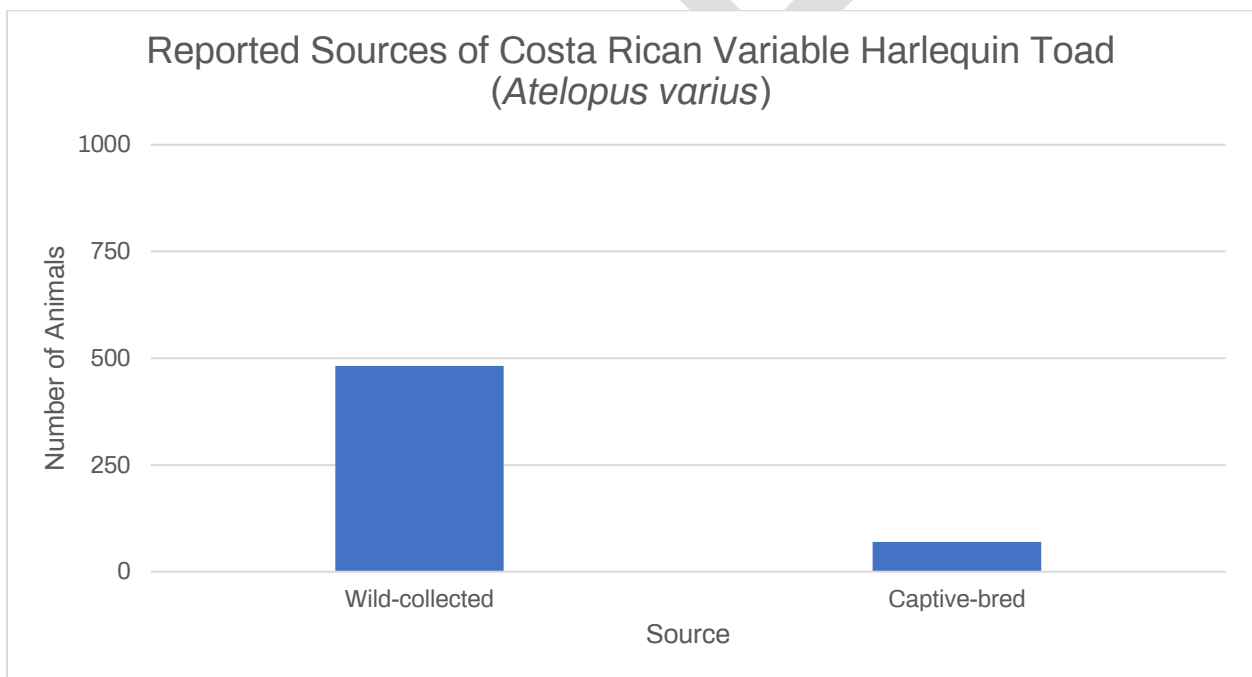


Figure 51: Reported sources of traded *Atelopus varius* recorded by the United States of America from 2015-2020.

1.10.e. *Bolitoglossa dofleini* trade summary

The Alta Verapaz Salamander (*Bolitoglossa dofleini*) is presently listed as Near Threatened by the IUCN Red List and its population trend was noted to be decreasing. (IUCN SSC Amphibian Specialist Group. 2020b). This species is native to Belize, Guatemala, and Honduras. Its presence in trade was described in this assessment as follows: “This species is found in the international pet trade. There are concerns about collection from the wild, as it does not breed until the females are 10–12 years old (J. Kolby pers. comm. March 2019). From 2004–2009, over 600 animals (only 30 of those were declared to be bred in captivity) were imported to the United States of America from all countries throughout the range of this species (J. Kolby pers. comm. March 2019).”

All traded *B. dofleini* from 2015-2020 involved live animals reportedly bred in captivity in Nicaragua and imported to the United States of America for commercial purposes. This species cannot be found in the wild in Nicaragua, but the closest population is found in neighbouring Honduras, in the north westernmost portion of the country. There appears to have been a significant shift from trade in predominantly wild-collected animals (as per 2004-2009 LEMIS data; IUCN SSC Amphibian Specialist Group, 2020) to trade in animals exclusively reported as bred in captivity (as per 2015-2020 LEMIS data). This shift occurred following the Fifteenth meeting of the Conference of the Parties (CITES CoP15) in March 2010. Leading up to CITES CoP15, two organizations (Defenders of Wildlife and the Species Survival Network) recommended that the United States of America propose *B. dofleini* for inclusion in CITES Appendix II (USFWS 2010). In their response, the US CITES Scientific Authority stated, “The international pet trade may be locally unsustainable due to slow maturation in the species (10-12 years). Between 2005 and 2008, U.S. trade data show 374 specimens, all wild-caught, imported into the United States of America from Honduras and Guatemala. The United States of America is unlikely to submit a proposal for inclusion of this species in Appendix II at CoP15 unless significant additional information is received about the species’ biological status and trade, or a range country requests our assistance.” Likely due to the absence of this additional information, and range country support, the United States of America decided not to propose *B. dofleini* for inclusion in CITES Appendix II.

It is notable that following this increased attention on the trade in wild-collected *B. dofleini* originating from Honduras and Guatemala, international trade with the United States of America appears to have entirely halted and instead became replaced by animals exported from a non-native range State with all animals declared as bred in captivity. This species has a remarkably

slow reproductive cycle in which animals require nearly 10 years before they reach sexual maturity and begin to reproduce (AmphibiaWeb. 2023). For this reason, successful captive breeding of this species is expected to be challenging and to require many years of investment before even small quantities can be produced. In the present study, trade in this species was also queried among older LEMIS data recorded from 2004-2009 and found that the 30 animals declared as captive bred had been imported to the United States of America in two shipments (10 individuals, and then 20 individuals, respectively) in late 2004 from Honduras, with all 30 captive bred animals declared as originating from Nicaragua (Eskew et al. 2020). These data suggest that efforts to produce this species in captivity might have been in development in Nicaragua for many years, but do not exclude the possibility that wild-collected animals have been collected from the wild in range countries and exported with inaccurate source and origin information.

1.11 Legal versus illegal trade among amphibian species likely threatened by trade as per Challender et al. (2023) and not CITES-listed

Among the 17 amphibian species traded by the United States of America and categorized by Challender et al. (2023) as likely to be threatened by trade but that are not CITES-listed, three species were recorded as refused clearance due to a trade violation. This involved just three (0.6%) of the 497 shipments which contained any of these 17 species. These shipments are summarized as follows:

1. In 2015, one shipment was illegally exported to Canada by air cargo for commercial purposes that contained two Pigeon Mountain salamanders (*Plethodon petraeus*). This species is listed as Vulnerable in the IUCN Red List, its population trend was described as stable, and the threat posed by trade was attributed to, “Over-collection for scientific study and possibly the illegal pet trade... the impacts of these threats is probably relatively limited.” (Hammerson 2004). These exported salamanders were recorded as “shell products”, wild-collected in Indonesia. This is a species native to a small range of distribution in the state of Georgia, within the United States of America. It is therefore uncertain which part of this illegal trade event was recorded in error: the species, country of origin, and/or the source of the wildlife.
2. In 2018, one shipment was illegally exported to Canada by air cargo for commercial purposes that contained two live Ornate horned frogs (*Ceratophrys ornata*). This species is listed as Near Threatened in the IUCN Red List, its population trend was described as decreasing, and threats posed by trade were described as, “It is also collected for the international pet trade and its eggs are sold internationally for scientific research.” (Kwet et al 2004). Kwet et al. (2004) also stated that among trade in this species, “captive

breeding is probably high.” The frogs illegally traded in this shipment were reported as bred in captivity in the United States of America.

3. In 2020, one shipment was illegally imported to the United States of America from the United Kingdom that contained material from the Mountain chicken frog (*Leptodactylus fallax*). This frog was transported within the personally accompanying baggage of an airline passenger, and it is uncertain what the part, product or live condition of this frog was because it was recorded by USFWS as “unspecified.” This species is listed as Critically Endangered in the IUCN Red List with a decreasing population trend and is native to the Caribbean islands of Dominica and Montserrat (IUCN SSC Amphibian Specialist Group 2017). The threat posed by trade is described as follows: “After the major population decline caused by chytridiomycosis in the early 2000s, a range-wide ban was put in place to stop the hunting of this species; however there may be some illegal hunting still taking place” (IUCN SSC Amphibian Specialist Group, 2017). Both the source and country of origin of the illegally imported *L. fallax* were recorded by USFWS as “unknown.”

Overall, illegal trade among this group of 17 species was observed to be minimal, based on available LEMIS data, but this does not exclude the possible presence of illegal trade activity among other shipments not identifiable based on these records alone. For instance, if some portion of trade among these species originated from countries where national laws prohibited their collection or exportation, then such imports into the United States of America may have been illegal, even if “cleared” for trade by USFWS. This type of illegal amphibian trade would fall under provisions of the Lacey Act, in which any violation of wildlife trade law in a foreign country becomes a violation of US law if those animals, parts, or products are then imported to the United States of America.

1.12 International trade in species categorized as globally threatened in the IUCN Red List

Among all 1,094 species traded by the United States of America during our study period which have also been assessed by the IUCN Red List, 22.3% (244) extant species were categorized as threatened with extinction, including 79 categorized as Vulnerable species, 68 Endangered species, and 38 Critically Endangered species (Figure 52).

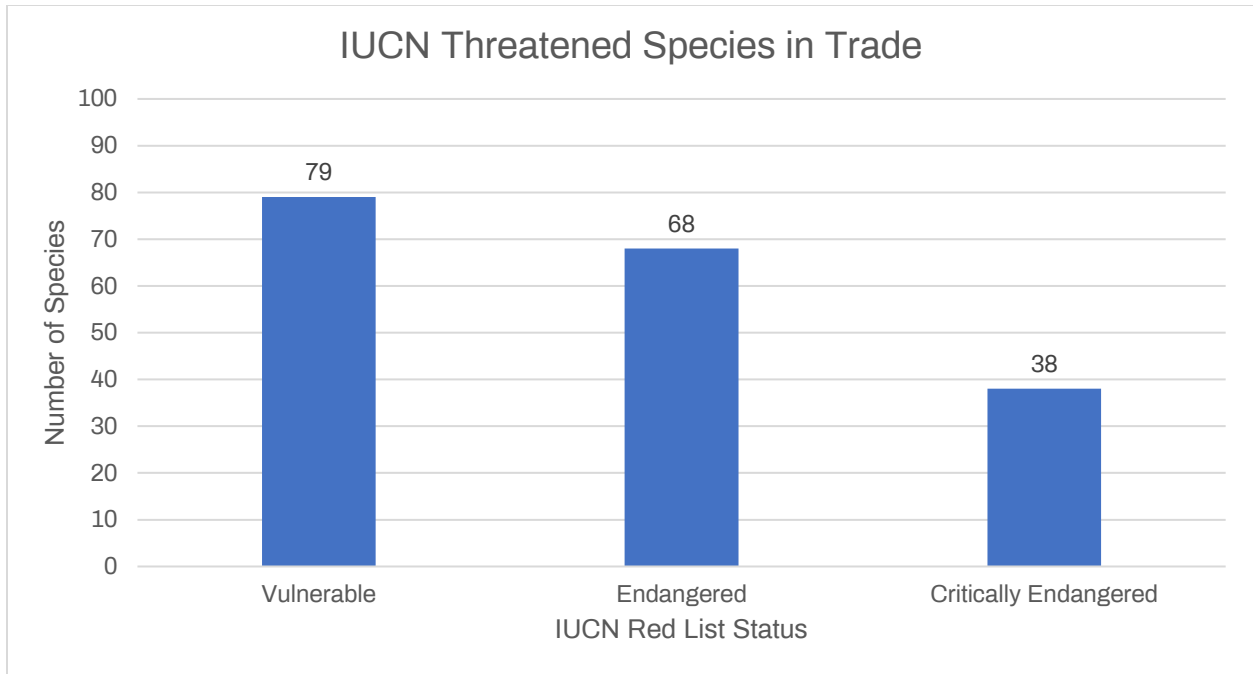


Figure 52: IUCN Red List categories of traded threatened amphibian species recorded by the United States of America from 2015-2020.

1.13 Quantities and sources of top traded threatened amphibians

Among these three groups of traded threatened amphibians, 100% of the top five traded live Critically Endangered amphibians were produced in captivity whereas the proportions of those bred in captivity lowered along with the reduction in threat categorizations: three of the top five traded live Endangered amphibians were in part collected from the wild and four of the top five traded live Vulnerable species were in part or entirely (i.e., *Theloderma bicolor*) collected from the wild (Tables 5-7). Among Vulnerable species, 100% *Osteopilus vastus* and *Hyla heilprini* were legally traded from wild populations. Legal commercial trade was recorded among 3/5 of these Critically Endangered species, and 5/5 of both top traded Endangered and Vulnerable species.

Table 5: The top 5 traded Critically Endangered amphibian species recorded in numbers of live animals by the United States of America from 2015-2020.

Scientific Name	Common Name	CITES Appendix	Number of Individuals Traded	Sources of Individuals Traded	Legal	Illegal	Number of Shipments	Any Commercial Shipments?
<i>Peltophryne lemur</i>	Puerto Rican crested toad	N/A	14,020	C	14,020	0	7	No
<i>Ambystoma mexicanum</i>	Axolotl	II	2,655	C	2,639	16	21	Yes, both were refused clearance
<i>Oophaga histrionica</i>	Harlequin poison frog	II	774	C, F	771	3	17	Yes
<i>Oophaga lehmanni</i>	Lehmann's poison frog	II	186	C, D	183	3	15	Yes
<i>Agalychnis lemur</i>	Lemur leaf frog	II	181	C, F	181	0	15	Yes

Table 6: The top 5 traded Endangered amphibian species recorded in numbers of live animals by the United States of America from 2015-2020.

Scientific Name	Common Name	CITES Appendix	Number of Individuals Traded	Sources of Individuals Traded	Legal	Illegal	Number of Shipments	Any Commercial Shipments?
<i>Mantella aurantiaca</i>	Golden mantella	II	1167	C, F, W	1,167	0	42	Yes
<i>Leptopelis vermiculatus</i>	Peacock tree frog	N/A	383	C, W	283	100	18	Yes
<i>Phyllobates terribilis</i>	Golden dart frog	II	347	C, D	347	0	22	Yes
<i>Phyllobates bicolor</i>	Black-legged poison dart frog	II	313	C, D	313	0	11	Yes
<i>Thelederma bicolor</i>	Vietnamese moss frog	N/A	281	W	281	0	26	Yes

Table 7: The top 5 traded Vulnerable amphibian species recorded in numbers of live animals by the United States of America from 2015-2020.

Scientific Name	Common Name	CITES Appendix	Number of Individuals Traded	Sources of Individuals Traded	Legal	Illegal	Number of Shipments	Any Commercial Shipments?
<i>Atelopus spumarius</i>	Pebas stubfoot toad	N/A	2249	C, W	2,249	0	81	Yes
<i>Osteopilus vastus</i>	Hispaniolan giant tree frog	N/A	1232	W	1,232	0	33	Yes
<i>Ranitomeya fantastica</i>	Red-headed poison frog	II	442	C	442	0	23	Yes
<i>Hyla heilprini</i>	Los Bracitos tree frog	N/A	353	W	353	0	18	Yes
<i>Litoria aurea</i>	Green and golden bell frog	N/A	271	C, F, W	271	0	15	Yes

1.14 Additional significant amphibian trade impacts not captured by US LEMIS trade data

1.14.a Responses to CITES Notif. 2023/101 on top traded amphibians

The questionnaire distributed through CITES Notif. 2023/101 requested information about amphibian species known to be internationally traded, even if quantified data were not also available. A summary of responses from government authorities is provided in Table 8, with added notations pertaining to IUCN Red List status, whether species are included in the CITES Appendices, and if the species was identified among the dataset of United States LEMIS records collected from 2015-2020.

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Table 8: Amphibian species present in trade noted by government respondents to the questionnaire distributed through CITES Notif. 2023/101.

Family	Scientific Name	Common Name	IUCN Status	Year of IUCN Assessment	CITES Appendix	In 2015-2020 LEMIS Data?
<i>Ambystomatidae</i>	<i>Ambystoma mavortium</i>	Western Tiger Salamander	Least Concern	2022	N/A	Yes
<i>Ambystomatidae</i>	<i>Ambystoma mexicanum</i>	Axolotl	Critically Endangered	2020	II	Yes
<i>Aromobatidae</i>	<i>Allobates femoralis</i>	Brilliant-thighed Poison Frog	Least Concern	2010	II	Yes
<i>Bombinatoridae</i>	<i>Bombina orientalis</i>	Oriental Fire-bellied Toad	Least Concern	2020	N/A	Yes
<i>Bufo</i>	<i>Nectophrynoides asperginis</i>	Kihansi Spray Toad	Extinct in the Wild	2014	I	Yes
<i>Centrolenidae</i>	<i>Cochranella granulosa</i>	Grainy Cochran Frog	Least Concern	2020	II	Yes
<i>Centrolenidae</i>	<i>Hyalinobatrachium fleischmanni</i>	Fleischmann's Glass Frog	Least Concern	2020	II	Yes
<i>Centrolenidae</i>	<i>Teratohyla pulverata</i>	Chiriqui Glass Frog	Least Concern	2020	II	Yes
<i>Dendrobatidae</i>	<i>Adelphobates galactonotus</i>	Splash-backed Poison Frog	Least Concern	2010	II	Yes
<i>Dendrobatidae</i>	<i>Ameerega berohoka</i>		Least Concern	2020*	II	No

<i>Dendrobatidae</i>	<i>Ameerega hahneli</i>		Least Concern	2010	II	Yes
<i>Dendrobatidae</i>	<i>Ameerega macero</i>	Manu Poison Frog	Least Concern	2014	II	Yes
<i>Dendrobatidae</i>	<i>Ameerega trivittata</i>	Three-striped Arrow-poison Frog	Least Concern	2008	II	Yes
<i>Dendrobatidae</i>	<i>Dendrobates auratus</i>	Green and Black Poison Frog	Least Concern	2020	II	Yes
<i>Dendrobatidae</i>	<i>Dendrobates leucomelas</i>	Yellow-banded Poison Dart Frog	Least Concern	2004	II	Yes
<i>Dendrobatidae</i>	<i>Dendrobates tinctorious</i>	Dyeing Poison Frog	Least Concern	2010	II	Yes
<i>Dendrobatidae</i>	<i>Dyscophus guineti</i>	Sambavo Tomato Frog	Least Concern	2016	II	Yes
<i>Dendrobatidae</i>	<i>Oophaga histrionica</i>	Harlequin Poison Frog	Critically Endangered	2019	II	Yes
<i>Dendrobatidae</i>	<i>Oophaga lehmanni</i>	Lehmann's Poison Frog	Critically Endangered	2019	II	Yes
<i>Dendrobatidae</i>	<i>Oophaga pumilio</i>	Strawberry Poison Frog	Least Concern	2015	II	Yes
<i>Dendrobatidae</i>	<i>Phyllobates aurotaenia</i>	Kokoe Poison Frog	Least Concern	2017	II	Yes

<i>Dendrobatidae</i>	<i>Phyllobates bicolor</i>	Black-legged Poison Dart Frog	Endangered	2017	II	Yes
<i>Dendrobatidae</i>	<i>Phyllobates terribilis</i>	Golden Poison Frog	Endangered	2017	II	Yes
<i>Dendrobatidae</i>	<i>Ranitomeya ventrimaculata</i>	Reticulated Poison Frog	Least Concern	2004	II	Yes
<i>Dicroglossidae</i>	<i>Fejervarya limnocharis</i>	Asian Grass Frog	Least Concern	2004	N/A	Yes
<i>Dicroglossidae</i>	<i>Hoplobatrachus rugulosus</i>	Asian Peters Frog	Least Concern	2022	N/A	Yes
<i>Dicroglossidae</i>	<i>Hoplobatrachus tigerinus</i>	Indian Bullfrog	Least Concern	2008	II	Yes
<i>Dicroglossidae</i>	<i>Occidozyga martensii</i>	Marten's Oriental Frog	Least Concern	2022	N/A	Yes
<i>Hylidae</i>	<i>Hyla cinerea</i>	American Green Treefrog	Least Concern	2021	N/A	Yes
<i>Hylidae</i>	<i>Smilisca phaeota</i>	New Granada Cross- banded Treefrog	Least Concern	2020	N/A	Yes
<i>Mantellidae</i>	<i>Mantella aurantiaca</i>	Golden Mantella	Endangered	2020	II	Yes

<i>Mantellidae</i>	<i>Mantella betsileo</i>	Betsileo Golden Frog	Least Concern	2017	II	Yes
<i>Mantellidae</i>	<i>Mantella nigricans</i>	Guibé's Mantella	Least Concern	2016	II	Yes
<i>Microhylidae</i>	<i>Glyphoglossus molossus</i>	Blunt-headed Burrowing Frog	Near Threatened	2021	N/A	No
<i>Myobatrachidae</i>	<i>Rheobatrachus spp.</i>	Gastric-brooding Frog	Extinct	2022	N/A	No
<i>Phyllomedusidae</i>	<i>Agalychnis callidryas</i>	Red-eyed Tree Frog	Least Concern	2020	II	Yes
<i>Pipidae</i>	<i>Hymenochirus boettgeri</i>	Zaire Clawed Frog	Least Concern	2014	N/A	Yes
<i>Pipidae</i>	<i>Hymenochirus curtipes</i>	Western Dwarf Clawed Frog	Least Concern	2013	N/A	Yes
<i>Pipidae</i>	<i>Xenopus laevis</i>	African Clawed Frog	Least Concern	2020	N/A	Yes
<i>Ranidae</i>	<i>Lithobates catesbeianus</i>	American Bullfrog	Least Concern	2020	N/A	Yes
<i>Ranidae</i>	<i>Lithobates forreri</i>	Forrer's Grass Frog	Least Concern	2020	N/A	Yes
<i>Ranidae</i>	<i>Rana pipiens</i>	Northern Leopard Frog	Least Concern	2021	N/A	Yes

<i>Ranidae</i>	<i>Rana draytonii</i>	California Red-legged Frog	Near Threatened	2022	N/A	No
<i>Salamandridae</i>	<i>Cynops orientalis</i>	Oriental Fire-bellied Newt	Least Concern	2020	N/A	Yes
<i>Telmatobiidae</i>	<i>Telmatobius culeus</i>	Titicaca Water Frog	Endangered	2019	I	Yes

*Amended version of 2014 Assessment

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Of the 45 species named, 60% are CITES-listed with 25 in CITES Appendix II and two in Appendix I. Four of these 45 species were not identified in the United States LEMIS records collected from 2015-2020.

1.14.b. Global trade in frogs for human consumption

Globally, the majority of available international trade data recorded to species level for non-CITES listed amphibians is limited to trade where the United States of America acted either as the importer or exporter. Due to the absence of similar recordkeeping outside of the United States of America, it is unknown what proportion of global amphibian trade is represented by these data alone. Although the diversity of species presented in this report likely constitutes the majority of amphibian species moving through contemporary international trade, the quantity traded by the United States of America may only represent a small fraction of the true volume of amphibians traded globally, particularly due to the industrial scale trade in frog legs for human consumption. As remarked by Auliya et al. (2023), “It is noteworthy that the large quantities of frogs’ legs of species harvested in Indonesia and eastern Europe have no sales in the USA.”

The international frog leg trade is not uniformly recorded among national-level customs statistics and when identifiable as amphibians, these shipments are described only as “frog legs” and without the names of species traded. Auliya et al. (2023) recently summarized the international frog leg trade between countries across Asia and with Europe, but similar frog farming trade activities also occur throughout Latin America. Additionally, trade with other countries/regions outside the United States of America has not been comprehensively evaluated and may also be substantial. Within our study period, 2,094,293 individual American bullfrogs (including live animals, bodies, specimens, and skins) plus 731,244.28 kilograms (including legs, meat and specimens) were collectively imported from the following western hemisphere countries of origin: Brazil, Canada, Dominican Republic, Ecuador, Mexico, and the United States of America. While most of these frogs were exported to the United States of America from the country of origin of the animals, 661,069.28 kilograms were reported as animals exported from China that were bred in captivity in the United States of America, and another 32,523 kilograms were recorded as exported from Hong Kong SAR of China, similarly bred in captivity in the United States of America.

In addition to the American bullfrogs imported from western hemisphere countries of origins, 10,450,767 individual American bullfrogs (including live animals, bodies, legs, specimens, skeletons, and unspecified material) plus 17,256,215.95 kilograms (including live animals, legs, meat) were also collectively imported from the following western hemisphere country/region of origins described in LEMIS as: China, Republic of Korea, Malaysia, Thailand, Taiwan Province of

China, and Viet Nam. International trade in frogs for human consumption is considerably greater between countries/regions outside the United States of America and this involves both farmed amphibians and significant volumes of frogs harvested from the wild (Auliya et al. 2023).

The use of incorrect scientific names among the frog leg industry further obscures the true diversity and harvest levels among traded species. For instance, a study was performed in France to investigate the species of frogs being sold at supermarkets as frozen frog legs that were imported from Indonesia (Ohler and Nicolas 2017). Sampled frog legs were exclusively labelled as *Rana macrodon* on the packaging and DNA testing revealed that only two out of the 209 frog legs (0.96%) had been correctly identified. Instead, most of these frogs (98.6%) were instead *Fejervarya cancrivora*, and one was *F. moodiei*. It is alarming that 99% of frogs exported from Indonesia and sampled in this study were incorrectly identified because Indonesia is the source of the greatest volume of frog legs exported to the European Union among all source countries, and it appears that *F. cancrivora* is the primary species traded for consumption (Auliya et al 2023).

It is uncertain whether misidentification of traded species is more often the result of human error and negligence versus intentional misrepresentation to circumvent national laws and regulations that govern amphibian trade. Further studies are needed to investigate the frequency of misidentifications, describe the actual diversity of species traded for human consumption and evaluate the impact on wild populations based on accurate trade data. While it may seem reasonable to assume that unintentional misidentification among traded frogs is limited to animals collected from the wild versus those farmed in high densities, investigations among farmed frogs to confirm proper identifications or that sources are being accurately described have not yet been performed. For instance, considerable frog farming operations in China produce American bullfrogs (*L. catesbeianus*) and Pig frogs (*R. gryllo*), but the quantity of captive bred frogs imported to the United States of America declared as *R. gryllo* was only a minuscule amount (146,282 kilograms), representing barely 1% of the amount declared as *L. catesbeianus* raised in captivity (14,473,436.08 kilograms plus 10,940 individual frogs). Because these two species are very similar in appearance, it is plausible that some of frogs declared as *L. catesbeianus* are instead *R. gryllo*, if not something else altogether, similar to the situation revealed among Indonesian frog legs by Ohler and Nicolas (2017).

In addition to the misidentification of amphibian species being traded among the frog leg trade, there is great uncertainty and a lack of tools with which to evaluate how often the sources of frogs are being correctly described as bred in captivity versus collected from the wild. New scientific tools allow for the examination of stable isotopes sampled from frog legs that can help shed light

on whether amphibians were raised under controlled conditions or were instead likely harvested from the wild. In a study performed in Germany, frog legs exported from Indonesia (with no labelled source) and Viet Nam (labelled as farmed) were sampled from grocery stores (Dittrich et al. 2017). Results showed that the two packages of frogs sampled from Viet Nam were farmed, in alignment with the packages' labels, whereas the one package of frogs sampled from Indonesia were instead wild-sourced. Unexpectedly, this study also revealed that again, species of frogs traded as frog legs were commonly mislabelled: 32 of 45 frog legs which originated from Indonesia were labelled as *Rana* [*Limnonectes*] *macrodon* but were instead *Fejervarya cancrivora*. Meanwhile, all 49 frogs sampled from Viet Nam were accurately labelled as *Hoplobatrachus rugulosus*. This is the second study to show that frogs exported from Indonesia were labelled with an incorrect scientific name. It is uncertain how commonly this is occurring and whether similar misrepresentation exists among frog legs exported from additional source countries. Additional diagnostic and monitoring studies are needed to estimate how frequently species of traded amphibians are being incorrectly labelled and reported. These errors jeopardize the likelihood of successful conservation and policy responses if developed based on inaccurate trade and harvest levels.

The misdeclaration of amphibian species and sources is not unique to the frog leg trade. In conducting the LEMIS trade analysis previously described in this report, numerous instances were identified where pet trade amphibians were declared with sources not plausible from the documented countries of origin. Either the species, sources, and/or countries of origins declared were incorrect, and this lack of accurate documentation and reporting appears to be a pervasive issue shared across the trade in amphibians globally.

1.14.c. Unintended consequences of large-scale amphibian farming

Most of the amphibians that comprise the international frog leg trade appear to involve species assessed as Least Concern in the IUCN Red List, which are primarily ranched or bred in captivity, according to available trade data. Nonetheless, despite the absence of measured negative impacts of these practices upon the species presently traded, frog farming operations serve as engines of global pathogen spread and spillover, with knock-on ecological consequences that stretch far beyond the species traded (Schloegel et al. 2009; 2010; 2012). As discussed in greater detail in report Section 3 on emerging infectious diseases, frog-farming operations create ideal opportunities for deadly amphibian pathogens like *Batrachochytrium dendrobatidis* (Bd) and ranavirus to rapidly spread between animals held in crowded conditions in the absence of strict biosecurity measures. It does not appear that biosecurity protocols to reduce the risk of pathogen introduction and spread are norms across the industry (Schloegel et al 2009), and it is unknown

whether risk mitigation at the scale necessary to sufficiently control disease spread are either scientifically or economically feasible at present. In a study where captive bred American bullfrogs were tested for the presence of pathogens upon importation to the United States of America, 58.8% of sampled frogs tested positive for the presence of Bd and 92.4% tested positive for ranavirus (Kolby 2016). Samples were only available for testing among animals exported from Taiwan, Province of China and the Dominican Republic, but similarly high detections of these pathogens have also been found among bullfrogs sampled from food markets in the United States of America (Schloegel et al. 2009) and in Hong Kong SAR of China (Kolby 2016), as well as among bullfrogs farmed in Uruguay (Mazzoni et al. 2003).

1.15 Low International Trade May Threaten Species under Intense Domestic Pressure

Levels of known international trade in amphibians are important to consider in evaluating possible areas of over exploitation, but even low levels of international trade in some species may threaten species if they are already subject to high levels of domestic use. Examples are not common among published literature, but a recent update to the Amphibian Conservation Action Plan (ACAP), draws attention to the high level of wild amphibian harvest in West and Central Africa for use in school dissections (IUCN SSC Amphibian Specialist Group, 2022). Species reported as highly affected by collection for laboratory dissection exercises include the Northern Flat-backed Toad (*Sclerophrys maculata*), the Common Toad (*S. regularis*), the African Tiger Frog (*Hoplobatrachus occipitalis*), and the Grass Frogs (*Ptychadena* spp). Among the LEMIS data examined during our present study, recorded international trade volumes in all of these species appear negligible: *Sclerophrys maculata*: 1 wild harvested specimen collected from Liberia, *S. regularis*: 40 wild harvested specimens collected from Angola, the *Hoplobatrachus occipitalis*: 131 wild harvested specimens collected from Angola, Benin, Democratic Republic of the Congo, Congo, Cameroon, Gabon, Ghana, Rwanda, Uganda, and unknown origins, and *Ptychadena* spp.: 1,231 specimens comprised of at least 20 species collected from the wild in at least 27 countries. Although these volumes of international trade with the United States of America do not themselves appear to be cause for concern, even low levels of international trade may exacerbate threats to wild populations if already highly traded domestically (IUCN SSC Amphibian Specialist Group, 2022).

The ACAP report also describes unregulated amphibian trade in Nepal, where wild amphibians are frequently collected in large quantities for use in biology class dissections, similar to practices in West and Central Africa. Four species are primarily targeted for this trade: the Tiger frog (*Hoplobatrachus tigerinus*), Jerdon's bullfrog (*H. crassus*), Terai cricket frog (*Minervarya*

teraiensis), and Skittering frog (*Euphlyctis cyanophlyctis*). From 2015 through 2020, LEMIS data show the importation of only 26 frog specimens (*Paa* sp.) which originated from the wild in Nepal suggesting the presence of minimal amphibian trade activity, but meanwhile tens of thousands of amphibians are collected annually for dissection classes in Nepal. This included approximately 14,000 bullfrogs (*H. tigerinus*) taken from the wild and dissected in high schools in eastern lowland Nepal in 2010-2012, during which time approximately 1,000 frogs were additionally being collected per night for human consumption (IUCN SSC Amphibian Specialist Group, 2022).

Exponentially higher levels of domestic trade compared to international trade has also been observed among the trade in frog legs. For instance, the export of 28–142 million frogs from Indonesia annually to supply the international frog leg trade was estimated to represent approximately only 15% of the animals harvested for domestic consumption across Indonesia (Kusrini 2005; Kusrini and Alford 2006).

These examples demonstrate the need for precautionary interpretation of low quantities of trade in species as per available international trade data (such as LEMIS or customs records) as they should not alone be presumed to indicate the absence of trade-driven threats to these species. Whether or not international trade in amphibians threatens the survival of wild populations requires many additional pieces of information, most importantly population estimates and studies of population trends, against which to evaluate the impacts of harvest levels. For most amphibian species, these data are rarely available.

Section 2: National Legislation Governing International Trade in Amphibians: Legislative Summary and Exploration of Potential and Confirmed Illegal Amphibian Trade Events

2.1 Wildlife trade regulations that either directly or indirectly govern the trade in amphibians: International responses to CITES Notif. 2023/101

These data were compiled from information provided by respondents to the questionnaire circulated in CITES Notification circulated to Parties on 18 August 2023 (No. 2023/101). The following questions were included as questions numbers 15-22:

15. Has your government/ organisation/ institution identified the amphibian species in trade?
16. Do the national laws of your country allow trade in amphibians (either amphibian-specific laws or wildlife trade laws that include amphibians)?
17. If some amphibian trade is allowed, please describe what is allowed and what is not allowed.
18. What are the laws in your country which regulate trade in amphibians? Please list the policy and/ or regulation, provide a link or citation and/or email them to oliver.tallowin@iucn.org
19. When was this law enacted?
20. Does/ Do the regulation(s) cover non-CITES listed species?
21. Which species does this law cover? Please list or describe below.
22. Which agency/ department is responsible for enforcing this law?

Please refer to Table 9 for a compilation of the laws and regulations that govern the trade in amphibians as provided by respondents. With respect to question number 20 on whether their national legislation covered trade in non-CITES listed amphibia, 84% of government respondents answered affirmatively (Figure 53).

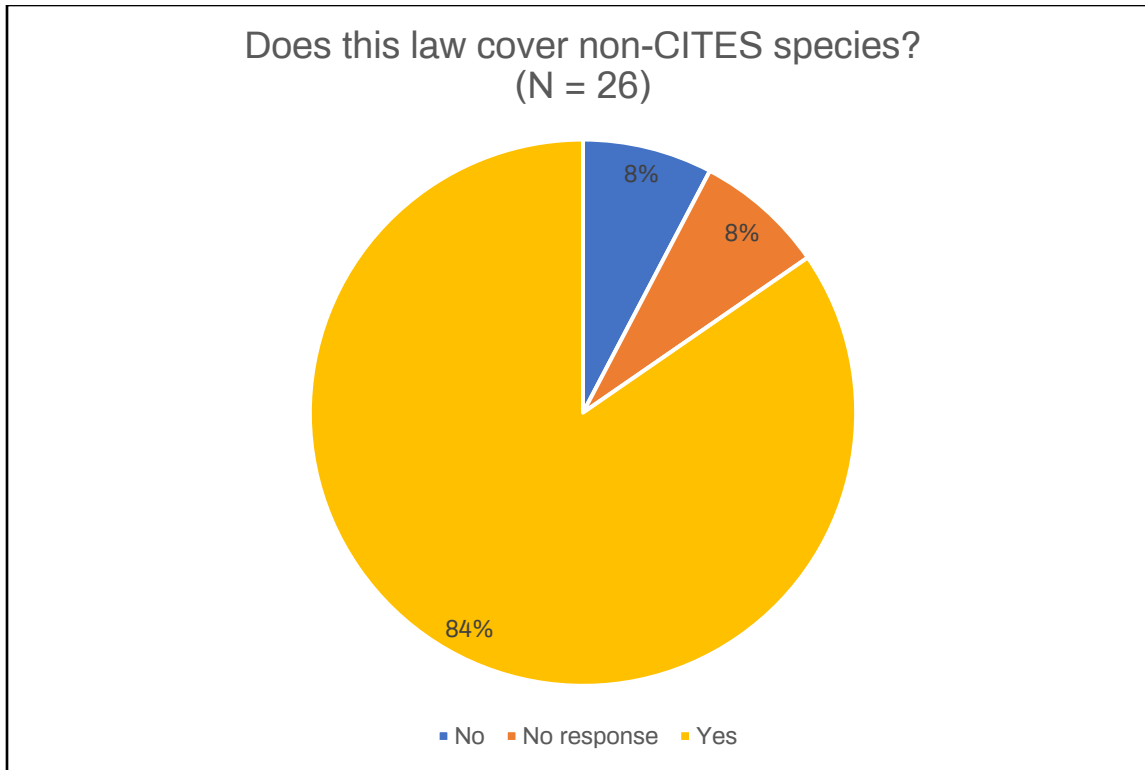


Figure 53: Government responses to Question 20 in the CITES Notification questionnaire circulated to Parties on 18 August 2023 (No. 2023/101) regarding the presence of national laws that govern amphibian trade in non-CITES listed species.

Of particular interest are also the responses to Question 15 with respect to the identification of traded amphibian species, where 64% responded affirmatively (Figure 54). The content of these responses does suggest the presence of regulation and monitoring of trade in non-CITES listed amphibians, although the associated request for data describing the trade in these species through this Notification did not result in the submission of species-specific government datasets for inclusion in this report. A plausible explanation is that some respondents may have alternatively interpreted this question as, "has your country identified the presence of amphibian species in trade", rather than "has your country identified amphibians in trade to the species level", which could mean that amphibians are generally recognized as being present in trade, but in the absence of species-level monitoring and record keeping.

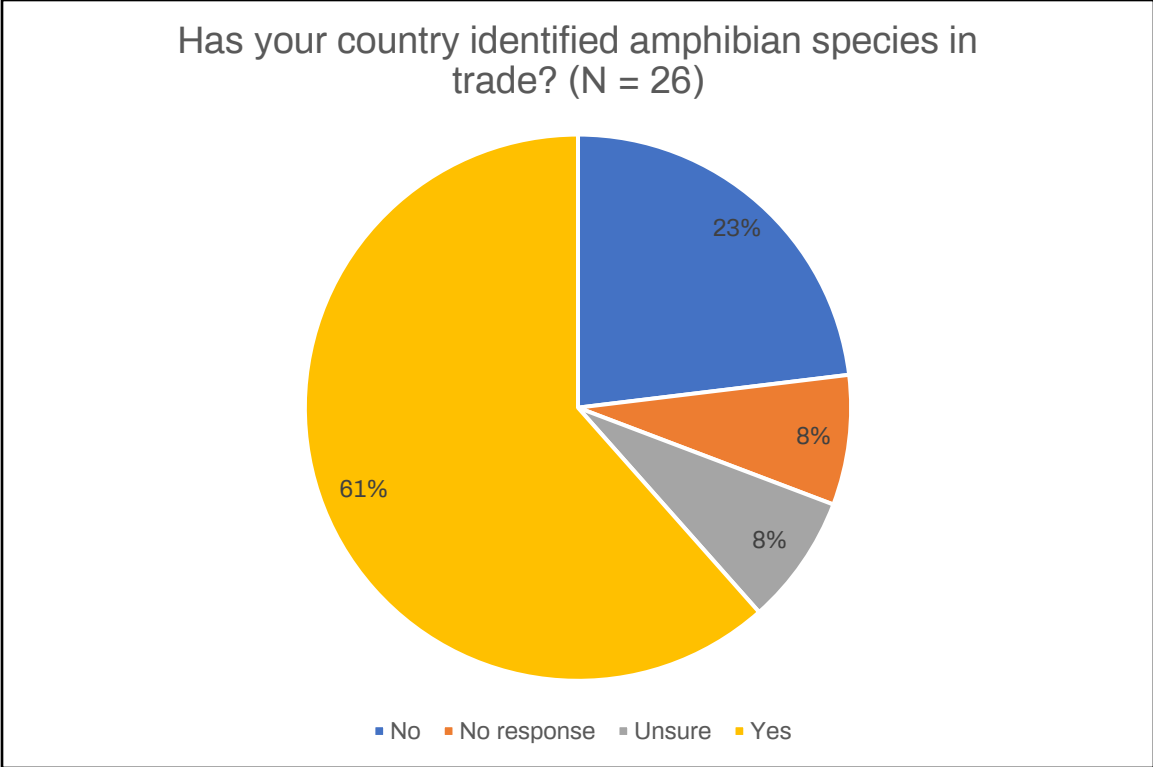


Figure 54: Government responses to Question 15 in the CITES Notification questionnaire circulated to Parties on 18 August 2023 (No. 2023/101).

The following table provides a compilation of all items of legislation relevant to the trade in amphibians as submitted by all respondents to the CITES Notif.2023/101 questionnaire (Table 9). This body of information provides a foundation for further work to explore national and global networks of amphibian trade regulatory oversight.

Table 9: Compilation of all responses to Question 18 in the CITES Notif.2023/101 questionnaire circulated to Parties on 18 August 2023: What are the laws in your country which regulate trade in amphibians?

Country/ region	National laws regulating trade in amphibians
Argentina	<p><u>The National Wildlife Conservation Law [Ley Nacional para la Conservación de la Fauna Silvestre] No. 22.421. Accessed on 4 September 2023.</u></p> <p><u>Wildlife Conservation Regulatory Decree N° 666/1997. Accessed on 4 September 2023.</u></p> <p><u>Decree No. 522/97, Regulating the provisions of Law No. 22,344, which approved the Convention on International Trade in Endangered Species of Wild Fauna and Flora. (Decreto N° 522/97, Reglamentase las disposiciones de la Ley N° 22.344). Accessed on 4 September 2023.</u></p> <p><u>Resolution No 62/1986 - Limit trade in native wildlife species (Limitase la comercialización de especies de la fauna silvestre autóctona). Accessed on 4 September 2023.</u></p> <p><u>Law No. 22.344, Approve the "Convention on International Trade in Endangered Species of Wild Fauna and Flora", signed in the city of Washington on 3 March 1973, with its Appendices and Amendments. (Ley No 22.344, Apruébase la "Convención sobre el Comercio Internacional de Especies Amenazadas de Fauna y Flora Silvestres"). Accessed on 4 September 2023.</u></p>
Brazil	<p><u>Ibama Ordinance No. 93 / 1998 of 07 July 1998 (Import and Export of Wild Fauna), (PORTARIA IBAMA nº 93 / 1998, de 07 de julho 1998 (Importação e Exportação Fauna Silvestre)). Accessed on 8 September 2023.</u></p> <p><u>Ordinance 2489 of 09 July 2019. Amends Ordinance No. 93, of 07 July 1998, which provides for the export and import of wild fauna. (Portaria 2489, de 09 de julho de 2019. Altera a Portaria nº 93, de 07 de julho de 1998, que dispõe sobre a exportação e importação da fauna silvestre). Accessed on 19 September 2023.</u></p>
Canada	<p><u>Wild Animal and Plant Trade Regulations (SOR/96-263). 2020. Accessed on 4 September 2023.</u></p> <p><u>Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act (S.C. 1992, c. 52). Accessed on 4 September 2023.</u></p> <p><u>Wildlife Act. Designation and exemption regulation. [Last amended July 1, 2022 by B.C. Reg. 157/2022]. Accessed on 13 September 2023.</u></p> <p><u>Regulations Amending the Wild Animal and Plant Trade Regulations</u></p>

Country/ region	National laws regulating trade in amphibians
	<u>P.C. 2017-505 May 12, 2017. Accessed on 13 September 2023.</u>
Colombia	<p><u>Decree-Law 1608 1974 By which the Code of Renewable Natural Resources and Environmental Protection is dictated. Accessed on 11 September 2023.</u></p> <p><u>Decree 1608 1978 Regulating the National Code of Renewable Natural Resources and Environmental Protection. Accessed on 11 September 2023.</u></p> <p><u>Law 23 of 1973 on wildlife. Accessed on 11 September 2023. Accessed on 11 September 2023.</u></p> <p><u>Law 17 1981 Approving the Convention on International Trade in Endangered Species of Wild Fauna and Flora - CITES. Accessed on 11 September 2023.</u></p> <p><u>Law 84 1989 Which adopts the National Statute for the Protection of Animals and creates some contraventions and regulates their procedure and competence. Accessed on 11 September 2023.</u></p> <p><u>Law 99 1993 Which creates the Ministry of the Environment, reorganises the Public Sector in charge of the management and conservation of the environment and renewable natural resources, organises the National Environmental System, SINA, and enacts other provisions. Regulated by National Decree 1713 of 2002, Regulated by National Decree 4688 of 2005, Partially regulated by National Decree 3600 of 2007, Regulated by National Decree 2372 of 2010. Accessed on 11 September 2023.</u></p> <p><u>Law 195 1994 By which Colombia adheres to the Convention on Biological Diversity. Accessed on 11 September 2023.</u></p> <p><u>Decree 1401 1997 Designating the Administrative Authority of Colombia to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and determining its functions. Accessed on 11 September 2023.</u></p> <p><u>Decree 1420 1997 Designating the Scientific Authorities of Colombia to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and determining their functions. Accessed on 11 September 2023.</u></p> <p><u>Decree 125 2000 Modifying Decree 1420 of 1997. Accessed on 11 September 2023.</u></p> <p><u>Decree 1909 2000 Designating sea and river ports, airports and other places for international trade in specimens of wild fauna and flora. Accessed on 11 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
	<p><u>Resolution 1317 of 2000. Accessed on 11 September 2023.</u></p> <p><u>Law 611 2000 By which norms are dictated for the sustainable management of species of wild and aquatic fauna. Accessed on 11 September 2023.</u></p> <p><u>Resolution 1317 of 2000 By which criteria are established for the granting of hunting licences for the purpose of promotion and for the establishment of zoos. Accessed on 11 September 2023.</u></p> <p><u>Resolution 1909 2018 Establishing the Single National Online Permit for the movement of specimens of biological diversity. Accessed on 11 September 2023.</u></p> <p><u>Resolution 081 2018 By which Resolution 1909 of 14 September 2017 is amended and other determinations are made". Accessed on 11 September 2023.</u></p> <p><u>Resolution 1172 2004 Establishing the National System for the Identification and Registration of Wildlife Specimens in Ex Situ Conditions. Accessed on 11 September 2023.</u></p> <p><u>Resolution 1173 2004 Regulating the National Register of Providers of Markings defined in the National System for the Identification of Wildlife Specimens in Ex Situ Conditions. Accessed on 11 September 2023.</u></p> <p><u>Resolution 1263 2006 Establishing the procedure and setting the value for issuing the permits referred to in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and issuing other provisions. Accessed on 11 September 2023.</u></p> <p><u>Law 1333 2009 Establishing the environmental sanctioning procedure and other provisions. Accessed on 11 September 2023.</u></p> <p><u>Resolution 2064 2010 By which the measures subsequent to the preventive arrest, restitution or confiscation of specimens of wild species of terrestrial and aquatic fauna and flora are regulated and other provisions are issued. Accessed on 11 September 2023.</u></p> <p><u>Decree 1076 2015 Through which the Sole Regulatory Decree of the Environment and Sustainable Development Sector is issued. Accessed on 11 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
	<p>Law 1774 2016 "Whereby the Civil Code, Law 84 of 1989 and the Criminal Code are amended. The Criminal Code. The Code of Criminal Procedure and other provisions are enacted. Accessed on 11 September 2023.</p> <p>Resolution 1912 2017 By which the list of threatened wild species of Colombian continental and coastal marine biodiversity is established. Accessed on 11 September 2023.</p>
Costa Rica	<p>Law No. 7788 of April 30, 1998, on Biodiversity (as amended up to Law No. 10133 of March 14, 2022). (Ley N° 7788, de 30 de abril de 1998, de Biodiversidad (así reformada por la Ley N° 10133 de 14 de marzo de 2022)). Accessed on 8 September 2023.</p> <p>Law No. 7788 of April 30, 1998, on Biodiversity (as amended up to Law No. 9766 of October 29, 2019). (Ley N° 7788, de 30 de abril de 1998, de Biodiversidad (así reformada por la Ley N° 9766 de 29 de octubre de 2019)). Accessed on 8 September 2023.</p> <p>Law No. 7788 of April 30, 1998, on Biodiversity (as amended by Law No. 8686 of November 21, 2008). (Ley N° 7788, de 30 de abril de 1998, de Biodiversidad (modificada por la Ley N° 8686 de 21 de noviembre de 2008)). Accessed on 8 September 2023.</p> <p>Biodiversity Law No. 7788, 1998. (Ley de Biodiversidad N° 7788). Accessed on 8 September 2023.</p> <p>Wildlife Conservation Law, No. 7317, 1998. (Ley de Conservación de la Vida Silvestre N° 7317). Accessed on 8 September 2023.</p> <p>Regulations to the Wildlife Conservation Law No. 7317 N° 40548-MINAE, 2017 (Reglamento a la Ley de Conservación de la Vida Silvestre N° 7317 N° 40548-MINAE, 2017). Accessed 8 September 2023.</p>
Cuba	<p>Official Gazette of the Republic of Cuba Ministry of Justice No. 026 Ordinary of 4 August 2011. Ministry of Science, Technology and Environment Resolution No. 160/11 (Gaceta Oficial de la Republic de Cuba Ministerio de Justicia No. 026 Ordinaria de 4 de agosto de 2011. Ministerio de Ciencia, Tecnología y Medio Ambiente Resolución No. 160/11). Accessed on 1 September 2023.</p>
Denmark	<p>European Union laws and regulations apply.</p>

Country/ region	National laws regulating trade in amphibians
European Union	<p><u>Council Regulation (EC) No 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein. Accessed 8 September 2023.</u></p> <p><u>Commission Regulation [EC] No 865/2006. Accessed 8 September 2023.</u></p> <p><u>Commission Implementing Regulation [EU] 792/2012. Accessed 8 September 2023.</u></p> <p><u>Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Accessed 8 September 2023.</u></p> <p><u>Regulation (EU) 2016/429 of the European Parliament and of the Council of 9 March 2016 on transmissible animal diseases and amending and repealing certain acts in the area of animal health ('Animal Health Law'). Accessed 8 September 2023.</u></p>
France	<p><u>European Union laws and regulations apply.</u></p> <p><u>Order of 8 October 2018 laying down general rules for the keeping of animals of non-domestic species (Arrêté du 8 octobre 2018 fixant les règles générales de détention d'animaux d'espèces non domestiques). Accessed on 1 September 2023.</u></p>
Germany	<p><u>European Union laws and regulations apply.</u></p> <p><u>Federal Nature Conservation Act of 29 July 2009 (Federal Law Gazette I p. 2542), as last amended by Article 3 of the Act of 8 December 2022. (Bundesnaturschutzgesetz vom 29. Juli 2009 (BGBl. I S. 2542), das zuletzt durch Artikel 3 des Gesetzes vom 8. Dezember 2022 geändert worden ist.). Accessed 8 September 2023.</u></p> <p><u>Federal Species Protection Ordinance of 16 February 2005 (BGBl. I p. 258; 896), as last amended by Article 10 of the Act of 21 January 2013 (BGBl. I p. 95). (Bundesartenschutzverordnung vom 16. Februar 2005 (BGBl. I S. 258; 896), die zuletzt durch Artikel 10 des Gesetzes vom 21. Januar 2013 (BGBl. I S. 95) geändert worden ist). Accessed 8 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
Hong Kong SAR of China	<p><u>Cap. 60 Import and Export Ordinance. Accessed on 21 September 2023.</u></p> <p><u>Cap. 139 Public Health (Animals and Birds) Ordinance. Accessed on 21 September 2023.</u></p> <p><u>Cap. 169 Prevention of Cruelty to Animals Ordinance. Accessed on 21 September 2023.</u></p> <p><u>Cap. 170 Wild Animals Protection Ordinance. Accessed on 21 September 2023.</u></p> <p><u>Cap. 455 Organized and Serious Crimes Ordinance. Accessed on 21 September 2023.</u></p> <p><u>Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance. Accessed on 21 September 2023.</u></p>
India	<p><u>Wild Life (Protection) Act, 1972. Accessed on 19 September 2023.</u></p> <p><u>Wild Life (Protection) Amendment Act, 2022 No 18 of 2022. Accessed on 4 September 2023.</u></p> <p><u>Biological Diversity (Amendment) Act, No. 10 of 2023. Accessed on 4 September 2023.</u></p> <p><u>Biological Diversity Rules, 2004. Accessed on 4 September 2023.</u></p>
Indonesia	<p><u>Regulation of the Minister of Forestry No. 447/Kpts-ii/2003 Concerning administration directive of harvest or capture and distribution of the specimens of wild plant and animal species. Accessed on 8 September 2023.</u></p>
Israel	<p><u>Wildlife Protection Law, 5715-1955. Accessed on 4 September 2023.</u></p> <p><u>Wildlife Protection Regulations, 1976. Accessed on 4 September 2023.</u></p> <p><u>National Parks, Nature Reserves, National Sites and Memorial Sites Law, 5758-1998. Accessed on 4 September 2023.</u></p>
Japan	<p><u>Act on Conservation of Endangered Species of Wild Fauna and Flora, Act No. 75 of June 5, 1992. Accessed on 8 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
	<p><u>Act on the Prevention of Adverse Ecological Impacts Caused by Designated Invasive Alien Species, Act No. 78 of June 2, 2004. Accessed on 8 September 2023.</u></p>
Kenya	<p><u>Wildlife Conservation and Management Act, 2013 (No. 47 of 2013). Accessed on 4 September 2023.</u></p>
Mexico	<p><u>Political Constitution of the United Mexican States. Constitution published in the Diario Oficial de la Federación on 5 February 1917. (Constitución Política de los Estados Unidos Mexicanos. Constitución publicada en el Diario Oficial de la Federación el 5 de febrero de 1917. Accessed on 8 September.</u></p> <p><u>General Law on Ecological Balance and Environmental Protection. New Law published in the Diario Oficial de la Federación on 28 January 1988. (Ley General del Equilibrio Ecológico y Protección al Ambiente. Nueva Ley publicada en el Diario Oficial de la Federación el 28 de enero de 1988.) Accessed on 8 September 2023.</u></p> <p><u>General Wildlife Law. New Law published in the Diario Oficial de la Federación on 3 July 2000. (Ley General de Vida Silvestre. Nueva Ley publicada en el Diario Oficial de la Federación el 3 de julio de 2000). Accessed on 8 September 2023.</u></p> <p><u>Regulations of the General Wildlife Law. New Regulation published in the Diario Oficial de la Federación on 30 November 2006. (Reglamento de la Ley General de Vida Silvestre. Nuevo Reglamento publicado en el Diario Oficial de la Federación el 30 de noviembre de 2006). Accessed on 8 September 2023.</u></p> <p><u>Organic Law of the Federal Public Administration. New Law published in the Diario Oficial de la Federación on 29 December 1976. (Ley Orgánica de la Administración Pública Federal. Nueva Ley publicada en el Diario Oficial de la Federación el 29 de diciembre de 1976). Accessed on 11 September 2023.</u></p> <p><u>Federal Law on Animal Health. New Law published in the Official Journal of the Federation on 25 July 2007. (Ley Federal de Sanidad Animal. Nueva Ley publicada en el Diario Oficial de la Federación el 25 de julio de 2007). Accessed on 11 September 2023.</u></p> <p><u>Rules of procedure of the Ministry of Environment and Natural Resources, 2012 (Reglamento Interior de la Secretaría de Medio Ambiente y Recursos Naturales, 2012). Accessed on 11 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
	<p><i>Mexican Official Rule NOM-059-SEMARNAT-2010, Environmental protection-Mexican native species of wild flora and fauna-Categories of risk and specifications for their inclusion, exclusion or change-List of species at risk. 2010. (NORMA Oficial Mexicana NOM-059-SEMARNAT-2010, Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo). 2010. Accessed on 11 September 2023.</i></p> <p><i>AMENDMENT of Normative Annex III, List of species at risk of the Mexican Official Standard NOM-059-SEMARNAT-2010, Environmental protection-Mexican native species of wild flora and fauna-Categories of risk and specifications for their inclusion, exclusion or change-List of species at risk, published on 30 December 2010. (MODIFICACIÓN del Anexo Normativo III, Lista de especies en riesgo de la Norma Oficial Mexicana NOM-059-SEMARNAT-2010, Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo, publicada el 30 de diciembre de 2010.). Accessed on 11 September 2023.</i></p> <p><i>AGREEMENT establishing the goods whose import and export is subject to regulation by the Ministry of the Environment and Natural Resources. 2020. (ACUERDO que establece las mercancías cuya importación y exportación está sujeta a regulación por parte de la Secretaría de Medio Ambiente y Recursos Naturales. 2010.). Accessed on 11 September 2023.</i></p> <p><i>AGREEMENT by which the notifiable exotic and endemic diseases and pests of terrestrial and aquatic animals in the United Mexican States are made known. 2018. (ACUERDO mediante el cual se dan a conocer en los Estados Unidos Mexicanos las enfermedades y plagas exóticas y endémicas de notificación obligatoria de los animales terrestres y acuáticos. 2018). Accessed on 11 September 2023.</i></p>
New Zealand	<p><i>Trade in Endangered Species Act 1989. Accessed on 8 September 2023.</i></p>
Netherlands	<p><i>European Union laws and regulations apply.</i></p> <p><i>Animals Law, 2022. (Wet dieren, 2022). Accessed 13 September 2023.</i></p> <p><i>Nature Conservation Act of 16 December 2015, laying down rules for the protection of nature. (Wet natuurbescherming van 16 december 2015, houdende regels ter bescherming van de natuur). Accessed on 13 September 2023.</i></p> <p><i>Nature Conservation Decree, 2021. (Besluit natuurbescherming, 2021.). Accessed 13 September 2023.</i></p> <p><i>Nature conservation regulations, 2023. (Regeling natuurbescherming, 2023). Accessed 13 September 2023.</i></p>

Country/ region	National laws regulating trade in amphibians
Peru	<u>Forestry and Wildlife Law No 29763. 2015. (Ley Forestal y de Fauna Silvestre Ley No 29763). Accessed on 4 September 2023.</u>
Slovakia	<p><u>European Union laws and regulations apply.</u></p> <p><u>15 THE LAW of December 2, 2004 on the protection of species of wild animals and wild plants by regulating trade with them and on the amendment of certain laws. (15 ZÁKON z 2. decembra 2004 o ochrane druhov voľne žijúcich živočíchov a voľne rastúcich rastlín reguláciou obchodu s nimi a o zmene a doplnení niektorých zákonov). Accessed on 8 September 2023.</u></p> <p><u>110 DECREE of the Ministry of the Environment of the Slovak Republic of 14 February 2005 implementing certain provisions of the Act on the Protection of Species of Wild Fauna and Flora by Regulating Trade Therein and on Amendments and Additions to Certain Acts. (110 VYHLÁŠKA, Ministerstva životného prostredia Slovenskej republiky zo 14. februára 2005, ktorou sa vykonávajú niektoré ustanovenia zákona o ochrane druhov voľne žijúcich živočíchov a voľne rastúcich rastlín reguláciou obchodu s nimi a o zmene a doplnení niektorých zákonov). Accessed on 8 September 2023.</u></p> <p><u>543, THE LAW of June 25, 2002 on nature and landscape protection. (543 ZÁKON z 25. júna 2002 o ochrane prírody a krajiny). Accessed on 8 September 2023.</u></p> <p><u>170 DECREE Ministry of the Environment of the Slovak Republic of 19 April 2021, which implements Act no. 543/2002 Coll. on nature and landscape protection, as amended (170 VYHLÁŠKA Ministerstva životného prostredia Slovenskej republiky z 19. apríla 2021, ktorou sa vykonáva zákon č. 543/2002 Z. z. o ochrane prírody a krajiny v znení neskorších predpisov). Accessed on 8 September 2023.</u></p>
Sweden	<p><u>Species Protection Ordinance (2007:845). (Artskyddsförordning (2007:845)). Accessed on 13 September 2023.</u></p> <p><u>National Board of Agriculture regulations and general advice (SJVFS 2021:13) on registration, authorisation, traceability, movement, imports and exports with regard to animal health; (Statens jordbruksverks föreskrifter och allmänna råd om registrering, godkännande, spårbarhet, förflyttning, införsel samt export med avseende på djurhälsa;). Accessed on 13 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
	<p><u>Swedish Board of Agriculture's regulation concerning conditions for keeping, breeding and selling etc. of animals intended for companionship and hobby; (SJVFS 2019:15) (Statens jordbruksverks föreskrifter och allmänna råd om villkor för hållande, uppfödning och försäljning m.m. av djur avsedda för sällskap och hobby; (SJVFS 2019:15)). Accessed on 13 September 2023.</u></p>
Switzerland	<p><u>Federal law on the Movement of Protected Species of Fauna and Flora. 2012. (Loi fédérale sur la circulation des espèces de faune et de flore protégées. (Loi sur les espèces protégées, LCITES) du 16 mars 2012 (État le 1er septembre 2023) L'Assemblée fédérale de la Confédération suisse. Accessed on 1 September 2023.</u></p> <p><u>Ordinance on the movement of protected species of fauna and flora (OCITES). 2013. Ordonnance sur la circulation des espèces de faune et de flore protégées (OCITES) du 4 septembre 2013 (État le 1er septembre 2023). Accessed on 1 September 2023.</u></p> <p><u>Federal Act on the Protection of Nature and Cultural Heritage (NCHA) 1 of 1 July 1966 (Status as of 1 January 2022). Accessed on 1 September 2023.</u></p> <p><u>Ordinance on the Protection of Nature and Cultural Heritage (NCHO) of 16 January 1991 (Status as of 1 June 2017)). Accessed on 1 September 2023.</u></p>
Thailand	<p><u>Wildlife Conservation and Protection Act, B.E. 2562 (2019). Accessed on 8 September 2023.</u></p> <p><u>Royal Ordinance on Fisheries, B.E. 2558 (2015). Accessed on 8 September 2023.</u></p> <p><u>Animal Epidemics Act B.E. 2558 (2015). Accessed on 8 September 2023.</u></p>
United Republic of Tanzania	<p><u>The Wildlife Policy of Tanzania 2007. Accessed on 1 September 2023.</u></p> <p><u>The Wildlife Conservation Act Cap. 283, 2022. Accessed on 1 September 2023.</u></p> <p><u>The Wildlife Conservation (Management of Wildlife Captive Facilities) Regulations, 2020. Accessed on 1 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
	<i>The Wildlife Conservation (Dealings in Trophies) Regulations, 1974 (G.Ns. Nos. 265 and 268). Accessed on 1 September 2023.</i>
United States of America	<i>The Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.). Accessed on 1 September 2023.</i>
Uruguay	<i>Law 9.481. Ecology. Protection of indigenous fauna. Official Gazette, July 10, 1935. Accessed on 4 September 2023.</i> <i>Decree no. 550/008. Regulation of trade and possession of endangered species of wild fauna and flora. Official Gazette, November 28, 2008. Accessed on 4 September 2023.</i>

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2.2 Potential international amphibian trade violations based on respondent information compared with LEMIS trade records

Information provided by respondents to the questionnaire distributed through CITES Notif. 2023/101 were compared to records of trade described by LEMIS data to identify potential illegal and/or unreported international trade in amphibians. Earlier in this report, illegal trade in amphibians was summarized for instances where the United States of America both identified and acted upon violations, but this only displays a landscape of regulatory compliance through the lens of the United States of America. Wildlife traded illegally between countries may incur the regulatory violation on only one side of the import-export transaction and can be challenging to perceive when not explicitly reported as trade violations. Therefore, survey responses were scanned for instances where corresponding LEMIS trade records could be identified that appeared to pose contradictions to the stated regulatory controls. Instances that might represent illegal and/or unreported transactions were then summarized (Table 10). It must be noted that the information provided in this section is not necessarily evidence of illegal activity and should be cautiously interpreted to acknowledge possible data reporting errors.

In the spirit of sharing information between importing and exporting nations where trade deemed illegal by one party is not necessarily realised by the other, these data are meant to provide opportunities for dialogue and future collaborations to better detect and control illegal amphibian trade, as appropriate. Records of illegal amphibian trade can be interpreted from a variety of perspectives, and considering these events from different angles can help support estimations of conservation impact, strengthen enforcement efforts, and better focus outreach efforts to improve wildlife trade regulatory compliance, as needed.

Table 10: Examples of possible illegal and/or unreported international amphibian trade based on responses from respondents to CITES Notif. 2023/101 compared with LEMIS data. The relevant questions from CITES Notif. 2023/101 are displayed following this table.

Respondent Country	Response Provided (Verbatim)	Anomalies Identified Among LEMIS Data
Cuba (Respondent #5)	Question 16. No amphibian trade allowed	Respondent stated that no trade in Cuban amphibians is allowed, but LEMIS records show wild-collected specimens in trade from at least two native Cuban species: <i>Peltophryne peltoccephala</i> and <i>Eleutherodactylus atkinsi</i> . At least three shipments were involved. One shipment of <i>E. atkinsi</i> was exported from Cuba to the United States of America and cleared for import and the other two shipments contained <i>P. peltoccephala</i> re-exported from the United States of America to Argentina and Brazil. All three of these shipments were declared as specimens collected from the wild for scientific purposes and may have been specially permitted.
Panama (Respondent #6)	Question 28. Captive bred (C); Animals born in captivity (F)	The respondent from Panama stated that exported amphibians only involved animals sourced from captivity, either bred or born in captivity, associated with LEMIS source codes "C" and "F". A review of LEMIS records showed the export from Panama of 14,616 amphibians collected from the wild between 2015-2020, involving a combination of live animals, bodies, scientific specimens, skin pieces, and unspecified material. This primarily involved shipments declared for scientific

		<p>purposes, but it also included 1,347 amphibians traded for commercial purposes. All commercially traded wild-collected frogs were provided clearance to enter trade by the United States of America, but 207 scientific specimens were refused clearance and re-exported to Panama. The authors also note that records in the CITES Trade Database show the export of 648 live amphibians, specimens, and bodies from wild-collected CITES listed amphibians by Panama from 2015-2020, all reported as for scientific purposes.</p>
Tanzania, United Republic of (Respondent #8)	<p>Question 53. Currently export of amphibian and other live specimens has been banned since 2016, therefore there is no legal trade of these specimens till further notice.</p>	<p>In 2016, 585 live wild-collected frogs were exported from the United Republic of Tanzania to the United States of America, as recorded in LEMIS data, but no additional trade in native amphibians was reported from 2017-2020. In 2017, one shipment said to contain 48,000 live American bullfrogs (<i>Lithobates catesbeianus</i>) was re-exported from the United Republic of Tanzania to the United States of America, which originated in Taiwan, Province of China.</p>
Israel (Respondent #9)	<p>Question 17. No export of any live amphibians is allowed. No breeding or trade in domestic species is allowed at all. All domestic amphibians are fully protected and they may not be captured, kept, or harmed in any way.</p>	<p>The respondent from Israel stated that all domestic amphibians are fully protected, and they may not be captured, kept, or harmed in any way. In 2019, one shipment was exported to the United States of America that contained 10 specimens of <i>Pelobates syriacus</i>, a species native to</p>

	<p>Imports of amphibians is very strictly restricted. Live amphibians may only be imported to universities for a research project that has been approved by the institute's Care and Use Committee in accordance with Israeli law. They must be kept indoors in closed and secure facilities, totally separated from the wild. They must be sacrificed at the end of the experiment, and they may not be released or transferred to anyone. Live amphibians may not be imported for any other purpose, and they may not be held by the public at all.</p> <p>Any projects for ex situ breeding or release of domestic species of amphibians for conservation purposes, must be approved by the Israel Nature and Parks Authority. "</p>	<p>Israel, declared as bred in captivity in Israel, and traded for scientific purposes. In total, from 2015-2020, Israel exported 2,534 amphibians to the United States of America, which involved live amphibians, specimens, and skeletons. Of these, 1,874 were live amphibians.</p>
Argentina (Respondent #13)	<p>Question 8. There is currently no national or international trade in amphibians in Argentina.</p>	<p>From 2015 through 2020, five shipments of amphibian specimens were imported from Brazil (1), Belgium (3), and Germany (1), all of which involved amphibians collected from the wild in Argentina. These data show that international trade in amphibians from Argentina does exist.</p>
Argentina (Respondent #13)	<p>Question 17. The National Law for the Conservation of Wild Fauna N° 22.421/1981 and its Regulatory Decree N° 666/1997 establish the general legal framework for the protection, conservation, propagation, repopulation and rational use of wild fauna. In a complementary manner, Resolution N° 62/1986 prohibits the export,</p>	<p>The respondent from Argentina stated that Resolution N° 62/1986 prohibits the export, commercialisation in federal jurisdiction, and interprovincial traffic of live specimens of all species of native fauna with the exception of those bred in captivity. According to the United States LEMIS data, from 2015-2020 there were 18</p>

	<p>commercialisation in federal jurisdiction, and interprovincial traffic of live specimens of all species of native fauna with the exception of those bred in captivity.</p>	<p>scientific specimens and 1 extract of amphibians collected from the wild in Argentina and re-exported to the United States of America across 11 shipments collectively exported from Germany, Belgium, Spain, and Brazil. None of these shipments were direct exports of wild-collected amphibian material from Argentina to the United States of America and all 11 were cleared to enter United States of America commerce.</p>
<p>India (Respondent #19)</p>	<p>Question 29. No export and imports are allowed in our country.</p>	<p>In 2015, one shipment reportedly containing 5,424 wild-collected <i>Rana sp.</i> was imported to the United States of America from India. It is possible that this record contained an error because the amphibians were described as shell products. It is unknown whether the description was incorrect, and this may have been a shipment of amphibians potentially illegally exported in violation of India's national legislation, or if instead it was a shipment of shell products. Although the respondent stated that no imports of amphibians into India are allowed, the US LEMIS data showed that at least 399 amphibians were exported to India for commercial purposes from 2015-2020, including 117 live <i>Xenopus laevis</i>, 130 <i>Ambystoma tigrinum</i> bodies, and 151 specimens of <i>Lithobates forreri</i> and 1 specimen of <i>Pelophylax fukiensis</i>. One shipment was also exported to India from</p>

		the United States of America for scientific purposes which included 130 <i>Ambystoma tigrinum</i> bodies and 60 <i>Necturus maculosus</i> bodies.
Costa Rica (Respondent #37)	Question 17. Extraction of amphibians from their natural habitat for commercial purposes is not allowed, only for scientific research. Export of captive-bred species is allowed, but so far no exports have been authorised, as there are no amphibian farms authorised for export. Local pet trade in any type of native or exotic amphibian is not authorised in Costa Rica either.	The respondent from Costa Rica stated that no exports of captive bred amphibians have been authorized, but the LEMIS data show the export of a shipment in 2015 that contained 80 <i>Oophaga pumilio</i> and 20 <i>Dendrobates auratus</i> declared as captive bred and imported to the United States of America for commercial purposes. This shipment was cleared to enter commerce.
United States of America (Respondent #44)	<p>Question 26. "The Lacey Act 18 USC 42, 50 CFR 16.14 prohibits the import of injurious wildlife. Since 2016, the US has included 201 salamander species as injurious in order to prevent the spread of Bsal. These species include species under the genera <i>Chioglossa</i>, <i>Cynops</i>, <i>Euproctus</i>, <i>Hydromantes</i>, <i>Hynobius</i>, <i>Ichthyosaura</i>, <i>Lissotriton</i>, <i>Neurergus</i>, <i>Notophthalmus</i>, <i>Onychodactylus</i>, <i>Paramesotriton</i>, <i>Plethodon</i>, <i>Pleurodeles</i>, <i>Salamandra</i>, <i>Salamandrella</i>, <i>Salamandrina</i>, <i>Siren</i>, <i>Taricha</i>, <i>Triturus</i>, and <i>Tylototriton</i>.</p> <p>The Lacey Act implementation regulations can be found here (https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-16) and the list of salamander species can be</p>	<p>Following implementation of this trade prohibition which took effect on January 28, 2016, the following amphibians prohibited from importation were cleared for entry: one shipment containing 18 live <i>Paramesotriton hongkongensis</i> imported from Singapore for commercial purposes and one shipment containing one live <i>Cynops pyrrhogaster</i> imported from Canada for personal use. An additional 17 shipments of amphibians prohibited from importation under this Lacey Act rule were also cleared for import during the study period, but these were declared for scientific or educational purposes and the United States of America might have chosen to issue injurious species import permits for these types of shipments. These 17 shipments involved 279 live</p>

	found here (https://www.fws.gov/node/266099)."	amphibians, 356 specimens, and 300 live eggs of species prohibited from import.
Nicaragua (Respondent #50)	Question 17. Trade in captive-bred amphibians only is allowed	Between 2015 and 2020, the following animals collected from the wild in Nicaragua were exported to the United States of America according to LEMIS data: 3,000 live amphibians, 169 specimens, and 95 units of unspecified amphibian material. All scientific specimens and unspecified material were traded for scientific purposes while 100% of live amphibians were traded for commercial purposes. Of the 3,000 live wild-collected amphibians, 2,650 were species listed in CITES Appendix II and involved <i>Agalychnis callidryas</i> , <i>Oophaga pumilio</i> and <i>Dendrobates auratus</i> .
Nicaragua (Respondent #50)	Question 28. Captive bred (C).	The respondent from Nicaragua stated that the only source of amphibians exported from the country is captive breeding, but according to LEMIS data examined, wild-collected amphibians are also exported for commercial purposes.
Nicaragua (Respondent #50)	Question 33. No.	The respondent from Nicaragua stated amphibians are not imported, but the LEMIS data show three shipments of <i>Xenopus laevis</i> exported to Nicaragua for commercial purposes. These shipments collectively contained 160 live individuals.

Key to Questions:

Question 8. If these data are available, please provide the website link in the comment box and/or email them to oliver.tallowin@iucn.org

Question 16. Do the national laws of your country allow trade in amphibians (either amphibian-specific laws or wildlife trade laws that include amphibians)?

Question 17. If some amphibian trade is allowed, please describe what is allowed and what is not allowed.

Question 26. If yes, please list the regulations or requirements and provide a link or citation.

Question 28. What is the source of amphibians exported from your country? Please select all those that apply.

Question 29. What are the most common purposes of use for amphibians exported from your country?

Question 33. Does your country import amphibians?

Question 53. Please include any additional information regarding amphibian trade in your country, or internationally, not already covered by the questions in this survey.

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2.3 Records of illegal amphibian trade among the TRAFFIC Wildlife Trade Portal

Data that capture illegal trade from a variety of sources were also explored among TRAFFIC's Wildlife Trade Portal. A query was performed on 16/10/2023 among this database that requested all incidents that involved the Class "Amphibia" and were categorised as "Organised Crime" or "Enforcement Action / Prosecution" or "Breeding / Ranching" or "Seizure" or "Poaching / Illegal Harvesting" or "Animal Injury / Mortality / Welfare" or "Smuggling / Illegal Trade (not elsewhere included)" and which took place on or between 01/01/2015 and 31/12/2020. This query produced 56 rows of data, each corresponding to a unique location and amphibian taxonomical unit. In total, 28 different taxonomic units were described, ranging from "Amphibia" with no further granularity to full species identifications (Table 11). Interestingly, those recorded as having occurred in the United States of America did not align with the LEMIS data recorded for that same period of time, likely due to lack of differentiation between illegal domestic versus international trade among WITIS, wherein LEMIS only captured those which were internationally traded.

Table 11: Global illegal trade in amphibians which took place on or between 01/01/2015 and 31/12/2020, as captured by TRAFFIC's Wildlife Trade Portal (WITIS).

Amphibian Species Recorded	Recorded Location Where Seizure Occurred and (Year of Incident)
<i>Agalychnis callidryas</i>	Mexico (2017)
<i>Ambystoma mexicanum</i>	Brazil (2019) Mexico (2018, 2018) Poland (2015)
<i>Ambystoma</i> sp.	Mexico (2018)
<i>Amphibia</i>	India (2020)
<i>Andrias davidianus</i>	China (2015, 2020) Hong Kong SAR of China (2017) United States of America (2019)
Anura	Australia (2020) China (2019) Colombia (2018) Germany (2019) Hong Kong SAR of China (2018) India (2019) Indonesia (2016) Malta (2020) Mexico (2018, 2018) Netherlands (2017) Peru (2017) Russian Federation (2018) South Africa (2016) Sweden (2018) Tanzania, United Republic of (2018) United States of America (2020, 2020) Viet Nam (2016)

<i>Ceratophrys cranwelli</i>	Mexico (2018)
<i>Ceratophrys ornata</i>	Singapore (2016) Philippines (2015)
<i>Ceratophrys</i> sp.	India (2020)
<i>Cryptobranchidae</i>	Hong Kong SAR of China (2018)
<i>Dendrobates auratus</i>	Singapore (2019)
<i>Dendrobates tinctorius</i>	Singapore (2019)
<i>Epipedobates anthonyi</i>	Singapore (2019)
<i>Leptopelis vermiculatus</i>	United Kingdom (2015)
<i>Lithobates catesbeianus</i>	Mexico (2018)
<i>Lithobates montezumae</i>	Mexico (2018)
<i>Oophaga histrionica</i>	Colombia (2018)
<i>Oophaga lehmanni</i>	Colombia (2018)
<i>Oophaga pumilio</i>	Germany (2020)
<i>Oophaga sylvatica</i>	Colombia (2018)
<i>Oophaga vicentei</i>	Germany (2020)
<i>Pelophylax nigromaculatus</i>	China (2020, 2020)
<i>Rana temporaria</i>	Belgium (2018) France (2018)
<i>Rhinella</i> sp.	Peru (2018)
<i>Salamandridae</i>	United States of America (2017, 2017)
<i>Trichobatrachus robustus</i>	Nigeria (2017)
<i>Tylotriton verrucosus</i>	China (2016)
<i>Xenopus laevis</i>	Argentina (2016)

2.4 Additional legislative implications drawn from illegal amphibian trade identified from United States LEMIS data

A closer examination of illegal amphibian trade recorded by the United States of America with higher granularity showed that the most common sector involved was the trade in amphibian bodies, primarily for commercial purposes (45,688 of 50,336 bodies). None of these illegally traded bodies were declared as species listed in the CITES appendices and all assessed species were listed as Least Concern by the IUCN Red List, with one exception of a species listed as Near Threatened: *Rhacophorus reinwardtii*.

Twenty-three bodies of *R. reinwardtii* were illegally imported from Indonesia for commercial purposes through the international postal service. Meanwhile, during the same period when 23 bodies were refused clearance, 1,249 were cleared to enter commerce also for commercial purposes, all of which were collected from the wild in Indonesia. Internet research conducted during this study found that these bodies are likely being sold as dried *R. reinwardtii* mounted in frames as wall decorations. The impact and legality of this trade in wild collected *R. reinwardtii* may warrant further exploration for compliance with Indonesian laws.

Among illegally traded amphibian bodies, the majority (71.6%) originated in Mexico and involved trade in *Lithobates forreri*, *Lithobates catesbeianus*, and *Rana pipiens* (Figure 55). This involved five shipments, where two were re-exports from the United States of America of amphibians collected from the wild in Mexico and three were imports into the United States of America of animals both collected from the wild and bred in captivity in Mexico.

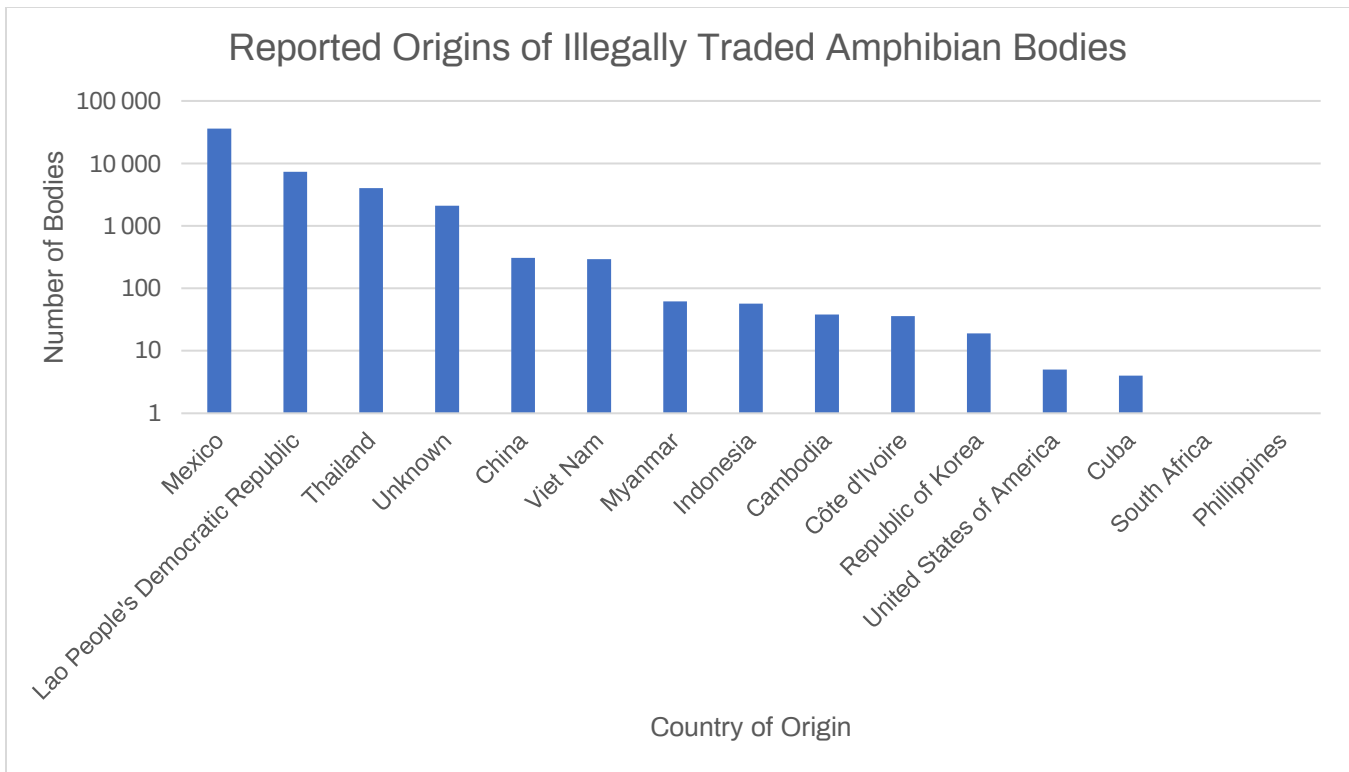


Figure 55: Recorded country /region of origin of illegally traded amphibian bodies recorded by the United States of America from 2015-2020.

As none of these species that originated in Mexico are threatened or CITES-listed, it is likely that either these shipments were imported to the United States of America in violation of Mexican law prescribing legal collection or exportation therefore triggering violation of the US Lacey Act, or they were not properly declared for import/export clearance to be granted by the United States of America, in violation of the US Endangered Species Act wildlife declaration requirements. The nuance of these violations does not inherently suggest negative conservation impact on these highly traded species, nor is there clear incentive for intentional lack of declaration of the primarily captive bred animals which were contained in these illegally traded shipments.

It is important to recognize that when interpreting records of illegal trade where contextual information is not also provided about the specific laws violated, it is not often possible to identify whether the action that triggered a violation occurred within the country of origin, export, or import. Additionally, amphibian trade violations range in nature and conservation impact from administrative (e.g. lack of payment of inspection fees) to intentional trafficking (e.g. fraudulent declaration of species prohibited from trade), and even among detailed United States LEMIS trade records, these violations cannot be differentiated due to the coarse manner of coding applied.

Section 3. Emerging Threat of Amphibian Diseases: Spread of Amphibian Pathogens Through the International Trade in Amphibians

Pathogens and parasites that negatively affect the health and survival of amphibians are easily spread through the international trade in amphibians due to the low host specificity of Bd, Bsal, and ranavirus and the high permeability of amphibian skin. These pathogens are often transmitted between animals through physical skin to skin contact, or through exposure to contaminated substrates and shipping materials. Due to the broad range of species susceptible to one or more of these pathogens, combining different amphibian species in single shipments, particularly when collected or produced from different sources, provides opportunities for pathogens to jump from species to species.

Amphibians are often shipped in high densities to reduce the cost of transport. They remain in crowded conditions for extended periods of time, taking hours, days, or weeks to pass between the exporters and importers. When animals experience stressful conditions in suboptimal environments, their immune systems can become suppressed, providing conditions that facilitate transmission of pathogens that spread through direct contact, augmenting the threat posed by these activities. For instance, if a bag containing 500 aquatic *Hymenochirus curtipes* is exported containing 10% pathogen-positive animals, these animals will shed infection particles into the small amount of water in their environment and expose the other 450 frogs to infection. Once imported, susceptible animals could then carry early-stage infections and transmit these pathogens through domestic trade or other pathways.

Infected amphibians also shed infectious particles into their surroundings. The containers of water as well as the boxes, bags, or plastic containers which carried these amphibians become vectors of pathogen dispersal when discarded without disinfection (Kolby 2016). Bd, Bsal, and ranavirus can all exist outside of a living amphibian host for extended periods of time ranging from hours to weeks and sometimes months (Johnson and Speare 2003, 2005; Miller et al. 2011). This extended persistence provides a long window of opportunity for infections to be spread if in the absence of effective biosecurity policies and procedures are not employed. For these reasons, the international trade in amphibians provides frequent and efficient avenues for emerging infectious diseases to spread both directly through infected animals and indirectly through waste materials created during the shipping process.

The three pathogens which are discussed in this review all share general characteristics that make biosecurity containment failures along international amphibian trade chains the greatest

contemporary source of continued outbreaks of infection in new regions and species. Furthermore, industrial scale breeding of amphibians is providing opportunities for formerly geographically isolated strains of these pathogens to be brought together and hybridize. Offspring strains can exhibit greater virulence than either of the parent strains (Farrer et al. 2011). Hybrid events have been observed in Brazil associated with the farming of bullfrogs for the frog leg trade (Schloegel et al. 2012). Without appropriate controls, the continued movement of amphibians carrying these deadly pathogens will undoubtedly bring rise to additional hybrid strains of global conservation concern.

Each of these three pathogens will be summarized below. For all three pathogens, the mode of spread and infection are similar in a trade environment, so it is important to consider that additional emerging infectious diseases of amphibians are likely also spreading through this same mechanism but have not yet been identified. Therefore, measures to control and reduce the spread of Bd, Bsal, and ranavirus can be expected to reduce the spread of additional unknown pathogens that likewise threaten the survival of amphibians or other wildlife.

3.1 Amphibian chytrid fungus: *Batrachochytrium dendrobatidis*

Infection with the amphibian chytrid fungus *Batrachochytrium dendrobatidis* (Bd) causes the disease chytridiomycosis among susceptible amphibians (Berger et al. 1998). This pathogen is responsible for the greatest loss of biodiversity attributed to a single pathogen in recorded history ((Scheele et al. 2019, Skerratt et al. 2007). This is because Bd exhibits extremely low host species specificity, meaning that many of the approximately 8,000 known species of amphibians are at risk of infection following exposure. Over 1000 species of amphibians have tested positive for infection with Bd and approximately 500 species have experienced decline attributed to this pathogen. Nearly 100 species have become extinct in recent history due to the ongoing Bd pandemic (Scheele et al. 2019). Amphibian chytrid fungus attacks the skin of these animals where it grows and reproduces. Upon maturity, infectious fungal spores are expelled from the surface of the skin into the environment, where the spores may infect other amphibians through direct contact, reinfect the same host animal, or contaminate soil and other substrates (Berger et al. 2005). In susceptible animals, infection with this pathogen damages the structure of the amphibians' highly permeable skin, interfering with respiration and electrolyte exchange, causing death through cardiac arrest (Voyles et al. 2009). Bd affects all species differently and sometimes populations of the same species respond with different levels of resistance to infection. However, most studied species have not demonstrated an immune response sufficient to kill Bd pathogens and entirely clear their infections.

Bd pathogens exhibit environmental persistence and may survive for weeks outside of an animal host in cool and wet conditions (Johnson and Speare 2003). Bd also infects more than just amphibians – crustaceans serve as an alternative reservoir host as Bd can infect tissue in their intestines (Brannelly et al. 2015). Fish can also become infected by Bd when their protective mucous coating has been disrupted (Liew et al. 2017). Due to these factors, even after amphibians have experienced decline in an area, amphibian chytrid fungus may remain indefinitely and infect future amphibians that recolonize an area where species have experienced extirpation. In one very specific circumstance, Bd was eradicated from a small, isolated area of the environment, but this required draining all water and applying strong chemical disinfectants, which removed not only Bd but also all beneficial organisms and microbes as well (Bosch et al. 2015). In other words, one of the greatest conservation challenges posed by Bd is that once it is introduced to a new area and becomes established in the environment, it is virtually impossible to safely eradicate this pathogen and protect amphibians in the wild.

In captivity, a variety of therapeutic treatments are available to suppress disease and prevent mortality caused by chytridiomycosis (Pessier and Mendelson 2017). Because Bd cannot survive extended exposure to temperatures above 28°C, heat can be used to reduce or cure infections if the amphibian species can tolerate these conditions- although many cannot (Woodhams et al. 2003). Alternatively, a liquid bath in diluted itraconazole is the most common treatment applied, although this antifungal medication is also sometimes harmful to certain species and life stages of amphibians (Pessier and Mendelson 2017). The skin of some amphibians is known to produce antimicrobial peptides created by symbiotic bacteria. Some experimental Bd treatments involve inoculating amphibians with these “good” anti-Bd bacteria to convey disease resistance to that individual (Kueneman et al. 2016).

Still, despite the variety of therapeutic options available, there is no universal treatment regime that protects all amphibians from this global disease event; each species must be approached on a case-by-case basis. Unfortunately, the protections afforded are often short-term and only applicable to animals being held in captivity. After animals are treated in captivity and reintroduced back into the wild, if the pathogen is still present in that environment, then the amphibian is likely to become re-exposed to Bd without a significantly higher likelihood of survival, although efforts to develop vaccine approaches continue to be explored and some progress has been made (Waddle et al. 2021). This arguably represents the greatest conservation challenge posed by the continued spread of Bd (as well as Bsal): populations of amphibians can be removed from the wild, cured and protected in captivity, but there is not yet a widely successful method available for successful reintroduction in habitats where the pathogen cannot be safely eradicated.

Amphibian chytrid fungus was first described nearly 25 years ago and was initially believed to originate in South Africa (Weldon et al. 2004). Its recent global spread was attributed to the trade in African clawed frogs (*Xenopus laevis*) which were widely used for biomedical research. At that time, it was not yet known that there are multiple strains of Bd, each of which appear to impact amphibians differently. Some strains are more virulent than others, depending on the context and species exposed (Berger et al. 2005). More recently, studies have shown that the most likely point of origin of the hyper virulent global panzootic lineage of Bd is likely Republic of Korea (O’hanlon et al. 2018). Although this strain is likely to have emerged as much as 1,000 years ago (Rosenblum et al. 2013), the global intercontinental spread does not appear to have initiated until the 21st century and is most likely attributed to globalization and the acceleration and efficiency of global international trade (Kolby 2016).

In addition to the six primary identified lineages of Bd, new strains are emerging as a result of hybridization between previously regionally isolated strains (Schloegel et al 2012; Farrer et al. 2011). While the international amphibian trade provides an effective vehicle for strains to be brought together and recombine, it appears that industrial farming of frogs for food poses the greatest risk of hybridization events occurring. Hybrid events have occurred among American bullfrog farms in Brazil and based on those data, it is likely they also occur among frog farms in Asia where pathogen strain hybridization has not yet been described. For this reason, new waves of disease are likely to continue to emerge if industrial scale frog farming continues in the absence of biosecurity measures to control and reduce the likelihood of pathogen introduction, hybridization, and spillover.

It is important to reiterate that despite their common names, “amphibian” or “frog” chytrid fungus (Bd) and “salamander” chytrid fungus (Bsal) affect many more species than their colloquial names suggest. For instance, Bsal infects frogs in addition to salamanders, and Bd not only infects frogs, but also salamanders, caecilians, crayfish, nematode worms, and fish. The majority of research published to date has focused on Bsal’s impact on salamanders and Bd’s impact on frogs. Their impact on other species, directly or indirectly, is much less explored and understood.

3.2 Salamander chytrid fungus: *Batrachochytrium salamandrivorans*

Salamander chytrid fungus (*Batrachochytrium salamandrivorans*, or “Bsal”) was first identified in 2013 following a series of dramatic mass mortality events observed among fire salamanders (*Salamandra salamandra*) in the Netherlands (Martel et al. 2013; 2014). This species of chytrid fungus appears to be less virulent to amphibians in the order Anura (frogs and toads) compared

to Bd, but it is highly virulent to amphibians in the order Urodela, which contains approximately 760 species of newts and salamanders. The processes by which Bsal infects and causes disease and mortality in salamanders mirror that of Bd, with the exception that skin lesions are often visible whereas Bd-infected amphibians infrequently show visible signs of disease. Research has shown that this pathogen most likely originated in Asia, and in very recent times, spread through the international trade in amphibians to a number of European countries including the Netherlands, Belgium, Germany, Spain and the United Kingdom (Martel et al. 2014). This phenomenon has now been linked to the decline and extirpation of fire salamanders in multiple regions, where spillover of Bsal from captive to wild amphibian populations is thought to have occurred. In other regions, such as the United Kingdom and Spain, Bsal-infected amphibians have been detected among captive populations but have not yet been detected in the wild (Fitzpatrick et al. 2018). Bsal has also not been detected among amphibians in Canada, Mexico, or the United States of America (Waddle et al. 2020).

3.3 Ranavirus

Ranaviruses are viral pathogens that are members of the genus Ranavirus, in the family Iridoviridae. Amphibians, reptiles and fish are susceptible to ranavirus infection, and in some cases the same strain of ranavirus can be transmitted across classes. For instance, ranavirus can sometimes be transmitted between fish and amphibians. Ranaviruses are globally distributed, and although their spread and spillover continue to occur through the movement of infected animals and fomites, their spread is not known to demonstrate the wave-like patterns of disease spread across the landscape observed with Bd and Bsal. As with Bd and Bsal, ranavirus is transmitted through both indirect and direct pathways, ranging from direct physical contact with other infected amphibians to exposure to contaminated water. Ranavirus demonstrates environmental persistence with the ability to survive outside of a host for weeks or longer in aquatic environments. Ranavirus is associated with dramatic amphibian mass die-offs but has not yet been linked to amphibian extinction events (Miller et al. 2011).

There are several notable differences between ranaviruses and the fungal pathogens Bd and Bsal. Where the fungal infections are transmitted exclusively through skin contact, ranavirus can also be transmitted through ingestion of infected tissue. Animals can become infected through predation or scavenging on infected carcasses (Gray et al. 2009). Amphibians that are highly susceptible to ranaviral disease and develop ranavirosis more often display visible pathological signs, including redness, swelling, and skin sores. The cause of mortality in highly diseased amphibians is often chronic cell death in multiple organs, differing from Bd and Bsal which only attack the skin of the amphibian and not their internal organs (Miller et al. 2011; Voyles et al. 2009).

Although ranaviruses can infect amphibians, reptiles, and fish, the number of susceptible species has been much less comprehensively investigated than has been done for Bd and Bsal. However, amphibians from at least 14 families and over 70 individual species are susceptible (Miller et al. 2011), and many more are likely affected. Additionally, ranaviruses isolated from high density amphibian trade supply chains such as and frog farms have been shown to express greater virulence than ranavirus samples collected from wild amphibians under natural conditions, suggesting that frog farming may be increasing the threat of ranavirus to wild amphibians globally (Claytor et al. 2017; Epstein et al. 2016; Ribeiro et al. 2019).

3.4 Pathogen detection among internationally traded amphibian shipments

The presence of amphibian pathogens among internationally traded amphibians is difficult to predict. Despite being commonly detected among amphibians within domestic trade, pathogen presence has rarely been quantified immediately upon importation, largely due to the difficulty of access to sampling. A summary of detections are presented in Table 12, where a limited number of studies were able to access and sample animals immediately upon importation. These studies illustrated several important points about pathogen dispersal by international amphibian trade: 1) Multiple pathogens are sometimes present within the same amphibian shipments, 2) Traded amphibians have been found co-infected with both Bd and ranavirus together, and 3) Amphibian pathogens known to cause amphibian declines are sometimes detected at extremely high prevalence when internationally traded amphibians are tested. Sometimes, nearly 100% of sampled amphibians tested positive for infection among certain shipments (Rowley et al. 2007, Peel et al. 2012, Kolby 2014, Kolby et al. 2014, Kolby 2016, Kolby unpublished data).

The digital version of Annex 2 provides notation of species identified in trade that are known to be susceptible to infection with either Bd, Bsal, and/or ranavirus. This is to be interpreted conservatively because many additional species susceptible to these pathogens might not yet have been tested. A lack of proven susceptibility should not be assumed to represent the absence of susceptibility.

Table 12: Summary of Bd and ranavirus detections among all amphibians sampled immediately upon importation. Species that tested pathogen-positive are listed in parentheses.

Study	Location of Importation	Pathogen-positive Species	Origin of Shipments Sampled	Cumulative Bd Prevalence Detected	Cumulative RV Prevalence Detected
Rowley et al. 2007	Hong Kong SAR of China	Chinese bullfrogs (<i>Hoplobatrachus rugulosus</i>)	Thailand	0%	Not tested
Peel et al. 2012	United Kingdom	Misc. exotics (Bd-positive: United States of America: <i>Pyxicephalus adspersus</i> , <i>Pseudacris crucifer</i> ; United Republic of Tanzania: <i>Hyperolius argus</i> , <i>H. tuberlinguis</i>)	United States of America and United Republic of Tanzania	3.7%	Not tested
Kolby 2014	United States of America	Misc. exotics (Bd-positive: <i>Heterixalus alboguttatus</i> , <i>Heterixalus Betsileo</i> , <i>Scaphiophryne spinosa</i>)	Madagascar	0.5%	62.1%
Kolby et al. 2014	United States of America	Misc. exotics (Bd-positive: <i>Bombina orientalis</i> , <i>Paramesotriton hongkongensis</i> (water positive but salamanders negative), <i>Xenopus laevis</i> ; Ranavirus-positive: <i>Bombina orientalis</i> , <i>cynops orientalis</i> , <i>Paramesotriton hongkongensis</i>)	Hong Kong SAR of China	11.7%	56.8%

Kolby (2016)	United States of America	American bullfrogs (Bd and ranavirus positive: <i>Lithobates catesbeianus</i>)	Dominican Republic	58.8%	92.4%
Kolby (2016)	United States of America	American bullfrogs (Bd-positive: <i>Lithobates catesbeianus</i>)	Taiwan, Province of China	0%	40.0%
Kolby unpublished data	Hong Kong SAR of China	Asian bullfrogs (Bd and ranavirus positive: <i>Hoplobatrachus rugulosus</i>)	Unknown origin	30.8%	34.6%

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In addition to the trade in pathogen-positive amphibians, Bd-contaminated shipping materials were also detected in these studies. One study identified contamination among 59.0% (62/105) of cardboard boxes that carried American bullfrogs into the United States of America from the Dominican Republic and another study identified contamination among 62.5% (5/8) of sampled bags of water used to carry amphibians from Hong Kong SAR of China into the United States of America (Kolby et al. 2014, Kolby 2016).

3.5 Biosecurity measures

Infection with ranavirus, Bd and Bsal are all listed under Article 1.3.4. as notifiable diseases by the World Organization for Animal Health (WOAH 2023). Biosecurity precautions are crucial to prevent continued international spread and spillover into native amphibian populations. Because these pathogens are commonly transmitted in very similar ways, largely through direct contact with infected animals or exposure to contaminated water or shipping substrates and containers, any biosecurity precautions aimed to control one is likely to control all three simultaneously.

The most basic approach to reduce and prevent the spread of pathogens is to trade only animals that have been bred in captivity, in a closed system, where everything that entered that system was pathogen-free including water, food, and the parent animals used for breeding. In lieu of a closed system, animals could be screened for infection prior to and/or following trade and treated with appropriate therapeutic methods to clear infections if detected. Unfortunately, no existing treatment can cure amphibians from ranaviral infection which occurs at high rates among frogs bred at industrial scales and traded for consumption as frog legs. Thus, while preventing the spread of Bd and Bsal in traded amphibians is more likely to be feasible among small quantities of amphibians, raising amphibians in large quantities that are also housed in high densities poses considerable challenges that have not yet been sufficiently explored and addressed. Even if frog farms were affected only by Bd or Bsal, the application of different chemical therapeutics used to clear infections might not yet be approved as safe for human consumption.

Because these pathogens are easily spread through shipping materials that can remain infectious even after the amphibians are removed, it is important to disinfect the water, cardboard boxes, plastic containers and bags, and soil or other substrates inside the containers prior to disposal. If disposed of without disinfection, then Bd, Bsal, ranavirus, and other pathogens may be released into new locations where native amphibians can become exposed. This can spark new waves of disease and amphibian declines. Resources describing the variety of available effective disinfection protocols are provided by the World Organization for Animal Health and links to these documents are provided later in this summary.

When aquatic amphibians are farmed in high densities in the absence of biosecurity measures it can negatively impact the survival of species in the wild. Although the international trade in frog legs appears to involve relatively few species of amphibians, and these are mostly species assessed as Least Concern by the IUCN Red List, the spread of pathogens caused by this activity potentially also threatens all local amphibian species (regardless of whether they themselves are traded) through discharge of infectious material.

3.6 Policies implemented to reduce the international spread of amphibian pathogens

To reduce the risk of importing amphibian pathogens, some countries have implemented trade regulations that either prohibit the importation of certain species or require permits that demonstrate risks have been mitigated as required. Based on information provided by respondents to the CITES Notification questionnaire and additional literature review, at least 11 countries plus the European Union (representing 27 nations) are reported to have enacted amphibian-specific trade regulations to control the spread of either Bd, Bsal, ranavirus, or pathogens more generally. Responses from respondents are summarized below (Figures 56-57) followed by specific regulatory information provided (Table 13). Note that some of the respondents are nations included within the European Union, but the European Union also provided their additional centralized responses.

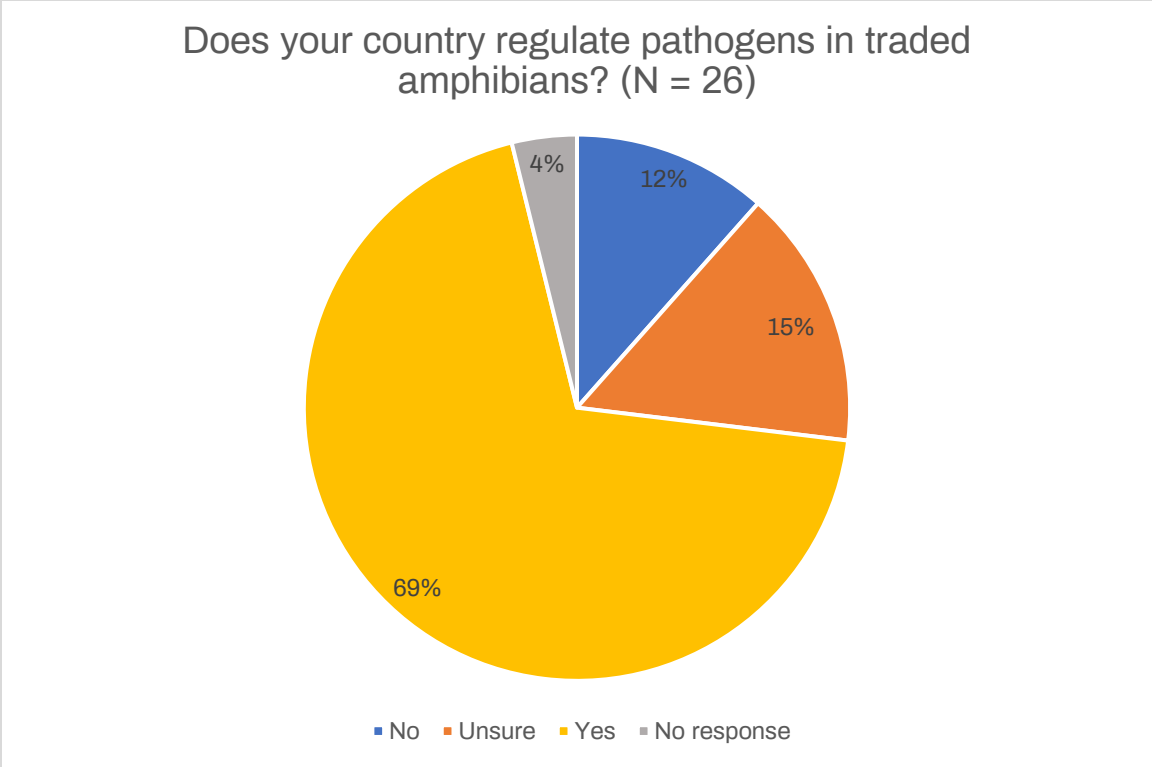


Figure 56: Government responses to Question 23 in the CITES Notification questionnaire circulated to Parties on 18 August 2023 (Notif. 2023/101).

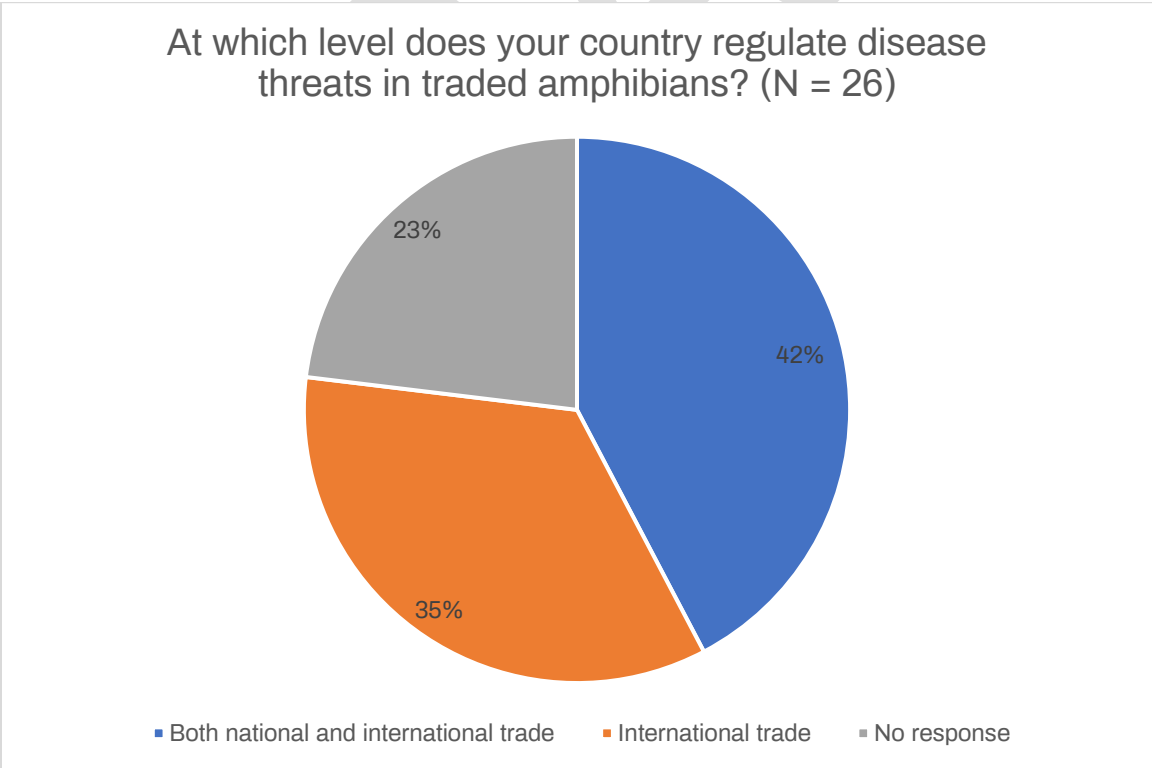


Figure 57: Government responses to Question 24 in the CITES Notification questionnaire circulated to Parties on 18 August 2023 (Notif. 2023/101).

Table 13: Summary of verbatim responses from government entities to survey question numbers 23-26 in Notif. 2023/101 regarding the control of amphibian pathogens among traded amphibians.

Respondent	Does your country regulate pathogens in traded amphibians?	At what level does your country regulate pathogens in traded amphibians?	What pathogens does your country regulate?	What laws provide authority for regulation?
Switzerland	Yes	International trade	<i>Batrachochytrium dendrobatidis</i>	Ordonnance réglant les échanges d'importation, de transit et d'exportation d'animaux et de produits animaux avec les pays tiers (OITE-PT)
Cuba	No	No response	No response	No response
Panama	Yes	International trade	Unspecified pathogens	Resolución N° DM-0657-2016
Tanzania, Republic of	Yes	International trade	Unspecified pathogens	The Wildlife Conservation Act
Israel	Yes	Both national and international trade	Unspecified pathogens	No response
Uruguay	No	International trade	Unspecified pathogens	No response
Argentina	Yes	International trade	<i>Aeromonas hydrophila</i> , <i>Batrachochytrium dendrobatidis</i> , Ranavirus, <i>Mycobacterium marinum</i>	Resolución 388/2008
Japan	Unsure	No response	No response	No response
Thailand	Yes	International trade	Ranavirus	WOAH Chapter 2.1.3 Infection with Ranavirus
Slovakia	Yes	International trade	All diseases transmitted by amphibians	No response
New Zealand	No	No response	No Response	No response
Sweden	Yes	Both national and international trade	Unspecified pathogens	SJVFS 2021:13

Netherlands	Yes	International trade	Ranavirus, <i>Batrachochytrium dendrobatidis</i> , <i>Batrachochytrium salamandrivorans</i>	Health certificate for the entry of reptiles and amphibians into the EU destined for the Netherlands
Germany	Yes	Both national and international trade	Not applicable	Regulation (EU) 2016/429
Costa Rica	Yes	Both national and international trade	Unspecified pathogens	Ley General del Servicio Nacional de Salud Animal N° 8495
Mexico	Yes	Both national and international trade	All disease listed by OMSA	Acuerdo mediante el cual se dan a conocer en los Estados Unidos Mexicanos las enfermedades y plagas exóticas y endémicas de notificación obligatoria de los animales terrestres y acuáticos.
Colombia	Unsure	No response	No response	No response
United Kingdom	No response	No response	No response	No response
United States of America	Yes	International trade	<i>Batrachochytrium dendrobatidis</i> , <i>Batrachochytrium salamandrivorans</i>	The Lacey Act 18 USC 42, 50 CFR 16.14
India	Yes	Both national and international trade	No response	Animal Quarantine & Certification Services" (AQCS)
Brazil	Unsure	Both national and international trade	No response	No response
European Union	Yes	Both national and international trade	<i>Batrachochytrium salamandrivorans</i>	Decision (EU) 2021/361
Austria	Yes	Both national and international trade	<i>Batrachochytrium salamandrivorans</i>	Decision (EU) 2021/362
Czech Republic	Yes	Both national and international trade	<i>Batrachochytrium salamandrivorans</i>	Decision (EU) 2021/363

Italy	Yes	Both national and international trade	<i>Batrachochytrium salamandrivorans</i>	Decision (EU) 2021/364
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Additional country-specific regulatory contexts identified:

United States of America: In 2016, the US Fish & Wildlife Service published an interim rule that added 20 genera of salamanders (including all species within those genera; approximately 200 species) to the list of injurious amphibians at 50 CFR 16.14, but no species are currently restricted from trade for being susceptible to or infected with *Batrachochytrium dendrobatidis*.

Canada: In 2017, through an amendment to the Wild Animal and Plant Trade Regulations (WAPTR), Canada enacted an import restriction on all salamander species within the order Caudata.

3.7 Amphibian Import Regulations to Mitigate Disease Risks: Observations and Remarks

Twenty years of Bd research, together with the acknowledgement of catastrophic amphibian declines associated with its uncontrolled spread, have paved the way for countries to more rapidly implement international trade restrictions to tackle the emerging threat of Bsal compared to responses to control the spread of Bd and ranavirus, which remain largely unmitigated globally. Bd is already found in wild amphibian populations across dozens of countries which seems to have generated a counterproductive sentiment that effective control measures are no longer necessary or likely to achieve success at this later stage of pandemic. In contrast, extensive survey efforts suggest Bsal remains absent from certain amphibian diversity hotspots such as the United States of America. Unfortunately, a growing body of scientific research is showing that the continued mixing of regional Bd strains, together with industrial scale frog farming, are setting the stage for new waves of disease.

Still, despite relatively swift policy responses to the threat of Bsal following its discovery, no present trade policy acknowledges the expanded range of species now known to be susceptible to infection with Bsal, initially thought to be a pathogen exclusive to salamanders but now proven to stretch beyond Caudata. Research shows that frogs and toads among at least four anuran genera (e.g. *Alytes*, *Bombina*, *Hyla*, and *Rana*) can also become infected and spread this pathogen (Stegen et al. 2017, Nguyen et al. 2017, Gray et al. 2023, Schulz et al. 2020). No countries have yet specifically restricted trade in anurans for their ability to spread Bsal. Current import restrictions only target salamanders to control this pathogen.

A decade after the initial identification and response to Bd, researchers discovered crustaceans were also susceptible to infection and could play a role in disease transmission (Brannelly et al.

2015). Rapidly expanding knowledge about emerging infectious diseases of amphibians means that effective trade policies must remain flexible and able to be adapted to keep pace with the evolving scientific information.

Much more research is needed to develop both the scientific and legal infrastructures for safe trade in pathogen-free amphibians internationally. Although this may be feasible in theory, actual trade behaviors introduce considerable economic and public health challenges that make this a lofty goal. For instance, one of the simplest things to reduce pathogen transmission is to house, breed, and ship amphibians in low densities, so that if an animal becomes infected it is compartmentalized and can only physically spread infection to those held in the same enclosure. When amphibians are shipped, they are often packed in the highest densities possible to reduce the costs of transport, and it is not uncommon for hundreds or thousands to be held in the same primary enclosures. Under these conditions, animals exported from sources with low pathogen prevalence can arrive at their destinations with recently acquired infections at much higher prevalence. Accordingly, creating policies to foster pathogen-free amphibian trade requires pathogen control efforts not only at the sources of production or harvest, but that are also integrated into the methods by which amphibians are consolidated and transported internationally.

Testing and treatment of amphibians prior to export to reduce the global spread of pathogens appears to be a practice in some, but not all countries, where amphibians are traded in high volumes. Many frameworks already exist to control and mitigate the spread of pathogens, for instance, certain plant export phytosanitary permits are issued following required treatment protocols and are required upon importation (Yeager et al. 2020) and studying these programs could help inform the development of safer trade practices within the trade in amphibians.

3.8 Additional Resources that Include Pathogen Testing and Disinfection Protocols

[World Organisation for Animal Health: Chapter 2.1.3. Infection with Ranavirus](#)

[World Organisation for Animal Health: Chapter 2.1.1. Infection with *Batrachochytrium dendrooatidis*](#)

[World Organisation for Animal Health: Chapter 2.1.3. Infection with *Batrachochytrium salamandrivorans*](#)

Concluding Remarks

Amphibians face a wide range of pressures affecting the long-term viability of populations across the globe. Wildlife trade, both domestic and international, represents a subset of these pressures that includes direct threats (e.g., harvesting animals for the trade in pets and food) and indirect threats (e.g. insufficient amphibian trade biosecurity practices that facilitate spread and spillover of harmful pathogens into the environment).

Overall, Section 1 of this review suggested that the most voluminous trade in amphibians predominantly affects species considered to be at lower levels of conservation risk, clustered within specific industries. However, many species, although traded at lower volumes internationally, might not be able to weather the pressures of commercialization. This may be compounded when combined with pressures such as climate change, invasive species, emerging infectious pathogens, or habitat degradation. Additionally, examination of international amphibian trade data showed a lack of standardization and questionable scientific accuracy, illustrated by an abundance of records of trade in species reportedly collected from the wild in places where populations do not appear to exist.

Section 2 outlined concerns expressed by parties regarding select species in trade and presented legislation governing the regulation of amphibian trade as provided by respondents to Notif. 2023/101. Despite their importance, amphibian species-specific legislative tools were not found to be widespread among the Parties, despite the abundance of more general wildlife trade legislation. Clarifying how these regulatory provisions can ensure legal and sustainable amphibian trade could illuminate potential key areas on which to focus for improvement. This section also provided a summary of recent illegal amphibian trade events and explored the presence of potential legislative infractions by interpreting United States of America wildlife trade data through the lens of regulatory information provided by various trading partners.

Finally, Section 3 reviewed available information on three major pathogens threatening amphibians worldwide and the role of international wildlife trade in facilitating their spread and spillover. The literature indicated that trade facilitates the movement of fomites just as easily as it does potentially infected amphibians themselves. Improved biosecurity containment, both along the international wildlife trade chain and among domestic amphibian production chains (such as farms that breed frogs for the trade in frog legs) must be considered to effectively reduce opportunities for continued pathogen transmission and pathogen hybridization events that may bring about increased threats to global amphibian populations. This section also provided a

summary of legislation governing the control of pathogens provided by government respondents to the questionnaire in Notif. 2023/101.

Cumulatively, this report provides a foundation upon which Parties can further explore the complex and multifaceted threats wildlife trade poses to amphibian species. Additional topics of interest drawn from this report for potential consideration and discussion at an amphibian trade workshop have also been provided (Annex 3). Many unknowns remain to be explored, but the information provided herein will help to develop a series of appropriate actions to better monitor the trade in amphibians, evaluate its impacts, and ensure the perpetuity of this globally threatened yet often overlooked taxon.

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References

- AmphibiaWeb. 2023. <<https://amphibiaweb.org>> University of California, Berkeley, CA, USA. Accessed 21 Oct 2023.
- Auliya M, Altherr S, Nithart C, Hughes A, Bickford D (2023) Numerous uncertainties in the multifaceted global trade in frogs' legs with the EU as the major consumer. *Nature Conservation*, 51: 71–135. <https://doi.org/10.3897/natureconservation.51.93868>
- Berger L, Hyatt AD, Speare R, Longcore JE. (1999) Life cycle stages of *Batrachochytrium dendrobatidis*, the amphibian chytrid. *Diseases of Aquatic Organisms*, 2005; 68:51-63. DOI: 10.3354/dao068051
- Berger L, Speare R, Daszak P, Green DE, Cunningham AA, Goggin CL, Slocombe R, Ragan MA, Hyatt AD, McDonald KR, Hines HB, Lips KR, Marantelli G, Parkes H (1998) Chytridiomycosis causes amphibian mortality associated with population declines in the rain forests of Australia and Central America. *Proceedings of the National Academy of Science, USA* 1998;95: 9031-9036.
- Bosch J, Sanchez-Tomé E, Fernández-Loras A, Oliver JA, Fisher MC, Garner TW (2015) Successful elimination of a lethal wildlife infectious disease in nature. *Biology Letters*, 2015 Nov;11(11):20150874. doi: 10.1098/rsbl.2015.0874
- Brannelly LA, McMahon TA, Hinton M, Lenger D, Richards-Zawacki C L (2015) *Batrachochytrium dendrobatidis* in natural and farmed Louisiana crayfish populations: prevalence and implications. *Disease of Aquatic Organisms*, 112(3), 229–235. <https://doi.org/10.3354/dao02817>
- Challender DWS, Cremona PJ, Malsch K *et al.* (2023) Identifying species likely threatened by international trade on the IUCN Red List can inform CITES trade measures. *Nature Ecology & Evolution*, 7, 1211–1220 (2023). <https://doi.org/10.1038/s41559-023-02115-8>
- CITES (2023) *How CITES works*. <https://cites.org/eng/disc/how.php> <Accessed 25 October 2023>
- CITES (2023) *The CITES species*. Available from: <https://cites.org/eng/disc/species.php> <Accessed 22 October 2023>
- Clayton SC, Subramaniam K, Landrau-Giovanetti N, Chinchar VG, Gray MJ, Miller DL, Mavian C, Salemi M, Wisely S, Waltzek, TB (2017) Ranavirus phylogenomics: Signatures of recombination and inversions among bullfrog ranaculture isolates. *Virology*, 511, 330–343. <https://doi.org/10.1016/j.virol.2017.07.028>
- Connelly PJ, Ross N, Stringham OC, Eskew EA (2023) United States amphibian imports pose a disease risk to salamanders despite Lacey Act regulations. *Communications Earth & Environment*, 4, 351 (2023). <https://doi.org/10.1038/s43247-023-01004-z>
- Cunningham AA, Turvey ST, Zhou F, Meredith HM, Guan W, Liu X, Sun C, Wang Z, Wu M. (2016). Development of the Chinese giant salamander *Andrias davidianus* farming industry in Shaanxi Province, China: conservation threats and opportunities. *Oryx*, 50(2): 265-273.
- Dittrich C, Struck U, Rödel MO (2017) Stable isotope analyses — A method to distinguish intensively farmed from wild frogs. *Ecology and Evolution*, 7(8): 2525–2534. <https://doi.org/10.1002/ece3.2878>
- Eskew EA, White AM, Ross N, Smith KM *et al.* (2020) United States wildlife and wildlife product imports from 2000-2014 [Supplementary Material]. *Scientific Data*, 7, 22 (2020). <https://doi.org/10.1038/s41597-020-0354-5>
- Fitzpatrick, LD, Pasmans F, Martel A, Cunningham AA (2018) Epidemiological tracing of *Batrachochytrium salamandrivorans* identifies widespread infection and associated mortalities in private amphibian collections. *Scientific reports*, 8(1), 13845. <https://doi.org/10.1038/s41598-018-31800-z>
- Gray, MJ *et al.* (2023) Broad host susceptibility of North American amphibian species to *Batrachochytrium salamandrivorans* suggests high invasion potential and biodiversity risk. *Nature Communications*, 14, 3270 (2023).

- Hughes AC, Marshall BM, Strine CT (2021) Gaps in global wildlife trade monitoring leave amphibians vulnerable. *eLife*, 10: e70086. <https://doi.org/10.7554/eLife.70086>
- IUCN SSC Amphibian Specialist Group (2013) *Hymenochirus curtipes*. The IUCN Red List of Threatened Species 2013: e.T58156A18396876. <https://dx.doi.org/10.2305/IUCN.UK.2013-2.RLTS.T58156A18396876.en>. <Accessed on 31 October 2023>
- IUCN SSC Amphibian Specialist Group (2014) *Hymenochirus boettgeri*. The IUCN Red List of Threatened Species 2014: e.T58154A18396612. <https://dx.doi.org/10.2305/IUCN.UK.2014-3.RLTS.T58154A18396612.en>. <Accessed on 21 October 2023>
- IUCN SSC Amphibian Specialist Group (2017) *Leptodactylus fallax*. The IUCN Red List of Threatened Species 2017: e.T57125A3055585. <https://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T57125A3055585.en>. <Accessed on 31 October 2023>
- IUCN SSC Amphibian Specialist Group (2020a) *Atelopus varius*. The IUCN Red List of Threatened Species 2020: e.T54560A3016252. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T54560A3016252.en>. <Accessed on 23 October 2023>
- IUCN SSC Amphibian Specialist Group (2020b) *Bolitoglossa dofleini*. The IUCN Red List of Threatened Species 2020: e.T59156A54374321. <https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T59156A54374321.en>. <Accessed on 23 October 2023>
- IUCN SSC Amphibian Specialist Group (2020c) *Xenopus laevis*. The IUCN Red List of Threatened Species 2020: e.T110466172A3066881. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T110466172A3066881.en>. <Accessed on 28 October 2023>
- IUCN SSC Amphibian Specialist Group (2021) *Cynops pyrrhogaster*. The IUCN Red List of Threatened Species 2021: e.T59444A177224976. <https://dx.doi.org/10.2305/IUCN.UK.2021-1.RLTS.T59444A177224976.en>. <Accessed on 23 October 2023>
- IUCN SSC Amphibian Specialist Group (2022a) The Amphibian Conservation Action Plan (ACAP): A status review and roadmap for global amphibian conservation. <https://ecoevorxiv.org/brfas/>. Preprint. DOI: 10.32942/osf.io/brfas
- IUCN SSC Amphibian Specialist Group (2022b) *Osteopilus vastus*. The IUCN Red List of Threatened Species 2022: e.T54346A172794001. <https://dx.doi.org/10.2305/IUCN.UK.2022-1.RLTS.T54346A172794001.en>. <Accessed on 21 October 2023>
- IUCN SSC Amphibian Specialist Group (2022c) *Rhacophorus reinwardtii*. The IUCN Red List of Threatened Species 2022: e.T48109368A3075656. <https://dx.doi.org/10.2305/IUCN.UK.2022-2.RLTS.T48109368A3075656.en>. <Accessed on 22 October 2023>
- IUCN (2023). The IUCN Red List of Threatened Species. Version 2022-2. <https://www.iucnredlist.org> <Accessed 10 October 2023>
- Johnson M, Speare R (2003) Survival of *Batrachochytrium dendrobatidis* in water: quarantine and control implications. *Emerging Infectious Diseases*, 2003;9(8):922-925.
- Johnson M, Speare R (2005) Possible modes of dissemination of the amphibian chytrid *Batrachochytrium dendrobatidis* in the environment. *Diseases of Aquatic Organisms* 2005;65:181-186.
- Kolby JE. (2014) Presence of the amphibian chytrid fungus *Batrachochytrium dendrobatidis* in native amphibians exported from Madagascar. *PLoS One* 9:e89660. doi:10.1371/journal.pone.0089660.
- Kolby, JE (2016) Pathways of amphibian chytrid fungus dispersal: global biosecurity and conservation implications. PhD thesis, James Cook University.

- Kolby JE, Smith KM, Berger L, Karesh WB, Preston A, Pessier AP, Skerratt LF (2014) First evidence of amphibian chytrid fungus (*Batrachochytrium dendrobatidis*) and ranavirus in Hong Kong amphibian trade. *PLoS One* 9:e90750. doi:10.1371/journal.pone.0090750
- Kueneman JG, Woodhams DC, Harris R, Archer HM, Knight R, McKenzie VJ (2016) Probiotic treatment restores protection against lethal fungal infection lost during amphibian captivity. *Proceedings of the Royal Society Biological Sciences*. 2016 Sep 28;283(1839):20161553. doi: 10.1098/rspb.2016.1553
- Kusrini M (2005) Edible frog harvesting in Indonesia: Evaluating its impact and ecological context. PhD thesis, School of Tropical Biology, James Cook University, Australia.
- Kusrini MD, Alford RA (2006) Indonesia's exports of frogs' legs. *Traffic Bulletin* 21: 14–24. https://www.traffic.org/site/assets/files/2978/traffic_publication_21_1.pdf <Accessed 20 October 2023>
- Kwet A, Skuk G, Silvano D, Lavilla E, di Tada I, Lajmanovich R (2004) *Ceratophrys ornata*. The IUCN Red List of Threatened Species 2004: e.T56340A11464790. <https://dx.doi.org/10.2305/IUCN.UK.2004.RLTS.T56340A11464790.en>. <Accessed on 21 October 2023>
- Liew N, Mazon Moya M, Wierzbicki C. *et al.* (2017) Chytrid fungus infection in zebrafish demonstrates that the pathogen can parasitize non-amphibian vertebrate hosts. *Nature Communications*, **8**, 15048 (2017). <https://doi.org/10.1038/ncomms15048>
- Luedtke JA, Chanson J, Neam K *et al.* (2023) Ongoing declines for the world's amphibians in the face of emerging threats. *Nature* 622, 308–314 (2023). <https://doi.org/10.1038/s41586-023-06578-4>
- Martel A, Blooi M, Adriaensen C, van Rooij P, Beukema W, Fisher MC, Farrer RA, Schmidt BR, Tobler U, Goka K, Lips KR, Muletz C, Zamudio KR, Bosch J, Lötters S, Wombwell E, Garner TWJ, Cunningham AA, Spitzen-van der Sluijs A, Salvidio S, Ducatelle R, Nishikawa K, Nguyen TT, Kolby JE, van Bocxlaer I, Bossuyt F, Pasmans F (2014) Recent introduction of a chytrid fungus endangers Western Palearctic salamanders. *Science*, 346(6209): 630–631. <https://doi.org/10.1126/science.1258268>
- Martel A, Spitzen-van der Sluijs A, Blooi M, Bert W, Ducatelle R, Fisher MC, Woeltjes A, Bosman W, Chiers K, Bossuyt F, Pasmans F (2013) *Batrachochytrium salamandrivorans* sp. nov. causes lethal chytridiomycosis in amphibians. *Proceedings of the National Academy of Sciences of the United States of America*, 110(38): 15325–15329. <https://doi.org/10.1073/pnas.1307356110>
- Mazzoni R, Cunningham AA, Daszak P, Apolo A, Perdomo E, Speranza G (2003) Emerging pathogen of wild amphibians in frogs (*Rana catesbeiana*) farmed for international trade. *Emerging Infectious Diseases*, 9(8): 995–998. <https://doi.org/10.3201/eid0908.030030>
- Miller D, Gray M, Storfer A (2011) Ecopathology of Ranaviruses Infecting Amphibians. *Viruses*, 3(11): 2351–2373. <https://doi.org/10.3390/v3112351>
- Mohanty NP, Measey J (2019) The global pet trade in amphibians: species traits, taxonomic Bias, and future directions. *Biodiversity and Conservation*, 28:3915–3923. <https://doi.org/10.1007/s10531-019-01857-x>
- Nguyen, TT, Nguyen TV, Ziegler T, Pasmans F, Martel A (2017) Trade in wild anurans vectors the urodelan pathogen *Batrachochytrium salamandrivorans* into Europe. *Amphibia-Reptilia*. 38, 554–556 (2017).
- O'Hanlon, SJ *et al.* (2018) Recent Asian origin of chytrid fungi causing global amphibian declines. *Science* 360, 621–627(2018). DOI:10.1126/science.aar1965
- Ohler A, Nicolas V (2017) Which frog's legs do froggies eat? The use of DNA barcoding for identification of deep-frozen frog legs (*Dicroglossidae*, Amphibia) commercialized in France. *European Journal of Taxonomy*, 271(271): 1–19. <https://doi.org/10.5852/ejt.2017.271>
- Olson DH, Aanensen DM, Ronnenberg KL, Powell CI, Walker SF, Bielby J, Garner TWJ, Weaver G, Fisher MC (2013) Mapping the global emergence of *Batrachochytrium dendrobatidis*, the amphibian chytrid fungus. *PLoS ONE*, 8(2): e56802. <https://doi.org/10.1371/journal.pone.0056802>

- Peel, AJ, Hartley M, Cunningham AA (2012) Qualitative risk analysis of introducing *Batrachochytrium dendrobatidis* to the UK through the importation of live amphibians. *Diseases of Aquatic Organisms*, 98(2), 95–112. <https://doi.org/10.3354/dao02424>
- Pessier, AP, Mendelson III JR (eds.) (2017) A Manual for Control of Infectious Diseases in Amphibian Survival Assurance Colonies and Reintroduction Programs, Ver. 2.0. IUCN/SSC Conservation Breeding Specialist Group: Apple Valley, MN.
- Re:wild, Synchronicity Earth, IUCN SSC Amphibian Specialist Group (2023) State of the World's Amphibians: The Second Global Amphibian Assessment. Texas, USA: Re:wild.
- Ribeiro, L.P., Carvalho, T., Becker, C.G. *et al* (2019) Bullfrog farms release virulent zoospores of the frog-killing fungus into the natural environment. *Scientific Reports*, 9, 13422 (2019). <https://doi.org/10.1038/s41598-019-49674-0>
- Rosenblum EB, James TY, Zamudio KR, Poorten TJ, Ilut D, Rodriguez D, *et al.* (2013) Complex history of the amphibian-killing chytrid fungus revealed with genome resequencing data. *Proceedings of National Academy of Sciences USA*, 2013;110: 9385-9390.
- Rowley JLL, Chan SKF, Tang WS, Speare R, Skerratt LF, *et al.* (2007) Survey for the amphibian chytrid *Batrachochytrium dendrobatidis* in Hong Kong in native amphibians and in the international amphibian trade. *Diseases of Aquatic Organisms*, 78: 87–95.
- Scheele BC, Pasmans F, Skerratt LF, Berger L, Martel A, Beukema W, *et al.* (2019) Amphibian fungal panzootic causes catastrophic and ongoing loss of biodiversity. *Science*, 363(6434): 1459–1463. <https://doi.org/10.1126/science.aav0379>
- Schloegel LM, Ferreira CM, James TY, Hipolito M, Longcore JE, Hyatt AD *et al.* (2010) The North American Bullfrog as a reservoir for the spread of *Batrachochytrium dendrobatidis* in Brazil. *Animal Conservation*, 2010;13(1): 53–61.
- Schloegel LM, Picco AM, Kilpatrick AM, Davies AJ, Hyatt AD, Daszak P (2009) Magnitude of the US trade in amphibians and presence of *Batrachochytrium dendrobatidis* and ranavirus infection in imported North American bullfrogs (*Rana catesbeiana*). *Biological Conservation*, 142(7): 1420–1426. <https://doi.org/10.1016/j.biocon.2009.02.007>
- Schloegel LM, Toledo LF, Longcore JE, Greenspan SE, Vieira CA, Lee M, *et al.* (2012) Novel, panzootic and hybrid genotypes of amphibian chytridiomycosis associated with the bullfrog trade. *Molecular Ecology*, 21(21): 5162–5177. <https://doi.org/10.1111/j.1365-294X.2012.05710.x>
- Schulz V, Schulz A, Klamke M, *et al.* (2020) *Batrachochytrium salamandrivorans* in the Ruhr District, Germany: history, distribution, decline dynamics and disease symptoms of the salamander plague. *Salamandra*, 56, 189–214 (2020).
- Skerratt LF, Berger L, Speare R, Cashins S, McDonald KR, Phillott AD, Hines HB, Kenyon N (2007) Spread of chytridiomycosis has caused the rapid global decline and extinction of frogs. *EcoHealth*, 2007;DOI: 10.1007/s10393-007-0093-5.
- Stegen, G. Pasmans F, Schmidt B, *et al* (2017) Drivers of salamander extirpation mediated by *Batrachochytrium salamandrivorans*. *Nature*, 544, 353–356 (2017).
- TRAFFIC (2023) *Wildlife Trade Portal*. <https://www.wildlifetradeportal.org/about>. <Accessed 20 October 2023>
- Trochet A, Moulherat S, Calvez O, Stevens V, Clobert J, Schmeller D (2014) A database of life-history traits of European amphibians. *Biodiversity Data Journal* 2: e4123. <https://doi.org/10.3897/BDJ.2.e4123>
- United States Fish and Wildlife Service (USFWS) (2010) CITES COP15: Announcement of species proposals and proposed resolutions, decisions, and agenda items being considered by the United States; Observer information. Available from <https://www.fws.gov/sites/default/files/documents/federal-register-notice-74-fr-33460-extended-version.pdf> <Accessed 22 October 2023>
- UNODC (2016) *World Wildlife Crime Report: Trafficking in protected species*. United Nations Office on Drugs and Crime Vienna. pp. 27-32. https://www.unodc.org/documents/data-and-analysis/wildlife/WLC16_Chapter_2.pdf <Accessed 12 October 2023>
- Uy K (2023) “What Is Hasma?” *Delighted Cooking*. 22 September 2023. <https://www.delightedcooking.com/what-is-hasma.htm> <Accessed 22 Oct 2023>

- Voyles J, Young S, Berger L, Campbell C, Voyles WF, Dinudom A, *et al.* (2009) Pathogenesis of chytridiomycosis, a cause of catastrophic amphibian declines. *Science*, 2009;326:582-585.
- Waddle AW, Rivera R, Rice H, Keenan EC, Rezeai G, Levy JE, *et al.* (2021) Amphibian Resistance to Chytridiomycosis Increases Following Low-Virulence Chytrid Fungal Infection or Drug-Mediated Clearance. *Journal of Applied Ecology*, 1-12. <http://dx.doi.org/10.1111/1365-2664.13974>.
- Waddle JH, Grear DA, Mosher BA, Grant EHC, Adams MJ, *et al.* (2020). *Batrachochytrium salamandrivorans* (Bsal) not detected in an intensive survey of wild North American amphibians. *Scientific Reports*, 10(1), 13012. <https://doi.org/10.1038/s41598-020-69486-x>.
- Weldon C, du Preez LH, Hyatt AD, Muller R, Speare R (2004) Origin of the amphibian chytrid fungus. *Emerging Infectious Diseases* 10: 2100–2105.
- Woodhams DC, Alford RA, Marantelli G (2003) Emerging disease of amphibians cured by elevated body temperature. *Diseases of Aquatic Organisms*, 2003;55:65-67.
- World Bank Group (2023) *Merchandise imports (current US\$) – United States*. <https://data.worldbank.org/indicator/TM.VAL.MRCH.CD.WT?locations=US>. <Accessed 30 October 2023>
- World Organization for Animal Health (WOAH) (2023) Aquatic Code Online Access: CHAPTER 1.3. Diseases Listed by WOA. https://www.woah.org/en/what-we-do/standards/codes-and-manuals/aquatic-code-online-access/?id=169&L=1&htmlfile=chapitre_diseases_listed.htm <Accessed 22 October 2023>
- Yeager J, Baquero RLE, Zarling A (2020) Mediating ethical considerations in the conservation and sustainable biocommerce of the jewels of the rainforest. *Journal for Nature Conservation*, 54:125803.
- Zhao Y, Wang Z, Zhang J, Su T (2018) Extraction and characterization of collagen hydrolysates from the skin of *Rana chensinensis*. *3 Biotech*, 2018 Mar;8(3):181. doi: 10.1007/s13205-018-1198-y

Annex 1. Conservation of amphibians (Amphibia spp.) consultation report: Collation of responses to Notification to the Parties No.2023/101.

Conservation of amphibians (Amphibia spp.) consultation report

This report relates to [Decision 19.197 on Conservation of amphibians \(Amphibia spp.\)](#) and provides a review and summary of responses to the CITES Notification to the Parties [No. 2023/101](#) seeking information on the status, management and trade in amphibians (Amphibia spp.).

A. Background and scope

At its 19th meeting (CoP19; Panama City, 2022), the Conference of the Parties adopted Decision 19.197 on *Conservation of amphibians (Amphibia spp)*, as follows:

Directed to the Secretariat, in close consultation with the Animals Committee

19.197 The Secretariat shall, subject to availability of external resources and in close consultation with the Animals Committee:

- a) conduct one or more interdisciplinary workshops for CITES Authorities and other relevant authorities and stakeholders about amphibian species in international trade, including but not limited to the following objectives:
 - i) identify amphibian species that are in international trade and evaluate whether certain species or groups should be recommended for possible listing in the Appendices;
 - ii) share existing national legislation relevant to the trade in amphibians;
 - iii) evaluate whether current levels of trade are compatible with the conservation of these species in the wild;
 - iv) compile further data on harvesting levels of amphibians subject to high volumes of international trade;
 - v) explore the emerging threat of diseases to traded amphibians, including amphibian chytrid fungus and rana viruses; and
 - vi) examine current enforcement efforts to deter and detect illegal and unreported trade and identify additional actions needed; and
- b) explore modalities to implement this Decision in a cost-effective manner, including through the organization of online events; and
- c) report on the progress in the implementation of paragraph a) and b) above to the Animals Committee, including any relevant recommendations.

Pursuant to the implementation of paragraph a) of Decision 19.197, IUCN and the Secretariat developed a questionnaire/survey to gather information on amphibians, including the following:

- a) the levels of international trade in amphibians (legal and illegal);
- b) captive breeding of amphibians;
- c) threat of diseases to and from amphibians in trade; and
- d) the national/regional (and/or local) management, enforcement and regulatory priorities of amphibians in international trade.

Parties were invited to access the questionnaire through the following link [CITES Notification: Amphibians in trade](#) and submit their responses by **6 September 2023**. Additional information relating to the survey was submitted by email to the IUCN at Oliver.Tallowin@iucn.org and copied to info@cites.org.

The information collected by this survey was used to inform three technical reports on amphibian species in trade (outlined below), and a workshop referred to in Decision 19.197 paragraph a) to be convened later this year.

- Technical report 1: Identification of non-CITES listed amphibian species as well as the newly listed amphibian species that are in international trade.
- Technical report 2: Emerging threat of disease.
- Technical report 3: National legislation relevant to the trade in both CITES listed and non-listed amphibian.

Technical report 1: Identification of non-CITES listed amphibian species as well as the newly listed amphibian species that are in international trade.

Survey responses

A total of 49 responses to the CITES Notification to the Parties (No. 2023/101) were received. These comprised responses from CITES Management Authorities (22, 45%), CITES Scientific Authorities (4, 8%) and stakeholder organisations and individuals (23, 47%). Responses were obtained from across all six CITES regions (Africa 3, 6%; Asia 9, 18%; Central and South America and the Caribbean 13, 27%; Europe 14, 29%; North America 9, 18% and Oceania 1, 2%).

Amphibian trade-data collection, analyses and National Red List assessments

Most respondents reported their government, organisation or institution collected national amphibian trade data relating to international trade (34, 69%) and legal trade (38, 78%), with just over half or fewer collecting illegal (26, 53%) and domestic (20, 41%) amphibian trade data (Fig 1.).

Of the 44 respondents who stated amphibian trade data was collected, 27 (61%) reported that this included all amphibian species, five (11%) reported that this only included CITES-listed species and two (5%) reported that it only included non-CITES listed species. Ten (23%) 'other' responses included comments such as amphibian trade data for CITES-listed and select non-CITES species was collected, such as European Union (EU27) countries collecting information on species that are listed in the Annexes of EU Council Regulation (No. 338/97).

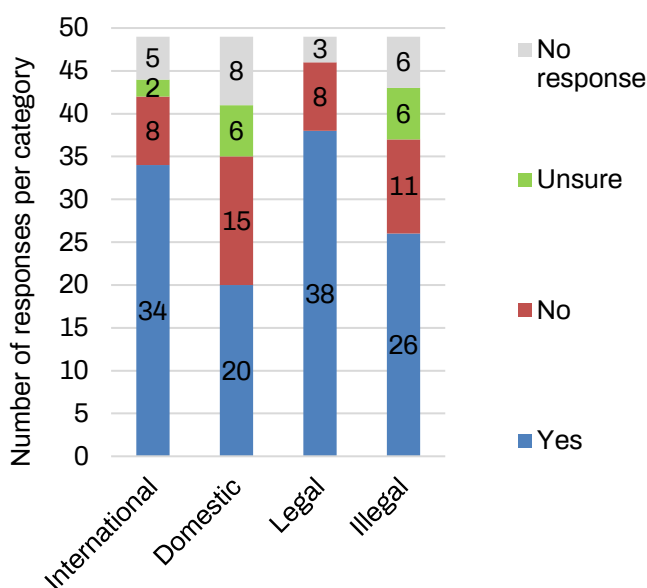


Figure 1: Number of governments, organisations or institutions recording national amphibian trade data relating to international, domestic, legal and illegal trade.

Regarding the type of amphibian trade data collected, the majority of respondents (≥ 31 , $\geq 70\%$) collected data on all data categories except mass (weight; 16, 36%; see Fig. 2). Principally trade data on species (36, 97%), source (34, 87%) and volume (30, 85%, Fig. 2) are collected. A response from the Indian Management Authority reported that information for only non-CITES listed species was collected and that data for all categories was recorded.

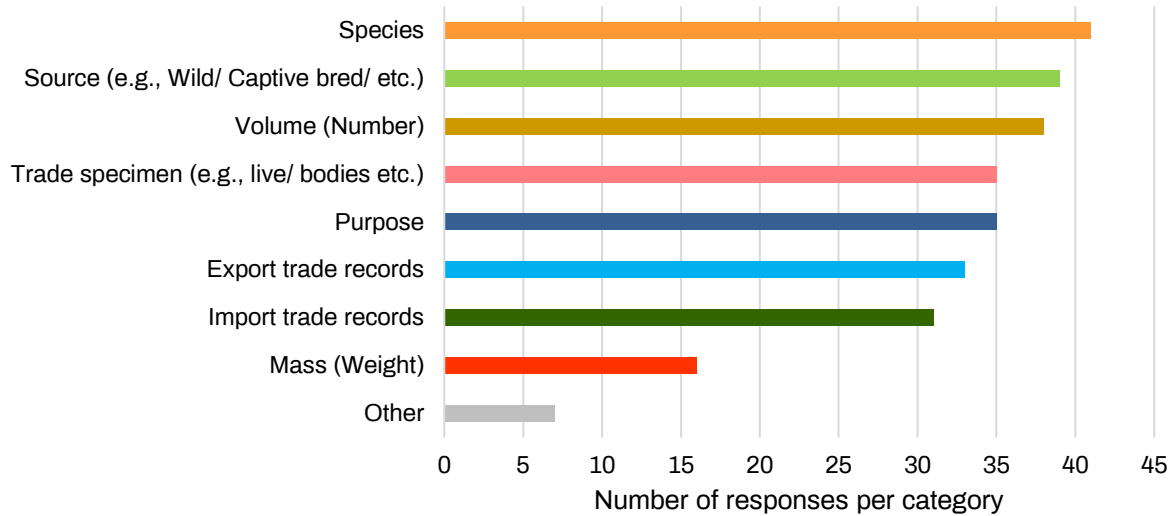


Figure 2: Number of amphibian trade categories recorded by governments, organisations or institutions.

A total of 14 respondents (29%) stated their government/organisation/institution had performed analyses of trade in amphibians, 25 (51%) noted they had not, eight (16%) were unsure and two did not provide a response. Of the 14 responses stating analyses had been performed, six reported carrying out analyses on all categories stated (see Fig. 3), with the highest number of analyses including trends in traded species and species groupings, as well as types of specimen traded (Fig. 3). Virtually all 14 analyses had been conducted at the national scale (13, 93%), with most (11, 79%) containing a species-specific component, eight (57%) containing regional level components and five (36%) including global scale analyses.

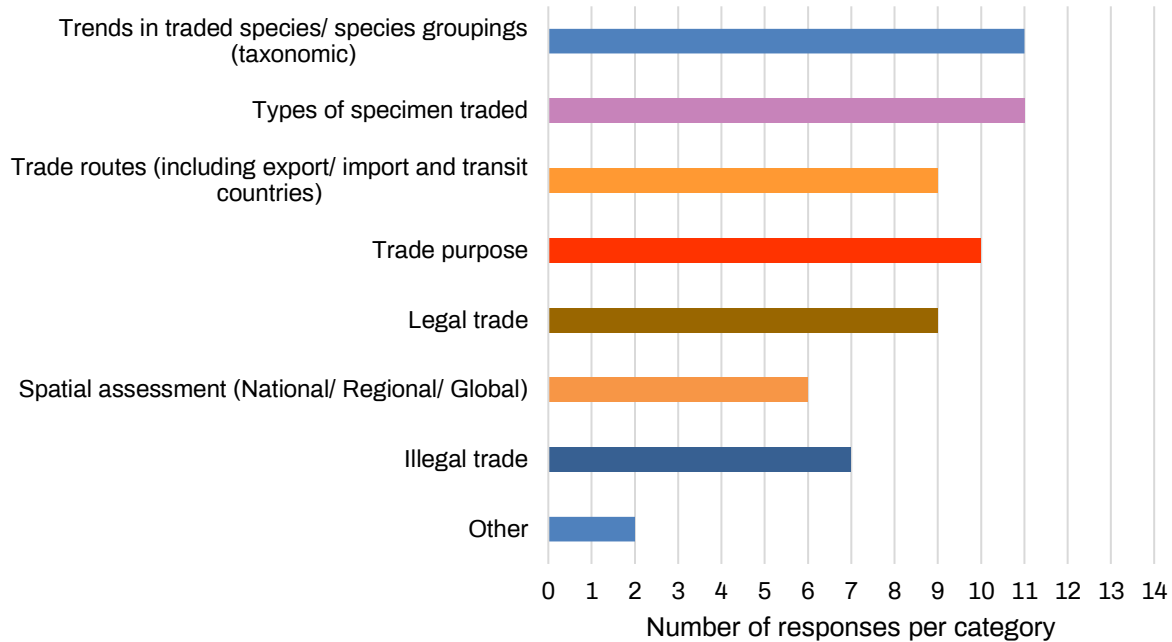


Figure 3: Number of categories included in amphibian trade analyses carried out by governments, organisations or institutions.

The majority of respondent countries/regions (35, 71%) had conducted national Red List assessments, or an equivalent conservation assessment for amphibian species (see [Annex 1.1](#)).

A total of 29 respondents (59%) stated their government/organisation/institution had identified amphibian species in trade, with 10 (20%) stating they had not, eight were unsure (16%) and two (4%) did not provide a response.

National legislation relating to amphibian trade

Regarding national laws pertaining to amphibian trade (i.e., amphibian-specific laws or wildlife trade laws that include amphibians), the majority of respondents (31, 63%) stated some amphibian trade was permitted. Seven (14%) respondents stated all amphibian trade was permitted, three (6%) that no amphibian trade was permitted, and six (12%) selected the 'other' option and two (4%) did not provide a response. Of the 31 responses stating 'some trade was permitted', 12 (39%) stated trade was permitted for captive-breeding purposes, six (19%) for select or non-native species, and three (10%) for scientific purposes, and non-native species only. Furthermore, nine (29%) respondents stated the trade in protected, native amphibian species was prohibited, and two (6%) that trade in invasive alien species was prohibited.

National legislation related to amphibian trade regulations for 25 countries/regions is provided in [Annex 1.2](#). A total of 34 (69%) respondents stated their countries'/regions' legislation covered non-CITES listed species, three (7%) reported it did not, six (14%) were unsure and six did not provide a response. Seven (14%) respondents stated their countries/regions national legislation covered all wildlife including amphibians, six (12%) that all amphibian species were covered, while four (8%) stated it covered all national species, or a select national list of amphibian species (Fig. 4).

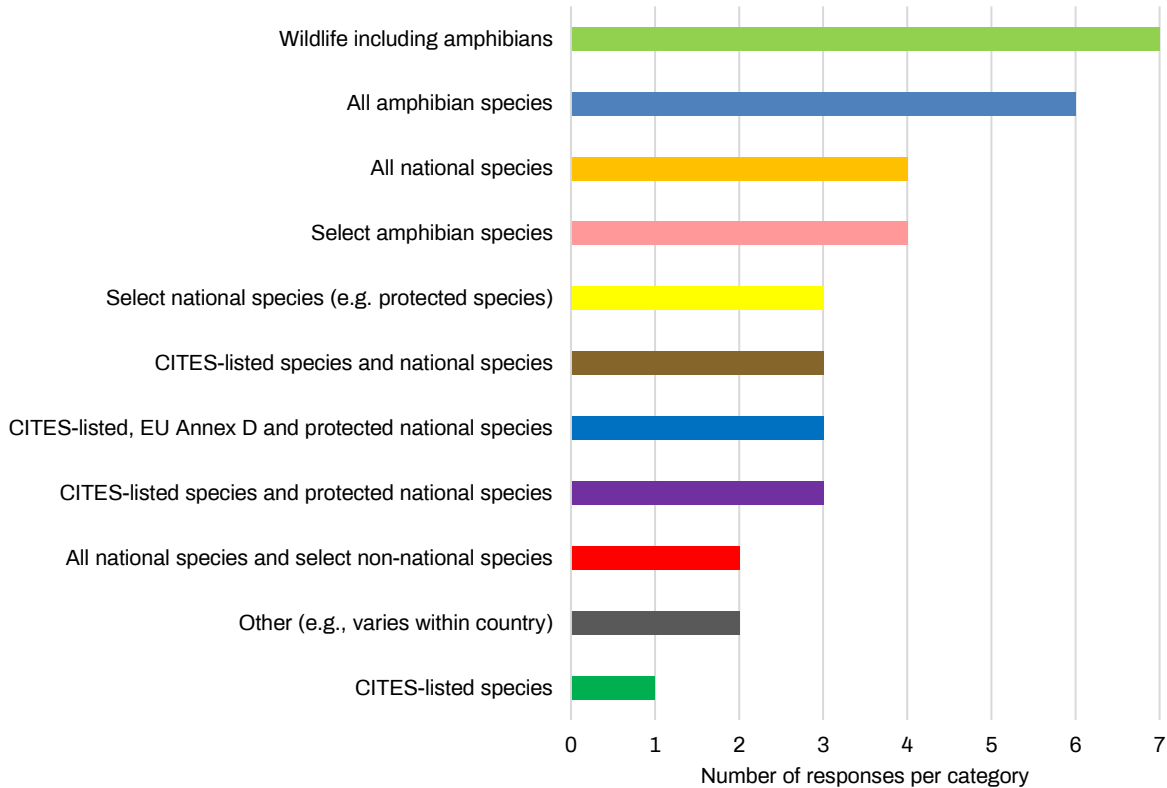


Figure 4: Number of responses per category of amphibian species covered by national legislation.

Amphibian disease threat

Just under half the respondents (24, 49%) stated their country/region had regulations or requirements aimed at controlling the spread of amphibian diseases through trade. A total of 12 (24%) stated their country/region did not have any such regulations or requirements, nine (18%) were unsure and four (8%) did not provide a response.

Regarding the type of amphibian trade these regulations or requirements covered, of the 27 responses 13 (48%) stated they covered only international trade, 13 (48%) that they covered both international and national trade, and one (4%) that they covered only national trade. Of the 27 respondents stating which diseases were covered, nine (33%) respondents stated the regulations or requirements were general, covering all pathogens and diseases (4, 15%), or that veterinary health certificates were required (5, 19%, Fig. 5). Of the 19 respondents stating amphibian-specific diseases were covered by their countries'/regions' regulations or requirements, a total of 11 specific diseases were mentioned. The highest number (13, 68%) covered amphibian chytrid fungus (chytridiomycosis, *Batrachochytrium dendrobatidis* and *Batrachochytrium salamandrivorans*) and seven included Ranavirus. The other diseases included *Aeromonas hydrophila*, Cestodiasis, Chromomycosis, Dendrovirus, Mycobacteriosis, *Mycobacterium marinum*, Strongyloidiasis and Trematodiasis.



Figure 5: Number of responses per category of general or specific amphibian diseases covered by national regulations or requirements. National regulations or requirements to control the spread of disease in traded amphibians are provided in Annex 1.3

Amphibian trade exports and imports

A total of 28 respondents (57%) reported that their country/region exported amphibians, 10 (20%) that their country/region did not export amphibians, eight (16%) were unsure and three (6%) did not provide a response. The highest number of amphibian exports were sourced from captive-breeding stocks (C, 30), followed by amphibians born in captivity (F, 21) and wild-sourced (W, 16, Fig. 6).

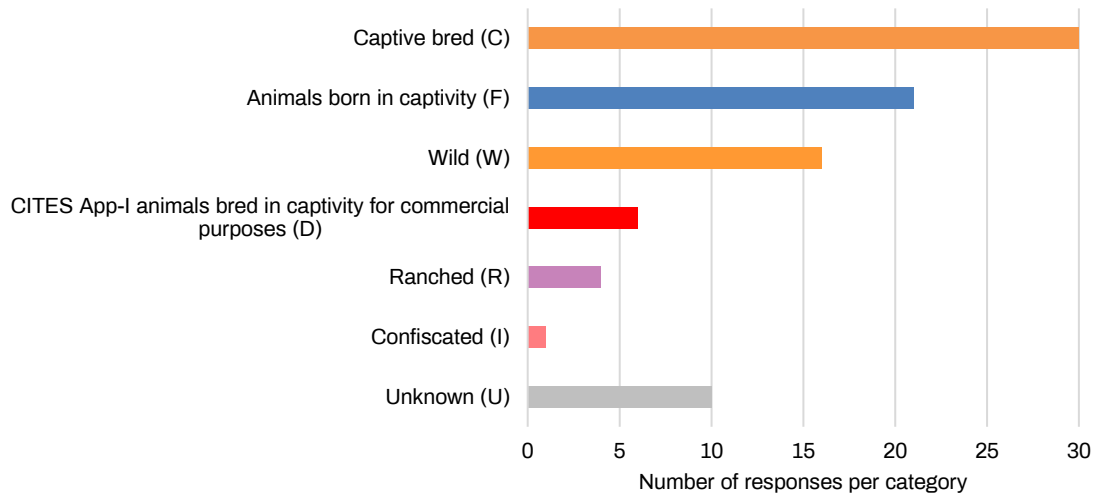


Figure 6: Number of responses per trade source of amphibian exports. The most common purpose of amphibian exports was commercial (32), specifically for general purposes (13) the pet trade (12), human consumption (5), and medicinal purposes (2, Fig. 7). A total of 17 non-commercial amphibian purposes were reported, specifically for scientific research (9), zoological (3), exhibition and education (2), captive-breeding purposes (2) and personal purposes (1).

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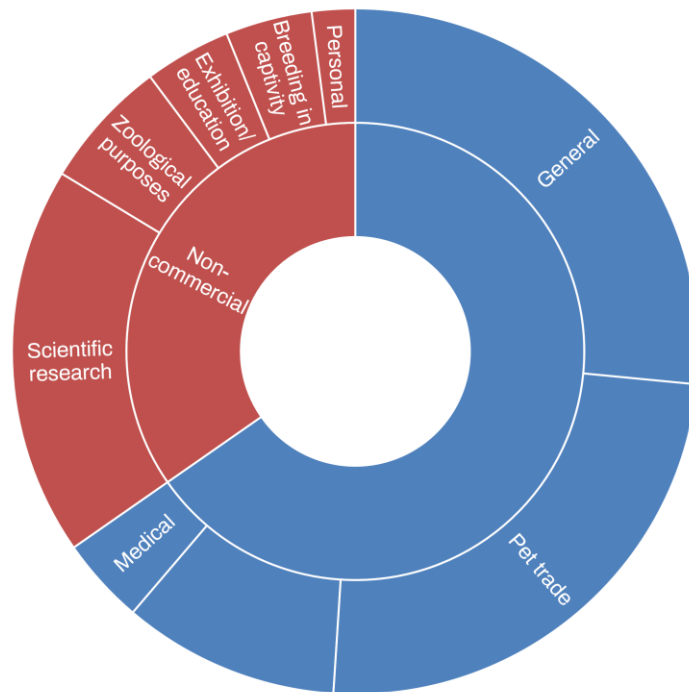


Figure 7: Number of responses per trade purpose of amphibian exports

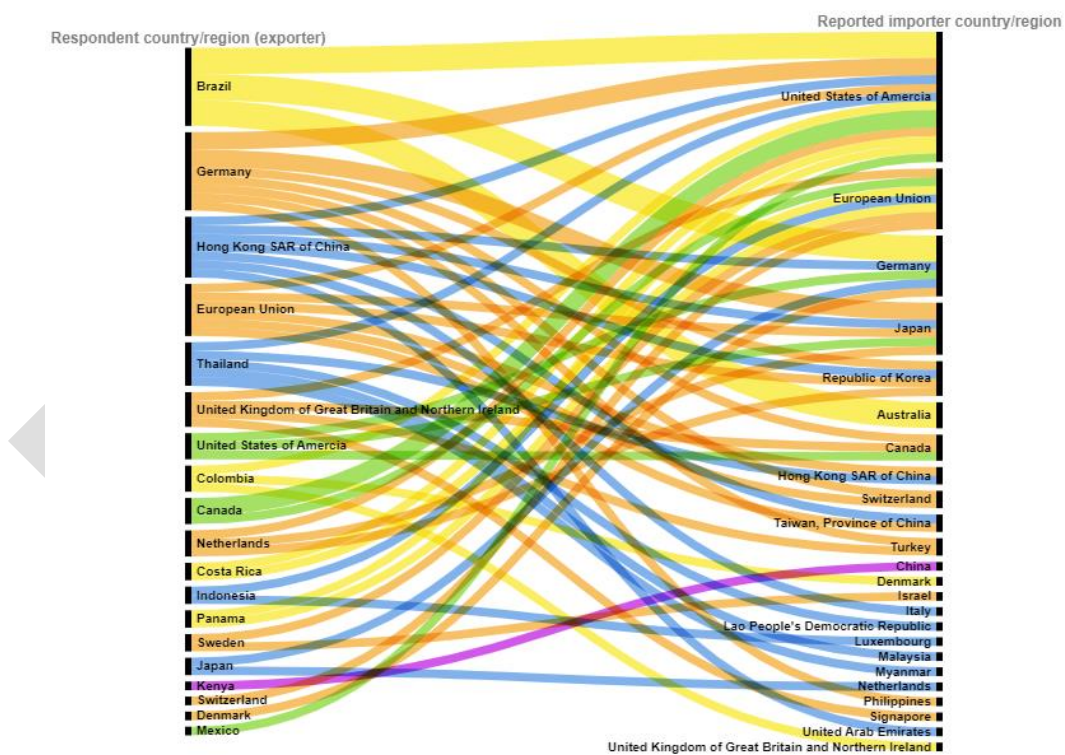


Figure 8: Respondent country/region amphibian exports to reported importer countries/regions. Colours relate to the CITES Region of the respondent country/region (Africa – purple, Asia – blue, Central and South America and the Caribbean – yellow, Europe – orange, and North America – green).

A total of 24 respondents reported the most frequent countries/region importing amphibian exports from their country/region. The most frequent countries/regions reported to be importing

amphibian exports from the respondent country/region were the United States of America (11), the European Union (7), Germany (7), Japan (6) and the Republic of Korea (4) (Fig. 8). A total of 21 respondents reported the most frequently exported amphibian species from their country/region. The highest proportion belonging to the poison dart frog family Dendrobatidae (45, Table 1.). The most frequently exported species included the dyeing poison frog (*Dendrobates tinctorius*, 4), the green and black poison frog (*Dendrobates auratus*, 4) and the red-eyed treefrog (*Agalychnis callidryas*, 3).

Of the 36 amphibians exported at the species level, nine (25%) were globally threatened according to the IUCN Red List of threatened species¹ (e.g., Vulnerable [VU], Endangered [EN], Critically Endangered [CR] and Extinct in the Wild [EW]). These included the Kihansi spray toad (*Nectophrynoides asperginis*) categorised as Extinct in the Wild, four Critically Endangered species (*Ambystoma mexicanum*, *Ambystoma dumerillii*, *Oophaga histrionica* and *Oophaga lehmanni*) and four Endangered species (*Phyllobates bicolor*, *Phyllobates terribilis*, *Mantella aurantiaca* and *Telmatobius culeus*). All globally threatened species are listed on either CITES Appendix I or II.

Nine species were not listed on the CITES Appendices² (*Fejervarya cancrivora*, *Hoplobatrachus rugulosus*, *Agalychnis dacnicolor*, *Dryophytes cinereus* [*Hyla cinerea*], *Hymenochirus curtipes*, *Xenopus laevis*, *Lithobates catesbeianus*, *Lithobates forreri* [*Rana forreri*] and *Rana draytonii*), all of which were categorised as Least Concern (LC), except the California red-legged frog (*Rana draytonii*) categorised as Near Threatened (NT).

Table 1: Amphibian species exported from respondent country/region.

Amphibian family	Amphibian species	IUCN Red List Category ¹	CITES Appendices ²	Frequency of export by respondent country/region
Ambystomatidae	<i>Ambystoma dumerillii</i>	CR	II	1
	<i>Ambystoma mavortium stebbinsi</i>	NA	Not Listed	1
	<i>Ambystoma mexicanum</i>	CR	II	3
	<i>Ambystoma</i> spp.	NA	Not Listed	1
Aromobatidae	<i>Allobates femoralis</i>	LC	II	1
Bufonidae	<i>Nectophrynoides asperginis</i>	EW	I	1
Ceratophryidae	Ceratophryidae spp.	NA	Not Listed	1
Dendrobatidae	<i>Adelphobates galactonotus</i>	LC	II	1
	<i>Ameerega berohoka</i>	LC	II	1
	<i>Ameerega hahneli</i>	LC	II	1
	<i>Ameerega macero</i>	LC	II	1
	<i>Ameerega trivittata</i>	LC	II	1
	<i>Dendrobates auratus</i>	LC	II	3
<i>Dendrobates leucomelas</i>	LC	II	2	

¹ IUCN. 2022. The IUCN Red List of Threatened Species. Version 2022-2. <https://www.iucnredlist.org>. Accessed on [01 September 2023]. Extinct in the Wild – EW, Critically Endangered – CR, Endangered – EN, Vulnerable - VU, Near Threatened – NT, Least Concern – LC, Data Deficient – DD, Not assessed – NA.

² UNEP (2023). The Species+ Website. Nairobi, Kenya. Compiled by UNEP-WCMC, Cambridge, UK. Available at: www.speciesplus.net. [Accessed 13/09/2023].

Amphibian family	Amphibian species	IUCN Red List Category ¹	CITES Appendices ²	Frequency of export by respondent country/region
	<i>Dendrobates tinctorius</i>	LC	II	3
	<i>Dendrobatidae spp.</i>	NA	Not Listed	5
	<i>Epipedobates anthonyi</i>	NT	II	1
	<i>Oophaga histrionica</i>	CR	II	1
	<i>Oophaga lehmanni</i>	CR	II	1
	<i>Oophaga pumilio</i>	LC	II	2
	<i>Phyllobates aurotaenia</i>	LC	II	2
	<i>Phyllobates bicolor</i>	EN	II	1
	<i>Phyllobates terribilis</i>	EN	II	2
	<i>Ranitomeya imitator</i>	LC	II	1
	<i>Ranitomeya sirensis</i>	LC	II	1
	<i>Rantiomeya variabilis</i>	DD	II	1
Dicroglossidae	<i>Fejervarya cancrivora</i>	LC	Not Listed	1
	<i>Hoplobatrachus rugulosus</i>	LC	Not Listed	1
Hylidae	<i>Agalychnis callidryas</i>	LC	II	3
	<i>Agalychnis dacnicolor</i>	LC	Not Listed	1
	<i>Hyla cinerea</i>	LC	Not Listed	1
	Hylidae spp.	N/A	Not Listed	1
Mantellidae	<i>Mantella aurantiaca</i>	EN	II	1
	Mantellidae spp.	N/A	II	1
Microhylidae	<i>Dyscophus guineti</i>	LC	II	1
Pipidae	<i>Hymenochirus curtipes</i>	LC	Not Listed	1
	<i>Xenopus laevis</i>	LC	Not Listed	1
Ranidae	<i>Lithobates catesbeianus</i>	LC	Not Listed	2
	<i>Lithobates forreri</i>	LC	Not Listed	1
	<i>Rana draytonii</i>	NT	Not Listed	1
	<i>Rana forreri</i>	N/A	Not Listed	1
Telmatobiidae	<i>Telmatobius culeus</i>	EN	I	1

A total of 29 respondents (59%) stated their country/region imported amphibians, 13 (27%) stated their country/region did not import amphibians, three (6%) were unsure and four (8%) did not provide a response. The highest number of amphibian imports were from captive-breeding sources (C, 27), followed by wild-sourced (W, 23) and amphibians born in captivity (F, 20, Fig. 9).

The most common purpose of amphibian imports was commercial (32), specifically for the pet trade (12), general (10), human consumption (7) and medicinal (3) (Fig. 10). A total of 14 non-commercial amphibian purposes were reported, the majority of which were for scientific purposes (8).

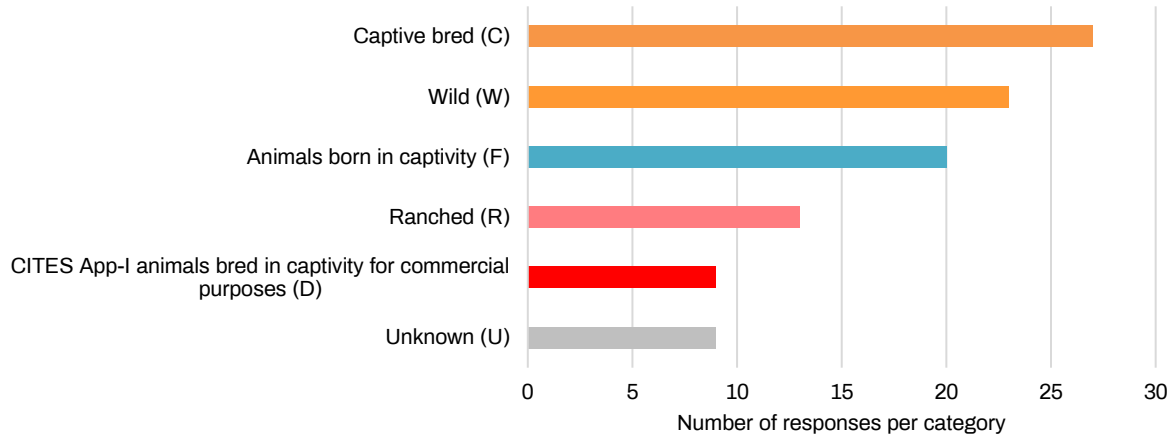


Figure 9: Number of responses per trade source of amphibian imports.

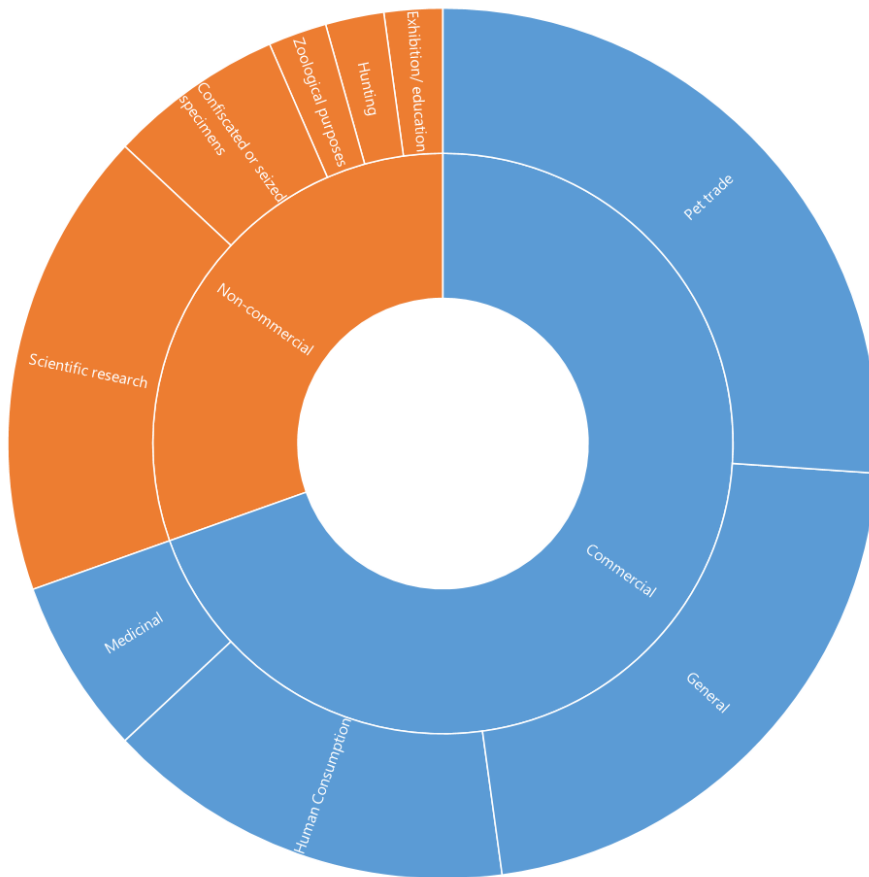


Figure 10: Number of responses per trade purpose of amphibian imports

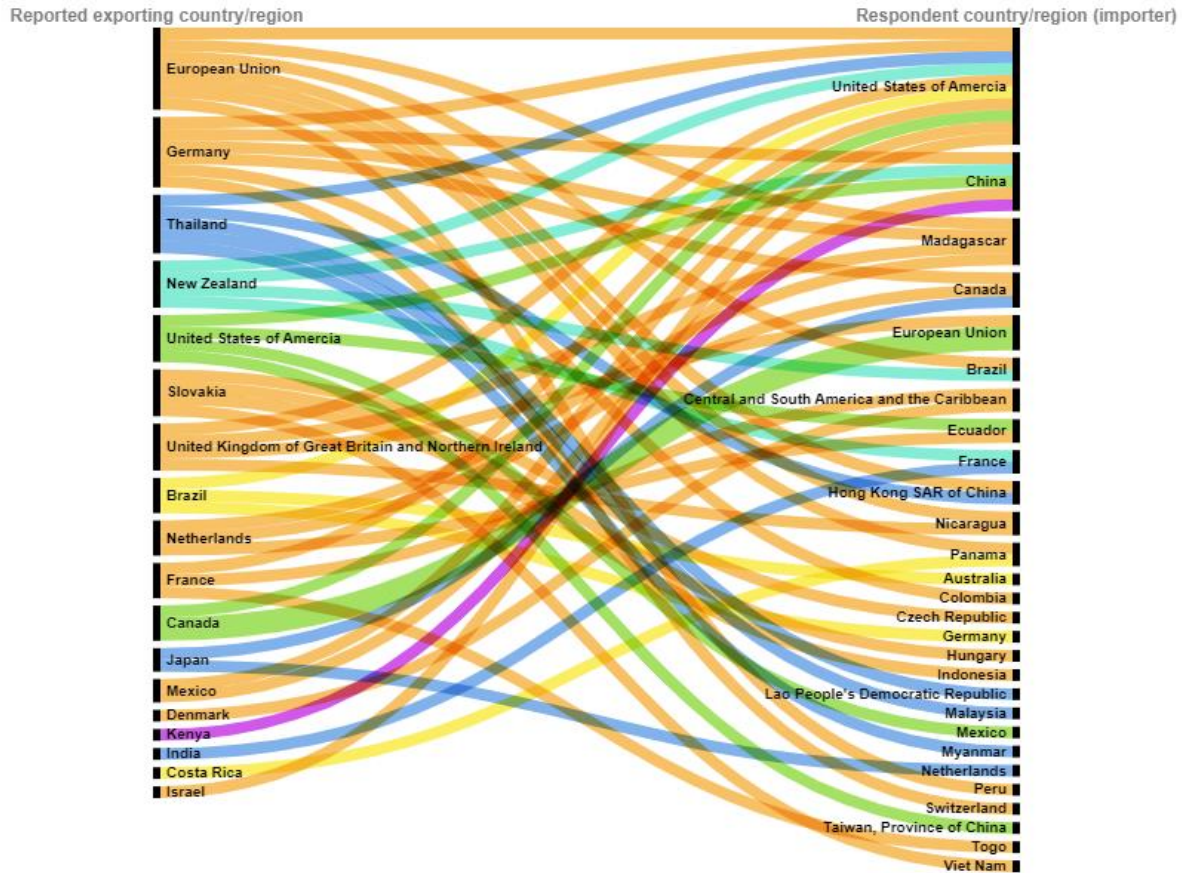


Figure 11: Respondent country/region amphibian imports from reported exporter countries/regions. Colours relate to the CITES Region of the respondent country/region (Africa – purple, Asia – blue, Central and South America and the Caribbean – yellow, Europe – orange, North America – green and Oceania – cyan).

A total of 23 respondents reported the most frequent export countries/regions from which their country/region imports amphibian species. The most frequent countries/regions reported to be exporting amphibians imported by the respondent country/region were the United States of America (10), China (5) and Madagascar (4) (Fig. 11).

A total of 19 respondents reported the amphibian species most frequently imported to their countries/regions, with the highest proportion belonging to the poison dart frog family Dendrobatidae (26, Table 2). The most frequently imported species included the red-eyed treefrog (*Agalychnis callidryas*, 7) and the green and black poison frog (*Dendrobates auratus*, 5).

Of the 31 amphibians imported at the species level, two (8%) were globally threatened according to the IUCN Red List of threatened species¹ including the Kihansi spray toad (*Nectophrynoides asperginis*) categorised as Extinct in the Wild, and the Axolotl (*Ambystoma mexicanum*) categorised as Critically Endangered. A total of 16 species were not listed on the CITES Appendices², all of which were categorised as Least Concern, except the blunt-headed burrowing frog (*Glyphoglossus molossus*) and black nobby newt (*Tylototriton asperrimus*), both categorised as Near Threatened.

Table 2: Amphibian species imported to respondent country/region

Amphibian family	Amphibian species	IUCN Red List Category ¹	CITES Appendices ²	Frequency of export by respondent country/region
Ambystomatidae	<i>Ambystoma mexicanum</i>	CR	II	2
	<i>Ambystoma</i> spp.	NA	Not Listed	2
Aromobatidae	<i>Allobates femoralis</i>	LC	II	1
Bombinatoridae	<i>Bombina orientalis</i>	LC	Not Listed	1
	<i>Bombina</i> spp.	NA	Not Listed	1
Bufo	<i>Bufo</i> spp.	NA	Not Listed	1
	<i>Bufo</i> spp.	NA	Not Listed	1
	<i>Nectophrynoides asperginis</i>	EW	I	1
Ceratophryidae	<i>Ceratophryidae</i> spp.	NA	Not Listed	1
	<i>Ceratophrys</i> spp.	NA	Not Listed	1
	<i>Lepidobatrachus laevis</i>	LC	Not Listed	1
Dendrobatidae	<i>Ameerega trivittata</i>	LC	II	1
	<i>Dendrobates auratus</i>	LC	II	5
	<i>Dendrobates</i> spp.	NA	II	3
	<i>Dendrobates tinctorius</i>	LC	II	2
	<i>Dendrobatidae</i> spp.	NA	Not Listed	5
	<i>Oophaga pumilio</i>	LC	II	4
	<i>Oophaga</i> spp.	NA	II	1
	<i>Ranitomeya imitator</i>	LC	II	1
	<i>Ranitomeya</i> spp.	NA	II	2
	<i>Ranitomeya variabilis</i>	LC	II	1
	<i>Ranitomeya ventrimaculata</i>	LC	II	1
	Dicroglossidae	<i>Fejervarya limnocharis</i>	LC	Not Listed
<i>Hoplobatrachus rugulosus</i>		LC	Not Listed	1
<i>Hoplobatrachus tigerinus</i>		LC	II	1
<i>Occidozyga martensii</i>		LC	Not Listed	1
Hylidae	<i>Agalychnis callidryas</i>	LC	II	7
	<i>Agalychnis</i> spp.	NA	II	2
	<i>Hyla</i> spp.	NA	Not Listed	1
	<i>Hylidae</i> spp.	NA	Not Listed	1
Hyperoliidae	<i>Hyperolius</i> spp.	NA	Not Listed	1
	<i>Kassina</i> spp.	NA	Not Listed	1
Mantellidae	<i>Mantella betsileo</i>	LC	II	3
	<i>Mantella nigricans</i>	LC	II	1
Megophryidae	<i>Megophrys nasuta</i>	LC	Not Listed	1
Microhylidae	<i>Dyscophus guineti</i>	LC	II	1
	<i>Glyphoglossus molossus</i>	NT	Not Listed	1

Myobatrachidae	<i>Rheobatrachus</i> spp.	NA	Not Listed	1
Pelodyadidae	<i>Litoria</i> spp.	NA	Not Listed	1
Pipidae	<i>Hymenochirus boettgeri</i>	LC	Not Listed	1
	<i>Hymenochirus curtipes</i>	LC	Not Listed	2
	<i>Xenopus laevis</i>	LC	Not Listed	3
Ranidae	<i>Lithobates catesbeianus</i>	LC	Not Listed	2
	<i>Lithobates forreri</i>	LC	Not Listed	2
	<i>Lithobates pipiens</i>	LC	Not Listed	1
	<i>Rana catesbeiana</i>	LC	Not Listed	1
	<i>Theloderma</i> spp.	NA	Not Listed	1
Rhacophoridae	<i>Cynops orientalis</i>	LC	Not Listed	1
	<i>Cynops</i> spp.	NA	Not Listed	1
Salamandridae	<i>Pleurodeles</i> spp.	NA	Not Listed	1
	<i>Tylotriton asperimus</i>	NT	Not Listed	1
	<i>Tylotriton</i> spp.	NA	Not Listed	1

A total of 21 respondents reported the amphibian species most frequently traded domestically in their countries/regions. The highest proportion belonging to the Ambystomatidae family (13) and poison dart frog family Dendrobatidae (11, Fig. 12).

Of the 33 amphibians traded domestically at the species level, 12 (36%) were globally threatened¹, including four Critically Endangered (*Ambystoma andersoni*, *Ambystoma dumerilii*, *Ambystoma mexicanum* and *Ambystoma taylori*), five Endangered (*Ambystoma granulatum*, *Ambystoma lermaense*, *Ambystoma rivulare*, *Incilius cristatus* and *Phyllobates terribilis*) and three Vulnerable species (*Andrias japonicus*, *Phyllobates vittatus* and *Litoria aurea*). A total of 23 species, of which six species were reported to be traded internationally, were not listed on the CITES Appendices², with five species listed as Least Concern and only the blunt-headed burrowing frog (*Glyphoglossus molossus*) categorised as Near Threatened.

A total of 20 respondents reported the amphibian species most frequently traded internationally in their countries/regions, with the highest proportion belonging to the poison dart frog family Dendrobatidae (40, Fig. 13).

Of the 37 amphibians traded internationally at the species level, six (16%) were globally threatened¹, including four Critically Endangered (*Ambystoma dumerilii*, *Ambystoma mexicanum*, *Oophaga histrionica* and *Oophaga lehmanni*), and two Endangered (*Phyllobates bicolor* and *Phyllobates terribilis*). A total of 14 species were not listed on the CITES Appendices², all of which were categorised as Least Concern (LC), except the California red-legged frog (*Rana draytonii*) categorised as Near Threatened (NT).



Figure 12: Amphibian species most frequently traded domestically in the respondent country/region.

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In response to whether captive-breeding facilities were required to register with a government department, 27 (55%) respondents stated they were, 11 (22%) said no, five (10%) were unsure, and six (12%) did not provide a response.

A total of 19 (37%) respondents stated government-registered captive-breeding facilities for amphibians were present in their countries/regions, 16 (31%) stated there were no captive-breeding facilities, ten (20%) were unsure and six (12%) did not provide a response.

Regarding the number of captive-breeding facilities for amphibians in respondent countries/regions, there were 28 responses, of which six (21%) stated there were between one and five facilities, one (4%) that there were between six and fifteen, and nine (32%) that there were sixteen or more facilities (Fig. 14).

A total of 20 respondents provided figures on the total volume of amphibians being bred annually in their countries/regions, with eight (40%) reporting that over ten thousand individuals were bred annually (Fig. 15).

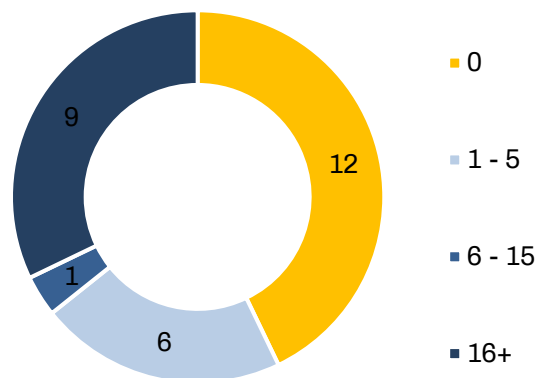


Figure 14: Number of captive-breeding facilities for amphibians registered within respondent countries/regions.

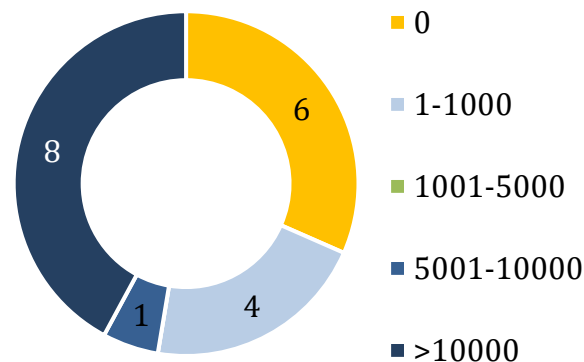


Figure 15: Total volume of amphibians being bred annually within respondent countries/regions.

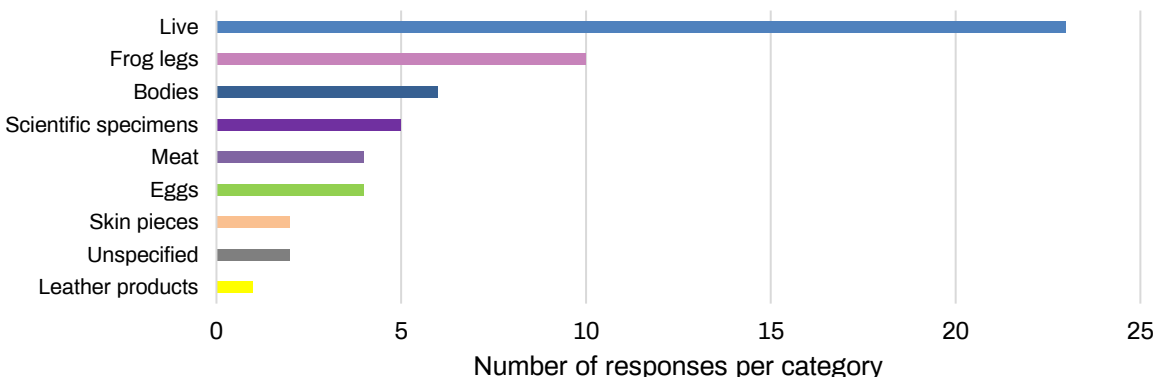


Figure 16: Main categories of amphibian specimens traded in the respondent country/region.

The main trade terms relating to amphibian trade in respondents categories comprised live individuals (23), frog legs (10) and bodies (6, Fig. 16).

The primary reasons for domestic trade in amphibians in respondent countries/regions, were predominately for commercial purposes (38), specifically for the pet trade (21) and human consumption (12).

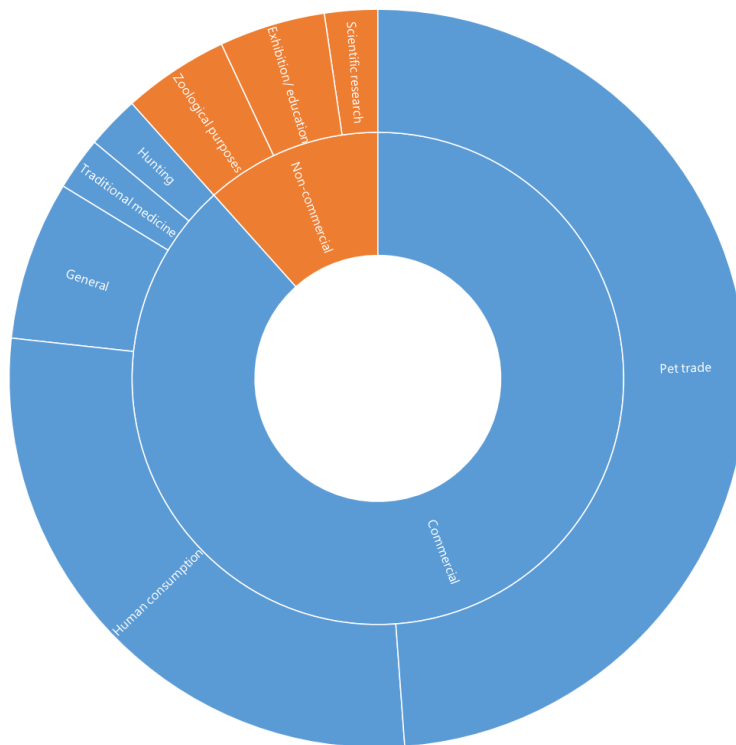


Figure 17: Main reasons for domestic trade in amphibians in respondent countries/regions.

Legal amphibian trade locations

The key locations within the respondent countries/regions where legal amphibian trade occurred were primarily retail premises, online and private residences, with the majority of this trade both domestic and international (Fig. 18). The key locations for where illegal amphibian trade occurred were predominantly private residences, online and retail premises, with the majority of trade also both domestic and international (Fig. 19).

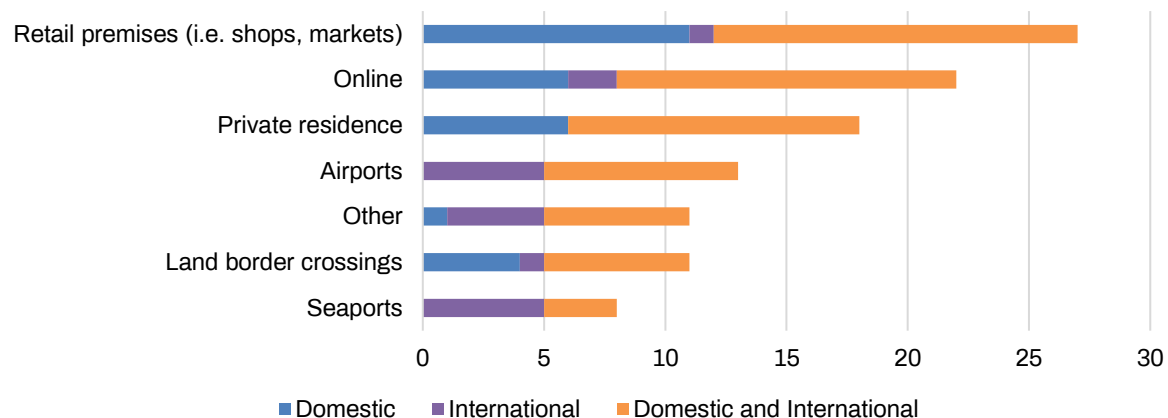


Figure 18: Key locations within the respondent country/region where legal amphibian trade occurred.

Illegal amphibian trade locations

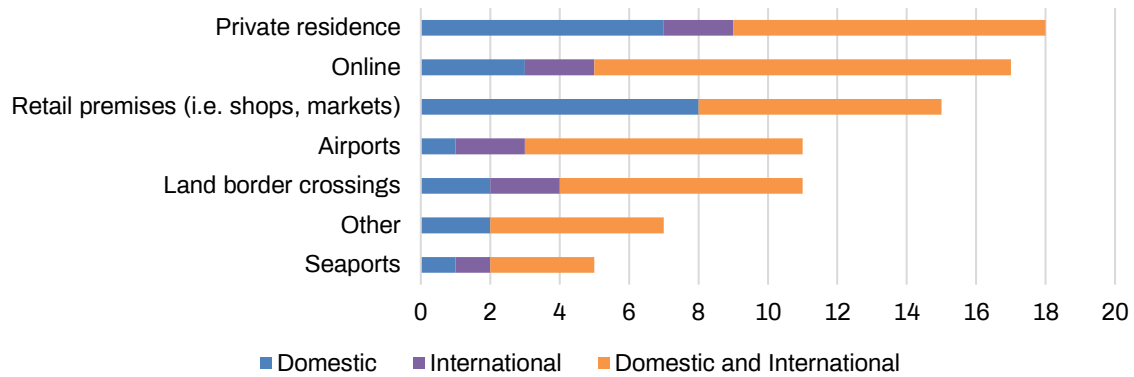


Figure 19: Key locations within the respondent country/region where illegal amphibian trade occurred.

The most common alleged final destinations of amphibian shipments illegally exported from respondent countries/regions, predominately comprised the European Union, the United States of America and China (Fig. 20).

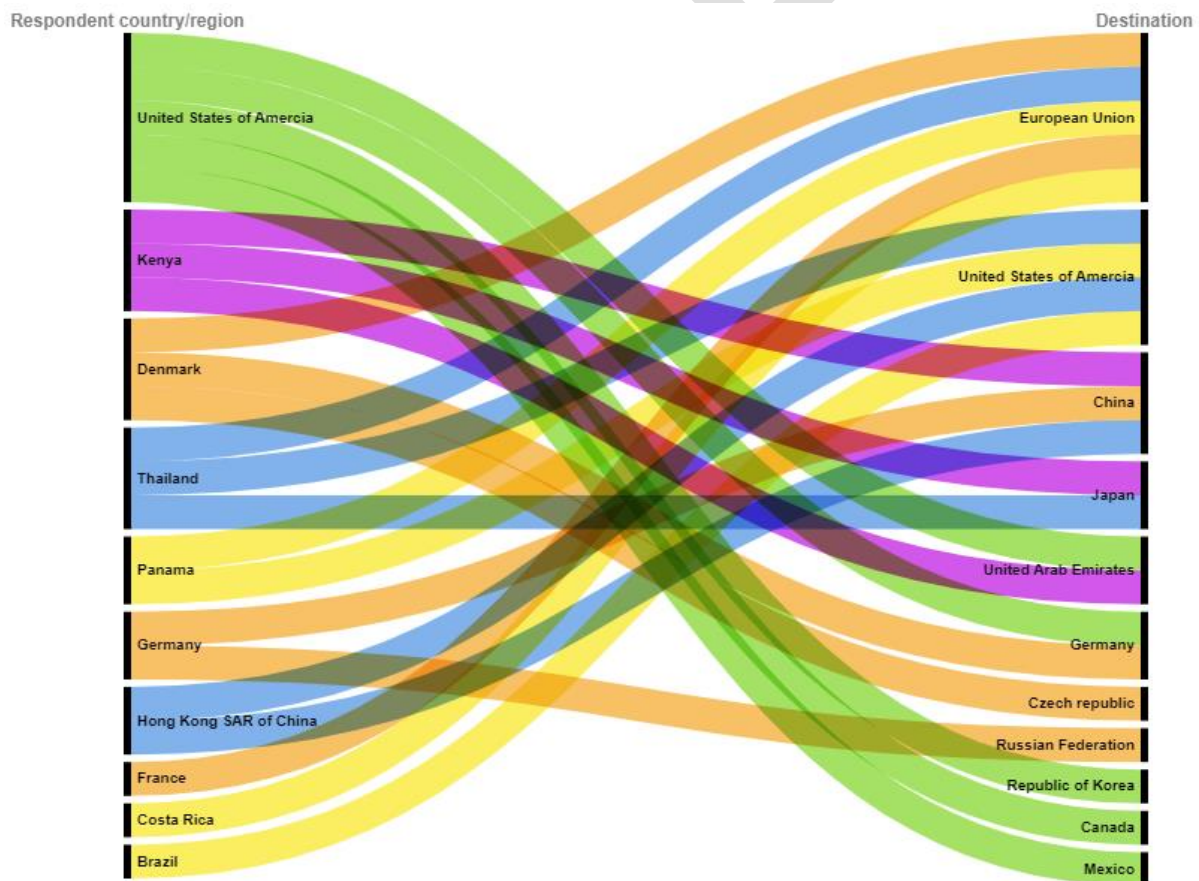


Figure 20: Most common reported final destinations of amphibian shipments illegally exported from respondent countries/regions.

The most common alleged origin countries/regions of amphibian shipments illegally imported to respondent countries/regions were largely South and Central American countries including Colombia, Panama and Costa Rica, as well as China (Fig. 21).

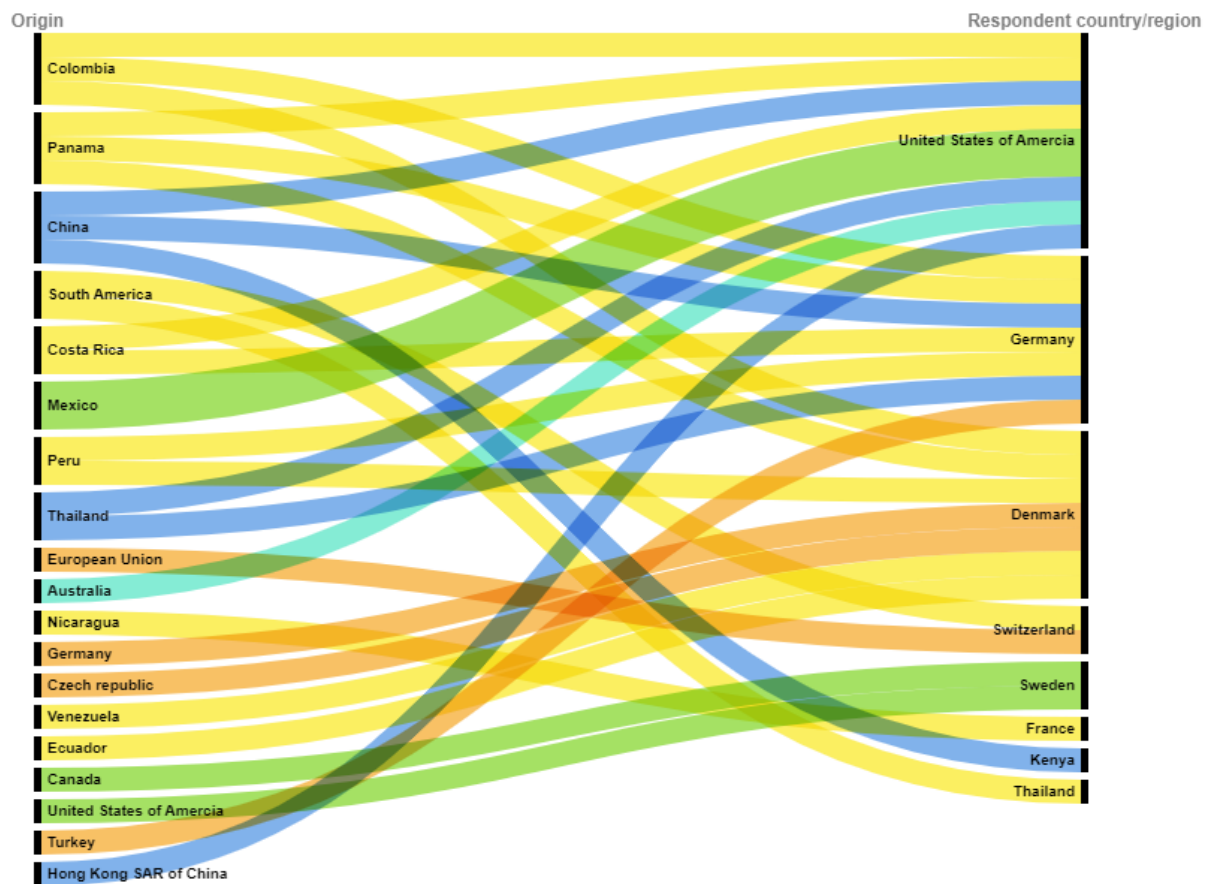


Figure 21: Most common alleged origin countries/regions of amphibian shipments illegally imported by respondent countries/regions.

Annex 1.1

Country/ region	National level Red List or other assessment of conservation status for amphibians
Argentina	Vaira et al. 2012. Categorización del estado de conservación de los anfibios de la República Argentina. Cuadernos de herpetología, 26, 131-159.
Brazil	Ministério do Meio Ambiente/Gabinete do Ministro. Portaria MMA Nº 148, de 7 de Junho de 2022. Available at: https://www.icmbio.gov.br/cepsul/images/stories/legislacao/Portaria/2020/P_mma_148_2022_altera_anexos_P_mma_443_444_445_2014_atualiza_especies_ameacadas_extincao.pdf.
Costa Rica	Establishes the Official List of Endangered Species and Species with Reduced and Threatened Populations (2023) Sistema Costarricense de Información Jurídica. Available at: http://www.pgrweb.go.cr/scij/Busqueda/Normativa/Normas/nrm_texto_completo.aspx?param1=NRTC&nValor1=1&nValor2=84908&nValor3=109703&strTipM=TC (Accessed: 07 September 2023).
Cuba	González Alonso, H., L. Rodríguez Schettino, A. Rodríguez, C. A. Mancina e I. Ramos García. 2012. Libro Rojo de los Vertebrados de Cuba. Editorial Academia, La Habana, 304.
Denmark	Moeslund, J.E., Nygaard, B., Ejrnæs, R., Bell, N., Bruun, L.D., Bygebjerg, R., Carl, H., Damgaard, J., Dylmer, E., Elmeros, M., Flensted, K., Fog, K., Goldberg, I., Gønget, H., Helsing, F., Holmen, M., Jørum, P., Lissner, J., Læssøe, T., Madsen, H.B., Misser, J., Møller, P.R., Nielsen, O.F., Olsen, K., Sterup, J., Søchting, U., Wiberg-Larsen, P. og Wind, P. 2019. Den danske Rødliste. Aarhus Universitet, DCE – Nationalt Center for Miljø og Energi. www.redlist.au.dk.
France	La Liste rouge des espèces menacées en France - Reptiles et Amphibiens de France métropolitaine (2015)
Germany	Rote-Liste-Gremium Amphibien und Reptilien (2020): Rote Liste und Gesamtartenliste der Amphibien (Amphibia) Deutschlands. – Naturschutz und Biologische Vielfalt 170 (4): 86 S.
Hong Kong SAR of China	Inglis, S.J., Wong, E.T.C., le Clue, S. & Whitfort, A.S. (2022) Wild, Threatened, Farmed: Hong Kong's Invisible Pets. ADM Capital Foundation: Hong Kong SAR.
Italy	Rondinini, C., Battistoni, A., Teofili, C. (compilatori). 2022 Lista Rossa IUCN dei vertebrati italiani 2022 Comitato Italiano IUCN e Ministero dell'Ambiente e della Sicurezza Energetica, Roma
Israel	Dolev A., Pervolutzki A. (2002). Endangered Species in Israel. Red List of Threatened Animals. Vertebrates. Jerusalem: The Nature Reserves and Park Authority and the Society for Conservation of Nature.
Japan	Japanese Ministry of the Environment (no date) RL/RDB : 環境省. Available at: https://ikilog.biodic.go.jp/Rdb/booklist (Accessed: 07 September 2023).
Mexico	Luna Reyes, R., Muñoz-Aionso, L. A., Percino-Daniel, R. y O. HernándezOrdoñez. 2020. Conservación y monitoreo de anfibios en riesgo de extinción en Chiapas. Universidad de Ciencias y Artes de Chiapas, Secretaría de Medio Ambiente e Historia Natural, El Colegio de la Frontera Sur y Universidad Nacional Autónoma de México. Informe final SNIB-CONABIO, Proyecto No. ME005 Ciudad de México.
Netherlands	Red Lists: species of Red List Amphibians. species of Red List Amphibians

Country/ region	National level Red List or other assessment of conservation status for amphibians
	Government Gazette 2009, 13201. Rode lijsten: soort van Rode Lijst Amfibieën. soort van Rode Lijst Amfibieën Staatscourant 2009, 13201.
New Zealand	Burns, R.J.; Bell, B.D.; Haigh, A.; Bishop, P.; Easton, L.; Wren, S.; Germano, J.; Hitchmough, R.A.; Rolfe, J.R.; Maken T. 2018: New Zealand Threat Classification Series 25. 7
Panama	Republica de Panama Ministerio de Ambiente Resolution No. DM-0657 2016 De 16 de Diciembre de 2016
Peru	SERFOR. 2018. Libro Rojo de la Fauna Silvestre Amenazada del Perú. Primera edición. SERFOR (Servicio Nacional Forestal y de Fauna Silvestre), Lima., Perú, pp. 1- 532.
Slovakia	Ferakova, V., Maglocky, S. & Marhold, K., 2001: Cerveny zoznam papredorastov a semennych rastlin Slovenska (December 2001) – In: Balaz, D., Marhold, K. & Urban, P. eds., Cerveny zoznam rastlin a zivocichov Slovenska, Ochr. Prir. 20 (Suppl.): 48-81.
Sweden	Ett kunskapscentrum för arter och naturtyper: SLU artdatabanken (1970) SLU.SE. Available at: https://www.artdatabanken.se/ (Accessed: 07 September 2023).
Switzerland	Rote Liste der gefährdeten Arten der Schweiz: Amphibien. 2005. 48, VU-9012-D, Bundesamt für Umwelt BAFU, Vollzug Umwelt VU.
Thailand	Thailand Office of Natural Resources, Environmental Policy, and Planning. 2023 Threatened animal species of Thailand. Website - ชนิดพันธุ์สัตว์ที่ถูกคุกคามของประเทศไทย – สำนักงานนโยบายและแผนทรัพยากรธรรมชาติและสิ่งแวดล้อม (onep.go.th). (Accessed 22 September 2023).
United Kingdom of Great Britain and Northern Ireland	Foster, J., Driver, D., Ward, R. & Wilkinson, J. (2021). IUCN Red List assessment of amphibians and reptiles at Great Britain and country scale. Report to Natural England. ARC report. ARC, Bournemouth.
United Republic of Tanzania	CITES-listed species for the United Republic of Tanzania guide national amphibian conservation status assessments
United States of America	Service, U.S.F. and W. (2023) Listed+Animals. Available at: https://ecos.fws.gov/ecp0/reports/ad-hoc-species-report?kingdom=I&status=SAT&mapstatus=3&fcrithab=on&fstatus=on&fspecrule=on&finvpop=on&fgroup=on&header=Listed%2BAnimals.
Uruguay	Carreira, S. & R. Maneyro. 2015. Lista Roja de los Anfíbios y Reptiles del Uruguay. Una evaluación del estado de conservación de la herpetofauna de Uruguay sobre la base de los criterios de la Unión Internacional para la Conservación de la Naturaleza. Dirección Nacional de Medio Ambiente, Montevideo.

Annex 1.2

Country/ region	National laws regulating trade in amphibians
Argentina	<p><u>The National Wildlife Conservation Law [Ley Nacional para la Conservación de la Fauna Silvestre] No. 22.421. Accessed on 4 September 2023.</u></p> <p><u>Wildlife Conservation Regulatory Decree N° 666/1997. Accessed on 4 September 2023.</u></p> <p><u>Decree No. 522/97, Regulating the provisions of Law No. 22.344, which approved the Convention on International Trade in Endangered Species of Wild Fauna and Flora. (Decreto N° 522/97, Reglamentase las disposiciones de la Ley N° 22.344). Accessed on 4 September 2023.</u></p> <p><u>Resolution No 62/1986 - Limit trade in native wildlife species (Limitase la comercialización de especies de la fauna silvestre autóctona). Accessed on 4 September 2023.</u></p> <p><u>Law No. 22.344, Approve the "Convention on International Trade in Endangered Species of Wild Fauna and Flora", signed in the city of Washington on 3 March 1973, with its Appendices and Amendments. (Ley No 22.344, Apruébase la "Convención sobre el Comercio Internacional de Especies Amenazadas de Fauna y Flora Silvestres"). Accessed on 4 September 2023.</u></p>
Brazil	<p><u>Ibama Ordinance No. 93 / 1998 of 07 July 1998 (Import and Export of Wild Fauna), (PORTARIA IBAMA nº 93 / 1998, de 07 de julho 1998 (Importação e Exportação Fauna Silvestre)). Accessed on 8 September 2023.</u></p> <p><u>Ordinance 2489 of 09 July 2019. Amends Ordinance No. 93, of 07 July 1998, which provides for the export and import of wild fauna. (Portaria 2489, de 09 de julho de 2019. Altera a Portaria nº 93, de 07 de julho de 1998, que dispõe sobre a exportação e importação da fauna silvestre). Accessed on 19 September 2023.</u></p>
Canada	<p><u>Wild Animal and Plant Trade Regulations (SOR/96-263). 2020. Accessed on 4 September 2023.</u></p> <p><u>Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act (S.C. 1992, c. 52). Accessed on 4 September 2023.</u></p> <p><u>Wildlife Act. Designation and exemption regulation. [Last amended July 1, 2022 by B.C. Reg. 157/2022]. Accessed on 13 September 2023.</u></p> <p><u>Regulations Amending the Wild Animal and Plant Trade Regulations P.C. 2017-505 May 12, 2017. Accessed on 13 September 2023.</u></p>
Colombia	<p><u>Decree-Law 1608 1974 By which the Code of Renewable Natural Resources and Environmental Protection is dictated. Accessed on 11 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
	<p><u>Decree 1608 1978 Regulating the National Code of Renewable Natural Resources and Environmental Protection. Accessed on 11 September 2023.</u></p> <p><u>Law 23 of 1973 on wildlife. Accessed on 11 September 2023. Accessed on 11 September 2023.</u></p> <p><u>Law 17 1981 Approving the Convention on International Trade in Endangered Species of Wild Fauna and Flora - CITES. Accessed on 11 September 2023.</u></p> <p><u>Law 84 1989 Which adopts the National Statute for the Protection of Animals and creates some contraventions and regulates their procedure and competence. Accessed on 11 September 2023.</u></p> <p><u>Law 99 1993 Which creates the Ministry of the Environment, reorganises the Public Sector in charge of the management and conservation of the environment and renewable natural resources, organises the National Environmental System, SINA, and enacts other provisions. Regulated by National Decree 1713 of 2002, Regulated by National Decree 4688 of 2005, Partially regulated by National Decree 3600 of 2007, Regulated by National Decree 2372 of 2010. Accessed on 11 September 2023.</u></p> <p><u>Law 195 1994 By which Colombia adheres to the Convention on Biological Diversity. Accessed on 11 September 2023.</u></p> <p><u>Decree 1401 1997 Designating the Administrative Authority of Colombia to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and determining its functions. Accessed on 11 September 2023.</u></p> <p><u>Decree 1420 1997 Designating the Scientific Authorities of Colombia to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and determining their functions. Accessed on 11 September 2023.</u></p> <p><u>Decree 125 2000 Modifying Decree 1420 of 1997. Accessed on 11 September 2023.</u></p> <p><u>Decree 1909 2000 Designating sea and river ports, airports and other places for international trade in specimens of wild fauna and flora. Accessed on 11 September 2023.</u></p> <p><u>Resolution 1317 of 2000. Accessed on 11 September 2023.</u></p> <p><u>Law 611 2000 By which norms are dictated for the sustainable management of species of wild and aquatic fauna. Accessed on 11 September 2023.</u></p> <p><u>Resolution 1317 of 2000 By which criteria are established for the granting of hunting licences for the purpose of promotion and for the establishment of zoos. Accessed on 11 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
	<p><u>Resolution 1909 2018 Establishing the Single National Online Permit for the movement of specimens of biological diversity. Accessed on 11 September 2023.</u></p> <p><u>Resolution 081 2018 By which Resolution 1909 of 14 September 2017 is amended and other determinations are made". Accessed on 11 September 2023.</u></p> <p><u>Resolution 1172 2004 Establishing the National System for the Identification and Registration of Wildlife Specimens in Ex Situ Conditions. Accessed on 11 September 2023.</u></p> <p><u>Resolution 1173 2004 Regulating the National Register of Providers of Markings defined in the National System for the Identification of Wildlife Specimens in Ex Situ Conditions. Accessed on 11 September 2023.</u></p> <p><u>Resolution 1263 2006 Establishing the procedure and setting the value for issuing the permits referred to in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and issuing other provisions. Accessed on 11 September 2023.</u></p> <p><u>Law 1333 2009 Establishing the environmental sanctioning procedure and other provisions. Accessed on 11 September 2023.</u></p> <p><u>Resolution 2064 2010 By which the measures subsequent to the preventive arrest, restitution or confiscation of specimens of wild species of terrestrial and aquatic fauna and flora are regulated and other provisions are issued. Accessed on 11 September 2023.</u></p> <p><u>Decree 1076 2015 Through which the Sole Regulatory Decree of the Environment and Sustainable Development Sector is issued. Accessed on 11 September 2023.</u></p> <p><u>Law 1774 2016 "Whereby the Civil Code, Law 84 of 1989 and the Criminal Code are amended. The Criminal Code. The Code of Criminal Procedure and other provisions are enacted. Accessed on 11 September 2023.</u></p> <p><u>Resolution 1912 2017 By which the list of threatened wild species of Colombian continental and coastal marine biodiversity is established. Accessed on 11 September 2023.</u></p>
Costa Rica	<p><u>Law No. 7788 of April 30, 1998, on Biodiversity (as amended up to Law No. 10133 of March 14, 2022). (Ley N° 7788, de 30 de abril de 1998, de Biodiversidad (así reformada por la Ley N° 10133 de 14 de marzo de 2022)). Accessed on 8 September 2023.</u></p> <p><u>Law No. 7788 of April 30, 1998, on Biodiversity (as amended up to Law No. 9766 of October 29, 2019), (Ley N° 7788, de 30 de abril de 1998, de Biodiversidad (así reformada por la Ley N° 9766 de 29 de octubre de 2019)). Accessed on 8 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
	<p><i>Law No. 7788 of April 30, 1998, on Biodiversity (as amended by Law No. 8686 of November 21, 2008), (Ley N° 7788, de 30 de abril de 1998, de Biodiversidad (modificada por la Ley N° 8686 de 21 de noviembre de 2008)). Accessed on 8 September 2023.</i></p> <p><i>Biodiversity Law No. 7788, 1998. (Ley de Biodiversidad N° 7788). Accessed on 8 September 2023.</i></p> <p><i>Wildlife Conservation Law, No. 7317, 1998. (Ley de Conservación de la Vida Silvestre N° 7317). Accessed on 8 September 2023.</i></p> <p><i>Regulations to the Wildlife Conservation Law No. 7317 N° 40548-MINAE, 2017 (Reglamento a la Ley de Conservación de la Vida Silvestre N° 7317 N° 40548-MINAE, 2017). Accessed 8 September 2023.</i></p>
Cuba	<p><i>Official Gazette of the Republic of Cuba Ministry of Justice No. 026 Ordinary of 4 August 2011. Ministry of Science, Technology and Environment Resolution No. 160/11 (Gaceta Oficial de la Republic de Cuba Ministerio de Justicia No. 026 Ordinaria de 4 de agosto de 2011. Ministerio de Ciencia, Tecnología y Medio Ambiente Resolución No. 160/11). Accessed on 1 September 2023.</i></p>
Denmark	<p><i>European Union laws and regulations apply.</i></p>
European Union	<p><i>Council Regulation (EC) No 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein. Accessed 8 September 2023.</i></p> <p><i>Commission Regulation [EC] No 865/2006. Accessed 8 September 2023.</i></p> <p><i>Commission Implementing Regulation [EU] 792/2012. Accessed 8 September 2023.</i></p> <p><i>Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Accessed 8 September 2023.</i></p> <p><i>Regulation (EU) 2016/429 of the European Parliament and of the Council of 9 March 2016 on transmissible animal diseases and amending and repealing certain acts in the area of animal health ('Animal Health Law'). Accessed 8 September 2023.</i></p>
France	<p><i>European Union laws and regulations apply.</i></p> <p><i>Order of 8 October 2018 laying down general rules for the keeping of animals of non-domestic species (Arrêté du 8 octobre 2018 fixant les règles générales de détention d'animaux d'espèces non domestiques). Accessed on 1 September 2023.</i></p>
Germany	<p><i>European Union laws and regulations apply.</i></p>

Country/ region	National laws regulating trade in amphibians
	<p><u>Federal Nature Conservation Act of 29 July 2009 (Federal Law Gazette I p. 2542), as last amended by Article 3 of the Act of 8 December 2022. (Bundesnaturschutzgesetz vom 29. Juli 2009 (BGBl. I S. 2542), das zuletzt durch Artikel 3 des Gesetzes vom 8. Dezember 2022 geändert worden ist.). Accessed 8 September 2023.</u></p> <p><u>Federal Species Protection Ordinance of 16 February 2005 (BGBl. I p. 258; 896), as last amended by Article 10 of the Act of 21 January 2013 (BGBl. I p. 95). (Bundesartenschutzverordnung vom 16. Februar 2005 (BGBl. I S. 258; 896), die zuletzt durch Artikel 10 des Gesetzes vom 21. Januar 2013 (BGBl. I S. 95) geändert worden ist). Accessed 8 September 2023.</u></p>
Hong Kong SAR of China	<p><u>Cap. 60 Import and Export Ordinance. Accessed on 21 September 2023.</u></p> <p><u>Cap. 139 Public Health (Animals and Birds) Ordinance. Accessed on 21 September 2023.</u></p> <p><u>Cap. 169 Prevention of Cruelty to Animals Ordinance. Accessed on 21 September 2023.</u></p> <p><u>Cap. 170 Wild Animals Protection Ordinance. Accessed on 21 September 2023.</u></p> <p><u>Cap. 455 Organized and Serious Crimes Ordinance. Accessed on 21 September 2023.</u></p> <p><u>Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance. Accessed on 21 September 2023.</u></p>
India	<p><u>Wild Life (Protection) Act, 1972. Accessed on 19 September 2023.</u></p> <p><u>Wild Life (Protection) Amendment Act, 2022 No 18 of 2022. Accessed on 4 September 2023.</u></p> <p><u>Biological Diversity (Amendment) Act, No. 10 of 2023. Accessed on 4 September 2023.</u></p> <p><u>Biological Diversity Rules, 2004. Accessed on 4 September 2023.</u></p>
Indonesia	<p><u>Regulation of the Minister of Forestry No. 447/Kpts-ii/2003 Concerning administration directive of harvest or capture and distribution of the specimens of wild plant and animal species. Accessed on 8 September 2023.</u></p>
Israel	<p><u>Wildlife Protection Law, 5715-1955. Accessed on 4 September 2023.</u></p> <p><u>Wildlife Protection Regulations, 1976. Accessed on 4 September 2023.</u></p> <p><u>National Parks, Nature Reserves, National Sites and Memorial Sites Law, 5758-1998. Accessed on 4 September 2023.</u></p>

Country/ region	National laws regulating trade in amphibians
Japan	<p><u>Act on Conservation of Endangered Species of Wild Fauna and Flora, Act No. 75 of June 5, 1992. Accessed on 8 September 2023.</u></p> <p><u>Act on the Prevention of Adverse Ecological Impacts Caused by Designated Invasive Alien Species, Act No. 78 of June 2, 2004. Accessed on 8 September 2023.</u></p>
Kenya	<p><u>Wildlife Conservation and Management Act, 2013 (No. 47 of 2013). Accessed on 4 September 2023.</u></p>
Mexico	<p><u>Political Constitution of the United Mexican States. Constitution published in the Diario Oficial de la Federación on 5 February 1917. (Constitución Política de los Estados Unidos Mexicanos. Constitución publicada en el Diario Oficial de la Federación el 5 de febrero de 1917. Accessed on 8 September.</u></p> <p><u>General Law on Ecological Balance and Environmental Protection. New Law published in the Diario Oficial de la Federación on 28 January 1988. (Ley General del Equilibrio Ecológico y Protección al Ambiente. Nueva Ley publicada en el Diario Oficial de la Federación el 28 de enero de 1988.) Accessed on 8 September 2023.</u></p> <p><u>General Wildlife Law. New Law published in the Diario Oficial de la Federación on 3 July 2000. (Ley General de Vida Silvestre. Nueva Ley publicada en el Diario Oficial de la Federación el 3 de julio de 2000). Accessed on 8 September 2023.</u></p> <p><u>Regulations of the General Wildlife Law. New Regulation published in the Diario Oficial de la Federación on 30 November 2006. (Reglamento de la Ley General de Vida Silvestre. Nuevo Reglamento publicado en el Diario Oficial de la Federación el 30 de noviembre de 2006). Accessed on 8 September 2023.</u></p> <p><u>Organic Law of the Federal Public Administration. New Law published in the Diario Oficial de la Federación on 29 December 1976. (Ley Orgánica de la Administración Pública Federal. Nueva Ley publicada en el Diario Oficial de la Federación el 29 de diciembre de 1976). Accessed on 11 September 2023.</u></p> <p><u>Federal Law on Animal Health. New Law published in the Official Journal of the Federation on 25 July 2007. (Ley Federal de Sanidad Animal. Nueva Ley publicada en el Diario Oficial de la Federación el 25 de julio de 2007). Accessed on 11 September 2023.</u></p> <p><u>Rules of procedure of the Ministry of Environment and Natural Resources, 2012 (Reglamento Interior de la Secretaría de Medio Ambiente y Recursos Naturales, 2012). Accessed on 11 September 2023.</u></p> <p><u>Mexican Official Rule NOM-059-SEMARNAT-2010, Environmental protection-Mexican native species of wild flora and fauna-Categories of risk and specifications for their inclusion, exclusion or change-List of</u></p>

Country/ region	National laws regulating trade in amphibians
	<p><i>species at risk, 2010. (NORMA Oficial Mexicana NOM-059-SEMARNAT-2010, Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo). 2010. Accessed on 11 September 2023.</i></p> <p><i>AMENDMENT of Normative Annex III, List of species at risk of the Mexican Official Standard NOM-059-SEMARNAT-2010, Environmental protection-Mexican native species of wild flora and fauna-Categories of risk and specifications for their inclusion, exclusion or change-List of species at risk, published on 30 December 2010. (MODIFICACIÓN del Anexo Normativo III, Lista de especies en riesgo de la Norma Oficial Mexicana NOM-059-SEMARNAT-2010, Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo, publicada el 30 de diciembre de 2010.). Accessed on 11 September 2023.</i></p> <p><i>AGREEMENT establishing the goods whose import and export is subject to regulation by the Ministry of the Environment and Natural Resources. 2020. (ACUERDO que establece las mercancías cuya importación y exportación está sujeta a regulación por parte de la Secretaría de Medio Ambiente y Recursos Naturales. 2010.). Accessed on 11 September 2023.</i></p> <p><i>AGREEMENT by which the notifiable exotic and endemic diseases and pests of terrestrial and aquatic animals in the United Mexican States are made known. 2018. (ACUERDO mediante el cual se dan a conocer en los Estados Unidos Mexicanos las enfermedades y plagas exóticas y endémicas de notificación obligatoria de los animales terrestres y acuáticos. 2018). Accessed on 11 September 2023.</i></p>
New Zealand	<p><i>Trade in Endangered Species Act 1989. Accessed on 8 September 2023.</i></p>
Netherlands	<p><i>European Union laws and regulations apply.</i></p> <p><i>Animals Law, 2022. (Wet dieren, 2022). Accessed 13 September 2023.</i></p> <p><i>Nature Conservation Act of 16 December 2015, laying down rules for the protection of nature. (Wet natuurbescherming van 16 december 2015, houdende regels ter bescherming van de natuur). Accessed on 13 September 2023.</i></p> <p><i>Nature Conservation Decree, 2021. (Besluit natuurbescherming, 2021.). Accessed 13 September 2023.</i></p> <p><i>Nature conservation regulations, 2023. (Regeling natuurbescherming, 2023). Accessed 13 September 2023.</i></p>
Peru	<p><i>Forestry and Wildlife Law No 29763. 2015. (Ley Forestal y de Fauna Silvestre Ley No 29763). Accessed on 4 September 2023.</i></p>

Country/ region	National laws regulating trade in amphibians
Slovakia	<p><u>European Union laws and regulations apply.</u></p> <p><u>15 THE LAW of December 2, 2004 on the protection of species of wild animals and wild plants by regulating trade with them and on the amendment of certain laws. (15 ZÁKON z 2. decembra 2004 o ochrane druhov voľne žijúcich živočíchov a voľne rastúcich rastlín reguláciou obchodu s nimi a o zmene a doplnení niektorých zákonov).</u> Accessed on 8 September 2023.</p> <p><u>110 DECREE of the Ministry of the Environment of the Slovak Republic of 14 February 2005 implementing certain provisions of the Act on the Protection of Species of Wild Fauna and Flora by Regulating Trade Therein and on Amendments and Additions to Certain Acts. (110 VYHLÁŠKA, Ministerstva životného prostredia Slovenskej republiky zo 14. februára 2005, ktorou sa vykonávajú niektoré ustanovenia zákona o ochrane druhov voľne žijúcich živočíchov a voľne rastúcich rastlín reguláciou obchodu s nimi a o zmene a doplnení niektorých zákonov).</u> Accessed on 8 September 2023.</p> <p><u>543, THE LAW of June 25, 2002 on nature and landscape protection. (543 ZÁKON z 25. júna 2002 o ochrane prírody a krajiny).</u> Accessed on 8 September 2023.</p> <p><u>170 DECREE Ministry of the Environment of the Slovak Republic of 19 April 2021, which implements Act no. 543/2002 Coll. on nature and landscape protection, as amended (170 VYHLÁŠKA Ministerstva životného prostredia Slovenskej republiky z 19. apríla 2021, ktorou sa vykonáva zákon č. 543/2002 Z. z. o ochrane prírody a krajiny v znení neskorších predpisov).</u> Accessed on 8 September 2023.</p>
Sweden	<p><u>Species Protection Ordinance (2007:845). (Artskyddsförordning (2007:845)).</u> Accessed on 13 September 2023.</p> <p><u>National Board of Agriculture regulations and general advice (SJVFS 2021:13) on registration, authorisation, traceability, movement, imports and exports with regard to animal health; (Statens jordbruksverks föreskrifter och allmänna råd om registrering, godkännande, spårbarhet, förflyttning, införsel samt export med avseende på djurhälsa;).</u> Accessed on 13 September 2023.</p> <p><u>Swedish Board of Agriculture's regulation concerning conditions for keeping, breeding and selling etc. of animals intended for companionship and hobby; (SJVFS 2019:15) (Statens jordbruksverks föreskrifter och allmänna råd om villkor för hållande, uppfödning och försäljning m.m. av djur avsedda för sällskap och hobby; (SJVFS 2019:15)).</u> Accessed on 13 September 2023.</p>
Switzerland	<p><u>Federal law on the Movement of Protected Species of Fauna and Flora. 2012. (Loi fédérale sur la circulation des espèces de faune et de flore protégées.</u></p>

Country/ region	National laws regulating trade in amphibians
	<p><i>(Loi sur les espèces protégées, LCITES) du 16 mars 2012 (État le 1er septembre 2023) L'Assemblée fédérale de la Confédération suisse. Accessed on 1 September 2023.</i></p> <p><i>Ordinance on the movement of protected species of fauna and flora (OCITES). 2013. Ordonnance sur la circulation des espèces de faune et de flore protégées (OCITES) du 4 septembre 2013 (État le 1er septembre 2023). Accessed on 1 September 2023.</i></p> <p><i>Federal Act on the Protection of Nature and Cultural Heritage (NCHA) 1 of 1 July 1966 (Status as of 1 January 2022). Accessed on 1 September 2023.</i></p> <p><i>Ordinance on the Protection of Nature and Cultural Heritage (NCHO) of 16 January 1991 (Status as of 1 June 2017) . Accessed on 1 September 2023.</i></p>
Thailand	<p><i>Wildlife Conservation and Protection Act, B.E. 2562 (2019). Accessed on 8 September 2023.</i></p> <p><i>Royal Ordinance on Fisheries, B.E. 2558 (2015). Accessed on 8 September 2023.</i></p> <p><i>Animal Epidemics Act B.E. 2558 (2015). Accessed on 8 September 2023.</i></p>
United Republic of Tanzania	<p><i>The Wildlife Policy of Tanzania 2007. Accessed on 1 September 2023.</i></p> <p><i>The Wildlife Conservation Act Cap. 283. 2022. Accessed on 1 September 2023.</i></p> <p><i>The Wildlife Conservation (Management of Wildlife Captive Facilities) Regulations, 2020. Accessed on 1 September 2023.</i></p> <p><i>The Wildlife Conservation (Dealings in Trophies) Regulations, 1974 (G.Ns. Nos. 265 and 268). Accessed on 1 September 2023.</i></p>
United States of America	<p><i>The Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.). Accessed on 1 September 2023.</i></p>
Uruguay	<p><i>Law 9.481. Ecology. Protection of indigenous fauna. Official Gazette, July 10, 1935. Accessed on 4 September 2023.</i></p> <p><i>Decree no. 550/008. Regulation of trade and possession of endangered species of wild fauna and flora. Official Gazette, November 28, 2008. Accessed on 4 September 2023.</i></p>

Annex 1.3

Country/ region	National regulations or requirements to control the spread of disease in traded amphibians
Argentina	<p>Resolution 388/2008. The "Sanitary Conditions to Authorize the Importation of Amphibians for commercial purposes to the Argentine Republic" are approved. forms. (Resolución 388/2008. Apruébanse las "Condiciones Sanitarias para Autorizar la Importación de Anfibios con fines comerciales a la República Argentina". Formularios). Accessed on 12 September 2023.</p> <p>Resolution 278/2008. The Sanitary Conditions to Authorize the Importation of Live Catesbeian Frogs to the Argentine Republic, the import application form and the international veterinary certificate are approved. (Resolución 278/2008. Apruébanse las Condiciones Sanitarias para Autorizar la Importación de Ranas Catesbeianas Vivas a la República Argentina, el formulario de solicitud de importación y el certificado veterinario internacional.). Accessed on 12 September 2023.</p>
Canada	<p>Regulations Amending the Wild Animal and Plant Trade Regulations: SOR/2018-81. Accessed on 12 September 2023.</p> <p>Environment and Climate Change Canada (ECCC) 2018. Import restriction on salamanders webpage. Accessed on 12 September 2023.</p>
Costa Rica	<p>See Costa Rica laws and regulations in Annex 1.2.</p> <p>General Law on the National Animal Health Service No. 8495. (Ley General del Servicio Nacional de Salud Animal N° 8495). Accessed on 12 September 2023.</p>
European Union	<p>Regulation (EU) 2016/429 of the European Parliament and of the Council of 9 March 2016 on transmissible animal diseases and amending and repealing certain acts in the area of animal health ('Animal Health Law'). Accessed 8 September 2023.</p>
Germany	<p>European Union regulations apply.</p>
India	<p>Animal Quarantine & Certification Services. Department- Department of Animal Husbandry, Dairying and Fisheries, Ministry- Ministry of Fisheries, Animal Husbandry and Dairying. Accessed on 19 September 2023.</p>
Indonesia	<p>Regulation of the Minister of Agriculture of the Republic of Indonesia No. 17/PERMENTAN/KR.120/5/2017 regarding Animal Quarantine Documents. Accessed on 12 September 2023.</p>
Mexico	<p>Federal Animal Health Law. New Law published in the Official Journal of the Federation on 25 July 2007. (LEY FEDERAL DE SANIDAD ANIMAL Nueva Ley publicada en el Diario Oficial de la Federación el 25 de julio de 2007). Accessed on 12 September 2023.</p>
Netherlands	<p>European Union regulations apply.</p>

Country/ region	National regulations or requirements to control the spread of disease in traded amphibians
	<u>Health certificate for the entry of reptiles and amphibians into the EU destined for the Netherlands. Accessed on 12 September 2023.</u>
New Zealand	<u>Animal Welfare Act 1999, No 142. Version as at 30 April 2023. Accessed 13 September 2023.</u>
Sweden	<p><u>The Swedish Agency for Agriculture's regulations and general advice on registration, approval, traceability, movement, import and export with regard to animal health. (Statens jordbruksverks föreskrifter och allmänna råd om registrering, godkännande, spårbarhet, förflyttning, införsel samt export med avseende på djurhälsa). Accessed on 12 September 2023.</u></p> <p><u>Regulation (EU) 2016/429 of the European Parliament and of the Council of 9 March 2016 on transmissible animal diseases and amending and repealing certain acts in the area of animal health ('Animal Health Law'). Accessed 8 September 2023.</u></p> <p><u>The Commission Implementing Regulation (EU) 2020/2235 of 16 December 2020. Accessed on 12 September 2023.</u></p>
Switzerland	<u>Ordinance on trade in imports, transit and exports of animals and animal products with third countries (OITE-PT). (Ordonnance réglant les échanges d'importation, de transit et d'exportation d'animaux et de produits animaux avec les pays tiers (OITE-PT)). Accessed on 12 September 2023.</u>
Thailand	<u>World Organisation for Animal Health (OIE). Manual of Diagnostic Tests for Aquatic Animals 2019. Chapter 2.1.2. Infection with Ranavirus. Accessed on 12 September 2023.</u>
United Republic of Tanzania	<p><u>Convention on International Trade in Endangered Species of Wild Fauna and Flora (Cites) (Implementation) Regulations, 2005 (G.N. No. 225 of 2005). Accessed on 12 September 2023.</u></p> <p><u>The Wildlife Conservation (Dealings in Trophies) Regulations. Accessed on 12 September 2023.</u></p> <p><u>Wildlife (Capture of Animals) Regulations, 1974 (G.Ns. Nos. 265 and 278 of 1974). Accessed on 12 September 2023</u></p>
United States of America	<u>The Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.). Accessed on 12 September 2023.</u>

Annex 1.4

Country/ region	National legislation regulating captive breeding of amphibian species
Argentina	MINISTRY OF ENVIRONMENT AND SUSTAINABLE DEVELOPMENT. Resolution 170/2021. (Resolución 170 / 2021 MINISTERIO DE AMBIENTE Y DESARROLLO SOSTENIBLE). Accessed on 13 September 2023.
Canada	Wild Animal and Plant Trade Regulations (SOR/96-263). 2020. Accessed on 4 September 2023. Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act (S.C. 1992, c. 52). Accessed on 4 September 2023. Wildlife Act. Designation and exemption regulation. [Last amended July 1, 2022 by B.C. Reg. 157/2022]. Accessed on 13 September 2023. Regulations Amending the Wild Animal and Plant Trade Regulations P.C. 2017-505 May 12, 2017. Accessed on 13 September 2023.
Colombia	See Annex 1.2
Costa Rica	Wildlife Conservation Law, No. 7317, 1998. (Ley de Conservación de la Vida Silvestre N° 7317). Accessed on 8 September 2023. Regulations to the Wildlife Conservation Law No. 7317 N° 40548-MINAE, 2017 (Reglamento a la Ley de Conservación de la Vida Silvestre N° 7317 N° 40548-MINAE, 2017). Accessed 8 September 2023.
Cuba	Official Gazette of the Republic of Cuba Ministry of Justice No. 026 Ordinary of 4 August 2011. Ministry of Science, Technology and Environment Resolution No. 160/11 (Gaceta Oficial de la Republic de Cuba Ministerio de Justicia No. 026 Ordinaria de 4 de agosto de 2011. Ministerio de Ciencia, Tecnología y Medio Ambiente Resolución No. 160/11). Accessed on 1 September 2023.
European Union	Council Regulation (EC) No 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein. Accessed 8 September 2023. Commission Regulation [EC] No 865/2006. Accessed 8 September 2023. Commission Implementing Regulation [EU] 792/2012. Accessed 8 September 2023. Regulation (EU) 2016/429 of the European Parliament and of the Council of 9 March 2016 on transmissible animal diseases and amending and repealing certain acts

Country/ region	National legislation regulating captive breeding of amphibian species
	<p>in the area of animal health ('Animal Health Law'). Accessed 8 September 2023.</p> <p>COMMISSION NOTICE Guidance document on live animals bred in captivity under the EU Wildlife Trade Regulations (2022/C 306/02) Official Journal of the European Union of 11.8.2022. Accessed 8 September 2023.</p>
France	<p>European Union laws and regulations apply.</p> <p>Order of 8 October 2018 laying down general rules for the keeping of animals of non-domestic species. (Arrêté du 8 octobre 2018 fixant les règles générales de détention d'animaux d'espèces non domestiques). Accessed 13 September 2023.</p>
Germany	<p>European Union laws and regulations apply.</p>
Hong Kong SAR of China	<p>Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance. Accessed on 21 September 2023.</p> <p>Cap. 139 Public Health (Animals and Birds) Ordinance. Accessed on 21 September 2023.</p>
India	<p>Wild life (Protection) Amendment Act, 2022 No 18 of 2022. Accessed on 4 September 2023.</p> <p>Biological Diversity (Amendment) Act, No. 10 of 2023. Accessed on 4 September 2023.</p> <p>Biological Diversity Rules, 2004. Accessed on 4 September 2023.</p>
Indonesia	<p>Ministry of Forestry Republic of Indonesia Decree Number: p. 36/menhut-ii/2009 regarding procedures for licensing of commercial utilisation of carbon sequestration and/or storage in production and protected forests. Accessed on 13 September 2023.</p>
Japan	<p>Act on the Prevention of Adverse Ecological Impacts Caused by Designated Invasive Alien Species, Act No. 78 of June 2, 2004. Accessed on 8 September 2023.</p>
Kenya	<p>Wildlife Conservation and Management Act, 2013 (No. 47 of 2013). Accessed on 4 September 2023.</p>
Mexico	<p>General Law on Ecological Balance and Environmental Protection. New Law published in the Diario Oficial de la Federación on 28 January 1988. (Ley General del Equilibrio Ecológico y Protección al Ambiente. Nueva Ley publicada en el Diario Oficial de la Federación el 28 de enero de 1988.) Accessed on 8 September 2023.</p> <p>General Wildlife Law. New Law published in the Diario Oficial de la Federación on 3 July 2000. (Ley General de Vida Silvestre. Nueva Ley publicada en el Diario Oficial de la Federación el 3 de julio de 2000). Accessed on 8 September 2023.</p>

Country/ region	National legislation regulating captive breeding of amphibian species
	<p><i>Regulations of the General Wildlife Law. New Regulation published in the Diario Oficial de la Federación on 30 November 2006. (Reglamento de la Ley General de Vida Silvestre. Nuevo Reglamento publicado en el Diario Oficial de la Federación el 30 de noviembre de 2006).</i> Accessed on 8 September 2023.</p>
Netherlands	<p>European Union laws and regulations apply.</p> <p>Animals Law, 2022. (Wet dieren, 2022). Accessed 13 September 2023.</p> <p>Animal husbandry decree, 2023. (Besluit houders van dieren, 2023). Accessed on 13 September 2023.</p> <p>Nature Conservation Decree, 2021. (Besluit natuurbescherming, 2021.). Accessed 13 September 2023.</p> <p>Nature conservation regulations, 2023. (Regeling natuurbescherming, 2023). Accessed 13 September 2023.</p>
New Zealand	<p>Animal Welfare Act 1999, No 142. Version as at 30 April 2023. Accessed 13 September 2023.</p>
Peru	<p>Forestry and Wildlife Law No 29763. 2015. (Ley Forestal y de Fauna Silvestre Ley No 29763). Accessed on 13 September 2023.</p>
Slovakia	<p>European Union laws and regulations apply.</p> <p>15 The Law of December 2, 2004 on the protection of species of wild animals and wild plants by regulating trade with them and on the amendment of certain laws. (15 ZÁKON z 2. decembra 2004 o ochrane druhov voľne žijúcich živočíchov a voľne rastúcich rastlín reguláciou obchodu s nimi a o zmene a doplnení niektorých zákonov). Accessed on 8 September 2023.</p> <p>110 DECREE of the Ministry of the Environment of the Slovak Republic of 14 February 2005 implementing certain provisions of the Act on the Protection of Species of Wild Fauna and Flora by Regulating Trade Therein and on Amendments and Additions to Certain Acts. (110 VYHLÁŠKA, Ministerstva životného prostredia Slovenskej republiky zo 14. februára 2005, ktorou sa vykonávajú niektoré ustanovenia zákona o ochrane druhov voľne žijúcich živočíchov a voľne rastúcich rastlín reguláciou obchodu s nimi a o zmene a doplnení niektorých zákonov). Accessed on 8 September 2023.</p> <p>543, THE LAW of June 25, 2002 on nature and landscape protection. (543</p>

Country/ region	National legislation regulating captive breeding of amphibian species
	<p>ZÁKON z 25. júna 2002 o ochrane prírody a krajiny. Accessed on 8 September 2023.</p> <p>170 DECREE Ministry of the Environment of the Slovak Republic of 19 April 2021, which implements Act no. 543/2002 Coll. on nature and landscape protection, as amended (170 VYHLÁŠKA Ministerstva životného prostredia Slovenskej republiky z 19. apríla 2021, ktorou sa vykonáva zákon č. 543/2002 Z. z. o ochrane prírody a krajiny v znení neskorších predpisov). Accessed on 8 September 2023.</p>
Sweden	<p>National Board of Agriculture regulations and general advice laying down conditions for the keeping, breeding and sale of animals etc. of pets and hobby animals; adopted on 28 March 2019. (Statens jordbruksverks föreskrifter och allmänna råd om villkor för hållande, uppfödning och försäljning m.m. av djur avsedda för sällskap och hobby; beslutade den 28 mars 2019). Accessed on 13 September 2023.</p>
Switzerland	<p>Federal law on the movement of protected species of flora and fauna (Protected Species Act, CITES) of 16 March 2012 (Status as at 1 September 2023). (Loi fédérale sur la circulation des espèces de faune et de flore protégées (Loi sur les espèces protégées, LCITES) du 16 mars 2012 (État le 1er septembre 2023)). Accessed 13 September 2023.</p> <p>Ordinance on the protection of animals (OPAn) of 23 April 2008 (Status as at 1 June 2022). (Ordonnance sur la protection des animaux (OPAn) du 23 avril 2008 (État le 1er juin 2022)). Accessed on 13 September 2023.</p>
Thailand	<p>Animal Epidemics Act, B.E. 2558 (2015). Accessed on 13 September 2023.</p> <p>Aquatic Organisms Prohibited from Import, Export or Transshipment in Thailand. Accessed on 13 September 2023.</p> <p>MOPH Notification No. 418 B.E.2020 Re: Prescribing the Principle, Conditions, Methods, and Proportion of Food Additives (No.2). Accessed on 13 September 2023.</p> <p>The Regulations, Procedures and Conditions for Applying for Import Permits for Aquatic Animals or Aquatic Animal Products B.E.2560. Accessed on 13 September 2023.</p>

Country/ region	National legislation regulating captive breeding of amphibian species
United Republic of Tanzania	The Wildlife Conservation (Management of Wildlife Captive Facilities) Regulations, 2020. Accessed on 1 September 2023.
Uruguay	Decree No 182/992 FOREIGN TRADE - ANIMAL HEALTH. (Decreto N° 182/992 COMERCIO EXTERIOR - SANIDAD ANIMAL). Accessed on 13 September 2023.

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Annex 2. Total amphibian species identified in international trade (Expanded digital version also including species range of distribution information, pathogen detection status, and more is provided together with this report: see Amphibian Trade Data Master Files).

Scientific Name	IUCN Assessment	AmphibiaWeb Unique ID	CITES Appendix
<i>Abavorana luctuosa</i>	Least concern (lc)	5082	
<i>Acris crepitans</i>	Least concern (lc)	670	
<i>Acris gryllus</i>	Least concern (lc)	671	
<i>Adelphobates galactonotus</i>	Least concern (lc)	1631	II
<i>Adenomera andreae</i>	Least concern (lc)	3299	
<i>Adenomera hylaedactyla</i>	Least concern (lc)	3301	
<i>Adenomera marmorata</i>	Least concern (lc)	3303	
<i>Adenomera martinezi</i>	Least concern (lc)	3304	
<i>Afrixalus dorsalis</i>	Least concern (lc)	448	
<i>Afrixalus equatorialis</i>	Least concern (lc)	450	
<i>Afrixalus fornasini</i>	Least concern (lc)	451	
<i>Afrixalus fulvovittatus</i>	Least concern (lc)	452	
<i>Afrixalus laevis</i>	Least concern (lc)	455	
<i>Afrixalus nigeriensis</i>	Least concern (lc)	459	
<i>Afrixalus osorioi</i>	Least concern (lc)	461	
<i>Afrixalus paradorsalis</i>	Least concern (lc)	462	
<i>Afrixalus quadrivittatus</i>	Least concern (lc)	6849	
<i>Afrixalus wittei</i>	Least concern (lc)	471	
<i>Agalychnis annae</i>	Vulnerable (vu)	614	II
<i>Agalychnis callidryas</i>	Least concern (lc)	616	II
<i>Agalychnis dacnicolor</i>	Least concern (lc)	626	II
<i>Agalychnis lemur</i>	Critically endangered (cr)	655	II
<i>Agalychnis moreletii</i>	Least concern (lc)	619	II
<i>Agalychnis spurrelli</i>	Least concern (lc)	621	II
<i>Aglyptodactylus inguinalis</i>	Least concern (lc)	8371	
<i>Aglyptodactylus madagascariensis</i>	Least concern (lc)	4326	
<i>Alcalus baluensis</i>	Least concern (lc)	4732	
<i>Allobates femoralis</i>	Least concern (lc)	1661	II
<i>Allobates insperatus</i>	Least concern (lc)	6576	
<i>Allobates kingsburyi</i>	Endangered (en)	1575	
<i>Allobates talamancae</i>	Least concern (lc)	1614	
<i>Allobates trilineatus</i>	Least concern (lc)	1617	
<i>Allobates zaparo</i>	Least concern (lc)	1676	II
<i>Allophryne ruthveni</i>	Least concern (lc)	2059	
<i>Alytes muletensis</i>	Endangered (en)	1521	

<i>Amazophrynella minuta</i>	Least concern (lc)	329	
<i>Ambystoma andersoni</i>	Critically endangered (cr)	3824	
<i>Ambystoma californiense</i>	Vulnerable (vu)	3829	
<i>Ambystoma dumerilii</i>	Critically endangered (cr)	3831	II
<i>Ambystoma jeffersonianum</i>	Least concern (lc)	3835	
<i>Ambystoma laterale</i>	Least concern (lc)	3836	
<i>Ambystoma lermaense</i>	Endangered (en)	3838	
<i>Ambystoma mabeei</i>	Least concern (lc)	3839	
<i>Ambystoma macrodactylum</i>	Least concern (lc)	3840	
<i>Ambystoma maculatum</i>	Least concern (lc)	3841	
<i>Ambystoma mavortium</i>	Least concern (lc)	5887	
<i>Ambystoma mexicanum</i>	Critically endangered (cr)	3842	II
<i>Ambystoma opacum</i>	Least concern (lc)	3843	
<i>Ambystoma talpoideum</i>	Least concern (lc)	3847	
<i>Ambystoma texanum</i>	Least concern (lc)	3849	
<i>Ambystoma tigrinum</i>	Least concern (lc)	3850	
<i>Ameerega altamazonica</i>		7108	II
<i>Ameerega bassleri</i>	Vulnerable (vu)	1653	II
<i>Ameerega bilinguis</i>	Least concern (lc)	1654	II
<i>Ameerega boliviana</i>	Near threatened (nt)	1655	II
<i>Ameerega cainarachi</i>	Endangered (en)	1658	II
<i>Ameerega hahneli</i>	Least concern (lc)	1663	II
<i>Ameerega macero</i>	Least concern (lc)	1665	II
<i>Ameerega maculata</i>	Data deficient (dd)	1666	II
<i>Ameerega parvula</i>	Least concern (lc)	1668	II
<i>Ameerega pepperi</i>	Vulnerable (vu)	7276	II
<i>Ameerega picta</i>	Least concern (lc)	1670	II
<i>Ameerega silverstonei</i>	Endangered (en)	1672	II
<i>Ameerega simulans</i>	Least concern (lc)	5456	II
<i>Ameerega trivittata</i>	Least concern (lc)	1675	II
<i>Amietia angolensis</i>	Least concern (lc)	4979	
<i>Amietia chapini</i>	Least concern (lc)	8511	
<i>Amietia desaegeri</i>	Least concern (lc)	5021	
<i>Amietia nutti</i>	Least concern (lc)	8513	
<i>Amietia ruwenzorica</i>	Least concern (lc)	5139	
<i>Amnirana albolabris</i>	Least concern (lc)	4971	
<i>Amnirana amnicola</i>	Least concern (lc)	4976	
<i>Amnirana galamensis</i>	Least concern (lc)	5036	
<i>Amnirana lepus</i>	Least concern (lc)	5076	
<i>Amnirana occidentalis</i>	Least concern (lc)	5114	

<i>Amolops cremnobatus</i>	Least concern (lc)	5414	
<i>Amolops daorum</i>		6227	
<i>Amolops larutensis</i>	Least concern (lc)	4650	
<i>Amolops marmoratus</i>	Least concern (lc)	4656	
<i>Amolops ricketti</i>	Least concern (lc)	4659	
<i>Amolops viridimaculatus</i>	Near threatened (nt)	4663	
<i>Amphiura means</i>	Least concern (lc)	3853	
<i>Amphiura pholeter</i>	Near threatened (nt)	3854	
<i>Amphiura tridactylum</i>	Least concern (lc)	3855	
<i>Anaxyrus americanus</i>	Least concern (lc)	100	
<i>Anaxyrus baxteri</i>	Extinct in the wild (ew)	114	
<i>Anaxyrus boreas</i>	Least concern (lc)	122	
<i>Anaxyrus californicus</i>	Endangered (en)	131	
<i>Anaxyrus cognatus</i>	Least concern (lc)	145	
<i>Anaxyrus debilis</i>	Least concern (lc)	159	
<i>Anaxyrus exsul</i>	Vulnerable (vu)	166	
<i>Anaxyrus punctatus</i>	Least concern (lc)	260	
<i>Anaxyrus quercicus</i>	Least concern (lc)	264	
<i>Anaxyrus retiformis</i>	Least concern (lc)	269	
<i>Anaxyrus speciosus</i>	Least concern (lc)	279	
<i>Anaxyrus terrestris</i>	Least concern (lc)	291	
<i>Anaxyrus woodhousii</i>	Least concern (lc)	314	
<i>Andinobates claudiae</i>	Data deficient (dd)	5908	II
<i>Andinobates fulguritus</i>	Least concern (lc)	1690	II
<i>Andinobates minutus</i>	Least concern (lc)	1691	II
<i>Andrias davidianus</i>	Critically endangered (cr)	3858	I
<i>Andrias japonicus</i>	Near threatened (nt)	3859	I
<i>Aneides flavipunctatus</i>	Near threatened (nt)	3936	
<i>Aneides lugubris</i>	Least concern (lc)	3938	
<i>Anodonthyla pollicaris</i>	Data deficient (dd)	7415	
<i>Ansonia inthanon</i>	Least concern (lc)	5416	
<i>Ansonia leptopus</i>	Least concern (lc)	15	
<i>Ansonia spinulifer</i>	Least concern (lc)	26	
<i>Aparasphenodon arapapa</i>		7315	
<i>Aparasphenodon brunoii</i>	Least concern (lc)	676	
<i>Aplastodiscus albofrenatus</i>	Least concern (lc)	697	
<i>Aplastodiscus albosignatus</i>	Least concern (lc)	704	
<i>Aplastodiscus arildae</i>	Least concern (lc)	722	
<i>Arthroleptis adelphus</i>	Least concern (lc)	1425	II

<i>Arthroleptis adolfifriederici</i>	Least concern (lc)	1426	
<i>Arthroleptis loveridgei</i>	Data deficient (dd)	1459	
<i>Arthroleptis poecilonotus</i>	Least concern (lc)	1464	
<i>Arthroleptis pyrrhoscelis</i>	Least concern (lc)	1465	
<i>Arthroleptis stenodactylus</i>	Least concern (lc)	1432	
<i>Arthroleptis sylvaticus</i>	Least concern (lc)	1468	
<i>Arthroleptis taeniatus</i>	Least concern (lc)	1469	
<i>Arthroleptis variabilis</i>	Least concern (lc)	1435	
<i>Arthroleptis xenodactyloides</i>	Least concern (lc)	1474	
<i>Arthroleptis xenodactylus</i>	Endangered (en)	1475	
<i>Astylosternus batesi</i>	Least concern (lc)	1479	
<i>Astylosternus laticephalus</i>	Near threatened (nt)	7790	
<i>Astylosternus occidentalis</i>	Least concern (lc)	1486	
<i>Atelopus balios</i>	Critically endangered (cr)	33	
<i>Atelopus bomolochos</i>	Critically endangered (cr)	34	
<i>Atelopus certus</i>	Critically endangered (cr)	39	
<i>Atelopus coynei</i>	Critically endangered (cr)	42	
<i>Atelopus elegans</i>	Endangered (en)	45	
<i>Atelopus glyphus</i>	Critically endangered (cr)	53	
<i>Atelopus hoogmoedi</i>		7798	
<i>Atelopus ignescens</i>	Critically endangered (cr)	55	
<i>Atelopus limosus</i>	Critically endangered (cr)	5540	
<i>Atelopus longirostris</i>	Extinct (ex)	59	
<i>Atelopus nanay</i>	Critically endangered (cr)	5977	
<i>Atelopus spumarius</i>	Vulnerable (vu)	83	
<i>Atelopus varius</i>	Critically endangered (cr)	88	
<i>Atelopus zeteki</i>	Critically endangered (cr)	91	I
<i>Atympanophrys gigantea</i>	Vulnerable (vu)	5645	
<i>Atympanophrys nankiangensis</i>	Vulnerable (vu)	2498	
<i>Aubria masako</i>	Least concern (lc)	4666	
<i>Aubria subsigillata</i>	Least concern (lc)	4667	
<i>Austrochaperina palmipes</i>	Least concern (lc)	2317	
<i>Austrochaperina rivularis</i>	Least concern (lc)	6374	
<i>Barbarophryne brongersmai</i>	Near threatened (nt)	125	
<i>Batrachoseps attenuatus</i>	Least concern (lc)	3941	
<i>Batrachoseps stebbinsi</i>	Vulnerable (vu)	3947	
<i>Blommersia blommersae</i>	Least concern (lc)	4585	

<i>Blommersia grandisonae</i>	Least concern (lc)	4600	
<i>Blommersia sarotra</i>	Least concern (lc)	6558	
<i>Boana aguilari</i>	Least concern (lc)	7532	
<i>Boana boans</i>	Least concern (lc)	739	
<i>Boana calcarata</i>	Least concern (lc)	748	
<i>Boana cinerascens</i>	Least concern (lc)	807	
<i>Boana crepitans</i>	Least concern (lc)	776	
<i>Boana faber</i>	Least concern (lc)	792	
<i>Boana fasciata</i>	Least concern (lc)	793	
<i>Boana geographica</i>	Least concern (lc)	801	
<i>Boana heilprini</i>	Vulnerable (vu)	816	
<i>Boana lanciformis</i>	Least concern (lc)	840	
<i>Boana picturata</i>	Least concern (lc)	911	
<i>Boana prasina</i>	Least concern (lc)	918	
<i>Boana punctata</i>	Least concern (lc)	926	
<i>Boana rosenbergi</i>	Least concern (lc)	937	
<i>Boana rufitela</i>	Least concern (lc)	941	
<i>Boana xerophylla</i>	Data deficient (dd)	798	
<i>Bokermannohyla ibitiguara</i>	Data deficient (dd)	822	
<i>Bokermannohyla sazimai</i>	Data deficient (dd)	953	
<i>Bolitoglossa altamazonica</i>	Least concern (lc)	3951	
<i>Bolitoglossa biseriata</i>	Least concern (lc)	3955	
<i>Bolitoglossa celaque</i>	Critically endangered (cr)	3959	
<i>Bolitoglossa cerroensis</i>	Least concern (lc)	3960	
<i>Bolitoglossa colonneae</i>	Least concern (lc)	3962	
<i>Bolitoglossa dofleini</i>	Near threatened (nt)	3970	
<i>Bolitoglossa mexicana</i>	Least concern (lc)	3990	
<i>Bolitoglossa pesrubra</i>	Least concern (lc)	5343	
<i>Bolitoglossa robusta</i>	Vulnerable (vu)	4007	
<i>Bolitoglossa schizodactyla</i>	Least concern (lc)	4012	
<i>Bolitoglossa sooyorum</i>	Endangered (en)	4015	
<i>Bolitoglossa striatula</i>	Least concern (lc)	4016	
<i>Bolitoglossa subpalmata</i>	Least concern (lc)	4018	
<i>Bombina bombina</i>	Least concern (lc)	2041	
<i>Bombina maxima</i>		2043	
<i>Bombina microdeladigitora</i>		2044	
<i>Bombina orientalis</i>	Least concern (lc)	2045	
<i>Bombina variegata</i>	Least concern (lc)	2046	
<i>Boophis albilabris</i>	Least concern (lc)	4328	

Boophis albipunctatus	Least concern (lc)	4329	
Boophis anjanaharibeensis	Endangered (en)	5778	
Boophis ankaratra	Least concern (lc)	4332	
Boophis boehmei	Endangered (en)	4334	
Boophis bottae	Least concern (lc)	6037	
Boophis burgeri	Data deficient (dd)	4336	
Boophis elenae	Near threatened (nt)	4338	
Boophis englaenderi	Vulnerable (vu)	4339	
Boophis entingae	Least concern (lc)	7454	
Boophis erythrodactylus	Least concern (lc)	4340	
Boophis goudotii	Least concern (lc)	4341	
Boophis guibei	Least concern (lc)	4342	
Boophis idae	Least concern (lc)	4344	
Boophis liami	Critically endangered (cr)	6209	
Boophis lichenoides	Least concern (lc)	5420	
Boophis luciae	Least concern (lc)	7462	
Boophis luteus	Least concern (lc)	4347	
Boophis madagascariensis	Least concern (lc)	4348	
Boophis mandraka	Data deficient (dd)	4350	
Boophis marojezensis	Least concern (lc)	4351	
Boophis microtyimpanum	Least concern (lc)	4353	
Boophis pauliani	Least concern (lc)	4356	
Boophis picturatus	Least concern (lc)	5930	
Boophis pyrrhus	Least concern (lc)	5928	
Boophis quasiboehmei	Near threatened (nt)	7596	
Boophis rappiodes	Least concern (lc)	4358	
Boophis reticulatus	Least concern (lc)	4359	
Boophis roseipalmatus	Least concern (lc)	7455	
Boophis rufiocularis	Near threatened (nt)	5779	
Boophis sambirano	Endangered (en)	6543	
Boophis septentrionalis	Least concern (lc)	6770	
Boophis sibilans	Least concern (lc)	4361	
Boophis solomaso	Endangered (en)	6210	
Boophis tasymena	Least concern (lc)	6038	
Boophis tephraeomystax	Least concern (lc)	4362	
Boophis ulftunni	Vulnerable (vu)	7079	
Boophis viridis	Least concern (lc)	4363	
Brachycephalus alipioi	Critically endangered (cr) - provisional	6807	
Brachycephalus auroguttatus	Data deficient (dd) - provisional	8338	

<i>Brachycephalus boticario</i>	Critically endangered (cr) - provisional	8342	
<i>Brachycephalus brunneus</i>	Least concern (lc) - provisional	6541	
<i>Brachycephalus crispus</i>	Data deficient (dd) - provisional	8134	
<i>Brachycephalus didactylus</i>	Vulnerable (vu) - provisional	5536	
<i>Brachycephalus ephippium</i>	Vulnerable (vu) - provisional	2033	
<i>Brachycephalus ferruginus</i>	Least concern (lc) - provisional	6742	
<i>Brachycephalus fuscolineatus</i>	Critically endangered (cr) - provisional	8340	
<i>Brachycephalus garbeanus</i>	Endangered (en) - provisional	7849	
<i>Brachycephalus guarani</i>	Data deficient (dd) - provisional	7906	
<i>Brachycephalus hermogenesi</i>	Vulnerable (vu) - provisional	5514	
<i>Brachycephalus izecksohni</i>	Vulnerable (vu) - provisional	6542	
<i>Brachycephalus leopardus</i>	Endangered (en) - provisional	8341	
<i>Brachycephalus margaritatus</i>	Endangered (en) - provisional	7961	
<i>Brachycephalus mariaeterezae</i>	Data deficient (dd) - provisional	8336	
<i>Brachycephalus nodoterga</i>	Vulnerable (vu) - provisional	2034	
<i>Brachycephalus olivaceus</i>	Endangered (en) - provisional	8337	
<i>Brachycephalus pernix</i>	Vulnerable (vu) - provisional	5421	
<i>Brachycephalus pitanga</i>	Least concern (lc) - provisional	7334	
<i>Brachycephalus pombali</i>	Data deficient (dd)	6743	
<i>Brachycephalus pulex</i>	Vulnerable (vu) - provisional	7691	
<i>Brachycephalus quiririensis</i>	Critically endangered (cr) - provisional	8365	
<i>Brachycephalus toby</i>	Data deficient (dd) - provisional	7590	
<i>Brachycephalus verrucosus</i>	Data deficient (dd) - provisional	8339	
<i>Brachycephalus vertebralis</i>	Data deficient (dd)	5835	
<i>Brachytarsophrys carinense</i>	Least concern (lc)	2455	
<i>Brachytarsophrys intermedia</i>	Least concern (lc)	2491	
<i>Bradytriton silus</i>	Endangered (en)	4025	
<i>Breviceps adpersus</i>	Least concern (lc)	2372	

<i>Breviceps mossambicus</i>	Least concern (lc)	2378	
<i>Bryophryne cophites</i>	Endangered (en)	2655	
<i>Bryophryne hanssaueri</i>	Least concern (lc)	7372	
<i>Bryophryne nubilosus</i>	Least concern (lc)	7117	
<i>Bufo bankorensis</i>	Least concern (lc)	113	
<i>Bufo bufo</i>	Least concern (lc)	127	
<i>Bufo gargarizans</i>	Least concern (lc)	179	
<i>Bufo japonicus</i>	Least concern (lc)	204	
<i>Bufo spinosus</i>	Least concern (lc)	7754	
<i>Bufo torrenticola</i>	Least concern (lc)	296	
<i>Bufotes boulengeri</i>	Least concern (lc)	7081	
<i>Bufotes viridis</i>	Least concern (lc)	312	
<i>Caecilia volcani</i>	Least concern (lc)	1875	
<i>Callulops argus</i>	Data deficient (dd)	9021	
<i>Callulops bicolor</i>	Least concern (lc)	9022	
<i>Callulops doriae</i>	Least concern (lc)	2406	
<i>Callulops neuhaussi</i>	Data deficient (dd)	9025	
<i>Callulops stellatus</i>	Least concern (lc)	9023	
<i>Callulops taxispilotus</i>	Least concern (lc)	9024	
<i>Calyptocephalella gayi</i>	Vulnerable (vu)	2585	III
<i>Cardioglossa elegans</i>	Least concern (lc)	1441	
<i>Cardioglossa gracilis</i>	Least concern (lc)	1443	
<i>Cardioglossa gratiosa</i>	Least concern (lc)	1444	
<i>Cardioglossa leucomystax</i>	Least concern (lc)	1445	
<i>Cardioglossa melanogaster</i>	Vulnerable (vu)	1447	
<i>Cardioglossa nigromaculata</i>	Least concern (lc)	1448	
<i>Cardioglossa occidentalis</i>	Least concern (lc)	7231	
<i>Cardioglossa oreas</i>	Endangered (en)	1449	
<i>Cardioglossa pulchra</i>	Endangered (en)	1450	
<i>Cardioglossa schioetzi</i>	Vulnerable (vu)	1451	
<i>Cardioglossa trifasciata</i>	Critically endangered (cr)	1452	
<i>Cardioglossa venusta</i>	Endangered (en)	1453	
<i>Ceratophrys aurita</i>	Least concern (lc)	5718	
<i>Ceratophrys calcarata</i>	Least concern (lc)	5719	
<i>Ceratophrys cornuta</i>	Least concern (lc)	5720	
<i>Ceratophrys cranwelli</i>	Least concern (lc)	5721	
<i>Ceratophrys ornata</i>	Near threatened (nt)	5723	
<i>Ceratophrys stolzmanni</i>	Vulnerable (vu)	5724	
<i>Chalcorana eschatia</i>		7241	
<i>Chalcorana raniceps</i>	Least concern (lc)	5136	

<i>Chaperina fusca</i>	Least concern (lc)	2095	
<i>Charadrahyla nephila</i>	Endangered (en)	5467	
<i>Charadrahyla taeniopus</i>	Vulnerable (vu)	972	
<i>Chiasmocleis bassleri</i>	Least concern (lc)	2099	
<i>Chiasmocleis hudsoni</i>	Least concern (lc)	2102	
<i>Chiasmocleis ventrimaculata</i>	Least concern (lc)	2108	
<i>Chimerella mariaelenae</i>	Least concern (lc)	6755	II
<i>Chioglossa lusitanica</i>	Vulnerable (vu)	4238	
<i>Chiromantis nongkhorensis</i>	Least concern (lc)	4371	
<i>Chiromantis petersii</i>	Least concern (lc)	4375	
<i>Chiromantis rufescens</i>	Least concern (lc)	4376	
<i>Choerophryne rostellifer</i>	Least concern (lc)	2242	
<i>Chrysobatrachus cupreonitens</i>	Endangered (en)	481	
<i>Clinotarsus alticola</i>	Least concern (lc)	4973	
<i>Cochranella granulosa</i>	Least concern (lc)	1770	II
<i>Cochranella ocellifera</i>	Data deficient (dd)	1780	II
<i>Colostethus panamansis</i>	Least concern (lc)	6424	
<i>Conraua alleni</i>	Least concern (lc)	4687	
<i>Conraua beccarii</i>	Least concern (lc)	4688	
<i>Conraua crassipes</i>	Least concern (lc)	4689	
<i>Conraua derooi</i>	Critically endangered (cr)	4690	
<i>Conraua goliath</i>	Endangered (en)	4691	
<i>Conraua robusta</i>	Vulnerable (vu)	4692	
<i>Cophixalus cheesmanae</i>	Least concern (lc)	2247	
<i>Cophixalus verrucosus</i>	Least concern (lc)	2271	
<i>Copiula minor</i>	Least concern (lc)	2274	
<i>Copiula oxyrhina</i>	Least concern (lc)	2275	
<i>Cornufer bufoniformis</i>	Least concern (lc)	4694	
<i>Cornufer desticans</i>	Vulnerable (vu)	7188	
<i>Cornufer elegans</i>	Least concern (lc)	4669	
<i>Cornufer guentheri</i>	Least concern (lc)	4678	
<i>Cornufer guppyi</i>	Least concern (lc)	4895	
<i>Cornufer hedigeri</i>	Least concern (lc)	8348	
<i>Cornufer heffernani</i>	Least concern (lc)	8349	
<i>Cornufer malukuna</i>	Least concern (lc)	4696	
<i>Cornufer neckeri</i>	Least concern (lc)	4907	
<i>Cornufer opisthodon</i>	Least concern (lc)	4697	
<i>Cornufer solomonis</i>	Least concern (lc)	4882	
<i>Cornufer trossulus</i>	Least concern (lc)	4674	
<i>Cornufer vertebralis</i>	Least concern (lc)	4675	

<i>Cornufer weberi</i>	Least concern (lc)	4922	
<i>Corythomantis greeningi</i>	Least concern (lc)	685	
<i>Craugastor bransfordii</i>	Least concern (lc)	2812	
<i>Craugastor crassidigitus</i>	Least concern (lc)	2863	
<i>Craugastor fitzingeri</i>	Least concern (lc)	2918	
<i>Craugastor laticeps</i>	Least concern (lc)	3008	
<i>Craugastor megacephalus</i>	Least concern (lc)	5988	
<i>Craugastor rayo</i>	Endangered (en)	3167	
<i>Craugastor tabasarae</i>	Critically endangered (cr)	6598	
<i>Crinia signifera</i>	Least concern (lc)	3562	
<i>Crossodactylus gaudichaudii</i>	Least concern (lc)	3453	
<i>Cruziohyla calcarifer</i>	Least concern (lc)	615	
<i>Cruziohyla craspedopus</i>	Least concern (lc)	617	
<i>Cruziohyla sylviae</i>	Least concern (lc)	8884	
<i>Cryptobranchus alleganiensis</i>	Near threatened (nt)	3861	III
<i>Cryptothylax greshoffii</i>	Least concern (lc)	483	
<i>Cryptothylax minutus</i>	Data deficient (dd)	484	
<i>Ctenophryne geayi</i>	Least concern (lc)	2110	
<i>Cynops cyanurus</i>	Least concern (lc)	4241	
<i>Cynops ensicauda</i>	Endangered (en)	4242	
<i>Cynops orientalis</i>	Least concern (lc)	4244	
<i>Cynops pyrrhogaster</i>	Least concern (lc)	4245	
<i>Dendrobates auratus</i>	Least concern (lc)	1625	II
<i>Dendrobates leucomelas</i>	Least concern (lc)	1638	II
<i>Dendrobates tinctorius</i>	Least concern (lc)	1646	II
<i>Dendrobates truncatus</i>	Least concern (lc)	1647	II
<i>Dendropsophus acreanus</i>	Least concern (lc)	696	
<i>Dendropsophus branneri</i>	Least concern (lc)	743	
<i>Dendropsophus carnifex</i>	Least concern (lc)	754	
<i>Dendropsophus ebraccatus</i>	Least concern (lc)	786	
<i>Dendropsophus elegans</i>	Least concern (lc)	788	
<i>Dendropsophus labialis</i>	Least concern (lc)	838	
<i>Dendropsophus leali</i>	Least concern (lc)	844	
<i>Dendropsophus leucophyllatus</i>	Least concern (lc)	847	
<i>Dendropsophus marmoratus</i>	Least concern (lc)	859	
<i>Dendropsophus microcephalus</i>	Least concern (lc)	868	
<i>Dendropsophus minutus</i>	Least concern (lc)	875	

<i>Dendropsophus nanus</i>	Least concern (lc)	885	
<i>Dendropsophus parviceps</i>	Least concern (lc)	898	
<i>Dendropsophus rhodopeplus</i>	Least concern (lc)	930	
<i>Dendropsophus riveroi</i>	Least concern (lc)	931	
<i>Dendropsophus sarayacuensis</i>	Least concern (lc)	948	
<i>Dendropsophus schubarti</i>	Least concern (lc)	954	
<i>Dendropsophus triangulum</i>	Least concern (lc)	979	
<i>Dermatonotus muelleri</i>	Least concern (lc)	2115	
<i>Dermophis mexicanus</i>	Least concern (lc)	1877	
<i>Dermophis parviceps</i>	Least concern (lc)	1879	
<i>Desmognathus aeneus</i>	Near threatened (nt)	3917	
<i>Desmognathus fuscus</i>	Least concern (lc)	3921	
<i>Desmognathus monticola</i>	Least concern (lc)	3924	
<i>Desmognathus ochrophæus</i>	Least concern (lc)	3925	
<i>Desmognathus orestes</i>	Least concern (lc)	5812	
<i>Diasporus diastema</i>	Least concern (lc)	2890	
<i>Dicamptodon ensatus</i>	Near threatened (nt)	3866	
<i>Didynamipus sjostedti</i>	Vulnerable (vu)	332	
<i>Discoglossus galganoi</i>	Least concern (lc)	5581	
<i>Discoglossus pictus</i>	Least concern (lc)	1527	
<i>Duellmanohyla chamulae</i>	Endangered (en)	687	
<i>Duellmanohyla ignicolor</i>	Near threatened (nt)	688	
<i>Duellmanohyla rufioculis</i>	Least concern (lc)	690	
<i>Duellmanohyla schmidtorum</i>	Near threatened (nt)	692	
<i>Duttaphrynus melanostictus</i>	Least concern (lc)	236	
<i>Dyscophus antongilii</i>	Least concern (lc)	5530	II
<i>Dyscophus guineti</i>	Least concern (lc)	5531	II
<i>Dyscophus insularis</i>	Least concern (lc)	5532	II
<i>Echinotriton andersoni</i>	Endangered (en)	4248	III
<i>Ecnomiohyla miotypanum</i>	Near threatened (nt)	876	
<i>Ecnomiohyla sukia</i>	Least concern (lc)	7595	
<i>Ectopoglossus confusus</i>	Endangered (en)	7393	
<i>Edalorhina perezii</i>	Least concern (lc)	3307	
<i>Elachistocleis surinamensis</i>	Least concern (lc)	2120	
<i>Eleutherodactylus abbotti</i>	Least concern (lc)	2744	
<i>Eleutherodactylus atkinsi</i>	Least concern (lc)	2781	

<i>Eleutherodactylus johnstonei</i>	Least concern (lc)	2990	
<i>Eleutherodactylus martinicensis</i>	Near threatened (nt)	3045	
<i>Eleutherodactylus montanus</i>	Endangered (en)	3070	
<i>Eleutherodactylus planirostris</i>	Least concern (lc)	3137	
<i>Engystomops freibergeri</i>	Least concern (lc)	6608	
<i>Engystomops petersi</i>	Least concern (lc)	3412	
<i>Engystomops pustulosus</i>	Least concern (lc)	3414	
<i>Ensatina eschscholtzii</i>	Least concern (lc)	4046	
<i>Epicrionops bicolor</i>	Least concern (lc)	2007	
<i>Epicrionops petersi</i>	Least concern (lc)	2014	
<i>Epipedobates anthonyi</i>	Near threatened (nt)	6581	II
<i>Epipedobates boulengeri</i>	Least concern (lc)	1656	II
<i>Epipedobates darwinwallacei</i>		7608	II
<i>Epipedobates espinosai</i>	Data deficient (dd)	1660	II
<i>Epipedobates machalilla</i>	Least concern (lc)	1581	II
<i>Epipedobates tricolor</i>	Vulnerable (vu)	1674	II
<i>Espadarana audax</i>	Least concern (lc)	1714	II
<i>Espadarana prosoblepon</i>	Least concern (lc)	1741	II
<i>Euphlyctis hexadactylus</i>	Least concern (lc)	4705	II
<i>Euproctus platycephalus</i>	Endangered (en)	4253	
<i>Eurycea bislineata</i>	Least concern (lc)	4049	
<i>Eurycea guttolineata</i>	Least concern (lc)	5813	
<i>Eurycea longicauda</i>	Least concern (lc)	4052	
<i>Eurycea lucifuga</i>	Least concern (lc)	4053	
<i>Eurycea nana</i>	Vulnerable (vu)	4055	
<i>Eurycea quadridigitata</i>	Least concern (lc)	4057	
<i>Eurycea rathbuni</i>	Vulnerable (vu)	4217	
<i>Eurycea wilderae</i>	Least concern (lc)	4061	
<i>Exerodonta catracha</i>	Near threatened (nt)	756	
<i>Feihyla palpebralis</i>	Near threatened (nt)	4442	
<i>Feihyla vittata</i>	Least concern (lc)	4373	
<i>Fejervarya cancrivora</i>	Least concern (lc)	4748	
<i>Fejervarya limnocharis</i>	Least concern (lc)	4770	
<i>Fejervarya moodiei</i>	Data deficient (dd)	7818	
<i>Fejervarya vittigera</i>	Least concern (lc)	4805	
<i>Gastrophryne carolinensis</i>	Least concern (lc)	2122	
<i>Gastrotheca cornuta</i>	Endangered (en)	1371	
<i>Gastrotheca cuencana</i>		8967	

<i>Gastrotheca fissipes</i>	Least concern (lc)	1376	
<i>Gastrotheca griswoldi</i>	Least concern (lc)	1379	
<i>Gastrotheca litonedis</i>	Endangered (en)	1384	
<i>Gastrotheca lojana</i>	Vulnerable (vu)	8971	
<i>Gastrotheca marsupiata</i>	Least concern (lc)	1386	
<i>Gastrotheca monticola</i>	Least concern (lc)	1388	
<i>Gastrotheca orophylax</i>	Vulnerable (vu)	1391	
<i>Gastrotheca peruana</i>	Least concern (lc)	1394	
<i>Gastrotheca plumbea</i>	Vulnerable (vu)	1395	
<i>Gastrotheca pseustes</i>	Near threatened (nt)	1396	
<i>Gastrotheca riobambae</i>	Endangered (en)	1399	
<i>Gastrotheca testudinea</i>	Least concern (lc)	1402	
<i>Gastrotheca turnerorum</i>		8969	
<i>Gastrotheca yacuri</i>		8970	
<i>Geotrypetes seraphini</i>	Least concern (lc)	1887	
<i>Gephyromantis ambohitra</i>	Vulnerable (vu)	5934	
<i>Gephyromantis asper</i>	Least concern (lc)	4580	
<i>Gephyromantis boulengeri</i>	Least concern (lc)	4586	
<i>Gephyromantis cornutus</i>	Vulnerable (vu)	4588	
<i>Gephyromantis eiselti</i>	Endangered (en)	4594	
<i>Gephyromantis granulatus</i>	Least concern (lc)	4601	
<i>Gephyromantis klemmeri</i>	Endangered (en)	4606	
<i>Gephyromantis leucomaculatus</i>	Least concern (lc)	4607	
<i>Gephyromantis luteus</i>	Least concern (lc)	4610	
<i>Gephyromantis malagasius</i>	Least concern (lc)	4613	
<i>Gephyromantis plicifer</i>	Least concern (lc)	4619	
<i>Gephyromantis pseudoasper</i>	Least concern (lc)	4620	
<i>Gephyromantis redimitus</i>	Least concern (lc)	4623	
<i>Gephyromantis rivicola</i>	Vulnerable (vu)	5633	
<i>Gephyromantis salegy</i>	Vulnerable (vu)	6208	
<i>Gephyromantis schilfi</i>	Vulnerable (vu)	6171	
<i>Gephyromantis sculpturatus</i>	Least concern (lc)	5933	
<i>Gephyromantis striatus</i>	Vulnerable (vu)	6025	
<i>Gephyromantis tahotra</i>	Vulnerable (vu)	7656	
<i>Gephyromantis tandroka</i>	Vulnerable (vu)	6172	
<i>Gephyromantis thelenae</i>	Endangered (en)	4627	
<i>Glyphoglossus guttulatus</i>	Least concern (lc)	5371	

<i>Gracixalus seesom</i>		8319	
<i>Grandisonia alternans</i>	Least concern (lc)	1889	
<i>Guibemantis albolineatus</i>	Least concern (lc)	4575	
<i>Guibemantis depressiceps</i>	Least concern (lc)	4592	
<i>Guibemantis flavobrunneus</i>	Least concern (lc)	4598	
<i>Guibemantis kathrinae</i>	Vulnerable (vu)	6771	
<i>Guibemantis liber</i>	Least concern (lc)	4608	
<i>Guibemantis methueni</i>	Least concern (lc)	8071	
<i>Guibemantis pulcher</i>	Least concern (lc)	4621	
<i>Guibemantis punctatus</i>	Critically endangered (cr)	4622	
<i>Guibemantis tornieri</i>	Least concern (lc)	4625	
<i>Gymnopsis multiplicata</i>	Least concern (lc)	1895	
<i>Gyrinophilus porphyriticus</i>	Least concern (lc)	4065	
<i>Haddadus binotatus</i>	Least concern (lc)	2804	
<i>Hamptophryne boliviana</i>	Least concern (lc)	2132	
<i>Hemidactylium scutatum</i>	Least concern (lc)	4069	
<i>Hemiphractus fasciatus</i>	Near threatened (nt)	1409	
<i>Hemisus guineensis</i>	Least concern (lc)	1510	
<i>Hemisus marmoratus</i>	Least concern (lc)	1512	
<i>Hemisus microscaphus</i>	Least concern (lc)	1513	
<i>Herpele multiplicata</i>	Data deficient (dd)	1898	
<i>Herpele squalostoma</i>	Least concern (lc)	1899	
<i>Heterixalus alboguttatus</i>	Least concern (lc)	486	
<i>Heterixalus betsileo</i>	Least concern (lc)	488	
<i>Heterixalus boettgeri</i>	Least concern (lc)	489	
<i>Heterixalus madagascariensis</i>	Least concern (lc)	491	
<i>Heterixalus punctatus</i>	Least concern (lc)	492	
<i>Heterixalus rutenbergi</i>	Least concern (lc)	493	
<i>Heterixalus tricolor</i>	Least concern (lc)	494	
<i>Hildebrandtia ornata</i>	Least concern (lc)	4708	
<i>Hoplobatrachus occipitalis</i>	Least concern (lc)	4713	
<i>Hoplobatrachus rugulosus</i>	Least concern (lc)	4714	
<i>Hoplobatrachus tigerinus</i>	Least concern (lc)	4715	II
<i>Humerana miopus</i>	Least concern (lc)	5100	
<i>Hyalinobatrachium aureoguttatum</i>	Least concern (lc)	1806	II
<i>Hyalinobatrachium colymbiphyllum</i>	Least concern (lc)	1809	II

Hyalinobatrachium fleischmanni	Least concern (lc)	1813	II
Hyalinobatrachium valerioi	Least concern (lc)	1830	II
Hyalinobatrachium vireovittatum	Least concern (lc)	1831	II
Hydromantes brunus	Vulnerable (vu)	4072	
Hydromantes flavus	Vulnerable (vu)	4073	
Hydromantes imperialis	Near threatened (nt)	4075	
Hydromantes platycephalus	Least concern (lc)	4077	
Hydromantes shastae	Vulnerable (vu)	4078	
Hyla arborea	Least concern (lc)	718	
Hyla arenicolor	Least concern (lc)	720	
Hyla chinensis	Least concern (lc)	765	
Hyla chrysoscelis	Least concern (lc)	768	
Hyla cinerea	Least concern (lc)	769	
Hyla femoralis	Least concern (lc)	794	
Hyla gratiosa	Least concern (lc)	808	
Hyla squirella	Least concern (lc)	965	
Hyla versicolor	Least concern (lc)	989	
Hylarana erythraea	Least concern (lc)	5028	
Hylarana montivaga	Endangered (en)	5103	
Hylarana taipehensis	Least concern (lc)	5164	
Hylodes heyeri	Data deficient (dd)	3463	
Hylodes japi		8320	
Hylodes phyllodes	Least concern (lc)	3472	
Hylophorbus rufescens	Data deficient (dd)	2419	
Hyloscirtus alytolylax	Near threatened (nt)	710	
Hyloscirtus armatus	Near threatened (nt)	723	
Hyloscirtus colymba	Endangered (en)	774	
Hyloscirtus palmeri	Least concern (lc)	895	
Hyloscirtus phyllognathus	Least concern (lc)	906	
Hyloxalus awa	Least concern (lc)	1539	
Hyloxalus azureiventris	Endangered (en)	1652	II
Hyloxalus infraguttatus	Near threatened (nt)	1571	
Hyloxalus shuar	Near threatened (nt)	1610	
Hyloxalus toachi	Endangered (en)	1615	
Hymenochirus boettgeri	Least concern (lc)	5238	
Hymenochirus boulengeri	Data deficient (dd)	5239	
Hymenochirus curtipes	Least concern (lc)	5240	
Hynobius amjiensis	Critically endangered (cr)	3879	III
Hynobius glacialis		7105	

<i>Hynobius nebulosus</i>	Least concern (lc)	3890	
<i>Hyperolius adspersus</i>	Least concern (lc)	6522	
<i>Hyperolius argus</i>	Least concern (lc)	502	
<i>Hyperolius bobirensis</i>	Vulnerable (vu)	508	
<i>Hyperolius bolifambae</i>	Least concern (lc)	510	
<i>Hyperolius camerunensis</i>	Least concern (lc)	6562	
<i>Hyperolius castaneus</i>	Least concern (lc)	513	
<i>Hyperolius chlorosteus</i>	Least concern (lc)	515	
<i>Hyperolius cinnamomeoventris</i>	Least concern (lc)	518	
<i>Hyperolius concolor</i>	Least concern (lc)	519	
<i>Hyperolius drewesi</i>		8557	
<i>Hyperolius frontalis</i>	Least concern (lc)	529	
<i>Hyperolius fusciventris</i>	Least concern (lc)	531	
<i>Hyperolius guttulatus</i>	Least concern (lc)	534	
<i>Hyperolius hutsebauti</i>	Least concern (lc)	5704	
<i>Hyperolius jynx</i>	Critically endangered (cr)	5520	
<i>Hyperolius kivuensis</i>	Least concern (lc)	540	
<i>Hyperolius kuligae</i>	Least concern (lc)	541	
<i>Hyperolius langi</i>	Least concern (lc)	5553	
<i>Hyperolius lateralis</i>	Least concern (lc)	543	
<i>Hyperolius laurenti</i>	Near threatened (nt)	545	
<i>Hyperolius marginatus</i>	Least concern (lc)	6564	
<i>Hyperolius marmoratus</i>	Least concern (lc)	550	
<i>Hyperolius mollerii</i>	Least concern (lc)	553	
<i>Hyperolius nasutus</i>	Least concern (lc)	556	
<i>Hyperolius ocellatus</i>	Least concern (lc)	559	
<i>Hyperolius olivaceus</i>		8681	
<i>Hyperolius parallelus</i>	Least concern (lc)	6143	
<i>Hyperolius parkeri</i>	Least concern (lc)	561	
<i>Hyperolius phantasticus</i>	Least concern (lc)	562	
<i>Hyperolius picturatus</i>	Least concern (lc)	564	
<i>Hyperolius pictus</i>	Least concern (lc)	565	
<i>Hyperolius platyceps</i>	Least concern (lc)	566	
<i>Hyperolius puncticulatus</i>	Endangered (en)	570	
<i>Hyperolius quinquevittatus</i>	Least concern (lc)	575	
<i>Hyperolius reesi</i>	Least concern (lc)	577	
<i>Hyperolius riggenbachi</i>	Least concern (lc)	579	
<i>Hyperolius sylvaticus</i>	Least concern (lc)	591	
<i>Hyperolius thomensis</i>	Endangered (en)	611	
<i>Hyperolius tuberculatus</i>	Least concern (lc)	597	

<i>Hyperolius tuberilinguis</i>	Least concern (lc)	598	
<i>Hyperolius viridiflavus</i>	Least concern (lc)	600	
<i>Hypogeophis rostratus</i>	Least concern (lc)	1901	
<i>Hypopachus barberi</i>	Near threatened (nt)	2136	
<i>Hypopachus variolosus</i>	Least concern (lc)	2137	
<i>Ichthyophis kohtaoensis</i>	Least concern (lc)	1988	
<i>Ichthyophis laosensis</i>	Data deficient (dd)	1989	
<i>Ichthyophis supachaii</i>	Data deficient (dd)	2002	
<i>Ichthyosaura alpestris</i>	Least concern (lc)	4292	
<i>Incilius alvarius</i>	Least concern (lc)	97	
<i>Incilius coccifer</i>	Least concern (lc)	144	
<i>Incilius coniferus</i>	Least concern (lc)	147	
<i>Incilius luetkenii</i>	Least concern (lc)	224	
<i>Incilius marmoratus</i>	Least concern (lc)	230	
<i>Incilius melanochlorus</i>	Least concern (lc)	233	
<i>Incilius porteri</i>	Least concern (lc)	6614	
<i>Incilius valliceps</i>	Least concern (lc)	305	
<i>Indosylvirana nicobariensis</i>	Least concern (lc)	7251	
<i>Ingerana tenasserimensis</i>	Least concern (lc)	4738	
<i>Ingerophrynus divergens</i>	Least concern (lc)	6003	
<i>Ingerophrynus galeatus</i>	Least concern (lc)	177	
<i>Ingerophrynus parvus</i>	Least concern (lc)	251	
<i>Ischnocnema parva</i>	Least concern (lc)	3113	
<i>Isthmohyla debilis</i>	Critically endangered (cr)	780	
<i>Kalophrynus interlineatus</i>	Least concern (lc)	2142	
<i>Kalophrynus pleurostigma</i>	Least concern (lc)	2146	
<i>Kaloula baleata</i>	Least concern (lc)	2151	
<i>Kaloula pulchra</i>	Least concern (lc)	2157	
<i>Kassina arboricola</i>	Vulnerable (vu)	3683	
<i>Kassina maculosa</i>	Least concern (lc)	3691	
<i>Kassina senegalensis</i>	Least concern (lc)	3694	
<i>Kurixalus baliogaster</i>	Least concern (lc)	5506	
<i>Kurixalus bisacculus</i>	Least concern (lc)	4502	
<i>Laotriton laoensis</i>	Endangered (en)	5980	II
<i>Lechriodus melanopyga</i>	Least concern (lc)	3500	
<i>Leiopelma archeyi</i>	Critically endangered (cr)	2064	
<i>Leiopelma hamiltoni</i>	Vulnerable (vu)	2065	
<i>Leiopelma hochstetteri</i>	Least concern (lc)	2066	
<i>Lepidobatrachus asper</i>	Near threatened (nt)	5601	
<i>Lepidobatrachus laevis</i>	Least concern (lc)	5602	

Lepidobatrachus llanensis	Least concern (lc)	5603	
Leptobranchella aerea	Least concern (lc)	7755	
Leptobranchella bidoupensis	Endangered (en)	7642	
Leptobranchella dringi	Least concern (lc)	2475	
Leptobranchella eos		7757	
Leptobranchella firthi	Endangered (en)	7830	
Leptobranchella juliandringi	Least concern (lc)	8375	
Leptobranchella minima	Least concern (lc)	7756	
Leptobranchella pelodytoides	Least concern (lc)	2479	
Leptobranchella ventripunctata	Data deficient (dd)	2480	
Leptobranchium abbotti	Least concern (lc)	2465	
Leptobranchium chapaense	Least concern (lc)	2466	
Leptobranchium hasseltii	Least concern (lc)	2467	
Leptobranchium hendricksoni	Least concern (lc)	2468	
Leptobranchium leucops	Vulnerable (vu)	7953	
Leptobranchium montanum	Least concern (lc)	2469	
Leptobranchium nigrops	Least concern (lc)	2470	
Leptobranchium pullum	Least concern (lc)	2471	
Leptobranchium smithi	Least concern (lc)	5475	
Leptodactylodon bicolor	Near threatened (nt)	1494	
Leptodactylus bolivianus	Least concern (lc)	3312	
Leptodactylus bufonius	Least concern (lc)	3313	
Leptodactylus chaquensis	Least concern (lc)	3315	
Leptodactylus colombiensis	Least concern (lc)	3316	
Leptodactylus fallax	Critically endangered (cr)	3322	
Leptodactylus fragilis	Least concern (lc)	3333	
Leptodactylus fuscus	Least concern (lc)	3325	
Leptodactylus guianensis		7721	
Leptodactylus knudseni	Least concern (lc)	3332	
Leptodactylus labrosus	Least concern (lc)	3334	
Leptodactylus laticeps	Near threatened (nt)	3336	
Leptodactylus latrans	Least concern (lc)	7436	
Leptodactylus leptodactyloides	Least concern (lc)	3338	
Leptodactylus longirostris	Least concern (lc)	3340	

<i>Leptodactylus macrosternum</i>	Least concern (lc)	3341	
<i>Leptodactylus melanonotus</i>	Least concern (lc)	3343	
<i>Leptodactylus myersi</i>	Least concern (lc)	3344	
<i>Leptodactylus mystaceus</i>	Least concern (lc)	3345	
<i>Leptodactylus mystacinus</i>	Least concern (lc)	3346	
<i>Leptodactylus pentadactylus</i>	Least concern (lc)	3353	
<i>Leptodactylus petersii</i>	Least concern (lc)	3354	
<i>Leptodactylus poecilochilus</i>	Least concern (lc)	3357	
<i>Leptodactylus rhodomystax</i>	Least concern (lc)	3359	
<i>Leptodactylus savagei</i>	Least concern (lc)	6713	
<i>Leptodactylus wagneri</i>	Least concern (lc)	3374	
<i>Leptomantis angulirostris</i>	Endangered (en)	4493	
<i>Leptomantis gauni</i>	Near threatened (nt)	4511	
<i>Leptopelis anchietae</i>	Least concern (lc)	3632	
<i>Leptopelis argenteus</i>	Least concern (lc)	3633	
<i>Leptopelis aubryi</i>	Least concern (lc)	3634	
<i>Leptopelis bocagii</i>	Least concern (lc)	3637	
<i>Leptopelis brevirostris</i>	Least concern (lc)	3640	
<i>Leptopelis broadleyi</i>	Least concern (lc)	3641	
<i>Leptopelis calcaratus</i>	Least concern (lc)	3643	
<i>Leptopelis christyi</i>	Least concern (lc)	3644	
<i>Leptopelis cynamomeus</i>	Least concern (lc)	3646	
<i>Leptopelis fiziensis</i>	Data deficient (dd)	3648	
<i>Leptopelis flavomaculatus</i>	Least concern (lc)	3649	
<i>Leptopelis grandiceps</i>	Vulnerable (vu)	8172	
<i>Leptopelis karissimbensis</i>	Vulnerable (vu)	3653	
<i>Leptopelis kivuensis</i>	Least concern (lc)	3654	
<i>Leptopelis macrotis</i>	Near threatened (nt)	3656	
<i>Leptopelis millsoni</i>	Least concern (lc)	3658	
<i>Leptopelis modestus</i>	Least concern (lc)	3659	
<i>Leptopelis nordequatorialis</i>	Least concern (lc)	3662	
<i>Leptopelis occidentalis</i>	Near threatened (nt)	3664	
<i>Leptopelis ocellatus</i>	Least concern (lc)	3665	
<i>Leptopelis palmatus</i>	Endangered (en)	3668	
<i>Leptopelis ragazzii</i>	Vulnerable (vu)	3672	
<i>Leptopelis rufus</i>	Least concern (lc)	3673	
<i>Leptopelis spiritusnoctis</i>	Least concern (lc)	6938	

Leptopelis uluguruensis	Near threatened (nt)	3675	
Leptopelis vermiculatus	Endangered (en)	3677	
Leptopelis viridis	Least concern (lc)	3678	
Leucostethus fugax	Data deficient (dd)	1564	
Limnonectes blythii	Near threatened (nt)	4746	
Limnonectes doriae	Least concern (lc)	4753	
Limnonectes finchi	Least concern (lc)	4754	
Limnonectes gyldenstolpei	Least concern (lc)	4792	
Limnonectes hascheanus	Least concern (lc)	5194	
Limnonectes hikidai		8228	
Limnonectes khasianus	Data deficient (dd)	4764	
Limnonectes kuhlii	Least concern (lc)	4767	
Limnonectes leporinus	Least concern (lc)	5668	
Limnonectes limborgi	Least concern (lc)	5195	
Limnonectes macrodon	Least concern (lc)	4772	
Limnonectes palavanensis	Least concern (lc)	4787	
Limnonectes taylori	Least concern (lc)	7553	
Lithodytes lineatus	Least concern (lc)	3376	
Litoria aurea	Vulnerable (vu)	1219	
Litoria bicolor	Least concern (lc)	1222	
Litoria caerulea	Least concern (lc)	1348	
Litoria eucnemis	Least concern (lc)	1245	
Litoria exophthalmia	Least concern (lc)	1248	
Litoria graminea	Least concern (lc)	1254	
Litoria impura	Least concern (lc)	1255	
Litoria infrafrenata	Least concern (lc)	1257	
Litoria lutea	Least concern (lc)	1271	
Litoria nasuta	Least concern (lc)	1282	
Litoria nigropunctata	Least concern (lc)	1284	
Litoria piperata	Critically endangered (cr)	1295	
Litoria rubella	Least concern (lc)	1304	
Litoria thesaurensis	Least concern (lc)	1309	
Litoria vocivincens	Least concern (lc)	1317	
Liuixalus romeri	Endangered (en)	4450	
Lyciasalamandra helverseni	Vulnerable (vu)	6345	
Lyciasalamandra luschani	Vulnerable (vu)	4256	
Lysapsus laevis	Least concern (lc)	5221	
Mannophryne olmonae	Vulnerable (vu)	1682	
Mantella aurantiaca	Endangered (en)	4559	II

Mantella baroni	Least concern (lc)	4560	II
Mantella bernhardi	Vulnerable (vu)	4562	II
Mantella betsileo	Least concern (lc)	4561	II
Mantella cowanii	Endangered (en)	4563	II
Mantella crocea	Vulnerable (vu)	4564	II
Mantella ebenau	Least concern (lc)	6768	II
Mantella expectata	Endangered (en)	4565	II
Mantella haraldmeieri	Endangered (en)	4566	II
Mantella laevigata	Least concern (lc)	4567	II
Mantella madagascariensis	Vulnerable (vu)	5529	II
Mantella milotympanum	Critically endangered (cr)	6103	II
Mantella nigricans	Least concern (lc)	6023	II
Mantella pulchra	Near threatened (nt)	4568	II
Mantella viridis	Endangered (en)	4569	II
Mantidactylus albofrenatus	Endangered (en)	4574	
Mantidactylus argenteus	Least concern (lc)	4579	
Mantidactylus betsileanus	Least concern (lc)	4582	
Mantidactylus biporus	Least concern (lc)	4583	
Mantidactylus charlotteae	Least concern (lc)	6241	
Mantidactylus cowanii	Near threatened (nt)	6766	
Mantidactylus femoralis	Least concern (lc)	4596	
Mantidactylus grandidieri	Least concern (lc)	4599	
Mantidactylus guttulatus	Least concern (lc)	4603	
Mantidactylus lugubris	Least concern (lc)	4609	
Mantidactylus majori	Least concern (lc)	4612	
Mantidactylus melanopleura	Least concern (lc)	6239	
Mantidactylus mocquardi	Least concern (lc)	4616	
Mantidactylus opiparis	Least concern (lc)	4617	
Mantidactylus zipperi	Least concern (lc)	6240	
Mantidactylus zolitschka	Critically endangered (cr)	6560	
Mantophryne lateralis	Least concern (lc)	2422	
Megastomatohyla mixe	Critically endangered (cr)	877	
Megophrys montana	Least concern (lc)	2497	
Melanophryniscus klappenbachi	Least concern (lc)	6051	
Melanophryniscus stelzneri	Least concern (lc)	350	
Meristogenys kinabaluensis	Least concern (lc)	4810	
Meristogenys orphnocnemis	Least concern (lc)	4812	

<i>Microcaecilia nicefori</i>	Least concern (lc)	1928	
<i>Microcaecilia pricei</i>	Least concern (lc)	1929	
<i>Microhyla annamensis</i>	Vulnerable (vu)	2167	
<i>Microhyla berdmorei</i>	Least concern (lc)	2169	
<i>Microhyla butleri</i>	Least concern (lc)	2171	
<i>Microhyla fissipes</i>	Least concern (lc)	6459	
<i>Microhyla heymonsi</i>	Least concern (lc)	2175	
<i>Microhyla ornata</i>	Least concern (lc)	2180	
<i>Microhyla pulchra</i>	Least concern (lc)	2185	
<i>Micryletta inornata</i>	Least concern (lc)	2190	
<i>Minervarya chiangmaiensis</i>		8571	
<i>Minyobates steyermarki</i>	Critically endangered (cr)	1693	II
<i>Nanorana parkeri</i>	Least concern (lc)	4829	
<i>Nanorana pleskei</i>	Near threatened (nt)	4830	
<i>Nectophryne afra</i>	Least concern (lc)	358	
<i>Nectophryne batesii</i>	Least concern (lc)	359	
<i>Nectophrynoides asperginis</i>	Extinct in the wild (ew)	5397	I
<i>Nectophrynoides minutus</i>	Endangered (en)	362	I
<i>Nectophrynoides tornieri</i>	Least concern (lc)	363	I
<i>Nectophrynoides viviparus</i>	Least concern (lc)	364	I
<i>Necturus beyeri</i>	Least concern (lc)	4224	
<i>Necturus maculosus</i>	Least concern (lc)	4226	
<i>Neobatrachus sutor</i>	Least concern (lc)	3533	
<i>Neobatrachus wilsmorei</i>	Least concern (lc)	3534	
<i>Neurergus crocatus</i>	Vulnerable (vu)	4258	
<i>Neurergus derjugini</i>	Critically endangered (cr)	4260	
<i>Neurergus kaiseri</i>	Vulnerable (vu)	4259	I
<i>Neurergus strauchii</i>	Vulnerable (vu)	4261	
<i>Nidirana adenopleura</i>	Least concern (lc)	4970	
<i>Nothophryne broadleyi</i>	Endangered (en)	3738	
<i>Notophthalmus viridescens</i>	Least concern (lc)	4265	
<i>Nototriton abscondens</i>	Least concern (lc)	4086	
<i>Nyctanolis pernix</i>	Vulnerable (vu)	4098	
<i>Nyctibates corrugatus</i>	Least concern (lc)	1480	
<i>Nyctixalus pictus</i>	Near threatened (nt)	4380	
<i>Occidozyga lima</i>	Least concern (lc)	4850	
<i>Odontobatrachus natator</i>	Least concern (lc)	3742	
<i>Odontophrynus americanus</i>	Least concern (lc)	5606	

<i>Odorrana banaorum</i>	Least concern (lc)	6230	
<i>Odorrana cangyuanensis</i>	Endangered (en)	8473	
<i>Odorrana chapaensis</i>	Near threatened (nt)	4640	
<i>Odorrana chloronota</i>	Least concern (lc)	6232	
<i>Odorrana hosii</i>	Least concern (lc)	5054	
<i>Odorrana junlianensis</i>	Vulnerable (vu)	6681	
<i>Odorrana livida</i>	Data deficient (dd)	5079	
<i>Odorrana morafkai</i>	Least concern (lc)	6229	
<i>Oedipina complex</i>	Least concern (lc)	4104	
<i>Oedipina pacificensis</i>	Least concern (lc)	5351	
<i>Oedipina parvipes</i>	Least concern (lc)	4110	
<i>Oedipina poelzi</i>	Endangered (en)	4112	
<i>Oedipina taylori</i>	Endangered (en)	4116	
<i>Oedipina uniformis</i>	Least concern (lc)	4117	
<i>Ommatotriton ophryticus</i>	Near threatened (nt)	6655	
<i>Ommatotriton vittatus</i>	Least concern (lc)	4302	
<i>Onychodactylus japonicus</i>	Least concern (lc)	3906	
<i>Oophaga arborea</i>	Critically endangered (cr)	1624	II
<i>Oophaga histrionica</i>	Critically endangered (cr)	1633	II
<i>Oophaga lehmanni</i>	Critically endangered (cr)	1637	II
<i>Oophaga pumilio</i>	Least concern (lc)	1641	II
<i>Oophaga sylvatica</i>	Near threatened (nt)	5910	II
<i>Oophaga vicentei</i>	Endangered (en)	5578	II
<i>Ophryophryne gerti</i>	Data deficient (dd)	6215	
<i>Ophryophryne hansi</i>	Data deficient (dd)	6216	
<i>Ophryophryne koui</i>	Least concern (lc)	2507	
<i>Ophryophryne microstoma</i>	Least concern (lc)	2506	
<i>Ophryophryne synoria</i>	Vulnerable (vu)	6727	
<i>Opisthoxylax immaculatus</i>	Least concern (lc)	3697	
<i>Oreobates quixensis</i>	Least concern (lc)	2643	
<i>Oreolalax lichuanensis</i>	Least concern (lc)	5310	
<i>Oreolalax schmidti</i>	Near threatened (nt)	5309	
<i>Oreophryne brevicrus</i>	Data deficient (dd)	2286	
<i>Oreophryne parkeri</i>	Data deficient (dd)	2300	
<i>Oreophrynella nigra</i>	Vulnerable (vu)	373	
<i>Oreophrynella quelchii</i>	Vulnerable (vu)	374	
<i>Oscaecilia bassleri</i>	Least concern (lc)	1918	
<i>Osteocephalus buckleyi</i>	Least concern (lc)	1005	
<i>Osteocephalus helenae</i>	Data deficient (dd)	817	
<i>Osteocephalus leprieurii</i>	Least concern (lc)	1009	

<i>Osteocephalus taurinus</i>	Least concern (lc)	1014	
<i>Osteopilus septentrionalis</i>	Least concern (lc)	1019	
<i>Osteopilus vastus</i>	Vulnerable (vu)	988	
<i>Pachyhynobius shangchengensis</i>	Vulnerable (vu)	3908	
<i>Pachytriton airobranchiatus</i>	Endangered (en) - provisional	8810	
<i>Pachytriton archospotus</i>	Near threatened (nt)	7156	
<i>Pachytriton brevipes</i>	Least concern (lc)	4267	
<i>Pachytriton moi</i>	Endangered (en)	7677	
<i>Pachytriton wuguanfui</i>	Endangered (en)	8458	
<i>Paedophryne swiftorum</i>	Least concern (lc)	7761	
<i>Papurana arfaki</i>	Least concern (lc)	4982	
<i>Papurana daemeli</i>	Least concern (lc)	5015	
<i>Papurana garritor</i>	Least concern (lc)	5038	
<i>Papurana grisea</i>	Data deficient (dd)	5045	
<i>Papurana krefftii</i>	Least concern (lc)	5069	
<i>Papurana milleti</i>	Least concern (lc)	5098	
<i>Paradoxophyla palmata</i>	Least concern (lc)	2070	
<i>Paramesotriton aurantius</i>	Vulnerable (vu)	8561	II
<i>Paramesotriton caudopunctatus</i>	Near threatened (nt)	4270	II
<i>Paramesotriton chinensis</i>	Least concern (lc)	4271	II
<i>Paramesotriton deloustali</i>	Least concern (lc)	4272	II
<i>Paramesotriton fuzhongensis</i>	Vulnerable (vu)	4273	II
<i>Paramesotriton hongkongensis</i>	Near threatened (nt)	5918	II
<i>Paramesotriton labiatus</i>	Least concern (lc)	4268	II
<i>Paramesotriton qixilingensis</i>	Vulnerable (vu)	8200	II
<i>Paramesotriton zhijinensis</i>	Endangered (en)	7109	II
<i>Pelobates fuscus</i>	Least concern (lc)	5270	
<i>Pelobates syriacus</i>	Least concern (lc)	5271	
<i>Pelobatrachus nasuta</i>	Least concern (lc)	6081	
<i>Pelophylax fukienensis</i>	Least concern (lc)	5034	
<i>Pelophylax lessonae</i>	Least concern (lc)	5077	
<i>Pelophylax ridibundus</i>	Least concern (lc)	5137	
<i>Peltophryne lemur</i>	Critically endangered (cr)	404	
<i>Peltophryne peltoccephala</i>	Least concern (lc)	406	
<i>Petropedetes johnstoni</i>	Least concern (lc)	3741	
<i>Petropedetes palmipes</i>	Vulnerable (vu)	3744	
<i>Philautus aurantium</i>	Vulnerable (vu)	4391	

<i>Philautus hosii</i>	Least concern (lc)	4416	
<i>Philautus petersi</i>	Least concern (lc)	4445	
<i>Philautus tectus</i>	Least concern (lc)	4460	
<i>Phlyctimantis boulengeri</i>	Least concern (lc)	3702	
<i>Phlyctimantis leonardi</i>	Least concern (lc)	3704	
<i>Phlyctimantis maculatus</i>	Least concern (lc)	3690	
<i>Phlyctimantis verrucosus</i>	Least concern (lc)	3705	
<i>Phrynobatrachus accraensis</i>	Least concern (lc)	3748	
<i>Phrynobatrachus acutirostris</i>	Near threatened (nt)	3750	
<i>Phrynobatrachus africanus</i>	Least concern (lc)	3730	
<i>Phrynobatrachus alleni</i>	Least concern (lc)	3753	
<i>Phrynobatrachus asper</i>	Vulnerable (vu)	3757	
<i>Phrynobatrachus auritus</i>	Least concern (lc)	3758	
<i>Phrynobatrachus batesii</i>	Least concern (lc)	3759	
<i>Phrynobatrachus calcaratus</i>	Least concern (lc)	3763	
<i>Phrynobatrachus cornutus</i>	Least concern (lc)	3765	
<i>Phrynobatrachus dendrobates</i>	Least concern (lc)	3769	
<i>Phrynobatrachus dispar</i>	Least concern (lc)	3770	
<i>Phrynobatrachus ghanensis</i>	Near threatened (nt)	3775	
<i>Phrynobatrachus gutturosus</i>	Least concern (lc)	3779	
<i>Phrynobatrachus intermedius</i>	Critically endangered (cr)	7237	
<i>Phrynobatrachus krefftii</i>	Endangered (en)	3783	
<i>Phrynobatrachus latifrons</i>	Least concern (lc)	3784	
<i>Phrynobatrachus leveleve</i>	Least concern (lc)	6994	
<i>Phrynobatrachus liberiensis</i>	Least concern (lc)	3785	
<i>Phrynobatrachus mababiensis</i>	Least concern (lc)	3786	
<i>Phrynobatrachus minutus</i>	Least concern (lc)	3788	
<i>Phrynobatrachus natalensis</i>	Least concern (lc)	3790	
<i>Phrynobatrachus parkeri</i>	Least concern (lc)	3793	
<i>Phrynobatrachus parvulus</i>	Least concern (lc)	3794	
<i>Phrynobatrachus perpalmatus</i>	Least concern (lc)	3795	
<i>Phrynobatrachus plicatus</i>	Least concern (lc)	3797	

<i>Phrynobatrachus ukingensis</i>	Least concern (lc)	3810	
<i>Phrynobatrachus villiersi</i>	Least concern (lc)	3812	
<i>Phrynoglossus baluensis</i>	Least concern (lc)	4844	
<i>Phrynoglossus laevis</i>	Least concern (lc)	4849	
<i>Phrynoglossus martensii</i>	Least concern (lc)	4852	
<i>Phrynoglossus semipalmatus</i>	Least concern (lc)	4853	
<i>Phrynoidis asper</i>	Least concern (lc)	110	
<i>Phrynoidis juxtasper</i>	Least concern (lc)	207	
<i>Phrynomantis annectens</i>	Least concern (lc)	2083	
<i>Phrynomantis bifasciatus</i>	Least concern (lc)	2084	
<i>Phrynomantis microps</i>	Least concern (lc)	2085	
<i>Phyllobates aurotaenia</i>	Least concern (lc)	1704	II
<i>Phyllobates bicolor</i>	Endangered (en)	1705	II
<i>Phyllobates lugubris</i>	Least concern (lc)	1706	II
<i>Phyllobates terribilis</i>	Endangered (en)	1707	II
<i>Phyllobates vittatus</i>	Vulnerable (vu)	1708	II
<i>Phyllomedusa atelopoides</i>	Least concern (lc)	639	
<i>Phyllomedusa azurea</i>	Data deficient (dd)	6800	
<i>Phyllomedusa bicolor</i>	Least concern (lc)	642	
<i>Phyllomedusa camba</i>	Least concern (lc)	6071	
<i>Phyllomedusa hypochondrialis</i>	Data deficient (dd)	653	
<i>Phyllomedusa palliata</i>	Least concern (lc)	657	
<i>Phyllomedusa sauvagii</i>	Least concern (lc)	661	
<i>Phyllomedusa tarsius</i>	Least concern (lc)	662	
<i>Phyllomedusa tetraploidea</i>	Least concern (lc)	663	
<i>Phyllomedusa tomopterna</i>	Least concern (lc)	664	
<i>Phyllomedusa vaillantii</i>	Least concern (lc)	666	
<i>Physalaemus cuvieri</i>	Least concern (lc)	3393	
<i>Pipa parva</i>	Least concern (lc)	5233	
<i>Pipa pipa</i>	Least concern (lc)	5234	
<i>Platymantis guentheri</i>	Least concern (lc)	4894	
<i>Platypelis barbouri</i>	Least concern (lc)	2336	
<i>Platypelis grandis</i>	Least concern (lc)	2338	
<i>Platypelis milloti</i>	Endangered (en)	2339	
<i>Platypelis pollicaris</i>	Least concern (lc)	2341	
<i>Platypelis tuberifera</i>	Least concern (lc)	2343	
<i>Platyplectrum ornatum</i>	Least concern (lc)	3509	
<i>Plectrohyla ixil</i>	Vulnerable (vu)	1042	

<i>Plectrohyla matudai</i>	Least concern (lc)	1044	
<i>Plethodon albagula</i>	Least concern (lc)	4121	
<i>Plethodon asupak</i>	Vulnerable (vu)	6434	
<i>Plethodon chlorobryonis</i>		4125	
<i>Plethodon cinereus</i>	Least concern (lc)	4126	
<i>Plethodon cylindraceus</i>	Least concern (lc)	4127	
<i>Plethodon dunni</i>	Least concern (lc)	4129	
<i>Plethodon glutinosus</i>	Least concern (lc)	4132	
<i>Plethodon jordani</i>	Near threatened (nt)	4137	
<i>Plethodon larselli</i>	Near threatened (nt)	4141	
<i>Plethodon metcalfi</i>	Least concern (lc)	5842	
<i>Plethodon montanus</i>	Least concern (lc)	5841	
<i>Plethodon petraeus</i>	Vulnerable (vu)	4148	
<i>Plethodon serratus</i>	Least concern (lc)	4153	
<i>Plethodon shermani</i>	Vulnerable (vu)	5845	
<i>Plethodon stormi</i>	Endangered (en)	4155	
<i>Plethodon teyahalee</i>	Least concern (lc)	5291	
<i>Plethodon yonahlossee</i>	Least concern (lc)	4162	
<i>Plethodontohyla alluaudi</i>	Least concern (lc)	2345	
<i>Plethodontohyla bipunctata</i>	Least concern (lc)	2347	
<i>Plethodontohyla guentheri</i>	Endangered (en)	6936	
<i>Plethodontohyla inguinalis</i>	Least concern (lc)	2351	
<i>Plethodontohyla mihanika</i>	Least concern (lc)	6219	
<i>Plethodontohyla notosticta</i>	Least concern (lc)	2354	
<i>Plethodontohyla ocellata</i>	Least concern (lc)	2355	
<i>Pleurodeles poireti</i>	Endangered (en)	4277	
<i>Pleurodeles waltl</i>	Near threatened (nt)	4278	
<i>Pleurodema brachyops</i>	Least concern (lc)	3424	
<i>Pleurodema diplolister</i>	Least concern (lc)	3427	
<i>Polypedates colletti</i>	Least concern (lc)	4470	
<i>Polypedates leucomystax</i>	Least concern (lc)	4479	
<i>Polypedates macrotis</i>	Least concern (lc)	4481	
<i>Polypedates megacephalus</i>	Least concern (lc)	4483	
<i>Polypedates otlophus</i>	Least concern (lc)	4486	
<i>Polypedates teraiensis</i>	Least concern (lc)	8016	
<i>Poyntonophrynus pachnodes</i>		8893	
<i>Pristimantis altamazonicus</i>	Least concern (lc)	2760	

<i>Pristimantis bogotensis</i>	Least concern (lc)	2809	
<i>Pristimantis buccinator</i>	Least concern (lc)	2820	
<i>Pristimantis carvalhoi</i>	Least concern (lc)	2835	
<i>Pristimantis caryophyllaceus</i>	Least concern (lc)	2836	
<i>Pristimantis cerasinus</i>	Least concern (lc)	2839	
<i>Pristimantis conspicillatus</i>	Least concern (lc)	2856	
<i>Pristimantis croceinguinis</i>	Least concern (lc)	2867	
<i>Pristimantis cruentus</i>	Least concern (lc)	2869	
<i>Pristimantis curtipes</i>	Least concern (lc)	2878	
<i>Pristimantis fenestratus</i>	Least concern (lc)	2917	
<i>Pristimantis gaigei</i>	Least concern (lc)	2926	
<i>Pristimantis lacrimosus</i>	Least concern (lc)	3001	
<i>Pristimantis lanthanites</i>	Least concern (lc)	3005	
<i>Pristimantis malkini</i>	Least concern (lc)	3039	
<i>Pristimantis martiae</i>	Least concern (lc)	3044	
<i>Pristimantis muscosus</i>	Near threatened (nt)	6152	
<i>Pristimantis ockendeni</i>	Least concern (lc)	3092	
<i>Pristimantis pharangobates</i>	Least concern (lc)	7944	
<i>Pristimantis reichlei</i>		7239	
<i>Pristimantis ridens</i>	Least concern (lc)	3176	
<i>Pristimantis sagittulus</i>	Least concern (lc)	6257	
<i>Pristimantis skydmainos</i>	Least concern (lc)	5591	
<i>Pristimantis toftae</i>	Least concern (lc)	3250	
<i>Pristimantis unistrigatus</i>	Least concern (lc)	3258	
<i>Pristimantis variabilis</i>	Least concern (lc)	3263	
<i>Pristimantis ventrimarmoratus</i>	Least concern (lc)	3268	
<i>Proceratophrys appendiculata</i>	Least concern (lc)	5618	
<i>Proceratophrys boiei</i>	Least concern (lc)	5621	
<i>Proceratophrys cristiceps</i>	Least concern (lc)	5622	
<i>Proceratophrys laticeps</i>	Least concern (lc)	5626	
<i>Proceratophrys palustris</i>	Data deficient (dd)	5628	
<i>Proceratophrys schirchi</i>	Least concern (lc)	5629	
<i>Proteus anguinus</i>	Vulnerable (vu)	4229	
<i>Pseudacris crucifer</i>	Least concern (lc)	777	
<i>Pseudacris feriarum</i>	Least concern (lc)	1055	
<i>Pseudacris ornata</i>	Least concern (lc)	1059	
<i>Pseudacris regilla</i>	Least concern (lc)	929	
<i>Pseudacris streckeri</i>	Least concern (lc)	1060	

<i>Pseudis paradoxa</i>	Least concern (lc)	5225	
<i>Pseudobranchius axanthus</i>	Least concern (lc)	4312	
<i>Pseudobranchius striatus</i>	Least concern (lc)	4313	
<i>Pseudobufo subasper</i>	Least concern (lc)	409	
<i>Pseudophryne bibronii</i>	Near threatened (nt)	3583	
<i>Pseudophryne coriacea</i>	Least concern (lc)	3584	
<i>Pseudophryne dendyi</i>	Least concern (lc)	3587	
<i>Pseudophryne guentheri</i>	Least concern (lc)	3589	
<i>Pseudophryne occidentalis</i>	Least concern (lc)	3591	
<i>Pseudophryne semimarmorata</i>	Least concern (lc)	3594	
<i>Pseudotriton ruber</i>	Least concern (lc)	4198	
<i>Psychrophrynella usurpator</i>	Near threatened (nt)	7288	
<i>Ptychadena aequiplicata</i>	Least concern (lc)	4924	
<i>Ptychadena anchietae</i>	Least concern (lc)	4925	
<i>Ptychadena bibroni</i>	Least concern (lc)	5535	
<i>Ptychadena christyi</i>	Least concern (lc)	4929	
<i>Ptychadena erlangeri</i>	Near threatened (nt)	4932	
<i>Ptychadena filwoha</i>	Data deficient (dd)	5684	
<i>Ptychadena guibei</i>	Least concern (lc)	4934	
<i>Ptychadena longirostris</i>	Least concern (lc)	4938	
<i>Ptychadena mascareniensis</i>	Least concern (lc)	4941	
<i>Ptychadena neumanni</i>	Least concern (lc)	4944	
<i>Ptychadena newtoni</i>	Endangered (en)	4945	
<i>Ptychadena nilotica</i>	Least concern (lc)	8100	
<i>Ptychadena oxyrhynchus</i>	Least concern (lc)	4947	
<i>Ptychadena perreti</i>	Least concern (lc)	4949	
<i>Ptychadena porosissima</i>	Least concern (lc)	4950	
<i>Ptychadena subpunctata</i>	Least concern (lc)	4958	
<i>Ptychohyla acrochorda</i>	Data deficient (dd)	6135	
<i>Ptychohyla euthysanota</i>	Least concern (lc)	1067	
<i>Ptychohyla hypomykter</i>	Vulnerable (vu)	1068	
<i>Ptychohyla zophodes</i>	Vulnerable (vu)	6136	
<i>Pulchrana glandulosa</i>	Least concern (lc)	5040	
<i>Pulchrana picturata</i>	Least concern (lc)	5774	
<i>Pulchrana signata</i>	Least concern (lc)	5152	
<i>Pyxicephalus adspersus</i>	Least concern (lc)	4966	
<i>Pyxicephalus edulis</i>	Least concern (lc)	4967	
<i>Quasipaa exilispinosa</i>	Least concern (lc)	4864	

<i>Quasipaa spinosa</i>	Vulnerable (vu)	4877	
<i>Rana aurora</i>	Least concern (lc)	4987	
<i>Rana berlandieri</i>	Least concern (lc)	4990	
<i>Rana capito</i>	Near threatened (nt)	6095	
<i>Rana catesbeiana</i>	Least concern (lc)	4999	
<i>Rana chensinensis</i>	Least concern (lc)	5005	
<i>Rana chiricahuensis</i>	Vulnerable (vu)	5007	
<i>Rana clamitans</i>	Least concern (lc)	5009	
<i>Rana forreri</i>	Least concern (lc)	5033	
<i>Rana grylio</i>	Least concern (lc)	5046	
<i>Rana heckscheri</i>	Least concern (lc)	5048	
<i>Rana latastei</i>	Vulnerable (vu)	5071	
<i>Rana maculata</i>	Least concern (lc)	5088	
<i>Rana magnaocularis</i>	Least concern (lc)	5089	
<i>Rana palustris</i>	Least concern (lc)	5121	
<i>Rana pipiens</i>	Least concern (lc)	5126	
<i>Rana sphenocephala</i>	Least concern (lc)	5174	
<i>Rana sylvatica</i>	Least concern (lc)	5162	
<i>Rana tarahumarae</i>	Vulnerable (vu)	5165	
<i>Rana temporaria</i>	Least concern (lc)	5168	
<i>Rana warszewitschii</i>	Least concern (lc)	5183	
<i>Rana yavapaiensis</i>	Least concern (lc)	5187	
<i>Ranitomeya amazonica</i>	Data deficient (dd)	5911	II
<i>Ranitomeya benedicta</i>	Vulnerable (vu)	7167	II
<i>Ranitomeya cyanovittata</i>		7488	II
<i>Ranitomeya defleri</i>	Least concern (lc)	7398	II
<i>Ranitomeya fantastica</i>	Vulnerable (vu)	1630	II
<i>Ranitomeya flavovittata</i>	Least concern (lc)	5913	II
<i>Ranitomeya imitator</i>	Least concern (lc)	1634	II
<i>Ranitomeya reticulata</i>	Least concern (lc)	1643	II
<i>Ranitomeya sirensis</i>	Least concern (lc)	6580	II
<i>Ranitomeya summersi</i>	Endangered (en)	7168	II
<i>Ranitomeya toraro</i>		7732	II
<i>Ranitomeya uakarii</i>	Least concern (lc)	6725	II
<i>Ranitomeya vanzolinii</i>	Least concern (lc)	1648	II
<i>Ranitomeya variabilis</i>	Data deficient (dd)	6117	II
<i>Ranitomeya ventrimaculata</i>	Least concern (lc)	1649	II
<i>Raorchestes gryllus</i>	Vulnerable (vu)	4414	
<i>Raorchestes parvulus</i>	Least concern (lc)	4444	
<i>Rentapia hosii</i>	Least concern (lc)	385	

Rhacophorus annamensis	Least concern (lc)	4494	
Rhacophorus bipunctatus	Least concern (lc)	4501	
Rhacophorus calcaneus	Endangered (en)	4504	
Rhacophorus exechopygus	Least concern (lc)	5508	
Rhacophorus helenae	Endangered (en)	7957	
Rhacophorus margaritifer	Least concern (lc)	5786	
Rhacophorus nigropalmatus	Least concern (lc)	4524	
Rhacophorus pardalis	Least concern (lc)	4529	
Rhacophorus reinwardtii	Near threatened (nt)	4532	
Rhacophorus rhodopus	Least concern (lc)	7016	
Rhacophorus spelaeus	Vulnerable (vu)	7481	
Rhacophorus verrucopus	Near threatened (nt)	4544	
Rhaebo guttatus	Least concern (lc)	188	
Rhaebo haematiticus	Least concern (lc)	191	
Rheobates palmatus	Least concern (lc)	1593	
Rhinatrema bivittatum	Least concern (lc)	2016	
Rhinella alata	Data deficient (dd)	6623	
Rhinella diptycha	Data deficient (dd)	162	
Rhinella granulosa	Least concern (lc)	187	
Rhinella icterica	Least concern (lc)	200	
Rhinella lescurei	Least concern (lc)	7022	
Rhinella margaritifera	Least concern (lc)	228	
Rhinella marina	Least concern (lc)	229	
Rhinella ornata	Least concern (lc)	6832	
Rhinella pygmaea	Least concern (lc)	261	
Rhinella spinulosa	Least concern (lc)	280	
Rhinoderma darwini	Endangered (en)	4322	
Rhinophryne dorsalis	Least concern (lc)	4319	
Rhombophryne savaka	Endangered (en)	8488	
Rhombophryne serratopalpebrosa	Endangered (en)	2356	
Rhombophryne testudo	Endangered (en)	2359	
Rhyacotriton olympicus	Vulnerable (vu)	4234	
Rulyrana flavopunctata	Least concern (lc)	1767	II
Sachatamia albomaculata	Least concern (lc)	1750	II
Sachatamia ilex	Least concern (lc)	1729	II
Salamandra salamandra	Least concern (lc)	4284	
Salamandrella keyserlingii	Least concern (lc)	3913	
Scaphiophryne boribory	Vulnerable (vu)	6398	II

<i>Scaphiophryne brevis</i>	Least concern (lc)	2072	
<i>Scaphiophryne calcarata</i>	Least concern (lc)	2073	
<i>Scaphiophryne gottlebei</i>	Endangered (en)	2074	II
<i>Scaphiophryne madagascariensis</i>	Near threatened (nt)	2075	
<i>Scaphiophryne marmorata</i>	Vulnerable (vu)	2076	II
<i>Scaphiophryne spinosa</i>	Least concern (lc)	6573	II
<i>Scaphiopus couchii</i>	Least concern (lc)	5274	
<i>Scaphiopus holbrookii</i>	Least concern (lc)	5275	
<i>Scarthyla goinorum</i>	Least concern (lc)	1118	
<i>Schismaderma carens</i>	Least concern (lc)	421	
<i>Schistometopum gregorii</i>	Least concern (lc)	1936	
<i>Schistometopum thomense</i>	Least concern (lc)	1937	
<i>Scinax boesemani</i>	Least concern (lc)	1093	
<i>Scinax cabralensis</i>	Data deficient (dd)	6993	
<i>Scinax camposseabrai</i>	Data deficient (dd)	6864	
<i>Scinax castroviejoii</i>	Least concern (lc)	1100	
<i>Scinax curicica</i>	Data deficient (dd)	6341	
<i>Scinax eurydice</i>	Least concern (lc)	1111	
<i>Scinax funereus</i>	Least concern (lc)	1114	
<i>Scinax fuscomarginatus</i>	Least concern (lc)	1115	
<i>Scinax fuscovarius</i>	Least concern (lc)	1116	
<i>Scinax garbei</i>	Least concern (lc)	1117	
<i>Scinax hayii</i>	Least concern (lc)	1119	
<i>Scinax maracaya</i>	Data deficient (dd)	1133	
<i>Scinax nasicus</i>	Least concern (lc)	1136	
<i>Scinax pachycrus</i>	Least concern (lc)	1141	
<i>Scinax perpusillus</i>	Least concern (lc)	1144	
<i>Scinax rogerioi</i>		7380	
<i>Scinax ruber</i>	Least concern (lc)	1083	
<i>Scinax squalirostris</i>	Least concern (lc)	1152	
<i>Scinax staufferi</i>	Least concern (lc)	1153	
<i>Scinax tigrinus</i>	Least concern (lc)	7510	
<i>Scinax x-signatus</i>	Least concern (lc)	1162	
<i>Sclerophrys camerunensis</i>	Least concern (lc)	133	
<i>Sclerophrys channingi</i>	Least concern (lc)	7630	I
<i>Sclerophrys garmani</i>	Least concern (lc)	181	
<i>Sclerophrys gracilipes</i>	Least concern (lc)	185	
<i>Sclerophrys maculata</i>	Least concern (lc)	227	
<i>Sclerophrys mauritanica</i>	Least concern (lc)	231	

<i>Sclerophrys pusilla</i>	Least concern (lc)	8467	
<i>Sclerophrys regularis</i>	Least concern (lc)	268	
<i>Sclerophrys togoensis</i>	Least concern (lc)	295	
<i>Sclerophrys tuberosa</i>	Least concern (lc)	299	
<i>Sclerophrys vittata</i>	Data deficient (dd)	313	
<i>Scotobleps gabonicus</i>	Least concern (lc)	1504	
<i>Scutigera glandulatus</i>	Least concern (lc)	2514	
<i>Silverstoneia flotator</i>	Least concern (lc)	1562	
<i>Siren intermedia</i>	Least concern (lc)	4315	
<i>Siren lacertina</i>	Least concern (lc)	4316	
<i>Smilisca baudinii</i>	Least concern (lc)	1164	
<i>Smilisca cyanosticta</i>	Least concern (lc)	1165	
<i>Smilisca phaeota</i>	Least concern (lc)	1166	
<i>Smilisca sila</i>	Least concern (lc)	1168	
<i>Smilisca sordida</i>	Least concern (lc)	1169	
<i>Sooglossus sechellensis</i>	Endangered (en)	5216	
<i>Sooglossus thomasseti</i>	Critically endangered (cr)	5213	
<i>Spea bombifrons</i>	Least concern (lc)	5278	
<i>Spea hammondii</i>	Near threatened (nt)	5279	
<i>Spea multiplicata</i>	Least concern (lc)	5281	
<i>Sphaenorhynchus lacteus</i>	Least concern (lc)	1174	
<i>Sphenophryne cornuta</i>	Least concern (lc)	2309	
<i>Sphenophryne thomsoni</i>	Least concern (lc)	2279	
<i>Spinomantis aglavei</i>	Least concern (lc)	4573	
<i>Spinomantis fimbriatus</i>	Least concern (lc)	4597	
<i>Spinomantis phantasticus</i>	Least concern (lc)	5632	
<i>Spinomantis tavaratra</i>	Vulnerable (vu)	7170	
<i>Stauroides guttatus</i>	Least concern (lc)	7622	
<i>Stauroides latopalmaris</i>	Least concern (lc)	5190	
<i>Stauroides parvus</i>	Vulnerable (vu)	6906	
<i>Stauroides tuberilinguis</i>	Least concern (lc)	5192	
<i>Stefania evansi</i>	Data deficient (dd)	1414	
<i>Strabomantis bufoniformis</i>	Endangered (en)	2822	
<i>Strauchbufo raddei</i>	Least concern (lc)	265	
<i>Strongylopus kitumbeine</i>	Vulnerable (vu)	6641	
<i>Stumpffia tridactyla</i>	Data deficient (dd)	2366	
<i>Sylvirana cubitalis</i>	Least concern (lc)	5013	
<i>Sylvirana guentheri</i>	Least concern (lc)	5047	
<i>Sylvirana montosa</i>		8803	
<i>Sylvirana mortenseni</i>	Near threatened (nt)	6860	

<i>Sylvirana nigrovittata</i>	Least concern (lc)	5111	
<i>Tachycnemis seychellensis</i>	Least concern (lc)	3629	
<i>Taricha granulosa</i>	Least concern (lc)	4288	
<i>Taricha torosa</i>	Least concern (lc)	4290	
<i>Telmatobius culeus</i>	Endangered (en)	2695	I
<i>Telmatobius macrostomus</i>	Endangered (en)	2578	
<i>Telmatobius marmoratus</i>	Endangered (en)	2708	
<i>Telmatobius verrucosus</i>	Critically endangered (cr)	6739	
<i>Teratohyla midas</i>	Least concern (lc)	1777	II
<i>Teratohyla pulverata</i>	Least concern (lc)	1825	II
<i>Teratohyla spinosa</i>	Least concern (lc)	1799	II
<i>Theloderma asperum</i>	Least concern (lc)	4547	
<i>Theloderma bicolor</i>	Endangered (en)	4548	
<i>Theloderma corticale</i>	Least concern (lc)	4549	
<i>Theloderma gordonii</i>	Least concern (lc)	4550	
<i>Theloderma horridum</i>	Least concern (lc)	4551	
<i>Theloderma licin</i>	Least concern (lc)	6915	
<i>Theloderma stellatum</i>	Least concern (lc)	4555	
<i>Theloderma vietnamense</i>	Least concern (lc)	8421	
<i>Tlalocohyla loquax</i>	Least concern (lc)	851	
<i>Tlalocohyla picta</i>	Least concern (lc)	909	
<i>Tlalocohyla smithii</i>	Least concern (lc)	963	
<i>Tomopterna cryptotis</i>	Least concern (lc)	5198	
<i>Tomopterna damarensis</i>	Data deficient (dd)	6642	
<i>Tomopterna marmorata</i>	Least concern (lc)	5204	
<i>Tomopterna tuberculosa</i>	Least concern (lc)	5210	
<i>Trachycephalus coriaceus</i>	Least concern (lc)	1021	
<i>Trachycephalus nigromaculatus</i>	Least concern (lc)	1193	
<i>Trachycephalus resinifictrix</i>	Least concern (lc)	1024	
<i>Trachycephalus typhoni</i>	Least concern (lc)	1025	
<i>Trichobatrachus robustus</i>	Least concern (lc)	1506	
<i>Tripurion petasatus</i>	Least concern (lc)	1195	
<i>Tripurion spinosus</i>	Least concern (lc)	673	
<i>Triturus carnifex</i>	Least concern (lc)	4294	
<i>Triturus cristatus</i>	Least concern (lc)	4295	
<i>Triturus dobrogicus</i>	Near threatened (nt)	4296	
<i>Triturus ivanbureschi</i>		8024	
<i>Triturus karelinii</i>	Least concern (lc)	4299	

<i>Triturus macedonicus</i>		7200	
<i>Triturus marmoratus</i>	Least concern (lc)	4300	
<i>Tylototriton anguliceps</i>	Least concern (lc)	8316	II
<i>Tylototriton asperrimus</i>	Near threatened (nt)	4305	II
<i>Tylototriton hainanensis</i>	Endangered (en)	5294	II
<i>Tylototriton kweichowensis</i>	Vulnerable (vu)	4306	II
<i>Tylototriton notialis</i>	Vulnerable (vu)	7585	II
<i>Tylototriton panhai</i>		8094	II
<i>Tylototriton shanjing</i>	Vulnerable (vu)	4307	II
<i>Tylototriton taliangensis</i>	Vulnerable (vu)	4308	II
<i>Tylototriton verrucosus</i>	Least concern (lc)	4309	II
<i>Tylototriton yangi</i>	Endangered (en)	7874	II
<i>Tylototriton zieglerei</i>	Vulnerable (vu)	7972	II
<i>Typhlonectes natans</i>	Least concern (lc)	1964	
<i>Werneria bambutensis</i>	Critically endangered (cr)	431	
<i>Wijayarana melasma</i>	Data deficient (dd)	6440	
<i>Wolterstorffina parvipalmata</i>	Critically endangered (cr)	437	
<i>Xenophrys aceras</i>	Least concern (lc)	2482	
<i>Xenophrys auralensis</i>	Vulnerable (vu)	6198	
<i>Xenophrys longipes</i>	Near threatened (nt)	2494	
<i>Xenophrys major</i>	Least concern (lc)	2493	
<i>Xenophrys parva</i>	Least concern (lc)	2502	
<i>Xenopus amieti</i>	Vulnerable (vu)	5248	
<i>Xenopus clivii</i>	Least concern (lc)	5252	
<i>Xenopus epitropicalis</i>	Least concern (lc)	5245	
<i>Xenopus gilli</i>	Endangered (en)	5254	
<i>Xenopus laevis</i>	Least concern (lc)	5255	
<i>Xenopus lenduensis</i>	Critically endangered (cr)	7638	
<i>Xenopus longipes</i>	Critically endangered (cr)	5257	
<i>Xenopus muelleri</i>	Least concern (lc)	5258	
<i>Xenopus petersii</i>	Least concern (lc)	5962	
<i>Xenopus poweri</i>	Least concern (lc)	8432	
<i>Xenopus pygmaeus</i>	Least concern (lc)	5259	
<i>Xenopus ruwenzoriensis</i>	Data deficient (dd)	5260	
<i>Xenopus tropicalis</i>	Least concern (lc)	5246	
<i>Xenopus victorianus</i>	Least concern (lc)	6856	
<i>Xenorhina oxycephala</i>	Least concern (lc)	2448	
<i>Zhangixalus dennysi</i>	Least concern (lc)	4472	
<i>Zhangixalus dulitensis</i>	Least concern (lc)	4506	
<i>Zhangixalus prominanus</i>	Least concern (lc)	4531	

Zhangixalus smaragdinus	Near threatened (nt)	4519	
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Annex 3. Frequency of trade in all species/taxonomic units recorded in LEMIS by the United States of America from 2015-2020, based on the number of times a traded shipment was recorded to contain each species.

Taxonomic Unit	Number of Shipments
<i>Hymenochirus curtipes</i>	3139
<i>Lithobates catesbeianus</i>	2902
<i>Xenopus laevis</i>	1525
<i>Lithobates forreri</i>	1216
<i>Noncites amphibians</i>	1111
<i>Ceratophrys cranwelli</i>	898
<i>Rhinella marina</i>	697
<i>Litoria caerulea</i>	650
<i>Rana pipiens</i>	644
<i>Hyla cinerea</i>	602
<i>Hymenochirus boettgeri</i>	586
<i>Agalychnis callidryas</i>	507
<i>Bombina orientalis</i>	480
<i>Pyxicephalus adspersus</i>	423
<i>Ceratophrys ornata</i>	404
<i>Kaloula pulchra</i>	373
<i>Duttaphrynus melanostictus</i>	295
<i>Ambystoma tigrinum</i>	277
<i>Polypedates leucomystax</i>	275
<i>Oophaga pumilio</i>	267
<i>Dendropsophus leucophyllatus</i>	266
<i>Pithecopus hypochondrialis</i>	264
<i>Hoplobatrachus rugulosus</i>	264
<i>Bufo species</i>	221
<i>Phyllomedusa bicolor</i>	218
<i>Rana species</i>	218
<i>Pristimantis species</i>	209
<i>Pipa pipa</i>	203
<i>Ceratophrys cornuta</i>	181
<i>Dendrobates auratus</i>	173
<i>Rhaebo guttatus</i>	160
<i>Ambystoma opacum</i>	160
<i>Phrynomantis bifasciatus</i>	159
<i>Cornufer guentheri</i>	152
<i>Dyscophus guineti</i>	152
<i>Hyalinobatrachium fleischmanni</i>	146
<i>Xenopus species</i>	144

<i>Rhacophorus reinwardtii</i>	134
<i>Cynops orientalis</i>	130
<i>Notophthalmus viridescens</i>	130
<i>Leptopelis species</i>	128
<i>Amphiuma tridactylum</i>	118
<i>Callimedusa tomopterna</i>	115
<i>Ceratophrys aurita</i>	115
<i>Incilius alvarius</i>	108
<i>Boophis species</i>	107
<i>Osteopilus septentrionalis</i>	105
<i>Ambystoma maculatum</i>	104
<i>Anaxyrus terrestris</i>	102
<i>Anaxyrus debilis</i>	102
<i>Hyperolius species</i>	98
<i>Mantella baroni</i>	98
<i>Occidozyga lima</i>	97
<i>Dendrobates tinctorius</i>	94
<i>Bufo gargarizans</i>	93
<i>Hyperolius concolor</i>	91
<i>Craugastor species</i>	89
<i>Amphiuma means</i>	88
<i>Phrynobatrachus species</i>	88
<i>Mantella betsileo</i>	88
<i>Atelopus spumarius</i>	86
<i>Gastrotheca species</i>	84
<i>Necturus maculosus</i>	84
<i>Hyla gratiosa</i>	82
<i>Hylarana species</i>	80
<i>Lepidobatrachus laevis</i>	78
<i>Lithobates species</i>	78
<i>Phyllomedusa vaillantii</i>	76
<i>Scaphiopus holbrookii</i>	76
<i>Hyla ebraccata</i>	74
<i>Limnonectes species</i>	71
<i>Hyla species</i>	70
<i>Ptychadena species</i>	70
<i>Osteopilus species</i>	69
<i>Hyla punctata</i>	68
<i>Fejervarya limnocharis</i>	67
<i>Rana erythraea</i>	66
<i>Hyla versicolor</i>	65

<i>Rhacophorus species</i>	65
<i>Theلودerma corticale</i>	61
<i>Sphaenorhynchus lacteus</i>	60
<i>Kassina senegalensis</i>	60
<i>Megophrys nasuta</i>	59
<i>Litoria infrafronata</i>	58
<i>Bufo quercicus</i>	58
<i>Hyperolius fusciventris</i>	58
<i>Cacosternum species</i>	58
<i>Hyla squirella</i>	57
<i>Arthroleptis species</i>	55
<i>Hyla marmorata</i>	54
<i>Megophrys species</i>	54
<i>Trachycephalus resinifictrix</i>	53
<i>Dendrobates leucomelas</i>	52
<i>Ceratophrys species</i>	51
<i>Leptolalax species</i>	49
<i>Atelopus species</i>	48
<i>Mantidactylus species</i>	48
<i>Mantella nigricans</i>	47
<i>Mantella aurantiaca</i>	47
<i>Cynops species</i>	45
<i>Bolitoglossa species</i>	45
<i>Salamandra salamandra</i>	45
<i>Theلودerma asperum</i>	45
<i>Glyphoglossus guttulatus</i>	45
<i>Triprrion petasatus</i>	44
<i>Siren lacertina</i>	44
<i>Bufo cognatus</i>	43
<i>Oophaga sylvatica</i>	42
<i>Phrynobatrachus auritus</i>	42
<i>Desmognathus fuscus</i>	41
<i>Phyllomedusa sauvagii</i>	41
<i>Plethodon glutinosus</i>	41
<i>Afrixalus dorsalis</i>	40
<i>Hyla crepitans</i>	40
<i>Litoria species</i>	40
<i>Hyalinobatrachium species</i>	40
<i>Ambystoma mexicanum</i>	38
<i>Eleutherodactylus species</i>	38
<i>Breviceps mossambicus</i>	38

<i>Microhyla pulchra</i>	36
<i>Dendropsophus species</i>	36
<i>Polypedates otlophus</i>	36
<i>Amietia species</i>	35
<i>Cochranella granulosa</i>	35
<i>Phrynohyas resinifictrix</i>	35
<i>Ameerega trivittata</i>	35
<i>Dendropsophus ebraccatus</i>	34
<i>Kassina maculata</i>	34
<i>Microhyla species</i>	33
<i>Philautus species</i>	33
<i>Osteopilus vastus</i>	33
<i>Leptodactylus pentadactylus</i>	33
<i>Ptychadena anchietae</i>	32
<i>Afrixalus species</i>	32
<i>Hemisus marmoratus</i>	32
<i>Cynops pyrrhogaster</i>	32
<i>Anaxyrus species</i>	32
<i>Leptodactylus species</i>	31
<i>Hyla calcarata</i>	31
<i>Agalychnis dacnicolor</i>	30
<i>Leptobrachium species</i>	30
<i>Siren intermedia</i>	30
<i>Incilius species</i>	30
<i>Amolops species</i>	30
<i>Phyllobates terribilis</i>	30
<i>Rana chensinensis</i>	29
<i>Epipedobates anthonyi</i>	29
<i>Limnonectes macrodon</i>	29
<i>Ptychadena oxyrhynchus</i>	29
<i>Mantella pulchra</i>	29
<i>Scaphiophryne madagascariensis</i>	29
<i>Desmognathus species</i>	29
<i>Polypedates species</i>	29
<i>Scaphiopus couchii</i>	29
<i>Amietophrynus species</i>	28
<i>Cruziohyla craspedopus</i>	28
<i>Rhacophorus pardalis</i>	28
<i>Leptopelis argenteus</i>	28
<i>Scinax species</i>	28
<i>Theloderma bicolor</i>	27

<i>Pyxicephalus edulis</i>	27
<i>Smilisca phaeota</i>	27
<i>Proceratophrys species</i>	27
<i>Odorrana species</i>	27
<i>Kaloula baleata</i>	26
<i>Pseudotriton ruber</i>	25
<i>Nyctixalus pictus</i>	25
<i>Dyscophus insularis</i>	25
<i>Epipedobates tricolor</i>	25
<i>Pachytriton brevipes</i>	24
<i>Ranitomeya fantastica</i>	24
<i>Gephyromantis species</i>	24
<i>Boophis madagascariensis</i>	24
<i>Ranitomeya amazonica</i>	23
<i>Theloderma species</i>	23
<i>Phrynomantis species</i>	23
<i>Bufo punctatus</i>	23
<i>Allobates species</i>	23
<i>Mantella madagascariensis</i>	23
<i>Zhangixalus dennysi</i>	23
<i>Rana clamitans</i>	23
<i>Oreophryne species</i>	23
<i>Trachycephalus species</i>	22
<i>Anotheca spinosa</i>	22
<i>Hoplobatrachus species</i>	22
<i>Pedostibes hosii</i>	22
<i>Boophis luteus</i>	21
<i>Bufo regularis</i>	21
<i>Ranitomeya imitator</i>	21
<i>Trichobatrachus robustus</i>	21
<i>Hyla femoralis</i>	20
<i>Phyllomedusa species</i>	20
<i>Necturus beyeri</i>	20
<i>Ameerega hahneli</i>	19
<i>Ranitomeya variabilis</i>	19
<i>Hoplobatrachus occipitalis</i>	19
<i>Ranitomeya reticulata</i>	19
<i>Bombina variegata</i>	18
<i>Triturus marmoratus</i>	18
<i>Scaphiophryne marmorata</i>	18
<i>Eurycea bislineata</i>	18

<i>Triturus species</i>	18
<i>Ranitomeya sirensis</i>	18
<i>Cynops cyanurus</i>	18
<i>Platymantis species</i>	18
<i>Hyla heilprini</i>	18
<i>Leptopelis vermiculatus</i>	18
<i>Oophaga histrionica</i>	18
<i>Brachycephalus species</i>	18
<i>Arthroleptis variabilis</i>	18
<i>Hyperolius ocellatus</i>	18
<i>Scotobleps gabonicus</i>	18
<i>Cophixalus species</i>	18
<i>Ptychadena mascareniensis</i>	17
<i>Eurycea wilderae</i>	17
<i>Ambystoma talpoideum</i>	17
<i>Pseudobranchius striatus</i>	17
<i>Crossodactylus species</i>	17
<i>Agalychnis lemur</i>	17
<i>Ranitomeya vanzolinii</i>	17
<i>Pelophylax fukienensis</i>	17
<i>Colostethus species</i>	16
<i>Breviceps adspersus</i>	16
<i>Nectophryne afra</i>	16
<i>Oophaga lehmanni</i>	16
<i>Heterixalus madagascariensis</i>	16
<i>Rana berlandieri</i>	16
<i>Heterixalus alboguttatus</i>	16
<i>Petropedetes species</i>	16
<i>Arthroleptis poecilonotus</i>	15
<i>Bufo speciosus</i>	15
<i>Pleurodema brachyops</i>	15
<i>Hyperolius cinnamomeoventris</i>	15
<i>Ambystoma species</i>	15
<i>Amietophrynus regularis</i>	15
<i>Rana grylio</i>	15
<i>Litoria aurea</i>	15
<i>Pleurodeles waltl</i>	15
<i>Occidozyga species</i>	15
<i>Odorrana chloronota</i>	15
<i>Chiromantis rufescens</i>	15
<i>Rhacophorus prominanus</i>	14

<i>Espadarana prosoblepon</i>	14
<i>Bombina bombina</i>	14
<i>Scutigera species</i>	14
<i>Spinomantis species</i>	14
<i>Eleutherodactylus johnstonei</i>	14
<i>Lithodytes lineatus</i>	14
<i>Leptodactylodon species</i>	14
<i>Hyloxalus species</i>	14
<i>Ameerega bassleri</i>	14
<i>Ichthyophis species</i>	14
<i>Amietia angolensis</i>	14
<i>Hymenochirus species</i>	13
<i>Agalychnis spurrelli</i>	13
<i>Microhyla butleri</i>	13
<i>Ranitomeya uakarii</i>	13
<i>Ranitomeya benedicta</i>	13
<i>Plethodon cinereus</i>	13
<i>Plectrohyla species</i>	13
<i>Cardioglossa leucomystax</i>	13
<i>Phrynobatrachus natalensis</i>	13
<i>Leptobranchium hasseltii</i>	13
<i>Neurergus crocatus</i>	13
<i>Atelopus varius</i>	13
<i>Desmognathus quadramaculatus</i>	13
<i>Physalaemus pustulosus</i>	12
<i>Eleutherodactylus planirostris</i>	12
<i>Aubria subsigillata</i>	12
<i>Smilisca baudinii</i>	12
<i>Rhinella margaritifera</i>	12
<i>Litoria thesaurensis</i>	12
<i>Rhinella lescurei</i>	12
<i>Atelopus limosus</i>	12
<i>Amphiuma species</i>	12
<i>Bufo granulatus</i>	12
<i>Eurycea guttolineata</i>	12
<i>Centrolene species</i>	12
<i>Allobates femoralis</i>	12
<i>Rana sylvatica</i>	12
<i>Hyla boans</i>	12
<i>Phyllobates bicolor</i>	12
<i>Stefania species</i>	12

<i>Kassina species</i>	12
<i>Gastrophryne carolinensis</i>	12
<i>Geotrypetes seraphini</i>	11
<i>Eurycea species</i>	11
<i>Heterixalus betsileo</i>	11
<i>Pelodryas caerulea</i>	11
<i>Ensatina eschscholtzii</i>	11
<i>Leptopelis brevirostris</i>	11
<i>Bufo viridis</i>	11
<i>Colostethus panamensis</i>	11
<i>Pyxicephalus species</i>	11
<i>Bufo americanus</i>	11
<i>Afrixalus paradorsalis</i>	11
<i>Hyla fasciata</i>	11
<i>Physalaemus species</i>	11
<i>Phyllobates aurotaenia</i>	11
<i>Rana temporaria</i>	11
<i>Cruziohyla calcarifer</i>	11
<i>Hyperolius viridiflavus</i>	10
<i>Hyperolius tuberculatus</i>	10
<i>Chiromantis species</i>	10
<i>Hemiphractus species</i>	10
<i>Megophrys montana</i>	10
<i>Mantophryne lateralis</i>	10
<i>Dermophis mexicanus</i>	10
<i>Nectophryne batesii</i>	10
<i>Hyla lanciformis</i>	10
<i>Hyla arborea</i>	10
<i>Diasporus species</i>	10
<i>Leptopelis uluguruensis</i>	10
<i>Litoria rubella</i>	10
<i>Tylotriton verrucosus</i>	10
<i>Bokermannohyla species</i>	10
<i>Hyperolius marmoratus</i>	10
<i>Acris crepitans</i>	10
<i>Afrixalus quadrivittatus</i>	10
<i>Smilisca sila</i>	10
<i>Melanophryniscus stelzneri</i>	10
<i>Hyperolius guttulatus</i>	9
<i>Desmognathus monticola</i>	9
<i>Caecilia species</i>	9

<i>Arthroleptis sylvaticus</i>	9
<i>Boophis albilabris</i>	9
<i>Bufo asper</i>	9
<i>Phyllobates lugubris</i>	9
<i>Cochranella species</i>	9
<i>Hemisis species</i>	9
<i>Scaphiophryne spinosa</i>	9
<i>Bufo typhonius</i>	9
<i>Pristimantis cruentus</i>	9
<i>Osteocephalus species</i>	9
<i>Phyllobates vittatus</i>	9
<i>Limnodynastes species</i>	9
<i>Mantella expectata</i>	9
<i>Cardioglossa species</i>	9
<i>Adelphobates galactonotus</i>	9
<i>Pseudacris crucifer</i>	9
<i>Hylarana albolabris</i>	8
All amphibians	8
<i>Incilius coniferus</i>	8
<i>Atelognathus species</i>	8
<i>Leptopelis christyi</i>	8
<i>Amnirana albolabris</i>	8
<i>Hylophorbus rufescens</i>	8
<i>Bombina maxima</i>	8
<i>Ischnocnema species</i>	8
<i>Albericus species</i>	8
<i>Herpele squalostoma</i>	8
<i>Mantophryne species</i>	8
<i>Austrochaperina species</i>	8
<i>Ranitomeya ventrimaculata</i>	8
<i>Nectophrynoides asperginis</i>	8
<i>Fejervarya species</i>	8
<i>Pristimantis lacrimosus</i>	8
<i>Xenopus clivii</i>	8
<i>Theloderma stellatum</i>	8
<i>Limnonectes kuhlii</i>	8
<i>Ameerega silverstonei</i>	8
<i>Microhyla heymonsi</i>	8
<i>Gyrinophilus porphyriticus</i>	8
<i>Leptopelis calcaratus</i>	8
<i>Pseudobufo subasper</i>	8

<i>Phlyctimantis leonardi</i>	8
<i>Triturus carnifex</i>	8
<i>Boophis microtympanum</i>	8
<i>Telmatobius marmoratus</i>	7
<i>Leptodactylus melanonotus</i>	7
<i>Leptodactylus fuscus</i>	7
<i>Eurycea longicauda</i>	7
<i>Pseudobranchius axanthus</i>	7
<i>Osteocephalus taurinus</i>	7
<i>Echinotriton andersoni</i>	7
<i>Dendropsophus marmoratus</i>	7
<i>Pristimantis cerasinus</i>	7
<i>Hyperolius nasutus</i>	7
<i>Copiula species</i>	7
<i>Ophryophryne species</i>	7
<i>Hyla rosenbergi</i>	7
<i>Mantella crocea</i>	7
<i>Staurois species</i>	7
<i>Callulops species</i>	7
<i>Tylototriton shanjing</i>	7
<i>Xenorhina species</i>	7
<i>Andrias davidianus</i>	7
<i>Afrixalus laevis</i>	7
<i>Plethodon montanus</i>	7
<i>Hyperolius castaneus</i>	7
<i>Nyctimystes species</i>	7
<i>Phrynoidis aspera</i>	7
<i>Tylototriton species</i>	7
<i>Rhacophorus dennysi</i>	7
<i>Ceratophrys calcarata</i>	7
<i>Leptobranchium hendricksoni</i>	7
<i>Rana arfaki</i>	7
<i>Odorrana morafkai</i>	7
<i>Peltophryne lemur</i>	7
<i>Pleurodema species</i>	7
<i>Dendropsophus minutus</i>	7
<i>Heterixalus species</i>	7
<i>Cophixalus verrucosus</i>	7
<i>Hyperolius langi</i>	7
<i>Spea multiplicata</i>	7
<i>Astylosternus species</i>	7

<i>Necturus species</i>	7
<i>Alytes species</i>	7
<i>Discodeles species</i>	6
<i>Cardioglossa elegans</i>	6
<i>Leptopelis ocellatus</i>	6
<i>Xenophrys species</i>	6
<i>Platypelis tuberifera</i>	6
<i>Adenomera species</i>	6
<i>Spea species</i>	6
<i>Phrynobatrachus mababiensis</i>	6
<i>Pipa species</i>	6
<i>Hyla geographica</i>	6
<i>Neurergus species</i>	6
<i>Andinobates minutus</i>	6
<i>Amnirana galamensis</i>	6
<i>Paedophryne species</i>	6
<i>Hyperolius picturatus</i>	6
<i>Cardioglossa gracilis</i>	6
<i>Ranitomeya flavovittata</i>	6
<i>Hyperolius kivuensis</i>	6
<i>Gastrotheca riobambae</i>	6
<i>Ranitomeya summersi</i>	6
<i>Plethodon yonahlossee</i>	6
<i>Ambystoma mavortium</i>	6
<i>Mantella viridis</i>	6
<i>Afrixalus osorioi</i>	6
<i>Kalophrynus interlineatus</i>	6
<i>Dendropsophus parviceps</i>	6
<i>Epipedobates boulengeri</i>	6
<i>Ophryophryne gerti</i>	6
<i>Boophis boehmei</i>	6
<i>Occidozyga semipalmata</i>	6
<i>Espadarana species</i>	6
<i>Chirixalus species</i>	6
<i>Hyla picturata</i>	6
<i>Nectophryne species</i>	6
<i>Rana nigrovittata</i>	6
<i>Hypopachus variolosus</i>	5
<i>Oreophrynella species</i>	5
<i>Rana heckscheri</i>	5
<i>Brachycephalus ephippium</i>	5

<i>Phlyctimantis verrucosus</i>	5
<i>Amietophrynus gutturalis</i>	5
<i>Allobates zaparo</i>	5
<i>Amietophrynus maculatus</i>	5
<i>Amnirana species</i>	5
<i>Leptodactylus petersii</i>	5
<i>Afrixalus fornasini</i>	5
<i>Rana signata</i>	5
<i>Microhyla berdmorei</i>	5
<i>Rana luctuosa</i>	5
<i>Tompterna species</i>	5
<i>Proceratophrys boiei</i>	5
<i>Rhinophrynus dorsalis</i>	5
<i>Pseudotriton species</i>	5
<i>Ansonia species</i>	5
<i>Amnirana lepus</i>	5
<i>Leptodactylus wagneri</i>	5
<i>Phrynomantis microps</i>	5
<i>Plethodon cylindraceus</i>	5
<i>Hyperolius argus</i>	5
<i>Rhacophorus helenae</i>	5
<i>Ptychohyla hypomykter</i>	5
<i>Scaphiophryne calcarata</i>	5
<i>Andinobates fulguritus</i>	5
<i>Anaxyrus baxteri</i>	5
<i>Conraua crassipes</i>	5
<i>Hyperolius phantasticus</i>	5
<i>Pristimantis lanthanites</i>	5
<i>Plethodon species</i>	5
<i>Pseudoeurycea species</i>	5
<i>Silurana tropicalis</i>	5
<i>Astylosternus batesi</i>	5
<i>Hyperolius platyceps</i>	5
<i>Bolitoglossa dofleini</i>	5
<i>Ameerega macero</i>	5
<i>Dendropsophus minisculus</i>	5
<i>Platypelis species</i>	5
<i>Xenopus longipes</i>	5
<i>Cycloramphus species</i>	5
<i>Atelopus ignescens</i>	5
<i>Chiasmocleis species</i>	5

<i>Megophrys parva</i>	4
<i>Atelopus certus</i>	4
<i>Dyscophus antongilii</i>	4
<i>Smilisca sordida</i>	4
<i>Leptodactylus mystaceus</i>	4
<i>Acris gryllus</i>	4
<i>Afrixalus equatorialis</i>	4
<i>Boophis goudotii</i>	4
<i>Melanophryniscus species</i>	4
<i>Sclerophrys regularis</i>	4
<i>Rana livida</i>	4
<i>Rana garritor</i>	4
<i>Pseudacris regilla</i>	4
<i>Leptopelis kivuensis</i>	4
<i>Craugastor megacephalus</i>	4
<i>Rhacophorus maximus</i>	4
<i>Guibemantis liber</i>	4
<i>Boophis pauliani</i>	4
<i>Phrynobatrachus latifrons</i>	4
<i>Siphonops species</i>	4
<i>Boana faber</i>	4
<i>Conraua robusta</i>	4
<i>Lechriodus melanopyga</i>	4
<i>Cornufer solomonis</i>	4
<i>Gastrotheca marsupiata</i>	4
<i>Cornufer hedigeri</i>	4
<i>Colostethus flotator</i>	4
<i>Hyperolius puncticulatus</i>	4
<i>Hyla chrysoscelis</i>	4
<i>Leptodactylus knudseni</i>	4
<i>Amietophrynus kisolensis</i>	4
<i>Hoplobatrachus tigerinus</i>	4
<i>Osteocephalus leprieurii</i>	4
<i>Leptopelis viridis</i>	4
<i>Dendrobates truncatus</i>	4
<i>Hyloscirtus colymba</i>	4
<i>Aplastodiscus species</i>	4
<i>Batrachoseps attenuatus</i>	4
<i>Megophrys major</i>	4
<i>Eurycea lucifuga</i>	4
<i>Smilisca species</i>	4

<i>Tylotriton kweichowensis</i>	4
<i>Plethodon serratus</i>	4
<i>Boophis pyrrhus</i>	4
<i>Pseudacris species</i>	4
<i>Mantidactylus melanopleura</i>	4
<i>Mannophryne species</i>	4
<i>Xenopus muelleri</i>	4
<i>Afrixalus fulvovittatus</i>	4
<i>Arthroleptis adelphus</i>	4
<i>Pelobates fuscus</i>	4
<i>Bolitoglossa striatula</i>	4
<i>Bolitoglossa robusta</i>	4
<i>Ameerega bilinguis</i>	4
<i>Genyophryne thomsoni</i>	4
<i>Cryptobranchus alleganiensis</i>	4
<i>Oedipina uniformis</i>	4
<i>Bolitoglossa subpalmata</i>	4
<i>Pachytriton labiatus</i>	4
<i>Platymantis papuensis</i>	4
<i>Kalophrynus pleurostigma</i>	4
<i>Callulops doriae</i>	4
<i>Barygenys species</i>	4
<i>Taricha granulosa</i>	4
<i>Chacophrys pierotti</i>	4
<i>Boophis elenae</i>	4
<i>Mantella milotympanum</i>	4
<i>Plethodon metcalfi</i>	4
<i>Cryptothylax greshoffii</i>	4
<i>Nototriton abscondens</i>	4
<i>Theloderma horridum</i>	4
<i>Chrysobatrachus cupreonitens</i>	4
<i>Plethodon teyahalee</i>	4
<i>Petropedetes palmipes</i>	4
<i>Bolitoglossa sooyorum</i>	4
<i>Lithobates maculatus</i>	4
<i>Oedipina pacificensis</i>	4
<i>Epipedobates machalilla</i>	4
<i>Oedipina poelzi</i>	4
<i>Boophis erythrodactylus</i>	4
<i>Cophixalus cheesmanae</i>	4
<i>Bolitoglossa cerroensis</i>	4

<i>Aneides species</i>	3
<i>Ptychohyla species</i>	3
<i>Leptopelis bocagei</i>	3
<i>Atelopus glyphus</i>	3
<i>Boophis picturatus</i>	3
<i>Cornufer malukuna</i>	3
<i>Phrynobatrachus plicatus</i>	3
<i>Ctenophryne geayi</i>	3
<i>Cornufer weberi</i>	3
<i>Lepidobatrachus llanensis</i>	3
<i>Hyperolius parallelus</i>	3
<i>Plethodontohyla mihanika</i>	3
<i>Fejervarya cancrivora</i>	3
<i>Spinomantis aglavei</i>	3
<i>Trachycephalus typhonius</i>	3
<i>Anodonthyla pollicaris</i>	3
<i>Aglyptodactylus madagascariensis</i>	3
<i>Hylarana erythraea</i>	3
<i>Spinomantis phantasticus</i>	3
<i>Scaphiopus species</i>	3
<i>Mantella cowanii</i>	3
<i>Mantidactylus mocquardi</i>	3
<i>Micryletta species</i>	3
<i>Guibemantis pulcher</i>	3
<i>Atelopus coynei</i>	3
<i>Mantella laevigata</i>	3
<i>Boophis guibei</i>	3
<i>Phrynobatrachus krefftii</i>	3
<i>Tylotriton asperrimus</i>	3
<i>Ischnocnema parva</i>	3
<i>Copiula oxyrhina</i>	3
<i>Alytes muletensis</i>	3
<i>Gastrotheca peruana</i>	3
<i>Leptopelis karissimbensis</i>	3
<i>Hyperolius bolifambae</i>	3
<i>Anaxyrus americanus</i>	3
<i>Leptodactylus rhodomystax</i>	3
<i>Leptodactylus bolivianus</i>	3
<i>Gastrotheca cornuta</i>	3
<i>Stefania evansi</i>	3
<i>Oedipina species</i>	3

<i>Hyalinobatrachium colymbiphyllum</i>	3
<i>Conraua alleni</i>	3
<i>Bufo spinulosus</i>	3
<i>Aubria masako</i>	3
<i>Wolterstorffina parvipalmata</i>	3
<i>Xenobatrachus species</i>	3
<i>Rhinella guttata</i>	3
<i>Leptodactylus labrosus</i>	3
<i>Rhacophorus appendiculatus</i>	3
<i>Triturus vittatus</i>	3
<i>Boophis viridis</i>	3
<i>Neurergus strauchii</i>	3
<i>Hyloscirtus armatus</i>	3
<i>Atelopus balios</i>	3
<i>Bombina species</i>	3
<i>Kaloula species</i>	3
<i>Batrachoseps species</i>	3
<i>Leiopelma hochstetteri</i>	3
<i>Paradoxophyla palmata</i>	3
<i>Silurana species</i>	3
<i>Oophaga vicentei</i>	3
<i>Edalorhina perezii</i>	3
<i>Hyloscirtus species</i>	3
<i>Paramesotriton hongkongensis</i>	3
<i>Platypelis barbouri</i>	3
<i>Elachistocleis species</i>	3
<i>Platypelis pollicaris</i>	3
<i>Epicrionops bicolor</i>	3
<i>Laotriton laoensis</i>	3
<i>Micryletta inornata</i>	3
<i>Ophryophryne microstoma</i>	3
<i>Ambystoma laterale</i>	3
<i>Leptopelis flavomaculatus</i>	3
<i>Boophis rappiodes</i>	3
<i>Salamandra species</i>	3
<i>Philautus petersi</i>	3
<i>Dendropsophus microcephalus</i>	3
<i>Dermophis species</i>	3
<i>Caeciliidae</i>	3
<i>Proceratophrys palustris</i>	3
<i>Plethodon chlorobryonis</i>	3

<i>Elachistocleis surinamensis</i>	3
<i>Rhacophorus margaritifer</i>	3
<i>Rhinella granulosa</i>	3
<i>Phrynobatrachus calcaratus</i>	3
<i>Allophryne ruthveni</i>	3
<i>Xenopus pygmaeus</i>	3
<i>Typhlonectes natans</i>	3
<i>Epipedobates espinosai</i>	3
<i>Arthroleptis adolfifriederici</i>	3
<i>Amietophrynus camerunensis</i>	3
<i>Tomopterna tuberculosa</i>	3
<i>Limnonectes gyldenstolpei</i>	3
<i>Boophis ankaratra</i>	3
<i>Eurycea quadridigitata</i>	3
<i>Ptychadena christyi</i>	3
<i>Pristimantis caryophyllaceus</i>	3
<i>Sclerophrys species</i>	3
<i>Epipedobates darwinwallacei</i>	3
<i>Dendropsophus triangulum</i>	3
<i>Rana grisea</i>	3
<i>Epicrionops petersi</i>	3
<i>Scinax garbei</i>	3
<i>Peltophryne species</i>	3
<i>Amphiuma pholeter</i>	3
<i>Rhinella species</i>	3
<i>Chiromantis xerapelina</i>	3
<i>Mantidactylus grandidieri</i>	3
<i>Mantidactylus lugubris</i>	3
<i>Leptopelis macrotis</i>	3
<i>Gephyromantis malagasius</i>	3
<i>Leptopelis spiritusnoctis</i>	3
<i>Pristimantis croceoinguinis</i>	3
<i>Litoria graminea</i>	3
<i>Hyperolius riggenbachi</i>	3
<i>Boana heilprini</i>	3
<i>Hynobius species</i>	3
<i>Quasipaa exilispinosa</i>	3
<i>Haddadus binotatus</i>	3
<i>Bolitoglossa schizodactyla</i>	3
<i>Hyla faber</i>	3
<i>Paa species</i>	3

<i>Physalaemus cuvieri</i>	3
<i>Limnonectes blythii</i>	3
<i>Paramesotriton chinensis</i>	3
<i>Plethodon jordani</i>	2
<i>Pristimantis carvalhoi</i>	2
<i>Conraua derooi</i>	2
<i>Hynobius nebulosus</i>	2
<i>Engystomops pustulosus</i>	2
<i>Atelopus bomolochos</i>	2
<i>Sclerophrys pusilla</i>	2
<i>Telmatobius culeus</i>	2
<i>Hyloscirtus palmeri</i>	2
<i>Neurergus derjugini</i>	2
<i>Engystomops freibergeri</i>	2
<i>Ameerega species</i>	2
<i>Hyperolius molleri</i>	2
<i>Leptopelis aubryi</i>	2
<i>Adenomera andreae</i>	2
<i>Hamptophryne boliviana</i>	2
<i>Schismaderma carens</i>	2
<i>Paramesotriton guanxiensis</i>	2
<i>Hyloscirtus phyllognathus</i>	2
<i>Gymnopsis multiplicata</i>	2
<i>Tylototriton taliangensis</i>	2
<i>Dendropsophus sarayacuensis</i>	2
<i>Boophis reticulatus</i>	2
<i>Pseudis paradoxa</i>	2
<i>Mantidactylus majori</i>	2
<i>Phrynobatrachus africanus</i>	2
<i>Scinax perpusilla</i>	2
<i>Rhinella alata</i>	2
<i>Tomopterna damarensis</i>	2
<i>Scarthyla goinorum</i>	2
<i>Allobates talamancae</i>	2
<i>Ameerega altamazonica</i>	2
<i>Sphaenorhynchus species</i>	2
<i>Boophis marojezensis</i>	2
<i>Choerophryne rostellifer</i>	2
<i>Scinax hayii</i>	2
<i>Proceratophrys laticeps</i>	2
<i>Proceratophrys schirchi</i>	2

<i>Pulchrana species</i>	2
<i>Spea hammondii</i>	2
<i>Cornufer elegans</i>	2
<i>Cornufer bufoniformis</i>	2
<i>Cornufer vertebralis</i>	2
<i>Cornufer guppyi</i>	2
<i>Bufo spinosus</i>	2
<i>Ambystoma andersoni</i>	2
<i>Kassina maculosa</i>	2
<i>Duttaphrynus species</i>	2
<i>Clinotarsus species</i>	2
<i>Blommersia blommersae</i>	2
<i>Boophis bottae</i>	2
<i>Boophis tephraeomystax</i>	2
<i>Gephyromantis cornutus</i>	2
<i>Gephyromantis boulengeri</i>	2
<i>Mantidactylus betsileanus</i>	2
<i>Mantidactylus femoralis</i>	2
<i>Bolitoglossa pesrubra</i>	2
<i>Proceratophrys cristiceps</i>	2
<i>Cardioglossa melanogaster</i>	2
<i>Odontophrynus species</i>	2
<i>Hyperolius quinquevittatus</i>	2
<i>Xenopus petersii</i>	2
<i>Sachatamia albomaculata</i>	2
<i>Rhombophryne testudo</i>	2
<i>Limnonectes limborgi</i>	2
<i>Guibemantis albolineatus</i>	2
<i>Rana ridibunda</i>	2
<i>Rhacophorus rhodopus</i>	2
<i>Lechriodus species</i>	2
<i>Rhacophorus annamensis</i>	2
<i>Nelsonophryne aterrimus</i>	2
<i>Leptopelis cynnamomeus</i>	2
<i>Amolops ricketti</i>	2
<i>Desmognathus ochrophaeus</i>	2
<i>Bufo woodhousii</i>	2
<i>Rana palustris</i>	2
<i>Sylvirana mortenseni</i>	2
<i>Atelopus nanay</i>	2
<i>Dermophis parviceps</i>	2

<i>Mantidactylus cowanii</i>	2
<i>Gastrotheca pseustes</i>	2
<i>Bufo valliceps</i>	2
<i>Spinomantis perracae</i>	2
<i>Pseudacris feriarum</i>	2
<i>Atelopus elegans</i>	2
<i>Centrolene prosoblepon</i>	2
<i>Rhacophorus bipunctatus</i>	2
<i>Pristimantis altamazonicus</i>	2
<i>Plethodon shermani</i>	2
<i>Mannophryne trinitatus</i>	2
<i>Litoria eucnemis</i>	2
<i>Pristimantis martiae</i>	2
<i>Brachycephalus vertebralis</i>	2
<i>Brachycephalus toby</i>	2
<i>Paramesotriton labiatus</i>	2
<i>Lepidobatrachus asper</i>	2
<i>Discoglossus species</i>	2
<i>Brachycephalus pitanga</i>	2
<i>Brachycephalus guarani</i>	2
<i>Brachycephalus crispus</i>	2
<i>Lyciasalamandra species</i>	2
<i>Pelobates species</i>	2
<i>Sphenophryne cornuta</i>	2
<i>Callulops slateri</i>	2
<i>Hemisis microscaphus</i>	2
<i>Microhyla fusca</i>	2
<i>Spinomantis fimbriatus</i>	2
<i>Raorchestes gryllus</i>	2
<i>Kurixalus baliogaster</i>	2
<i>Platymantis vitiensis</i>	2
<i>Feihyla palpebralis</i>	2
<i>Ophryophryne synoria</i>	2
<i>Hylarana montivaga</i>	2
<i>Microhyla annamensis</i>	2
<i>Rhacophorus calcaneus</i>	2
<i>Quasipaa spinosa</i>	2
<i>Rana milleti</i>	2
<i>Amnirana amnicola</i>	2
<i>Nyctibates corrugatus</i>	2
<i>Sclerophrys gracilipes</i>	2

<i>Phyllomedusa atelopoides</i>	2
<i>Megophrys aceras</i>	2
<i>Wolterstorffina species</i>	2
<i>Austrochaperina palmipes</i>	2
<i>Leptodactylus fallax</i>	2
<i>Bufo</i>	2
<i>Scaphiophryne brevis</i>	2
<i>Ichthyosaura alpestris</i>	2
<i>Batrachylodes vertebralis</i>	2
<i>Litoria lutea</i>	2
<i>Papurana krefftii</i>	2
<i>Discodeles guppyi</i>	2
<i>Scinax staufferi</i>	2
<i>Phrynomantis annectens</i>	2
<i>Tompterna cryptotis</i>	2
<i>Polypedates macrotis</i>	2
<i>Leptodactylus guianensis</i>	2
<i>Bufo japonicus</i>	2
<i>Bufo galeatus</i>	2
<i>Epipedobates species</i>	2
<i>Hyloxalus toachi</i>	2
<i>Amazophrynella minuta</i>	2
<i>Phrynobatrachus gutturosus</i>	2
<i>Pseudacris ornata</i>	2
<i>Silurana epitropicalis</i>	2
<i>Proceratophrys appendiculata</i>	2
<i>Leptopelis rufus</i>	2
<i>Guibemantis</i>	2
<i>Guibemantis depressiceps</i>	2
<i>Mantidactylus biporus</i>	2
<i>Leptolalax minimus</i>	2
<i>Leptolalax bidoupensis</i>	2
<i>Aneides lugubris</i>	2
<i>Ichthyophis kohtaoensis</i>	2
<i>Peltophryne peltoccephala</i>	2
<i>Atelopus hoogmoedi</i>	2
<i>Pseudacris triserata</i>	2
<i>Crossodactylus gaudichaudii</i>	2
<i>Eleutherodactylus martinicensis</i>	2
<i>Pelobates syriacus</i>	2
<i>Oreophrynella nigra</i>	2

<i>Rhinella jimi</i>	2
<i>Amolops daorum</i>	2
<i>Chirixalus vittatus</i>	2
<i>Hymenochirus boulengeri</i>	2
<i>Hyperolius tuberilinguis</i>	2
<i>Engystomops petersi</i>	2
<i>Plectrohyla ixil</i>	2
<i>Lithobates sphenoccephalus</i>	2
<i>Andrias japonicus</i>	2
<i>Amietia lubrica</i>	2
<i>Leptopelis millsoni</i>	2
<i>Taricha torosa</i>	2
<i>Xenopus lenduensis</i>	2
<i>Xenopus epitropicalis</i>	2
<i>Hildebrandtia ornata</i>	2
<i>Herpele multiplicata</i>	2
<i>Nyctixalus species</i>	2
<i>Bufo garmani</i>	2
<i>Conraua species</i>	2
<i>Bolitoglossa mexicana</i>	2
<i>Bufo mauritanicus</i>	2
<i>Brachycephalus ferruginus</i>	2
<i>Pelophryne species</i>	2
<i>Rhacophorus nigropalmatus</i>	2
<i>Fejervarya vittigera</i>	2
<i>Hemidactylium scutatum</i>	2
<i>Petropedetes newtoni</i>	2
<i>Phrynomerus species</i>	2
<i>Brachycephalus quiririensis</i>	2
<i>Ameerega pepperi</i>	2
<i>Hyperolius punctulatus</i>	2
<i>Kalophrynus species</i>	2
<i>Salamandrella keyserlingii</i>	2
<i>Onychodactylus japonicus</i>	2
<i>Taricha species</i>	2
<i>Dicamptodon species</i>	2
<i>Boophis solomaso</i>	2
<i>Scinax ruber</i>	2
<i>Ptychadena longirostris</i>	2
<i>Phrynobatrachus liberiensis</i>	2
<i>Heterixalus tricolor</i>	2

<i>Proteus anguinus</i>	2
<i>Craugastor fitzingeri</i>	2
<i>Diasporus diastema</i>	2
<i>Craugastor bransfordii</i>	2
<i>Strabomantis bufoniformis</i>	2
<i>Ptychadena aequiplicata</i>	2
<i>Afrixalus nigeriensis</i>	2
<i>Paramesotriton qixilingensis</i>	1
<i>Tylototriton yangi</i>	1
<i>Leptobrachium nigrops</i>	1
<i>Desmognathus aeneus</i>	1
<i>Hyla triangulum</i>	1
<i>Desmognathus orestes</i>	1
<i>Paramesotriton zhijinensis</i>	1
<i>Pachytriton inexpectatus</i>	1
<i>Pachytriton airobranchiatus</i>	1
<i>Pachytriton moi</i>	1
<i>Pachytriton archospotus</i>	1
<i>Pachytriton wuguanfui</i>	1
<i>Paramesotriton aurantius</i>	1
<i>Brachycephalus pernix</i>	1
<i>Pristimantis curtipes</i>	1
<i>Brachycephalus mariaeterezae</i>	1
<i>Dendropsophus elegans</i>	1
<i>Leptodactylus latrans</i>	1
<i>Nototriton species</i>	1
<i>Craugastor laticeps</i>	1
<i>Pithecopus palliatus</i>	1
<i>Cornufer desticans</i>	1
<i>Cornufer trossulus</i>	1
<i>Cornufer opisthodon</i>	1
<i>Cornufer neckeri</i>	1
<i>Cornufer heffernani</i>	1
<i>Staurois parvus</i>	1
<i>Rana hosii</i>	1
<i>Brachycephalus pombali</i>	1
<i>Brachycephalus boticario</i>	1
<i>Pristimantis muscosus</i>	1
<i>Adenomera marmorata</i>	1
<i>Rana chapaensis</i>	1
<i>Leptodactylus colombiensis</i>	1

<i>Brachycephalus verrucosus</i>	1
<i>Brachycephalus leopardus</i>	1
<i>Hypopachus barberi</i>	1
<i>Bolitoglossa celaque</i>	1
<i>Litoria impura</i>	1
<i>Litoria vocivincens</i>	1
<i>Exerodonta catracha</i>	1
<i>Rhacophorus javanus</i>	1
<i>Bufo torrenticola</i>	1
<i>Scinax funereus</i>	1
<i>Pristimantis toftae</i>	1
<i>Hyla fuentei</i>	1
<i>Ptychadena perreti</i>	1
<i>Ololygon perpusilla</i>	1
<i>Xenopus poweri</i>	1
<i>Phrynobatrachus perpalmatus</i>	1
<i>Hyperolius marginatus</i>	1
<i>Agalychnis species</i>	1
<i>Duellmanohyla rufioculis</i>	1
<i>Platyplectrum ornatum</i>	1
<i>Pristimantis skydmainos</i>	1
<i>Brachycephalus izecksohni</i>	1
<i>Hydromantes species</i>	1
<i>Oscacilia bassleri</i>	1
<i>Parvicaecilia pricei</i>	1
<i>Brachycephalus brunneus</i>	1
<i>Bufo pygmaeus</i>	1
<i>Leptopelis ragazzii</i>	1
<i>Teratohyla spinosa</i>	1
<i>Phrynobatrachus minutus</i>	1
<i>Ptychadena filwoha</i>	1
<i>Pipa parva</i>	1
<i>Pristimantis reichlei</i>	1
<i>Pristimantis ockendeni</i>	1
<i>Pristimantis fenestratus</i>	1
<i>Brachycephalus fuscolineatus</i>	1
<i>Xenorhina oxycephala</i>	1
<i>Hydromantes platycephalus</i>	1
<i>Lithobates warszewitschii</i>	1
<i>Hypsiboas calcaratus</i>	1
<i>Hyloxalus shuar</i>	1

<i>Hyloxalus awa</i>	1
<i>Arthroleptis pyrrhoscelis</i>	1
<i>Allobates kingsburyi</i>	1
<i>Allobates insperatus</i>	1
<i>Phrynobatrachus accraensis</i>	1
<i>Colostethus fugax</i>	1
<i>Phyllomedusa azurea</i>	1
<i>Werneria species</i>	1
<i>Didynamipus sjostedti</i>	1
<i>Cardioglossa pulchra</i>	1
<i>Alexteroon jynx</i>	1
<i>Litoria exophthalmia</i>	1
<i>Boophis idae</i>	1
<i>Guibemantis tornieri</i>	1
<i>Triturus dobrogicus</i>	1
<i>Aubria species</i>	1
<i>Gracixalus seesom</i>	1
<i>Huia melasma</i>	1
<i>Humerana miopus</i>	1
<i>Afrixalus wittei</i>	1
<i>Ptychadena subpunctata</i>	1
<i>Hyperolius hutsebauti</i>	1
<i>Rhacophorus exechopygus</i>	1
<i>Plethodontohyla alluaudi</i>	1
<i>Ptychadena guibei</i>	1
<i>Hemisis guineensis</i>	1
<i>Rhinatrema bivittatum</i>	1
<i>Dendropsophus rhodopeplus</i>	1
<i>Eleutherodactylus atkinsi</i>	1
<i>Guibemantis species</i>	1
<i>Triturus cristatus</i>	1
<i>Triturus ivanbureschi</i>	1
<i>Brachycephalus auroguttatus</i>	1
<i>Osteocephalus helenae</i>	1
<i>Plethodon albagula</i>	1
<i>Bufo retiformis</i>	1
<i>Occidozyga laevis</i>	1
<i>Phyllomedusa camba</i>	1
<i>Hypsiboas picturatus</i>	1
<i>Hyalinobatrachium aureoguttatum</i>	1
<i>Leptodactylodon bicolor</i>	1

<i>Oreobates quixensis</i>	1
<i>Pristimantis buccinator</i>	1
<i>Pristimantis ridens</i>	1
<i>Cardioglossa oreas</i>	1
<i>Brachycephalus olivaceus</i>	1
<i>Amieta ruwenzorica</i>	1
<i>Oreophryne parkeri</i>	1
<i>Nyctanolis pernix</i>	1
<i>Hypsiboas cinerascens</i>	1
<i>Triturus macedonicus</i>	1
<i>Leptodactylus leptodactyloides</i>	1
<i>Pleurodema diplolister</i>	1
<i>Rana esculenta</i>	1
<i>Heterixalus rutenbergi</i>	1
<i>Boophis difficilis</i>	1
<i>Boophis albipunctatus</i>	1
<i>Odorrana junlianensis</i>	1
<i>Hypsiboas punctatus</i>	1
<i>Hynobius amjiensis</i>	1
<i>Hypsiboas lanciformis</i>	1
<i>Aphantophryne species</i>	1
<i>Ceratophrys stolzmanni</i>	1
<i>Hypsiboas geographicus</i>	1
<i>Aneides flavipunctatus</i>	1
<i>Plethodon stormi</i>	1
<i>Amietia nutti</i>	1
<i>Tylototriton anguliceps</i>	1
<i>Tylototriton hainanensis</i>	1
<i>Ameerega parvula</i>	1
<i>Phrynobatrachus dendrobates</i>	1
<i>Minyobates steyermarki</i>	1
<i>Hyla colymba</i>	1
<i>Leptopelis anchietae</i>	1
<i>Atelopus longirostris</i>	1
<i>Ectopoglossus confusus</i>	1
<i>Gephyromantis luteus</i>	1
<i>Hoplobatrachus species</i>	1
<i>Xenopus ruwenzoriensis</i>	1
<i>Amietia desaegeri</i>	1
<i>Afrixalus aequatorialis</i>	1
<i>Chimerella mariaelenae</i>	1

<i>Nymphargus balionota</i>	1
<i>Espadarana audax</i>	1
<i>Rulyrana flavopunctata</i>	1
<i>Ambystoma jeffersonianum</i>	1
<i>Phrynobatrachus batesii</i>	1
<i>Hyperolius camerunensis</i>	1
<i>Pristimantis conspicillatus</i>	1
<i>Leptopelis fiziensis</i>	1
<i>Hyperolius burgessi/viridiflavus</i>	1
<i>Dendropsophus molitor</i>	1
<i>Pristimantis bogotensis</i>	1
<i>Dendrotriton species</i>	1
<i>Bradytriton silus</i>	1
<i>Pristimantis variabilis</i>	1
<i>Acris species</i>	1
<i>Ptychadena nilotica/mascareniensis</i>	1
<i>Scinax cruentomma</i>	1
<i>Salamandrina species</i>	1
<i>Incilius luetkenii</i>	1
<i>Dyscophus species</i>	1
<i>Ambystoma texanum</i>	1
<i>Poyntonophrynus pachnodes</i>	1
<i>Hyloxalus infraguttatus</i>	1
<i>Oedipinia nica</i>	1
<i>Mantidactylus flavobrunneus</i>	1
<i>Leptopelis nordequatorialis</i>	1
<i>Arthroleptis stenodactylus</i>	1
<i>Bombina microdeladigitora</i>	1
<i>Theloderma vietnamense</i>	1
<i>Cruziohyla sylviae</i>	1
<i>Incilius valliceps</i>	1
<i>Cruziohyla species</i>	1
<i>Phyllomedusa lemur</i>	1
<i>Zhangixalus dulitensis</i>	1
<i>Andinobates species</i>	1
<i>Sooglossus sechellensis</i>	1
<i>Tachycnemis seychellensis</i>	1
<i>Dendropsophus nanus</i>	1
<i>Psychrophrynella species</i>	1
<i>Scaphiophryne boribory</i>	1
<i>Anaxyrus californicus</i>	1

<i>Batrachylodes elegans</i>	1
<i>Incilius marmoreus</i>	1
<i>Odontobatrachus natator</i>	1
<i>Bufo melanochloris</i>	1
<i>Litoria piperata</i>	1
<i>Amnirana occidentalis</i>	1
<i>Astylosternus occidentalis</i>	1
<i>Cardioglossa occidentalis</i>	1
<i>Hyperolius chlorosteus</i>	1
<i>Phlyctimantis boulengeri</i>	1
<i>Theloderma licin</i>	1
<i>Phrynobatrachus villiersi</i>	1
<i>Sclerophrys maculata</i>	1
<i>Phrynoidis asper</i>	1
<i>Mantidactylus pulcher</i>	1
<i>Anaxyrus woodhousii</i>	1
<i>Leiopelma archeyi</i>	1
<i>Nothophryne broadleyi</i>	1
<i>Bufotes boulengeri</i>	1
<i>Tylototriton notialis</i>	1
<i>Gastrotheca griswoldi</i>	1
<i>Typhlonectes species</i>	1
<i>Phrynobatrachus cornutus</i>	1
<i>Hyperolius kuligae</i>	1
<i>Hyperolius olivaceus</i>	1
<i>Hyperolius adspersus</i>	1
<i>Rhaebo haematiticus</i>	1
<i>Arthroleptis taeniatus</i>	1
<i>Odorrana banaorum</i>	1
<i>Rhacophorus verrucopus</i>	1
<i>Phrynopus species</i>	1
<i>Hylodes japi</i>	1
<i>Hylodes heyeri</i>	1
<i>Teratohyla pulverata</i>	1
<i>Melanophryniscus klappenbachi</i>	1
<i>Hynobius glacialis</i>	1
<i>Ptychadena porosissima</i>	1
<i>Xenopus victorianus</i>	1
<i>Craugastor crassidigitus</i>	1
<i>Hyla granosa</i>	1
<i>Ingerophrynus parvus</i>	1

<i>Tylototriton panhai</i>	1
<i>Ophryophryne hansii</i>	1
<i>Sylvirana montosa</i>	1
<i>Rhacophorus spelaeus</i>	1
<i>Sclerophrys vittata</i>	1
<i>Hyperolius frontalis</i>	1
<i>Phrynohyas coriacea</i>	1
<i>Hyperolius lateralis</i>	1
<i>Hypopachus species</i>	1
<i>Tylototriton zieglerei</i>	1
<i>Hyla trachycephalus</i>	1
<i>Bolitoglossa altamazonica</i>	1
<i>Pedostibes species</i>	1
<i>Gastrotheca fissipes</i>	1
<i>Gastrotheca monticola</i>	1
<i>Nyctimystes infrafronatus</i>	1
<i>Sachatamia ilex</i>	1
<i>Dendropsophus acroanus</i>	1
<i>Dendropsophus leali</i>	1
<i>Oscacilia species</i>	1
<i>Trachycephalus nigromaculatus</i>	1
<i>Rheobates palmatus</i>	1
<i>Nanorana parkeri</i>	1
<i>Nanorana pleskei</i>	1
<i>Leptodactylus fragilis</i>	1
<i>Rhinella icterica</i>	1
<i>Rhinella ornata</i>	1
<i>Boana prasina</i>	1
<i>Hyperolius parkeri</i>	1
<i>Trachycephalus coriaceus</i>	1
<i>Amietia ruwenzorica</i>	1
<i>Triturus karelinii</i>	1
<i>Chiasmocleis bassleri</i>	1
<i>Amazophrynella species</i>	1
<i>Adenomera hylaedactyla</i>	1
<i>Oedipina complex</i>	1
<i>Oedipina parvipes</i>	1
<i>Gastrotheca turnerorum</i>	1
<i>Gastrotheca yacuri</i>	1
<i>Gastrotheca lojana</i>	1
<i>Gastrotheca orophylax</i>	1

<i>Gastrotheca plumbea</i>	1
<i>Gastrotheca testudinea</i>	1
<i>Strongylopus kitumbeine</i>	1
<i>Bolitoglossa biseriata</i>	1
<i>Gastrotheca cuencana</i>	1
<i>Gastrotheca litonedis</i>	1
<i>Leucostethus species</i>	1
<i>Nesomantis thomasseti</i>	1
<i>Teratohyla midas</i>	1
<i>Fejervarya chiangmaiensis</i>	1
<i>Limnonectes hascheanus</i>	1
<i>Ingerana tenasserimensis</i>	1
<i>Ptychohyla euthysanota</i>	1
<i>Silverstoneia flotator</i>	1
<i>Hyperolius bobirensis</i>	1
<i>Hyperolius laurenti</i>	1
<i>Sclerophrys togoensis</i>	1
<i>Megophrys intermedia</i>	1
<i>Ecnomiohyla miotympanum</i>	1
<i>Duellmanohyla schmidtorum</i>	1
<i>Duellmanohyla chamulae</i>	1
<i>Duellmanohyla ignicolor</i>	1
<i>Charadrahyla nephila</i>	1
<i>Plectrohyla matudai</i>	1
<i>Megastomatohyla mixe</i>	1
<i>Smilisca cyanosticta</i>	1
<i>Hylodes phyllodes</i>	1
<i>Ptychohyla zophodes</i>	1
<i>Opisthothylax immaculatus</i>	1
<i>Batrachylodes trossulus</i>	1
<i>Cornufer wolfi</i>	1
<i>Crinia signifera</i>	1
<i>Osteocephalus buckleyi</i>	1
<i>Hypsiboas rufitelus</i>	1
<i>Werneria bambutensis</i>	1
<i>Pristimantis gaigei</i>	1
<i>Ambystoma mabeei</i>	1
<i>Leptodactylus savagei</i>	1
<i>Pseudophryne bibronii</i>	1
<i>Sclerophrys camerunensis</i>	1
<i>Pseudophryne coriacea</i>	1

<i>Pseudophryne dendyi</i>	1
<i>Pseudophryne guentheri</i>	1
<i>Pseudophryne occidentalis</i>	1
<i>Pseudophryne semimarmorata</i>	1
<i>Plethodon petraeus</i>	1
<i>Oreophrynella quelchii</i>	1
<i>Pristimantis ventrimarmoratus</i>	1
<i>Brachycephalus didactylus</i>	1
<i>Cochranella spinosa</i>	1
<i>Mantidactylus zolitschka</i>	1
<i>Chiasmocleis ventrimaculata</i>	1
<i>Cophyla grandis</i>	1
<i>Phrynobatrachus acutirostris</i>	1
<i>Mantidactylus opiparis</i>	1
<i>Mantidactylus zipperi</i>	1
<i>Mantidactylus charlotteae</i>	1
<i>Astylosternus laticephalus</i>	1
<i>Chaperina fusca</i>	1
<i>Bufo juxtasper</i>	1
<i>Mantidactylus guttulatus</i>	1
<i>Bufo divergens</i>	1
<i>Mantidactylus albofrenatus</i>	1
<i>Mantidactylus argenteus</i>	1
<i>Ansonia spinulifer</i>	1
<i>Plethodontohyla notosticta</i>	1
<i>Charadrahyla taeniopus</i>	1
<i>Plethodontohyla inguinalis</i>	1
<i>Stumpffia tridactyla</i>	1
<i>Centrolene ilex</i>	1
<i>Aglyptodactylus inguinalis</i>	1
<i>Ptychohyla acrochorda</i>	1
<i>Anodonthyla bouldengerii</i>	1
<i>Thorius species</i>	1
<i>Spinomantis tavaratra</i>	1
<i>Rhombophryne serratopalpebrosa</i>	1
<i>Plethodontohyla guentheri</i>	1
<i>Tlacochohyla species</i>	1
<i>Tlacochohyla smithii</i>	1
<i>Tlacochohyla picta</i>	1
<i>Plethodontohyla ocellata</i>	1
<i>Rhombophryne savaka</i>	1

<i>Plethodontohyla bipunctata</i>	1
<i>Brachycephalus garbeanus</i>	1
<i>Brachycephalus nodoterga</i>	1
<i>Ichthyophis supachaii</i>	1
<i>Theloderma gordonii</i>	1
<i>Pristimantis malkini</i>	1
<i>Leptolalax aereus</i>	1
<i>Strauchbufo raddei</i>	1
<i>Nelsonophryne species</i>	1
<i>Caecilia volceni</i>	1
<i>Plethodon asupak</i>	1
<i>Leptopelis palmatus</i>	1
<i>Phrynobatrachus dispar</i>	1
<i>Phrynobatrachus leveleve</i>	1
<i>Ptychadena newtoni</i>	1
<i>Schistometopum thomense</i>	1
<i>Hyperolius drewesi</i>	1
<i>Scolecophorus species</i>	1
<i>Hyperolius thomensis</i>	1
<i>Eleutherodactylus conspicillatus</i>	1
<i>Leptolalax firthi</i>	1
<i>Phrynobatrachus ghanensis</i>	1
<i>Paramesotriton fuzhongensis</i>	1
<i>Aplastodiscus arildae</i>	1
<i>Boophis quasiboehmei</i>	1
<i>Gephyromantis salegy</i>	1
<i>Xenopus tropicalis</i>	1
<i>Ptychadena bibroni</i>	1
<i>Aplastodiscus albofrenatus</i>	1
<i>Aplastodiscus albosignatus</i>	1
<i>Hyloscirtus alytolylax</i>	1
<i>Leptobrachella isos</i>	1
<i>Stumpffia species</i>	1
<i>Aglyptodactylus species</i>	1
<i>Hyla arenicolor</i>	1
<i>Dicamptodon ensatus</i>	1
<i>Leptolalax ventripunctatus</i>	1
<i>Leptolalax eos</i>	1
<i>Ameerega simulans</i>	1
<i>Amieryophrynus pantherinus</i>	1
<i>Brachycephalus margaritatus</i>	1

<i>Phrynobatrachus natalensis</i>	1
<i>Hypsiboas rosenbergi</i>	1
<i>Atelopus pulcher/spumarius</i>	1
<i>Discoglossus pictus</i>	1
<i>Euphlyctis species</i>	1
<i>Mixophyes species</i>	1
<i>Mannophryne olmonae</i>	1
<i>Crepidophryne epiotica</i>	1
<i>Liuixalus romeri</i>	1
<i>Hyperolius sylvaticus</i>	1
<i>Kassina arboricola</i>	1
<i>Leptopelis occidentalis</i>	1
<i>Pseudopaludicola species</i>	1
<i>Brachycephalus alipioi</i>	1
<i>Brachycephalus pulex</i>	1
<i>Brachycephalus hermogenesi</i>	1
<i>Phrynobatrachus alleni</i>	1
<i>Dermatonotus muelleri</i>	1
<i>Discoglossus jeanneae</i>	1
<i>Amolops viridimaculatus</i>	1
<i>Leptopelis modestus</i>	1
<i>Dendrobates species</i>	1
<i>Plethodon dunni</i>	1
<i>Bufo tuberosus</i>	1
<i>Phrynobatrachus intermedius</i>	1
<i>Sylvirana cubitalis</i>	1
<i>Hyla debilis</i>	1
<i>Opisthodon ornatus</i>	1
<i>Oreolalax lichuanensis</i>	1
<i>Phrynobatrachus parvulus</i>	1
<i>Rana aurora</i>	1
<i>Atelopus zeteki</i>	1
<i>Batrachuperus species</i>	1
<i>Pseudacris streckeri</i>	1
<i>Guibemantis methueni</i>	1
<i>Guibemantis punctatus</i>	1
<i>Heterixalus punctatus</i>	1
<i>Dendropsophus riveroi</i>	1
<i>Leptodactylus longirostris</i>	1
<i>Odontophrynus americanus</i>	1
<i>Lyciasalamandra helverseni</i>	1

<i>Lyciasalamandra luschani</i>	1
<i>Bufo luetkenii</i>	1
<i>Eleutherodactylus diastema</i>	1
<i>Eleutherodactylus bransfordii</i>	1
<i>Eleutherodactylus crassidigitus</i>	1
<i>Phyllomedusa tarsius</i>	1
<i>Lysapsus laevis</i>	1
<i>Ranitomeya cyanovittata</i>	1
<i>Ranitomeya defleri</i>	1
<i>Ranitomeya toraro</i>	1
<i>Herpele species</i>	1
<i>Parvicaecilia nicefori</i>	1
<i>Hypsiboas boans</i>	1
<i>Hypsiboas crepitans</i>	1
<i>Ranoidea maini</i>	1
<i>Hyalinobatrachium valerioi</i>	1
<i>Rhacophorus gauni</i>	1
<i>Bufo bankorensis</i>	1
<i>Rana adenopleura</i>	1
<i>Ecnomiohyla sukia</i>	1
<i>Staurois latopalmaris</i>	1
<i>Bufo brongersmai</i>	1
<i>Eleutherodactylus abbotti</i>	1
<i>Sylvirana guentheri</i>	1
<i>Notaden species</i>	1
<i>Neobatrachus wilsmorei</i>	1
<i>Neobatrachus sutor</i>	1
<i>Aparasphenodon arapapa</i>	1
<i>Aparasphenodon brunoii</i>	1
<i>Corythomantis greeningi</i>	1
<i>Litoria nasuta</i>	1
<i>Typhlomolge rathbuni</i>	1
<i>Gephyromantis tahotra</i>	1
<i>Xenopus amieti</i>	1
<i>Fejervarya moodiei</i>	1
<i>Raorchestes parvulus</i>	1
<i>Sylvirana nigrovittata</i>	1
<i>Odorrana hoseii</i>	1
<i>Odorrana livida</i>	1
<i>Polypedates megacephalus</i>	1
<i>Pulchrana glandulosa</i>	1

<i>Microhyla fissipes</i>	1
<i>Occidozyga martensii</i>	1
<i>Ptychadena nilotica</i>	1
<i>Limnonectes taylori</i>	1
<i>Leptobrachium smithi</i>	1
<i>Limnonectes doriae</i>	1
<i>Amietia chapini</i>	1
<i>Pristimantis unistrigatus</i>	1
<i>Felihyla hansenae</i>	1
<i>Chalcorana eschatia</i>	1
<i>Ansonia inthanon</i>	1
<i>Brachytarsophrys carinensis</i>	1
<i>Megaphrys intermedia</i>	1
<i>Kurixalus species</i>	1
<i>Leptobrachium leucops</i>	1
<i>Leptobrachium pullum</i>	1
<i>Bufo boreas</i>	1
<i>Chiropterotriton species</i>	1
<i>Ophryophryne pachyproctus</i>	1
<i>Amolops marmoratus</i>	1
<i>Telmatobius species</i>	1
<i>Litoria bicolor</i>	1
<i>Ameerega cainarachi</i>	1
<i>Rana daemeli</i>	1
<i>Schistometopum species</i>	1
<i>Amietophrynus channingi</i>	1
<i>Staurois tuberilinguis</i>	1
<i>Cornufer species</i>	1
<i>Staurois guttatus</i>	1
<i>Philautus aurantium</i>	1
<i>Chalcorana raniceps</i>	1
<i>Gephyromantis eiselti</i>	1
<i>Pulchrana picturata</i>	1
<i>Boophis ulftunni</i>	1
<i>Cophyla species</i>	1
<i>Boophis sambirano</i>	1
<i>Boophis septentrionalis</i>	1
<i>Boophis sibilans</i>	1
<i>Boophis tasymena</i>	1
<i>Boophis roseipalmatus</i>	1
<i>Boophis rufiocularis</i>	1

<i>Boophis luciae</i>	1
<i>Boophis mandraka</i>	1
<i>Boophis entingae</i>	1
<i>Boophis liami</i>	1
<i>Alcalus baluensis</i>	1
<i>Gephyromantis asper</i>	1
<i>Gephyromantis ambohitra</i>	1
<i>Gephyromantis schilfi</i>	1
<i>Gephyromantis tandroka</i>	1
<i>Gephyromantis thelenae</i>	1
<i>Guibemantis flavobrunneus</i>	1
<i>Guibemantis kathrinae</i>	1
<i>Gephyromantis redimitus</i>	1
<i>Gephyromantis rivicola</i>	1
<i>Gephyromantis sculpturatus</i>	1
<i>Gephyromantis pseudoasper</i>	1
<i>Gephyromantis striatus</i>	1
<i>Gephyromantis granulatus</i>	1
<i>Gephyromantis klemmeri</i>	1
<i>Gephyromantis leucomaculatus</i>	1
<i>Ansonia leptopus</i>	1
<i>Gephyromantis plicifer</i>	1
<i>Boophis lichenoides</i>	1
<i>Boophis anjanaharibeensis</i>	1
<i>Amnirana nicobariensis</i>	1
<i>Dendropsophus branneri</i>	1
<i>Ommatotriton ophryticus</i>	1
<i>Bolitoglossa colonnea</i>	1
<i>Limnonectes leporinus</i>	1
<i>Calluella species</i>	1
<i>Spea bombifrons</i>	1
<i>Limnonectes laticeps</i>	1
<i>Odorrana hosii</i>	1
<i>Bufo bufo</i>	1
<i>Occidozyga baluensis</i>	1
<i>Meristogenys species</i>	1
<i>Rhacophorus angulirostris</i>	1
<i>Dendropsophus schubarti</i>	1
<i>Philautus hosii</i>	1
<i>Rana krefftii</i>	1
<i>Limnonectes palavanensis</i>	1

<i>Ceratophrys hybrid</i>	1
<i>Boophis burgeri</i>	1
<i>Ichthyophis laosensis</i>	1
<i>Boophis englaenderi</i>	1
<i>Limnonectes finchi</i>	1
<i>Blommersia grandisonae</i>	1
<i>Blommersia sarotra</i>	1
<i>Leptobranchella species</i>	1
<i>Leptolalax dringi</i>	1
<i>Leptobranchium montanum</i>	1
<i>Meristogenys kinabaluensis</i>	1
<i>Megophrys nankiangensis</i>	1
<i>Leptobranchella juliandringi</i>	1
<i>A tympanophrys gigantea</i>	1
<i>Oreolalax schmidtii</i>	1
<i>Leptobranchium abbotti</i>	1
<i>Meristogenys orphnocnemis</i>	1
<i>Megophrys auralensis</i>	1

Annex 4. Suggested topics for potential consideration and discussion at the amphibian trade workshop.

General topics:

1. Conversion factors of amphibians reported in units of mass versus units of number.
 - a. Challenge identified: How many animals were traded?
 - i. This largely pertains to amphibians traded in high volume shipments for the food (e.g. kilograms of frog meat and frog legs) and scientific trade (e.g. kilograms of bodies of amphibians).
 - ii. Is it possible to agree on a standardized method of reporting?
 - iii. Is it not feasible to report trade by the actual (even if estimated) number of animals traded to provide less ambiguity?
 - iv. Can exporting nations provide a conversion factor for the approximate mass of individual animals traded for species reported by mass?
2. Use of trade terms and variability in interpretation.
 - a. Challenge identified: How many animals were traded and in what condition?
 - b. When is it most appropriate to use each different code to describe amphibians traded as meat/food: LEG, MEA, LIV
 - i. Is it possible to agree on a standardized method of reporting and interpretation?
 - c. When is it most appropriate to use each different code to describe amphibians traded as scientific specimens: SPE, BOD, LIV
 - i. Is it possible to agree on a standardized method of reporting and interpretation?
3. Anomalous reporting of amphibian countries/regions of origin and/or sources.
 - a. Challenge identified: What is the accurate source and origin of highly traded amphibians?
 - b. The present study has demonstrated that traded amphibians have been reported as collected from the wild in countries/regions of origin where populations in the wild have not been documented.
 - i. Is it possible to improve traceability along the amphibian supply chain?
 - ii. Is it possible to strengthen detection of anomalous information provided on import/export documents?
 - iii. Do any of the species-specific anomalies presented in this report raise concerns about potential violations of national legislation, either at the point of import, export, or re-export?
4. Incorrect species identification of traded amphibians.
 - a. Challenge identified: Which species of amphibians are traded?
 - b. Studies have shown that amphibians traded in high volumes (i.e. for the frog leg trade) have entered commerce labelled with incorrect species descriptions.
 - i. Can the process of wildlife trade enforcement be strengthened to identify amphibians fraudulently documented prior to exportation either through improved traceability or DNA sampling?
 - ii. Do any of the species-specific anomalies presented in this report raise concerns about potential violations of national legislation, either at the point of import, export, or re-export?

5. Spread of emerging infectious diseases through the international trade in amphibians.
 - a. Challenge identified: The spread of amphibian chytrid fungi (*Batrachochytrium dendrobatidis* and *B. salamandrivorans*) and ranavirus is contributing towards global amphibian population declines and extinctions.
 - b. Some nations and regions have established national legislation to control the spread of pathogens through a variety of trade prohibition and permitting frameworks, but certain high-risk trade activities continue in the absence of biosecurity control measures.
 - i. What available biosecurity measures would be feasible to implement among sectors of high-volume amphibian trade to reduce the spread of these pathogens?
 1. Among amphibians traded for use as food, what approaches would maintain animal welfare, effectively reduce the presence of viable pathogens, and allow for the trade in amphibians safe for human or animal consumption?
 2. Among amphibians traded for any purpose, is it feasible to pack and transport animals in lower densities both to reduce stress and prevent increased disease transmission through direct physical contact?
 - ii. Information to guide the development of science-based species-specific disease control regulations is lacking due to the low amount of surveillance that has been performed to quantify pathogen presence among different types, purposes, and origins of traded amphibians.
 1. Are there any national wildlife trade enforcement authorities present at this workshop that possess authority to perform or allow (through collaborations) non-invasive screening for pathogens among traded amphibians?
 2. Among those with necessary authority, are there any national wildlife trade enforcement authorities that would like to perform or facilitate screening? The purpose of such activities would be to create scientific information that can help guide development of trade protocols to ensure trade in amphibians is safer both for both species in trade and native species which can be indirectly affected.

Species-specific topics:

1. *Ceratophrys ornata*
 - a. Question: Is the volume of trade in *C. ornata* eggs occurring at levels that would be cause for conservation concern?
 - b. Background information: The IUCN Red List assessment for this species stated that *C. ornata* is, "...collected for the international pet trade and its eggs are sold internationally for scientific research." Among the data available for this study, international trade in eggs of *C. ornata* was not identified. All trade was recorded in LEMIS as either live adult frogs or scientific specimens. It is possible that trade not captured in LEMIS, between other trading partners, may involve eggs of this species and warrant attention.
2. *Cynops pyrrhogaster*

- a. Question: Does the trade in *C. pyrrhogaster* between countries or regions outside the United States of America (e.g. the European Union) involve mostly wild collected animals?
- b. Background information: The IUCN assessment for this species stated that, "Individuals from the wild are constantly being traded on the internet as a pet. Only a small number are bred in captivity for research only." It also stated that, "Numerous newts are collected for sale and export to Europe for the pet trade, and this is considered a threat to the species." According to the US LEMIS data, most of the animals traded by the United States of America involved animals bred in captivity and most trade occurred prior to 2016. It is possible that trade not captured in LEMIS, between other trading partners, may involve animals collected from the wild and warrant attention.

3. *Bolitoglossa dofleini*

- a. Questions:
 - i. Does Honduras and/or Guatemala allow commercial international trade in *B. dofleini*?
 - 1. If yes, then are collection and export permits required?
 - 2. If yes, then have these permits been granted previously?
 - ii. Has *B. dofleini* been successfully bred in captivity in Nicaragua for commercial purposes?
 - iii. From which range State did the parental stock of animals reportedly bred in captivity in Nicaragua originate?
 - iv. How many facilities in Nicaragua are currently breeding *B. dofleini*?
 - 1. How many adult reproductive females are currently held in captivity by these facilities?
 - v. Is *B. dofleini* exported by Nicaragua to countries other than the United States of America?
 - 1. If yes, then in what quantities?
- b. Background information: This species has a remarkably slow reproductive cycle in which animals require nearly 10 years before they reach sexual maturity and begin to reproduce. A notable shift in reported sources was identified in the trade of this species exported from Nicaragua. Nearly all animals traded during the study period (2015-2020) were reported as bred in captivity but in years prior, most reported trade involved animals described as collected from the wild in Honduras and Guatemala, the only two range States for this species, and then re-exported from Nicaragua. The observed shift in source codes of traded animals from primarily wild-collected to exclusively bred in captivity occurred after 2010 when two organizations recommended that the United States of America propose *B. dofleini* for inclusion in CITES Appendix II at CoP15. Due to the lack of available information about this species, the United States of America did not propose its listing.