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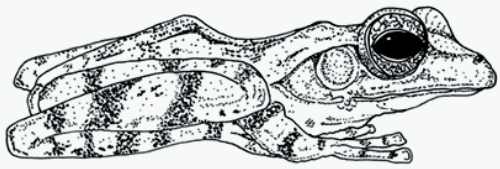
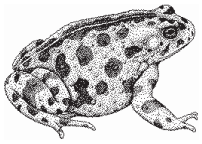


Polypedates cruciger (Sri Lanka)
By Ruchira Somaweera

FROGLOG

Newsletter of the Declining Amphibian Populations Task Force

June 2003, Number 57: *North & Central American Special*



The Houston Toad in Bastrop State Park 1990 – 2002

From Andy Price, Working Group Chair for the US Southern Plains

In 1990, Texas Parks & Wildlife Department began an effort to implement some of the tasks outlined in the 1984 recovery plan for the Houston Toad (*Bufo houstonensis)*. Breeding toads were marked with PIT tags initially at two ponds in Bastrop State Park (which contains the most robust population of this species known to exist) beginning during the 1990 breeding season. Ponds were visited every night from the third week of January through the first week of May for the first 3 years (1990-1992) in order to determine environmental factors governing breeding activity. Other ponds were added to the study in subsequent years and other toads in the park were marked on an incidental basis. Body size and weight were also noted. Other potentially significant information, such as which males were mating with which females, was gathered as the opportunity allowed.

Bufo houstonensis is an explosive breeder; choruses form for several nights and then disappear for intervals of several days to a week or more. About one-third of the individuals participating in choruses show up once a year, regardless of whether they are recaptured in subsequent years. Data from this study indicate that generation time for the *B. houstonensis* population in this system is short, with essentially complete turnover within three years.

The Bastrop State Park Houston Toad population was robust and steady for the first six years of this study. Recruitment was also high during this period. Following the commencement of a severe regional drought between the 1995 and 1996 breeding seasons, recruitment was much lower and population numbers have now adjusted downward to a lower steady state. Whether this is merely a segment of a long-term population cycle will only be determined by continued monitoring. This study has also shown that *B. houstonensis* can and does travel between known breeding sites in a given season or over several seasons, emphasizing the conservation value of maintaining good-quality, interconnecting terrestrial habitat.

Unlike other closely related, relictual species of *Bufo* exhibiting population declines, the Houston Toad remains common and abundant in Bastrop State Park and the surrounding sandy-soil habitat of Bastrop County (Hillis et al. 1984, Price and Yantis 1990, 1992, 1993, A.H. Price unpubl. data). Like other relictual species of anurans that have not declined and for which there are good data (e.g. Banks et al. 1994), such isolated populations can persist and may even thrive provided sufficient quality habitat is available.

The Houston Toad has adapted to the drought cycles characteristic of this region of central Texas (Hafner 1993, Sorenson et al. 1976, Winkler 1990). The Bastrop County population has survived the extinction of other populations concomitant with the expansion of the City of Houston and the last major regional drought during the 1950s. It is reasonable to assume that it will continue to survive if its aquatic and terrestrial habitat requirements can be met. These intuitive conclusions are bolstered by a Population Viability Analysis using the data gathered during this study (Hatfield et al. in press): the more toads there are in the breeding population (carrying capacity, K, a reflection of the amount of habitat) and the greater the probability that individual toads can disperse between breeding sites, the more likely the population will be able to withstand catastrophes (such as drought) that would otherwise drive a small, fragmented population to extinction.

Acknowledgements
Funds for the first 3 years of this project were provided under Section 6 of the Federal Endangered Species Act. My thanks to USFWS staff and other colleagues and friends for their invaluable help and assistance.

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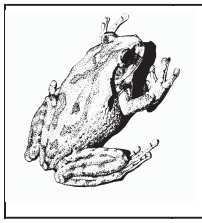

Amphibian Conservation in the US Pacific Northwest

By Deanna H. Olson, Co-Chair for the Pacific Northwest Working Group

The Pacific Northwest continues to be a very active region relative to amphibian conservation issues. Our understanding of the regional fauna has advanced considerably in the last decade, with application of new molecular techniques to explore biological diversity within taxa, and studies into effects of various agents on amphibian populations. Cooperative efforts among agencies, institutions, and societies have been pivotal for inventory and monitoring, concern-species management, and education.

Research: Both university and agency scientists are contributing new knowledge about our endemic fauna that is having direct bearing on their management. Genetic studies have broadened our understanding of the regional amphibian fauna; new taxa have been identified (*Rana luteiventris, Ascaphus montanus, Aneides vagrans*), while populations representing geographically structured divergent lineages are being detected in other species (*Rana cascadae, Batrachoseps wrighti, Plethodon larselli, P. stormi, P. elongatus*). Studies of land management effects on amphibians are ongoing in stream-, pond- and terrestrial-breeders. Key topics of 35 amphibian-related presentations at the recent 2003 annual meeting of the Society for Northwestern Vertebrate Biology (**http://www.snwvb.org/**) were species-habitat associations, movement patterns, riparian buffer zones, importance of forested headwaters, forest thinning, culvert passage, and fire. Research on potential contributors to amphibian declines are ongoing in Dr. Andrew Blaustein's lab at Oregon State University, including: lethal and sublethal effects of UV-B radiation; disease ecology (*Saprolegnia* fungi, chytrid fungi, nematode parasites); and contaminants.

Inventory & Monitoring: Several programs are advancing our knowledge of species' distributions, status, and trends. First, the federal Northwest Forest Plan covers about 10 million ha of forestlands west of the Cascade Range. Since 1994, surveys for 5 rare terrestrial plethodontid salamanders have been mandated under the Survey and Manage provision of this plan (protocols available at: **http://www.or.blm.gov/surveyandmanage/sp.htm**), resulting in considerable data on terrestrial herpetological assemblages on federal Forest Service and Bureau of Land Management lands, confirmation of rarity for 4 species, and reduced concern for one species (*Plethodon elongatus*), due to its relatively widespread occurrence on federal reserved lands. In 2003, strategic surveys are exploring distribution and validating habitat models for *Plethodon stormi, P. vandykei* and *P. larselli* (Dede Olson, Richard Nauman, and Charlie Crisafulli; US Forest Service). Second, Aquatic-Riparian Effectiveness Monitoring under the Northwest Forest Plan is compiling amphibian and fish occurrences in streams across 250 6th-field watersheds in their assessment of regional federal watershed conditions (**http://www.reo.gov/monitoring/watershed/aremp-compile.htm** and **http://www.reo.gov/monitoring/watershed/02fieldprotocol.pdf**). Third, the US Department of Interior has its own "ARMI", the Amphibian Research and Monitoring Initiative (**http://edc2.usgs.gov/armi**). In the US Pacific Northwest and adjacent arid-lands, Dr. Michael Adams (Principal Investigator, US Geological Survey) is coordinating a three-tiered monitoring approach and additional research projects: 1) Apex Monitoring Sites are selected populations for intensive monitoring; 2) Mid-Level Monitoring Areas assess amphibian occurrence and water quality over 6.7 million ha of Department of Interior lands; 3) Base Assessments provide snapshots of occurrences over broad areas (e.g., the Great Basin); and 4) research at focal study sites is being conducted with regard to non-native species, cattle grazing, and UV-B radiation. Fourth, an inventory and monitoring program is ongoing on US National Park Service lands. National parks in Washington State (Olympic National Park, North Cascades National Park, and Mount Rainier National Park) have completed the first inventory stage of the program. Lastly, Charlie Crisafulli (US Forest Service) and colleagues continue to monitor amphibian populations in the blast zone of Mt. St. Helens, which erupted in 1980 (**http://www.fs.fed.us/gpnf/mshnvm/research/faq.htm**).

Species Management: The rarest amphibian species in the US Pacific Northwest have a site-by-site conservation approach, for the maintenance of site-level persistence (e.g., *Rana pretiosa*). For uncommon to common species, current federal forest land management regulations (National Forest Management Act) require that stable, well-distributed populations be maintained across their ranges (="persistence"). Species "persistence" is a term undergoing scrutiny relative to US Pacific Northwest uncommon amphibians and other taxa. Dr. Steven Morey, conservation coordinator for the Survey and Manage program, is leading an interagency group of species experts to better develop these concepts, criteria for species' persistence assessments and management guidelines. In April 2003, a symposium was held in Portland, Oregon, to more fully address the topic of rare and uncommon species management, with an eye to recent innovations from the national and international community (**http://outreach.cof.orst.edu/species/**). The developing conservation plan for *Plethodon stormi* relies on the maintenance of multiple sites at the intermediate scale of the 6th-field watershed, to achieve stable well-distributed populations across the population range (~20 6th-field watersheds).

Education: A new emphasis on amphibian and reptile education is developing in our region. Many individuals, institutions, and agencies have been playing key roles, providing instruction to public and school audiences, land managers and policy makers, and science professionals. The focus of these efforts has been on the importance of the regional fauna within ecosystems, species identification, status and trends, and methodologies for inventory and monitoring. A variety of communication tools have been used, including courses and workshops (e.g., March 2003, Stream amphibians: sampling, ecology, and management workshop, joint meeting of the Society for Northwestern Vertebrate Biology and the California North Coast Chapter of The Wildlife Society, Arcata, California), exhibits, publications (new: Maxell *et al.* 2003, Herpetology in Montana, Northwest Fauna 5; see **http://www.snwvb.org/**), and websites (e.g., digital atlas of Idaho; **http://imnh.isu.edu/digitalatlas/**). Dr. Charles R. Peterson of Idaho State University represented the Pacific

Northwest region at the April 2003 herp-education conference in Gainesville, Florida (**http://www.parcplace.org/CurrentMeetings/SEPARC/Education-Fla2003.htm**).

Collaboration between the US national Partners in Amphibian and Reptile Conservation (PARC) and members of the US-Canada Pacific Northwest Amphibian and Reptile Consortium (PNARC, subgroup of the Society for Northwestern Vertebrate Biology) has resulted in a working group that is intended to organize and focus future regional efforts.

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Over Half of Mesoamerican Amphibians Threatened with Extinction

By Bruce Young, Simon Stuart, Janice Long & Neil Cox

Twenty-five herpetologists met on 11-15 November, 2002, at the La Selva Biological Station in Costa Rica to complete assessments of the conservation status of the 771 species of amphibians known from Mesoamerica (Mexico through Panama). This exercise formed part of the Global Amphibian Assessment sponsored by the IUCN-SSC, the Center for Applied Biodiversity Science at Conservation International, NatureServe, the DAPTF, and AmphibiaWeb.

Prior to the workshop, a lead assessor from several countries had already completed a draft assessment of each species. Georgina Santos-Barrera led the Mexican team, Gustavo Cruz worked on the Honduran species, and Frank Solís together with the Círculo Herpetológico de Panamá drafted the assessment for the species in Panama. In addition, the Costa Rican herpetologists led by Federico Bolaños met in August, 2002, to assign Red List categories to the Costa Rican fauna. We drafted assessments for the remaining species based on literature information. At the La Selva workshop, participants reviewed, updated, and corrected these draft data.

After a week of intensive data compilation to document the systematics, Red List assessment, ecology, distribution, threats, conservation measures, and bibliography for each species, we could finally put numbers to what we all know is a critical situation for amphibian conservation in the region. Of the 550 species for which enough information is available to allow an assessment, 52% fall into one of the IUCN Red List threatened (Critically Endangered, Endangered, or Vulnerable) or extinct categories. Summaries by taxonomic group and nation follow.

Class	TOTAL	Gymnophiona	Caudata	Anura
Data Deficient (DD)	121	13	41	67
Extinct (EX)	4	0	1	3
Critically Endangered (CR)	84	0	35	49
Endangered (EN)	108	0	53	55
Vulnerable (VU)	88	0	32	56
Near Threatened (NT)	65	0	20	45
Least Concern (LC)	201	3	28	170

Participants declared four species extinct: the Costa Rican toad *Bufo periglenes*, the Honduran frogs *Eleutherodactylus milesi* and *E. chrysozetete*, and the Mexican salamander *Ambystoma lermaense.* Many of the 84 Critically Endangered species appear to have disappeared and researchers can no longer locate populations of these species. If the situation continues, many of these species will fall into the Extinct category when these species are next reviewed. Overall, the endemic, highland species with small distributions were the most threatened, whereas the widely distributed lowland species had the most secure populations. Likewise, faunas in countries without extensive highlands such as Belize and Nicaragua are less threatened than in other countries.

Country	Panama	Nicaragua	Mexico	Honduras	Guatemala	El Salvador	Costa Rica	Belize
Data Deficient (DD)	46	4	41	5	20	1	29	1
Extinct (EX)			1	2			1	
Critically Endangered (CR)	8		38	22	10	1	15	1
Endangered (EN)	15	2	67	16	18	2	11	
Vulnerable (VU)	7	4	52	9	24	2	11	2
Near Threatened (NT)	20	2	30	8	17	1	20	6
Least Concern (LC)	93	54	102	52	46	23	91	30

In addition to documenting the conservation status of these species, this exercise produced a valuable compendium of previously unpublished data summarizing recent fieldwork on amphibian populations throughout the region. Participants also updated digital range maps for each species. These data will be published together with data from the rest of the world's amphibian species in late 2003. Web access to the data will be via **www.redlist.org** and **www.natureserve.org** (Americas only).

Acknowledgement: We thank the participants who sweated through the grueling days at La Selva and financial support from the (US) National Science Foundation (DEB-0130273).

(For contact details see end of Spanish version.)

Más de la mitad de los anfibios centroamericanos están amenazados por la extinción

Por Bruce Young, Simon Stuart, Janice Long y Neil Cox

Veinte herpetólogos se reunieron, entre el 11 y el 15 de noviembre de 2002, en la Estación Biológica La Selva, Costa Rica, para completar una evaluación del estatus de las 771 especies de anfibios conocidas en América Central (desde México hasta Panamá). Este ejercicio formó parte de la Evaluación Global de Anfibios (*Global Amphibian Assessment*) patrocinada por IUCN-SSC, el Centro de Ciencias Aplicadas a la Biodiversidad de *Conservation International*, *NatureServe*, el Grupo de Trabajo contra la Disminución de Poblaciones Anfibias (DAPTF) y la AnphibiaWeb.

Antes de este taller, un asesor principal de cada uno de los países había realizado un bosquejo de evaluación de cada una de las especies. Georgina Santos Barrera lideró el equipo mexicano, Gustavo Cruz trabajó sobre las especies de Honduras, y Frank Solís junto con el Círculo Herpetológico de Panamá bosquejaron la evaluación de las especies en Panamá. Además, los herpetólogos costarricenses liderados por Federico Bolaños se reunieron en agosto de 2002, para asignar las categorías de la Lista Roja a la fauna costarricense. Se bosquejaron las evaluaciones para las especies restantes en base a la bibliografía disponible. En el taller de La Selva, los participantes revisaron, actualizaron y corrigieron los datos de los bosquejos.

Luego de una semana de intensa compilación de datos para documentar las clasificaciones, la evaluación con respecto a la Lista Roja, la ecología, la distribución, las amenazas, las medidas de conservación y la bibliografía para cada una de las especies, se le pudo, finalmente, poner números a la ya por todos conocida situación crítica de la conservación de los anfibios de la región. De las 550 especies para las cuales hay suficiente información disponible como para permitir una evaluación, el 52% fueron ubicadas en una de las categorías sobre amenazas de la Lista Roja de IUCN (Críticamente amenazada, Amenazada, o Vulnerable), o fue declarada extinguida. Las siguientes tablas son una síntesis de los grupos taxonómicos según las naciones.

Clase	Anura	Caudata	Gymnophiona	TOTAL
Datos Insuficientes (DD)	67	41	13	121
Extinguida (EX)	3	1	0	4
Críticamente amenazada (CR)	49	35	0	84
Amenazada (EN)	55	53	0	108
Vulnerable (VU)	56	32	0	88
Cuasi-amenazada (NT)	45	20	0	65
De menor preocupación (LC)	170	28	3	201

País	Datos Insuficientes (DD)	Extinguida (EX)	Críticamente amenazada (CR)	Amenazada (EN)	Vulnerable (VU)	Cuasi-amenazada (NT)	De menor preocupación (LC)
Belice	1		1		2	6	30
Costa Rica	29	1	15	11	11	20	91
El Salvador	1		1	2	2	1	23
Guatemala	20		10	18	24	17	46
Honduras	5	2	22	16	9	8	52
México	41	1	38	67	52	30	102
Nicaragua	4			2	4	2	54
Panamá	46		8	15	7	20	93

Los participantes declararon extinguidas cuatro especies: el sapo costarricense *Bufo periglenes*, las ranas hondureñas *Eleutherodactylus milesi* y *Eleutherodactylus chysozetete*, y la salamandra mexicana *Ambystoma lermaense.* Muchas de las 84 especies Críticamente amenazadas parecen haber desaparecido y los

investigadores ya no pueden localizar las poblaciones de estas especies. Si esta situación continúa, muchas de ellas entrarán en la categoría de Extinguidas cuando sean controladas nuevamente. En general, las especies endémicas, de tierras altas, con distribuciones pequeñas fueron las más amenazadas, mientras que las especies de tierras bajas, con una distribución amplia, fueron las que tienen sus poblaciones más seguras. Del mismo modo, la fauna de los países sin tierras altas extensas, tales como Belice y Nicaragua, están menos amenazadas que las de los otros países.

Además de documentar el estatus de conservación de estas especies, este ejercicio dio como resultado un valioso compendio de datos no publicados con anterioridad, que sintetiza trabajos de campo recientes acerca de las poblaciones de anfibios de toda la región. Los participantes también actualizaron los mapas digitales de rangos para cada una de las especies. Estos datos serán publicados junto con los datos del resto de las especies de anfibios del mundo hacia finales de 2003. El acceso a estos datos será a través de la Web en las siguientes direcciones: www.redlist.org y www.natureserve.org (sólo para las Américas).

Reconocimientos: Queremos agradecer a los participantes que soportaron los agotadores y sofocantes días en La Selva, así como la ayuda económica de la *National Science Foundation* (DEB-0130273) de EE.UU.

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California – Nevada Working Group Report

By David Bradford, Working Group Chair

The primary activities of the California-Nevada Working Group in 2002 and 2003 have been to host an annual meeting, and to serve as a conduit for communicating issues among members of the group. The mailing list consists of about 160 individuals. A website is under development. The January 2002 meeting was held in San Diego, and was attended by about 60 individuals from government agencies, academia, and non-governmental organizations. Twenty-six presentations were made in the following topic areas: recent observations and insights regarding disease, die-offs, and malformations; population status and conservation of amphibians in Nevada; population recovery & re-establishment tools - eradication of exotic species, head starting, and translocation; California Dept. of Fish and Game and introduced fishes; status of recent or pending legal actions; airborne contaminants and amphibian population declines; and status and challenges for conservation strategies, assessments, and agreements. The second morning of the meeting consisted of a demonstration by the U.S. Geological Survey, Biological Resources Division, of their paperless data collection system using hand-held devices, and the national database management system to be used in conjunction with the national Amphibian Research and Monitoring Initiative.

In 2003 we hosted a meeting in Sacramento that was attended by about 90 individuals. Twenty five presentations were made in the following topic areas: chytrid fungus and declining amphibian populations; relicensing of hydroelectric projects - opportunities for research and conservation of amphibians; recent findings in phylogeography that may influence conservation; chemical contaminants and amphibian population declines; exotic species and active management for the benefit of amphibians; legal actions and activities pertaining to listed or proposed T&E species; and status, distribution, and population biology.

There continue to be many issues of concern about amphibians in our region. A number of species are listed as federally threatened or endangered, but the proposed listing for two species (*Rana muscosa, Bufo canorus*) were recently determined to be "warranted, but precluded," and other petitions are pending (*R. onca*, *Ambystoma californiense* distinct population segment). Stressors strongly implicated in declines include exotic species, water management, timber harvest, agriculture, urban development, disease, and airborne contaminants. Mysterious declines continue for several species. Two lawsuits have been filed against a state and a federal agency concerning potential effects of airborne agricultural contaminants on amphibians. There is heightened interest in amphibians in Nevada, where at least 7 of 13 native amphibians have suffered substantial declines. The Nevada Division of Wildlife has added staff to address amphibians. Fish stocking practices in California mountains are undergoing revision in response to amphibian and other concerns. No fish stocking will occur in the Sierra Nevada backcountry in 2003. Conservation strategies have been completed or are under development for at least eight species. The California Department of Fish and Game and the U.S. Forest Service have launched substantial efforts to assess and/or monitor amphibian populations. There is much interest in translocation programs to re-establish populations.

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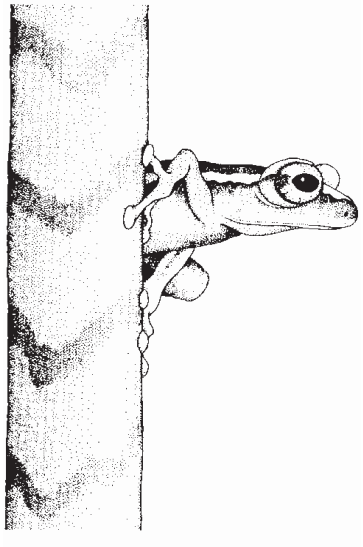

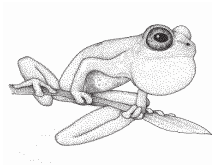

Rocky Mountain Working Group Report

By Stephen Corn & Charles R. Peterson, Working Group Chairs

Concern over the status of amphibians in the Rocky Mountains continues to focus on toads. The Wyoming toad (*Bufo baxteri*), Federal Endangered Species, disappeared from its last known breeding location near Laramie, Wyoming, in early 1993. A captive breeding effort, begun in 1988 by the Wyoming Game and Fish Department and continued currently by the US Fish and Wildlife Survey and several zoos around the country, kept this species in existence. Toads were released back into the wild beginning in 1994, and some of these have survived and reproduced. *B. baxteri,* however, still occurs at only one location and its status is extremely precarious.

Boreal toads (*B. boreas*) are listed as Endangered by the State of Colorado. The Colorado Division of Wildlife has initiated a captive breeding program for this species, with releases planned for Grand Mesa in western Colorado, a part of the toad's historic range where it is considered to have been extirpated. One of the few large breeding populations of this species, in Rocky Mountain National Park, underwent a severe decline in abundance beginning in 1996. Survival of this population remains in question.

Utah populations of the Columbia Spotted Frog (*Rana luteiventris*) were proposed for Federal listing as Threatened, but the US Fish and Wildlife Service determined in 2002 that the listing was not warranted. This species persists in small populations along the Wasatch Front in central Utah and at spring-fed marshes in the salt desert of western Utah. A mitigation project on the Provo River in central Utah has resulted in colonization by frogs of human-created wetlands. Further north, in Wyoming, Idaho and Montana, *R. luteiventris* remains widespread and abundant.

Chytrid fungus has been identified as contributing to the declines of *B. baxteri* and *B. boreas*. This pathogen has also been detected in *B. boreas* and *R. luteiventris* at several locations in the Greater Yellowstone Ecosystem and in *R. luteiventris* from southwest Idaho. Chytrid has not yet been detected in Montana.

The US Geological Survey has established the Amphibian Research and Monitoring Initiative (ARMI) to conduct monitoring of trends in amphibian populations and determine causes of declines (**http://edc2.usgs.gov/armi/index.asp**). The Rocky Mountain Working Group interacts with the ARMI Rocky Mountain (**http://www.fort.usgs.gov/research/rarmi/default.html**) and Pacific Northwest Regions. In cooperation with the National Park Service and Idaho State University, Rocky Mountain ARMI has established a monitoring transect along the Continental Divide, including Glacier National Park in Montana, the Greater Yellowstone Ecosystem in Wyoming, Idaho and Montana, and Rocky Mountain National Park in Colorado. This transect encompasses a gradient of amphibian decline, from severe declines in the south to few or no declines in the north. The Greater Yellowstone Ecosystem, at the center of the transect, may allow the rare opportunity to study the dynamics of amphibian populations affected with chytrid fungus and other pathogens. Amphibian surveys have been performed at numerous other locations, with support from the US Forest Service, US Fish and Wildlife Service, National Park Service, and several State agencies.

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Amphibian Declines in the United States

A Report from Michael J. Lannoo, U.S. Coordinator for DAPTF

In the United States, we currently recognize 288 extant amphibian species: 103 species of frogs and 185 species of salamanders, although the identity and relationships of species in several genera remain unresolved. Through DAPTF, Partners in Amphibian and Reptile Conservation (PARC), the USGS's Amphibian Research and Monitoring Initiative (ARMI), and several other partners we have recently completed our 2-volume Status and Conservation of U.S. Amphibians project. The first volume, consisting of 52 conservation essays, gives us our context—how we think about amphibian declines and malformations. The second volume, consisting of species accounts covering all species and authored by experts, and newly developed, digitally based, distribution maps gives us the range of facts we need to support and expand both our theoretical and practical perspectives.

In the United States, but not just in the United States, a problem with documenting amphibian declines is that in most regions, and for most species, we have few historical data to compare to the data from our current studies. A second problem is that amphibian populations fluctuate with environmental conditions—wet years favor reproduction, drought years do not. Therefore, to properly document amphibian declines, we have tended to focus our studies on areas where historical data are available and sample across many years under a variety of conditions. Despite these limitations, several studies have now been done that document declines. For example, Drost and Fellers have documented the decline of several frog species in the Yosemite region of the California Sierra Nevada. Also in the Sierra Nevada, Bradford and colleagues note the role that introduced fishes play in reducing anuran populations, a theme that Knapp and Matthews have expanded upon. Introduced American bullfrogs (*Rana catesbeiana*) are also playing a role in reducing native amphibian numbers in many parts of the West (but see the work of M. Hayes and Jennings).

In the midwestern United States, fish and American bullfrog introductions are playing the same role in decimating amphibian populations that they have played in California. Long-term data from the Wisconsin Frog and Toad Survey indicate that numbers of most amphibians are in steady decline, at rates of between 1% and 4% per year (Mossman and colleagues).

In the Southeast, the conversion of native forests to pine plantations appears to be decimating amphibian populations (Means and colleagues).

Contradicting reports of declines, other studies designed to look at amphibian abundance indicate that numbers are stable. Long-term studies at the Savannah River Ecology Laboratory show large

population fluctuations but little evidence for declines over the past two decades (Pechmann and colleagues). From these studies and others, a general picture emerges. Within species, populations may be in decline in some regions, yet stable in others.

A second general pattern is also evident. Within regions of the United States, some species are in decline while others are not. For example, in North America, northern populations of Blanchard's cricket frogs (*Acris crepitans blanchardi*) have declined, while southern populations remain robust. These declines in northern populations of cricket frogs have not been mirrored by concomitant declines in syntopic species such as northern leopard frogs (*Rana pipiens*), American toads (*Bufo americanus*), western chorus frogs (*Pseudacris triseriata*), and tiger salamanders (*Ambystoma tigrinum*).

The reasons underlying amphibian declines are in some cases thought to be known, while in others they are completely unknown. In the United States, and indeed the world, ultraviolet light, acid rain, commercial collecting, invasive species, pesticide use, and global warming have all been implicated. In fact, under the 2 CO_2 model (doubling the ambient levels of atmospheric carbon dioxide) of global warming, the lush Southeastern forests, currently home to the most stable North American amphibian populations and the highest richness of species, will transform into a dry chaparral-like ecosystem (R. Neilson, personal communication). Such dry conditions are inconsistent with the life history requirements of the current native amphibian species assemblage of this region.

Despite the attention given to these causes of amphibian declines, up to this point in time the rather pedestrian causes of habitat loss and alteration undoubtedly have been the largest factors contributing to amphibian declines.

While the trend in experimental studies has been to focus on single potential causes of amphibian declines, animals in nature rarely face only one threat. Recognizing this, recent studies (e.g., by Kiesecker, Blaustein, and colleagues) have focused on synergistic effects of anthropogenic disturbances on amphibians. A second trend in experimental studies has been to assess the level of insult needed to kill. But again, recognizing the situation in nature, more recent studies (e.g., T. Hayes and colleagues) have focused on the role of sublethal effects.

In the United States there are several conclusions that can be drawn from recent work:

1. Despite our knowledge, we still do not have a complete picture of the conservation status of amphibians. In essence, by defining what we know, we have also defined what we do not know—it is this lack of information, and its magnitude, that now draws our attention.

2. Amphibian species are responding in various ways to the environmental pressures presented by current land management practices and by compromises in air and water quality.

3. We now have enough information on many U.S. amphibian species to begin to make informed decisions about their management.

4. In assessing amphibian declines we must distinguish between naturally rare species and declines for unnatural reasons.

5. Current abundance does not equate with future conservation status.

6. Developmental malformations can cause amphibian declines, but declines are occurring in the absence of high rates of malformations.

7. Aquatic species are being affected more than terrestrial species. In aquatic species malformation rates are higher (Hoppe and colleagues) and declines are greater. While roughly 70% of United States species have an aquatic life history stage, 88% (22/25) of the currently listed U.S. Federal Threatened and Endangered species have an aquatic life history stage.

8. While amphibian declines are currently receiving a great degree of publicity, they serve as a proxy for declines that are co-occurring in many other non-game species, including (and especially) aquatic species.

9. The notion of amphibians as bioindicators of conditions for humans is real, but needs some qualification. While it is true that amphibians have a number of characteristics that make them potential bioindicators, including unprotected permeable skin and a lack of long-range dispersal capability, amphibians cannot in truth tell us any more about human health than a careful epidemiologist could tease apart from an examination of either historical or comparative data.

10. As environmental indicators, amphibians show the effects of compromised ecosystems. But in certain cases the situation is reversed—rather than amphibians being affected because ecosystems are sick, ecosystems become sick because amphibians are affected. For example, in chytrid fungal outbreaks, amphibians themselves are the targets and, with their loss, ecosystems are damaged. These cause-effect relationships may not be as simple as we imagine they are. Sublethal exposures of pollutants or UV-B may stress amphibians to the point of making them susceptible to pathogens such as chytrid fungi. The factor (or a coincident one) causing malformations at the Crow Wing site in Minnesota is also causing behavioral modifications in northern leopard frogs that is affecting their ability to reproduce (Hoppe and colleagues). So, amphibians are affected when ecosystems are affected, and amphibians themselves can be targeted even when ecosystems otherwise appear to be healthy.

11. While the focus of the high-profile amphibian malformations investigation has been on determining proximal causes and their relative importance, the solution to this problem is relatively simple and largely independent of proximal cause. From our recent work in Minnesota, we realize that the hottest of the hot spots all share one feature: they are altered wetlands. While the nature of these alterations varies by site (eutrophication, erosion, septic system leakage, partial filling, excavation, cattle usage) these alterations are easily identified and if corrected would undoubtedly reduce, if not eliminate, the malformation problem at these sites.

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Reports on DAPTF Seed Grants

From Tim Halliday
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Recipients of DAPTF Seed Grants are generally expected to publish the results of their projects in refereed journals, or as articles in *Froglog*. They are also required to send us reports, so that their results can be made available to DAPTF members. Below is a list of reports that we have received recently. Anyone wanting a

copy of a report should contact the author in the first instance; we can supply copies if you cannot reach the author.

Nikolay Berezovikov et al. (2002)
Recent status of *Rana asiatica* populations in Kazakhstan. I. *Rana asiatica* in highlands of central Tien-Shan mountains (southeastern Kazakhstan). (Report in form of a draft paper.)
dragon@nursat,kz

Alexander Borisovskiy (2002)
Research of populations of the rare frogs (*Rana lessonae, Rana esculenta*) in Udmurt Republic
bag@uni.udm.ru

Ranjit Daniels (2002)
Impact of tea cultivation on amphibians in the Western Ghats
careearth@usa.net

Tatjana Dujsebayeva & Stefano Doglio (2000/1)
Report of the 2001 monitoring of herpetofauna on the Kazakh shore of the Aral Sea
dragon@nursat.kz
finrod_s@libero.it

Eli Greenbaum (2002)
Global amphibian declines and the need for herpetofaunal inventories in Guinea, West Africa
elig@mail.ukans.edu

Amy Gye et al. (2002)
The impact of habitat modification on water loss, activity and body temperature of the striped marsh frog (*Limnodynastes peronii*)
amygye@hotmail.com

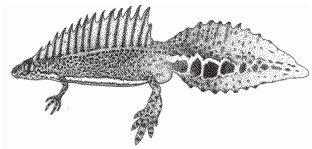
Tanya Hawley (2002)
Effects of Hurricane Iris on amphibian populations in the Bladen Nature Reserve, southern Belize. (Report in form of a draft paper.)
thawley@bio.miami.edu

Rajendra Vyas (2002)
Survey of habitat, distribution and status of Bombay Ichthyophis (*Ichthyophis bombayensis*) in the Western Ghats of Gujarat State
razoovyas@hotmail.com

Guinevere Wogan (2002)
Survey of amphibians in Myanmar (Burma) and implementation of long term monitoring
(Dept. of Herpetology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, USA).

Publications of Interest can now be found, updated monthly, at: **http://www.open.ac.uk/daptf/news2.htm**

Froglog Shorts



NEW CHAIR OF THE DAPTF

We are pleased to announce that, from July 2003, we will be led by Dr. Jim Collins, of Arizona State University, Tempe. Jim is currently leading a major, interdisciplinary study of amphibian diseases (**http://lifesciences.asu.edu /irceb/index.htm**) His appointment is for three years.

DONATIONS We gratefully acknowledge receipt of these donations, received prior to June 9, 2003. **Individuals:** Anonymous, Terry Gampper, Jan Hoover, Moira Hope, Karen L. Jacobs, Karen Lips **Institutions:** Roger Williams Park Zoo.

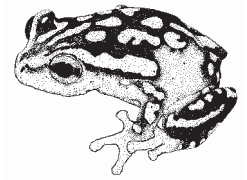
DAPTF Board Meeting 2003 Our annual Board meeting will be held in Manaus, Brasil, during the ASIH, HL and SSAR meeting. It will be at 1 pm on Friday 27th June. Our Board meetings are open and we welcome anyone who is interested in amphibian declines.

ANUNCIO: El **VI Simposio de Zoología** se efectuará en la Ciudad de la Habana, Cuba del 15 al 20 de noviembre del 2004. Cuota de inscripción: 120$USD. Conatcto para mayor información el Secretaria Ejecutiva: Dr. C. Daysi Rodríguez Batista (**zoología.ies@ama.cu**) o visite: **www.geocities.com/zoologia cubana/simposio**
ANNOUNCEMENT: The **VI Symposium of Zoology** will take place in Havana, Cuba, from November 15-20, 2004. Registration Fee: 120 $USD. For information details contact the Executive Secretary: Dr. C. Daysi Rodríguez Batista (**zoologia.ies@ama.cu**) or visit: **www.geocities.com/zoologia cubana/simposio**

Workshop for African Students From 1st to 5th April 2003, a workshop *Amphibian Monitoring Standards - a Workshop for African Students* was hosted by the National Museums of Kenya, BIOTA East Africa and the University of the Western Cape, with support from the DAPTF. It was attended by 21 students from Kenya, Tanzania, Uganda, Malawi and South Africa. It is hoped to hold other such meetings in the future.

Pathology and Medicine of Reptiles and Amphibians The 7th International Symposium on the Pathology and Medicine of Reptiles and Amphibians will be held in Berlin, April 16th to 18th, 2004. For further details, contact **info@pmra.de** or go to: **www.prama.de**

***Froglog* Cover Illustrations** We welcome the submission of good-quality line drawings by "guest artists" to feature on the front page of *Froglog,* such as those by Ruchira Somaweera which feature in this issue and the following one. These, and other submissions, can be sent to John Wilkinson at the address below (e-mail submissions in Word are preferred). Artist's name and caption/species should normally be separated from the illustration.



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FROGLOG is the bi-monthly newsletter of the Declining Amphibian Populations Task Force. *Articles on any subject relevant to the understanding of amphibian declines should be sent to:*
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