Biodiversity and Conservation
April 27-28, 2017 Dubai, UAE

Amphibian decimation, reduce biodiversity in Panama

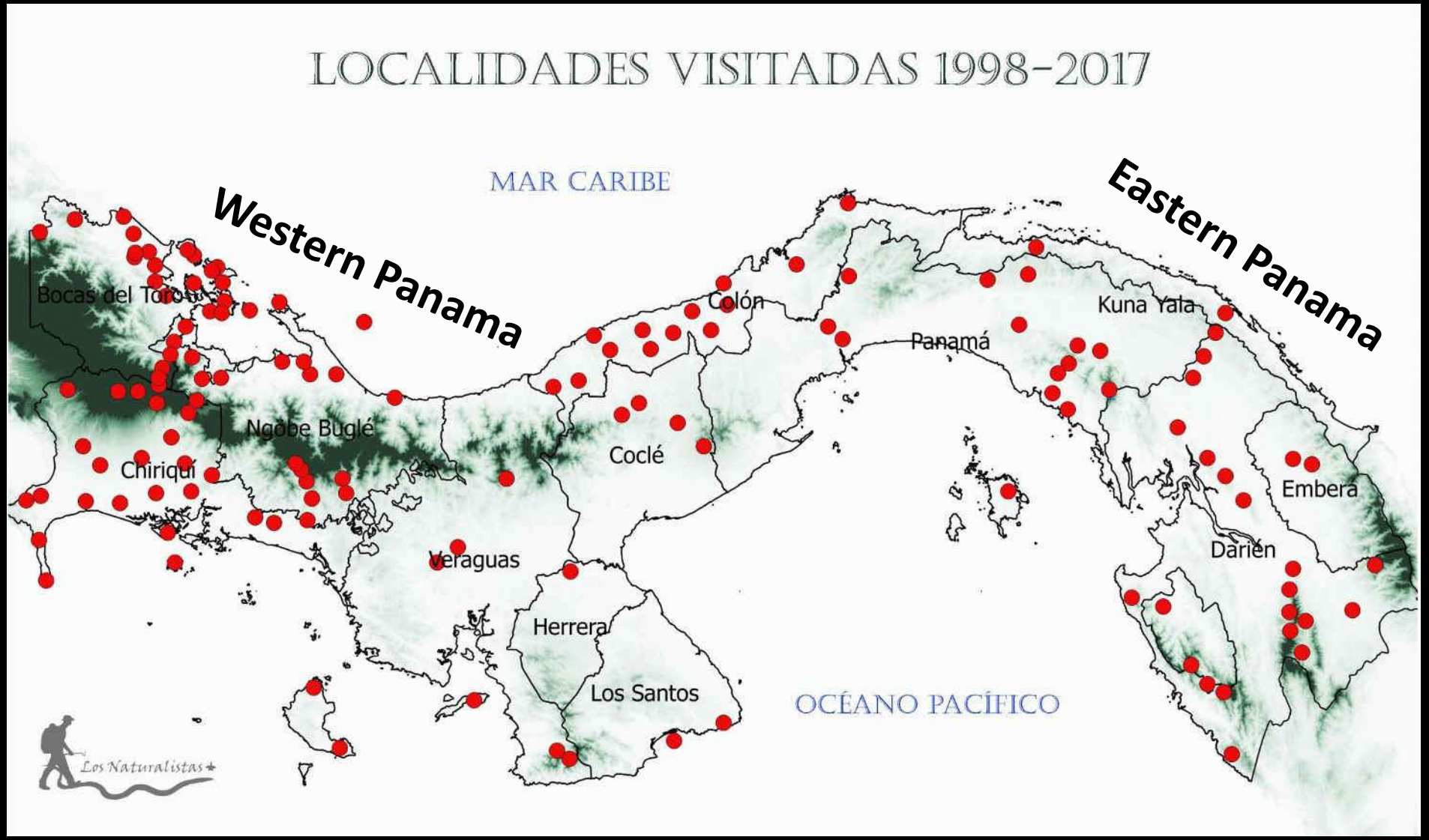
PhD Abel Batista

Los Naturalistas

UNIVERSIDAD AUTÓNOMA DE CHIRIQUÍ
-REPÚBLICA DE PANAMÁ-
1995
UNACHI

Sociedad Panameña de BIOLOGIA


Google Earth
Panamá
US Dept of State Geographer
Image Landsat / Copernicus
© 2016 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Fechas de imágenes: 12/13/2015 lat 8.423046° long -78.402571° alt. ojo 14523.07 km


LOCALIDADES VISITADAS 1998-2017
MAR CARIBE
Western Panama
Eastern Panama
Bocas del Toro
Colón
Kuna Yala
Panamá
Ngöbe Buglé
Coclé
Chiriquí
Embera
Veraguas
Darién
Herrera
Los Santos
OCÉANO PACÍFICO
Los Naturalistas

Joining the field!

Marcos Ponce

Madian Pamela

Michelle Quiróz

Milan Vesely

Konrad Mebert

Con las botas puestas

Supporting research

Amphibian species in Panama

Total species 219

- Frogs and toads 178
- Salamanders 30
- Caecilians 11

3% of the global diversity

16.8% endemics

IUCN category

Endangered 33 % + 13 % DD

LC 54 %

- CR (10.2%), EN (12.8%), VU (6.6%), NT (3.5) and DD (13.3)

Amphibians in the eye of the storm!

Decline of a Tropical Montane Amphibian Fauna

KAREN R. LIPS*
Department of Biology, University of Miami, Coral Gables, FL 33124, U.S.A.

Conservation Biology, Pages 106–117
Volume 12, No. 1, February 1998

Mass Mortality and Population Declines of Anurans at an Upland Site in Western Panama

KAREN R. LIPS*
Department of Biology, St. Lawrence University, Canton, NY 13617, U.S.A.

Conservation Biology, Pages 117–125
Volume 13, No. 1, February 1999

Up to 40% of the amphibian fauna have disappeared from some places!

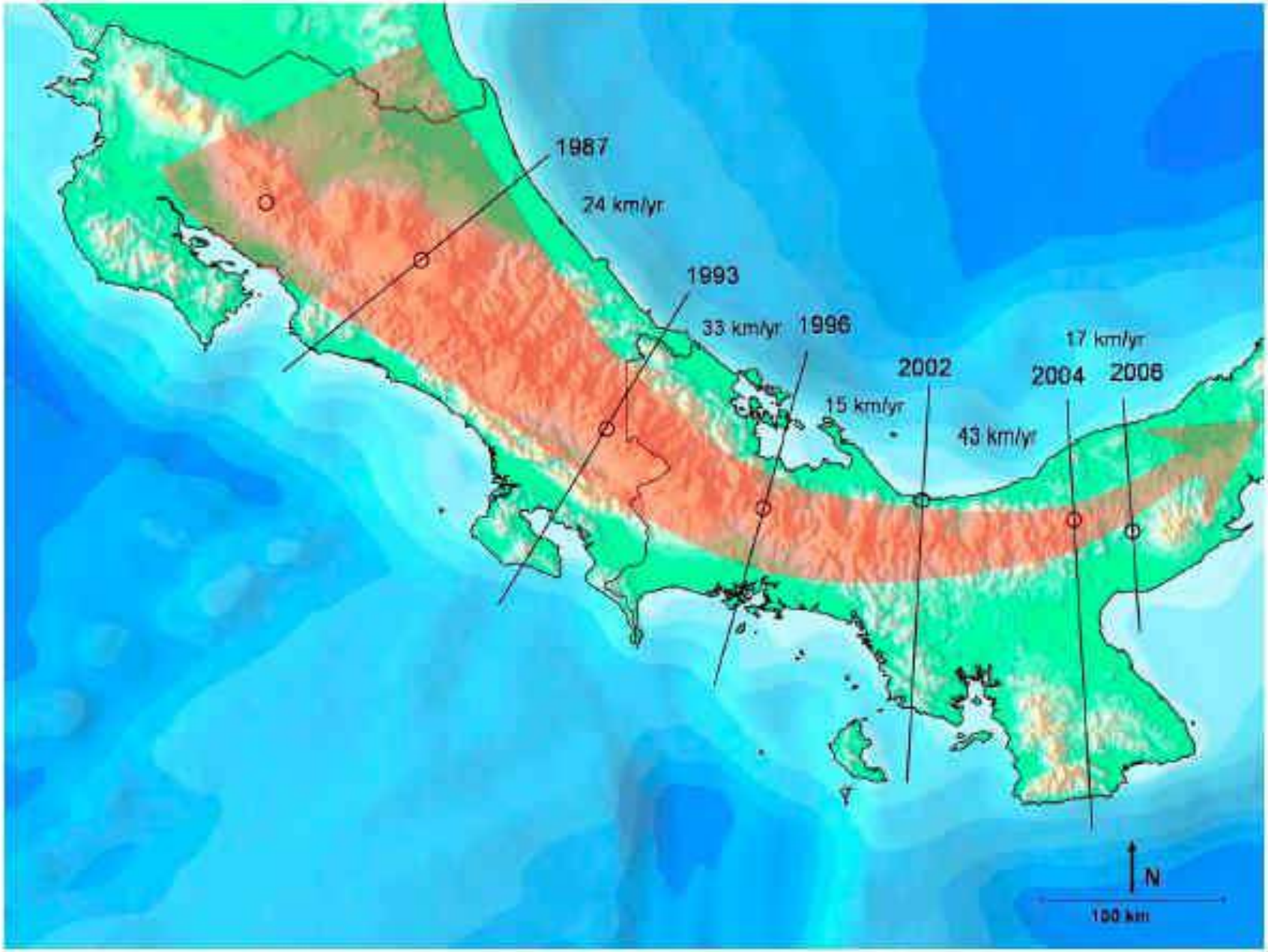


Figure 2. Map of Central American Spreading Wave (Wave 1) with DOD Sites Indicated and Rate of Spread

DOD sites are indicated by open circles. Black bars indicate the hypothesized leading edge of the wave of *Bd* in the year indicated.

doi:10.1371/journal.pbio.0060072.g002

Emerging infectious disease and the loss of biodiversity in a Neotropical amphibian community

Karen R. Lips*†, Forrest Brem*, Roberto Brenes*, John D. Reeve*, Ross A. Alford‡, Jamie Voyles§, Cynthia Carey§, Lauren Livo§, Allan P. Pessier¶, and James P. Collins||

PNAS | February 28, 2006 | vol. 103 | no. 9 | 3165–3170

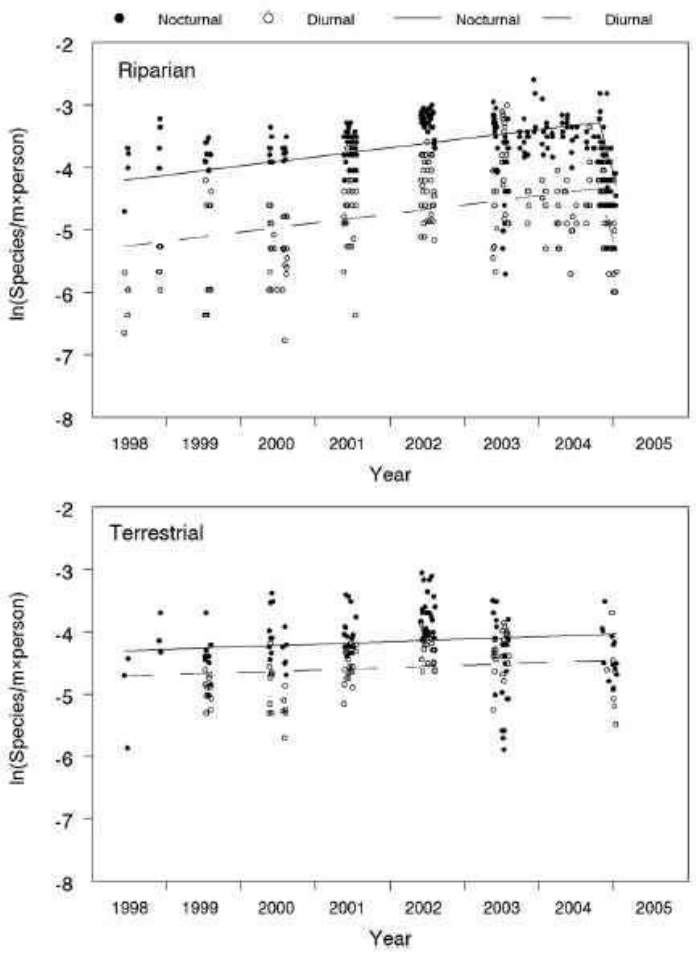


Fig. 4. Species richness and statistical models for riparian and terrestrial transects (1998–2005). By using the segmented linear model for the riparian transects, we found a highly significant difference (θ_2) in slope ($t = -6.97$, df = 486, $P < 0.0001$), with the estimated time of change (α) being October 22, 2004 (95% confidence interval, October 11–November 3, 2004). We could fit a linear model to only the terrestrial transects (see text for details). Diurnal transects were significantly lower in density than nocturnal transects ($t = -21.33$, df = 486, $P < 0.0001$ for riparian transects; $t = -6.14$, df = 212, $P < 0.0001$ for terrestrial transects).

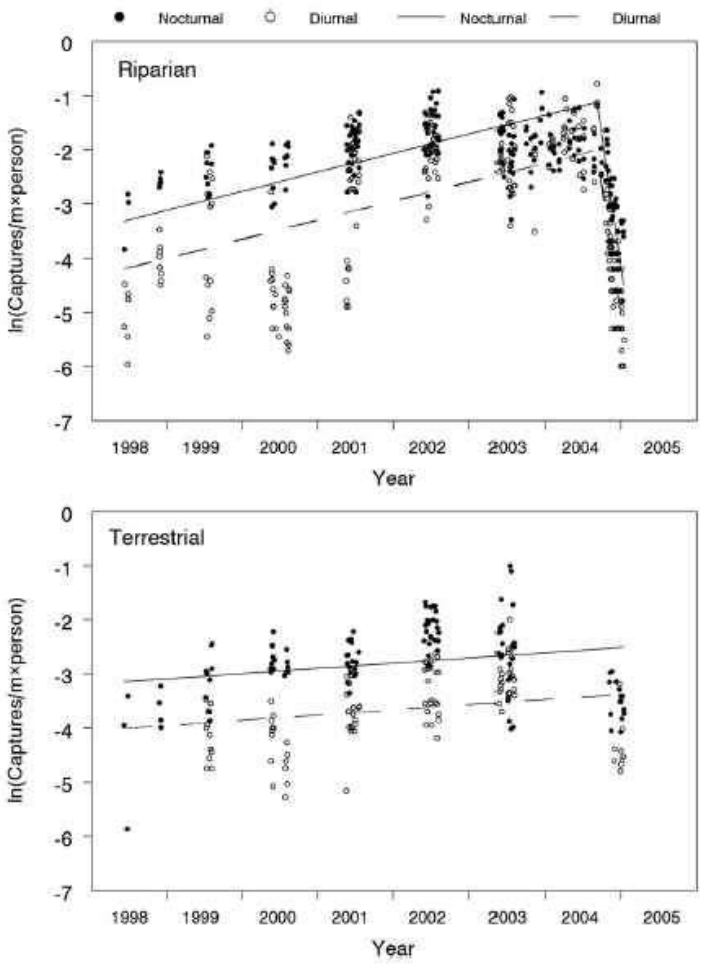


Fig. 3. Amphibian densities and statistical models for riparian and terrestrial transects (1998–2005). By using a segmented linear model for the riparian transects, we found a highly significant difference (θ_2) in slope ($t = -24.44$, df = 486, $P < 0.0001$), with the estimated time of change (α) being September 4, 2004 (95% confidence interval, September 1–6). We could fit a linear model to only the terrestrial transects (see text for details). Diurnal transects were significantly lower in density than nocturnal ones ($t = -13.05$, df = 486, $P < 0.0001$ for riparian transects; $t = -9.11$, df = 212, $P < 0.0001$ for terrestrial transects).

Western Panamenian species sweet and sour!

*Atelopus chiriquensis (CR)**

Rana arlequin de Chiriqui Chiriqui Harlequin Frog

Foto: Michael & Patricia Fogden/in T. Leenders 2016

*Oophaga speciosa (EN)**

*Oophaga arborea (EN)**

https://insearchofsmallthings.com/2016/01/05/oophaga-arborea-2/

*Atelopus limosus (CR)**
Rana Arlequín Limosa *Limosa Harlequin Frog*

Lazarus

Amphibians are under attack. Climate change, habitat loss and the effects of the deadly skin disease caused by the chytrid fungus have wiped out many frog and toad populations worldwide. Some entire species are missing, presumed dead. But in a few spots in the forests of Central America, a fightback has begun. Meet the Lazarus toads

Photographs by Clay Bolt and Twan Leenders.
Words by Catherine Brahic

In March 2013, Twan Leenders and a student were hiking in the Cocobolo reserve in central Panama when they spotted a precious jewel: a delicate string of white pearls floating at the bottom of a rocky puddle at a stream's edge. "That was absolutely tremendous," says Leenders. "Everything fit for *Atelopus*, there was nothing else it could be."

Leenders, a herpetologist at the Roger Tory Peterson Institute of Natural History in Jamestown, New York, has spent his career studying tropical frogs and toads. That had mostly meant documenting their astonishing decline. Climate change and human encroachment on the amphibians' favoured habitats were a major part of the problem – as was the advance of the deadly chytrid fungus.

Since the chytrid strain *Batrachochytrium dendrobatidis* was identified in 1999, it has been seen in amphibian populations across Europe, Africa, Australia and Central and South America. The fungus accumulates in the outer skin layers of amphibians, overstimulating production of the protein keratin and hardening the skin. That prevents ›

Atelopus limosus
Panama
Discovery of spawn from this toad species – known as "harlequin frogs" – (pictured in the main photo, left) in the streams of the Cocobolo reserve indicated the revival of a species thought almost gone. The toad's colourful skin harbours bacteria that produce a neurotoxin also found in blue-ringed octopuses and the notorious "fugu" pufferfish. Until the advent of chytrid, this was sufficient protection against most enemies.

Atelopus varius
Costa Rica
Before the arrival of the chytrid fungus, more than 100 populations of this harlequin species were once known in the mountains of Costa Rica and adjoining Panama. One population is now known to have survived and thrived in a single stream valley on an isolated mountain in Costa Rica's Pacific coastal plain. What conferred it with resistance to chytrid is a mystery.

*Isthmohyla graceae (CR)**

Lithobates vibicarius (CR)

Rana montañera

Foto: Carlos Saldaña

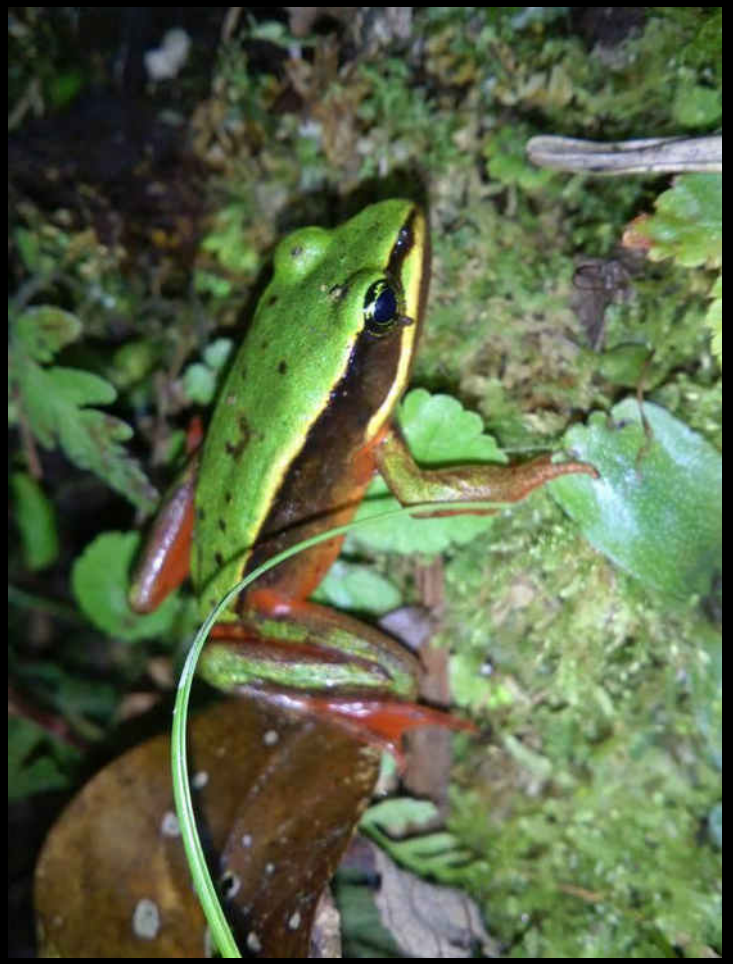


Foto: Probablemente
personal de Boquete zipline

*Bolitoglossa compacta (EN)**

Salamandra de Cerro Pando Cerro Pando Salamander

*Bolitoglossa magnifica (EN)**

Magnificent Web-Footed Salamander

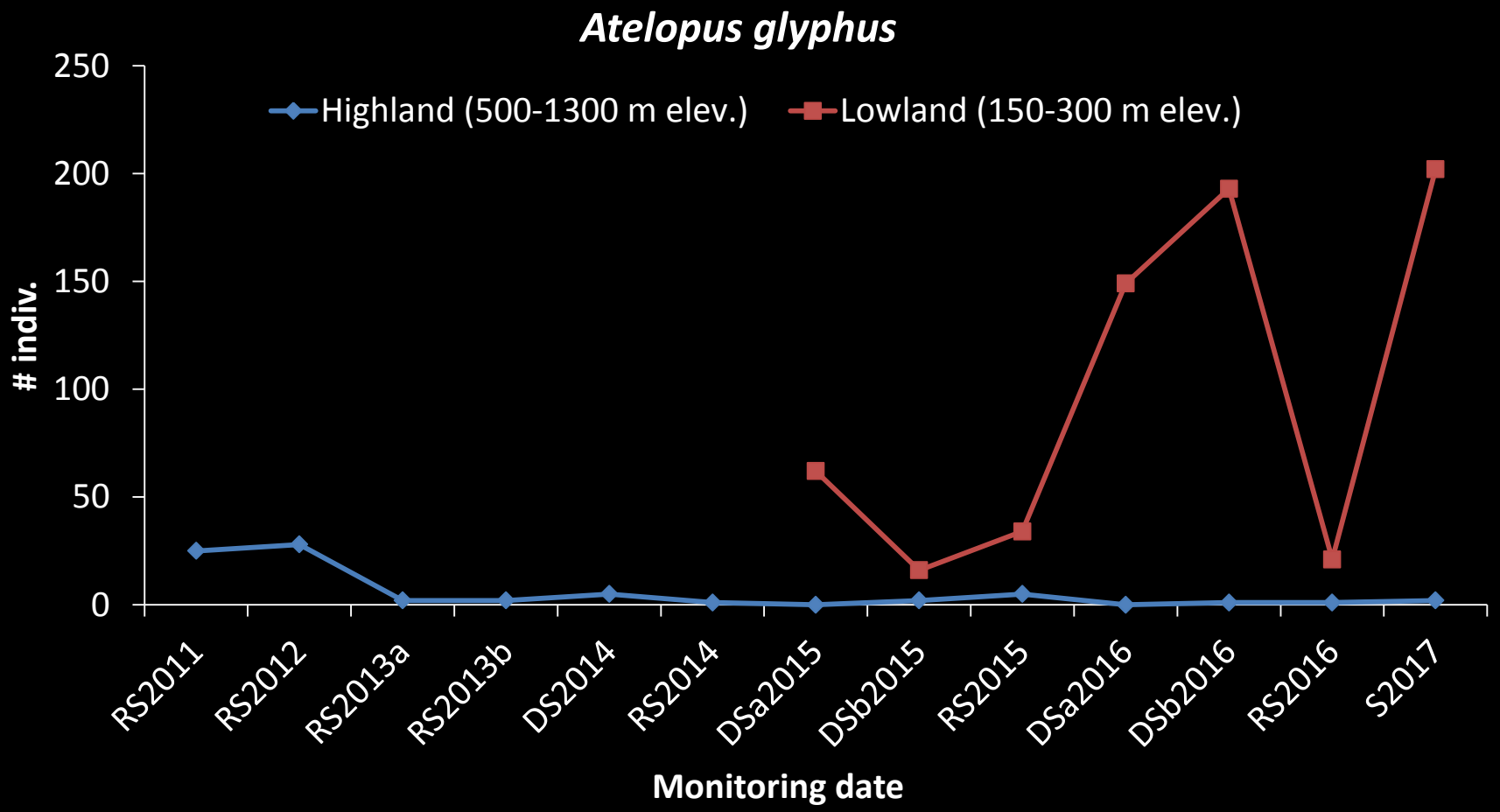
Eastern Panamenian species more sour than sweet!

*Atelopus certus (EN)**

Toad Mountain Harlequin Frog

Ecosistem indicators

Variation in number of individuals of *Atelopus glyphus,* per survey season at cerro Pirre eastern Panama, GEMAS, 2017.



Undescribed species, with no records since 2012

Undescribed species, still present.

Bolitoglossa chucantiensis recently described


Questions?

Anfibios en peligro/Endangered amphibians

Categoría UICN	UICN	EPLP
CR	25	37
EN	22	17
VU	7	37
NT	9	0
LC	111	0
DD	26	0
NE	21	1

En Panamá/In Panama

Official journal website:
amphibian-reptile-conservation.org

Amphibian & Reptile Conservation
9(2): 1–94 (e100).

A conservation reassessment of the Central American herpetofauna based on the EVS measure

[1]Jerry D. Johnson, [2]Vicente Mata-Silva, and [3]Larry David Wilson

[1,2]*Department of Biological Sciences, The University of Texas at El Paso, El Paso, Texas 79968-0500, USA* [3]*Centro Zamorano de Biodiversidad, Escuela Agrícola Panamericana Zamorano, Departamento de Francisco Morazán, HONDURAS*

THE HERPETOFAUNA OF PANAMA: DISTRIBUTION AND CONSERVATION STATUS

CÉSAR JARAMILLO[1,2,3], LARRY DAVID WILSON[4], ROBERTO IBÁÑEZ[1,3], AND FIDEL JARAMILLO[1,5]

EVS	N
L	60
M	67
H	66
NE	0