



Edited by Jennifer Sills

## Dams threaten rare Mekong dolphins

R. STONE'S IN DEPTH News story "Dam-building threatens Mekong fisheries" (2 December, p. 1084) explains why the scores of dams planned for the Mekong River are likely to have major impacts on eight of the world's largest freshwater fishes, all of which are already at risk of extinction. Stone does not mention the impacts on a critically endangered freshwater population of dolphins, *Orcaella brevirostris*, estimated to number only 85 individuals in 2010 (1). Although once widespread in the Mekong system, this dolphin's range in the river is now restricted to an area spanning from the main stem from Khone Falls (Pha Phen Falls) near the Laos-Cambodia border to about 200 km downstream in Cambodia.

Dams change the flow and seasonal dynamics of water and sediments that structure both upstream and downstream environments. The net effect is a reduction of the ecological niches available for freshwater biodiversity, including large mobile predators such as the Mekong's dolphins. The proposed dams would block movements of migratory fish and, if built downstream of Khone Falls, fragment the precariously small dolphin population. Local knowledge suggests that the Don Sahong dam under construction in Laos is already affecting the population (2), and the Lower Sesan 2 dam currently being built in Cambodia will have major impacts on dolphin habitat downstream. The proposed Sambor Dam in the Mekong's main stem in Cambodia would also eliminate

habitat and divide the dolphins into two smaller, isolated populations, thereby strongly compromising their chances of survival. These dams threaten to put additional stresses on this rare freshwater dolphin population, which already include incidental fishing mortality, vessel interactions, and historical hunting—a toxic mix that contributed to the recent extinction of China's endemic Yangtze River dolphin, or baiji, *Lipotes vexillifer* (3).

**Robert L. Brownell Jr.,<sup>1\*</sup> Randall R. Reeves,<sup>2</sup> Peter O. Thomas,<sup>3</sup> Brian D. Smith,<sup>4</sup> Gerard E. Ryan<sup>5</sup>**

<sup>1</sup>NOAA Fisheries, Southwest Fisheries Science Center, Monterey, CA 93940, USA. <sup>2</sup>Okapi Wildlife Associates, Hudson, QC, JOP 1H0, Canada. <sup>3</sup>Marine Mammal Commission, Bethesda, MD 20814, USA. <sup>4</sup>Wildlife Conservation Society, Ocean Giants Program, Bronx, NY 10460, USA. <sup>5</sup>School of BioSciences, University of Melbourne, VIC 2010, Australia.

\*Corresponding author.  
Email: robert.brownell@noaa.gov

### REFERENCES AND NOTES

1. G. E. Ryan *et al.*, *Ecosphere* **2**, 58 (2011).
2. S. Men, *Radio Free Asia*, 8 December 2016 ([www.rfa.org/english/news/cambodia/cambodia-villagers-say-dam-construction-is-forcing-endangered-dolphins-upstream-12082016162753.html](http://www.rfa.org/english/news/cambodia/cambodia-villagers-say-dam-construction-is-forcing-endangered-dolphins-upstream-12082016162753.html)).
3. S. T. Turvey *et al.*, *Biol. Lett.* **3**, 537 (2007).
4. The conclusions, as well as any views or opinions expressed herein, are those of R.L.B. and do not necessarily reflect the views of NOAA or the Department of Commerce.

10.1126/science.aam6406

## Photos belong in the taxonomic Code

THE 2015 PUBLICATION of a photography-based description of a new fly species (1) kicked off a debate in the scientific community: Must a new species description

The rare Irrawaddy dolphin (*Orcaella brevirostris*) lives in an ever-shrinking area of the Mekong River.

include a specimen deposited in a museum, or is a photograph sufficient (2–6)? A large group of taxonomists advocate including at least one specimen (2, 4, 6), based on an interpretation of the *International Code of Zoological Nomenclature* (7). Meanwhile, a growing number of scientists argue that, in special circumstances, some taxa can be described without preserved specimens (1, 5). So far, the debate has focused on taxonomical groups for which it is easy to justify requiring a preserved specimen. It is important to consider that for some species, traditional preservation techniques are ineffective.

In the case of soft-bodied meiofaunal animals (small invertebrates that live in marine and freshwater sediments, such as gastrotrichs), specimens deteriorate and most of their diagnostic characteristics vanish soon after preservation. Depositing sharp photographs and movies instead, as has been done in some of the recent records, is informative and long-lasting, allowing a timeless and correct identification of meiofaunal taxa (8, 9). However, the *Code* does not state that movies or photographs can serve as the primary identification for such organisms.

While the current debate focuses on the interpretation of the *Code* itself, biological diversity is being neglected. In a world where new technologies and information exchange are on the rise, scientists should be open to discussing the standard practices in taxonomy and whether they are adequate for diverse biological groups. We suggest a revision of the *Code* to allow museum deposits of good-quality photographs or movies as primary types for meiofaunal organisms whose material types will be inevitably lost. This change would allow valid species descriptions within these groups without violating the *Code*.

**André Rinaldo Senna Garraffoni\* and André Victor Lucci Freitas**

Animal Biology Department, University of Campinas, 13083-872 Campinas SP, Brazil.

\*Corresponding author. Email: arsg@unicamp.br

### REFERENCES

1. S. A. Marshall, N. L. Evenhuis, *ZooKeys* **525**, 117 (2015).
2. D. S. Amorim *et al.*, *Zootaxa* **4137**, 121 (2016).
3. *Nature* **535**, 323 (2016).
4. L. P. C. Ceríaco *et al.*, *Zootaxa* **4196**, 435 (2016).
5. T. Pape, *Nature* **537**, 307 (2016).
6. C. M. D. Santos *et al.*, *Syst. Entomol.* **41**, 511 (2016).
7. International Code of Zoological Nomenclature ([www.iczn.org/iczn/index.jsp](http://www.iczn.org/iczn/index.jsp)).
8. M. A. Todaro *et al.*, *PLOS ONE* **10**, e0130278 (2015).
9. A. R. S. Garraffoni *et al.*, *Mar. Biodiv.* **10**, 1007/s12526-016-0486-1 (2016).

10.1126/science.aam7686

## Lee Rubin: Our mentor and role model

IN HER NEWS FEATURE “Out of bounds” (27 January p. 339), A. McCook strove to present an objective narrative of the situation in which a student at Harvard University was forced to undergo a psychiatric evaluation and then filed a court order against scientist Dr. Lee Rubin. However, McCook failed to take into consideration Rubin’s longstanding reputation as a scientist and a mentor. We are scientists who have worked with, been mentored by, or collaborated with Rubin. Some are current members of his laboratory, some have known him for many years, and a few have known him for more than 30 years. We could not let this story stand without adding our perspective.

Rubin’s scientific reputation can be readily appreciated simply by skimming through the list of his stellar publications. However, a dry bibliography fails to illuminate the quality of the scientist behind the science. Rubin has always upheld the highest standards of scientific and personal integrity. His kindness and concern for the personal well-being and professional development of his graduate students, and indeed everyone in his laboratory, has always been clearly evident. Rubin has always had our backs, whether as a mentor, a colleague, a boss, or a friend. He upholds the highest standards of scientific rigor while providing compassionate mentorship. His commitment to leading by example means we place the highest value on our friendship and connections with him. We have sought out his scientific counsel and, in several cases, engaged in collaborations that span many years. We feel fortunate to have had the opportunity to know and to work with him. It is our collective experience that besides being an outstanding scientist, he is a warm and caring scientific mentor who does not deserve to have the reputation he has built over 40 years or more besmirched.

**Chantal Bazenet,<sup>1</sup> Howard Desmond,<sup>2</sup> Eric Frank,<sup>3</sup> Patrick Doherty,<sup>2</sup> Andreas Eilers,<sup>4</sup> Christine Gatchalian,<sup>5</sup> Marcie Glicksman,<sup>3</sup> Piotr Graczyk,<sup>6</sup> Fabian Gusovsky,<sup>3</sup> Jonathan Ham,<sup>2</sup> David Kaplan,<sup>7</sup> Michael Klymkoswsky,<sup>8</sup> Karen Kotkow,<sup>9</sup> Richard Krolewski,<sup>9</sup> Paul Lang,<sup>3</sup> Alison Linsley O’Neil,<sup>9</sup> Mary Jane McCarthy,<sup>10</sup> Karina Meiri,<sup>3\*</sup> Freda Miller,<sup>7</sup> Monica Mota Neumage,<sup>11</sup> Ceren Ozek,<sup>9</sup> Karen Philpott,<sup>12</sup> Silvia Piccinotti,<sup>9</sup> Feodor Price,<sup>9</sup> Martin Raff,<sup>2</sup> Marianne Ratcliffe,<sup>13</sup> Jane Relton,<sup>9</sup> Ken Rhodes,<sup>14</sup> James Schwob,<sup>3</sup> Caroline Smales,<sup>2</sup> Terrence Smith,<sup>15</sup>**

**Cesare Spadoni,<sup>16</sup> Joanne Taylor,<sup>2</sup> Kostas Vekrellis,<sup>17</sup> Jonny Whitfield<sup>18</sup>**

<sup>1</sup>Hamburg, Germany, <sup>2</sup>London, UK, <sup>3</sup>Boston, MA, USA, <sup>4</sup>Darmstadt, Germany, <sup>5</sup>Los Angeles, CA, USA, <sup>6</sup>Krakow, Poland <sup>7</sup>Toronto, ON, Canada, <sup>8</sup>Boulder, CO, USA <sup>9</sup>Cambridge, MA, USA, <sup>10</sup>Wellington, New Zealand, <sup>11</sup>Drohn, Germany, <sup>12</sup>St. Albans, UK, <sup>13</sup>Nether Alderley, UK, <sup>14</sup>Belmont, MA, USA, <sup>15</sup>Bath, UK, <sup>16</sup>Budapest, Hungary, <sup>17</sup>Athens, Greece, <sup>18</sup>Barcelona, Spain.

\*Corresponding author.  
Email: karina.meiri@tufts.edu

10.1126/science.aam8703

### TECHNICAL COMMENT ABSTRACTS

#### Comment on “Ducklings imprint on the relational concept of ‘same or different’”

**Jean-Michel Hupé**

Martinho and Kacelnik’s (Reports, 15 July 2016, p. 286) finding that mallard ducklings can deal with abstract concepts is important for understanding the evolution of cognition. However, a statistically more robust analysis of the data calls their conclusions into question. This example brings to light the risk of drawing too strong an inference by relying solely on *P* values.

Full text at <http://dx.doi.org/10.1126/science.aah6047>

#### Comment on “Ducklings imprint on the relational concept of ‘same or different’”

**Jan Langbein and Birger Puppe**

Martinho and Kacelnik (Reports, 15 July 2016, p. 286) reported that newly hatched ducklings imprinted on relational concepts. We argue that reanalyzing the data at the individual level shows that this conclusion cannot be applied for all sets of stimuli presented and that the ability to grasp relational concepts is limited to the stimulus category that is most beneficial for survival.

Full text at <http://dx.doi.org/10.1126/science.aai7431>

#### Response to Comments on “Ducklings imprint on the relational concept of ‘same or different’”

**Antone Martinho III and Alex Kacelnik**

Two Comments by Hupé and by Langbein and Puppe address our choice of statistical analysis in assigning preference between sets of stimuli to individual ducklings in our paper. We believe that our analysis remains the most appropriate approach for our data and experimental design.

Full text at <http://dx.doi.org/10.1126/science.aai8397>



**Dams threaten rare Mekong dolphins**

Robert L. Brownell Jr., Randall R. Reeves, Peter O. Thomas, Brian D. Smith and Gerard E. Ryan (February 23, 2017)

*Science* **355** (6327), 805. [doi: 10.1126/science.aam6406]

Editor's Summary

---

This copy is for your personal, non-commercial use only.

---

- Article Tools** Visit the online version of this article to access the personalization and article tools:  
<http://science.sciencemag.org/content/355/6327/805.1>
- Permissions** Obtain information about reproducing this article:  
<http://www.sciencemag.org/about/permissions.dtl>

*Science* (print ISSN 0036-8075; online ISSN 1095-9203) is published weekly, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. Copyright 2016 by the American Association for the Advancement of Science; all rights reserved. The title *Science* is a registered trademark of AAAS.