



FROGLOG

IUCN/SSC Declining Amphibian Populations Task Force

December, 1992, No. 4



Coordinator's Column

There have been some important recent changes in the DAPTF organization.

In October Robert Johnson, Curator of Amphibians and Reptiles at the Metropolitan Toronto Zoo, assumed the chair of the Task Force, succeeding David B. Wake who completed his tenure last July, but who will remain as a Board member. Dr. Johnson has been a member of the Board of Directors since the Task Force was activated; he brings a wealth of leadership experience with multinational conservation programs to this assignment.

Michael Unsworth recently assumed the position of Director at the Center for Analysis of Environmental Change, thus replacing William Winner as a Board member of the DAPTF. Dr. Unsworth was formerly with the University of Nottingham, UK, as Professor of Environmental Physics, Department Head and Dean, Faculty of Agriculture and Food Science. He is known world-wide for his research and administration activities on a variety of environmental issues.

Until September 1, when Lorelei Saylor joined the Coordinator's Office as Research Assistant/Systems Manager, this position was staffed with temporary personnel. Lorelei completed her B.A. in Environmental Studies and Biology at the University of California, Santa Cruz, and researched amphibian populations for her senior thesis. Her appointment as a "regular" will greatly improve the efficiency and continuity of our communications systems.

In FROGLOG Nos. 2 and 3 we identified several grant programs relevant to the DAPTF mission. To make the most of these opportunities it is imperative to present our activities as a series of concerted, collaborative projects, rather than independent, detached efforts. To this end I am requesting all Working

Group Chairs, as well as National and Regional Coordinators in the Task Force, to provide my office with a list of (1) "target species" - those having significant population declines, or are considered "sensitive," threatened or endangered; and (2) critical habitats - "hot spots" of recognized fragility or limited area inhabited by amphibian populations.

Our real and urgent need is to identify priority projects and potential Principal Investigators we can support with Task Force seed grant dollars, while concurrently formulating grant proposals for extended funding. By uniting diverse assessment projects within the global mission of the DAPTF we can not only expand our resource potential but also our chances for success.



Major Grant Awarded Lower Central America Working Group

Dr. Jay M. Savage, at the University of Miami, in Coral Gables, Florida, USA, and Chair of the Declining Amphibian Populations Task Force, Working Group for Lower Central America, was recently awarded a two year grant to study "Declining Amphibian Populations in Lower Central America: Evaluation of the Phenomenon and its Possible Causes," beginning in January, 1993. Funding for the project is being provided by the U.S. National Science Foundation (\$195,000) and the U. S. Agency for International Development (\$115,000).

Dr. Savage will be Principal Investigator, Dr. Maureen A. Donnelly, also of the University of Miami, will be Project Director and coordinate field work, data collection and analysis, as well as manuscript preparation. Drs. Savage and Donnelly will work closely with field collaborators Dr. Roberto Ibañez D. (Panamá) and Lic. Federico Bolaños (Costa Rica). Other members of the Working Group include Drs. Martha Crump, George Gorman, J. Alan Pounds, A. Stanley Rand, and David B. Wake.

The operations in Panamá and Costa Rica, where amphibian declines were among the first to be recognized, will include: (1) resampling of previously in-

vestigated sites employing the originally used quantitative methods; (2) sampling of sites through several seasons; (3) establishing transects for repeated sampling at specific altitudes in areas of obvious declines and where declines have not been evidenced, and (4) sampling individual species believed to be particularly sensitive to environmental deterioration.

Data obtained during the two years will allow Savage and his collaborators to demonstrate conclusively the extent of declines, whether the entire amphibian assemblage or only a subset is affected, and if the apparent difference between upland (marked declines at many localities) and lowland (no clear declines overall) sites is real. Additionally, this group will gather data on soil and/or water acidification, ultraviolet radiation, exotic fish introduction, and the frequency of El Niño-Southern Oscillation events to determine if these factors can be correlated with observed changes in amphibian population sizes. This project will be the first to apply a repeatable standardized quantitative approach to the study of declining amphibian populations and may provide a model for investigations of the phenomenon in other regions.

Edited from a report submitted by J.M. Savage



Seasonal Field Herpetologists Sought

The United States National Park Service is planning a survey of amphibians in California parks. Field work will be conducted from February to September, beginning in 1993. Several 0.7 FTE positions at GS-5 level (\$1,475/mo.) and one GS-7/9 (\$1,825-2,235) for 1-3 years are anticipated, depending on funding. Applicants should have a B.S. or graduate degree in biology and/or 1-2 years field experience with herptiles, preferably amphibians. Information on how to apply will be sent to those who submit *only* a two-page résumé (including phone) to: Dr. Gary M. Fellers, Point Reyes National Seashore, Point Reyes, CA 94956, USA (phone: 415-663-8522).



Canada Continues Compilation

Members of the Task Force's Canadian Working Group met during October 17-18 at McGill University, Montreal, Quebec Province, to report their activities during the past year and evaluate the status of amphibians in Canada.

Biologists with the Canadian Wildlife Service (CWS) reported severely reduced levels of corticosteroids in "mudpuppies" (*Necturus*) from the St. Lawrence River. Depression of these chemicals that regulate metabolism, growth and reproduction raises concern about the impact of chlorinated hydrocarbons upon the health of amphibians. A field study of 122 ponds in south-western Ontario confirmed the devastating impact upon amphibian populations by introduction of sport fish such as bass and trout. Research is continuing on the effects of logging upon salamanders in British Columbia. Both the CWS and New Brunswick Museum are investigating effects of aerial spraying on mink frogs in Atlantic forests. Over the past year volunteers have been recruited in five provinces to monitor amphibian populations; and the Metropolitan Toronto Zoo has begun an "Adopt a Pond" program involving 5,000 school children who, with their teachers, study and learn about the amphibian occupants.

The Working Group revised its action plan to organize more effectively its coordination of effort, communication, funding strategy and research activities.

Edited from a report
submitted by C. Bishop and D. Green



Abstracts from Recent Meetings

The following abstracts have been taken from the Program for the 35th Annual Meeting of the Society for the Study of Amphibians and Reptiles (SSAR) held in August, 1992, at the University of Texas, El Paso, Texas, USA.

DECLINING AMPHIBIAN POPULATIONS IN PUERTO RICO

In the last 10 years declining amphibian populations have been reported from all parts of the world. Puerto Rico is no exception to this global trend. In the last 10 years some of our amphibian species have experienced drastic population declines. A survey of the population status of five endemic Puerto Rican frogs *Eleutherodactylus jasperi*, *E. karlschmidti*, *E. eneidae*, *E. richmondi*, and *E. locustus* has been conducted since August 1989.

The main geographical areas sampled are the Sierra de Luquillo (El Yunque) and the Sierra de Cayey. No extant populations of the first three species have been found. At El Yunque, *E. richmondi* has disappeared from the high elevations and *E. locustus* has been found in low numbers in very few localities. There are serious concerns that these species have been driven to the brink of extinction by either habitat alteration, acid rain, pollution, over collection and/or introduced species.

Presented by P.A. Burrowes and R. L. Joglar; Dept. of Biology, Univ. of Puerto Rico, Rio Piedras, P.R., USA.

LABORATORY AND FIELD EVALUATION OF EFFECTS OF PIT TAGS

I tested the effects of implanting passive integrated transponders (PIT tags) on *Bufo woodhousei* in the laboratory and on a population of *B. boreas* in the field. On 31 May 1991, I placed 18 *B. woodhousei* into 6 37-l aquaria in a randomized block design. PIT tags were implanted subcutaneously in 6 toads, 6 toads were toe-clipped, and 6 toads were left untreated as controls. The aquaria were housed in a chamber with controlled photoperiod (14L:10D) and temperature (25°L:15°D), and toads were supplied with crickets *ad libitum*. Initial sizes of toads in the three groups were not different, but after 6 weeks, 5 surviving toads with PIT tags had lost an average of 1.3g, while 5 surviving toads with toe clips gained an average of 13.0g, and 4 surviving control toads gained an average of 14.4g ($F = 4.89$, 2, 6df, $P=0.055$). I also implanted PIT tags in 231 *B. boreas* at Lost Lake in Rocky Mountain National Park in 1991. Toads recaptured in 1991 displayed no overt signs of adverse effects of PIT tags. I am testing long-term effects by comparing overwinter mortality and the length-mass relationship of toads with and without PIT tags. Initial results do not demonstrate an effect by PIT tags on mortality or health of *B. boreas*.

Presented by P.S. Corn; U.S. Fish and Wildlife Service, 4512 McMurry Ave., Ft. Collins, CO 80525-3400, USA.

EFFECT OF URBAN DEVELOPMENT ON THE ANURAN COMMUNITY IN WEST CENTRAL FLORIDA

Fragmentation of natural habitats may have detrimental effects on the herpetofaunal community. Six wetlands within a residential development were studied and compared with similar wetlands at a nearby natural park for anuran species. Individuals were captured using a system of drift fences and pitfall traps combined with window-screen funnel traps. Trapping was supplemented with transects and road cruising on rainy nights.

Species richness was higher in the wetlands of the natural park (15 species)

than in the wetlands of the development (11 species). In the wetlands of the development, characteristic species of the original natural environment (wetlands within pine flatwood habitat) such as *Bufo quercicus*, *Scaphiopus holbrooki*, *Hyla gratiosa*, and *Hyla femoralis* were conspicuously missing. The relative densities of the 11 species shared by both study sites also were significantly different.

Presented by P. Delis; Dept. of Biology, Univ. of So. Florida, Tampa, FL, USA.

DISAPPEARANCE OF THE CASCADES FROG, *Rana cascadae*, AT THE SOUTHERN END OF ITS RANGE

Data from historic accounts and museum records indicate that *Rana cascadae* was once an abundant frog at the southern end of its range. Early biologists could sometimes find 40 or more frogs at some sites. We conducted intensive searches at all 16 historic sites in the vicinity of Lassen Volcanic National Park, California where *R. cascadae* had previously been recorded, plus 34 additional sites with suitable habitat. Only two *R. cascadae* were found at a single locality. This represents a precipitous decline over a period of <15 years. The decline seems to have been caused by a combination of local factors, including 1) the presence of non-native, predatory fish which have restricted available habitat and limited dispersal of frogs; 2) the gradual loss of open meadows and associated aquatic habitats; and 3) the loss of breeding habitat due to a five year drought. The decline of *R. cascadae* suggests that some common management practices in parks and wilderness areas may be endangering some of the species these areas are intended to protect. Similar local factors may account for amphibian declines reported elsewhere and should be carefully evaluated along with possible global effects.

Presented by G. Fellers¹ and C. Drost²; ¹Pt. Reyes Nat'l. Seashores, Pt. Reyes, CA and ²Cooperative Parks Studies Unit, Univ. of Calif., Davis, CA, USA.

DISTRIBUTION AND HABITAT CHARACTERISTICS OF RANID FROGS IN THE EL PASO AREA.

Field studies to determine the presence of larval populations of three ranid frogs historically known to live in the El Paso, Texas region were conducted between April 1990 and September 1991. The study area roughly paralleled the Rio Grande and extended from Old Mesilla, New Mexico to Ft. Quitman, Texas. The results of the sampling suggested that *Rana pipiens* was not found in the study area, that *R. berlandieri* was present in the Ft. Hancock region in Hudspeth County, Texas, and that *R. catesbeiana* was distributed throughout the study area.

At most sites where larvae or metamorphosed specimens were taken, water samples were collected and measurements of temperature, conductance, salinity, pH, dissolved oxygen, carbon dioxide, acidity, alkalinity, and hardness were obtained. These data were compared with surface water standards set by the Texas Water Commission, July 1991. Analyses of the water data indicated that conductance, salinity, temperature, and pH were within TWC standards. Water in the study area tended to be alkaline and "very hard" and DO levels were frequently below standards.

Presented by M. Jackson; Dept. of Biol., Univ. of Texas, El Paso, TX 79969, USA

POPULATION FLUCTUATIONS OF *Eleutherodactylus coqui* AT EL YUNQUE, PUERTO RICO

In order to distinguish natural fluctuations from declining amphibian populations a long term study of the activity patterns of *Eleutherodactylus coqui* was conducted at El Yunque, Puerto Rico. A 300 m² transect was established in the Palo Colorado Forest at 650 m above sea level. During a three year period the transect was sampled twice a month, specifically during nights of full moon and new moon. Densities of adults, juveniles and egg clutches follow a particular yearly pattern that is correlated with precipitation and air temperature. Lower densities are found from January to March when precipitation and air temperatures decrease. Lunar phases also have a direct effect on amphibian activity at El Yunque. On nights of full moon, the number of active frogs is significantly lower than on nights of new moon. Unlike other species, *E. coqui* adjusted to severe habitat destruction caused by Hurricane Hugo.

Presented by R.L. Joglar and P.A. Burrowes; Dept. of Biology, Univ. of Puerto Rico, Rio Piedras, P.R., USA.

ECOLOGY OF THE NATTERJACK TOAD (*Bufo calamita*) IN HIS ALTITUDINAL LIMIT (SIC)

Distribution, biometry, activity, habitat use, diet and reproduction of *Bufo calamita* were studied in "Sierra de Gredos" (Central mountains of Spain) in one of the highest known localities for this species. Toads were collected for several years in three different altitudinal localities. Diet (percentage of each prey-item, presence and volume) has been analyzed, including its seasonal and altitudinal variation. Prey selection was established in base to prey availability in the field. *Bufo calamita* is an active forager and selects prey as beetles, ants and insects larvae. Gonadal cycle, number of eggs and other characteristics of the reproduction are also reported in this explosive breeder.

Presented by R. Martin-Sanchez¹ and M. Lizana^{1,2}; ¹Dept. of Animal Biol., Univ. of Salamanca, Spain and ²Mus. Nat. Hist., Univ. of Kansas, Lawrence, KS, USA.

STATUS AND HABITAT OF THE FLATWOODS SALAMANDER, *Ambystoma cingulatum*, IN THE NATIONAL FORESTS IN FLORIDA, WITH MANAGEMENT RECOMMENDATIONS

The flatwoods salamander is believed to have undergone a rangewide population decline as a result of habitat conversion for silviculture, agriculture, and residential and commercial development. Consensus opinion of southeastern herpetologists convened by the U.S. Fish and Wildlife Service in January 1991 indicated that federal listing of the flatwoods salamander as threatened is appropriate. As part of an ongoing survey of the flatwoods salamander in Florida, ephemeral wetlands within the Apalachicola and Osceola National Forests were sampled for larval flatwoods salamanders during the winters of 1991 and 1992. Larval presence/absence was determined by dipnet surveys. Ponds and surrounding terrestrial habitats were characterized qualitatively, and the faunal associates of larval salamanders identified. Survey results and effects of forest management on the flatwoods salamander will be discussed, and management recommendations will be provided.

Presented by J.G. Palis; Florida Natural Areas Inventory, Tallahassee, FL, USA.

EXPLOSIVE BREEDING AGGREGATIONS AND PARACHUTING BEHAVIOR IN A NEOTROPICAL FROG, *Agalychnis saltator*, (HYLIDAE)

Agalychnis saltator gathers in spectacular and chaotic breeding aggregations on lianas above temporary swamps. Explosive breeding aggregations that form only after heavy rains may serve several functions including pre-mating reproductive isolation, predator saturation, and the assurance of full swamps for larval development after hatching. *A. saltator* descends to breeding aggregations by parachuting and rapidly ascends back into canopy trees by hand-over-hand locomotion up lianas. Parachuting behavior and the opposable digits used in walking locomotion have evolved in arboreal frogs in the lowland tropics of both Asia and the Americas. Neither of these traits is known from African frogs, despite extensive lowland forests and the presence of two families of arboreal frogs with toe pads and webbed digits. The differences in the frog faunas among these continents may be related to differences in liana densities of tropical forests.

Presented by W.E. Roberts; Museum of Vertebrate Zoology, Univ. of Calif., Berkeley, CA, USA.

Bufo americanus TADPOLES DO NOT AVOID LEAD-CONTAMINATED WATER

American toad, *Bufo americanus*, tadpoles were exposed to 500, 750, or 1000 ug as lead nitrate for 144 h. Previous studies have shown that similar exposure of green frog, *Rana clamitans*, tadpoles to 1000 or 750 ug Pb/L and of bullfrog, *R. catesbeiana*, tadpoles to 625, 750, or 1000 ug Pb/L interferes with both learning acquisition and retention; neither species avoids these Pb concentrations. We examined the preference avoidance responses of metal-exposed and unexposed *Bufo* tadpoles to plumes of Pb-enriched water at each concentration in an octagonal fluvium. In no instance was there an overt indication of detection of Pb or obvious behavioral stress by tadpoles when they entered the plumes of Pb-contaminated water.

Presented by D.A. Taylor, C. Steele and S. Strickler-Shaw; Dept. of Zoology, Miami University, Oxford, OH, USA.

CALLING SITE FIDELITY IN A STREAM-BREEDING TOAD

Males in a marked population of arroyo toads (*Bufo microscaphus californicus*) display varying degrees of calling site fidelity: 10 of 22 repeatedly-recaptured males were sedentary over a two month period, while 12 relocated 1-5 times each, traveling up to 0.8 mile along the stream. Upstream or downstream movements and reversals were equally likely. Larger males were marginally more likely to move, apparently as linked to mating success: all males seen in amplexus moved to a new pool soon thereafter. Female and subadult toads were strictly sedentary. Within a pool the same calling sites were regularly used by all males (whether residents or transients), whether or not another male or a previously-laid clutch was present. Call site selection appears to be based on criteria of suitability for clutch placement rather than on call transmission features.

Presented by S.S. Sweet; University of California, Santa Barbara, CA, USA.

BEHAVIORAL HYPOTHERMIA IN DEHYDRATED *Bufo valliceps*

The selection of a preferred body temperature can be influenced by many different environmental and physiological parameters. Although there have been several reports on the factors influencing anuran temperature selection, accounts incorporating a reliance on hydration state are lacking. The purpose of this study was to determine if *Bufo valliceps* uses behavioral hypothermia during a decreased hydration state. A thermal gradient and thermal telemetry were used to detect differences in temperature selection of "hydrated" and "dehydrated" *Bufo valliceps*. Results showed that toads dehydrated to 77-87% of their standard mass actively selected a mean body temperature 5.9 C lower than 100% hydrated toads.

Dehydrated toads achieved a lower body temperature that minimized the rate at which body water was lost to the atmosphere by evaporation. This behavioral hypothermia provided a mean reduction in water loss by 54%. Therefore, this form of thermoregulation would decrease the threat of lethal dehydration.

Presented by A.A. Williams and M.L. Wygoda, McNeese State University, Lake Charles, LA, USA.

PREDATION ON RINGED SALAMANDER LARVAE

Predation on larval *Ambystoma annulatum* was studied. The following predators, which are normally present in *A. annulatum* breeding ponds during larval development, were studied: Dragonfly nymphs (*Anax* and *Tamea*), waterbugs (*Belostoma*), backswimmers (*Notonecta*), water scorpions (*Ranatra*), diving beetles (*Dytiscus*), and newts (*Notophthalmus*). Five larvae and one predator were placed into each of 35 containers. Five containers with no predators served as controls. The containers were checked every 24 h for 5 days. The number of larvae eaten each day was recorded, the number of larvae was brought back up to 5/container, and the old predator was replaced with a new one. The procedure was initiated in Sept. (SVL=7-8 mm) and repeated in Oct. (SVL=13-15 mm), Nov. (SVL=21-23 mm), and Mar. (SVL=28-30 mm). No mortality occurred in the control or March groups. A 3-way ANOVA of the treatments for Sept., Oct., and Nov. showed highly significant effects of predator ($P < 0.0001$), prey size ($P < 0.0001$), day ($P < 0.0001$), and the interaction of predator and prey size ($P < 0.0001$).

Presented by T.J. Wilson and R.F. Wilkinson; Southwest Missouri State Univ., Springfield, MO 65804, USA.



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Eungella Day Frog Rediscovered

The Brisbane (Australia) Courier Mail recently noted the rediscovery of the Eungella Day Frog (*Taudactylus eungellensis*) in the Clarke Range of mid-east Queensland. This sighting of a single individual was reported by Patrick Couper, an assistant curator at Queensland Museum. It is the first observation of this previously common species since 1985.

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Newsletter of the IUCN/SSC Task Force on Declining Amphibians

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