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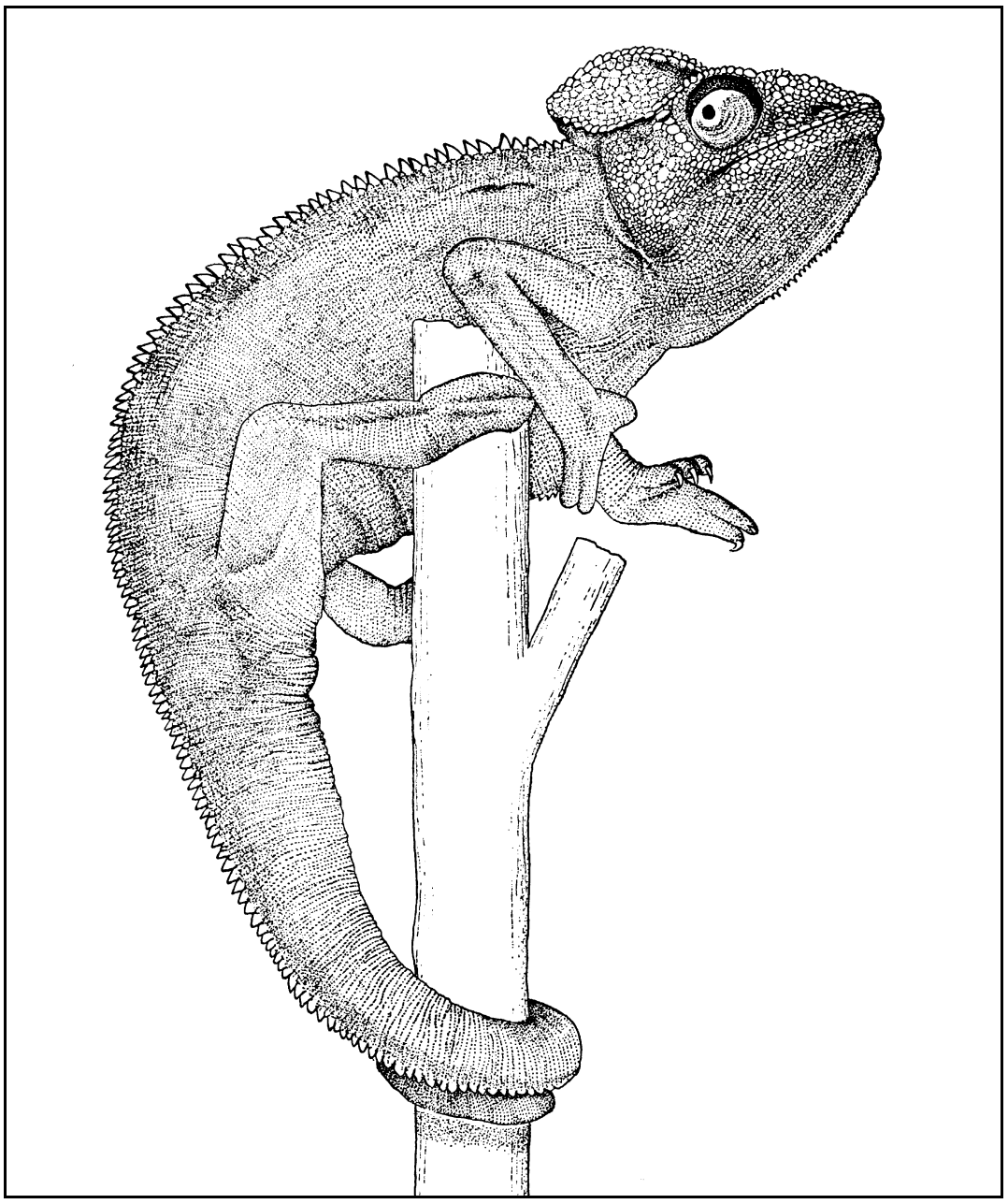

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A Review of: Dorcas et al. 2012. *Severe Mammal Declines Coincide with Proliferation of Invasive Burmese Pythons in Everglades National Park*. Proceedings of the National Academy of Science. Online at: doi/10.1073./prias/1115226109

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We have lived in a rural setting in the Hill Country of Texas for over 20 years. Until recently we had not seen a skunk, live or DOR, on the five miles of country road we drive to our house, but we have seen three in the past year. There are three species of skunks here and they have been here all along, we smell their essences wafting in on the wind from time to time. We had not seen a ringtail (*Bassariscus astutus*) on the road in 15 years, but we've seen two this year. We mention this to illustrate the uncertainty and vagary of estimating mammal presence and population density on the basis of road driving.

The paper under review is about road driving. It is a weak and deceptive paper. It is the latest contribution of the GCRAP researchers, and it is little more than fodder for the media who apparently starve for any further shred to feed the story that Burmese pythons in Florida may be worse than the asteroid that ended the Cretaceous.

This paper is multi-authored by Michael E. Dorcas, John D. Willson, Robert N. Reed, Ray W. (Skip) Snow, Michael R. Rochford, Mellissa A. Miller, Walter E. Meshaka, Paul T. Andreadis, Frank J. Mazzotti, Christina M. Romagosa and Kristen M. Hart—all apparently in the belief that if enough GCRAP researchers sign on to a paper, then it must be true. These are many of the all-stars of the GCRAP camp. And for those readers who have not followed this story for the past few years, we explain that "GCRAP" is the acronym for the "Giant Constrictor Risk Assessment Partnership," the name this merry band assigned to itself.

We note that this paper is not sponsored or funded by the National Academy of Science, as has been erroneously reported in several media accounts, but rather is published in the Proceedings of the National Academy of Science—and according to Mazzotti (2012) that is a big difference. As is protocol for this journal, the editor is cited below the authors—this paper was edited by Peter M. Vitousek, an environmentalist from Stanford working with soils and nutrient recycling. Looking through his extensive and impressive resume, we see no evidence that he has any interest, experience or expertise with vertebrate zoology, predator/prey interactions, herpetology, mammal surveys, or the Everglades region—those being the general topics of this paper.

Synopsis

The title of this paper could be "Severe mammal declines coincide with [fill in the blank]." With confidence equal to any correlation with pythons proven by this paper, one could write into that blank "drought in the ENP." Or "increase in atmospheric CO_2." Or "increase in solar flares and sunspots." Or "increased traffic and tourism in ENP." Or "increase in feral hogs in ENP". Or "increase in invasive fire ant presence in ENP." Even "collapse of the housing market" is just as true as "proliferation of pythons."

The paper begins with the apparently obligatory paragraph meant to describe the monumental importance of Invasion Biology itself. The various references include, of course, the estimation of Pimentel et al. (2005) that invasive species cost the US billions of dollars; the following apocryphal statements are supported by papers that describe the environmental mayhem caused by cane toads, ants and cordgrass—but nothing pertaining to the Everglades National Park [ENP] or to snakes of any sort.

The last sentence in the first paragraph reads as follows: "Invasive predators can reduce or even extirpate native prey populations" (Gurevitch and Padilla, 2004). Of course, it seems obvious that any predator—invasive, alien, or native—can reduce prey populations. However, the article of Gurevitch and Padilla (2004) concerns extinction and not extirpation, and offers little support to the statement made by Dorcas et al. We were interested to note that Gurevitch and Padilla (2004) observe that of the 762 species globally documented to have become extinct as a result of human activities in the past few hundred years, fewer than 2% list alien species as a cause; of those, predatory invasive terrestrial vertebrates are an even smaller percentage of cause.

The first sentence of the second paragraph states: "Nonnative reptiles are increasingly recognized as problematic invaders." and incorrectly cites Pough (1980) to support this statement—nowhere in that paper is such a statement made. The paragraph then goes on to make general statements about the dangers invasive snakes pose to ecosystems. Of course, all supporting references to those statements are publications concerning the brown treesnake in Guam, as it is the only truly invasive snake species. It is our observation that the comparisons made in nearly every GCRAP publication of Burmese pythons in the Everglades to brown treesnakes in Guam are invalid and pointless. One is an arboreal colubrid snake that invaded a small island with no native snakes, no natural predators, and a dense human population—the other is a terrestrial medium-to-large python that is established in an immense protected Florida refuge with many native snakes and many native predators. There is no correlation between the actions, effects and futures of the two snakes.

The first half of the third paragraph describes the history of Burmese pythons in south Florida in five sentences, three of which emphasize that these pythons really eat a lot of a wide variety of Florida animals. The second half of this paragraph is a description of the methods used and the purpose of this paper. The authors state their hypothesis on which this paper is based, writing: "Here, we present spatial and temporal data supporting the hypothesis that Burmese pythons have severely reduced populations of several species of formerly common mammals in ENP within 11 y of being recognized as an established invasive species."

Basically, this paper is based on "systematic road surveys" as a means to sample the mammal population. In other words the authors drove back and forth at night on roads in and around the Everglades National Park and counted the mammals, live and dead, that they saw. Four separate surveys were created in this manner: in 1996–1997 a total of 6,599 km (4,100 mi) were driven on 51 nights in the ENP in areas where years later Burmese pythons were recorded; during 2003–2011 a total of 56,971 km (35,400 mi) were driven on 313 nights in the ENP in areas where Burmese python reports were most concentrated; during 2009–2011 a total of 4,794 km (2,978 mi) were driven on 26 nights in four locations that they believed that Burmese pythons had recently colonized. In two areas north of the Everglades ecosystem where Burmese are not found, during 2009–2011, 278 km (172 mi) were driven on one night in one of the areas and in the other area, on nine nights a total of 539 km (334 mi) were driven.

A problem we have with the data set is that according to Mazzotti (2012), the actual study was undertaken by GCRAP in 2009. The data for the years of 1996–97, and from 2003 into 2009 were compiled from other sources not specified in the paper. The one identified extraneous source of data is Holbrook and Chesnes (2011), itself a weak and poorly designed undergraduate research paper based on 18 nights of road-driving.

For comparison reasons, the total number of sightings of each species was divided by the number of kilometers driven in that survey (animals/km) and that figure then multiplied by 1/100 (animals/100 km) to give the number of animals seen in 100 km (62 mi) of driving. They refer to this as the "corrected sighting rate." For example, the authors report sighting five opossums in 56,971 km, giving a corrected sighting rate [csr] of .0088, which they round up to .01.

Additionally, during 1993–1999, the park rangers in the ENP recorded all road-killed animals. They did not maintain records of the mileage associated with the DOR records, and, though not stated in this paper, we assume park rangers recorded all DOR animals throughout the year as encountered, day and night.

The observations of only a few mammal species are reported in this paper. There are generic categories of "rodent," "fox," and "rabbit" and then more specific categories of opossum, raccoon, coyote, bobcat, panther and deer.

The authors then did before-and-after comparisons between the data from the 1990s and the data for 2003–2011 compiled apparently from several different sources. "Before" of course refers to before Burmese pythons were realized as becoming established in south Florida in the 1990s, and "after" refers to this past 10 years when Burmese pythons were found in the ENP. They also made comparisons of the observations of mammals made in the "core python habitat" [that being the Main Park Road in ENP] and in the two "peripheral locations" and the two extralimital locations.

There is no analysis, no statistical evaluation of results, and no science in this paper. This paper is based solely on the observations made during road driving. The bulk of the paper comprises unfounded speculation on why Burmese pythons must have been responsible for the declines they report in rabbits, opossums, raccoons, foxes, bobcats, and deer while observations of rodents, coyotes and panthers increased.

Comments on the decline of mammals

We refer to this paper as weak for the following reasons. First the authors fail to convincingly demonstrate that any significant mammal decline has occurred. Second, the authors completely fail to demonstrate that the presence of Burmese pythons has had any significant negative effect on the populations of mammals in south Florida.

The authors state: "However, our reliance on indirect estimates of mammal abundance in ENP is the result of a nearly complete absence of actual density or population size estimates based on rigorous and repeatable field methods." In other words, they have no idea how many mammals existed in ENP before or after Burmese pythons. They have no idea of the distribution, habitat preferences/requirements, or population densities of mammals in ENP before and after Burmese pythons. They don't have a clue about naturally occurring population cycles for any of these mammals in ENP.

When we state that the authors fail to convincingly demonstrate that any significant mammal decline has occurred, we are not talking about statistical significance. There probably is a statistically significant difference between the number of raccoons seen in 1996 (csr 2.79) and 2004 (csr 0.1). Rather we refer to the irrelevance of basing any such declarations on data for populations of mammals based on indirect estimates over a short time span. Mammal populations are not stable through time, they wax and wane. Most mammal populations cycle in size over a multi-year period of time that varies species to species. Additionally, populations of animals increase in response to favorable conditions such as food surpluses and mild weather, and decrease in response to drought, disease, inclement weather, and overpopulation.

Looking at the data created by park rangers from 1993 to 1999 compared to the data from 2003–2011, there appears to be a decline in the medium-sized mammal species. However, any comparison is invalid for the following reasons. The park ranger survey is based on multiple observers in multiple vehicles in operation day and night. No record was made of miles traveled, so no "corrected sighting rate" can be generated.

The 1996–97 road survey in this paper began at dusk and averaged 2 hours of driving. The surveys of 2003–2011 averaged 2.9 hours of driving at different intervals between dusk and dawn. Post-midnight mammal activity was unsampled in the 1996–97 survey, and post-midnight/pre-dawn mammals were mostly unsampled in the surveys of 2003–2011. DOR mammals killed after midnight likely are consumed at dawn by the black vultures, corvids, and raptors that exist in large numbers in ENP. These DOR animals would have been reported in the Park Ranger surveys of the 1990s, but invisible to the surveys of this study. We mention that it is our observation here in Texas that during hot weather, mammal activity is greatest in the pre-dawn hours, not at sunset.

In fact, only three of the mammal species show any dramatic variation from the 1996–97 survey to the 2003–11 survey, those

being opossums, raccoons, and deer. Of those three, deer are irrelevant to the hypothesis of the authors because deer numbers are dramatically reduced in all three recent survey areas—the core region, the peripheral regions, and the extralimital regions. To their credit, the authors do muse that " . . . the relatively low numbers of deer observed in recent surveys at peripheral and extralimital sites raises the possibility that factors other than pythons *may* have contributed to declines in deer populations" [italics ours]. We wonder why the authors then dismiss the possibility that factors other than pythons might also affect the other species.

It was misleading to have mentioned deer in this study when deer numbers were so low in every area. According to Fleming et al. (1994) " . . . Everglades deer herd contingent characteristics portray a population with a relative low abundance, low productivity, and smaller body size. . . ." In other words, even 20 years ago, deer were not plentiful in the ENP. Fleming et al. (1994) also noted that in wet periods deer were found in higher densities in restricted areas [such as the dry elevated roadways in and around ENP], but in dry periods the density of deer was reduced and deer spread into the larger areas of dry habitat; consider that the past 10 years have been the driest period in the history of ENP. Further, we question any realistic probability that pythons could have negatively affected deer numbers—there are not many pythons to begin with and only a very small portion of the python population is large enough to eat even small fawns.

Raccoons show the greatest decline of all mammals in the survey. There are several points to be emphasized. The authors note: "In the 1980s, raccoons were such nuisances in campgrounds and visitor-use areas that a control program was initiated in ENP." So in other words, the park service elected to eradicate raccoons, but now they are wondering where they all went. Even measures taken to make all refuse areas and garbage cans raccoon-proof, dramatically reducing this previously plentiful food supply for raccoons, would reduce the numbers of raccoons. It is possible that the survey of 1996–1997 was at the exact time of the greatest population of raccoons in the history of the park, the population numbers artificially elevated by a surplus of human-provided food. Such a surplus also likely increased the numbers of opossums, as they too are inveterate camp raiders like raccoons.

It's also worth mentioning that Snow et al. (2007) found raccoons to be a rare item in the diet of ENP pythons. Only two out of 54 prey items (3.7%) recovered from a sample of 56 pythons examined during 2003–2006 were raccoons. Opossums made up only 1.8% of the items. Rodents, all species (including squirrels), comprised 38.9% of the dietary items recovered from pythons in the sample.

Speed limits were lower in the 1990s in ENP than the current 55 mph limit for most of the Main Park Road from where most of the survey took place. It's possible that medium-sized mammals, including raccoons, that lived near roadways had a higher survival rate than is now possible with faster traffic.

Raccoons are subject to a variety of diseases that will devastate local populations, including rabies, pseudorabies, leptospirosis, canine distemper, parvoviral enteritis, and toxoplasmosis. The authors dismiss disease as a possible cause of the population declines seen in raccoons, opossums, foxes, rabbits, bobcats and deer, stating that there is no evidence of a disease that could have resulted in the widespread population declines in all taxa in this study. This seems to us to be extraordinarily naive. The authors go on to state: "Limited evidence of disease has been noted in the varied mammalian taxa that have declined in ENP during the time period we examined. . . ." So there wasn't any one big disease, but apparently there were several little diseases. No information is provided to explain this mysterious statement, clarifying what diseases were reported in which of the taxa.

The authors do not consider the pollution of ENP as a possible factor in the decline of raccoons and the other mammal species. There is increasing concern about pollution in ENP by methylmercury. Methylmercury is a highly bioaccumulative form of mercury that has remained a chronic water quality problem and poses a neurotoxic threat for wildlife and humans in ENP (Axelrad et al., 2011.) Because the diet of raccoons and opossums include a high percentage of aquatic and semi-aquatic animals, both carry heavy, even toxic loads of mercury. The ongoing drought in ENP has concentrated water and perhaps has concentrated toxin loads in the vertebrates in ENP.

The flow of fresh water through the Everglades is steadily declining. The ENP is the driest it has been in recorded history. It is so dry that in 2010 the ENP was removed from the list of Ramsar Wetlands of International Importance. The dramatic reduction in water in the ENP has undoubtedly affected all of the mammal species in this study. The authors summarily gloss over any effect with the following statement: " . . . other than changes in water-management regimes, anthropogenic impacts in ENP that might result in mammal declines have not changed markedly during the last two decades." So there is an ongoing "water-management" change that has significantly reduced flow and dropped water levels to such an extreme degree that is has received international attention, but the authors don't even discuss the possibility that these eco-destructive conditions might have affected the mammal species.

We contend that the drought conditions in ENP have at least two effects on mammal populations. One is that the distribution of terrestrial mammals changes in response to conditions. For example, in the Everglades it is reported that in wet conditions, rodent population densities are high as the rodents are restricted to smaller areas; during dry periods, population density drops as animals disperse more widely (Smith and Vrieze, 1979). One obvious result of lower population densities is that individual animals are encountered at a lower rate in areas that previously had higher population densities, which would result in a reduction in the numbers of animals sighted in road surveys.

The second effect is that less water flow and decreased acreage of inundated land surface reduces the food base for terrestrial predators of fish and crustaceans such as raccoons and opossums. It also crowds aquatic predators such as alligators into the limited suitable water holes (Fujisaki et al., 2011). This, in turn, makes activities near water more hazardous for terrestrial animals that come to water to drink or forage.

The authors state: " . . . raccoons and opossums often forage

near the water's edge, a microhabitat frequented by ambushing pythons." We find it hard to believe that raccoons and opossums ever casually amble near the water's edge in an area with probably the largest alligator population in the country. Of course, pythons also have to be vigilant when near water in ENP, as pythons at all age and size classes are potential prey for alligators. The GCRAP camp never misses a chance to claim that pythons eat alligators. It has happened, but it is an incredibly rare event; however, alligators readily feed on pythons. In dry times when the alligators are crowded and hungry, it is dangerous for pythons to get too close to the water. [We digress here to mention that we can find only one report of an alligator being eaten by a python (Snow, 2007), that being the well-circulated photo of the dead headless python with the gator hanging out of a gash on the python; in that case, the bones of the skull of the ingested alligator were crushed, evidence that it was dead prior to being encountered by the python. We note that the recent report of Fujisaki et al. (2011) does not mention python predation on alligators.]

Dorcas et al. make the following unsupported statement: "These species [referring to the species in their survey] can serve as proxies for species of conservation concern that often are more difficult to monitor because of low densities, spotty distributions or secretive behavior." No, they can't! This is a ridiculous self-serving fiction that is created by the authors; undoubtedly it will serve as a reference in a future GCRAP paper.

The authors write: "Additionally we documented slight increases in sighting rates of rodents, coyotes, and Florida panthers within ENP. However, the overall numbers for these groups are low both before and after python proliferation, making firm conclusions regarding the status of their current populations difficult." In light of the hypothesis that the authors are trying to support, it seems impossible that under a regime of python predation so strong as to devastate the populations of middle-sized mammals that the population of the most common prey found in the diet of ENP pythons, rodents, would increase. It seems equally unlikely that the populations of two other apex predators, coyotes and panthers, would increase if pythons had consumed their prey base. The authors declare they are unwilling to make a firm conclusion about these animals because of the low numbers, yet they seem to be completely willing to blame pythons for rabbits, bobcats, and foxes, those being populations with similarly low numbers.

We note that two of the authors of this paper, Reed and Mazzotti, are co-authors of a recent paper on trapping Burmese pythons (Reed et al., 2011). In summary, that paper recounts the unsuccessful attempts to trap Burmese pythons in an area known as Frog Pond. The study took place in 2009, at the height of Burmese python populations in south Florida, and just before the two ensuing cold winters significantly reduced python numbers by nearly half. Frog Pond is an area on the eastern margin of ENP just north of the east end of the Main Park Road. Frog Pond was believed to be the area with the densest concentration of pythons. The authors report that 6053 trap-nights resulted in three python captures; 37 rodents also were trapped. After the project ended and the traps were removed, this 550 ha (1360 acres) area was harrowed. This revealed a total of 11 Burmese pythons. Over the several days it took to harrow the entire area >200 rats were daily observed fleeing from the tractor and harrow. We note that in the discussion of this paper, Reed and others propose that the trapping experiment failed because there were not many pythons and there was an immense population of rodents that served as prey for the pythons present in the area.

Because of the failure of Dorcas et al. to even mention this paper, despite Reed and Mazzotti being authors of both reports, we propose that a lie of omission is committed. It simply cannot be ignored that one GCRAP paper states that their study failed because there were few pythons and too many prey animals, while another contends that the "apparent incredible density of pythons in ENP" is responsible for the near extirpation of prey animals in the entire region. By this act, the extraordinary bias of the GCRAP researchers and the government agencies they represent are well illustrated.

For the reasons we have stated, we feel that this paper in no way conclusively demonstrates that any significant decline has occurred that cannot be considered as the result of natural processes, diseases, normal population cycles, and the increasingly dry conditions in ENP. Only raccoons and opossums have shown any significant reduction of numbers, but there are particular circumstances for those two species that better explain any changes in population numbers.

Comments on the hypothesis of the authors

The essence of the hypothesis is that mammal populations in ENP have declined and pythons are the cause.

We question why the authors did not include Burmese pythons in these surveys? What was the corrected sighting rate of Burmese pythons in the road surveys and why are these figures not included in this paper?

In fact, Burmese pythons have never appeared to be plentiful in anything other than GCRAP press releases and media interviews. ENP Superintendent Dan Kimball stated: Encounters with pythons are very rare. . . ." (Puckett, 2012). We point out that Reed and Rodda (2009) state that one python was encountered in the Everglades for every 1,318 man-days of searching. This was in 2009, the year with the highest numbers of pythons reported. Also, in the previously mentioned study of Reed et al. (2011) that also took place in 2009, standardized searching of the Frog Pond study area found zero pythons. The numbers of reported pythons from all sources in 2011 dropped nearly 50% from the 2009 high (National Park Service, www.nps.gov/ever/naturescience/burmesepython.htm.)

Let's do the math. We'll use the GCRAP numbers from 2009, even though pythons have become much more scarce since then. Then it required 1,318 man days of searching to encounter a python. A "man-day" is considered to be one person working for 8 hours, so that is 10,544 hours of searching. Let's say that person was driving rather than walking. The authors state that the speed of the vehicles used in their road surveys was 55 km/hr to 70 km/hr; we'll calculate using an average speed of 62.5 km/hr. So a person would drive an average of

659,000 km (409,484 mi) to find a python. That is a corrected sighting rate of .00015. In other words, one or fewer Burmese pythons would have been sighted in all the surveys combined and Burmese pythons would be the rarest species in this study except for those species with a csr of zero.

Of course the two methods of collection are not exactly comparable. The encounter rate when searching for Burmese pythons is undoubtedly lower because the pythons are well camouflaged when in grasses and brush. However, even if the encounter rate for road collecting is higher by a factor of 100, Burmese still would have a csr of .015, which is essentially the current csr of the raccoons [csr .02] and opossums [csr .01] in ENP that the authors declare are nearly extirpated. It is a major fault of this paper that the numbers of observed Burmese pythons, ostensibly the focus of this study, were not included in the study.

Nevertheless and not surprisingly, this paper concludes with the following transparent and self-serving statement: "The magnitude of these declines underscores the *apparent incredible density of pythons* in ENP and justifies intensive investigation into how the addition of novel apex predators affects overall ecosystem processes." [italics ours]. We consider this statement to be an intentional, gross, and dishonest misinterpretation of the facts.

Correlation versus causation

This paper does not prove that there have been major or significant declines in most of the mammal species that were incorporated into the surveys. Even the apparent decline in raccoons and opossums are more likely the result of natural processes, diseases, normal population cycles, and the increasingly dry conditions in ENP than due to predation by a novel predator that is rare and seldom encountered. There are simply no data of any sort other than the presence of pythons to support the hypothesis of the authors that pythons are eating the ENP mammals into oblivion.

Even if there were declines in medium-sized mammals that were proven to not be the results of natural factors in the environment of populations of mammals in the ENP, this paper does not prove that Burmese pythons have had any effect of any sort on the mammals in ENP. It may be that the populations of several species have declined at the same time that the population of Burmese pythons increased but there is zero evidence that the two changes are more than random coincidence.

Gurevitch and Padilla (2004) neatly sum up our major criticism of this paper with the following observation: "Existing data on causes of extinctions and threats are, in many cases, anecdotal, speculative, or based upon limited field observation. Although it is clear that obtaining quantitative and experimental data are impossible under many circumstances, the problem remains that correlation is too often assumed to imply causation."

Deception

To conclude, this paper is no more than a report on observations made of mammals on the roadways in and around ENP. This paper is a preliminary report that someday may be of interest to future mammal research. But this paper neither proves that there is a decline in mammal populations, nor does it prove that Burmese pythons have had any measurable effect on mammal populations, either negative or positive.

But this paper has been adroitly used by the GCRAP camp to deceive the media and the public into believing that it was proven beyond doubt that pythons ate all the mammals. GCRAP researchers have released press releases after every paper they have published. On the day this paper was released, 30 January 2012, there was a press release that was forwarded to all the major news outlets. On that day the AP wire story by Matt Sedensky had a headline stating "Pythons apparently wiping out Everglades mammals."

The GCRAP camp boldly seeks to advance its agenda through the media and this aberration of publicity apparently goes to the top. In a press release for this paper from USGS, Director Marcia McNutt states "Pythons are wreaking havoc on one of America's most beautiful, treasured and naturally bountiful ecosystems" (Puckett, 2012) [This is, at best, an unproven opinion.]

A press release from Virginia Tech (Davis, 2012 begins with the deceptive and incorrect title: "Virginia Tech wildlife ecologist links severe declines in Everglades mammals with invasive pythons." [No such link is even claimed in this paper.] In the release co-author Willson is quoted: "Our research adds to the increasing evidence that predators, whether native or exotic, exert major influence on the structure of animal communities. The effects of declining mammal populations on the overall Everglades ecosystem, which extends well beyond the national park boundaries, are likely profound, but are probably complex and difficult to predict." [In fact, no "research" published in this paper (or any other paper on Florida pythons co-authored by Willson) produces any irrefutable, authoritative evidence that pythons have done quantifiable ecological damage of any sort.]

Co-author Reed is quoted as saying: " . . . it has apparently taken only 11 years since pythons were recognized as being established in the Everglades for researchers to implicate pythons in the same kind of severe mammal declines. . . ." (Puckett, 2012). [This is in comparison to brown tree snakes in Guam, which, in fact devastated bird populations, not mammal.]

Most quotes from authors Dorcas, Reed and Willson imply that pythons are the cause of the mammal decline, but in general they do not state that this is proven. But the media snapped up the story and it ran in almost every major media outlet that pythons had eaten 90% of the mammals in the ENP. Wayne Pacelle of the Humane Society of the United States repeated this several times in an interview on the Dianne Riehm Show on NPR. A press release on the Nature Conservancy website (Nature Conservancy, 2012) states that Kris Serbesoff-King, an associate director of conservation for the Nature Conservancy "called the drastic loss of common mammals in the Everglades due to Burmese pythons, reported by the Florida [sic] Academy of Sciences, 'really scary' and worries about the repercussions for all wildlife and for Everglades restoration." [A theatrical statement that is a misinterpretation of this study and is completely misleading.]

Here the act of deception is the failure of USGS and USFWS to make any attempt to correct the media stories. By their absolute silence we assume that they were not concerned that this

research was being misinterpreted and exaggerated.

To his credit, Dr. Frank Mazzotti, one of the authors, came forth and posted a blog on the Huffington Post and stated, among other things, that "With few exceptions you would get that impression from the media coverage that hoards of rampaging snakes were vacuuming up mammals in the Everglades. We don't know that. . . ." He goes on to give an insightful evaluation of this study, and then states that there may well be factors other than pythons that affect mammals in ENP (Mazzotti, 2012).

We note the statement at the bottom right of the first page of the paper: "The authors declare no conflict of interest." At first we were angered—of course the GCRAP camp in general and every author of this paper has a clearly demonstrable vested interest, both financial and professional, to see that pythons are painted as being destructive and dangerous creatures wreaking havoc in south Florida. Many of the authors have directly benefited in one way or another from the more than 100 million taxpayer dollars funded by the military and the Congress to study brown treesnakes in Guam, and all of them have received money to work on python projects in Florida. They now deliberately manipulate the media, ignore criticism, and plan to repeat their Guam success in obtaining major funding and grants as they "study" the Burmese python and the other large constrictors that will be added to the Injurious Wildlife List of the Lacey Act. Then came the realization that the authors really hadn't lied—this is their interest and their agenda. There is no conflict.

The poor quality of the publications and the biased press releases that are issued by the federal regulatory agencies involved in the Burmese python issue in southern Florida are troubling. It's time for the Department of Interior to change the editorial and review process of the publications and to closely monitor or restrict the direct interaction of the GCRAP camp with the media. If even the director of USGS can't honestly and correctly represent the research supervised and funded by her agency, perhaps it's time to clean house.

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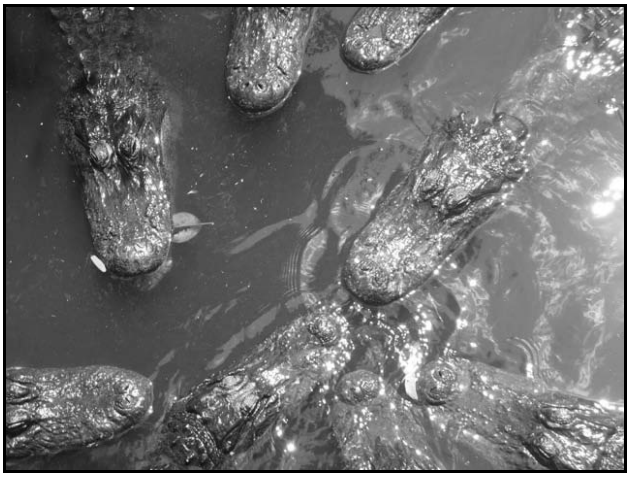
What You Missed at the March Meeting

John Archer
j-archer@sbcglobal.net

Marisa Tellez looked surprised when I mentioned that I was pleased to meet someone so famous. I suppose that her fame is limited to a small group, but as I browsed the Internet I had come across her name frequently. She was dressed in high black lace-up boots, distressed ripped hiphugger jeans, and a black T-shirt Her curly dark hair cascaded to below her shoulders. She has a southern California accent and has lived in Los Angeles most of her life. With her petite frame she looked as though she should be a model in a Hot Topics catalog, but her claim to fame was her study of crocodilian parasites.

Marisa Tellez. Photograph by Dick Buchholz.

Because she always gets the same question, our March speaker began with the explanation of how she became involved with crocodilians and their parasites. At the age of five her father presented her with a flat package instead of the Barbie doll that she had asked for. She opened it to discover a book on the Civil War, a book on World War II, and a book on sharks. Her father said, "I'm raising a human being, not a girl." The third book captured the young human being's imagination, and soon her fascination with sharks led into a fascination with predators, and then snakes, and then alligators. Parasites didn't get involved until her senior year of college, but she fell in love with the amazing creatures after a course that year. When she was beginning her doctorate she decided to combine the two creatures that most fascinate her. She is well into her doctorate at the University of California, Los Angeles, and she gave us a glimpse into the methods of crocodilian parasite research.



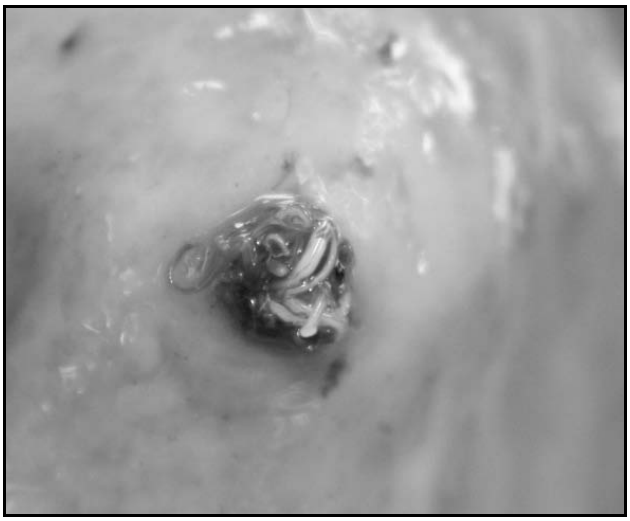
Alligator populations are recovering in Louisiana, and the annual harvest has allowed Marisa to dissect over 100 alligators so far. She says she's an expert in the gastrointestinal tracts of alligators.

Crocodilians have been around for about 254 million years or so and the twenty-three extant species are being joined by more and more ancient species being discovered. Marisa said some scientists are thinking of renaming the late Cretaceous the "Age of Crocodilians" rather than the "Age of Dinosaurs", an exciting prospect for someone in her line. Crocodilians show adaptations that astound most people. A small but well-developed brain allows parental care and unique communication skills. They have superior olfactory capabilities, and a complex inner and middle ear receive a wide range of frequencies. A four-chambered heart has a unique appendage, the Foramen of Panizza, that allows more efficient use of blood oxygen. And crocodilians have one of the strongest immune systems in the animal world. She cautioned us that even though crocodilians look nearly invincible, they have weaknesses. She hoped that her research could assist managers in avoiding populations succumbing to those weaknesses.

The relationship between parasites and their hosts is complex and can reveal clues to environmental and anthropogenic disturbances that effect their life cycle. Marisa headed to Louisiana to collect her data. That state has large populations of alligators (*Alligator mississippiensis*) and has suffered from environmental and anthropogenic changes in the recent past. For three years she has collected data during the alligator harvest, and has analyzed some data from the first two years. Louisiana Department of Wildlife and Fisheries divides the state into east and west populations of alligators. Marisa's biggest thrill was finding parasites in one hundred percent of the alligators she dissected, but more in the eastern population. She speculated that this may be because the eastern section of the state is more agricultural and the western state has mining and a higher salinity. Heavy metals and salt tend to decrease parasitic loads and eutrophication, aggravated by agriculture runoff, tends to increase the number of parasites.

Now the only expert in this somewhat esoteric field, Marisa was invited to study Florida alligators, so, somewhat as a lark, she made her way to Gainesville with her student assistants to look at the Florida alligators. After her 100% success rate in Louisiana, she was stunned to find no parasites in the Florida gators. Balance is important in the host-parasite relationship and too few parasites may be as detrimental as too many. After consultation with her advisors, she has added Florida to her studies.

The complex life cycles of parasites make them possible



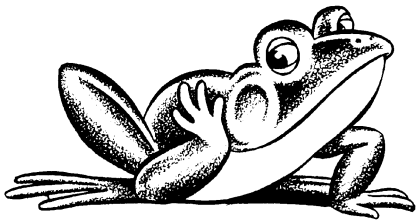
A slide of nematodes in an alligator's stomach. Marisa called this a "fun, cool slide."

bellwethers for changes in the environment. Frequently parasites may reveal conditions that go unobserved in the hosts. The intricate life cycles can encompass not only revelations about the apex predators such as the alligator, but also the myriad other animals that depend on or are hosts in the other stages of the parasite's life. Marisa hopes that her studies can lead to knowledge that is useful in the preservation of not only the alligator and other crocodilians, but the web of life that surrounds, supports, and relies on these creatures. She gave us a little insight into the methods she using, including niche modeling and mathematical modeling.

The presentation was filled with her passion, illustrated with neat line drawings of various parasites and photos of crocodilians, and punctuated with the sounds of a light saber. Not five minutes into her talk, Marisa, admitting to being a huge Star Wars fan, whipped out a light saber (with sound effects!) to use as a pointer. She wielded the pointer with authority, probably due to the fact that she was a champion baton twirler in younger days. She gave us pictures of her with hands buried in gator guts and waxed enthusiastic over a photo of nematodes in an alligator's stomach, which she called a "fun, cool slide." I don't think that she converted many of us into parasite lovers, but she certainly brought us to a greater appreciation of the critters. On her web site (alligatorparasites.wordpress.com) she writes an interesting blog, a recent entry mentioning her interest in capoeira, the Brazilian dance-like martial art. At diner she expressed her desire to one day manage a wildlife refuge. I think she should have no trouble achieving that. Her dad did a fine job of raising a human being who appears limited only by her desires.

The Tympanum

Of Pythons and Pit Bulls:
Pushing Back against Media Bias



People used to say "Euuuw!" when they heard I had pythons, and shiver in fear at my pit bulls. Now, those reactions are reversed.

Over the years, the pit bull community has taken a very proactive role in fighting false negative stereotypes about our dogs. For longer than I have owned dogs, people in the community have stepped out, created educational days, spent time talking about our dogs to anyone who will listen. It's time for the python community to adopt what has been an extremely successful program for getting out the truth about our pets.

Consider the headline on an article on ctpost.com:

> **DEEP collects 5 illegal pets, one vicious python, at Beardsley Zoo**

The article goes on to explain the surrender of a Burmese python in lurid detail:

> The most exciting moment of the day occurred behind closed doors.
>
> Overturf and EnCon officer Todd Chemacki recalled it in the back of the room.
>
> The other Burmese python was about 13 feet—and deemed too dangerous to show the public.
>
> When Ralbovsky tried putting it into one of his bins, it struck its head at him several times, reaching waist-high. He had to pin it with a catch pole; then it took two people to get it in the bin.
>
> Of course, the animal isn't poisonous, Overturf granted.
>
> "But when a snake with the head of a small dog hits you, and bites, you'll feel it," he said.
>
> "And then when it wraps around you, . . . " Chemacki said.

That is the scene people who have never met a python will always remember. They'll get the idea pythons are dangerous beasts who will strike at you and wrap around you and, presumably, send you to your scaly doom—something those of us who keep them know is a distorted and false view of our pets.

Distorted or not, stories like this fill the newscasts, papers, and websites non-snake-owning people read every day. It's time we learned from the pit bull people and started pushing back. We need to attend Snake Day and herp society events that are occurring this spring nationwide. Offer to do presentations at local schools, camps, and community groups. Set up a booth at festivals and street fairs. We need to talk about our pets to other pet people, whenever and wherever we can. This is our opportunity to reach out and change minds.

It worked with pit bulls. It will work with pythons—if we do the work to get our voices heard. Will you start speaking out this spring? **Cindy Steinle**. [This opinion piece first appeared in Cindy's blog for April 6, 2012, on Kingsnake.com. For more of Cindy's blogs see http://www.kingsnake.com/blog/authors/7-Cindy-Steinle]

Herpetology 2012

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

TRANSLOCATED OZARK HELLBENDERS

C. M. Bodinoff et al. [2012, Copeia 2012(1):150-159] used radiotelemetry and recapture to monitor survival and body condition of 36 captive-reared Ozark hellbenders (*Cryptobranchus alleganiensis bishopi*) released at two sites on the North Fork of the White River, Missouri, from May 2008 to August 2009. At the end of our study 16 salamanders were alive, 13 had died, and the fate of seven could not be determined. Captive-reared hellbenders released at a site with densely arranged boulders exhibited approximately 1.5-fold higher annual survival (0.7467; daily survival = 0.9992 ± 0.0004 95% CI) than hellbenders released at a site where boulders were patchily distributed (0.4816; daily survival = 0.9980 ± 0.0007 95% CI). When compared to log-transformed length–mass relationships developed for wild hellbenders from the same river in the 1970s, mean body condition of hellbenders at the patchy boulder site was about average at the end of the study (mean residual distance = -0.0273 ± 0.0234 SE, n = 7; range = -0.1375–0.0486), while mean body condition of hellbenders at the dense boulder site was above average (mean residual distance = 0.0423 ± 0.0402 SE; n = 8; range = -0.0374–0.1088). In addition to lower survivorship and body condition, a greater proportion of hellbenders at the patchy site accrued physical abnormalities (6 of 13 vs. 2 of 14), carried leech parasites (9 of 16 vs. 4 of 14), and carried the fungus *Batrachochytrium dendrobatidis* (3 of 11 vs. 1 of 13). A "site only" model of survival was most supported, though additional supported models suggested increased mass at release may have increased daily survivorship. While more work is needed to determine the impact of translocation on long-term population dynamics of Ozark hellbenders, this study demonstrated that about half of a translocated population of captive-reared hellbenders can survive while maintaining or increasing in body condition during their first year post-release, given release sites are well selected.

EFFECT OF TAIL-CLIPPING

A. Herrel et al. [2012, J. Herpetology 46(1):91-93] note that toe and tail clipping are commonly used methods for permanent marking of animals and for obtaining tissue samples. Although it has been tested whether toe clipping affects locomotor performance (and thus potentially the fitness of an individual), little is known about the effect of tail clipping. Tails are important organs in many amphibians and reptiles and are used for balance or stability during locomotion or as prehensile organs. Effects of tail autotomy or the removal of large parts of the tail have previously been demonstrated. This study tests whether removal of a small part (<5 mm) of the distal tail in chameleons affects their ability to cling to branches of different diameters by measuring gripping strength using of a force platform. The data show no significant or directional effect of tail clipping on the maximal forces that can be generated by the tail and, thus, suggest that tail clipping can be used as a method for tissue collection.

USE OF CHEMICAL CUES BY ROSY BOAS

R. W. Clark and G. Ramirez [2011, The Herpetological Journal 21(3):187-191] note that laboratory studies focusing on the ability of squamate reptiles to discriminate among prey chemical cues have been the foundation for many important contributions in animal behavior and ecology. This study examined the ability of rosy boas (*Lichanura trivirgata*) to discriminate among several sources of prey chemicals. Because of the high frequency of neonatal mammals in the diet of erycine boas, the study was focused on chemical cues from female mice (*Mus musculus*) with and without litters of dependent young. Chemical stimuli were presented on cotton-tipped applicators in one set of experiments; in a second set chemical cues were presented as trails placed in an observation arena with test subjects. The cotton swab assays did not reveal a difference in response to prey chemical cues, but in the arena-based assays it was found that snakes showed an attraction to chemical cues from female mice with litters of young. This attraction could be caused by either the feeding experiences of these individuals, an innate ability to recognize chemical cues from neonatal mammals, or both.

COLOR PATTERNS IN DARWIN'S FROGS

J. Bourke et al. [2011, The Herpetological Journal 21(4):227-234] demonstrate that Darwin's frogs (*Rhinoderma darwinii*) show sex differences in dorsal pattern and body coloration. Males possessed higher variability than females, which were mainly brown; two dorsal patterns and a green body color were found exclusively in males. Males at different reproductive stages differed significantly in body color and dorsal pattern; brooding males were characterized by being greener. Females—almost exclusively brown—were mostly found on brown substrates, whereas males were distributed across brown, green and brown/green substrates. An association between body and substrate coloration suggests crypsis to reduce predation risk.

GREEN RACERS IN NORTHEAST BRAZIL

P. C. M. D. de Mesquita et al. [2011, The Herpetological Journal 21(3):193-198] describe, through hypothesis testing and observations on life-history traits, the ecology of the Paraguay green racer, *Philodryas nattereri*, in a semi-arid region in northeast Brazil, where it is widespread and occurs at high abundance. They document sexual dimorphism in snout–vent length and relative tail length. The species is diurnal and semi-arboreal, and most active during the warmest periods of the day. It is active year-round, with peaks of activity during periods of maximum precipitation and temperature. Adults feed on a variety of prey types, whereas juveniles are lizard specialists. The reproductive season extends over at least nine months of the year. The authors conclude that, due to its high abundance, foraging skills and fecundity, *P. nattereri* is a major predator in the Brazilian semi-arid region.

HERP-ACROSTIC #21 *by Mike Dloogatch*

1 O	2 D	3 K		4 F	5 N	6 D	7 T		8 P	9 T	10 N	11 H		12 G	13 N		14 I	15 D	16 O	17 F		18 N	19 I	
20 D	21 L	22 Q		23 M	24 G	25 L	26 P		27 T	28 E	29 K		30 C	31 U	32 G	33 H		34 S	35 F		36 H		37 S	38 J	
39 H	40 E	41 B	42 C		43 H	44 Q		45 T		46 A	47 N	48 K	49 J	50 M		51 D	52 R	53 Q	54 T	55 B		56 P	57 N	58 A	
	59 H		60 P	61 R	62 J	63 I	64 B	65 L		66 Q	67 D	68 R	69 M	70 E	71 D	72 J	73 T		74 S	75 U	76 J		77 N	78 M	
79 H		80 T		81 K	82 O	83 R	84 D		85 N	86 O	87 Q		88 S	89 N		90 H	91 A	92 U	93 C	94 E		95 J	96 H		
97 I	98 O		99 D	100 J	101 Q	102 A	103 O	104 T		105 E	106 B	107 A	108 N	109 U		110 F	111 K	112 N		113 C	114 D	115 R	116 K		
117 U	118 T		119 I	120 L	121 N	122 C	123 G	124 D	125 H		126 N	127 D		128 H		129 K	130 E	131 G	132 M	133 A	134 I	135 D		136 O	
137 G	138 H	139 P	140 T		141 U	142 H	143 E	144 Q	145 S	146 M	147 C	148 P	149 B		150 K	151 S	152 L	153 Q	154 M		155 O	156 J	157 T	158 Q	
159 K	—	160 D	161 C	162 I	163 P																					

How to solve this puzzle: The diagram, when filled in, will contain a quotation from a published work on herpetology. The numbered squares in the diagram correspond to the numbered blanks under the WORDS. The letter at the upper right of each square indicates the WORD containing the letter to be entered in that square. The WORDS form an acrostic: taking the first letter of each in order spells out the name of the author and the title of the work from which the quotation is taken.

CLUES **WORDS**

A. _____ treefrog, *Litoria caerulea*.
___ ___ ___ ___ ___ ___
102 91 133 46 107 58

B. Author in 2007 of *Boas and Pythons of the World* (last name only).
___ ___ ___ ___ ___
64 149 106 55 41

C. _____ snake, *Farancia erytrogramma*.
___ ___ ___ ___ ___ ___ ___
93 113 161 42 30 147 122

D. Any snake of the family Bolyeridae (three words).
___ ___ ___ ___ ___ ___ ___ ___ ___
124 127 67 6 20 71 51 114 99
___ ___ ___ ___ ___
135 84 160 2 15

E. In taxonomy, the second word of a binomial name of a species.
___ ___ ___ ___ ___ ___ ___
143 40 130 70 28 94 105

F. Followed by word G, habitat for many small species of herpeto-fauna and their invertebrate prey.
___ ___ ___ ___
4 17 110 35

G. See clue F.
___ ___ ___ ___ ___ ___
131 12 32 137 123 24

H. Region covered by a 2010 reptile field guide by Indraneil Das (two words).
___ ___ ___ ___ ___ ___ ___ ___ ___
11 43 142 90 138 33 59 125 79
___ ___ ___ ___
36 96 39 128

I. _____ viper, *Montivipera xanthina.*
___ ___ ___ ___ ___ ___ ___
134 14 162 19 63 119 97

J. Like a subspecies for which the subspecific name is the same as the specific name.
___ ___ ___ ___ ___ ___ ___ ___
156 72 62 95 100 38 76 49

K. Former reptile curator at the Taronga Zoo (first and last names).
___ ___ ___ ___ ___ ___ ___ ___ ___
48 111 150 159 129 29 81 116 3

L. Widely cultivated herb of the lily family.
___ ___ ___ ___ ___
152 120 21 25 65

M. FTD, for one.
___ ___ ___ ___ ___ ___ ___
23 132 78 50 146 69 154

N. They're in the genus *Psammobates* (two words).
___ ___ ___ ___ ___ ___ ___ ___ ___
18 112 77 126 57 5 108 13 85
___ ___ ___ ___
47 121 10 89

O. Informally, any snake of the genera *Ficimia* and *Gyalopion*.
___ ___ ___ ___ ___ ___ ___ ___
1 136 98 16 86 82 155 103

P. Restricted to a particular region or habitat.
___ ___ ___ ___ ___ ___ ___
139 148 8 163 26 56 60

Q. Frogs of the genus *Arthroleptis*.
___ ___ ___ ___ ___ ___ ___ ___ ___
101 66 153 22 53 158 87 44 144

R. Likely equipment item for a lizard biologist.
___ ___ ___ ___ ___
52 83 61 115 68

S. Naturalist and collector (1860–1936) after whom a day gecko and an anglehead lizard were named (last name only).
___ ___ ___ ___ ___ ___
88 74 151 34 37 145

T. Likely prey item for a desert rattlesnake (two words).
___ ___ ___ ___ ___ ___ ___ ___ ___
54 157 73 7 45 140 9 118 104
___ ___
80 27

U. Horselike.
___ ___ ___ ___ ___ ___
92 141 75 31 117 109

Unofficial Minutes of the CHS Board Meeting, March 23, 2012

The meeting was called to order at 7:47 P.M. at the Wildlife Discovery Center in Lake Forest.. Board members Jim Foster, Barbara Khan, Andy Malawy and Linda Malawy were not present.

Officers' Reports

Recording Secretary: The minutes of the February 17 board meeting were read, corrected, and accepted.

Treasurer: Andy was absent. The February financial report was discussed and accepted.

Membership Secretary: Membership continues to increase over last year.

Vice-president: Programs are confirmed for every month but August this year.

Sergeant-at-arms: Attendance at the February meeting was 61.

Committee Reports

Shows:
- Notebaert, first full weekend of each month. Josh Chernoff is coordinator.

Adoptions: Linda has several new animals coming in.

Reptilefest: School advertising is going well. T-shirts are ordered. Paul Sereno will speak on Sunday at 11 A.M..

Old Business

NARBC table: We need more CHS participation in the future, perhaps setting a schedule to be sure our tables are staffed.

Bulletin articles: Mike is always looking for articles to put in the Bulletin. Several have been submitted recently.

IL Senate bill SB3264: Action has been temporarily postponed, but we still need to address our response, since it will come up again.

Legal summit at NARBC: A council has been formed to address legal issues regarding the herpetological community, The National Reptile and Amphibian Advisory Council (NRAAC.org).

Banners: Jason will order new banners for fest and future events.

New Business

Junior Herpers program: Discussion regarding ways to implement a program as something new to stimulate interest in the Society. J.T. Turingan will head a committee to look into it.

National Herpetological Society: Jason Hood has been contacted about formation of a national society to support smaller regional societies and promote the exchange of ideas and information throughout the herpetological community.

Zoo trips: There was some discussion regarding ideas for future trips.

Round Table

Bob Bavirsha thanked Rob Carmichael for hosting the meeting tonight. The Little Red Schoolhouse has offered to host a future meeting.

J. T. Turingan hopes numbers at Fest will increase this year.

Lawrence Huddleston reported that Petco is looking for someone to do a crested gecko meet and greet.

The meeting was adjourned at 9:27 P.M.

Respectfully submitted by recording secretary Jenny Vollman

Advertisements

UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, April 25, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **Doug Hotle**, curator of herpetology at the Rio Grande Zoo in Albuquerque, New Mexico, will speak about the Albuquerque BioPark's Native Species Recovery Program.

Speaking at the May 30 meeting will be **Tony Gamble**, a postdoctoral researcher at the University of Minnesota. Tony's talk will be about geckos, but we don't have a title just yet.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

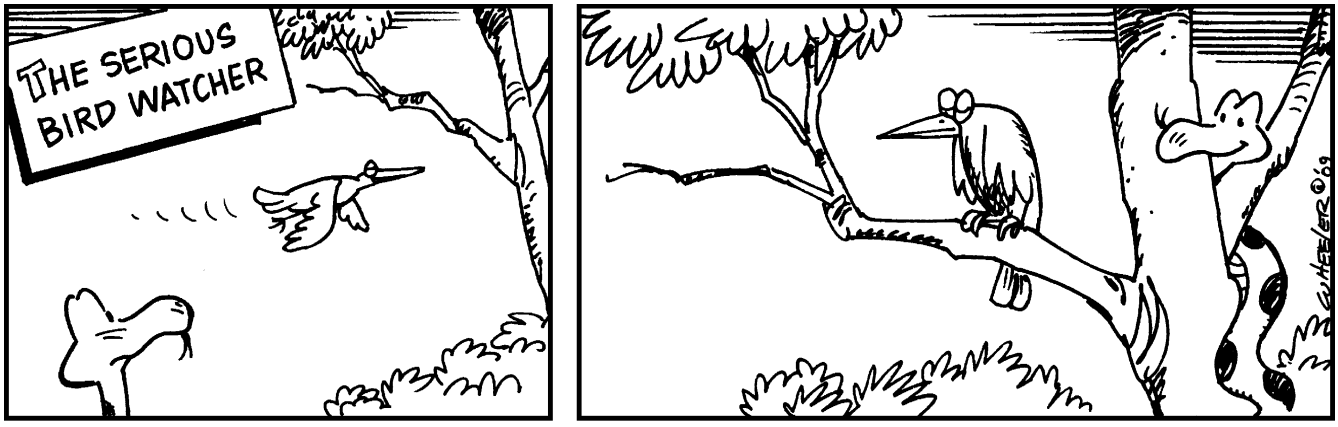
Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., May 18 , in the adult meeting room on the second floor of the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the group's Facebook page.

THE ADVENTURES OF SPOT



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