COMMENTARY

Collecting Animals from Nature

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"Could we be going in the direction that eventually zoos and researchers will be denied access to wildlife?"

Al Winstel
Naturalist and Environmental Educator,
Cincinnati, Ohio

The deleterious effects of wholesale destruction of populations and habitats as a consequence of development have been amply documented (e.g., Tilman et al., 2002), as have those of uncontrolled collection (e.g., COSAEWIC, 2004). Here I focus on efforts to govern personal, educational, and scientific collection. My discussion is based on personal experiences, exchanges with colleagues, postings over the past several years on the PARC (Partners in Amphibian and Reptile Conservation: www.parcplace.org) listserver, and comments by responsible hobbyists. Individuals in each of those categories will see comments below that reflect their input and sometimes their very words.

Personal Collection

Young people love to collect. Although an early enthusiasm for reptiles may be responsible for the development of many professional herpetologists, many others become hobbyists or merely pass through such a stage. Nearly every coveted salamander, frog, turtle, lizard, or snake they encounter makes its way into a cage. This can be a learning experience leading to an increased awareness of nature and the myriad interactions that keep it going. However, the mortality of captured animals, many of them not well suited to captivity, is almost invariably high, especially during early attempts at husbandry.

THOMAS WIEWANDT, WILD HORIZONS

JOHN BINNS

Despite better and more frequently enforced regulations and a burgeoning captive-breeding industry, the sale of wild-caught animals persists. Locals in the Dominican Republic offering for sale wild-caught male and female Rhinoceros Iguanas (*Cyclura cornuta*) to a tourist in 1975. The snouts of the Iguanas were tied with wire or rope to prevent biting. International and domestic laws now help protect iguanas in the Dominican Republic and many other nations. Large expos offer for sale both captive-bred and some wild-caught animals. Sellers are required to have permits, a regulation that is strictly enforced by responsible organizers of reputable expos and the U.S. Fish and Wildlife Service (vendor names are intentionally blurred in this photograph).

BRIAN S. EDMOND

Catching and keeping wild-caught animals has been responsible for the development of many budding herpetologists.

Such losses might be accepted as the price that must be paid to attract the next generation of herpetologists, except that the number of people engaged in personal collection has increased dramatically in recent years. For evidence, one need only to look at the phenomenally profitable business that provides housing, lighting, food, supplements, and more for captive reptiles and amphibians. Some of that increase has been met by captive breeding, but the sale of wild-caught animals persists. Even if only a tiny fraction of enthusiasts buy or collect wild animals, some populations, especially in and around dense human concentrations, will inevitably become depleted. As the numbers of people engaged in such activities increase, even casual collecting can become significant.

On the other hand, discouraging children from collecting animals may alienate them from the natural world. Richard Louv, in his recent book (*Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder*), argued that sensationalist media coverage and paranoid parents have "scared children straight out of the woods and fields," while promoting a litigious culture of fear that favors "safe," regimented sports over imaginative play and exploration. Well-meaning elementary school curricula may teach students everything they need to know about the Amazonian rainforest and DNA, but do little to encourage personal relationships with the world outside their own doors.

ALLISON C. ALBERTS, ZOOLOGICAL SOCIETY OF SAN DIEGO.

Educating the public about amphibians and reptiles is most effective when live animals are used. Here, a Cuban Iguana is featured in a program for military and civilian personnel and their families at the U.S. Naval Base at Guantanamo Bay.

Educational Collection

A dearth of knowledge on the part of most people about amphibians and reptiles is a considerable deficiency in promoting reasonable and effective herpetological conservation. Those of us with experience, especially we who bill ourselves as "professionals," have a vested responsibility to teach others — and that requires access to live animals.

Scientific Collection

Scientific collection has not been implicated directly in the extinction of any species. Although historically common meth-

PHOTOGRAPH COURTESY OF GEORGE C. GORMAN.

Although scientists historically used "markets," in which locals catch and offer animals for a small fee, the number of specimens taken are invariably limited to those needed to address specific questions. This stands in stark contrast to actions of indiscriminate commercial collectors, who often take every animal hoping that enough survive to ensure a profit. Here, children bring lizards caught with grass nooses to a researcher studying inter-island evolution in the Lesser Antilles.

PHOTOGRAPH COURTESY OF ELLEN J. CENSKY.

Researchers today rarely collect large numbers of animals from any one population. More and more studies involve mark-and-release methods. Here, a scientist weighs an animal in the field prior to releasing it at the original site of capture.

ods (e.g., "markets) may well have caused declines of some populations, most scientists now seek to minimize the numbers of individuals taken. Unfortunately, attitudes of agencies and current regulations frequently reflect abuses of the past instead of today's reality. Instances of "scientific imperialism" (e.g., removal of important materials from the nation of origin, failure to share results with local agencies, and a lack of willingness to collaborate with resident scientists or students) by North Americans or Europeans may be cited by governmental agencies in developing nations to deny or restrict collection of specimens by scientists from those regions. Although the events are real, very few are recent. Almost all cases of exploitative collection within the past 50 years are attributable to collectors feeding the ever-growing commercial trade in amphibians and reptiles.

Regulatory issues

The acquisition of animals from the wild for personal, educational, and scientific purposes is subject to a plethora of regulations governing collection. Attempts to abide by these rules are frequently rendered difficult by fees or procedures that appear to exist primarily in order to discourage such activities. In sharp contrast, few regulations effectively address wholesale destruction of entire populations or even habitats as a consequence of economic development, which is responsible for the decline or disappearance of most populations. Often further complicating this issue is the lack of regulatory distinction between commercial collectors, whose activities are often driven solely by a desire for short-term profits, and those who are motivated by a sincere interest in animals, such as hobbyists, educators, and scientists.

Regulations prohibiting personal collection of native wildlife often exclude "game" animals (e.g., Bullfrogs, Snapping Turtles, Green Iguanas) that are covered by hunting or fishing permits. This inevitably leads to situations in which possession of an animal as a pet is illegal, yet thousands can be legally "harvested," kept in inhumane conditions, killed, and sold as food when "in season." Complicating matters even more is the fact that "snake hunting" can create revenue. Local businesses in west Texas for example, love snake hunters, who stay in their motels, buy their gas, eat at their restaurants, and pay Texas taxes.

Snake hunting can create revenue. Local businesses in west Texas, for example, love snake hunters, who stay in their motels, buy their gas, eat at their restaurants, and pay Texas taxes. Photograph courtesy of APNM.org

Educational collecting in some states requires a permit to keep and display native wildlife, often imposing additional restrictions on dangerous species such as venomous snakes or large constrictors. Some governmental agencies limit animals used in education to non-releasable, rehabbed individuals or those confiscated from illegal keepers. Such constraints would, for example, preclude individual teachers from collecting tadpoles for their classrooms, forcing them to rely instead on scientific supply houses that provide such resources by collecting and shipping large numbers of animals — with inevitably high levels of mortality. Similarly impacted are individuals, often associated with local or regional herpetological societies, who are knowledgeable and willing to conduct educational programs for the public, but are discouraged from using native species that might be most effective in developing an environmental ethic in their audience.

Restricting scientific collections of animals that are threatened or potentially threatened in the wild can lead to lack of sufficient knowledge to develop effective management programs or develop appropriate protocols for rearing them in captivity. The latter may make the difference between extinction and survival. For example, isolation and captive propagation of frogs with populations in nature that are vulnerable to the chytrid fungus may be the only way to salvage a species and the sole means of reestablishing a wild population should the risk ever be remediated. Without captive animals, refining husbandry and breeding techniques is impossible, and methods based on experiences with presumably similar species may or may not apply. Ironically, lack of information is frequently cited as justification for restricting collection. At the same time, some individuals have suggested that gaps in knowledge should not exist, considering the number of educational institutions and individuals who have been studying amphibians and reptiles for many years. Unfortunately, those who hold these views often rely on anecdotal observations, as opposed to reliable research, to support their contentions. In reality, we know far less than we should about most species and populations. The only way to address this deficiency is to encourage more research, even if this entails the collection of some animals. Restrictions that preclude accurate scientific assessments are shortsighted and ultimately place more populations and communities at risk of extirpation or extinction.

Common Themes

Three issues are relevant to all forms of collecting: (1) Collecting animals in the wild can and does affect the viability of populations and their habitats; (2) little or no information is available on the status of most populations; and (3) prohibition (or severe restriction) of all forms of collection is easier than regulating case-specific situations.

That all forms of collecting arguably cause less harm to animal populations than development is an unpleasant reality. I was once questioned about the number of several common species I sought to collect until the point was made that a 100-m extension of a planned road into the area would kill far more individuals than I sought to remove from the population. However, using the "bulldozer" justification for unregulated collecting is disingenuous. Developmental pressures on habitats and their inhabitants do not absolve commercial and casual or even scientific collectors from their collective share of the responsibility for

CRAIG PELKE

Isolation and captive propagation of frogs with populations in nature that are vulnerable to the chytrid fungus may be the only way to salvage a species and the sole means of reestablishing a wild population should the risk ever be remediated. Here, an *Eleutherodactylus euphronides* sits on eggs in the breeding facility of the Milwaukee County Zoo. One recent estimate of this endangered species' restricted distribution in the highlands of Grenada was only 18 km^2.

the many thousands of specimens that they remove purposefully from the wild gene pool. Even if such activities are legal, that does not mean that they should be.

Private collectors often argue that they are doing more good for species than bad. Once animals are bred in captivity in sufficient numbers, prices will drop until buying them from breeders or pet shops is cheaper than collecting them from the wild. Some breeders have also argued that occasional collection is necessary to get "new" blood into captive populations, needed as a safety net against extirpations and extinctions in the wild. Many are not convinced by these arguments. Does anyone really need 20 snakes of a single species from a single locality? Of course not — but too many individuals, especially those engaged in commercial operations, cannot seem to stop collecting. A recent article in the *Kansas City Star* (3 July 2006) featured Rodney Wittenberg, a graduate student studying Timber Rattlesnakes in an old quarry where efforts are in place to clean up discarded tires that had accumulated over many years. He is trying to keep workers and snakes from harming one another. The article did not reveal the actual site. Wittenberg said: "I don't want to alert rattlesnake poachers or even thrill-seekers. Next thing you know, you can kiss [the snakes] good-bye," noting that they could end up as somebody's hatband or in a rattlesnake roundup. As for captive breeding, private individuals allowed to breed endangered and threatened species should have to submit to regulation and inspection to assure compliance with the need to maintain breeding lines and proper use of husbandry techniques. Collection should be strictly regulated to conform to detailed breeding plans, not individual whim.

RODNEY D. WITTENBERG

A graduate student is studying Timber Rattlesnakes (*Crotalus horridus*) in an old quarry where efforts are in place to clean up discarded tires that had accumulated over many years. He is trying to keep workers and snakes from harming one another. He will not reveal the actual site, noting: "I don't want to alert rattlesnake poachers or even thrill-seekers. Next thing you know, you can kiss [the snakes] good-bye." Portrayed here is a rarely seen but apparently not particularly rare instance of arboreal activity in Timber Rattlesnakes.

Contentious Issues

One really important point divides those who engage in collection of animals from the wild. Many conservation biologists would favor bans on collection until hard data show that collecting causes "no real threat" for a given species, but many others would favor collection until data show that collecting poses a "real threat." Such extreme positions typically preclude compromise. Decisions based on data that are fragmentary or inconclusive might be acceptable in situations during which populations are being affected by other factors. For example, because development is ongoing and often inevitable, building permits should include provisions that require collection for scientific assessments, or even allow personal collection of species from the area destined to be altered. On the other hand, bans on all but responsible — and limited — scientific collection may be appropriate for species about which essentially nothing is known (on the presumption that lack of knowledge may be indicative of few opportunities to study the relevant species) or under circumstances involving fragile ecosystems (or even habitats) that deserve complete protection.

Because a deficiency of information is often responsible for conservative measures (e.g., protect until we have data that assures us that some collection is reasonable), investigations into the natural history of as many species (populations or even communities) as possible should be encouraged and funded. That would presumably lead to regulations based on reliable (rather than anecdotal) data and applicable specifically to targeted species and populations. Because the drawback to this approach is frequently fiscal, designated funds might be made available by charging substantial fees for collecting permits other than for scientific investigations. Individuals seeking to harvest animals for personal pleasure or profit would ultimately benefit if more data suggest that more species could be managed on a basis of sustained yields.

However, research capable of determining the effects of collection is inevitably difficult due to the many confounding factors (e.g., complexity of interactions and local effects that may or may not apply to other populations of even the same species). The implications of that reality have profound effects on management decisions. In the interim, then, until more and better data slowly accrue, such decisions must and undoubtedly should be made on the basis of factors that may merely reflect the sub-

STESHA PASACHNIK

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jective judgment of "designated experts." I would have to think that anyone sincerely interested in amphibians and reptiles would prefer that over decisions made by uninformed bureaucrats and based largely on the financial interests of a few fiscally influential citizens.

Recommendations

Collection for personal use, whether by individual or commercial collectors, almost invariably diminishes population health or habitats. Private collectors should be restricted to small numbers of common species — those for which we have enough information to safely conclude that removal of a few individuals will not be deleterious. Although individuals enamored with rarities will object and may on occasion circumvent regulations, no justification exists for allowing unconstrained collection of any species for which we lack definitive information. Captive breeding should compensate for the imposition of restrictions on collecting. Taxon-specific caresheets and books are available for many species, often via the internet.

Collection for educational purposes should be similarly restricted. Developing a conservation ethic does not require the use of rare and threatened species. However, reason should prevail. Restrictions on the possession of wild-caught animals should not preclude the use of common native species (e.g., the afore-mentioned tadpoles) in classrooms or in presentations by conscientious educators, be they professionals or hobbyists.

In stark contrast, restrictions on scientific collection should be streamlined and limited to steps necessary to confirm the legitimacy and identities of scientists seeking to remove any animals from the wild. Numbers to be collected should be determined by circumstances unique to each situation and the needs of the investigation rather than any arbitrary limit established by bureaucrats, even those with the best of intentions. The apparent health of a population frequently is based on counts of organisms, which do not necessarily indicate whether a population is healthy. For example, do we know how many individuals are required to make the population viable? What is the level of mortality? Recruitment? Is this adequate for maintaining numbers? How vulnerable is the habitat to destructive effects of collection? Only by studying animals will we ever learn enough about natural populations to manage them effectively, much less relieve restrictions on collecting animals from nature for purposes other than research and conservation.

Finally, the loopholes that allow massive losses to habitat destruction must be closed. The fiction that natural areas can be "developed" without the loss of the animals dwelling there must be abandoned. Because development is ongoing and often inevitable, building permits should include provisions that require and fund collection for scientific assessments, or even allow personal collection.

Ultimately, any decision to restrict collection should be determined by considering all possible effects on populations of species affected. When data are insufficient for reasonable consideration, short-term bans should be implemented, but are to be accompanied by efforts to promote acquisition of necessary data by qualified individuals. In today's world, changes are occurring at such a rapid pace that laissez faire management of wild populations cannot be justified, lest we lose them forever.

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References

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2004. COSEWIC assessment and update status report on the Spotted Turtle *Clemmys guttata* in Canada. COSEWIC, Ottawa (www.sararegistry.gc.ca/status/status_e.cfm).

Hansen, E. 2000. *Orchid Fever: A Horticultural Tale of Love, Lust, and Lunacy*. Pantheon Books, New York. Note: Although this book does not address the collection of amphibians and reptiles, its coverage of orchid collecting and breeding documents many of the same problems.

Hedges, S.B. and R. Thomas. 1991. The importance of systematic research in the conservation of amphibian and reptile populations, pp. 56–61. In: J.A. Moreno (ed.), *Status y Distribución de los Reptiles and Anfibios de la Región de Puerto Rico*. Publicación Científica Miscelánea No. 1. Departamento de Recursos Naturales de Puerto Rico, San Juan, Puerto Rico.

Tilman, D., R. M. May, C. L. Lehman, and M. A. Nowak[1]. 2002. Habitat destruction and the extinction debt. *Nature* 371:65–66.

[1] Abstract of Tilman et al. (2002): Habitat destruction is the major cause of species extinctions. Dominant species often are considered to be free of this threat because they are abundant in the undisturbed fragments that remain after destruction. Here we describe a model that explains multispecies coexistence in patchy habitats and which predicts that their abundance may be fleeting. Even moderate habitat destruction is predicted to cause time-delayed but deterministic extinction of the dominant competitor in remnant patches. Further species are predicted to become extinct, in order from the best to the poorest competitors, as habitat destruction increases. Moreover, the more fragmented a habitat already is, the greater is the number of extinctions caused by added destruction. Because such extinctions occur generations after fragmentation, they represent a debt — a future ecological cost of current habitat destruction.