

And the Voice of the Grey Tree Frog Was Heard Again in the Land ...

By Robert P. Cook

It was the summer of 1988 and a long-silenced sound pulsed in the air over Jamaica Bay. It was juvenile grey tree frogs calling at dusk from woodlands near the pond within Gateway National Recreation Area, and it was a thrilling moment for park employees, who had transplanted the tiny singers as tadpoles in 1987.

Gateway NRA, 26,000 acres scattered among four counties and two states, lies within and adjacent to New York City. Its lands range from relatively intact natural landforms such as Sandy Hook and Breezy Point, to the dredge spoil and landfill that underly most of the upland habitats of the Staten Island and Jamaica Bay units. Of these "human created" lands, habitats such as freshwater ponds and marshes, grasslands, shrub thickets, and pioneering woodlands have developed ... the result of planting programs and plant colonization. Gateway management now is directed toward preservation and restoration of natural processes.

Inventory Shows Declines

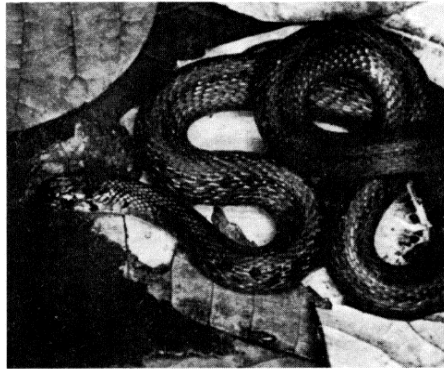
Inventory efforts have shown that compared to historic records for the area, the herpetofauna (amphibians and reptiles) of Gateway is impoverished. For example, Noble (1927) listed 37 species as indigenous to Long Island. In the Jamaica Bay unit, on western Long Island, only four species were found recently to occur as viable populations. This pattern, repeated at the other Gateway units, is partially due to the coastal nature of the park and the lack of certain habitats (e.g. cold, rocky streams). However the major factors are human related.

On Sandy Hook, the eastern hognose snake and its primary food, the Fowler's toad, have been extirpated, with pesticides the suspected cause. For the Staten Island and Jamaica Bay units, the upland habitats have developed on substrate deposited atop what once was salt marsh. While these habitats were being created, rapid urbanization of the surrounding areas was eliminating habitats and local populations (Schlauch 1976, 1978). Some species managed to survive in remnant habitats, but for most, the highways, urban neighborhoods, and tidal creeks proved to be effective barriers to dispersal. Thus, few of the survivors of urbanization were able to colonize the recently-created habitats that eventually became Gateway.

Transplanting Begun

In 1980, a pilot program of transplanting locally-collected native herpetofauna began at Gateway's Jamaica Bay Wildlife Refuge, based on the belief that "restoration" should include all components of an area's biota, not simply cleanup and revegetation. It was recognized that local gene pools of native species were still being lost to urbanization at the same time that Gateway habitats capable of supporting many of these species were going unoccupied.

Gateway now is undertaking to restore or recreate to the extent possible the community of amphibians and reptiles native to the habitats now present. Similar programs had been proposed in theory (Campbell 1974) or undertaken for the purpose of protecting or enhancing a single endangered species (Beebe 1973, Gates *et al* 1985). This program differs only in its attempt to transplant several species rather than just one.



Northern Brown Snake, an urban tolerant species, is easily transplanted and has been released in three Gateway areas. (Photo by W.A. Tompkins)

From 1980 to 1986, Jamaica Bay Wildlife Refuge staff carried out the pilot program, which now serves as the basis for Gateway-wide implementation. At the Bay, candidate species for transplanting were those native to Long Island and adapted to the habitats present. Only individuals collected on Long Island would be released.

Collections Made With Care

Animals used in the transplant program are collected from populations facing imminent destruction from habitat loss or from secure populations capable of sustaining collection. Depending on the species, different life stages or a combination of life stages are

released. The northern spring peeper, for example, is most easily collected as larvae whereas the spotted salamander is most easily transported as egg masses.

Prior to release, all snakes and turtles are marked, using scale branding and carapace notching, respectively. Due to their relatively short lifespan, their larger numbers, and the inherent difficulties in long term marking, amphibians are released unmarked. Monitoring efforts consist of observations at breeding ponds, live trapping, searching under boards and logs, and miscellaneous encounters (e.g. road kills and animals found by visitors.)

In monitoring these transplants, we usually document overwinter survival and then confirm breeding or production of offspring. The latter is determined by records of neonates, metamorphs, and unmarked individuals of species marked prior to release. Offspring records, however, do not necessarily prove establishment because gravid females sometimes are released. We have been conservative about deciding when a species is established, but when a pattern emerges of continuing progeny, recorded over a few years and combined with evidence of a spread from the introduction point, it is fairly safe to assume establishment.

Early Results Encouraging

Early results at Jamaica Bay were encouraging. Spring peeper and northern brownsnake were established within three and four years, respectively. By 1986, 11 species had been released and survival and reproduction had been documented for most.

Table 1. Population status of amphibians and reptiles released on Ruler's Bar Hassock Island, Jamaica Bay Wildlife Refuge, New York, New York, 1980 - 1987.

Species Released	Year	No. of Individuals	Overwinter Survival	Breeding Records	Established
Spring peeper	80-83	58 adult 3600 larvae	Yes	Innumerable	Yes
Gray tree frog	1987	1000 larvae	Yes	a	a
Green frog	85-87	130 adult 212 larvae	Yes	a	a
Spotted salamander	1987	14,000 embryos	a	a	a
Redback salamander	83-86	361 juvenile 1443 adult	Yes	12 offspring recorded	a
Northern brown snake	80-84	23 juvenile 49 adult	Yes	42 offspring recorded 83-84	Yes
Smooth green snake	81-86	17 juvenile 64 adult	Yes	10 offspring recorded	a
Eastern hognose snake	84-85	21 hatchling 4 adult	Yes	a	a
Eastern milk snake	84-87	19 juvenile 13 adult	Yes	1 offspring recorded	a
Black racer	85-87	6 juvenile 18 adult	Yes	25 offspring recorded	a
Snapping turtle	83-87	320 hatchling 12 juvenile 38 adult	Yes	3 offspring recorded	a
Eastern painted turtle	82-87	28 juvenile 361 adult	Yes	8 offspring recorded	a
Eastern box turtle	80-86	12 juvenile 183 adult	Yes	6 offspring recorded	a

a = Insufficient elapsed time or data to determine.

In 1987, aided by funds from the Natural Resources Protection Program, Gateway's Office of Resource Management and Compliance expanded the project parkwide. For each unit, the above process of historic research, inventory, habitat suitability assessment, collection, release, and monitoring was begun. For each site, a list of candidate species for release was developed.

At the New York Zoological Society's Bronx Zoo, the curator of herpetology, Dr. John Behler, and his staff entered into a cooperative agreement. The zoo's reptile house is currently rearing eastern hognose snakes for release into the coastal dune habitats of Breezy Point unit. The hognose, once common, has long been extirpated locally, and on Long Island not enough exist in the wilds for the usual collection and release methods. In summer 1988, 16 hatchlings were produced and 10 were released at Breezy Point. The remaining six will be used to supplement the wild-caught breeding stock. Within another year or two the annual release of hognose snakes should double and a population become established.

Restoration Started

Work has begun on restoring the Fowler's toad to Sandy Hook and once established, the hognose snake will follow. Meanwhile, at Jamaica Bay Refuge with its greater habitat diversity and acreage, the program is at its most advanced stage. Individuals of 13 species have been released and records of survival, dispersal, and reproduction continue to grow. (Table 1). It is hoped that the juvenile grey tree frogs who sang last summer at Jamaica Bay will begin breeding in 1989.

Gateway inherited lands with a history of initial abuse for which recent efforts at restoration are attempting to compensate. It is unrealistic to expect the entire pre-urbanization fauna can be restored here, but as a result of this program, continued existence of many of these species in the metropolitan New York area will be ensured. By adapting the principles of this program, other urban areas may also be able to preserve and manage local herpetofauna gene pools and thus provide visitors the opportunity to experience greater wildlife variety.

Cook is a Natural Resource Management Specialist at Gateway NRA.

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Juvenile Black Racer, a species that has produced successfully at both Jamaica Bay Wildlife Refuge and Floyd Bennett Field. (Photo by Don Riepe)

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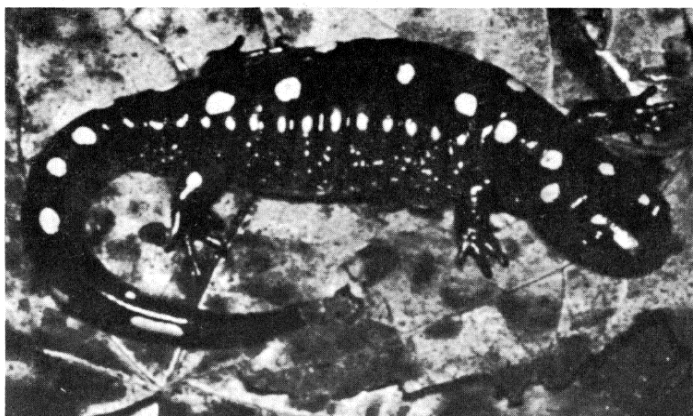
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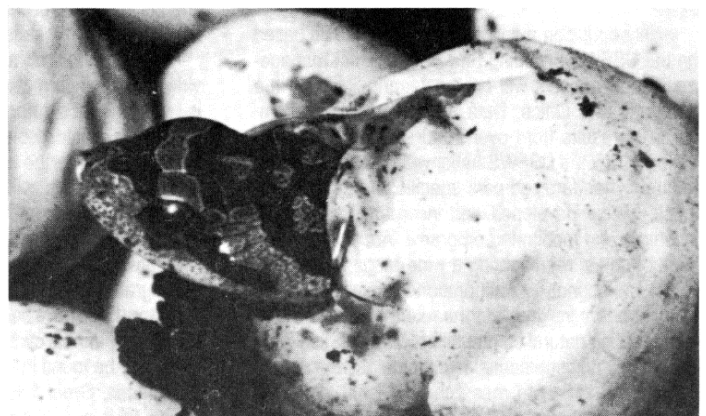
NPCA Update of Leopold Report to DI Secretary on March 19

The results of one year's deliberations on NPS research and management policy for the 21st Century were scheduled to go to the Interior Department Secretary on March 19 — presstime for *Park Science's* Spring 1989 issue. Current NPS policies for wildlife have been largely based on a 1963 report by an advisory board headed by Dr. A. Starker Leopold. A 17-member panel, convened early in 1988 and chaired by Dr. John C. Gordon, dean of the Yale School of Forestry and Environmental Studies, has produced a "Successor to the Leopold Report," which was presented at the opening session of the 54th North American Wildlife and Natural Resources Conference in Washington, D.C., March 19.

A detailed look at this report and its reception at Interior will be carried in the summer issue of *Park Science*.



Spotted Salamander. Transplanted egg masses of this species have successfully hatched and metamorphosed at Jamaica Bay Wildlife Refuge. (Photo by W.A. Tomkins)



Eastern Hognose snake, shown here hatching out. The Bronx Zoo's Reptile House is captive rearing hognose snakes for release at Breezy Point.