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Tourism, the Environment, and the Military: The Case of Guam, 1962-2002

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In this paper, I examine relationships among military rule, the development of tourism as a form of economic development, environmental changes, and the rights of indigenous people (the Chamoru or Chamorro) on Guam between 1962 and 2002. Specifically, I address the impact of the brown tree snake (an alien species accidentally introduced to Guam by the U.S. Navy after World War II) on the evolution of tourism, how Chamoru and other Guamanians view their identities, and the flora and fauna of Guam. The brown tree snake currently threatens to spread throughout the Pacific, including the Hawaiian Islands, with potentially devastating effects.

A publication of the government of Guam noted with pride in 1953 that the island was "completely free of poisonous snakes," making it "a virtual utopia from poisonous bites of any kind."[1] A scant forty-three years later, the authors of a scientific report prepared for the U.S. Congress observed the very damaging impacts of the brown tree snake on Guam:

> The brown tree snake has been a major factor in a modern extinction episode beyond its native range that is unprecedented in its scope: the extirpation of most of Guam's native terrestrial vertebrates, lizards, and virtually all of the island's forest birds.[2]

In addition, brown tree snakes on Guam had caused "more than a thousand power outages, damaged agricultural interests by preying on poultry, killed many pets, and envenomated numerous children."[3] Journalists reporting on the damage done by the brown tree snake were

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This paper is part of a much larger project in which I examine economic development and environmental protection matters since World War II in the Hawaiian Islands, Silicon Valley, the Seattle region, Alaska's Aleutian Islands, Hiroshima, Okinawa, South Korea, Guam, and American Samoa.

[1] Joseph R. Holmes, *This is Guam* (Agano, 1953), 11.

[2] Brown Tree Snake Control Committee (of the Aquatic Nuisance Species Task Force), *Brown Tree Snake Control Plan* (n.p., 1996), 1.

[3] Ibid.

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blunt. One titled his account "The Snake That Ate Guam."[4] How the brown tree snake came to over run Guam has much to tell us about relationships among economic development, the environment, and the U.S. military in the Pacific.

The Invasion of the Brown Tree Snake

Native to Indonesia, New Guinea, the Solomon Islands, and northern Australia, the brown tree snake probably entered Guam as a stowaway in a U.S. Navy ship's cargo shortly after World War II. It was only the most notorious of alien species to invade the Mariana Islands in the wake of World War II. On Saipan, for example, the U.S. Navy planted *tangan-tangan* grasses to hold in place the earth torn up by bombing and shelling. The grass quickly spread over Saipan, creating "an impenetrable barrier."[5] Facing no natural predators on Guam and proving to be very adaptable in its exploitation of habitat and food sources, the brown tree snake reached a population density of 30-50 per acre by the mid-1980s, or about 20,000 per square mile for a total of approximately two million brown tree snakes on Guam.[6]

Biological Discovery

Julie Savidge, a doctoral candidate in ecology at the University of Illinois who worked in Guam's Division of Aquatic and Wildlife Resources (DAWR), was the first scientist to understand and publicize the harm the brown tree snake was causing. By the 1970s, Guamanians noticed that birdlife on many parts of their island was becoming increasingly rare. Guam's avifauna consisted of eighteen native birds, mainly forest dwellers such as the bridled white-eye, the Guam flycatcher, and the Rufous fantail. Many were unique to Guam, including the Guam rail and the Micronesian broadbill. In 1978, DAWR personnel proposed placing ten of Guam's native birds as well as two species of fruit bats on the federal list of endangered species. The agency also put forward a plan to try to discover the causes for the decline in bird populations. Savidge was tapped for that investigation.[7]

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[4] For a particularly valuable journalistic account, see Mark Jaffe, *And No Birds Sing: The Story of an Ecological Disaster in a Tropical Paradise* (New York, 1994). Shorter accounts include David Quammen, *The Song of the Dodo: Island Biogeography in an Age of Extinction* (New York, 1996), 321-44; and Oliver Sacks, *Island of the Colorblind* (New York, 1997), 153-54. For a collection of essays by leading scientists, see Gordon H. Rodda et al., eds., *Problem Snake Management: The Habu and Brown Treesnake* (Ithaca, N.Y., 1999).

[5] Mark R. Peattie, *Nan'yo: The Rise and Fall of the Japanese in Micronesia, 1885-1945* (Honolulu, 1988), 313.

[6] Brown Tree Snake Control Committee, *Brown Tree Snake Control Plan*, 5-8.

[7] Jaffe, *No Birds Sing*, 11-28.

Savidge's work showed conclusively that the brown tree snake was responsible for the plummeting bird numbers. Scientists and non-scientists alike had suspected other causes, not surprisingly, for no snake had ever been implicated in the wholesale destruction of birdlife anywhere in the world. Through extensive fieldwork, Savidge ruled out other possibilities: pesticide contamination, loss of habitat, competition from introduced birds, the depredations of rats, and exotic diseases (avian malaria continues to decimate some bird species endemic to the Hawaiian Islands). Using interviews and questionnaires with people across Guam, Savidge determined both when brown tree snakes were first noticed in different regions and when birdlife began disappearing from those areas. When it became clear that the arrival of snakes marked the decline in birdlife, Savidge thought she had discovered why the birds were disappearing. When additional fieldwork revealed that brown tree snakes ate all kinds of birds, as well as the lizards and fruit bats that were becoming scarce, she was sure.[8] Her role as a public historian shows us once again that history matters.

Working with others, Savidge was able to determine how the brown tree snake had spread on Guam. Introduced through Apra Harbor (Guam's only commercial port), probably in the hold of a Navy ship sometime in the late 1940s or early 1950s, the snakes spread to southern Guam in the 1950s, to central Guam in the mid-1960s, and to Guam's northern extremities in the late 1970s and early 1980s. By early 1983, ten forest bird species could be found only in a small forest below the cliff line at the northern tip of Guam, a place the snakes could not reach. Birds also flourished on Cocos Island, a small islet just south of Guam, another place snakes had not reached. By this time, several of Guam's bird species were presumed to be extinct in the wild. Some that survived in captivity through the heroic efforts of zoo curators were later reintroduced into the wild. Others were completely lost.[9]

Damages Caused by the Brown Tree Snake

The brown tree snake had multiple impacts. First, they hurt people both directly and indirectly. Invading buildings, the mildly venomous nocturnal snakes bit babies and children as they slept. By 1994, officials had recorded some 206 snakebites, including eleven serious cases involving babies less than one year old. In addition, with most birds gone, there was the threat that growing swarms of mosquitoes might spread tropical diseases such as the potentially fatal Dengue fever, which has recently killed people in Maui, causing a decline in tourism.

Second, the snakes exterminated nine species of birds by 1986, and endangered others. In the minds of many Guamanians, and especially in

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[8] Julie A. Savidge, "Extinction of an Island Forest Avifauna by an Introduced Snake," *Ecology* 68 (June 1987): 660-68.
[9] Ibid., 661.

the minds of some indigenous Chamorros, this extinction episode took on ideological overtones. The Guamanians and Chamorros were at the time engaged in a series of acrimonious land-use battles with the U.S. military, viewed as an occupying colonial power. By 1950, some 58 percent of Guam's land area, including much of the best farmland, had been taken over for military bases. By extension, Guam's residents viewed the snakes' extirpation of their native birdlife as an attack on their culture.

Third, the snakes climbed guy wires leading to poles supporting electrical power lines. When their bodies touched both electric-power lines and guy wires, they shorted out the power lines. Power outages became common, just as uninterrupted electric flows were most needed for tourism development. Between 1978 and 1994, there were 1,200 power outages, and those caused by brown tree snakes were conservatively estimated to cost millions of dollars a year. These power disruptions had many ramifications. As a government report observed, "Snakes startle people, and power outages frequently cut short their enjoyment of Guam's nightlife and shopping centers."[10] Power outages also shut down refrigeration units and computers. Not only were the snakes dangerous and spreading diseases; they were also bad for business.

The damage to tourism was a serious matter. After getting off to a slow start in the 1950s and 1960s, tourism boomed on Guam in the 1970s and 1980s. By the 1990s, 1.1 million visitors stayed in 4,000 hotel rooms on Guam each year. Tourism became Guam's leading industry and seemed to offer Guamanians a route to economic independence from the American military. However, the snakes, as Guamanians viewed matters, endangered that economic progress.

Brown tree snakes also threatened to become a problem throughout the Pacific. Very hardy, they could hitchhike to other islands in the wheel wells and cargo holds of airplanes and in cargo containers leaving Guam by ship. Biologists warned that "exotic snakes pose an enormous threat to other islands" and observed that it was "imperative that they be eliminated from interisland transport." Brown tree snakes were repeatedly found on O'ahu in the 1980s and 1990s, brought in accidentally by military airplanes. Closer to Guam, numerous sightings of brown tree snakes occurred on Saipan, Tinian, and Rota in the Northern Marianas. It was deemed likely that a colony of the snakes was established on Saipan by the 1990s. Kwajalein, Pohnpei, Wake Island, Okinawajima, and the Diego Garcia Atoll (in the Indian Ocean) reported less frequent sightings.[11]

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[10] Brown Tree Snake Control Committee, *Brown Tree Snake Control Plan*, 12-13. See also Thomas H. Fritts and David Chiszar, "Snakes on Electrical Transmission Lines: Patterns, Causes, and Strategies for Reducing Electrical Outages Due to Snakes," in *Problem Snake Management*, ed. Rodda et al., 89-103.

[11] Brown Tree Snake Control Committee, *Brown Tree Snake Control Plan*, 8; and Thomas H. Fritts, Michael J. McCoid, and Douglas M. Gomez, "Dispersal of Snakes to Extralimital Islands: Incidents of the Brown Treesnake (*Boiga*

Conceding that the snakes would never be completely eliminated from Guam, scientists and government officials hoped in the early 2000s to reduce their numbers through an integrated management plan that would alter their habitat and employ chemical and biological controls.[12] Recognizing the danger that the snakes might spread beyond Guam, the U.S. Congress in 1991 added a section to the Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990 to authorize a cooperative program to control the snake. Representatives of the Departments of Agriculture, Commerce, Defense, and the Interior, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, and the state of Hawai'i formed a Brown Tree Snake Control Committee in 1993 to develop an integrated pest control approach.[13]

The most stringent controls applied to the Hawaiian Islands. Working with the Brown Tree Snake Control Committee, the Hawaiian Legislature established an Alien Species Action Plan in 1994. As applied to brown tree snakes, this plan meant inspecting all airplanes leaving Guam for Hawai'i on the ground in Guam and checking all airplanes from Guam again once they landed at a Hawaiian airport. Finally, the state established Snake Watch Alert Teams (SWAT) to seek out and destroy any snakes that might somehow get loose in the Hawaiian Islands. Even so, fears that brown tree snakes might run wild on Maui contributed substantially to a decision not to extend the length of the major runway of that Maui's main airport, which might allow airplanes to fly in directly from Guam, bringing in brown tree snakes. Nonetheless, in the summer of 2004 some residents suspected that brown tree snakes had gotten loose in the Hana region of Maui. In the winter of 2005, the snakes were feared to be on the prowl on O'ahu.[14]

Conclusions

This story of snakes, tourism, and the military leads us to several conclusions. First, it shows the importance of alien species for economic development. Brown tree snakes have threatened, and continue to threaten, development on Guam and in the Pacific generally. Nor is this an isolated case. The depredations of alien species are global problems.

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irregularis) Dispersing to Islands in Ships and Aircraft," in *Problem Snake Management*, ed. Rodda et al., 209-23.

[12] Earl W. Campbell, III, Gordon H. Rodda, Thomas H. Fritts, and Richard L. Bruggers, "An Integrated Management Plan for the Brown Treesnake (*Boiga irregularis*) on Pacific Islands," in *Problem Snake Management*, ed. Rodda et al., 422-35. See also U.S. Department of Agriculture, "No Escape from Guam: Stopping the Spread of the Brown Tree Snake" (n.p., 1998), 1-5.

[13] Brown Tree Snake Control Committee, *Brown Tree Snake Control Plan*, 1.

[14] Mansel G. Blackford, *Fragile Paradise: The Impact of Tourism on Maui, 1959-2000* (Lawrence, Kans., 2001), 170-90.

Alien species are, however, particular pests on Pacific islands, where one small change can quickly "cascade" to cause other major alterations.

Second, and perhaps even more interesting, is how the snakes took on ideological overtones. Guamanians, and especially Chamorros, identified the snakes with a colonial attack on their culture. Again, this phenomenon is not unique to Guam. On Kaho'olawe (one of the eight major Hawaiian Islands, just southwest of Maui), natives recently won the right to restore the island to its pre-contact state after environmental damage caused first by Western ranching and then by use as a U.S. Navy live-fire range.[15] The bombing and shelling stopped in 1990, and over the past decade, natives have overseen Navy efforts to clean up Kaho'olawe, aided by a $400-million Congressional appropriation. That cleanup has involved revegetation, which became an important issue in the 1990s. Those involved rescinded their initial decision to remove all tamarisk trees (an alien species) when they discovered that they provided shade in which many native species of plants thrived. Ideology was at work in this and other similar decisions throughout the Pacific, as culture and economics went hand-in-hand.[16]

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[15] Mansel G. Blackford, "Environmental Justice, Native Rights, Tourism, and Opposition to Military Control: The Case of Kaho'olawe," *Journal of American History* 91 (Sept. 2004): 544-71.

[16] Rene Silva, "Native Plants," in *Malama: Hawaiian Land and Water,* ed. Dana Naone Hall, special issue of *Bamboo* Ridge*: The Hawaiian Writers' Quarterly* 29 (Winter 1985): 77.