BROWN TREESNAKE CONTROL

ANNUAL PROGRESS REPORT
For

GUAM POWER AUTHORITY

Fiscal Year 2009

Prepared by:

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BACKGROUND

The inadvertent introduction of the brown treesnake (BTS; *Boiga irregularis*) to the island of Guam has resulted in significant environmental and ecological damages. The BTS is responsible for the extirpation of most native birds and lizards on the island and has become an agricultural pest. In addition, the BTS has been implicated in hundreds of power outages throughout the island, resulting in millions of dollars in structural damage and lost revenue.

In response to concerns about continued snake-caused power outages on Guam, the Guam Power Authority (GPA) enlisted the services of the United States Department of Agriculture, Wildlife Services (WS) program to help reduce snake-related damages. Beginning in November 1998, WS initiated BTS removal efforts at seven GPA substations around Guam. The program became annually funded in February 1999. Control efforts were expanded in October 1999, October 2000, and October 2001. Beginning October 2003, WS added control efforts to the Marbo and Macheche facilities. In 2006, WS added control efforts to the Anigua and Pagat substations, as well as the use of oral toxicants to parts of the Tanguisson transmission line, bringing the total number of substations under contract to seventeen (see Table 1 for a complete list of substations under contract). With the relocation of Tanguisson transmission lines underground during this fiscal year, toxicant use was reduced in that area and relocated to the Airport transmission lines in April.

CURRENT CONTROL PROGRAM

WS employs one full-time Wildlife Specialist to conduct control efforts at GPA substations and a second specialist working 5-10 hours weekly to assist with toxicant work. Oversight for the program is provided by a Supervisory Wildlife Biologist working out of the WS office in Barrigada. A wildlife biologist inputs and maintains snake capture data generated by the control program. Currently, 252 snake traps, which are activated 24 hours per day, seven days per week, are in use at the targeted substations. Sixty toxicant stations for BTS are operated in several high risk locations along the transmission lines of Tanguisson and the Airport, and at the entrance gates of two substations. In addition to snake trapping, WS conducts nighttime spotlight searches at each substation, up to twice weekly.

CONTROL PROGRAM RESULTS

Between October 1, 2008 and September 30, 2009, WS removed 816 BTS from the fifteen targeted substations. Since the inception of the program in 1998, WS has removed 8,645 snakes. Traps have accounted for approximately 72% (n =6,260) of the total snakes removed, while approximately 28% (n =2,385) were hand captured. Table 1 summarizes the level of effort applied, traps currently in use by WS, and snake captures by method and substation. Additional BTS control was conducted with toxicants along the Tanguisson and Airport transmission lines, with a total of 1090 bait taken. Toxicants were also applied at the Yona (Pulantat) and Macheche substations, with 159 and 54 baits taken, respectively. The total number of BTS removed using toxicants is difficult to ascertain, as missing bait is generally assumed to be taken by a BTS. There is an unknown, but possibly significant, level of take by non-targets, such as

ants and rodents, which account for some missing bait.

Data from recent field trials with oral toxicants suggest that the integration of toxicants, traps, and hand capture may further expand the population of BTS targeted by control efforts. As WS generates more data on the efficacy of toxicants (in relation to trapping and hand capture), more recommendations on their application will be forwarded to GPA for consideration.

TABLE 1. Brown treesnake captures and effort, reported by substation.

SUBSTATION	# Traps	FY2009 #Visits/Site	FY2009 # Hours/Site	FY2009 BTS by Trap	FY2009 BTS by Hand	Total BTS by Trap[2]	Total BTS by Hand[2]
Airport	8	59	56	3	7	67	25
Anigua	5	57	29	8	5	22	15
Apra Heights	14	64	79	32	21	272	120
Cabras/Piti[1]	28	116	144	22	10	251	135
Harmon	18	66	107	115	27	1051	328
Macheche	12	116	162	12	6	72	46
Marbo	20	64	112	121	20	691	161
Mongmong	20	61	117	26	11	355	169
Orote	29	59	129	5	8	49	40
Pagat	2	53	27	8	0	25	1
Pulantat	11	127	166	40	25	760	409
Talofofo	12	64	80	41	22	496	137
Tamuning	16	61	98	17	9	226	148
Tanguisson	20	125	262	65	18	1046	436
Tenjo Vista	9	58	61	72	10	515	84
Yigo	28	55	115	24	6	362	131
SUBTOTALS	252	1205	1744	611	205	6260	2385
TOTAL BTS REMOVED[2]							**8645**

[1]Data from Cabras and Piti substations is pooled for this report
[2]Total snakes include all removed between 11/1/98 and 9/30/09

RECOMMENDATIONS

1) Continue control at key substations that are integral to power generation and distribution
Snake capture rates continue to be highest at the Tanguisson, Talofofo, Tenjo Vista, Harmon, Marbo, and Yona substations. These stations are located near large blocks of forest where surrounding snake populations are high; snake densities surrounding these substations have likely not been significantly impacted by ongoing control efforts. As a result, snake captures will remain high in these areas for the foreseeable future, and snake-caused outages would likely increase if control efforts cease. Other substations that are further removed from large blocks of forest (such as Cabras or Tamuning) have lower snake capture rates; however, all substations

attract a variety of potential snake prey, including introduced birds and rats, which in turn may attract snakes. For this reason, some level of continuing control at each priority substation is advisable.

2) Consider the use of permanent barriers to further exclude snakes
The use of snake-proof barriers may have some applicability at several substations, especially those that are situated in areas with surrounding forest. Dense forest adjacent to substations such as Pulantat support large populations of BTS that are not greatly impacted by the control operations occurring inside the substation. Barriers may further reduce the number of BTS that circumvent primary control activities.

3) Reduce the abundance of snake prey at power generation and distribution sites
The presence of potential snake prey, especially introduced birds and rodents, may greatly increase the attractiveness of an individual substation to snakes. GPA should consider control of rats (*Rattus* spp.), Eurasian tree sparrows (*Passer montanus*), feral pigeons (*Columba livia*), and black drongos (*Dicrurus macrocercus*) from substations as part of the ongoing effort to reduce snake-caused outages. A variety of techniques, including netting, repellents, and toxicants are available to manage rodents and introduced birds.

4) Document the reduction in snake-caused outages at the targeted substations
Information provided by GPA indicates snake-caused outages are occurring infrequently at substations currently under contract with WS. However, this information does not provide any baseline data on outage rates prior to the inception of snake control. It would be beneficial for both GPA and WS to obtain outage information at the targeted substations prior to the initiation of the current control contract. Such information would allow a comparison of outage rates before and after the initiation of snake control. This information could be useful for GPA outreach in publicizing efforts by GPA to reduce rate-payer costs.

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