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CUSTOM TRUCKS, RADIO SNAKE JINGLES, AND TEMPORARY TATTOOS: AN OVERVIEW OF A SUCCESSFUL PUBLIC AWARENESS CAMPAIGN RELATED TO BROWN TREESNAKES IN THE COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS

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Abstract: The brown treesnake (*Boiga irregularis*) was introduced on Guam during post World War II cargo movements. Brown treesnakes (BTS) have now become exceptionally abundant on Guam and pose a direct, significant, and growing threat to other areas outside of their historic range, including the Commonwealth of the Northern Mariana Islands (CNMI), the State of Hawaii, the United States mainland and other sites regionally and internationally. The CNMI is at high risk for a BTS introduction due to its close proximity and the types and amount of cargo received. Limited BTS awareness efforts between 1986 and 2002 in the CNMI resulted in an average response time of 126 hours indicating that an increased awareness of appropriate response actions among the public was needed. An awareness campaign was outlined in three phases: (1) baseline public survey, (2) ten month awareness campaign, and (3) re-evaluation survey. The CNMI Division of Fish and Wildlife (DFW) staff and an outside advertising firm created a baseline survey to gather media consumption information and environmental attitudes. Conclusions of the baseline survey were then utilized to create a ten month awareness campaign to improve average response times. After the campaign, average response times decreased from 126 hours to 1 hour 42 minutes. The re-evaluation survey confirmed the success of specific campaign components and directs current awareness efforts.

Key Words: *Boiga irregularis*, brown treesnake, education, invasive species, public awareness, rapid response.

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INTRODUCTION

Shortly after World War II and before 1952, the brown treesnake (*Boiga irregularis*) was accidentally transported from its native range to Guam, probably as a stowaway in ship cargo (Rodda et al. 1992). Upon arrival in Guam, the brown treesnake (BTS) encountered an abundant prey base and an absence of natural predators and pathogens allowing the BTS to reach high densities (Savidge 1987). Since its accidental introduction to Guam, the BTS has been responsible for the extirpation of ten native forest bird species; three native lizard species and hundreds of power outages affecting private, commercial, and military activities; large-scale loss of domestic birds and pets; numerous potentially fatal envenomations of children; and considerable emotional trauma to residents and visitors alike (Fritts et al. 2001, Campbell 2004).

HIGH-RISK EXTRALIMITAL SITES

Guam is located in the western Pacific and serves as a military and commercial shipping hub for the region. Due to its high abundance on Guam, the BTS poses a direct, significant, and growing threat of dispersal to other areas outside of its historic range, including the Commonwealth of the Northern Mariana Islands (CNMI), the State of Hawaii, the mainland of the United States (US), and other regional and international sites (Campbell 2004). Unlike Guam, where the BTS has devastated many of the native wildlife populations, the CNMI still harbors many native species. Since 1982, however, the CNMI has documented 13 BTS captures (11 on Saipan and 2 on Rota) and 76 credible sightings. Repeated sightings on Saipan indicate that an incipient population is now present there (Colvin et al. 2005).

PREVIOUS BROWN TREESNAKE AWARENESS EFFORTS IN THE CNMI

Rapid response and early detection are arguably the best practices in locating and eradicating invasive species. However, the CNMI rapid response efforts to potential BTS sightings have suffered from a lack of public awareness. From 1992 to 2002, BTS awareness efforts in the CNMI were limited primarily to school presentations, newspaper advertisements, and press releases. Consequently, the average response time (time elapsed from initial sighting to an official response by CNMI Division of Fish and Wildlife [DFW] personnel) for CNMI BTS sighting reports from August 1986 to August 2002 was approximately 126 hours (5.25 days). On November 15, 2001, the DFW received a telephone call from a professor of biology at the Northern Marianas College, Saipan, regarding a snake sighting that occurred on November 1, 2001. If early detection and eradication efforts were to succeed, DFW would have to improve the average response time by promoting public awareness.

CNMI BTS AWARENESS CAMPAIGN DESIGN

The United States Department of the Interior's (DOI) Office of Insular Affairs (OIA), who had been funding the CNMI BTS Program since 1992, awarded an awareness grant to the DFW in January 2002 (Table 1).

Table 1. CNMI BTS Awareness Campaign Budget (2002-2007).

Campaign awards 2002-2004:	
DOI-OIA grant	$100k
Telecommunication (gifts-in-kind)	$33k
Total award	$133k
Campaign award 2004-2007:	
USFWS	$65k
Campaign expenses 2002-2004:	
Baseline survey	$55k
10-month campaign	$64k
Re-evaluation survey	$14k
Campaign expense 2004-2007:	
36-month campaign	$65k

The performance measurement of the OIA grant was to ultimately increase public awareness efforts to improve the average response times for snake sightings in the CNMI. Working closely with United States Geological Survey (USGS), DFW outlined a comprehensive awareness campaign that included three major components: (1) a baseline survey, (2) campaign design and implementation based on survey results, and (3) a re-evaluation survey that would measure the performance of the campaign. After outlining the awareness campaign, DFW contracted a local advertising firm to facilitate and expedite the campaign.

BASELINE SURVEY

DFW worked closely with the advertising firm to develop a baseline survey that would generate information accurate to within ± 5% at the 95% confidence level. The survey was designed to measure current BTS awareness levels and the impact of past communications programs. Due to DFW planned implementation of BTS specific quarantine regulations, the survey also assessed viewpoints towards BTS specific regulations, as they would likely increase consumer costs. Because of the potential political impact of BTS specific quarantine regulations, the November 2002 survey was based on a random sample of Saipan's (CNMI) eligible voters.

The baseline survey revealed that the BTS problem had become a salient issue in the CNMI. Over 69% of the 300 people interviewed perceived the BTS to be "a problem", with 37% of the 69% perceiving the BTS as a "big problem." The survey also found that when asked if the quarantine was "a good move" even if it "results in delays" and "forces up costs", 53% of voters responded positively. When asked even if the quarantine list included "household items" shipped to Saipan, voter support remained high at 62% (Merrill 2004).

The baseline survey also provided information on media consumption habits in the CNMI. The survey found radio advertisements to be as equally effective in reaching audiences as more expensive newspaper and television advertisements. The media consumption information collected from the baseline survey was invaluable, as it had not been evaluated by a government agency in the past and was therefore unavailable.

IMPLEMENTATION OF THE CNMI BTS AWARENESS CAMPAIGN

The first step in the implementation of the ten-month campaign was to develop clear and concise messages regarding appropriate community response actions to a snake sighting. It was evident

from the baseline survey that the public was generally aware of the BTS threat to the CNMI and that quarantine measures would be supported. However, the survey revealed confusion when the public was asked who they should contact to report BTS sightings in the CNMI. Since the objective of the campaign was to improve average response time, the messages needed to stress the immediacy in reporting any snake sightings to a BTS Hotline.

The "Don't Give Snakes a Break" slogan, accompanied with a logo and radio jingle, was created to highlight the hotline and stress the immediacy of reporting snake sightings. Advertisements were also developed to outline the threats of the BTS to the CNMI. The materials developed were incorporated in all public relations activities.

DFW contacted the local telecommunications company to establish the BTS Hotline. The telecommunications company immediately became interested in the campaign and offered to contribute cash donations, free advertisements, billing inserts and cellular phones to help improve BTS awareness in the CNMI. The partnership was formed and the 28-SNAKE Hotline (287-6253) was implemented in April 2003 during a press conference at the CNMI Governor's Office.

Over the course of the ten-month campaign, several outreach materials were created and distributed. To promote of the new hotline and partnership with the telecommunications company, 28-SNAKE t-shirts, hats, can coozies, temporary tattoos, and bumper stickers were made available. Radio advertisements, in the form of snake jingles, were aired during peak listening times. Radio contests with prizes donated by the telecommunications company were also held to test the knowledge of listeners. DFW also contracted a local artist to design custom paint jobs for the DFW trucks that acted as moving billboards for the BTS program. The trucks were entered in car shows, parades and parked at local events to promote the hotline.

To prepare for the 2003-04 school year, DFW created BTS book covers, brochures and stickers. In August, just as the school year began, the BTS campaign launched a series of advertisements to encourage educators to schedule BTS awareness presentations. During the year DFW staff averaged three presentations per week to elementary, middle and high school students.

RE-EVALUTION SURVEY

In March 2004, DFW conducted a survey to evaluate the effectiveness of the BTS awareness campaign. A total of 356 individuals were surveyed with an accuracy of ± 5% at the 95% confidence level. Unfortunately, the 2002 survey (CNMI population of eligible voters) over-represented Chamorros and Caucasians and under-represented other ethnic groups. Therefore, the 2004 survey expanded to populations that included non-resident workers of various ethnic backgrounds in order to include more individuals in professions (night security, port equipment operators, construction, shipping and receiving) likely to encounter the BTS.

Some key demographic statistics (age, sex, number of dependents and level of education) remained constant between the two surveys. The re-evaluation survey, however, sampled a more evenly-distributed ethic population and found 46% of the respondents had incomes lower than $20,000 as compared with 28% in 2002 (Merrill 2004). It was known that the ethnic shift between the two surveys might represent a decrease in exposure to the campaign, as many of these groups were not the target audiences. However, the information from these groups would need to be known before any adjustments to the campaign could be made.

The BTS issue remained an important concern among those surveyed in 2004. In fact, the re-evaluation survey found that those perceiving snakes as a "very big problem" increased from 37% in 2002 to 57% in 2004. The 2004 survey also evaluated the messaging of the campaign and found 72% of the respondents were able to identify the correct slogan and hotline number. The survey also found 72% of the respondents were aware of the campaign's messaging regarding the snake's impact on wildlife, human health, and the economy (power outages) (Merrill 2004).

Even though the 2004 survey expanded to non-target audiences, the exposure percentage remained constant at 39% (both surveys) having seen a BTS presentation. A campaign exposure index (CEI) was calculated from the two surveys to find that 87% (2002) and 80% (2004) of the respondents had seen at least two or more types of BTS awareness messaging. The survey also measured the effectiveness of specific campaign outreach materials. Results showed custom trucks and bumper stickers had the highest exposure values. The CEI found that between ethnic groups, Chamorros (local population) held the highest

scores in both 2002 and 2004 with 37% and 38%, respectively. Filipinos had relatively high scores as well with 15% and 23%, respectively, and other Asians, 8% and 14%, respectively (Merrill 2004).

An important component of the 2002 and 2004 surveys was to determine the level of public support for planned BTS-specific quarantine regulations. The surveys found that nearly 9 out of 10 respondents (87% in 2002; 85% in 2004) agreed that increased quarantine was a "good move." Furthermore, when asked if quarantine was still a "good move" if it resulted in delays and increased costs, 53% of respondents in 2002 and 73% in 2004 said that it was (Merrill 2004).

A quarantine support index (QSI) was calculated from both surveys to measure the respondents' incremental support for various quarantine options. This was used to gauge the respondent's overall support. It was evident that exposure to the BTS awareness campaign was associated with support for quarantine. Respondents in both surveys scoring the highest on the CEI also scored highest on the QSI (49% November 2002; 57% March 2004). Additionally, the surveys revealed that respondents with lower exposure tended to have more mixed (or ambiguous) views about the planned quarantine regulations (Merrill 2004).

CURRENT BTS AWARENESS EFFORTS IN THE CNMI

After the 2004 survey, the DFW received an awareness grant from the US Fish and Wildlife Service (USFWS) to continue the campaign. Utilizing the information from previous efforts, DFW continued to expand the BTS awareness campaign to target additional audiences. In June 2004, the DFW expanded its presentation activities by coordinating with non-resident worker groups and presenting awareness information to over 3,000 non-resident workers by June 2007. The DFW also increased awareness efforts with the public school system by incorporating BTS information and presentations into the 4th grade science curriculum. Furthermore, DFW expanded awareness efforts and helped to offset budget shortfalls in the public school system by providing basketball backboards with BTS messaging. DFW plans to further this effort by renovating school bus stops and sports fields.

Additional outreach materials were developed including, banners, revised snake jingles, mouse pads, "push" and "pull" stickers for places of business and e-advertisements for visiting military personnel.

DISCUSSION

The success of the CNMI BTS awareness campaign can ultimately be measured by the improved average response time from 126 hours (06/1986-06/2002) to 1 hour 42 minutes (08/2002-present). This was achieved by developing appropriate motivational messages and materials that were based upon existing audience behaviors and attitudes. The baseline and re-evaluation surveys proved to be invaluable for conducting the BTS awareness campaign. Collecting public attitude and media information before and after a campaign allows mangers to evaluate the effectiveness of the campaign.

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