

# **SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT: TARGETED AERIAL APPLICATION OF ACETAMINOPHEN FOR BROWN TREESNAKE CONTROL ON GUAM**

**United States Department of Agriculture  
Animal and Plant Health Inspection Service  
Wildlife Services**

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## **1.0 PURPOSE AND NEED FOR ACTION**

### **1.1 PURPOSE**

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program prepared an environmental assessment (EA) to evaluate potential impacts on the quality of the human environment including risks to threatened and endangered species from the experimental targeted broadcast application of acetaminophen as an oral toxicant for the control of invasive brown treesnakes (*Boiga irregularis*) on Guam (USDA 2011). Acetaminophen, one of the most widely used human pharmaceuticals, has proven to be an effective toxicant for brown treesnakes at relatively low doses.

The EA evaluated the need for continued development and improvement of technologies to provide enhanced options and abilities to control this harmful invasive predator, and the relative effectiveness of four alternative approaches to meet that proposed need, while accounting for the potential environmental effects of those activities.

After consideration of the analysis contained in the EA and review of public comments, WS issued a Decision and Finding of No Significant Impact (FONSI) for the EA on January 4, 2012. The Decision and FONSI selected the proposed action alternative, which permitted the targeted aerial application of oral toxicants for controlling brown treesnake populations in and around the Habitat Management Unit (HMU) on Andersen Air Force Base (AAFB), Guam. The action occurred over two 55-hectare plots, where toxicant baits were applied, plus a third plot (reference site) that served as a source of baseline data on brown treesnake abundance. Eight aerial applications of baits were made using a commercially leased helicopter at a rate of 36 baits per hectare per application, with a total of 15,840 and 13,860 baits dropped at each of the two treatment sites.

The purpose of the EA will remain as addressed in Section 1.2 of the EA (USDA 2011). The purpose of this supplement to the EA is to evaluate potential impacts of an additional experimental aerial application of oral acetaminophen baits under slightly modified conditions resulting from further development of aerial application technology. This experimental application will evaluate the effectiveness of an automated bait delivery system with a novel apparatus for ensuring entanglement of baits in forest canopy, making them available to arboreally-foraging brown treesnakes while preventing them from being taken by terrestrial non-target animals (particularly crabs). The purpose of this project is to evaluate the efficacy of oral toxicant application for reducing brown treesnake activity levels in a test plot without a history of brown treesnake suppression. Thus, WS proposes the substitution of a new drop site for one covered in the original EA.

Deviations from the action approved under the original EA are explicitly detailed in “Alternative 1 (Proposed Action),” below.

### **1.2 NEED FOR ACTION**

Section 1.3 of the EA provides a description of the need for action to develop improvements to existing aerial toxicant delivery technology and methodology that will greatly increase the capacity of operational brown treesnake control programs, subsequently reducing the impacts of snakes on Guam and the risk of their dispersal from Guam (Savarie et al. 2001).

The proposed supplemental action is required to evaluate the field performance and capabilities of an automated system for the targeted delivery of large quantities of baits, necessary for scaling up to an effective program of landscape-scale control of brown treesnakes.

### **1.3 SCOPE OF THE ENVIRONMENTAL ASSESSMENT**

The EA and this supplement evaluate potential impacts to the quality of the human environment including risks to threatened and endangered species from the experimental targeted broadcast of acetaminophen baits for the control of invasive brown treesnakes on Guam.

The scope of analysis remains valid as addressed in the EA (1.5.2) with the addition of a neighboring forest plot of the same habitat type and species assemblage. This supplemental EA also analyzes the impact of alternative methods of evaluating the efficacy of an automated bait delivery system for brown treesnake control, to include a No Action Alternative.

#### **Public Involvement**

WS has provided a draft of the supplemental EA to cooperating agencies to review. Revisions based upon cooperator comments have been made as necessary. A revised draft was provided for a 30-day public comment period, via a legal notice in Guam's Pacific Daily News, web notices including to nationally interested stakeholders (GovDelivery), and mailing of notices to a local mailing list of interested individuals and groups. After the public comment period, WS will respond to all substantive public comments collectively, and make any necessary changes to this supplemental EA.

### **1.4 RELATIONSHIP OF THIS DOCUMENT TO OTHER ENVIRONMENTAL DOCUMENTS**

#### **ADC Programmatic Environmental Impact Statement (USDA 1997, revised).**

Wildlife Services has determined that review of alternatives for a targeted aerial application of acetaminophen for brown treesnake control on Guam is best addressed at the project level in an EA. Wildlife Services' decision and actions regarding this research activity will rely solely and exclusively on the decision document and record on this supplemental EA. The 2011 EA entitled Targeted Aerial Application of Acetaminophen for Brown Treesnake Control on Guam incorporated by reference USDA, 1997, revised. This Supplemental EA does not incorporate by reference USDA 1997, revised.

#### **Brown Treesnake Control Activities on Guam Environmental Assessment (USDA 1996).**

The 2011 EA entitled Targeted Aerial Application of Acetaminophen for Brown Treesnake Control on Guam incorporated information on BTS control methods from USDA (1996). Wildlife Service's decision and actions regarding the research activities discussed in this supplement to the 2011 EA rely solely and exclusively on the decision document and record on this supplemental EA. This supplemental EA does not incorporate information on BTS control methods from USDA (1996).

#### **Targeted Aerial Application of Acetaminophen for Brown Treesnake Control on Guam (EA; USDA 2011)**

The supplemental EA incorporates by reference all information from this original EA, with the exception of those elements explicitly detailed as deviating from the original EA elsewhere within this document.

WS issued a Finding of No Significant Impact for this EA on 4 January 2012 (USDA 2012).

### Aerial Application of Acetaminophen-treated Baits for Control of Brown Treesnakes (Draft Final Report)

This draft final report of the ESTCP-funded action occurring under the original EA details the successful manual deployment of baits and the subsequent reduction in snake activity as indicated by reduction in removal of placebo baits (Figure 1). This report is in review by ESTCP and not yet available. This report also addresses the logistical and economic advantages to be realized by the automation of a bait dispensing system, such as the one to be evaluated under the action proposed in this supplement.

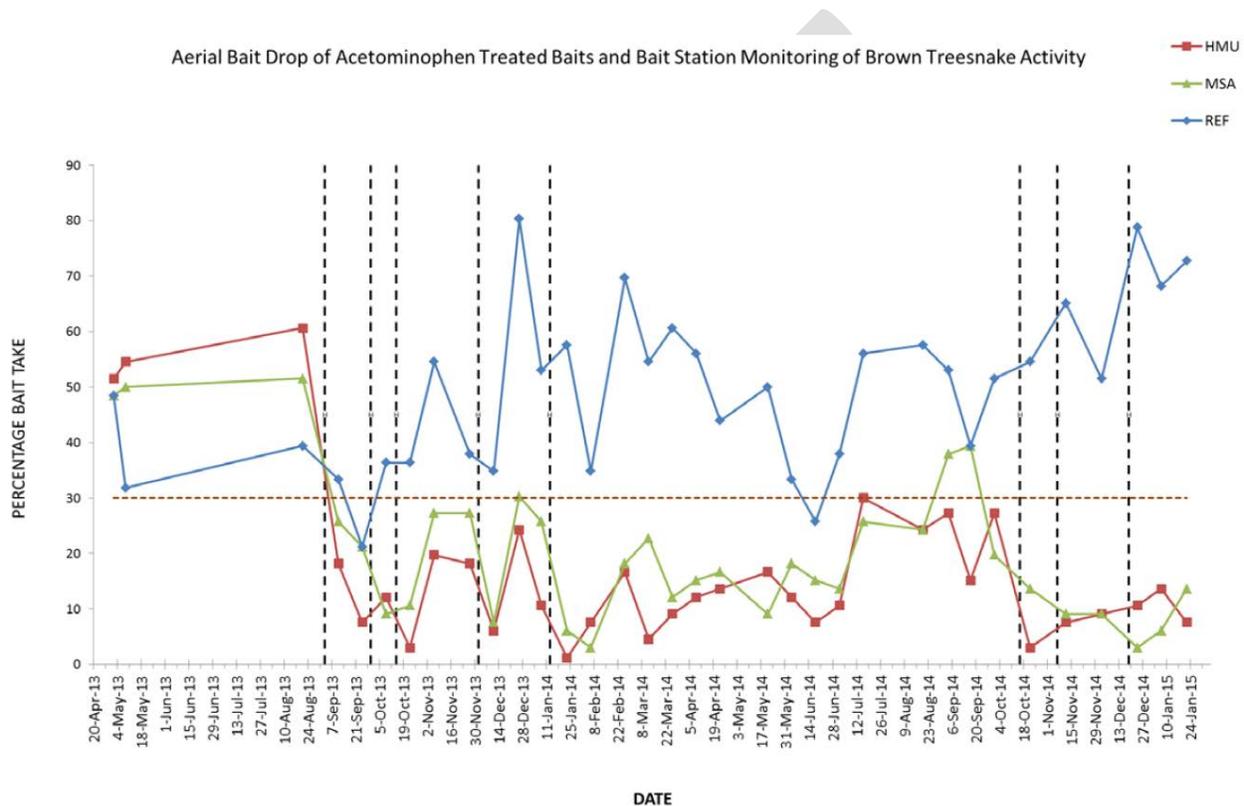


Figure 1. Snake activity levels, as indicated by removal of placebo baits, at the untreated control site (REF) and the two treated plots (HMU and MSA). Dashed vertical lines indicate the dates of bait applications. This figure is from a draft report and not to be duplicated or disseminated elsewhere.

Section 1.6 of the EA addresses the relationship of the EA and this supplement to additional documents (USDA 2011).

### 1.5 AUTHORITY AND COMPLIANCE

Federal, state, and local laws regulate WS’ activities to reduce threats associated with invasive brown treesnakes on Guam. Section 1.7 of the EA discusses the authority of WS (USDA 2011), along with the authorities of other federal, state, and local entities. WS’ authorities and those of federal, state, and local entities would remain as addressed in the EA. WS would comply with applicable federal, state, and local laws and regulations pursuant to WS Directive 2.210. Section 1.7 of the EA also discusses WS’ compliance with relevant laws and regulations (USDA 2011).

## **1.6 AFFECTED ENVIRONMENT**

Section 1.5 of the EA addresses the location and scope of the affected environment and remains valid as described (USDA 2011), with the exception of the addition of an alternate test drop site in neighboring habitat under the same jurisdiction, habitat characteristics, and species composition as the sites approved under the EA. In addition, a potential cultural resource issue was identified during interagency coordination for this supplemental EA and is addressed under Sections 3 and 4. Inclusion of this additional site does not raise other new environmental issues to those studied in the EA. The alternate test drop site location is detailed under “Alternative 1 (Preferred Action).”

## **2.0 DESCRIPTION OF THE ALTERNATIVES**

Chapter 2 of the EA describes and discusses in detail the alternatives WS considered and evaluated using the identified issues (USDA 2011). In addition, the EA contains a detailed description and discussion of the alternatives and the effects of the alternatives on the issues identified (USDA 2011). The EA also provides a description of the methods that WS could use or recommend under each action alternative. The methodology is changed as discussed below under Section 2.1

This supplemental EA describes a proposed action to augment the results of the action carried out under the original EA, along with potential alternative actions. The Alternatives analyzed in this supplemental EA include:

- Alternative 1 – Evaluation of the aerial bait delivery system over the HMU and a new site within the Munitions Storage Area (MSA)(Proposed Action).
- Alternative 2 – Evaluation of the aerial bait delivery system over the HMU and the original MSA drop site.
- Alternative 3 – No evaluation of the aerial bait delivery system (No Action Alternative)

### **2.1 ALTERNATIVE 1 – Evaluation of the aerial bait delivery system over the HMU and a new site within the Munitions Storage Area (Proposed Action).**

Aerial suppression of brown treesnakes is key to the management of snakes on a landscape scale. Through the previous project, titled “Targeted Aerial Application of Acetaminophen for Brown Treesnake Control on Guam,” the National Wildlife Research Center (NWRC), WS’s research branch, has demonstrated that snake populations on Guam can be managed through the use of aerial application of baits containing the snake toxicant acetaminophen. One of the principal logistical concerns with scaling these operations to larger areas is the obvious need to automate both the bait production and the aerial dispensing of the bait. In response to this need, NWRC has partnered with an engineering firm to develop an aerial suppression system that automates bait production and dispensing from either helicopters or fixed wing aircraft. The system offers the capability to provide near pinpoint dispensing of thousands of baits in a matter of minutes. This new system provides a fully integrated solution that considers bait cartridges, the dispensing system module, and all supporting infrastructure and logistics for practical manufacturing, storing, and flight-line handling of the bait cartridges. The proposed project would provide the first large-scale evaluation of this system. NWRC and the Guam WS operational program are proposing a period of application of acetaminophen baits (which may entail multiple applications as allowed under the EPA restricted use pesticide registration label) employing the helicopter-borne automated delivery system (ADS) to evaluate the effectiveness of this technology for landscape-scale control of brown treesnakes. The proposed project would occur on the Munitions Storage Area (MSA) of Andersen Air Force Base (AAFB) and adjoining property owned by the U.S. Navy, although no application of baits would occur on Navy lands (untreated control plot). Approximately 110 hectares of forest would be exposed to up to three applications of toxicants via a commercially contracted helicopter,

with 55 hectares of adjacent property serving as a control (or baseline) site. The proposed action will include monitoring of activity levels of brown treesnakes and their rodent prey before and after treatment in a fashion similar to that under the prior action.

The proposed action is expected to be undertaken as early as 19 January 2016, or as soon thereafter as is logistically feasible, and no later than 30 September 2016.

This proposed action differs from the prior action covered by the original EA in the following aspects:

1. The prior action was conducted under funding from the Department of Defense (DoD) Environmental Security Technology Certification Program (ESTCP); the proposed action is funded by the Department of Interior (DOI) Office of Insular Affairs (OIA).
2. Applications under the prior action occurred over two sites, a 55-hectare habitat management unit (HMU Drop Site) surrounded by a brown treesnake enclosure and a neighboring block of forest habitat of the same size within the MSA unbound by a snake enclosure (MSA Drop Site); the proposed action would treat the same HMU Drop Site, but would substitute an alternative 55-hectare treatment site (Alt MSA Drop Site) for the MSA Drop Site (Figure 2). Snake activity at the MSA Drop Site has been depressed by the treatments administered under the prior action and by prior and subsequent trapping and hand-delivery of toxicant baits occurring operationally in adjoining habitats. Since the intention of the proposed action is to evaluate the effectiveness of the methodology at suppressing abundant snake populations, as occur in most forested habitat on Guam, we have selected a neighboring habitat on AAFB without a history of snake suppression to serve as our second treatment site (Alt MSA Drop Site). This alternative location is of the same general habitat type (primary and secondary limestone forest) and manifests no differences in risks to groundwater, human activities, historical, non-target species, or other environmental resources. The alternative site will have transects of minimally-trimmed vegetation established for snake and prey monitoring in a pattern similar to that in the other sites. The two rows of monitoring transects at the Alt Drop Site have been offset to avoid inclusion of a large patch of bare ground within the drop site.
3. The prior action entailed 15 aerial bait applications (8 over the HMU Drop Site and 7 over the MSA Drop Site) over a 16-months period; the proposed action consists of up to three applications over the HMU Drop Site and the Alt MSA Drop Site. Multiple flights applying baits at rates lower than the label maximum may occur, but the sum total of those drops will not exceed the maximum rate for a single application allowed by the label (e.g., a flight dispensing baits at 40/hectare may be followed by another flight at 80/ha, achieving the maximum single-application rate of 120/hectare), with up to three applications spaced at least three days apart as per the EPA label.

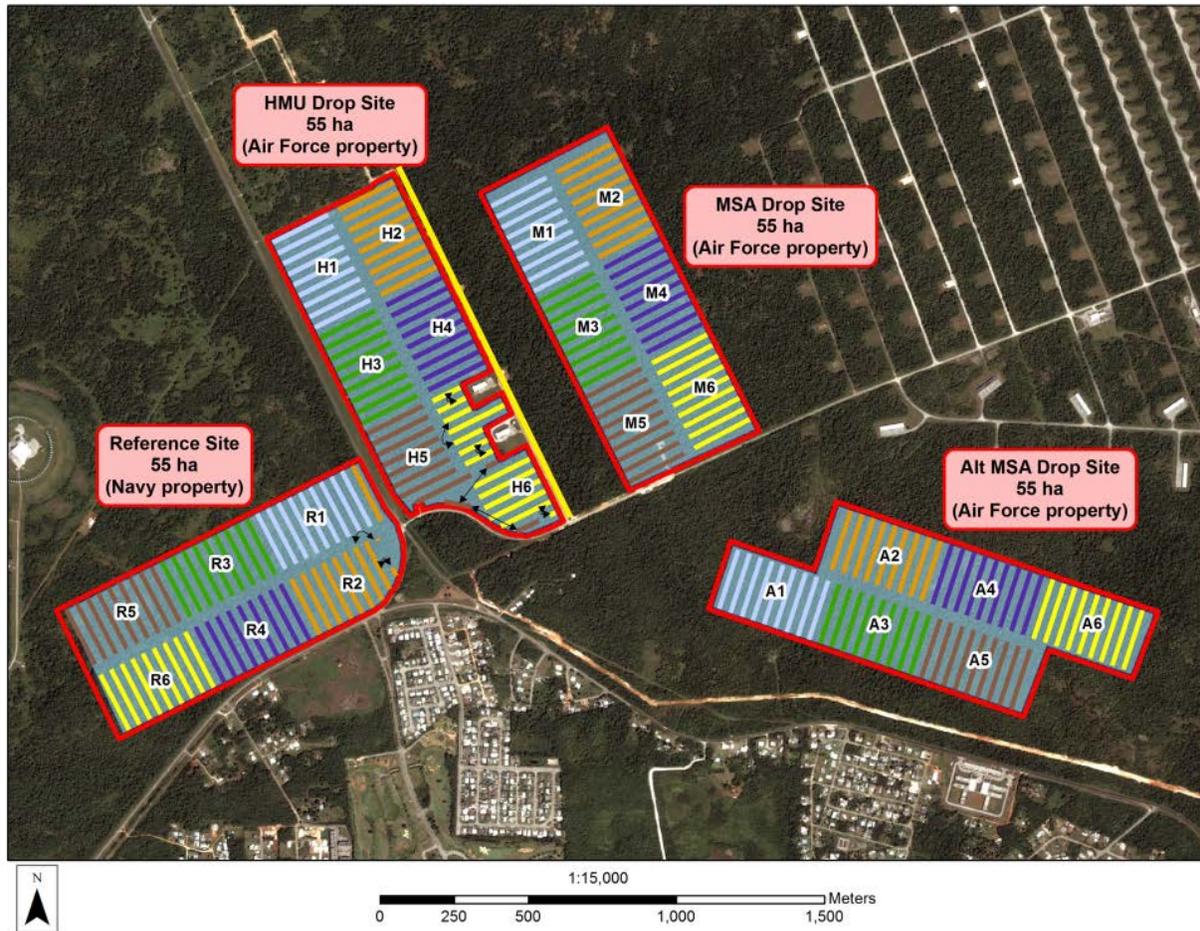


Figure 2. The proposed action entails substituting the “Alt MSA Drop Site,” in adjoining habitat, for the “MSA Drop Site.” At the Alt MSA Drop Site, transect quadrants have been offset to avoid inclusion of a defunct quarry in the treatment site. The yellow line along the northeast edge of the HMU indicates the road along which bait spacing validation flights will occur.

4. During the prior action, each treatment occurred at a target application rate of 36 baits per hectare, the maximum application rate approved on the product label. Since the drafting of the existing EA, WS has obtained a label modification allowing an application rate up to 120 baits per hectare per application, with a minimum of three days between application periods (EPA Registration # 56228-34; Appendix B). The applications in this proposed action would be implemented at this new maximum rate.
5. During the prior action, dead neonatal mouse (DNM) baits were implanted with an 80 mg acetaminophen tablet forced into the body cavity through the mouth. The DNM were then glued by the foot to one of the cardboard panels of a paper streamer manufactured for marking fields during aerial pesticide applications (Figure 3). These streamers allowed entanglement of the device in treetops, the preferred habitat of BTS, preventing them from falling to the forest floor where baits would quickly be consumed by non-target species, particularly crabs. The proposed action would use an acetaminophen tablet glued to the exterior surface of the DNM, in turn glued to the interior surface of a pulp paper ‘clamshell’ which closes over the mouse. A biodegradable ribbon is wound around and glued to the ‘clamshell’ and a pulp paper endcap. The bait/clamshell/ribbon/endcap assemblage is inserted into the cardboard tube for a completed bait cartridge (Figure 3). All components of the cartridge assembly are biodegradable.



*Figure 3. Paper streamer used to apply acetaminophen baits for controlling brown treesnakes during the prior action. DNM bait is attached to the cardboard on the left side of the image.*



*Figure 4. Tablet, DNM bait, clamshell, ribbon, and tube comprising a complete bait cartridge.*

6. During the prior action, baited streamers (Figure 3) were manually dispensed (hand-thrown) from the helicopter by personnel, trained to apply the baits at the prescribed rate. Under the proposed action, bait cartridges (Figure 4) would be automatically dispensed at the prescribed application rate using the dispensing system module (DSM). The DSM adjusts bait cartridge delivery rates according to the airspeed of the helicopter (Figure 5). The bait cartridge is ejected from the DSM in a fashion that causes it to spin; the linear inertia of the cardboard tube/clamshell assembly causes the clamshell to slide out of the spinning tube (“centrifugal force”), deploying the ribbon to tangle in foliage and causing the assembly to be suspended above the ground (Figure 6).



*Figure 5. Dispensing system module (DSM) of the automated delivery system (ADS) for dispensing bait cartridges.*



*Figure 6. Depiction of the deployed bait cartridge entangled in the canopy of a tree. Note: the opened clamshell contains a surrogate bait for demonstration purposes only.*

7. Practice bait drops (non-placebo) would occur along the road comprising the northeast margin of the HMU Drop Site (yellow line in Figure 2). This would allow for on-the-ground validation of bait spacing, ensuring accurate application rates. Acetaminophen baits expelled during these flights would be retrieved and properly disposed of by ground personnel, and would not remain in the environment.

## **2.2 ALTERNATIVE 2 – Evaluation of the aerial bait delivery system over the HMU and the original MSA drop site.**

This alternative is identical to the proposed action, with the exception of the application of baits to the original MSA Drop Site rather than the preferred Alt Drop Site.

## **2.3 ALTERNATIVE 3 – No evaluation of the aerial bait delivery system (No Action Alternative)**

Under this alternative, the evaluation of the effectiveness of this means of distributing oral toxicants for brown treesnake control on Guam would not occur.

## **2.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL**

Alternatives considered but not analyzed in detail are described in section 2.5 of the EA. WS has reviewed the alternatives not analyzed in detail in the EA and has determined that the discussion provided in the EA has not changed and is still appropriate.

## **3.0 ISSUES IMPORTANT TO THE ANALYSIS OF IMPACTS**

The issues identified in the EA remain as detailed in Section 3 with the exception of cultural resources discussed herein. As per Section 3.2, “[T]he actions discussed in this [original] EA involve no construction or physical alteration of the environment, therefore the following resource values are either

not affected, or are not expected to be significantly affected by any of the alternatives analyzed: soils, vegetation, geology, minerals, flood plains, aesthetic values, and prime and unique farmlands. There are no significant irreversible or irretrievable commitments of resources. These resources will not be analyzed further.”

### **3.1 Cultural Resources**

An informal consultation with AAFB cultural resources personnel (Base Archaeologist Richard Olmo, letter dated 21 October 2015) indicated that cultural resources surveys conducted subsequent to finalization of the original EA revealed previously unknown cultural resources in both the original MSA Drop Site and the proposed Alternate Drop Site, as well as previously known resources in the HMU Drop Site and the Reference Site.

This consultation states: “Although the activities described for the project appear not to be of the kind to adversely affect cultural resources there remains some potential for this to occur during the cutting of transect lines through the parcels. To negate this possibility, any movement of rock from the transect path is disallowed as this might compromise site integrity because the sites in this area tend to be rock mounds and alignments. It is also possible that new (inadvertent) discoveries of sites will occur, and these should be reported to the base archaeologist.”

Pursuant to this advisement, all personnel would be instructed to not move any rocks and to report any new findings of cultural resources to the base archaeologist. This behavior is concordant with required unexploded ordnance (UXO) training which prohibits ground disturbance and requires reporting of discovered ordnance. These practices and prohibitions would apply to all listed sites, regardless of the selected alternative action.

## **4.0 ENVIRONMENTAL CONSEQUENCES**

Except where addressed below, the potential environmental consequences would remain as detailed for Alternative 1, the preferred and implemented action, under the original EA.

### **4.1 ALTERNATIVE 1 – Evaluation of the aerial bait delivery system over the HMU and a new site within the Munitions Storage Area (Preferred Action).**

#### **4.1.1 Effectiveness**

Under this alternative, the results of the prior action would be built upon by the evaluation of a system for scaling up the delivery of baits to cover more significant portions of the landscape of Guam by using an automated system for bait distribution, reducing the flight and personnel costs associated with manual broadcast of baits. The use of the Alt MSA Drop Site (Figure 2), which did not have its snake densities reduced under the prior action will provide a clearer picture of the effectiveness of the automated drop at reducing snake activity by starting with a population of snakes more representative of the rest of Guam’s forest habitats. Repeated treatment of the HMU Drop Site will further reduce the snake densities within the snake-proof barrier in support of the conservation mission associated with this management unit.

#### **4.1.2 Impacts on Non-target Animals and Plants**

The current list of federally listed species designated as threatened and endangered in Guam, as determined by the USFWS, was obtained and reviewed during the development of this supplement. Additionally, the threatened and endangered Micronesian species listed under a final ruling on 1 October 2015 (U.S. Fish and Wildlife Service 2015) were also considered for potential effects. WS has and made

“no effect” determinations for several species (detailed in Table 1 below) based on the fact that the proposed action will not be conducted in the range of the species and/or would not use methods that could directly or indirectly affect these taxa. During the preparation of the original EA, one Mariana crow (*Corvus kubaryi*) remained in the wild on Guam, necessitating a formal U.S. Fish and Wildlife Service Biological Opinion. Subsequent to the preparation of the EA, and prior to the original project implementation, the single remaining crow has not been observed since 2012 and is believed to have died. Potential impacts on the federally endangered tree *Serianthes nelsonii* and threatened Mariana fruit bat (*Pteropus mariannus*) were addressed in an informal consultation (2011-1-0270). Because of the distance of the single remaining *Serianthes nelsonii* tree from the action area, the proposed action was considered not likely to adversely affect. Given the low density of fruit bats on Guam, and the unlikelihood of a helicopter strike, the effect of the action to fruit bats was considered to be discountable.

During the action occurring under the original EA, ground personnel were staged to monitor for bat activity and to call off the helicopter pilot if bat movement was observed, in order to prevent an air strike. Two bat sightings were reported to FWS by WS on 5 September 2015. On one occasion, a bat appeared to have been flushed from a roost by the helicopter, and on the other a bat appeared to only be transiting the area. On both occasions, bats immediately left the project site.

The proposed action does not differ from the prior action with respect to these risks. Based on a discussion between USFWS and WS personnel on November 9, 2015, FWS agreed that the informal consultation 2011-I-0270 associated with the 2011 EA may be considered to remain valid for the purposes of further experimental acetaminophen applications under this supplemental EA. Participants discussed the observations of bat activity during the previous action. USFWS agreed that, in the knowledge of these events, the lack of apparent impact on bat well-being, and the successful measures employed to avoid bat air strikes, Wildlife Services could choose to proceed under a presumption of continued discountable effect on fruit bats and consider the prior informal consultation to be valid and sufficient with respect to Mariana fruit bats under the proposed action.

WS also considered the effects of the proposed action on other non-target species. The analysis in the original EA indicated there was little risk to any non-target species. During the prior action, only two non-target takes of acetaminophen were documented: one invasive cane toad (*Rhinella marina*) had taken one of 105 VHF radio-marked baits, and one juvenile monitor lizard (*Varanus indicus*) found dead was tested and found to have been exposed to acetaminophen (ESTCP 2015). *Varanus indicus* are not native to Guam and are thought to have been introduced by Polynesian colonists (Cota 2008). The inclusion of the Alt MSA Drop Site, being of the same habitat type and in very close proximity to the HMU and MSA sites, is very unlikely to pose any additional primary or secondary risks to non-target animals.

Since preparation of the original EA, several plant species have been newly listed as threatened or endangered. Information currently available to WS does not indicate the presence of threatened or endangered plants in the proposed action areas. To prevent impacts to listed species, establishment and maintenance of ground monitoring transects will be conducted with a minimum of vegetation modification, and would be limited to pruning only of known common plants (e.g., *Flagellaria* vines). No whole plants will be removed. Other cutting only common plants, WS also avoids affecting plant species because it would avoid ground disturbing activity, a required protocol to avoid disturbance of unexploded ordinance.

*Table 1. Federally listed threatened and endangered species in Guam, as determined by USFWS, and WS determinations for effects of the proposed action. Comprised from the USFWS web site list from Guam and from the 1 October 2015 listing of new threatened and endangered species from Micronesia; species not reported from Guam or historical occurrences are not listed. Species considered under this supplement but not under the original EA are denoted by an asterisk.*

Federal Status <sup>†</sup>	Species/Listing Name	Determination for Proposed Action <sup>‡</sup>
Animals		
E	Bat, little Mariana fruit ( <i>Pteropus tokudae</i> )	NE
T	Bat, Mariana fruit ( <i>Pteropus mariannus mariannus</i> )	MANLAA
E	Butterfly, Mariana eight-spot ( <i>Hypolimnas octocula mariannensis</i> )	NE
E	Butterfly, Mariana wandering ( <i>Vagrans egistina</i> )	NE
E	Crow, Mariana ( <i>Corvus kubaryi</i> )	NE
E	Kingfisher, Guam ( <i>Todiramphus cinnamominus</i> )	NE
E	Megapode, Micronesian ( <i>Megapodius laperouse</i> )	NE
E	Moorhen, Mariana common ( <i>Gallinula chloropus guami</i> )	NE
E	Rail, Guam ( <i>Rallus owstoni</i> )	NE
T	Sea turtle, green ( <i>Chelonia mydas</i> )	NE
E	Sea turtle, hawksbill ( <i>Eretmochelys imbricata</i> )	NE
E	Snail, fragile tree ( <i>Samoana fragilis</i> )	NE
E	Snail, Guam tree ( <i>Partula radiolata</i> )	NE
E	Snail, Humped tree ( <i>Partula gibba</i> )	NE
E	Snail, Langford's tree ( <i>Partula langfordi</i> )*	NE
E	Swiftlet, Mariana gray ( <i>Aerodramus vanikorensis bartschi</i> )	NE
E	Warbler, nightingale reed ( <i>Acrocephalus luscini</i> )	NE
E	White-eye, bridled ( <i>Zosterops conspicillatus conspicillatus</i> )	NE
Plants		
E	Dedu, pao ( <i>Hedyotis megalantha</i> )*	NE
T	Fadang ( <i>Cycas guamense</i> )*	NE
E	Halumtano, biringenas ( <i>Solanum guamense</i> )*	NE
T	Halumtano, siboyas ( <i>Bulbophyllum guamense</i> )*	NE
E	Iagu, hayun ( <i>Serianthes nelsonii</i> )	NE
E	Palaoan, aplokating ( <i>Psychotria malaspinae</i> )*	NE
E	Ufa-halomtano ( <i>Heritiera longipetiolata</i> )	NE
T	NCN ( <i>Dendrobium guamense</i> )*	NE
E	NCN ( <i>Eugenia bryanii</i> )	NE
T	NCN ( <i>Maesa walkeri</i> )	NE
T	NCN ( <i>Nervilia jacksoniae</i> )	NE
E	NCN ( <i>Phyllanthus saffordii</i> )	NE
T	NCN ( <i>Tabernaemontana rotensis</i> )	NE
E	NCN ( <i>Tinospora homosepaia</i> )	NE
T	NCN ( <i>Tuberolabium guamense</i> )	NE

NCN = No common name

<sup>†</sup>T=Threatened; E=Endangered

<sup>‡</sup>NE=No effect; MANLAA=May affect, not likely to adversely affect

#### 4.1.3 Impacts on Human Health and Safety

The potential risks to human health associated with the broadcast of acetaminophen baits are fully detailed under the original EA. Under the previous action, the HMU and MSA drop sites received 8 and 7 bait applications, respectively, with a total of 29,700 baits being dropped at a density of 36 baits per hectare. Under this action alternative, a total of 6,600 baits would be dropped at the increased maximum

application rate of 120 baits per hectare at each site during each bait application period. Each bait contains 80 mg of acetaminophen; to ingest more than the daily maximum prescription dose (4000 mg) at this bait density, a person would have to consume 50 toxicant baits. This would require a person to find and consume every bait applied on approximately 0.43 ha (65 m x 65 m) of heavily forested land, located inside a secure military installation. Based upon this analysis, the probability of human exposure to acetaminophen via accidental or intentional ingestion is highly unlikely.

#### **4.1.4 Impacts on Watersheds and Water Quality**

Under the original EA, the proposed application of up to 64 kg of acetaminophen was determined to pose no reasonable expectation of significant impact. The actual action that occurred involved application of 29,700 baits at 80 mg of acetaminophen each, or 2.38 kg of acetaminophen. The proposed application of 120 baits per hectare, per each of up to three applications, for a total of up to 39,600 baits, would equal 3.18 kg of active ingredient. As acetaminophen appears to have limited persistence in the environment, with a half-life of roughly 1 to 4 days, the effects of the proposed action are not likely to be cumulative with the previous acetaminophen applications, which ceased in December of 2014. The location of the Alt MSA Drop Site is within the same watershed as the MSA Drop Site (Alternative 2; previously treated under the original EA), so the expected impacts on watersheds and water quality would be roughly equivalent (133%) to the amount of acetaminophen applied under the original action, and far less than the maximum of 64 kg considered under the original EA.

#### **4.1.5 Impacts on Cultural Resources**

The proposed action has potential to impact cultural resources on the Reference Site, the HMU Drop Site, and Alt MSA Drop site (Section 3.1 above, including Table 1 and Figure 7). While the proposed action itself – aerial application of acetaminophen baits – is of a kind not likely to adversely affect cultural resources, establishment and maintenance of monitoring transects have the potential to compromise site integrity by disturbing rock mounds and alignments. Under advisement from the AAFB Base Archaeologist, disturbance of rocks would be prohibited, and encounters with potential historical resources would be reported. WS personnel would not remove any rocks or disturb grounds, as required by standard protocol between AAFB and WS, therefore, no effects on cultural resources are expected, other than the potential to report a discovery of a new rock mound.

With respect to potential environmental consequences, the preferred alternative is identical to the prior action in all factors (magnitude, duration, frequency, likelihood, and geographic extent of impacts and the legal status of species that may be affected), except as explicitly detailed above.

#### **4.2 ALTERNATIVE 2 – Evaluation of the aerial bait delivery system over the HMU and the original MSA drop site.**

The environmental consequences of this alternative are expected to be identical to Alternative 1, with the exception that only sites already approved for application under the original EA would be treated. Implementation of this alternative would decrease the effectiveness of the test, since starting with a population of snakes that has already been suppressed will be a less representative assessment of the effects of the automated application of baits over forest habitats which have not been previously treated (virtually all of Guam's forests). The impacts on non-target animals, health and human safety, and watersheds and water quality are expected to be identical to those addressed under Alternative 1.

Potential impacts on cultural resources of this alternative are identical to Alternative 1 with the exception that historical properties at the MSA Drop Site would be present and those at the Alt MSA Drop Site would not. All associated prohibitions, requirements and effects on cultural resources under Alternative 1

would be identical under Alternative 2.

#### **4.3 ALTERNATIVE 3 – No evaluation of the aerial bait delivery system (No Action Alternative)**

There are no anticipated environmental consequences associated with the No Action Alternative. However, the inability to develop, evaluate, and implement a system for the practical suppression of brown treesnakes on a landscape scale has the environmental consequence of the perpetual presence of very high snake densities, along with the attendant impacts on Guam's ecology, economy, and society. WS would have no effect on any environmental resource evaluated in this supplement.

#### **4.5 CUMULATIVE IMPACTS**

As more thoroughly addressed in the EA, acetaminophen appears to have limited persistence in the environment, with a half-life of roughly 1 to 4 days. Therefore, the effects of the proposed action are not likely to be cumulative with the previous acetaminophen applications, which ceased in December of 2014.

As shown in the EA, the project is not likely to adversely affect the Mariana fruit bat..

The HMU site is proposed as a key native wildlife recovery site on Guam, and the effective control of BTS within the area will provide benefit to the larger effort of preserving native fauna on the island (U.S. Fish and Wildlife Service 2006).

No past, present, or reasonably foreseeable future effects on cultural resources (as discussed in this supplement) are expected because standard protocol prohibits personnel from disturbing ground or moving rocks. While cultural resources have been discovered since the 2011 EA was prepared, that associated past project would have avoided potential effects simply by following protocol to avoid disturbance of unexploded ordinance.

#### **4.6 MONITORING**

The effects of this supplemental action would be monitored under the same framework as detailed in 4.6 of the original EA.

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**APPENDIX B  
PESTICIDE LABEL**

<p align="center"><b>PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS</b></p> <p align="center"><b>CAUTION</b></p> <p>Si usted no entiende la etiqueta, busque alguien para que se la explique a usted en detalle (If you do not understand the label, find someone to explain it to you.)</p> <p>READ THE ENTIRE LABEL AND FOLLOW ALL APPLICABLE DIRECTIONS, RESTRICTIONS AND PRECAUTIONS. THIS LABEL MUST BE IN THE POSSESSION OF THE USER AT THE TIME OF PESTICIDE APPLICATION.</p> <p><b>PERSONAL PROTECTIVE EQUIPMENT (PPE):</b> <b>People who handle the product must wear:</b></p> <ul style="list-style-type: none"> <li>- Long-sleeved shirt and long pants</li> <li>- Socks and shoes</li> <li>- Waterproof or rubber gloves</li> </ul> <p><b>Applicators who handle bait must wear:</b></p> <ul style="list-style-type: none"> <li>- Waterproof or rubber gloves</li> </ul> <p><b>User Safety Requirements:</b> Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions are provided for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.</p> <p><b>Use Safety Recommendations:</b> Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.</p> <p>Users should remove PPE immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing.</p>	<p align="center"><b>ACETAMINOPHEN FOR BROWN TREESNAKE CONTROL</b></p> <p><b>ACTIVE INGREDIENT</b> Acetaminophen.....72.73%</p> <p><b>OTHER INGREDIENTS</b>.....27.27%</p> <p><b>TOTAL</b> .....100.00%</p> <p><i>This product may be used only to control brown treesnakes (Boiga irregularis) in non-crop areas in and around military bases, airports, shipping ports, and other areas where brown treesnakes may be present.</i></p>	<p align="center"><b>DIRECTIONS FOR USE</b></p> <p>It is a violation of Federal law to use this product in a manner inconsistent with its labeling.</p> <p>For use only by employees of the U.S. State and Federal governments, the Government of Guam or the Commonwealth of the Northern Mariana Islands trained in brown treesnake control, or persons under their direct supervision.</p> <p><b>USE RESTRICTIONS:</b></p> <p><b>DO NOT</b> apply this product in a manner that will contaminate food, feed, and water.</p> <p><b>DO NOT</b> apply this product in a manner where it is accessible to children or domestic animals.</p> <p><b>DO NOT</b> apply treated baits in areas where there is a danger that threatened or endangered species will consume baits unless special precautions are taken to limit such exposures. Such precautions shall include applying treated baits inside bait stations that will exclude threatened or endangered species that otherwise might feed upon baits.</p> <p><b>SINGLE BAIT PREPARATION:</b> Acetaminophen baits made using dead mouse pups (approximate age: 10-15 days) may be prepared by one of the two following methods: 1) insert one 30-mg or two 40-mg acetaminophen tablets into the throat of a dead mouse pup, or 2) affix one 30-mg or two 40-mg acetaminophen tablets to the outside of a dead mouse pup.</p> <p><b>BAIT STATIONS:</b> Construct bait stations from lengths of PVC pipe that are 2 to 4 inches (5.1 to 10.2 cm) in diameter and 12 to 18 inches (30.5 to 45.8 cm) in length. Alternatively, use wire mesh funnel traps. Hang bait stations in trees and on fences at heights of approximately 4.9 feet (1.5 meters) above ground. Place single mouse baits inside individual bait stations. Place bait stations at intervals of approximately 22 yards (20 meters) or greater in and around forested areas and along fence lines. Bait density must not exceed 15 baits per acre (36 baits per hectare). Bait stations may be restocked at a minimum interval of two days and may be operated continuously throughout the year.</p> <p align="right">Page 1 of 2, EPA Reg. No. 56228-34</p>
<p align="center"><b>KEEP OUT OF REACH OF CHILDREN</b></p> <p align="center"><b>CAUTION PRECAUTION</b></p>		
<p align="center"><b>FIRST AID</b></p> <p align="center">Have label with you when calling a doctor or poison control center, or obtaining treatment advice.</p>		
<p><b>If swallowed</b></p>	<ul style="list-style-type: none"> <li>• Call doctor or poison control center immediately.</li> <li>• Have person sip a glass of water if able to swallow.</li> <li>• Do not induce vomiting unless told to do so by a doctor or the poison control center.</li> <li>• Do not give anything by mouth to an unconscious person.</li> </ul>	
<p><b>If on skin or clothing</b></p>	<ul style="list-style-type: none"> <li>• Remove contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>• Call poison control center or doctor for treatment advice.</li> </ul>	
<p><b>If inhaled</b></p>	<ul style="list-style-type: none"> <li>• Remove person to fresh air.</li> <li>• If not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth.</li> <li>• Call poison control center or doctor for further treatment advice.</li> </ul>	
<p><b>If in eyes</b></p>	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call poison control center or doctor for treatment advice.</li> </ul>	
<p><b>UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE</b> 4700 RIVER ROAD, UNIT149 RIVERDALE, MD 20737</p> <p>EPA Reg. No. 56228-34 EPA Est. No. 56228-CO-01</p> <p>Net Contents: _____</p> <p>Batch Code No.: _____</p>		

<p align="center"><b>DIRECTIONS FOR USE, continued</b></p> <p><b>BROADCAST APPLICATION:</b> Baits may be hand broadcast or dropped from helicopters and fixed-wing aircraft. If the desired bait placement is in the forest canopy, use pre-packaged bait designed for aerial broadcast uses, or manually attach a small piece of netting or other material to the bait. Apply no more than 50 baits per acre (120 baits per hectare) per aerial drop, with a minimum interval between drops of 3 days. No more than 150 baits per acre (360 baits per hectare) may occur within a 4-month period, and no more than 450 baits per acre (1,080 baits per hectare) may occur within a single year.</p>	<p align="center"><b>ENDANGERED SPECIES CONSIDERATIONS</b></p> <p><b>NOTICE:</b> It is a Federal offense to use any pesticide in a manner that results in the death of an endangered species. Before undertaking any control operations with the product, consult with local, State, and Federal wildlife authorities to ensure the use of this product presents no hazard to any endangered species.</p> <p>To reduce the hazard baiting may present to non-target species, consultation and concurrence will be obtained from Federal and local wildlife management authorities (e.g., U.S. Fish and Wildlife Service (FWS) Ecological Services, and Government of Guam Division of Aquatic and Wildlife Resources) prior to use in threatened or endangered species habitat (including habitat of the Mariana crow, Guam rail, or other reintroduced species).</p> <p><b><u>Threatened or Endangered Species – Guam:</u></b></p> <p>Bat, Little Mariana fruit (<i>Pteropus tokudae</i>)  Bat, Mariana fruit (<i>Pteropus mariannus mariannus</i>)  Broadbill, Guam (<i>Myiagra freycineti</i>)  Crow, Mariana (<i>Corvus kubaryi</i>)  Kingfisher, Guam Micronesian (<i>Halcyon cinnamomina cinnamomina</i>)  Mallard, Mariana (<i>Anas oustaleti</i>)  Moorhen, Mariana common (<i>Gallinula chloropus guami</i>)  Rail, Guam (<i>Gallirallus owstoni</i>)  Sea turtle, green (<i>Chelonia mydas</i>)  Sea turtle, hawksbill (<i>Eretmochelys imbricata</i>)  Sea turtle, leatherback (<i>Dermochelys coriacea</i>)  Sea turtle, loggerhead (<i>Caretta caretta</i>)  Swiftlet, Mariana gray (<i>Aerodramus vanikorensis bartschi</i>)</p> <p>Endangered Plants: Iagu, Hayun (<i>Serianthes nelsonii</i>)</p>
<p align="center"><b>ENVIRONMENTAL HAZARDS</b></p> <p>Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash waters.</p>	
<p align="center"><b>STORAGE AND DISPOSAL</b></p> <p><b>Do not contaminate water, food, or feed by storage and disposal.</b></p> <p><b>Pesticide Storage:</b> Store only in a closed container in a dry place that is inaccessible to children, pets and domestic animals.</p> <p><b>Pesticide Disposal:</b> If the product cannot be disposed of through use in accordance with product label directions, contact your Territorial Pesticide or Environmental Control agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.</p> <p><b>Container Disposal:</b> Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Offer for recycling, if available. Otherwise, puncture and dispose of in a sanitary landfill or incinerator, or, if allowed by state and local authorities, burn. If burned, stay out of smoke.</p>	<p><b><u>Threatened or Endangered Species – Commonwealth of the Northern Mariana Islands:</u></b></p> <p>Crow, Mariana (<i>Corvus kubaryi</i>)  Mallard, Mariana (<i>Anas oustaleti</i>)  Megapode, Micronesian (<i>Megapodius laperouse</i>)  Monarch, Tinian (<i>Monarcha takatsukasae</i>)  Moorhen, Mariana common (<i>Gallinula chloropus guami</i>)  Rail, Guam (<i>Gallirallus owstoni</i>)  Sea turtle, green (<i>Chelonia mydas</i>)  Sea turtle, hawksbill (<i>Eretmochelys imbricata</i>)  Sea turtle, leatherback (<i>Dermochelys coriacea</i>)  Sea turtle, loggerhead (<i>Caretta caretta</i>)  Swiftlet, Mariana gray (<i>Aerodramus vanikorensis bartschi</i>)  Warbler, nightingale reed (<i>Acrocephalus lusciniia</i>)</p> <p>Endangered Plants: Iagu, Hayun (<i>Serianthes nelsonii</i>)</p> <p align="right">Page 2 of 2, EPA Reg. No. 56228-34 Revised 07/2015</p>

