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Animal and Plant Health Inspection Service

Coconut Rhinoceros Beetle Eradication Program

Guam

EA Number: GU-08-1

Environmental Assessment
December 2007

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A. Introduction

An infestation of the coconut rhinoceros beetle (CRB), *Oryctes rhinoceros*, was detected on Guam on September 12, 2007. CRB is not known to occur in the United States except in American Samoa. Delimiting surveys performed September 13-25, 2007 indicated that the infestation was limited to Tumon Bay and Faifai Beach, an area of approximately 900 acres. Guam Department of Agriculture (GDA) placed quarantine on all properties within the Tumon area on October 5 and later expanded the quarantine to about 2,500 acres on October 25; approximately ½ mile radius in all directions from all known locations of CRB infestation. CRB is native to Southern Asia and distributed throughout Asia and the Western Pacific including Sri Lanka, Upolu, Western Samoa, American Samoa, Palau Islands, New Britain, West Irian, New Ireland, Pak Island and Manus Island (New Guinea), Fiji, Cocos (Keeling) Islands, Mauritius, and Reunion. The most likely method of introduction onto Guam was as a hitchhiker with construction material from the Philippines.

Natural factors that keep the beetle under control in its native range are not present when introduced into insular habitats and this serious pest reproduces and spreads quickly. The coconut rhinoceros beetle is one of the most damaging insects to coconut palms. CRB has also been recorded to attack other palm species, banana, taro, sugar cane, and pineapple plants. Relatively few pupae and adults have been collected to date. However, the population density of grubs feeding in rotting coconut logs and stumps is very high. As many as 140 grubs have been extracted from a one meter section of decaying coconut log. Most grubs are currently in the third and final larval stage. These will pupate and emerge as adults within the next two months and are expected to cause massive damage to palms within the infested area. Adult beetles bore deep into the crowns of coconuts and other palms to feed on sap. Trees are killed when beetles bore through the meristematic tissue and by secondary infection by pathogens. Trees killed provide breeding sites for future generations of CRB. Despite the low number of CRB adults collected to date, mortality of young palms from feeding damage has already been observed.

Without immediate action to suppress and contain the infestation, massive mortality of cultivated and wild palms is expected. When the CRB invaded Palau starting in 1942, coconut palms were completely eradicated from some islands and overall tree mortality was about 50% [1]. Guam is primed for a huge outbreak of CRB. There are many standing and fallen coconut logs resulting from typhoon damage which would be used as larval breeding sites. In addition, vertebrate insectivores capable of preying on CRB grubs and adults have been extirpated by the brown tree snake. During the predicted outbreak it is expected that many, if not most, palm trees on Guam will be attacked and killed [2]. In addition, adults will be numerous and risk of accidental transport to other islands in Micronesia, Hawaii, and beyond will be high.

B. Purpose and Need

USDA APHIS, in cooperation with GDA, is proposing a program for the control of the coconut rhinoceros beetle (CRB), *Oryctes rhinoceros,* on Guam. The purpose of this program is to eradicate all adults and their progeny from the island of Guam.

APHIS authority for cooperation in this proposed program is based upon the Plant Protection Act (Title 4 of the Agricultural Risk Protection Act of 2000), which authorizes the Secretary of Agriculture to use emergency measures to prevent dissemination of plant pests new to or not widely distributed throughout the United States. Under APHIS' National Environmental Policy Act Implementing Procedures, 7 CFR Part 372, the proposed action is a class of action for which an environmental assessment (EA) is normally prepared. This EA has been prepared in compliance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4327 (NEPA)) and implementing regulations. The environmental documentation prepared for this program considers the potential effects of (A) no action, (B) an integrated eradication program (proposed action) with the use of pesticides, and (C) an integrated eradication program without the use of pesticides.

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II. Alternatives

A. No Action

Under the no action alternative, APHIS would take no new action of any kind. The only functions performed by APHIS would be in the areas of advisory and technical assistance. The ongoing quarantine and exclusion activities to prevent CRB introductions at ports of entry would continue. Some control actions could be taken by other Federal or non-Federal authorities; those actions would not be under APHIS' control and would not be funded by APHIS. Without APHIS funding GDA may not be able to carry out an effective eradication program. Local groups and landowners could attempt to control damage from beetle infestation of palms on their properties with excessive pesticide use and some individuals might remove infested debris from their properties. This removal could contribute to the spread of CRB from the sites of infestation. In the absence of effective measures to contain and prevent dispersal of beetles, the CRB population could increase its numbers and expand its distribution to establish a permanent infestation on Guam with potential for increased damage to host plants commensurate with the dispersion. Dispersion into nearby habitat of the threatened Marianas fruit bat may have detrimental affects to the bat's survival. Pest risk is the primary issue of environmental concern related to the no action alternative.

B. Integrated Eradication Program with Pesticide Use

Under the integrated eradication program alternative, APHIS would work cooperatively with GDA to eradicate the CRB population from Guam. Implementation of the program follows emergency response guidelines under a Unified Incident Command System. Guidelines were developed by scientists and program managers with experience in pest management, literature reviews, and consultation with professionals from other countries and locations that have control programs or have conducted eradication efforts for CRB. These guidelines specify a best method collective of the protocols for survey, control, and regulatory activities for areas infested with CRB and are adjusted for specific sites, taking into consideration archeological values, environmental concerns, host status and dynamics, pest population dynamics, and available resources. The program involves a combination of control strategies including regulatory control, delimitation trapping and survey, mass trapping, sanitation, and prophylactic treatment to affect eradication of CRB from Guam. The majority of work is anticipated to be completed within six months with monitoring continuing for two years. Program actions would be extended and geographic area may be increased if evidence of CRB infestation is discovered at presently unknown sites.

Regulatory control

Regulatory control consists of Guam Department of Agriculture establishing a quarantine through a “Declaration of Quarantine”. All host material from within the quarantine area is prohibited from moving outside the area, except under a limited permit issued by an Agriculture Officer. Local police are involved to enforce the quarantine as well as Agriculture Officers. Green waste material within the quarantine boundary is further directed to be disposed of at designed sites. Signs are placed at all major roads advising people that host material is not allowed to move outside the area. Existing quarantine regulations are considered sufficient with regard to interstate movement.

Delimitation and mass trapping

Delimitation and mass trapping strategies use the same methodology in trap design and location. Only the trapping density differs. CRB bucket traps were developed by the University of Guam using a design that has proven effective for the beetle. The traps are made from five gallon buckets and fitted with a plastic vane. A commercially available lure containing a synthetic aggregation pheromone, ethyl 4-methyloctanote, is suspended from the vane and attracts both sexes of the adult beetle. Traps are located in open areas where a higher percentage of beetles are captured as opposed to more densely vegetated areas. The traps are suspended from branches and existing aerial supports or placed on poles at a height of about 8 feet. Attracted beetles strike the vane and fall into the bucket. Once inside the bucket the beetle lacks enough space to take-off and escape. The traps are non-lethal and are checked and emptied once every one to two weeks. Collected beetles are placed in specimen jars and delivered to the University of Guam for sexing and recording. All traps are numbered for accountability and for database record reference. A warning label is also affixed to the trap with excessive toxicity reference to deter theft, which is a major problem.

Delimitation trap density is about 1 trap per 1,340 acres and covers a grid encompassing the entire island. Additional traps are placed at a density of 1 trap per acre in areas classified as having a high probability of material moved from the quarantine area. These areas include the Ordot landfill and nurseries that rotate plants to resorts. Mass trapping is aimed at reducing numbers or eliminating the adult beetles. Trap density for mass trapping is 1 trap per acre. Trap density will be increased if data indicates that a measurable increase in effectiveness will be realized.

Reconnaissance survey

Reconnaissance surveys will supplement delimitation trapping by visually identifying locations having feeding damage or the presence of grubs in dead palms and logs. Surveys will be done on 100% of the area within the Quarantine boundary, in areas where trap captures indicate the presence of CRB, and in areas where sightings of CRB or CRB damage is reported. Surveys shall begin in the Faifai Beach area and Tumon "hotspot" area then extend outward. Priority shall also be given to any new discoveries.

CRB sinks

CRB sinks will also be used to both trap and monitor CRB. Coconut palm logs, taken from the middle third of standing dead trees from outside the quarantine area, will be placed at random locations within the quarantine area. The sinks will be monitored weekly for signs of CRB. If CRB is found then the log(s) will be dissected, data recorded, CRB killed, and a replacement of the sink installed.

Sanitation

Sanitation will consist of a five step process. These steps are (1) locate sites that require cleaning and treatment, (2) clean and haul standing and ground debris to a central processing site, (3) treat the cleaned area with pesticides, (4) chip or grind the debris at the processing site, and (5) compost the debris at the processing site.

Step 1 involves identifying, by reconnaissance, trees displaying feeding damage and breeding sites. Standing dead trees will be flagged with fluorescent pink ribbon. Logs, stumps, and other ground debris will be marked by stakes with fluorescent pink ribbon. GPS coordinates using longitude and latitude for WGS-84 projection shall be recorded along with the following data: Date, Type (live palm/dead palm/stump/log/litter/other), and name of surveyor. Data will be entered daily using the Incident internet web site database.

After all known sites are marked and recorded, sites shall be selected using a stratified random sampling method to be re-visited and sampled for quantitative infestation data. Live grubs, adults, and pupae will be counted and collected. Adults shall be placed in glass specimen jars for later killing and mounting, grubs and pupae shall be placed in specimen jars containing 70% isopropyl alcohol. Specimen jars shall be identified with the location identifier, date, and surveyor name in a manner approved by the Planning Chief. Specimens shall be delivered to Dr Aubrey Moore at the University of Guam to determine sex and life stage. Dr Moore will enter sampling data into the Incident database. Sites that have been located, cleaned, and treated will be re-surveyed at least once per month while the quarantine is in affect. Quantitative sampling data shall be collected at the time any new discoveries are found at previously cleaned and treated sites.

Step 2, site cleaning, will consist of removing all ground debris within 10 meters of the flagging that marks the location; and any other debris identified by the Incident supervisor on site. Dead palms and other dead trees shall be felled. Stumps shall be cut flat and protrude no more than six (6) inches above the ground. Cleaning shall result in a steel raked finish with only light litter (0-1 inch deep) remaining. Undeveloped lots may be cleared of over-story vegetation using equipment; any clearing where anticipated soil disturbance will be greater than 4 inches will be done in consultation with Guam Parks and Recreation regarding archeological concerns. All material shall be chipped on-site or loaded in such a way that material will not be blown or lost while in route to the processing site. Standing live trees displaying signs of feeding damage shall be dealt with by using one of the following three options: (1) Using a lift or ladder, ascend to the crown and remove all adults and immature beetles from any boreholes, frond bases, or other visible areas; spray the inside of any boreholes and frond basil areas with one of the following:

- chlorpyrifos: 0,0 diethyl 0-(3,5,6 trichloro-2-pyridinyl) phosphorothioate, 23% a.i., using a dosage of 0.5% solution, or equivalent
- carbaryl (1-naphthyl N-methylcarbamate), 43% a.i., using a dosage of 2% solution, or equivalent
- bifenthrin, 7.9% a.i., using a dosage of 0.33% solution, or equivalent

Spraying shall be followed by filling the boreholes with urethane foam. (2) Or, fall the tree and remove all debris from the site along with other ground debris if it is unsafe or impractical to use Option 1. (3) Or, do nothing. This option must be approved in writing by the Operations Chief. The Operations Chief will make a determination based upon sampling data and observation as to whether or not there is an acceptable risk if the tree is left untreated.

Step 3, within one day of cleaning, the area (about 80 square meters or 860 square feet) will be treated using one of the following:

- broadcast application of carbaryl (1-naphthyl N-methylcarbamate) granules, 10% a.i., using a dosage of 1.9 lbs per 1000 sq. ft., or equivalent
- broadcast application of imidacloprid [1-[6-Chloro-3-Pyridyyl-)methyl]-N-nitro-2-Imidazolidinimine]], 0.15% a.i., using a dosage of 3 pounds per 1,000 sq ft., or equivalent
- broadcast application of bifenthrin, 0.115$^{\Delta}$% a.i., using a dosage of 2 pounds per 1,000 sq ft., or equivalent
- spraying of carbaryl (1-naphthyl N-methylcarbamate), 43% a.i., using a dosage of 0.73 oz. per 1000 sq. ft., or equivalent.

Stumps of felled trees, to prevent beetle emergence from within or under the stump, will be treated with one of the following:

- chlorpyrifos: 0,0 diethyl 0-(3,5,6 trichloro-2-pyridinyl) phosphorothioate, 23% a.i., using a dosage of 0.5% solution, or equivalent
- carbaryl (1-naphthyl N-methylcarbamate), 43% a.i., using a dosage of 2% solution, or equivalent
- bifenthrin, 7.9% a.i., using a dosage of 0.33% solution, or equivalent
- imidacloprid, 21.4% a.i., using at a dosage of 0.23% solution, or equivalent

Allowable application, protective equipment, exclusion, dosage, and entry restrictions will follow the label instruction of the pesticide specified. Only licensed applicators or persons working under the supervision of a licensed applicator shall apply pesticides. Areas shall be re-treated at specified intervals based upon the label direction, persistence of the pesticide, and environmental conditions. The Planning Chief will establish and approve re-treating intervals and when re-treating an area shall be stopped. If areas cannot be treated with insecticide, specified spots may have temporary fencing placed to contain poultry as a biological control for grubs in the soil. The fungus *Metarhizium anisopliae* or the viral pathogen Baculovirus of Oryctes may also be used to inoculate areas where insecticides cannot be used. We are currently having difficulty finding a commercial source for these pathogens.

Step 4 is processing all green waste and other organic material collected from feeding and breeding sites and from landscape maintenance within the quarantine area. Debris will be unloaded by the cleaner, public, landscapers, and government agencies at the processing site in a location directed by the processing site Supervisor. Debris shall be chipped or ground to within a maximum of ½ inch particle size in two dimensions. Chipping or grinding shall be accomplished within one day of delivery of the debris to the processing site. This material shall be placed in stock piles until sufficient volume, as specified by the Compost Specialist, exists to form into compost windrows. Faifai Beach, and perhaps other areas, is inaccessible by vehicle. Debris from clean-up will be pulled by hand or ATV's to the beach or other cleared area and burned. Burning will generally be done when smoke is not visible. Burning permits will be obtained as required prior to burning.

Step 5 consists of composting the chipped material using a compost turner such that sufficient heat is generated to kill any eggs or larvae that may have survived the chipping process.

Chipped or ground material shall be formed into windrows having a minimum and maximum specified height and width of 5 feet and 8feet. Chipped or ground material may also require the addition and mixing of nitrogen additives such as urea or animal manure (i.e. chicken manure) as prescribed by the Compost Specialist to increase the biologic activity and resulting heat. Inoculation with *Metarhizium anisopliae* or Baculovirus of Oryctes may be used to increase the effectiveness of composting in killing any surviving CRB. Temperature readings as well as carbon dioxide readings shall be taken twice a week from the center of each windrow at 20 foot intervals following each turn event. Before each turning event samples will be taken from various sections of the windrow for moisture content determination. Water will be supplied to the compost windrow during the turning event if necessary as determined by the moisture content analysis procedure.

Turning equipment is provided by the University of Guam College of Natural and Applied Sciences. The Compost Specialist shall establish minimum temperature and duration for the compost to be considered finished. In addition to the temperature evaluation, samples will be taken to determine Carbon to Nitrogen Ratio (C/N) in order to determine the compost maturity more accurately. These minimums shall also include consideration of temperatures necessary to kill CRB eggs, larvae, and adults, which is unknown at this time. Once the material has finished composting it shall be placed in static piles for curing.The finished compost shall then be made available for use only within the quarantine eradication area.

Although chipping and composting is the preferred method of treating the debris from feeding and breeding site removal, technical issues related to the available chippers' ability to process wet and green material and the lack of other equipment capable of meeting the processing requirements necessitates an alternative treatment method at this time. Burning, deep burial, and fumigation were identified as alternatives.

Burning has limited application because the fuel moisture level of the majority of debris is too high for efficient combustion which will result in excessive smoke and incomplete consumption and may result in CRB survival and their subsequent escape and reestablishment. Burning may have some application where materials are dry enough but is not planned except in those areas that are inaccessible by vehicle.

Deep burial within the quarantine area is a preferred alternative with respect to cost and effectiveness. Material will be placed in a pit and covered with a minimum of 60" of soil or coral aggregate. A topical application of carbaryl, imidacloprid, or bifenthrin at label dosage rate may be used to prevent CRB escape between when debris is placed in the pit and the time when it can be covered. However, the Tumon area is the highest value property on Guam and destined for development in the future. Disposal by burial will likely require permits and compaction methods suitable to meet hard-fill requirements. Two existing sites within the quarantine area that would work well for disposal by burial and permission is being sought for use, however it is not guaranteed at this time.

Fumigation of the debris and disposal outside of the quarantine area is the most viable alternative for immediate implementation with the highest probability of effectiveness in eliminating the pest risk. Fumigation would be monitored by APHIS qualified personnel using Treatment Schedule T403-e-1-2—MB ("Q" label only) at NAP with a dosage rate of 4 to 8 pounds of methyl bromide per 1000 cubic feet for 24 hours, depending upon temperature. This schedule is the most conservative fumigation schedule approved for quarantine for use on non-food and non-feed commodities. Debris will be loaded into 25-40 roll-off open containers and fumigated at the processing site using tarpaulin methods where gas concentration is measured at specific intervals during the fumigation schedule. The area is restricted access so there should not be any public exposure. Following fumigation and aeration, the debris will be disposed of at a composting site, a hard-fill site, or a scatter site outside of the quarantine area. Fumigated debris must be disposed of outside the quarantine area to eliminate the possibility of re-infestation of the material.

Prophylactic treatment

Prophylactic treatment will involve treating small areas at high risk with a systemic insecticide, imidacloprid [1-[6-Chloro-3-Pyridyyl-)methyl]-N-nitro-2-Imidazolidinimine]], 75% a.i. formulation, or equivalent, will be applied by broadcast or soil injection using a dosage of less than 8.6 oz active ingredient per year where there is very low risk of groundwater contamination. Tree injection of Imidacloprid, 17.1% a.i. using a dosage of 0.025-0.05 oz., or equivalent, per inch of tree diameter not to exceed one application per year, where there is a potential for groundwater contamination.

No application of pesticides will be made within 100 feet of live streams, drainag**es**, or the inter-tidal high water mark. Nuts will be removed from trees prior to treatment by injection. Effectiveness against CRB will be evaluated for the various pesticides as the project continues and dosage rates may be reduced or the use of any of the pesticides listed suspended based upon the evaluations.

C. Integrated Eradication Program without Pesticides

This alternative is the same as Alternative B, without the use of pesticides.

III. Environmental Impacts of Proposed Action and Alternatives

Description of Affected Environment

The geology of Guam is of volcanic origin, surrounded by coral reefs; relatively flat coraline limestone plateau (source of most fresh water) with steep coastal cliffs and narrow coastal plains in north, low-rising hills in center, mountains in south.

Soils
Soils within the quarantine fall into three classifications [9]. Shioya (carbonatic, isohyperthermic, Typical Ustipsamments) soils near the beaches with depth ranging from 0-60 inches; 0-6 percent clay content; 0.05-0.10 percent available water capacity; and containing 0-5 percent organic matter. Guam (clayey, gibbsitic, nonacid, isohyperthermic, Lithic Ustorthents) soils adjacent to Shioya soils moving upland with depth ranging form 0-14 inches; 30-55 percent clay content; 0.0-0.24 percent available water capacity; and containing 0-15 percent organic matter. Ritidian (clayey-skeletal, gibbsitic, nonacid, isohyperthermic, Lithic Ustorthents) soils surrounding the cliff zones with depth ranging form 0-4 inches; 30-60 percent clay content; 0.05-0.08 percent available water capacity; and containing 1-9 percent organic matter.

Vegetation
Guam is about 48% forested with an estimated 13,619,659 live coconut palms on forest lands. About 10% of these have some form of damage from typhoons and established pests. Dead standing coconut palms are estimated at about 1.5% of the live trees. [10]. There are some undeveloped lands within the quarantine area but no native forest.

Human Population [3]
173,456 (July 2007 est.)
0-14 years: 28.6% (male 25,686/female 23,938)
15-64 years: 64.5% (male 57,023/female 54,872)
65 years and over: 6.9% (male 5,592/female 6,345) (2007 est.)
Chamorro 37.1%, Filipino 26.3%, other Pacific islander 11.3%, white 6.9%, other Asian 6.3%, other ethnic origin or race 2.3%, mixed 9.8% (2000 census)

Economy [3]
The economy depends largely on US military spending and tourism. Total US grants, wage payments, and procurement outlays amounted to $1.3 billion in 2004. Over the past 30 years, the tourist industry has grown to become the largest income source following national defense. The Guam economy continues to experience expansion in both its tourism and military sectors.

Labor force is about: agriculture: 26%, industry: 10%, services: 64% (2004 est.)
Unemployment rate is about 11.4% (2002 est.)
Population below the poverty line is about 23% (2001 est.)

Weather/Climate [4]
Guam's tropical climate features warm temperatures and high humidity throughout the year. There is a marked seasonal variation in rainfall, with July through December being the rainy season, although some rain occurs during the dry season. The dry season has steady easterly trade winds. March is the driest month, with an average of less than 2.5 inches of rain. The annual rainfall totals 80 to 110 inches. The average humidity varies from an early morning high of 86 percent to an afternoon low of 72 percent.

Archeology [5]
European influence began about 1568 with annual visits by Spanish Galleons and English privateers. The Dutch made visits between 1600 and 1625. Guam was under Spanish occupation from 1668 until 1898 when it was transferred from Spain to the United States. Carolinians and Hawaiians settled in Guam during the early 1800's. Japan occupied Guam during World War II from 1941 to 1944.

Natural Resources
Historically Guam hosted a rich diversity of terrestrial and aquatic species. Over 100 species of birds have been documented on the island including migrant, wetland, seabird, grassland, and forest birds [6] [7]. Three native mammals were also known to Guam, including the Marianas fruit bat (*Pteropus mariannus mariannus*), little Marianas fruit bat (*Pteropus tokudae*) and Pacific sheath-tailed bat (*Emballonura semicaudata rotensis*), although the Marianas fruit bat is the only extant species. There are six native reptiles, five skink species, and one gecko species that are still found in the wild. Several native tree snail species still exist in low numbers on Guam. Two species of snails, *Samoana fragilis* and *Partula radiolata*, are on the candidate list of the Endangered Species Act (ESA; 1973). Guam has more than 320 native plant species and one, *Serianthes nelsonii*, is eligible under the ESA. In addition, Guam's marine environment includes more than 5000 known species [8]. There are no U.S. listed threatened or endangered species occurring within the project area.

Given its small size, the entire island of Guam has been designated, both locally and federally, as coastal zone. Guam is divided into 19 watersheds in the southern half of the island. These areas are defined by hydrologic unit boundaries based on a 14-digit sub-watershed level (typically 10,000 to 40,000 acres, with a minimum of 3,000 acres) developed by NRCS in coordination with the USGS system developed for larger drainage areas [11]. The Northern Guam sub-watershed was defined in the Guam Clean Water Action Plan (1998) as an area that has no clearly defined drainage ways, composed of a shallow soil layer over permeable limestone, with little or no runoff. This sub-watershed has been further delineated into sub-basins as more complete data on the flow of water through the northern aquifer become available.

The island possesses a variety of terrestrial habitats, including limestone and ravine forests, savanna complex, and strand vegetation. One hundred named rivers are found in the southern part of the island, along with 2 man-made reservoirs [13]. Historically, Tumon Bay was home to many of Guam's native species. Today, two known native species can be found in Tumon Bay, the tree snail, *Partula radiolata* and the Micronesian starling, *Aplonis opacus guami*. The starling has been observed in Tumon in early 2007. Whereas the tree snail has been observed in three areas in Tumon, Gun Beach, Fajita road, and a parcel east of Ypao Beach Park. Other species that may be found in Tumon include native lizards, insects and birds, including the white fairy tern, *Gygis alba*, the Pacific reef heron (*Egretta sacra*) and variety of migratory shore birds.

Marine habitats include fringing, patch, submerged and barrier reefs, offshore banks, seagrass beds, and mangroves. The combined area of coral reef and lagoon is approximately 69 km^2 in nearshore waters between 0-3 nmi, and an additional 110 km^2 in waters greater than 3 nmi offshore [14]. Sea surface temperatures range from about 27-30^{o}C, with higher temperatures measured on the reef flats and in portions of the lagoons [8]. No Federal preserves are adjacent to the project area. Guam's Tumon Bay Marine Preserve lies adjacent to the central tourist district on Guam. This 4.5 km^2 (1117 acre) preserve features a broad reef flat (2.7 km^2, 665 acres) and gently sloping fore reef slope (0.7 km^2, 166 acres), and broad bank/shelf habitat (1.42 km^2, 351 acres less than 100 feet deep). Almost 1 km^2 (253 acres) of this preserve is dominated by coral. On the fore reef slope, the dominant species is plate-and-pillar coral (*Porites (synarea) rus),* complemented by a wide variety of other species. The reef flat contains large stag horn (*Acropora),* lobe *(Porites),* and lettuce (*Pavona)* coral stands. These coral stands provide rich habitat for a variety of fish species including the CITES listed Humphead wrasse (*C. undulatus*) and many other species of reef fish. Extensive sand patches that harbor sea cucumbers and a variety of scavengers complement this coral-dominated area. Limited traditional fishing with hook and line or *talaya* (cast net) from shore is allowed in this preserve for four types of fish: *kichu* (convict tangs, *Acanthurus triostegus), manahac or sesjun* (rabbitfish, *Siganus sp.*), *I'e* (juvenile jacks and trevallies, *Caranx sp.), and ti'ao* (juvenile goatfish, *Mullidae species).* Talaya (cast net) may be used for *kichu and manahac or sesjun*, along the reef margin.

Environmental Impacts

There are potential impacts from each of the alternatives being considered. The pest risk from CRB is an important consideration for all alternatives. Potential program impacts arise from host removal and chemical treatments, but the environmental consequences from the program actions are not expected to be significant because the sanitation work and limited use of pesticides will occur on spots rather than broad areas. There are no known threatened and endangered species within the area where eradication activities will occur. Any substantial future expansion of this program may require further assessment of the potential impacts. The specific impacts of the alternatives are highly dependent upon the particular action and location of infestation. The principal concerns associated with the alternatives are the potential effects of insecticides on human health, including subpopulations that might be at increased risk, and impacts of insecticides on non-target organisms.

A. No Action

Environmental impacts that could result from APHIS' implementation of the no action alternative relate primarily to pest risk effects if the quarantine and exclusion measures did not eliminate the pest risk. It is clear that damage from CRB to local host plants would be substantial if a viable pest population were to spread and become established in adjacent areas. If established, the invasive nature of CRB would be anticipated to result in rapid spread. There are many susceptible host plants present near the sites of infestation, including a large expanse of undeveloped jungle. Any host plant damage from the anticipated spread would soon be much greater than any impacts from the initial host plant removal contemplated under an integrated eradication program. Movement of wood, debris, or infested host plants from the present quarantine area could increase the rate of spread of CRB and this man-facilitated spread of CRB would contribute readily to increases in damage from CRB.

Although GDA could maintain the quarantine area, perform some mass trapping, remove some host material, and do some treatments independent of USDA assistance, a cooperative effort provides the necessary resources to ensure that potential pest risks are eliminated in a timely manner. Delays in mass trapping, host removal and treatments could provide CRB with a window of time to spread before adequate control actions are completed. Other than through transport of infested wood, debris, and host plants, the spread of CRB could occur through flight of adult beetles. The likely time of emergence of adult beetles from current breeding areas is within the next 1 ½ months, based on the results of survey data. CRB infestation is estimated to be near the third life cycle, which means we are on the verge of a potential population explosion from an estimated 91,000 CRB to over 4 million CRB (assumes 50% females with 10% mortality per cycle of 100 offspring per female). Treatment or elimination of infested host material would have to occur prior to this emergence to effectively diminish pest risk. Over 184 million CRB could be possible in the following cycle if no effective action were taken.

Lack of any governmental efforts to control CRB damage would likely result in efforts by landscapers and landowners. Most actions of these groups would be uncoordinated and spread of CRB is likely if an established population were not cooperatively managed. The damage and losses to resort, park, and residential shade and ornamental plants from CRB could result in reductions in private property values and loss of tourism. The damage and losses to commercial trees would lower the production to coconut, betel nut and other host plants. Individual efforts to limit plant damage would be expected to involve use of pesticides with increasing frequency and with increasing adverse impacts to the physical environment, human health, and non-target species. The likely changes in the composition and age structure of palm forests resulting from no action could have long-term effects on the ecological relationships in areas including detrimental affects to the threatened Marianas fruit bat on adjacent islands. There could be losses in recreational use and revenue to some areas from diminished scenic appeal. A permanent infestation could lead to additional interstate and international quarantine restrictions affecting both Guam and the United States in general.

The primary environmental consequences of this alternative relative to an integrated eradication program are increased risk of damage from pest spread and elevated environmental risks from uncoordinated application of pesticide by others to limit damage from CRB. There may also be greater disturbance of archeological sites, over a greater area, without the benefit of consultation from Parks and Recreation. The potential adverse impacts from selection of this alternative are believed to be considerably greater than those anticipated for an integrated eradication program.

B. Integrated Eradication Program with Pesticide Use

The environmental consequences of this alternative relate primarily to the potential environmental effects from sanitation work and chemical treatment.

The removal of susceptible host material may have adverse effects on local wildlife that depend upon this vegetation for food, cover, and related needs. This is particularly true for some invertebrates and sessile animals that are not mobile. The primary issue to humans from loss of plants is aesthetic, but any potential removal of coconut or betel nut trees could involve loss of fresh produce to the residents. Few live trees are anticipated to be removed and the impacts on environmental quality from removal of trees are expected to be negligible. Although there could be some limited soil erosion at the sites where sanitation clean-up occurs, work would involve only the removal of large debris and incidental live plants in small areas. New plant growth on these sites is anticipated shortly after any potential soil disturbance.

Effective operational implementation of pesticide treatment by the program could help to protect susceptible host plants and assist in the efforts to contain and eradicate CRB. This approach could prevent the damage to and loss of many valuable ornamental and commercial trees and the uncoordinated use of pesticides to control CRB damage with associated adverse impacts to the environment. Pesticide applications provide both direct control of larval and adult beetles in breeding sites, an alternative to the practice of removing and destroying newly infested trees, and prevention of CRB from establishing in un-infested trees. The insecticides proposed for application against CRB are imidacloprid, carbaryl, chlorpyrifos, bifenthrin, and methyl bromide. Determination of the potential environmental impacts from this alternative requires analysis of toxicity, environmental fate, exposure, and associated risks from there proposed use and application.

a. Toxicity

Imidacloprid is a systemic, chloronicotinyl insecticide. The mode of toxic action is unique and involves direct binding to the acetylcholine receptors. This binding causes a nerve impulse to be sent, but acetylcholinesterase is incapable of removing imidacloprid from the site. The receptor site becomes overstimulated and is eventually blocked. The nicotinergic site of action is more prevalent in insects than in higher organisms, so the toxicity is selectively more toxic to insects. The acute toxicity to mammals is moderate. The acute oral median lethal dose of imidacloprid to rats is 450 milligrams per kilogram (mg/kg) body weight. The acute dermal median lethal dose to rats of imidacloprid is greater than 5,000 mg/kg. Imidacloprid is not irritating to eyes or skin and is not a skin sensitizer. Signs and symptoms of intoxication include fatigue, twitching, cramps, and muscle weakness including the muscles for breathing. Chronic toxicity from imidacloprid is low. The systemic No Observed Effect Level (NOEL) for a 2-year feeding study of male rats was 5.7 mg/kg based on increased thyroid lesions observed at the next higher dose, 17.1 mg/kg. The reproductive NOEL determined from a three generation reproduction study of rats was 8 mg/kg based upon decreased pup body weight at 20 mg/kg. Imidacloprid may be weakly mutagenic. Test results were negative for mutagenicity in all but two of the 23 laboratory mutagenicity assays conducted. The positive assays were for genotoxicity in Chinese hamster ovary cells and changes in chromosomes in human lymphocytes. The U.S Environmental Protection Agency (EPA) has classified imidacloprid in "Group E" in regards to carcinogenic potential. This indicates that the submitted studies provide evidence of noncarcinogenicity for humans. Toxicity to other wildlife varies considerably. Imidacloprid is moderately to severely toxic to birds, but the repellant nature of imidacloprid to birds makes hazardous exposures unlikely. It is severely toxic to bees. Imidacloprid is practically nontoxic to fish and slightly toxic to daphnia.

Carbaryl is of moderate acute oral toxicity to humans. The mode of toxic action of carbaryl occurs through inhibition of acetylcholinesterase (AChE) function in the nervous system. This inhibition is reversible over time if exposure to carbaryl ceases. The Environmental Protection Agency (EPA) has classified carbaryl as a 'possible human carcinogen'. However, it is not considered to pose any mutagenic or genotoxic risk. Potential exposures to the general public from conventional application rates are infrequent and of low magnitude. These low exposures to the public pose no risk of direct toxicity, carcinogenicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. The potential for adverse effects to workers is negligible if proper safety procedures are followed, including wearing the required protective clothing. Therefore, routine safety precautions are expected to provide adequate worker health protection. Carbaryl is of moderate acute oral toxicity to mammals. Carbaryl is not subject to significant bioaccumulation due to its low water solubility and low octanol-water partition coefficient [15]. Should carbaryl enter water, there is the potential to affect the aquatic invertebrate assemblage, especially amphipods. Field studies with carbaryl concluded that there was no biologically significant effect on aquatic resources, although invertebrate downstream drift increased for a short period after treatment due to toxic effects [16]. Carbaryl is moderately toxic to most fish [17].

Chlorpyrifos is an organophosphate insecticide and its mode of toxic action occurs primarily through acetylcholinesterase (AChE) inhibition [18] [19]. At low doses, the signs and symptoms of exposure in humans include localized effects (such as blurred vision) and systemic effects (such as nausea, sweating, dizziness, and muscular weakness). The effects of higher doses may include irregular heartbeat, elevated blood pressure, cramps, convulsions, and respiratory failure. The acute oral toxicity of chlorpyrifos is moderate to humans and mammals. Reports of chronic and subchronic toxicity tests, as measured by AChE inhibition, indicate that the toxicity is relatively low. However, the potential exposures are considerable and other systemic signs of exposure associated with non-lethal adverse effects are possible. Chlorpyrifos is not a dermal sensitizer, does not induce delayed neurotoxicity, and is not carcinogenic based upon studies acceptable to the Environmental Protection Agency. Tests of chlorpyrifos have been negative for neurotoxicity other than AChE inhibition, immunotoxicity, genotoxicity and mutagenicity in mammals, hematopoietic effects, and adverse effects of impurities and degradation products.

Reproductive and developmental toxicity effects occur only at exposures higher than those anticipated in the CRB program when safety procedures are adhered to and proper protective gear are used. Chlorpyrifos is moderately to severely toxic to birds, moderately or less toxic to adult reptiles and amphibians, slightly to very highly toxic to tadpoles, and severely toxic to terrestrial invertebrates. It is particularly toxic to earthworms, honey bees, and some birds. Chlorpyrifos is very highly toxic to fish and aquatic invertebrates.

Bifenthrin [(2-methyl-1,1-biphenyl-3-y1)-methyl-3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethyl cyclopropanecarboxylate] is a member of the pyrethroid chemical class. It is an insecticide and acaricide which affects the nervous system and causes paralysis in insects. It is very highly toxic to fish and aquatic organisms. The U.S. EPA has classified bifenthrin as Toxicity Class II-moderately toxic. Bifenthrin is moderately toxic to mammals when ingested. LD50, for bifenthrin is about 54 mg/kg in female rats and 70 mg/kg in male rats. The LD50 for rabbits whose skin is exposed to bifenthrin is greater than 2,000 mg/kg. Bifenthrin does not sensitize the skin of guinea pigs. Although it does not cause inflammation or irritation on human skin, it can cause a tingling sensation which lasts about 12 hours. It is virtually non-irritating to rabbit eyes. The dose at which no toxic reproductive effect of bifenthrin is observed on the mother (maternal toxicity NOEL) is 1 mg/kg/day for rats and 2.67 mg/kg/day for rabbits. At higher doses, test animals had tremors. The dose at which no toxic effect is observed on development (developmental toxicity NOEL) is 1 mg/kg/day for rats and is greater than 8 mg/kg/day for rabbits. Bifenthrin does not demonstrate any teratogenic effects at the highest levels tested (100 ppm, approximately 5.5 mg/kg/day) in a two-generational study in rats. Evidence of mutagenic effects from exposure to bifenthrin are inconclusive. Studies of mouse white blood cells were positive for gene mutation. However, other tests of bifenthrin's mutagenic effects, including the Ames test and studies in live rat bone marrow cells, were negative. The EPA has classified bifenthrin as a class C carcinogen, a possible human carcinogen. Bifenthrin is absorbed through intact skin when applied topically in humans and animals. It undergoes similar modes of breakdown within animal systems as other pyrethroid insecticides. In mammals, bifenthrin is rapidly broken down and promptly excreted. Bifenthrin is less toxic to warm-blooded animals, such as mammals, than to cold-blooded animals. Bifenthrin is moderately toxic to many species of birds. There is concern about possible bioaccumulation in birds. Bifenthrin is very highly toxic to fish, crustaceans and aquatic animals. Because of its low water solubility and high affinity for soil, bifenthrin is not likely to be found in aquatic systems. Bifenthrin is toxic to bees. [21]

Methyl bromide is an extremely effective gaseous pesticide with such a broad range of toxicity that it may properly be referred to as a biocide: it kills insects, nematodes, weed seeds, fungi, and other pests. Since methyl bromide is a gas at ambient temperatures, the most significant route of exposure is inhalation. The reported 1-hour inhalation LC50 in rats is 4.5 mg/L, and the 11-hour LC50 in rabbits is 8 mg/L. Inhalation of 6 mg/L for 10 to 20 hours, or 30 mg/L for 1.5 hours is lethal to humans. The compound is readily absorbed through the lung alveoli (gas exchange regions). Methyl bromide can be highly irritating to the mucous membranes of the eyes, airways, and skin with contact. The rat oral LD50 (methyl bromide administered as a liquid, or in solution) is 214 mg/kg, also indicating moderate to high toxicity. Chronic exposure to methyl bromide can cause extensive damage to neurons (nerve cells) involved in cognitive processes and physical coordination or muscular control. These effects were seen in rats exposed to 0.51 to

1.3 mg/L 6 hours per day for 5 days. Methyl bromide is considered to be weakly mutagenic. [21]

Metarhizium anisopliae is a fungus that grows naturally in soils throughout the world and causes disease in various insects by acting as a parasite. It is known to infect over 200 insect species and is used as a biological insecticide to control a number of pests such as grasshoppers, termites, thrips, etc. The disease caused by the fungus is called green muscardine disease because of the green color of its spores. Once the fungus spores attach to the outer surface of the insect, they germinate and begin to grow. After penetrating the outside skeleton of the insect, they grow rapidly inside the insect, causing the insect to die. Insects that come in contact with infected insects also become infected. There are several strains of the fungus that are available, each with varying levels of specificity to insects. Depending on the strain that might be used (based on availability), some toxicity can occur to non-target insects. The level of insect control depends on factors like the number of spores applied against the insect host, the fungus strain used, the formulation and weather conditions.

The viral pathogen Baculovirus of Oryctes (OBV) is very effective and kills the grub in 15-20 days of infestation and it affects the longevity and fecundity of adult beetles. The virus was found to occur in the wild populations of *O. rhinoceros* in the islands of Malaysia, Indonesia, and Philippines. The Malaysian isolate of OBV was introduced into the pest population of many South Pacific islands in 1967. OBV has been used to control *O. monoceros* in the Islands of Seychelles and Tanzania. Similarly release of OBV infected beetles led to the successful biological control of *O. rhinoceros* in Papua New Guinea and Mauritius. No other insect or invertebrate groups appear to be infected by this virus. Infection occurs after susceptible insect larvae eat food contaminated with virus. The virus then attacks the haemolymph, fatty tissue, and mid gut, and the insect becomes paralysed. Some spread occurs from contamination of adult breeding and larval feeding sites, but the virus does not survive long in the environment.

b. Environmental Fate and Exposure

The half-life of imidacloprid in soil is 48-190 days, depending on the amount of ground cover (it breaks down faster in soils with plant ground cover than in fallow soils). Organic material aging may also affect the breakdown rate of imidacloprid. Imidacloprid is degraded stepwise to the primary metabolite 6-chloronicotinic acid, which eventually breaks down into carbon dioxide. There is generally not a high risk of groundwater contamination with imidacloprid if used as directed. The chemical is moderately soluble, and has moderate binding affinity to organic materials in soils. However, there is a potential for the compound to move through sensitive soil types including porous, gravelly, or cobbly soils, depending on irrigation practices. Imidacloprid penetrates the plant, and moves from the stem to the tips of the plant. It has been tested in a variety of application and crop types, and is metabolized following the same pathways. The most important steps were loss of the nitro group, hydroxylation at the imidazolidine ring, hydrolysis to 6- chloronicotinic acid and formation of conjugates. [21]

Carbaryl has a low persistence in soil. Degradation of carbaryl in the soil is mostly due to sunlight and bacterial action. It is bound by organic matter and can be transported in soil runoff. Carbaryl has a half-life of 7 to 14 days in sandy loam soil and 14 to 28 days in clay loam soil. In surface water, carbaryl is broken down by bacteria and through hydrolysis. Evaporation is very slow. Carbaryl has a half-life of about 10 days at neutral pH. The half-life varies greatly with water acidity. Carbaryl is stable to heat, light, and acids. It is not stable under alkaline conditions. [21]

Chlorpyrifos is moderately persistent in soils. The half-life of chlorpyrifos in soil is usually between 60 and 120 days, but can range from 2 weeks to over 1 year, depending on the soil type, climate, and other conditions. The soil half-life of chlorpyrifos was from 11 to 141 days in seven soils ranging in texture from loamy sand to clay and with soil pHs from 5.4 to 7.4. Chlorpyrifos was less persistent in the soils with a higher pH. Soil half-life was not affected by soil texture or organic matter content. In anaerobic soils, the half-life was 15 days in loam and 58 days in clay soil. Adsorbed chlorpyrifos is subject to degradation by UV light, chemical hydrolysis and by soil microbes. When applied to moist soils, the volatility half-life of chlorpyrifos was 45 to 163 hours, with 62 to 89% of the applied chlorpyrifos remaining on the soil after 36 hours. In another study, 2.6 and 9.3% of the chlorpyrifos applied to sand or silt loam soil remained after 30 days. Chlorpyrifos adsorbs strongly to soil particles and it is not readily soluble in water. It is therefore immobile in soils and unlikely to leach or to contaminate groundwater. TCP, the principal metabolite of chlorpyrifos, adsorbs weakly to soil particles and appears to be moderately mobile and persistent in soils. Breakdown in vegetation: Chlorpyrifos may be toxic to some plants, such as lettuce. Residues remain on plant surfaces for approximately 10 to 14 days. Data indicate that this insecticide and its soil metabolites can accumulate in certain crops. [21]

Bifenthrin does not move in soils with large amounts of organic matter, clay and silt. It also has a low mobility in sandy soils that are low in organic matter. Bifenthrin is relatively insoluble in water, so there are no concerns about groundwater contamination through leaching. It’s half-life in soil, the amount of time it takes to degrade to half of its original concentration, is 7 days to 8 months depending on the soil type and the amount of air in the soil. Bifenthrin is not absorbed by plant foliage, nor does it translocate in the plant. It is photostable, stable to hydrolysis, has minimal volatility, and is stable in storage. It has a negative temperature coefficient, so it works better at lower temperatures. [21]

Adherence to the pesticide label and standard operating procedures ensures that exposures are minimal. The applications would not be expected to routinely result in any exposure to humans except the program applicators. The required protective gear and safety precautions minimize applicator exposure. The only route for potential exposure of the public is from the accidental scenario of a person digging in the treated soil following soil applications. Much of the compounds would have adsorbed to soil particles or been taken up by the host plant and the actual exposure would be minimal. The only species likely to be directly exposed are those non-target invertebrates present in the treated soil or in the treated tree. Some insectivores and scavengers could also be exposed to residues during foraging activities in the soil below or in the treated trees. The exposures of these species are expected to be light. Insectivorous birds are repelled by imidacloprid residues and would avoid locations where exposure was possible. The application of pesticides will be done as spot treatments to specific areas of infestation and not as broad area application. No aerial application of pesticides will be conducted. This approach minimizes potential adverse effects to beneficial non-target species.

Methyl bromide is soluble in water and very poorly sorbed by soils. Methyl bromide quickly evaporates at temperatures ordinarily encountered in fumigating; therefore run-off into surface waters is very rare. If it does contact surface waters, the average half-life for methyl bromide under field conditions has been calculated to be 6.6 hours at 11 C. [21]

Metarhizium anisopliae does not appear to infect humans or other animals and is considered safe as an insecticide, particularly as it occurs naturally in the environment worldwide. No harm is expected to humans from exposure to the fungus by ingesting, inhaling, or touching products containing the active ingredient. No toxicity or adverse effects were seen when the fungus was tested in laboratory animals.

Baculoviruses, including Baculovirus of Oryctes, are among the safest insect viruses to use as pathogens, since no similar viruses are known to infect vertebrates or plants. These viruses are unusual since they have no protective protein coat to help them to survive. Spread is generally from insect to insect, although some spread can occur at breeding and feeding sites. OBV does not survive long in the environment and is expected to be eliminated from Guam with the expected eradication of CRB.

c. Risk Assessment

The risk of adverse effects to environmental quality is minimal. Pesticides used are not expected to volatilize to the atmosphere (excluding Methyl bromide), are not expected to be leached to groundwater, and are not expected to be carried to surface water except from unusually heavy rainstorms. Imidacloprid and chlorpyrifos soil and plant residues are expected to remain active for up to two years to protect the trees from infestation by CRB. Injection treatments of imidacloprid are directed to protect susceptible host plants and minimize potential uptake by other plants nearby. Carbaryl and bifenthrin are expected to remain active for up to 2 months. Methyl bromide is generally below the permissible level of 5 ppm within 2 hours following a treatment.

The risks to human health are minimal. The required protective gear and safety precautions for applicators result in potential exposures much lower than any that could result in adverse effects. The anticipated margins of safety from the accidental exposure scenario where a person digs up the soil from the treated area are less than for the applicators, but no adverse effects are anticipated for those individuals either. Mortality from exposure would be expected for some invertebrates. The populations of insects directly exposed would be expected to decrease temporarily in the treatment area until the residues decrease and re-colonization occurs from surrounding areas. Insect populations would remain unaffected in the untreated plants and areas. The low exposures to birds and insectivores foraging in the soil and trees are not expected to result in any adverse effects to those species.

Cumulative impact, as defined in the CEQ NEPA implementing regulations (40 CFR § 1508.7) "is the impact on the environment which results from the incremental impact of the action when added to the past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." APHIS will coordinate pesticide treatments with local landowners to minimize cumulative effects of pesticides. Landowners will be notified and any previous pesticide applications will be considered when determining treatment dates. If the same area has been previously treated for another cause, the type of chemical used, the amount, and date treated will be evaluated prior to treatment for CRB. It is possible that other entities may use pesticides in the same areas to treat for a variety of problems. These actions are not in the control of APHIS or cooperating agencies but occur within the same area that CRB treatments may occur. Reasonable and foreseeable actions are initial spot pesticide applications to infested sites and re-treatment at prescribed intervals.

As previously discussed, methyl bromide is a highly volatile fumigant and has been identified as an ozone depleting compound. On a global scale, the use of methyl bromide in the eradication program may contribute to the overall release of manmade ozone-depleting substances, but the quantity that might be used would be insignificant. Although a precise estimate of the amount of methyl bromide that might be used cannot be quantified, such domestic quarantine uses were found to be inconsequential in terms of the quantity of methyl bromide that would be added to that already in use worldwide [20]. As noted in the Environmental Impact Statement, proposed quarantine treatments constitute minimal amounts of methyl bromide:

"New proposals to use methyl bromide for QPS (quarantine and preshipment) treatment are occurring less frequently. Methyl bromide treatment for imported dried herbs is one example of a more recent APHIS proposal for such use. This type of proposed action results in minimal new use of methyl bromide for treatment…Another example is the expansion of a regulated quarantine area (defined boundaries of agriculturally important pest infestations where host crops cannot be moved from unless first treated) for a program, such as a fruit fly eradication program in California, which potentially could pose an increase in methyl bromide treatment for some crops before they are allowed to be moved out of a quarantine area. These types of regulated uses would add minimal increases to the existing QPS methyl bromide applications."

The minimal use of methyl bromide as a potential treatment option will not decrease stratospheric ozone, the main concern with the use of the chemical. From the 2002 Environmental Impact Statement

"The collective total contribution of increased methyl bromide use from regulations other than SWPM (solid wood packing material) will not decrease the rate of ozone restoration to any measurable extent in the stratosphere."

Consistent with Executive Order No. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," APHIS considered the potential for disproportionately high and adverse human health or environmental effects on any minority populations and low-income populations. The environmental and human health effects from the proposed applications are minimal and are not expected to have disproportionate adverse effects to any minority or low income populations. The primary human concerns relate to the adverse aesthetic effects from loss of host plants.

Consistent with Executive Order No. 13045, "Protection of Children From Environmental Health Risks and Safety Risks," APHIS considered the potential for disproportionately high and adverse environmental health and safety risks to children. The program applications are made to trees and soil and stumps in undeveloped lots, landscape areas surrounding hotels and businesses, and within public parks where children would not be expected to play or climb to the crown of trees. The program applicators ensure that the general public is not in or around areas being treated, so no exposure will occur during applications and entry into ay treatment area will be not be allowed during any restricted entry interval (REI). The only possible exposure could occur from a child playing in the treated soil. This accidental exposure scenario was analyzed and it was determined that no adverse human health effects would result to the child. Therefore, it was determined that no disproportionate effects on children are anticipated as a consequence of implementing the preferred alternative.

The Endangered Species Act (ESA) and its implementing regulations require federal agencies to consult with the U.S. Department of the Interior's Fish and Wildlife Service (FWS) and/or the U.S. Department of Commerce's National Marine Fisheries Service (NMFS) to ensure their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat. Federal agencies must determine if their actions “may affect” an endangered or threatened species or its habitat; if that determination is positive, they must initiate consultation with the FWS and/or the NMFS. According to the regulations, the federal agency need not initiate formal consultation if it obtains the concurrence of the FWS and/or the NMFS, through informal consultation, with its determination that the action “is not likely to adversely affect” the endangered or threatened species or its habitat. APHIS has informally consulted with FWS and NMFS and the results of that consultation are that there are no threatened or endangered species or designated critical habitat within the project area. FWS further recommended APHIS to consider the use of other control methods, including chemicals, to prevent the spread of CRB into habitats of the threatened Mariana’s fruit bat and other threatened or endangered species on Guam and neighboring islands.

Imidacloprid is preferred over the other pesticides because it’s low risk for groundwater contamination, low toxicity to fish, good persistence with respect to the CRB life cycle, and systemic attributes. However, the effectiveness of imidacloprid against various CRB life stages has not been fully evaluated. Efficacy tests will be undertaken during the project to determine which of the proposed pesticides will be most effective, with consideration for environmental risk, and prescriptive decisions will be made for each of the identified application requirements.

C. Integrated Eradication Program without Pesticide Use

Significant environmental impacts that could result from APHIS' implementation of the Integrated Eradications Program without Pesticide Use alternative are similar to the no action alternative and relate primarily to pest risk effects if the mass trapping and sanitation control measures did not eliminate the pest risk.

Individual landowner efforts to limit plant damage would be expected to involve use of pesticides with increasing frequency and with increasing adverse impacts to the physical environment, human health, and non-target species.

The primary environmental consequences of this alternative relative to an integrated eradication program with the use of pesticides are increased risk of damage from pest spread and elevated environmental risks from uncoordinated application of pesticide by others to limit damage from CRB. The potential adverse impacts from selection of this alternative are believed to be considerably greater than those anticipated for an integrated eradication program with the use of pesticides.

IV. Agencies, Organizations, and Individuals Consulted

U.S. Department of Agriculture Animal and Plant Health Inspection Service Plant Protection and Quarantine Emergency and Domestic Programs 4700 River Road, Unit 134 Riverdale, MD 20737-1236

U.S. Department of Agriculture Animal and Plant Health Inspection Service Plant Protection and Quarantine Insecticide and Application Technology Section Building 1398 Otis ANG Base, MA 02542

U.S. Department of Agriculture Animal and Plant Health Inspection Service Plant Protection and Quarantine EDP Environmental Compliance
4700 River Road, Unit 150, Riverdale, MD 20737

U.S. Department of Agriculture Animal and Plant Health Inspection Service Plant Protection and Quarantine, Western Region
2150 Centre Ave., Bldg. B3E10, Fort Collins, CO, 80526

Guam Department of Agriculture
163 Dairy Road, Mangilao, Guam 96913

Guam Bureau of Statistics and Plans
PO Box 2950, Hagatna, Guam 96932

Guam Department of Parks and Recreation
490 Chalan Palayso, Agana Heights, Guam 96910

Guam Environmental Protection Agency
17-3304 Mariner Ave, Barrigada, Guam 96913

U.S. Fish and Wildlife Service Pacific Islands Fish and Wildlfe Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

U.S. NOAA, National Marine Fisheries Service
1601 Kapiolani Blvd., Suite 1110
Honolulu, HI. 96814-4700

University of Guam College of Natural & Applied Sciences
University of Guam Station, Mangilao, GU 96923

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University of California-Davis, Oregon State University, Michigan State University, Cornell
University, and the University of Idaho.

Finding of No Significant Impact
Coconut Rhinoceros Beetle Program on Guam
Environmental Assessment
December 2007

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), in cooperation with Guam Department of Agriculture (GDA), is proposing to conduct a program to eradicate coconut rhinoceros beetle, *Oryctes rhinoceros*, that dispersed from an exotic introduction in the Tumon Bay area of Guam. The coconut rhinoceros beetle is a serious exotic pest of palm trees and also attacks other hosts of agricultural and horticultural significance. The proposed program is needed to eliminate the pest risk from the infested areas of Guam, where it has been detected, and to prevent the spread of coconut rhinoceros beetle to other areas of Guam and other parts of the United States. APHIS prepared an environmental assessment (EA) to analyze potential environmental consequences from program actions being considered. The EA, incorporated by reference in this document, is available from the following offices:

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Emergency and Domestic Programs
4700 River Road, Unit 134
Riverdale, MD 20737-1236

or

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Guam Inspection Station
905 East Sunset Blvd.
Barrigada, GU 96913

The EA analyzed three alternatives - no action, an integrated eradication program with the use of pesticides, and an integrated eradication program without the use of pesticides. Based on the analysis of the potential environmental impacts, APHIS has determined that there would be no significant impact on the quality of the human environment from the implementation of the integrated eradication program with the use of pesticides alternative. APHIS' finding of no significant impact for this program action is based upon the implementation of standard operating procedures for the applications and their expected environmental consequences, as analyzed within the EA. APHIS has informally consulted with the U.S. Fish and Wildlife Service and National Marine Fisheries Service, who report that there are no threatened or endangered species or designated critical habitat within the project area.

In addition, I find that the environmental process undertaken for this program is entirely consistent with the principles expressed in Executive Order No. 12898 (Environmental Justice) and Executive Order No. 13045 (Protection of Children from Environmental Risks) and that implementation of the control measures will not result in disproportionately high and adverse human health or environmental effects to any minority populations, low income populations, or children. Lastly, because I have not found evidence of significant environmental impact associated with the proposed program, I further find that an environmental impact statement does not need to be prepared and that the program may proceed.

Robert M. Baca ACTING FOR

Osama El-Lissy
Emergency and Domestic Program
Plant Protection and Quarantine
Animal and Plant Health Inspection Service

December 6, 2007

Date