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SouthTexas/Wintergarden Boll Weevil Cooperative Eradication Program

Environmental Assessment December 1995

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I. Introduction

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), is proposing to cooperate with State organizations and cotton grower organizations in a program to eradicate the boll weevil in the South Texas/Wintergarden area (refer to table 1, list of counties). The proposed program is a component of the National Boll Weevil Cooperative Control Program (national program), which has adopted an incremental strategy to eradicate the boll weevil from the U.S. cotton Belt. This site-specific environmental assessment (EA) analyzes the potential effects of the proposed program's alternatives (including no action) and considers characteristics and issues that may be special or unique to the South Texas/Wintergarden area.

Since its introduction in southern Texas in the late 1800's, the boll weevil (*Anthonomus grandis* Boheman) has spread across the U.S. Cotton Belt. It annually causes economic losses to the agricultural industry and to consumers. Since the early 1950's, the nation's agricultural community has acknowledged the need for a beltwide strategy for controlling the boll weevil. Since the first pilot program in 1971, programs implemented in an incremental fashion have been successful in eradicating the boll weevil from over 3.5 million acres in major areas of the cotton belt.

In accordance with the National Environmental Policy Act (NEPA) and its implementing regulations, APHIS and its cooperators analyzed the potneitla environmental effects of the national program to control the boll weevil in a programmatic document, the "Naitonal Boll Weevil Cooperative Control Program, Final Environmental Impact Statement—1991" (EIS). The EIS analyzed alternatives and control methods that could be used for boll weevil eradication and included detailed human health and nontarget species risk analyses. In the record of decision for the national program, APHIS committed to prepare site-specific EA's, tiered to the programmatic EIS, as necessary. This site-specific EA incorporates by reference all of the discussions, analyses, and conclusions of the EIS.

Table 1. List of Counties in South Texas/Wintergarden Program Area

Aransas	Calhoun	Frio	Kleberg	Medina	Wharton
Atascosa	Colorado	Goliad	La Salle	Nueces	Wilson
Austin	De Witt	Jackson	Lavaca	Refugio	Zavala
Bee	Dimmit	Jim Wells	Love Oak	San Patricio	
Bexar	Duval	Karnes	Matagorda	Uvalde	
Brazoria	Fort Bend	Kinney	McMullen	Victoria	

II. Need for the Proposed Action

APHIS is proposing to cooperate with other Federal and State agencies, grower groups, and growers in a program to eradicate the boll weevil from cotton fields in the South Texas/Wintergarden area. The proposed action is needed to (1) reduce agricultural losses suffered by growers as a result of continuous boll weevil infestation, (2) substantially reduce the amount of pesticides used by growers and the cost of applying those pesticides to control boll weevil and other cotton pests, (3) maintain the biological integrity and efficacy of the national program to eradicate the boll weevil, and (4) comply with relevant pest control statutes and regulations.

APHIS' authority for cooperation in this proposed program is based upon and complies with the Incipient and Emergency Control of Pests [Act] (1937), the Organic Act of the Department of Agriculture (1944), the Cooperation with State agencies in the Administration and Enforcement of Certain Federal Laws Act (1962), and the Food Security Act of 1985.

III. Alternatives

The national program to eradicate the boll weevil employs a beltwide integrated control strategy. Integrated control, in this case, involves the selection of a particular control method or combination of methods for an individual site, based on factors including variations in boll weevil biology, availability of overwintering sites, environmental concerns, weather patterns, and crip production requirements. Consistent with the strategy used in the national program, integrated control considered as alternatives within this EA include (1) limited no action, (2) biological control, (3) chemical control (azinphos-methyl, diflubenzuron, endosulfan, malathion, methyl parathion, or oxamyl), (4) cultural control (use of short-season cotton varieties and/or mandatory stalk destruction), (5) mechanical control (mass trapping and bait tubes), and (6) sterile insect technology.

A. Limited No Action

For the purposed of this proposed program, the limited no action alternative is defined as no cooperative control action in an individual site within the program's area of operation.[1] It is conceivable that, because of a site's special

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[1] A variety of interpretations may exist for the no action alternative, including entirely (no program) or possibly no Federal involvement. However, the most probable result of implementing either of these other interpretations would be that the existing high pesticide use patterns would continue. Under those circumstances, the environmental effects of no action would be more severe than those that might be incurred in the implementation of the proposed action. In APHIS' judgment therefore, the public's interest is better served through analysis of a limited no action alternative.

characteristics, no control actions of any kind would be implemented. For example, measures that are agreed upon for the protection of endangered and threatened species could involve the enforcement of "no action" buffer zones. For the program to be effective in such areas, it would have to employ indirect methods such as mass trapping, the release of sterile boll weevils (when the technology is perfected and approved) in adjacent surrounding areas, or other methods which through attrition may eliminate the population of boll weevils from that site. The limited no action alternative affords the program a degree of flexibility to deal with extremely sensitive sites that may occur within a broad program area.

B. Biological Control

Biological control (biocontrol) agents are predators, parasites, or microbial pathogens (viruses, bacteria, and fungi) that can be used to provide natural suppression of some insect species that damage agricultural crops. APHIS has reviewed research done on various biocontrol agents, including Naturalis-L and the parasitic wasp *Catolaccus grandis*, and, after field tests, is proposing use of *Catolaccus grandis* on very limited acreage. Constraints associated with the use of biocontrol agents for boll weevil control include the lack of artificial diets, mass propagation systems, or release systems. APHIS will continue to review, consider, and support the use of new or improved biocontrol strategies for the control of the boll weevil and other insect pests.

C. Chemical Control

Six pesticides have been analyzed for program treatments and are registered for this use by the U.S. Environmental Protection Agency (EPA): azinphos-methyl, diflubenzuron, endosulfan, malathion, methyl parathion, and oxamyl (refer to the EIS and "Chemicals Risk Assessment, Boll Weevil Cooperative Eradication Program" for detailed information). Three pesticides (chlorpyrifos, dichlorvos, and propoxur) may be used in traps. Application methods, timing, and frequencies may vary (table 2 summarizes application rates and methods).

Table 2. Proposed Pesticides

Insecticide	Application Rate (lb a.i./acre)	Application Method	Active Ingredient
Malathion	0.88-1.17	ULV aerial and ground	O,O-dimethyl phosphorodithioate of dimethyl mercaptosuccinate
Azinphosmethyl	0.25	ULV aerial and ground	Phosphorodithioic acid, O,O-dimethyl S-[(4-oxo-1,2,3,-benzotriazin-3(4H)-yl)methyl ester
Diflubenzuron	0.125	ULV aerial and ground	N-[(4-chlorophenyl) amino)carbonyl]-2,6-difluorobenzamide
Methyl parathion	0.5	ULV aerial and ground (encapsulated)	Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester
Endosulfan	0.5	Aerial and ground	Hexachlorohexahydromethano-2,4,3-benzodioxathiepin-3-oxide
Oxamyl	0.25	Aerial and ground	Methyl N"N"-demethyl-N-[(methylcarbamoyl)oxy]-1-thiooxamimidate
Chlorpyrifos	NA[1]	Laminated insecticide strip in trap	O,O-Diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate
Dichlorvos	NA	Laminated insecticide strip in trap	2,2-Dichlorovinyl dimethyl phosphate
Propoxur	NA	Laminated insecticide strip in trap	O-isopropoxyphenyl N-methylcarbamate[1]

NA = Not applicable.

D. Curltural Control

Cultural control is the modification of the crop environment to make it less favorable for pest reproduction and survival. The principal cultural methods proposed for use in this program (and analyzed in the EIS) are use of “short-season” techniques (growing short-season cotton varieties and manipulating planting and harvesting dates) and mandatory stalk destruction (postharvest stalk destruction with prohibition against cultivation of perennial cotton).

E. Mechanical Control

Mechanical control involves the mass trapping of boll weevils. The boll weevils are attracted to a trap or an “attracticide device” (e.g., BWACT—“boll weevil attract and control tube") containing a species-specific sex attractant and aggregation pheromone (a chemical that motivates insect behavior or development).

F. Sterile Insect Technique (SIT)

SIT involves the rearing, sterilization, and release of sterile weevils into wild boll weevil populations. Field trials have shown variable results for this alternative and program managers do not consider the technology to be ready for implementation at this time. APHIS will continue to investigate the potential of SIT for eradication of the boll weevil.

IV. Environmental Impacts of Proposed Action and Alternatives

The environmental impacts that may result from implementation of the proposed action and/or its alternatives are considered in this section. Because the principal environmental concern over this proposed program relates to its use of chemical pesticides, this EA, therefore, focuses on the potential effects of program chemical pesticides. The EA uses both quantitative methods (especially to determine risks associated with the use of program chemicals) and qualitative methods to predict risk.

A. Limited No Action

Implementation of the limited no action alternative would mean that no control method would be used near the most sensitive sites, such as hospitals, schools, or wildlife refuges. Although this may result in less environmental impact initially than if these adjacent areas were treated, the untreated areas could serve as refuges for the pest and result in the need for prolonged treatments on surrounding areas until the boll weevil population is eliminated from its refuge site. Considering the prevailing need to protect sensitive sites, the use of the limited no action alternative could have an overall beneficial effect on the environment. Conversely, the lack of such an alternative probably would jeopardize the completion of the program, thereby influencing growers to return to previous pesticide uses with associated adverse environmental impacts.

The net effect of use of the limited no action alternative on human health would be a reduced risk of exposure and effects from program pesticides (in the short term for the limited no action site and in the long term for the entire program area). The net effect on the physical environment (air, land, and water) would be a reduction of residues and contaminants from program pesticides (in the short term for the limited no action site and in the long term for the entire program area). The net effect on sensitive nontarget species (wildlife, livestock, and domestic animals, and plants) would be a reduced risk of exposure and effects from program pesticides. The overall effect of use of the limited no action alternative, therefore, is regarded as positive.

B. Biological Control

This program would use releases of the biocontrol agent *Catolaccus grandis* on limited acreage. No direct adverse effects are associated with the use of the biocontrol agent. An indirect adverse effect might result if the biocontrol agent were not effective and the program or growers had to resort to the use of chemical pesticides late in the season to control boll weevils. The net effect of successful use of *Catolaccus grandis* on human health would be a reduced risk of exposure and effects from program pesticides. The net effect on the physical environment (air, land, and water) would be a reduction of residues and contaminants from program pesticides. The net effect on sensitive nontarget species (wildlife, livestock, and domestic animals, and plants) would be a reduced risk of exposure and effects from program pesticides. The overall effect of the use of this biocontrol agent, therefore, is regarded as positive.

C. Chemical Control

This EA considers potential effects that may result from use of any of the six pesticides that are proposed for this program: azinphos-methyl, diflubenzuron, endosulfan, malathion, methyl parathion, and oxamyl. Description of the risks associated with pesticides in traps is presented in the section on mechanical control. Refer to the EIS for greater detail on the formulations and use patterns. The EA's risk assessment integrated hazard information (pesticides' toxicity and environmental fate) with exposure predictions to develop the risk characterization. Exposure to any chemical agent may be associated with some level of risk, assessed with a degree of uncertainty. The EPA classifications (40 CFR 162.10, July 8, 1985; EPA, 1986) are used to describe the relative toxicities of the pesticides discussed in this section.

1. Human Health

The EA relied on quantitative risk assessment, using potential exposure scenarios for each program chemical application. The EA also relied on qualitative risk assessment, considering factors that may influence exposure and risk and that cannot be related quantitatively to exposure, or that may be beyond the capacity of program managers to control.

a. Quantitative Assessment

Human health risk is quantified by comparing predicted exposure to toxicity reference levels based upon intrinsic hazards as described in detail in the EIS (volume 1, appendix B, section B.4.) and in the chemicals risk assessment (chapter 3). Those toxicity reference values were applied to expected exposures to quantify risk. The classifications of the program pesticides' acute human oral toxicities are as follows: slight for malathion, very slight to slight for diflubenzuron, and moderate to severe for azinphos-methyl, endosulfan, methyl parathion, and oxamyl. Refer to the discussion in the EIS and chemicals risk assessment for a more thorough review of toxicities and hazards of the program pesticides. The scenarios analyzed quantitatively in the EIS (volume 1, appendix B, section B.3.) and in the chemicals risk assessment (chapter 4, section A) do not differ substantially from conditions in the proposed program and are applicable to the program. The scenarios include dermal, inhalation, and dietary exposures to the public, as well as occupational exposures.

The margin of safety was determined by dividing the toxicity reference level of the pesticide by the exposure level determined in the scenario. The potential risk to program workers and the general public are presented in the programmatic EIS (volume 1, appendix B, section B.4.) and in the chemicals risk assessment (chapter 5, section A). Comprehensive training of all workers assures that there will be adequate margins of safety to prevent adverse effects for all likely exposure routes. Likewise, the margins of safety to the general public indicate minimal risk and adequate safety against adverse effects.

b. Qualitative Assessment

Qualitative risk assessment is used to analyze risks that cannot be quantified easily, especially those involving incomplete exposure information or unclear relationships between dose and response. Thorough discussions of qualitative risks are presented in the EIS and the chemicals risk assessment. This EA qualitatively assesses the effects of program pesticide formulations' impurities and degradation products, the anticipated cumulative and synergistic effects, and the effects on sensitive groups.

Impurities and degradation products may occur in formulated products, result from improper storage, or result from use of chemicals after the expiration date for shelf life. Program quality control guidelines require proper storage conditions and sampling of the product to ensure that impurities and degradation products pose no significant hazard to workers or the general public.

Cumulative effects are those which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects from simultaneous exposure to program treatments and to growers' treatments of other crops in adjacent fields is possible, but highly unlikely. To avoid risks for applicators and workers, growers are likely to make other pesticide applications at times when program treatments are not being made. Appropriate communication with growers and residents in adjacent properties through the notification process would assure that most residents will be aware of the treatments, understand the meaning of the treatment flags, and adhere to the required reentry periods.

Synergistic impacts are those which occur when two or more chemicals combine to cause effects that are different or stronger than the sum of their individual effects. Both cumulative and synergistic effects are more likely for the program organophosphate pesticides (malathion, azinphos-methyl, and methyl parathion), endosulfan, and oxamyl, than for diflubenzuron. Organophosphates and the carbamate, oxamyl, may elicit synergistic or cumulative effects if acetylcholinesterase activity has not recovered from inhibition by a simultaneous or earlier chemical exposure. The organochlorine endosulfan is known to be synergistic with other organochlorine pesticides and some synthetic pyrethroid pesticides if exposure is simultaneous or body burdens persist from earlier chemical exposure. Although growers are unlikely to treat adjacent fields synchronously with the boll weevil treatments, the potential for synergism is considerable if such activity takes place. Synergism of diflubenzuron is possible for individuals who are smokers, but unlikely to pose any risk to other groups in the population. Cumulative and synergistic effects of these compounds are considerably less likely if proper safety procedures and reentry periods are followed for program and grower treatments. Although exposure to trap chemicals could result in cumulative or synergistic effects, the small amounts used and the trappers' safety precautions preclude such exposure. Refer to the EIS and chemicals risk assessment for more information about synergism.

Certain groups may have increased risk due to location, disease state, or other biological characteristics. Those who live next to cotton fields are at greatest risk. Infants may be more sensitive than adults to the effects of exposure to program pesticides. Individuals on certain medicines, such as pentobarbitone, may be at increased risk. Some individuals may be less tolerant to exposure to these compounds because of a diminished ability to recover from the effects induced by exposure to these chemicals. Proper notification and instruction about reentry precautions may reduce appreciably their risk.

Individuals with multiple chemical sensitivity (MCS) may be extremely sensitive to even very low levels of exposure to a variety of chemical agents. Because of the highly variable nature of this condition, it is not possible to quantitatively or qualitatively assess the effects to such people. The percentage of MCS in the general population is unknown, partly because there is no acceptance of a single set of criteria for the diagnosis of MCS. It is possible that some residents with MCS could be disproportionately affected by program pesticide treatments. However, because the program would tend to reduce pesticide use on cotton, the overall incidence of MCS from pesticide use on cotton probably would be reduced.

2. The Physical Environment

The chemical pesticides proposed for use in the program have potential to affect the physical environment (air, land, and water). Concerns over the effects of program pesticides on the physical environment relate to air pollution (from off-site drift), soil pollution (from drift or misdirected applications), and water pollution (from runoff, drift, and misdirected applications).

Program pesticides are not expected to affect the air quality in the general (overall) sense. Localized off-site drift may occur, however, from program treatments. Any off-site drift would be expected to be minimal because the proposed program chemicals have very low vapor pressures and are essentially nonvolatile, and because other program precautions are taken (refer to table 2-1 of the EIS and chapter 2 of the chemicals risk assessment).

The potential for soil pollution also is expected to be minimal. Applications are rarely misdirected because of sophisticated guidance and control systems that the program uses (satellite tracking, global positioning systems (GPS), and onboard computer systems that track an aircraft's path and spray operations). Also, the program pesticides degrade rapidly and do not persist for great lengths of time in soil (volume 1, appendix B, section B.8. of the EIS and chapter 2 of the chemicals risk assessment)).

There is some potential for runoff of program pesticides if rainfall occurs shortly after treatments. However, operating procedures and recommended mitigation measures (tables 2-1 and 2-2 of the EIS) serve to minimize the effects of program chemicals on bodies of water and the public who could drink from or consume fish from those bodies of water. Program applications are unlikely to result in greater risk than that caused by existing pest control practices.

The potential for chemicals to leach into groundwater is related to their properties: solubility, soil/dissolved partition coefficient (K_{oc}), hydrolysis, and soil half-lives. Generally, substances that exhibit high solubility and low degradation rates have the greatest potential to migrate through soil layers and reach groundwater aquifers. Modeling data indicates percolation of program pesticide residues through even the more porous soils to be negligible except for oxamyl. However, the half-life of oxamyl in soil and groundwater is very short and residues do not persist long. Residues are undetectable within less than a week. It is unlikely, therefore, that groundwater would be affected.

3. Nontarget Species

a. Quantative and Qualitative Assessments

Risk assessments were conducted to evaluate the potential effects of program pesticides on nontarget species (domestic animals, wildlife, and plants). Following methodology detailed in the EIS (volume 1, appendix B, sections B.5. to B.7.) and chemicals risk assessment (chapter 6), the risk assessment integrated hazard assessment and exposure assessment to arrive at a characterization of risk. Estimations of exposures to program insecticides for routine and extreme exposure scenarios were compared to toxicity reference levels for representative nontarget species. Based upon this comparison, risks were characterized as low, moderate, or high.

Detailed results of the nontarget risk assessments may be found in tables 4-3 through 4-6 in the EIS, tables VI-1 through VI-3 of the chemicals risk assessment, and these data are summarized here. Malathion poses little risk to most terrestrial organisms but can pose a high risk to fish, amphibians, and aquatic invertebrates. Potential drift concentrations of azinphos-methyl present little risk, but a direct spray may present moderate to high risk to terrestrial organisms. For aquatic species, azinphos-methyl presents a high risk to fish, amphibians, and aquatic invertebrates. Potential drift concentrations of methyl parathion may present a moderate risk to some terrestrial species, while a direct spray presents moderate to high risks. Also, methyl parathion poses moderate risk to aquatic invertebrates. Diflubenzuron presents little risk to terrestrial organisms but may pose moderate to high risk to aquatic invertebrates. Endosulfan presents little risk to most terrestrial and aquatic species, but poses a moderate risk to mammals. Oxamyl presents little risk to aquatic species, but poses moderate risk to most terrestrial wildlife species.

Although program applications of pesticides pose no direct risk to plant species, there may be some indirect risk to plants associated with adverse effects to pollinators. Pollinators include many species of insects, such as bees, ants, wasps, as well as bats and/or birds for certain plants. It is unlikely that the application of the pesticides used in the program would eliminate all pollinators for the length of time sufficient to prevent pollination, but pesticides could temporarily reduce the number of potential pollinators for a particular plant species. Honey bees are important as crop pollinators and honey producers. As a precaution, prior to treatments with azinphos-methyl, malathion, methyl parathion, or oxamyl, program personnel will notify registered apiarists in or near the treatment area of the date and approximate time of the treatment application.

b. Special Wildlife Concerns

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 is preparing a biological assessment to determine the effects of the proposed South Texas/Wintergarden Boll Weevil Eradication Program on the endangered and threatened species of the area (refer to appendix A). For those species for which potential adverse effects will be identified, additional protection measures will be developed and submitted as part of the biological assessment to FWS for concurrence. APHIS will comply with all protection measures stipulated in the biological assessment and mutually agreed on with FWS.

The Migratory Bird Treaty Act prohibits the taking of migratory birds without a permit. "Take" is to pursue, hunt, shoot, wound, kill, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, capture, or collect migratory birds. The proposed program would not involve intentional take of migratory birds; any take would be incidental.

D. Cultural Control

The use of cultural control methods (crop rotation, short-season varieties, and mandatory postharvest stalk destruction) are anticipated to have minimal impact to human health, the physical environment, and nontarget species.

Tractors and other agricultural implements used in mandatory stalk destruction pose some risk of injury to equipment operators or others working near the equipment. Use of machinery produces considerable dust and particulate matter which could contribute to respiratory problems or allergies, but program experience indicates that such effects have been minimal to nonexistent.

Mandatory stalk destruction can result in soil disruption (soil losses and erosion), but such effects would not exceed the effects associated with routine procedures that growers use during planting, tilling, and harvesting operations. Conversely, crop rotation tends to reduce erosion and replace soil nitrogen lost during cotton production.

The use of short-season varieties may have a beneficial influence on the physical environment in that there would be a longer dormant period during which the cotton crop is not in the field. Populations of wildlife (small mammals, reptiles, and insects) that inhabit ecological niches associated with cotton fields would not be adversely impacted by program cultural control practices to any greater extent than the effects of current practices (planting and mechanical harvesting).

E. Mechanical Control

The use of mechanical control methods (traps or attracticide devices) are anticipated to have minimal impact to human health, the physical environment, and nontarget species.

Impacts could arise from the use of vehicles to place and monitor traps. Because workers or the public would have little exposure to minuscule amounts of pesticides (chlorpyrifos, dichlorvos, or propoxur) used in the traps, this alternative presents minimal risk. The only identifiable impacts on the physical environment would be minor soil displacement from vehicular and foot traffic during placement and monitoring of traps, and small amounts of plastic that could be left in the environment from broken traps. Mechanical control would have a negligible effect on nontarget species, because other insect species are not attracted to the traps and the amount of pesticide associated with the traps is insufficient to affect larger livestock or wildlife that may encounter the traps.

F. Sterile Insect Technique (SIT)

Although sterile insect technique was not considered ready for implementation, its use is anticipated to have minimal impact to human health, the physical environment, and nontarget species.

No direct adverse effects on human health have been associated with the use of sterile insect technique, except for possible injury in the use of vehicles or mechanical release equipment. Release of sterile boll weevils is not expected to adversely impact air, land, or water. The release of sterile boll weevils would not impact nontarget species, except to result in minimal feeding damage to plants in the family Malvaceae (e.g., cotton, *Hibiscus* sp.).

V. Conclusions

This section: (1) summarizes and characterizes the impacts that reasonably may be expected as a result of implementing this proposed program,
(2) considers unique or special concerns for this program area that are not covered in the EIS, and (3) considers the need for additional protective measures to further reduce risk for this specific program. This approach is intended to assist the decisionmaker and the public to put the relative program risks into perspective and provide a clear basis for choice among alternatives and site-specific protective measures.

A. Summary of Impacts

The principal concern for this program is the severity of impacts that may be expected as a consequence of program use of chemical pesticides. All of the pesticides that could be used in this program (azinphos-methyl, diflubenzuron, endosulfan, malathion, methyl parathion, and oxamyl) are acknowledged to present a degree of risk to humans, the physical environment, and nontarget species. (Impacts from the use of nonchemical alternatives were determined to be insignificant (even in the absence of protective measures or mitigation) and therefore are not considered in detail in this section.) The impacts from chemical pesticides may be direct, indirect, cumulative, or synergistic in nature. Such impacts may be incurred even if a nonchemical alternative is chosen, but fails for some reason, and a chemical alternative has to be employed. The impacts may overlap, may vary by site, and may be reduced substantially through the application of mitigation and protective measures.

Direct impacts that are likely to occur as a consequence of this program are believed to be considerably less than those that are possible if the program were not implemented. The principal reasons are that, in the absence of a program: (1) more toxic chemicals could be used, (2) higher application rates could be used, (3) treatments could continue without abatement for many years, and (4) there would be no requirements for special protective measures. Minimal risk was determined for indirect toxic, systemic, reproductive, or cancer effects. Risks of cumulative impacts to human beings (systemic, reproductive, and cancer risks) were found to be minimal. Synergistic effects are reduced substantially through program operating procedures, including the requirement of safety equipment and reentry periods following treatments.

B. Unique or Special Concerns

Unique or special concerns for the proposed program area were identified via consultations and a site visit. They included (1) potential pesticide impact to wetlands and major water bodies, (2) potential pesticide impact to wildlife refuges, (3) potential outbreaks of secondary pests (such as beet armyworm), and (4) potential adverse effects on rural colonias (with possible environmental justice implications).

Major water bodies exist throughout the proposed program area, but are more prevalent in the eastern part of the area. No cotton fields exist near either Lake Corpus Christi or Choke Canyon Reservoir; pesticide drift or runoff cannot occur to those major water bodies. In the eastern part of the area, some cotton fields are very close to estuarine areas or bayfronts. Water bodies are avoided in program operations and most bayfronts are protected to an extent from spray drift by the usually easterly winds. The program's routine operational procedures and mitigation measures (listed in the EIS, tables 2-1 and 2-2) generally protect wetlands and major water bodies; recommendations for additional protective measures appear in the next section of this EA.

Refuges in the proposed program area serve as "refueling" areas for migratory bird species whose arrivals tend to coincide with insect emergences and population increases. Refuges, critical habitats, and other sensitive areas will not be treated. Program managers will use sophisticated Global Positioning System (GPS) equipment augmented with differential correction equipment that further improves system accuracy for locating and plotting target crops, refuges, and sensitive areas. In addition, the system will allow the program to document fully its pesticide applications so that they may be correlated with monitoring data.

Some concern was registered regarding the potential of the program treatments to increase the severity of outbreaks of secondary pests such as beet armyworm (which also feeds on cotton). Entomologists have noted that malathion is not effective on beet armyworm and believe it may temporarily reduce beneficial insects that are a factor in controlling that pest. Evidence suggests that beet armyworm outbreaks are also related to climatological influences. The two new chemicals, endosulfan and oxamyl, have been proposed for use in the program because they are reported to have less impact on beneficial insects and they reduce the risk of secondary pest outbreaks. Either chemical could be used instead of malathion for initial applications; however, label restrictions would limit their use for the entire treatment schedule.

Potential effects on the residents of the proposed program area's colonias were considered, especially with respect to the goals of Executive Order (EO) No. 12898 (EO 12898), "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Consistent with EO 12898, APHIS must conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that persons (including populations) are not excluded, denied benefits, or discriminated against (based on race, color, or national origin). The National Cooperative Boll Weevil Control Program generally is conducted in such a way as to promote the goals of EO 12898. The site visit and consultations confirmed that the proposed program also will be conducted in the same way. To further ensure the continued health and safety of the colonias' residents, additional protective measures have been recommended (see the next section) which require Spanish translations for notifications and some program documents.

In general, direct impacts, indirect impacts, cumulative impacts, and synergistic effects were considered in detail in the EIS. The site-specific consideration of the conditions that exist in this program area revealed no evidence to suggest that the EIS' discussions and conclusions related to these impacts would not apply also to this program.

C. Additional Protective Measures

Comprehensive lists of routine operational procedures and mitigation measures that are followed in all areas of the National Cooperative Boll Weevil Control Program are provided in the EIS. Refer to the EIS (tables 2-1 and 2-2) for those procedures and measures which constitute the standard protective measures for this program. The following additional protective measures, recommended for the South Texas/Wintergarden program, may further reduce the potential for adverse environmental effects from that program.

Pesticide Applications

1. At weevil-infested cotton fields where secondary pest infestations are anticipated, an early season treatment using another pesticide (usually endosulfan or oxamyl) may be made. Endosulfan will not be applied if moderate to heavy precipitation is anticipated within 48 hours of application or if the required 300-foot buffer for endosulfan treatments around bodies of water cannot be maintained. Applications of oxamyl will not be applied if the predominant component in the site's soil type is sand and there is high potential for leaching of pesticide residues to groundwater. Endosulfan cannot be used if endangered species are listed in the area.

2. Program personnel overseeing applications of organophosphate (malathion, azinphos-methyl, methyl parathion), carbamate (oxamyl), and organochlorine (endosulfan) pesticides are required to wear protective clothing or remain inside a closed vehicle with recirculating air, depending on the circumstances of the application.

3. Unprotected workers will be advised of the respective reentry periods following treatment. If azinphos-methyl or endosulfan is used, unprotected workers will not reenter the fields for 24 hours; following a methyl parathion or oxamyl treatment, unprotected workers will not reenter the field for 48 hours.

4. Program personnel shall immediately cease spraying operations if members of the public are observed within 100 feet of a cotton field being sprayed with malathion, azinphos-methyl, endosulfan, methyl parathion, or oxamyl.

5. Aerial applications will not be made to sensitive areas (residences, public buildings, bodies of water, hospitals, primary and secondary schools, day

care centers, inpatient clinics, nursing homes, parks, churches); program treatments will be applied only to cotton fields.

6. Applications of endosulfan will not be applied within 300 feet of any stream or other body of water.

7. Aerial applications will be made at a height of 5 feet or less above the cotton canopy, unless precluded by obstructions.

8. Program personnel will familiarize aerial applicators with applicable operational procedures, mitigation measures, and protection measures.

9. Before initiating operations, APHIS will obtain concurrence from the U.S. Department of the Interior's Fish and Wildlife Service on protection measures that are required for endangered and threatened species, or their critical habitats.

10. Program personnel will be present during all treatments near sensitive areas; they will use dye cards along field edges to detect for offsite drift of pesticides.

11. The program will report any incident of pesticide poisoning to the Texas Department of Health; information about the validity and probable cause will be used to develop additional protective measures, as necessary.

Notification Procedures

1. Program personnel will provide advance written or telephonic notification of the approximate times and dates of treatments to area residents who reside within ¼-mile of treatments and who formally request (providing their name, address, and telephone number) special notification.

2. Program personnel will publish public notices of the availability of the environmental assessment (EA) for this program in local newspapers; notices will be in both English and Spanish; copies of the programmatic EIS and the EA will be provided to local libraries.

3. Growers participating in the program will be notified of treatment dates so that they may provide timely and appropriate notice of treatments and protective measures to persons in their employ or residing on properties who could be exposed to chemical pesticides.

4. Residents who are registered with the Texas Department of Agriculture as having multiple chemical sensitivity (MCS) will be notified in writing or

by telephone of the time of any program treatments to be made within ¼-mile of their residence.

5. Before beginning treatment with malathion, azinphos-methyl, methyl parathion, endosulfan, or oxamyl, program personnel shall notify all registered apiarists in or near the treatment area of the date and the approximate time of treatment.

VI. Listing of Agencies, Organizations, and Individuals Consulted

Government Agencies

Gary Cunningham, Coordinator
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
National Boll Weevil Eradication Program
4700 River Road, Unit 138
Riverdale, MD 20737-1236

Bill Grefenstette, Senior Operations Officer
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
National Boll Weevil Eradication Program
4700 River Road, Unit 138
Riverdale, MD 20737-1236

Joe Davidson, Regional Program Manager
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Central Regional Office
3505 Boca Chica Blvd., Suite 360
Brownsville, TX 78521-4065

Deborah McPartlan, Program Co-Director
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Texas Boll Weevil Eradication Program
P.O. Box 5089
Abilene, TX 79608-5089

Roger D. Barker, M.B.A.
Assistant Director for Public Health Administration
Corpus Christi-Nueces County Department of Public Health
1702 Horne Road
P.O. Box 9727
Corpus Christi, TX 78469-9727

Robyn A. Cobb, Wildlife Biologist
U.S. Fish and Wildlife Service
Ecological Services
Corpus Christi Field Office
c/o CCSU Campus Box 338
6300 Ocean Drive
Corpus Christi, TX 78412

R. Leon Decker, P.E.
Director Environmental & Consumer Health Protection
Corpus Christi-Nueces County Department of Public Health
1702 Horne Road
P.O. Box 9727
Corpus Christi, TX 78469-9727

J. Brent Giezentanner
Refuge Manager
U.S. Fish and Wildlife Service
Aransas National Wildlife Refuge
Matagorda Island National Wildlife Refuge
P.O. Box 100
Austwell, TX 77950

Roy Parker, Ph.D.
Professor and Extension Entomologist
Texas Agricultural Extension Service
Rt. 2, Box 589
Corpus Christi, TX 78406-9704

Ken Schwindt, Deputy Refuge Manager
U.S. Fish and Wildlife Service
Aransas National Wildlife Refuge
Matagorda Island National Wildlife Refuge
P.O. Box 100
Austwell, TX 77950

Nina M. Sisley, M.D., M.P.H.
Director of Public Health
Corpus Christi-Nueces County Department of Public Health
1702 Horne Road
P.O. Box 9727
Corpus Christi, TX 78469-9727

Daniel Sprenger, Ph.D.
Supervisor
City of Corpus Christi
Vector Control Department
3401 Morgan
Corpus Christi, TX 78405

Organizations

Osama El-Lissy, Program Director
Texas Boll Weevil Eradication Foundation, Inc.
P.O. Box 5089
Abilene, TX 79608-5089

Greg Bolin
Environmental Monitoring Specialist, State Coordinator
Texas Boll Weevil Eradication Foundation, Inc.
940 Arroyo
San Angelo, TX 79601

Craig D. Shook
Farm and Ranch Manager
Driscoll Foundation
1635 Mercantile Bank Tower
P.O. Box 169
Corpus Christi, TX 78403

Appendix A. Endangered and Threatened Species for South Texas/Wintergarden Area

County/Common Name	Status	Scientific Name
Aransas County		
American peregrine falcon	E	*Falco peregrinus anatum*
Attwater's prairie chicken	E	*Tympanuchus cupido attwateri*
Brown pelican	E	*Pelecanus occidentalis*
Hawksbill sea turtle	E	*Eretmochelys imbricata*
Jaguarundi	E	*Felis yagouaroundi*
Kemp's ridley sea turtle	E	*Lepidochelys kempii*
Leatherback sea turtle	E	*Dermochelys coriacea*
Ocelot	E	*Felis pardalis*
Whooping crane	E	*Grus americana*
Arctic peregrine falcon	T	*Falco peregrinus tundrius*
Bald eagle	T	*Haliaeetus leucocephalus*
Green sea turtle	T	*Chelonia mydas*
Loggerhead sea turtle	T	*Caretta caretta*
Piping plover	T	*Charadrius melodus*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*
Mountain plover	C	*Charadrius montanus*
Atascosa County		
Ocelot	E	*Felis pardalis*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*
Mountain plover	C	*Charadrius montanus*
Austin County		
Houston toad	E	*Bufo houstonensis*
Attwater's prairie chicken	E	*Tympanuchus cupido attwateri*
Whooping crane (migration route)	E	*Grus americana*
Bee County		
Ocelot	E	*Felis pardalis*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*
Mountain plover	C	*Charadrius montanus*
Bexar County		
Black-capped vireo	E	*Vireo atricapillus*
Golden-cheeked warbler	E	*Dendroica chrysoparia*
Mountain plover	C	*Charadrius montanus*

Brazoria County

Brown pelican	E	*Pelecanus occidentalis*
Kemp's ridley sea turtle	E	*Lepidochelys kempii*
Arctic peregrine falcon	T	*Falco peregrinus tundrius*
Bald eagle	T	*Haliaeetus leucocephalus*
Green sea turtle	T	*Chelonia mydas*
Loggerhead sea turtle	T	*Caretta caretta*
Piping plover	T	*Charadrius melodus*

Calhoun County

American peregrine falcon	E	*Falco peregrinus anatum*
Brown pelican	E	*Pelecanus occidentalis*
Hawksbill sea turtle	E	*Eretmochelys imbricata*
Kemp's ridley sea turtle	E	*Lepidochelys kempii*
Leatherback sea turtle	E	*Dermochelys coriacea*
Whooping crane	E	*Grus americana*
Arctic peregrine falcon	T	*Falco peregrinus tundrius*
Bald eagle	T	*Haliaeetus leucocephalus*
Green sea turtle	T	*Chelonia mydas*
Loggerhead sea turtle	T	*Caretta caretta*
Piping plover	T	*Charadrius melodus*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*

Colorado County

Attwater's prairie chicken	E	*Tympanuchus cupido attwateri*
Houston toad	E	*Bufo houstonensis*
Bald eagle	T	*Haliaeetus leucocephalus*

Dewitt County

Cagle's map turtle	C	*Graptemys caglei*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*

Dimmit County

Ocelot	E	*Felis pardalis*
Mountain plover	C	*Charadrius montanus*

Duval County

Ocelot	E	*Felis pardalis*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*

Fort Bend County

Prairie dawn	E	*Hymenoxys texana*
Arctic peregrine falcon	T	*Falco peregrinus tundrius*
Bald eagle	T	*Haliaeetus leucocephalus*

Frio County

Northern aplomado falcon	E	*Falco femoralis septentrionalis*
Ocelot	E	*Felis pardalis*

Goliad County

Attwater's prairie chicken	E	*Tympanuchus cupido attwateri*
Bald eagle	T	*Haliaeetus leucocephalus*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*

Jackson County

Bald eagle	T	*Haliaeetus leucocephalus*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*

Jim Wells County

Black lace cactus	E	*Echinocereus reichenbachii* var. *albertii*
Jaguarundi	E	*Felis yagouaroundi*
Ocelot	E	*Felis pardalis*
South Texas ambrosia	E	*Ambrosia cheiranthifolia*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*
Mountain plover	C	*Charadrius montanus*

Karnes County

Ocelot	E	*Felis pardalis*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*

Kinney County

Black-capped vireo	E	*Vireo atricapillus*
Golden-cheeked warbler	E	*Dendroica chrysoparia*
Texas snowbells	E	*Styrax texana*
Tobusch fishhook cactus	E	*Ancistrocactus tobuschii*
Bald eagle	T	*Haliaeetus leucocephalus*

Kleberg County

American peregrine falcon	E	*Falco peregrinus anatum*
Black lace cactus	E	*Echinocereus reichenbachii* var. *albertii*
Brown pelican	E	*Pelecanus occidentalis*
Hawksbill sea turtle	E	*Eretmochelys imbricata*
Jaguarundi	E	*Felis yagouaroundi*
Kemp's ridley sea turtle	E	*Lepidochelys kempii*
Leatherback sea turtle	E	*Dermochelys coriacea*
Northern aplomado falcon	E	*Falco femoralis septentrionalis*
Ocelot	E	*Felis pardalis*
Slender rush-pea	E	*Hoffmannseggia tenella*
South Texas ambrosia	E	*Ambrosia cheiranthifolia*
Arctic peregrine falcon	T	*Falco peregrinus tundrius*
Bald eagle	T	*Haliaeetus leucocephalus*
Green sea turtle	T	*Chelonia mydas*
Loggerhead sea turtle	T	*Caretta caretta*

Piping plover	T	*Charadrius melodus*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*
Mountain plover	C	*Charadrius melodus*

La Salle County

Ocelot	E	*Felis pardalis*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*

Lavaca County

Houston toad	E	*Bufo houstonensis*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*

Live Oak County

Jaguarundi	E	*Felis yagouaroundi*
Ocelot	E	*Felis pardalis*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*

McMullen County

Jaguarundi	E	*Felis yagouaroundi*
Ocelot	E	*Felis pardalis*

Matagorda County

American alligator	E	*Falco peregrinus anatum*
Arctic peregrine falcon	E	*Falco peregrinus anatum*
Brown pelican	E	*Pelecanus occidentalis*
Hawksbill sea turtle	E	*Eretmochelys imbricata*
Interior least tern	E	*Sterna antillarum*
Kemp's Ridley sea turtle	E	*Lepidochelys kempii*
Leatherback sea turtle	E	*Dermochelys coriacea*
West Indian manatee	E	*Trichechus manatus*
Whooping crane (migration route)	E	*Grus americana*
Bald eagle	T	*Haliaeetus leucocephalus*
Green sea turtle	T	*Chelonia mydas*
Loggerhead sea turtle	T	*Caretta caretta*
Piping plover	T	*Charadrius melodus*

Medina County

Black-capped vireo	E	*Vireo atricapillus*
Golden-cheeked warbler	E	*Dendroica chrysoparia*

Nueces County

American peregrine falcon	E	*Falco peregrinus anatum*
Brown pelican	E	*Pelecanus occidentalis*
Hawksbill sea turtle	E	*Eretmochelys imbricata*
Jaguarundi	E	*Felis yagouaroundi*
Kemp's ridley sea turtle	E	*Lepidochelys kempii*
Leatherback sea turtle	E	*Dermochelys coriacea*
Ocelot	E	*Felis pardalis*

Slender rush-pea	E	*Hoffmannseggia tenella*
South Texas ambrosia	E	*Ambrosia cheiranthifolia*
Arctic peregrine falcon	T	*Falco peregrinus tundrius*
Green sea turtle	T	*Chelonia mydas*
Loggerhead sea turtle	T	*Caretta caretta*
Piping plover	T	*Charadrius melodus*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*
Mountain plover	C	*Charadrius montanus*

Refugio County

American peregrine falcon	E	*Falco peregrinus anatum*
Attwater's prairie chicken	E	*Tympanuchus cupido attwateri*
Black lace cactus	E	*Echinocereus reichenbachii* var. *albertii*
Brown pelican	E	*Pelecanus occidentalis*
Hawksbill sea turtle	E	*Eretmochelys imbricata*
Jaguarundi	E	*Felis yagouaroundi*
Kemp's ridley sea turtle	E	*Lepidochelys kempii*
Leatherback sea turtle	E	*Dermochelys coriacea*
Whooping crane	E	*Grus americana*
Arctic peregrine falcon	T	*Falco peregrinus tundrius*
Bald eagle	T	*Haliaeetus leucocephalus*
Green sea turtle	T	*Chelonia mydas*
Loggerhead sea turtle	T	*Caretta caretta*
Piping plover	T	*Charadrius melodus*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*
Mountain plover	C	*Charadrius montanus*

San Patricio County

American peregrine falcon	E	*Falco peregrinus anatum*
Brown pelican	E	*Pelecanus occidentalis*
Hawksbill sea turtle	E	*Eretmochelys imbricata*
Jaguarundi	E	*Felis yagouaroundi*
Kemp's ridley sea turtle	E	*Lepidochelys kempii*
Leatherback sea turtle	E	*Dermochelys coriacea*
Ocelot	E	*Felis pardalis*
Arctic peregrine falcon	T	*Falco peregrinus tundrius*
Green sea turtle	T	*Chelonia mydas*
Loggerhead sea turtle	T	*Caretta caretta*
Piping plover	T	*Charadrius melodus*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*

Uvalde County

Black-capped vireo	E	*Vireo atricapillus*
Golden-cheeked warbler	E	*Dendroica chrysoparia*
Comanche Springs pupfish	E	*Cyprinodon elegans* - Uvalde NFH
Texas snowbells	E	*Styrax texana*
Tobusch fishhook cactus	E	*Ancistrocactus tobuschii*
Pecos pupfish	C	*Cyprinodon pecosensis* - Uvalde NFH

Victoria County

Whooping crane	E	*Grus americana*
Bald eagle	T	*Haliaeetus leucocephalus*
Cagle's map turtle	C	*Graptemys caglei*
Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus texensis*
Mountain plover	C	*Charadrius montanus*

Wharton County

Bald eagle	T	*Haliaeetus leucocephalus*

Wilson County

Gulf Coast hog-nosed skunk	C	*Conepatus leuconotus* texensis

Zavala County

Ocelot	E	*Felis pardalis*

Finding of No Significant Impact
for
South Texas/Wintergarden
Boll Weevil Cooperative Eradication Program
Environmental Assessment

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), has prepared an environmental assessment (EA) for its participation in the National Boll Weevil Cooperative Control Program (Boll Weevil Program) in the South Texas/Wintergarden area. The EA, incorporated by reference into this document, is tiered to the "Final Environmental Impact Statement for the National Boll Weevil Cooperative Control Program—1991." The EA is available from:

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Central Regional Office
3505 Boca Chica Blvd., Suite 360
Brownsville, TX 78521-4065

The EA considered the impacts of alternatives and specific control methods for boll weevil eradication. Alternatives considered include limited no action, biological control, chemical control, cultural control, mechanical control, and sterile insect technology. The proposed program is needed to (1) reduce agricultural losses caused by the boll weevil and allow local growers to remain economically competitive, (2) maintain the integrity and efficacy of the national program to eradicate the boll weevil, (3) substantially reduce the amount of pesticide used against the boll weevil and other pests, and (4) comply with relevant pest control statutes and regulations.

APHIS is consulting with the U.S. Department of the Interior, Fish and Wildlife Service (FWS), with regard to the protection of endangered and threatened species or their critical habitats. APHIS will adhere to protective measures designed specifically for this program, contained in the biological assessment for the program, and mutually agreed upon with FWS.

I find that implementation of the proposed boll weevil eradication program in the South Texas/Wintergarden area will not significantly impact the quality of the human environment.

I have considered and base my finding of no significant impact on quantitative and qualitative risk assessments of the proposed pesticides, review of the program's operational characteristics, and the site-specific aspects of the proposed program's area. In addition, I find that the environmental process undertaken for this program is entirely consistent with the principles of "environmental justice," as expressed in Executive Order No. 12898. Lastly, because I have not found evidence of significant environmental impact associated with this program, I further find that an environmental impact statement does not need to be prepared and the program may proceed.

/S/
Robert L. Williamson
Regional Director

2/16/96
Date