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El Paso/Trans Pecos Pink Bollworm Cooperative Eradication Program

Environmental Assessment
April 2001

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I. Need for the Proposed Action

The pink bollworm, *Pectinophora gossypiella* (Saunders), is one of the most destructive pests of cotton throughout many of the major cotton-growing regions of the world. The larvae of the pink bollworm feed inside growing cotton bolls, destroying the cotton. Although it prefers cotton, the pest occasionally feeds on okra, kenaf, and hibiscus. The pink bollworm was detected first in the United States in Hearn, Texas, in 1917, and by 1926 had spread throughout much of the country's southwestern cotton belt, where it is now a major economic pest of cotton.

Growers in the El Paso/Trans Pecos area of Texas have observed an increasing level of pink bollworm infestation during the past few years. Pest surveys conducted in 1999 and 2000 by the Texas Boll Weevil Eradication Foundation indicated that pink bollworm populations are remaining at economically damaging levels. In response, in 1999, the Texas Commissioner of Agriculture determined the need to establish an eradication zone and allow growers the opportunity to initiate a pink bollworm eradication program. Since then, grower organizations in New Mexico, Arizona, California, and Mexico have requested to join the eradication efforts. In October 2000, the National Cotton Council recommended a "bilateral" pink bollworm eradication program in the United States and Mexico.

The Animal and Plant Health Inspection Service (APHIS) proposes to cooperate on the bilateral pink bollworm eradication program, which will be implemented in 2001 in the El Paso/Trans Pecos area of Texas. This area consists of approximately 55,000 acres of cotton in Brewster, Crane, Crockett, Culberson, El Paso, Hudspeth, Jeff Davis, Loving, Pecos, Presidio, Reeves, Terrell, Ward, Winkler, and Val Verde counties. Areas in other States and in Mexico will be added to the program in succeeding years.

APHIS has prepared an independent environmental assessment for this program increment because of the imminence of the proposed treatments and because of the independent utility the program has for protection of cotton agriculture in Texas. However, the bilateral nature of the broader program (planned for both the United States and Mexico), as well as its potential for cumulative effects, will require that future program increments be analyzed jointly (together with this original one) in a single analysis, in compliance with Executive Order 12114, "Environmental Effects Abroad of Major Federal Actions," and the National Environmental Policy Act of 1969.

APHIS' authority for cooperation in the program is based upon the Plant Protection Act (Public Law 106-224, 114 Stat. 438-455), which authorizes the Secretary of

Agriculture to take measures to prevent the dissemination of a plant pest that is new to or not known to be widely prevalent or distributed within and throughout the United States.

II. Alternatives

APHIS considered three alternatives for this program which are described in this environmental assessment. They were (1) no action, (2) pink bollworm suppression, and (3) pink bollworm cooperative eradication (the proposed alternative).

A. No Action

No action would be characterized by no APHIS action to eradicate, suppress, or otherwise control the pink bollworm in the El Paso/Trans Pecos area of Texas. In the absence of APHIS cooperation on the program, nonfederal efforts such as a grower/State cooperative program could be mounted for the objective of eradicating the pink bollworm in that area. It is likely, however, that such efforts would be diminished or slowed because of the lack of Federal support and/or resources. No action would likely result in the continuation of the current control practices implemented by individual growers, which rely heavily on the use of agricultural chemicals. No action would result in the prolonged use of agricultural chemicals, and correspondingly greater potential for adverse environmental impact than the proposed action.

B. Pink Bollworm Suppression

A pink bollworm suppression program could be implemented which would have as its objective the reduction of infestation levels of pink bollworm in the El Paso/Trans Pecos area of Texas. Such a program could use any combination of methods, including chemical control, cultural control, and regulatory control. Cultural control (specially-timed planting and harvesting, defoliation, stalk destruction, winter irrigation, and burial of crop residues) and regulatory control (enforcing quarantine rules and regulations to prevent the transportation of pink bollworm) could be used by themselves or jointly in a nonchemical suppression program.

Although such a suppression alternative could have potential benefits, it was considered briefly by APHIS and dismissed from detailed consideration because it did not meet the desired objective (eradication, not suppression, of pink bollworm populations). Further, such an alternative would be unsupported by the States and the Government of Mexico which have already decided to implement a cooperative eradication program. Effectively, the pre-existence of an eradication program limited

APHIS’ choice of alternatives to either participating in the existing eradication program or not participating (no action).

C. Pink Bollworm Cooperative Eradication Program

The Pink Bollworm Cooperative Eradication Program (the proposed action) would be characterized by APHIS participation in a grower/State/Federal cooperative program for the objective of eradicating the pink bollworm from the El Paso/Trans Pecos area of Texas. Because a comprehensive, cooperative program already has been proposed by the State of Texas, other cooperating States, the Government of Mexico, and grower groups, it would be inappropriate and superfluous to attempt to consider at this time various other conjectural iterations of pink bollworm management such as suppression, nonchemical control, or perhaps quarantine only. Considering the scope of the program about to be undertaken through the cooperation of those other organizational entities, the only real choice facing APHIS is whether to cooperate (pink bollworm eradication) or not to cooperate (no action).

The proposed program would include (1) mapping, to identify cotton acreages and locations; (2) detection, by trapping and visual inspection, to identify sites of infestation; and (3) control, using cultural control, mating disruption (pheromone only, or pheromone with permethrin), transgenic cotton, sterile moth releases, and chemical control (aerial or ground applications of chlorpyrifos). The proposed program has quantifiable potential environmental consequences, which are discussed in detail in the next section of this environmental assessment.

III. Environmental Impacts of Proposed Action and Alternatives

A. No Action

The no action alternative is characterized by no APHIS cooperation with the State of Texas, other cooperating States, the Government of Mexico, and grower groups in their effort to eradicate pink bollworm. This alternative does not eliminate the ability of APHIS to review protocol, provide recommendations, and supply technical expertise to assist the cooperating groups. However, APHIS would not be involved in providing funds, management, personnel, or sterile moths to eradicate, suppress, or control any pink bollworm infestations under this alternative. Any control efforts would be the responsibility of the cooperating State or local governments, growers or grower groups, individual citizens, and the Government of Mexico. There is no way to predict whether the cooperative effort could accumulate adequate resources and yield sufficient jurisdiction to take the action required to eradicate the well-established pink bollworm infestations.

The most probable outcome of the no action alternative would be that some established local infestations would remain. This could be expected to cause periodic outbreaks in cotton-growing areas and might not suppress the infestation sufficiently to prevent costly damage to the cotton crop.

In the absence of APHIS efforts to assist in the eradication program, losses and damage to crops would continue to provoke individual control efforts that would probably lack sufficient coordination to eliminate the ongoing threat of crop loss from pink bollworm. Available resources for trapping, sterile insect technique, cultural control, and chemical control would be more limited to the program. Those efforts could result in continually increasing dependence upon chemical pesticides to ensure crop protection. The lack of coordination of effort would be expected to require greater quantities of pesticides, more frequent applications, and possibly inadequately targeted applications.

The severity of environmental consequences to human health, nontarget species, and the physical environment would depend upon the site-specific areas treated, the effectiveness of treatments at eliminating pest risks, and the characteristics of the control techniques used. It is likely that people would not be informed of the times and areas to be treated for grower-managed applications. This would not allow some people to take the precautions needed to avoid exposures. Public exposure to various pesticides used in cotton at differing application rates may pose increased risks from cumulative effects or synergistic effects from pesticide interaction. The lack of APHIS assistance would be expected to delay or decrease the effectiveness of the eradication effort which would result in extending the time when the growers would have to treat for pink bollworm. The unavailability of APHIS assistance, which encompasses vital technical and operational expertise and resources, would likely delay or decrease the effectiveness of the eradication efforts and result in the growers'continued use of insecticide as a primary method of control. The adverse effects of these continuing treatments could be precluded by a cooperative eradication program with good coordination and broad jurisdiction over the entire zone of infestation. In general, the potential for environmental consequences from no action would be expected to exceed that from a cooperative eradication program with good coordination, particularly over the long term after successful eradication.

B. Pink Bollworm Suppression

A hypothetical pink bollworm suppression program would be characterized by unilateral or cooperative efforts by APHIS for the objective of reducing pink bollworm populations in the El Paso/Trans Pecos area of Texas. Any, or a combination of, chemical, cultural, and regulatory controls could be used in such a suppression program.

It is unlikely that APHIS would unilaterally implement a pink bollworm suppression within an area where other government organizations have already embarked on a pink bollworm eradication program. Nor is it likely that APHIS could secure cooperation on a suppression program from those other government entities. The production of potential environmental consequences for such a program, therefore, is highly speculative.

Assuming that a suppression program could be implemented in this area, pink bollworm populations would be reduced in size, and associated crop damage would be proportionately reduced. There would be a continued requirement, on a seasonal basis, to use whatever control methods were adopted for the program. The adoption of nonchemical methods only would result in reduced exposure to applicators and the public from program and nonprogram pesticides that otherwise would be used against pink bollworm. A successful chemical suppression program also could be expected to result in reduced need for program chemicals over time, resulting in less pesticide used overall than under no action. However, sporadic outbreaks may pose increased risks from pesticide exposure if growers resort to the application of nonprogram pesticides which have potential for cumulative effects.

The specific environmental effects resulting from the methods used for suppression would be similar to those resulting from the use of the same methods in an eradication program (refer to the next section for a description). In general, a suppression program would be expected to have less overall impact than no action (in which there is no program control over the use of pesticides), but more impact than an eradication program in which program pesticide use would be carefully controlled and would virtually end after eradication occurred.

C. Pink Bollworm Cooperative Eradication Program

The cooperative nature of the proposed program is designed to ensure good coordination of effort among the concerned parties. This approach provides more effective control actions and less need to duplicate efforts or make unnecessary treatments. It also provides more personnel and resources to focus on the eradication effort and increase the likelihood of more thorough control of the pink bollworm across all infested areas.

1. Overview of Potential Consequences of Proposed Actions

Although the proposed program places emphasis on the use of several techniques to accomplish the goal of pink bollworm eradication, the environmental consequences for most techniques pose few issues of concern. Activities such as mapping, trapping, and visual inspection are critical to program success, but pose minimal environmental impacts. Detection traps use a lure that is nontoxic to nontarget species. Mapping and visual inspection involve minimal disturbance of the soil, wildlife, and plants in cotton fields. Cultural control methods (defoliation, stalk destruction, winter irrigation, and burial of crop residues) are often routine practices of the growers to decrease pest risks. This level of disturbance of the fields would be expected to be comparable to the effects under no action. However, as the program progresses and pink bollworm infestations decrease, the disturbance level resulting from program activities will be reduced, and ultimately will be eliminated when the pest is eradicated. Growers are routinely planting various strains of transgenic Bt cotton as part of their pest control strategy, so use of this type of cotton does not pose any risks that would not also exist under the no action alternative. The use of a sterile insect technique (SIT) to release sterile moths has been determined to pose no impacts to nontarget wildlife other than providing a temporary source of food for some insectivorous species. The use of SIT has also been determined to be compatible with protection of endangered and threatened species of wildlife and their habitats.

The use of a mating disruption technique involving applications of pheromones (natural attractants) poses minimal adverse impacts when applied independent of other chemical controls. The pheromones are specific to pink bollworm adults and pose no risk to other nontarget species. However, permethrin may be incorporated in the applied mixture. The environmental consequences of the permethrin-incorporated application are described in the chemical control section starting with the next paragraph. As with any aerial application, there are vehicular emissions from the engines, but the frequency of application and the quantity of emissions pose minimal effects to air quality. The hand-application of non-insecticide PB-Rope or PB-Rope*L (pheromone only) dispensers is an efficacious and safe method for eradication at sensitive sites where potential environmental risks from chemical control applications might be considered unsatisfactory.

The environmental consequences of chemical control applications (aerial or ground applications of chlorpyrifos) as an independent treatment or as an over-spray following a mating disruption technique pose greater potential for adverse effects. Likewise, the use of permethrin in aerial applications of pheromone placement has greater potential for adverse impacts. Although the use of chemical control applications with chlorpyrifos are limited to fields where there is at least 5% of the cotton infested with pink bollworm larvae or where other techniques (mating disruption and use of transgenic Bt cotton) have failed to meet the control thresholds, the use of chemical controls at these sites will have certain consequences that should be carefully considered. The use of permethrin as part of the pheromone treatment results in exposures and environmental effects that are also important to analyze. Therefore, this chapter will concentrate on the consequences of the risks from these two chemical control applications.

2. Potential Consequences of Chemical Control Applications

Program applications of pesticides are limited to low application rates as part of a pheromone mixture or to a field where there is at least 5% of the cotton infested with pink bollworm larvae or where other techniques have failed to meet control thresholds. This limitation ensures that chemical applications are minimized by the program and resources are applied in the most effective manner. The consequences presented in this part of the chapter are based upon the assumption of direct exposure of the habitat or environmental resource to the treatment chemical. The consequences to some environmental quality indices, human health, and some nontarget species may be quite severe, but the limited use of these applications on a site-specific basis by the program can restrict treatments to areas and methods where these issues pose no risks of concern.

A chemical risk assessment was prepared to consider the potential human health risks and environmental effects from chemical pesticide applications that have been proposed for the Pink Bollworm Cooperative Eradication Program in the "Chemicals Risk Assessment: Pink Bollworm Cooperative Eradication Program" (USDA, APHIS, 2001). Program use of the two pesticides (chlorpyrifos and permethrin) were analyzed comprehensively. The results of the risk assessment are incorporated by reference into this environmental assessment and the information from that risk assessment is summarized here. Table III-1 below summarizes the proposed use patterns of each of the pesticides.

Table III-1. Proposed Use Patterns for Insecticides

Insecticide	Application rate (lb a.i./acre)	Application method for cotton crops	Active ingredient
Chlorpyrifos	0.75	Aerial and ground	O,O-diethyl O-(3,5,6-trichloro-2-pyridinyl) phosphorothioate
Permethrin	0.08	Aerial as part of a pheromone application	3-(phenoxyphenyl) methyl (±)-cis, trans-3-(2,2-dichloroethenyl)-2,2-dimethyl cyclopropanecar-boxylate

a. Potential Effects on Environmental Quality

Analysis of the environmental fate of each pesticide used in the pink bollworm program under various meteorological conditions was assessed through use of the Agricultural Dispersal model (AGDISP) for determining potential for drift and the Groundwater Loading Effects of Agricultural Management Systems (GLEAMS) model for determining potential for insecticide runoff in water and eroded soil following a 2-year storm (USDA, APHIS, 2001). The maximum drift determined by AGDISP occurred for chlorpyrifos at a distance of 100 feet under calm conditions (crosswind speed of 1 mph) and at a distance of 200 feet under extreme conditions (crosswind speed of 10 mph). Treatments are not made when wind speeds are higher than 10 mph (refer to III-D "Operational Procedures and Mitigation Measures"). Permethrin drift was not projected to drift further than 50 feet and 100 feet for calm and extreme conditions, respectively. Deposition at 25 feet was determined to be 4.5 mg a.i./m^3 for chlorpyrifos and 0.5 mg a.i./m^3 for permethrin under calm conditions. Deposition at 25 feet was determined to be 48 mg a.i./m^3 for chlorpyrifos and 5.1 mg a.i./m^3 for permethrin under extreme conditions. The predicted insecticide losses from GLEAMS simulation of a 2-year storm in runoff water are 0.105 mg/L for chlorpyrifos and 0.0224 mg/L for permethrin. The predicted insecticide losses from GLEAMS simulation of a 2-year storm in eroded soil are 2.1 μg/g for chlorpyrifos and 0.224 μg/g for permethrin. Data from this modeling is applied to calculations of potential exposure of humans and nontarget species.

Chlorpyrifos readily binds or is adsorbed to soil particles. This may increase the persistence in soil or on organic matter in water to several months under certain conditions, but the persistence is generally only for a month or less. The half life in air is only for a few hours due to photolysis and various chemical reactions. The half life on plants is generally 1 to 4 days. Chlorpyrifos is rapidly metabolized by mammals (1 to 2 days), but can bioconcentrate in fish and blue-green bacteria. Chlorpyrifos is persistent on sediments and organic matter, but the rate of degradation is sufficient that any residues in air, water, and soil would not linger for extended periods beyond the growing season. The strong binding of chlorpyrifos to organic matter limits the bioavailability. The degradation of residues that are available for uptake is more rapid than the degradation of the bound residues and exposure to the bound residues is less likely.

Permethrin degrades readily under most environmental conditions. Some residues may volatilize into the air, but this is unlikely to pose a primary route of exposure. The half-life for hydrolysis of permethrin varies from 124 to 347 days (Allsup, 1976). Permethrin degrades readily in most soils, but organic matter may decrease the rate. The half-life in organic soil ranges from 3 to 6 weeks (Kaufman *et al.,* 1977). Degradation is slower under anaerobic, waterlogged soil conditions than in aerobic soil (Ohkawa *et al.,* 1978). Permethrin is not very mobile in soil and very little leaching has been reported (Wagenet, 1985). Permethrin degrades rapidly in water, but it can persist in sediments. Other than adsorption to sediments, volatilization is the major route of removal from water, but microbial degradation may be important in deep, acidic lakes. Primary photolysis of permethrin is negligible, but hydrolysis is an important route only under alkaline conditions. Metabolism of permethrin in vertebrates is rapid and occurs through ester cleavage (National Research Council of Canada, 1986). There is a tendency of permethrin to bioconcentrate in estuarine environments (Schimmel *et al.,* 1983), but depuration of tissues occurs within a week. Low levels of permethrin tend to persist in deciduous foliage and leaf litter (Kingsbury and Kreutzweiser, 1980).

b. Potential Effects on Human Health

Exposure to any chemical agent is associated with some level of risk and the risk is assessed with some level of uncertainty. All human activity or inactivity is accompanied by risk and uncertainty. The decision to apply pesticides to control pink bollworm is based, at least implicitly, on a comparison of risks among the various alternative control methods and an assessment of the benefits associated with each alternative.

The risk assessment reviewed information about each pesticide to identify the potential toxic effects (hazard identification), determine exposure levels associated with these effects (dose-response assessment), estimate levels to which individuals may be exposed (exposure assessment), and discuss the consequences of such exposure (risk characterization). Each phase of this assessment is accompanied by uncertainties imposed by either limited data or limitations in the ability to extrapolate the available data to exposure scenarios of concern to this risk assessment. The risk comparison is designed to place both the quantitative assessments and their uncertainties into perspective with the problem posed by pink bollworm and the available control methods for dealing with this insect pest.

Chlorpyrifos is an organophosphate insecticide and its mode of toxic action occurs primarily through acetylcholinesterase (AChE) inhibition (Smith, 1987; Klaassen *et al.*, 1986). 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.

Permethrin is a synthetic pyrethroid and its mode of toxic action occurs through effects on the sodium channel to stimulate nerves to produce repetitive discharges. Muscle contractions are sustained until a block of the contraction occurs. Nerve paralysis occurs at high levels of exposure. The symptoms of pyrethroid toxicity in mammals are diarrhea, deepened respiration, tremors, and convulsions. Pyrethroid insecticides are most toxic at low temperatures (Sparks *et al.*, 1983). The primary potential route of exposure to permethrin is dermal, but some exposure through inhalation is also possible.

The human health risk assessment includes quantitative and qualitative aspects. The quantitative risk assessments consider potential exposure scenarios (typical and extreme) for each program chemical application. The qualitative risk assessment takes into account important factors that influence exposure and risk, but are outside the direct control of the program or cannot be quantitatively related to exposure. For example, risk to human health from applications of pesticide on fields adjacent to cotton fields treated through program activities would be analyzed subjectively. This qualitative approach is taken because the chemical, rate, and method of application for treatment of these adjacent fields are not known and cannot be predicted with certainty.

(1) Quantitative Assessment

The quantitative analyses are prepared for both typical and extreme exposures to workers and the general public. Although exposures and associated risks in several of the worker exposure scenarios appear high, these scenarios do not include use of required safety precautions or use of protective clothing. Comprehensive training of all workers and proper use of protective clothing ensure that the margins of safety are adequate for exposures by all likely routes.

The assessment of quantitative risk is determined by comparison of the potential exposure to toxicity reference levels for each pesticide. The margin of safety is determined by dividing the lowest toxicity reference level of the pesticide by the exposure level determined in the scenario. The toxicity reference levels used in the risk assessment of pink bollworm program chemicals are presented in table III-2.

Table III-2. Acute and Chronic Toxicity Reference Levels Used in This Analysis

Pesticide	Acute oral LD_{50} in rats (mg/kg)	Systemic NOEL[1] (mg/kg/day)		Reproductive/ developmental NOEL (mg/kg/day)
		Human	Rat	
Chlorpyrifos	97.0	0.03	0.01	2.5
Permethrin	430	5.0	5.0	50

[1]NOEL = the No Observed Effect Level. The highest dose level at which there are no observable differences between the test and control populations.

The risk determined for exposed individuals depends largely upon the exposure scenario. This information is summarized in table III-3. Each scenario assumes no special efforts are taken to prevent exposure and the estimated risk is very conservative. Required adherence to program protective measures by workers and application of mitigative measures to prevent exposure of the general public ensure that these potential risks are minimized.

Typical exposures pose negligible risk for dermal and inhalation exposure scenarios of chlorpyrifos. Risk is categorized as slight for typical dietary exposure scenarios of chlorpyrifos. However, this scenario involves the consumption of venison from wild animals, which are not usually hunted at the time of year when cotton is being treated for pink bollworm. Both typical and extreme exposures to permethrin pose negligible risks to the public. Risks vary from slight (inhalation) to substantial (consumption of fish) to the public for extreme exposures to chlorpyrifos. Mitigation measures (refer to III-D "Operational Procedures and Mitigation Measures") are designed to keep pesticides out of water and adherence to these measures precludes the elevated exposures and higher risks associated with fish consumption and water consumption.

Table III-3. Summary of Highest Public and Worker Risks* from Control Operations by Chemical

Exposure Scenarios	Chlorpyrifos Typical	Chlorpyrifos Extreme	Permethrin Typical	Permethrin Extreme
Public:				
Dermal and inhalation	E	C	E	E
Dietary	D	A	E	E
Workers:				
Pilot	B	A	E	E
Mixer/loader	B	A	E	E
Observer	A	A	E	E
Monitoring team	C	C	E	E
Ground applicators	A	A	E	E
Accidents:				
Worker		A		A
Public		A		E

*Where there is more than one risk category for an exposure scenario, only the highest risk category is included.

Risks are categorized as follows:
A = Substantial risk - margin of safety is less than 1.
B = Moderate to substantial risk - margin of safety is between 1 and 10.
C = Slight to moderate risk - margin of safety is between 10 and 50.
D = Slight risk - margin of safety is between 50 and 100.
E = Negligible risk - margin of safety is greater than 100.

As was noted with the public, risks to workers have also been determined to be higher with chlorpyrifos than permethrin. In particular, most extreme scenarios are indicated to involve substantial risk. This assessment disregards the required safety procedures and mandatory protective gear, so the actual risk is considerably overstated. However, this does indicate the importance of adhering to safety procedures and wearing proper protective gear when applications of chlorpyrifos are made. Although the risks from the typical exposure scenarios of chlorpyrifos for workers are less hazardous than under the extreme exposure scenarios, ground applicators and observers must adhere to proper protective gear and safety procedures to prevent adverse health effects. All potential exposures of workers to permethrin pose negligible risk.

The highest risk occurs from the exposure of workers in accidental scenarios. The highest risk is to workers with direct exposure from a spill or broken hose. Immediate cleansing of the exposed skin and other required safety procedures lower these risks to an acceptable level. Adherence to safety procedures is designed to prevent the accidental exposure scenarios to the general public.

(2) Qualitative Assessment

Qualitative assessments either relate directly to the formulated pesticides (impurities and degradation products) used in program treatments or to treatment of adjacent fields with pesticides by private growers as they relate to program pesticide applications. There are several potential adverse health effects that are best analyzed qualitatively. This may be the result of inadequate exposure information or unclear relationships between dose and response. Impurities vary with formulation and degradation; therefore, the exposure concentration may vary considerably, so accurate assessment of dose is not possible. Likewise, exposure of individuals from treatment of adjacent fields with pesticides can vary considerably with the method of application and the pesticide. This analysis considers qualitatively the most likely treatments that could occur in adjacent fields and their interactions either directly with the program chemicals or their cumulative influence on adverse toxic responses to pesticide exposure.

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 (EPA, 1989a; EPA, 1984; EPA, 1989b). 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 pink bollworm programs when safety procedures are adhered to and proper protective gear are used.

Permethrin has considerably lower acute toxicity than chlorpyrifos. Permethrin use may cause mild, localized skin irritation to some individuals. Tests of permethrin have been negative for skin sensitization (immunotoxicity), neurotoxic effects other than those related to the toxicity mechanism, genotoxicity, mutagenicity, and teratogenicity. Reproductive and developmental effects have only been noted for exposures greater than are anticipated from program applications of permethrin. Permethrin may be a weak oncogen and is suspected of having carcinogenic effects, but the potential exposure to permethrin from program applications would not result in these effects which are considered to be borderline by EPA.

Impurities and degradation products may occur in the formulated products, result from improper storage, or result from use of chemicals after the expiration date for shelf life. Although impurities in formulated products are a consideration, the program samples the product for purity before use. The program also requires proper storage of all pesticides and orders only recyclable 55-gallon drums of pesticide to meet anticipated needs within the next two weeks, so storage and shelf life concerns are not anticipated for this program. The main metabolite of chlorpyrifos is 3,5,6-trichloropyridinol. It is structurally very similar to chlorpyrifos, but it is not considered to be an inhibitor of cholinesterase (EPA, OPP, 1989b). The major metabolites or degradation products of permethrin result from ester cleavage and include dihalovinyl or p-chlorophenyl isovaleric acids (National Research Council of Canada, 1986). These compounds are of less acute toxicity than permethrin.

(a) Cumulative and Synergistic Effects

Cumulative and synergistic effects are those adverse effects that result from exposures to more than one chemical or exposure to a given chemical more than once with a frequency that results in greater adverse effects than a single exposure. The potential for multiple exposures depends on site-specific conditions and persistence of the chemical. Cumulative effects are those adverse effects from exposures that can be added together to indicate overall potential risk. Synergistic effects are those adverse effects from exposure to more than one compound that result in greater overall potential risk than the sum of the risks from individual exposures.

Simultaneous exposure to pesticide residues from program treatment of cotton fields and from grower treatment of other crops in adjacent fields is possible, but highly unlikely. To avoid conflicts in scheduling and space requirements, growers are likely to apply their pesticides at times when program treatments are not being made. Appropriate communication with growers and residents in adjacent properties through the notification process assures that most residents will be aware of the treatments, understand the meaning of the treatment flags, and adhere to the required reentry periods. The reentry period is the time when no one should enter a field unprotected following a treatment based on degradation of the pesticide applied. All workers are required to adhere to the reentry periods following treatments.

Treatment of adjacent fields by growers one day or more before or after program treatment is considerably more likely. Exposure to more than one chemical under these circumstances depends upon the rate of degradation of the pesticides used and the location relative to treatment areas. Persistence of pesticide residues in specific environmental media can increase the likelihood of exposure to more than one pesticide. The degradation of the program pesticides is rapid on plants and in water under the warm conditions in the cotton fields. Cumulative effects should generally be limited to periods shortly after treatments. However, chlorpyrifos is quite persistent in soil and may remain active for several months. Chlorpyrifos binds readily to organic matter on plants and in water where it is only available through ingestion. Potential exposure from foliage or water can occur only within the first few days after treatment and limiting access to field workers with protective clothing precludes unacceptable exposures. Permethrin has a half-life of 3 to 6 weeks in organic soil, so it is not so persistent as chlorpyrifos. Any adverse cumulative or synergistic effects of program pesticides would be limited to the period of persistence in the field.

Cumulative effects are most likely for multiple exposure to the compounds of the same chemical class. Chlorpyrifos is an organophosphate and a strong inhibitor of acetylcholinesterase. As a result, there is potential for cumulative adverse effects with exposures to other compounds that inhibit acetylcholinesterase such as organophosphates and carbamates. Permethrin has potential for cumulative adverse effects with exposures to other synthetic pyrethroids. Cumulative effects for permethrin and chlorpyrifos are most likely to occur at locations where there is reentry to fields too soon, since these compounds persist longer on soil than in water or on plants. Malathion, azinphos-methyl, endosulfan, oxamyl, dicrotophos, methyl parathion, and synthetic pyrethroids are also generally used by growers in the areas where the pink bollworm program occurs. Exposure to some of these compounds may result in additive or cumulative toxicity if a person were affected by a program pesticide.

Exposure to some pesticides could result in synergism such that the adverse effects from exposure to more than one pesticide exceed the sum of the adverse effects of exposure to each pesticide separately. Synergism of chlorpyrifos is possible with exposure to other organophosphate pesticides and carbamate pesticides (Knaak and O'Brien, 1960; Cohen and Murphy, 1970; Segal and Fedoroff, 1989; Koziol and Witkowski, 1982; Keil and Parrella, 1990; Horowitz *et al.*, 1987). Synergism of toxicity of organophosphates (such as chlorpyrifos) has also been shown when combined with synthetic pyrethroids (such as permethrin) or amitraz in some laboratory and field tests (Keil and Parrella, 1990; Horowitz *et al.,* 1987). This effect is possible if other pesticides are being applied in these areas. Synergism that results in increased toxicity is of greater concern for chlorpyrifos because this pesticide has higher acute toxicity, and adverse effects from synergism are more likely. Although growers are unlikely to treat adjacent fields close to the same time as the pink bollworm treatments, there is potential for synergism if the growers do. Most of the pesticide compounds frequently used by growers at locations near pink bollworm treatment sites have either additive or synergistic properties with either chlorpyrifos or permethrin. Synergistic effects of these compounds are considerably less likely if proper safety procedures and reentry periods are followed for program and grower treatments.

(b) Connected Actions

In general, there is no reason to expect increased risk when combining chemical control with other control methods. In fact, it is reasonable to expect reduced risks because combined alternatives may reduce the number of chemical applications needed. Exposures from trapping, cultural control, sterile insect technique, and use of transgenic Bt cotton do not involve exposures to cumulative or synergistic compounds. Cultural control such as ploughing under cotton stalks could involve exposure to other organophosphate or carbamate compounds, but the time of this exposure would differ from the time of treatment. Although exposure to the trap chemicals may occur simultaneously with control applications, the relatively non-toxic compounds used in traps are not additive, cumulative or synergistic with the pesticides used in chemical control applications.

The introduction of the pink bollworm to the United States in 1917 has resulted in considerable losses to growers from Texas to California and in adjacent areas of Mexico. Success of the national program to eradicate the pink bollworm is contingent on good cooperation among the States and Mexico. The ability of the pink bollworm to spread naturally through flight makes any eradication effort challenging. Regional efforts may only be successful as part of an ongoing effort until the pink bollworms are eliminated from all areas within the flight range. A well coordinated eradication effort will reduce the need of growers to apply pesticides, resulting in a commensurate decrease in potential adverse environmental impacts from agricultural practices.

(c) Groups at Special Risk

For each chemical control agent, an attempt was made to identify groups at special risk due to location, disease state, or other biological variation. Safety procedures assure that program workers are not exposed to levels of these pesticides high enough to increase risk. The group at the greatest risk are those individuals who live next to cotton fields. A careful assessment of their risk indicates that these individuals need to be notified of the times of pesticide application and instructed about safe reentry times for fields. Infants may be more sensitive than adults to the effects of exposure to program pesticides. Individuals on certain medicines such as pentobarbitone (Uppal *et al.*, 1982) may be at increased risk. Some individuals may be less tolerant of exposure to these compounds because of a diminished ability to recover from the effects induced by exposure to these chemicals.

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. Studies of the incidence of MCS have indicated that only a small percentage of the general population have this level of sensitivity to chemical exposure (Calabrese, 1991). Because the program would reduce pesticide use on cotton in the area, exposures to the public would be reduced, and therefore the incidence of MCS from pesticide use on cotton would be reduced.

c. Potential Effects on Nontarget Species

The criteria that EPA (U.S. EPA, OPP, 1986b) uses in its ecological risk assessment of nontarget species were used to determine the risks to different representative wildlife species for each of the insecticides. The risk is determined by comparing exposure to each compound to the inherent toxicity (hazard) of the active ingredient.

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. Algal blooms are often noted for ponds treated with chlorpyrifos due to the reduced grazing by zooplankton and increased phosphorous availability.

Permethrin is very slightly toxic to birds, severely toxic to honey bees, and very highly toxic to fish and aquatic invertebrates. Based upon the mode of toxic action and available data, it is expected that permethrin is highly toxic to most aquatic stages of reptiles and amphibians, but only slightly toxic to most terrestrial stages. Both permethrin and chlorpyrifos should be kept out of bodies of water.

(1) Terrestrial Nontarget Species

Risk to terrestrial wildlife is assessed by comparing the exposure to a hazard index. The acute median lethal dose or LD_{50} is the standard value used for comparison to exposure of terrestrial wildlife species to determine the risk. The LD_{50} is the dose in laboratory tests at which there is mortality to one-half of the exposed population. For nonendangered terrestrial wildlife species, the assessment of risk from chemical exposure is determined according to the following scale (U.S. EPA, OPP, 1986b):

A = High risk – dose is greater than or equal to LD_{50} for terrestrial species.
B = Moderate risk – dose is greater than or equal to 1/5 LD_{50} but is less than LD_{50} for terrestrial species.
C = Low risk – dose is less than 1/5 LD_{50} for terrestrial species.

The exposure of terrestrial wildlife depends upon many factors such as habits, physiology, and niche. The species receiving the highest exposure in the scenarios for each chemical was the deer mouse. This species has the potential for considerable exposure through diet, dermal exposure, and respiration. This species is, however, usually not the most sensitive to the adverse effects of these pesticides.

The risks to terrestrial wildlife species are presented in table III-4. The risks that would usually be expected from program applications would be those for the typical scenarios. Based upon this, the risks to terrestrial wildlife species are generally low for program use of chlorpyrifos. However, risks to some wildlife species are elevated for these use patterns. For example, risks from program use of chlorpyrifos are moderate to birds and terrestrial insects. Low risks are anticipated for all exposed terrestrial taxa for both typical and extreme exposure scenarios except insects. Many of the potential exposures under the extreme scenario pose high risk, and mitigations to preclude such scenarios are desirable, particularly for chlorpyrifos applications.

(2) Aquatic Nontarget Species

Risk to aquatic wildlife is assessed by comparing the expected environmental concentration (EEC) in water to a hazard index. The acute median lethal concentration or LC_{50} is the standard value used for comparison to the expected environmental concentration in the water of aquatic wildlife species to determine their risk. The LC_{50} is the concentration in water in laboratory tests at which there is mortality to one-half of the exposed population. For nonendangered aquatic wildlife species, the assessment of risk from chemical exposure is determined according to the following scale (U.S. EPA, OPP, 1986b):

A = High risk – EEC is greater than or equal to ½ LC_{50} for aquatic species.

B = Moderate risk – EEC is greater than or equal to 1/10 LC_{50} but is less than ½ LC_{50} for aquatic species.

C = Low risk – EEC is less than 1/10 LC_{50} for aquatic species.

Table III-4. Summary of Highest Risks to Nontarget Terrestrial Species from Insecticides

	Chlorpyrifos		Permethrin	
Species	**Typical**	**Extreme**	**Typical**	**Extreme**
Birds	B	A	C	C
Mammals	C	B	C	C
Reptiles	C	B	C	C
Amphibians	C	C	C	C
Insects	B	A	B	A
Domestic animals	C	C	C	C

Risks are categorized as follows:

A = High risk – dose is greater than or equal to LD_{50} for terrestrial species.

B = Moderate risk - dose is greater than or equal to 1/5 LD_{50} but is less than LD_{50} for terrestrial species.

C = Low risk – dose is less than 1/5 LD_{50} for terrestrial species.

The exposure of aquatic wildlife to pesticides depends upon many factors such as habits, physiology, and niche. The primary factor for most species is the concentration in the water. Use of the EEC assumes that the concentration is the same throughout the water, independent of depth, organic matter, and nature of bottom sediments. The tendency of pesticides to settle, degrade, and adsorb to surfaces may affect the actual exposure considerably. By assuming even mixing of the pesticide in the water, the actual exposure to species may be either overestimated or underestimated. This approach is generally conservative and usually overestimates exposure for these species.

The risks to aquatic wildlife species are presented in tables III-5 (ponds) and III-6 (creeks). The risks that would usually be expected from program applications would be those for the typical scenarios. Based upon this, the risks to wildlife species in ponds are generally high for program use chlorpyrifos and permethrin. This indicates that mitigation measures to prevent drift and runoff into standing bodies of water are important to protect fish and other nontarget aquatic species.

Residues of pesticides entering flowing water (i.e., creeks) dissipate more readily than in ponds due to constant movement of water from upstream that lowers the potential water concentration. This effect diminishes the risk in the exposure scenarios for creeks relative to ponds. Despite this tendency of flowing water to lower exposure and potential risk, the risk from program use of chlorpyrifos remains high to fish and aquatic invertebrates. The risk from program use of permethrin to aquatic wildlife species is somewhat moderated, but mitigation measures (refer to III-D "Operational Procedures and Mitigation Measures") generally prevent drift and runoff from entering flowing water.

Table III-5. Summary of Highest Risk to Aquatic Species in Ponds

	Chlorpyrifos		Permethrin	
Species	**Typical**	**Extreme**	**Typical**	**Extreme**
Fish	A	A	A	A
Aquatic invertebrates	A	A	A	A
Amphibians	A	A	B	A

Risks are categorized as follows:

A = High risk - estimated environmental concentration (EEC) is greater than or equal to1/2 LC_{50} or ½ EC_{50} for aquatic species.

B = Moderate risk - EEC is greater than or equal to 1/10 LC_{50} or 1/10 EC_{50} but is less than ½ LC_{50} or ½ EC_{50} for aquatic species.

Table III-6. Summary of Highest Risks to Aquatic Species in Creeks

Species	Chlorpyrifos Typical	Chlorpyrifos Extreme	Permethrin Typical	Permethrin Extreme
Fish	A	A	C	C
Aquatic invertebrates	A	A	A	A
Amphibians	C	C	C	C

Risks are categorized as follows:

A = High risk - estimated environmental concentration (EEC) is greater than or equal to ½ LC_{50} or ½ EC_{50} for aquatic species.

C = Low risk - EEC is less than 1/10 LC_{50} or 1/10 EC_{50} for aquatic species.

D. Unique or Special Concerns

Unique or special concerns relating to the proposed program area's environment were considered and are discussed briefly in this session. Recommended protection measures provided in the following section have been designed, in part, to reduce the risks associated with these concerns.

1. Site-specific Characteristics

Unique or special concerns for the proposed program area include potential pesticide impact to wetlands, major water bodies, groundwater, and potential outbreaks of secondary pests (such as beet armyworm).

The climate of the West Texas/Trans Pecos area is generally dry and arid, but the area includes several prominent water bodies that may be located in close proximity to cotton production areas. These include Red Bluff and Amistad Reservoirs, and the Pecos and Rio Grande Rivers. Protection of these water resources is an important consideration for program managers. In general, wetlands or water bodies are avoided in program operations or protected under specific protection measures.

The protection of groundwater is also an important consideration. The lack of surface water in many areas requires that freshwater be obtained from underground aquifers. Groundwater is an important source of fresh water in the El Paso area of Texas. Much of this water is used in irrigation. Modeling data indicate that the physical properties and program use of chemicals make it unlikely that detectable leaching to groundwater would occur.

2. Environmental Justice

Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires each Federal agency to make achieving environmental justice part of its mission. Agencies must identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions. Consistent with its responsibilities under Executive Order 12898, APHIS considered the potential for disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

In particular, APHIS analyzed the potential for adverse effects to minority and low-income residents of Spanish-speaking colonias, and tribal lands of native Americans in the El Paso/Trans Pecos region. Although language barriers could prevent understanding of normal program precautions and instructions relative to reentry periods, additional protective measures have been recommended to reduce such risks. In general, no disproportionate effects on such populations are anticipated as a consequence of implementing the preferred alternative.

3. Protection of Children from Environmental Health Risks and Safety Risks

Executive Order 13045, "Protection of Children From Environmental Health Risks and Safety Risks,” recognizes that children may be more susceptible to environmental health risks and safety risks because of the special characteristics of their neurological, immunological, digestive, and other body systems. It requires that Federal agencies ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Children who live on farms are thought to have greater potential for contact with pesticides in everyday activities. There is opportunity for repeat exposures and concern that their bodies cannot efficiently detoxify and eliminate chemicals. Children are generally protected through the routine safety procedures that are employed by the program, and may be protected further through the adoption of recommended protection measures (refer to III-D “Operational Procedures and Mitigation Measures”).

4. Secondary Pest Outbreaks

Some concern has been registered for other programs regarding the potential of the treatments to increase the severity of outbreaks of secondary pests such as beet armyworm (which also feeds on cotton), because of the loss of beneficial insects and predators. Entomologists at Mississippi State have concluded that dry weather and early season insecticide applications were the two factors which best correlated with beet armyworm outbreaks over a 10-year period in 4 States (Stewart *et al.*, 1996). However, other factors that also contribute to beet armyworm outbreaks include sandy soils, skip-row plantings, drought-stressed plants, and weediness of fields.

Unlike boll weevil eradication, where almost 100% of first-year fields are treated with malathion, only 5% of fields may require insecticide treatment in pink bollworm eradication. The majority of the fields (95%) will be treated with pheromone only. It's highly unlikely that program activities would distrub or suppress beneficial insect populations to levels that cause secondary pest outbreaks. (In Arizona and California trials, there were no secondary pest outbreaks.)

5. Endangered and Threatened Species

Section 7 of the Endangered Species Act (ESA) and the ESA's implementing regulations require Federal agencies to consult with the U.S. Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service to ensure that 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.

APHIS has considered the potential effects on endangered and threatened species and their critical habitats in the El Paso/Trans Pecos region and concluded that there would be no effect. Generally, the nature of the program treatments and their specific target (cotton) serve to preclude any effects on those species and their habitats. APHIS will be considering the potential effects on endangered and threatened species and their critical habitats for the broader program (to be implemented later) within the context of a formal consultation with FWS.

E. Operational Procedures and Mitigation Measures

The operational procedures and mitigation measures described in this subsection have been adopted by, and are an integral part of, pink bollworm programs.

1. Operational Procedures

a. All Methods of Control

1. All applicable Federal, State, and local environmental laws and regulations will be followed during pink bollworm control operations.

2. Sensitive areas (water bodies; parks; and occupied dwellings, such as homes, schools, churches, hospitals, and recreation areas) that may be adjacent to cotton fields will be identified. Some of the adjustments include, but are not limited to, the application of PB-Rope or PB-Rope*L (pheromone only), or the release of sterile moths. If an insecticide application is required, wind speed, wind direction, and temperature will be monitored during the application to ensure sensitive areas are not adversely impacted.

3. Environmental monitoring of the program will be in accordance with the current environmental monitoring plans.

4. All cotton fields in each program increment will be trapped, but only fields meeting the program criteria will be treated.

5. All program personnel will be instructed in the use of equipment and materials and on operational procedures. Field supervisors will emphasize operational procedures and monitor the conduct of personnel.

b. Aerial Applications

1. All materials will be applied in strict accordance with EPA- and State-approved label instructions.

2. Aircraft, dispersal equipment, and pilots that do not meet all contract requirements will not be allowed to operate.

3. All USDA, APHIS, Plant Protection and Quarantine employees who plan, supervise, recommend, or perform pesticide treatments must be certified under the APHIS pesticide certification plan. They are also required to know and meet any additional requirements of the State where they perform duties involving pesticide use.

4. Unprotected workers will be advised of the respective reentry periods following treatment. If chlorpyrifos is used, unprotected workers will not reenter the field for 24 hours.

5. Two-way radios will be provided to personnel who direct or coordinate field operations. Radio communication will be available to provide close coordination of all application operations.

6. All APHIS field personnel will have baseline cholinesterase tests before the first application and each spring and fall thereafter. It is recommended that contract, State, and private personnel also participate in this testing program.

7. Only certified aerial applicators who have been familiarized with local conditions will be used by the program.

8. To minimize drift and volatilization, applications will not be made when any of the following conditions exist in the spray area: wind velocity exceeding 10 miles per hour (or less if required by State law); rainfall or imminent rainfall; foggy weather;

air turbulence that could seriously affect the normal spray pattern; or temperature inversions that could lead to offsite movement of spray.

9. Nozzle types and sizes, spray system pressure, and nozzle orientation will be specified in the program's aerial application contract or as otherwise directed by program personnel.

c. Ground Applications

Mist Blowers

- Operators either will be certified applicators or will be in constant radio contact with certified applicators.

- Units will be operated from closed truck cabs, with operators using recirculated air.

High-clearance Machines

- Operators either will be certified applicators or will be in constant radio contact with certified applicators.
- Units will be operated from closed truck cabs, with operators using recirculated air.

2. Mitigation Measures

All required State and local authorities will be notified upon initiation of the program. The notification will advise State and local authorities of the need for any assistance in identifying sensitive areas in proposed treatment areas.

a. Protection of Workers

All program personnel will be instructed on emergency procedures to follow in the event of insecticide exposure. Equipment necessary for immediate washing procedures must be available for application personnel.

(1) Aerial Applications

1. Pilots, loaders, and other personnel handling insecticides will be advised to wear safety equipment and protective clothing.

2. Program personnel observing applications of chlorpyrifos are required to wear protective clothing or remain inside a closed vehicle with recirculating air, depending on the circumstances of the application.

3. Application operations will be postponed in fields occupied by workers.

4. Flags, GPS equipment, or other markers will be used for pilot guidance at all times.

(2) Ground Applications

Mist Blowers

- Units will be operated from closed cabs with operators using recirculated air.

- Operators will wear appropriate safety equipment when loading or servicing the unit and will be specially trained by program personnel.

High-clearance Machines

- Operators must be certified applicators for chlorpyrifos applications, and they will exercise extreme caution when applying this material.

- Operators will wear appropriate safety equipment and protective clothing when loading, servicing, and operating the unit.

(3) Pesticide-Handling Precautions

1. To the degree possible, insecticides will be delivered and stored in sealed bulk tanks and then pumped directly into the aircraft.

2. All insecticides will be stored in accordance with Federal, State, and local regulations and label instructions.

3. All mixing, loading, and unloading of insecticides will be in an area where an accidental spill will not contaminate a stream or other body of water.

4. In the event of an accidental spill, procedures set forth in “PPQ Guidelines for Managing and Monitoring Pesticide Spills” (USDA-APHIS-M390.1402, 1983) will be followed.

5. All insecticide drums must be triple-rinsed before disposal. Rinse solutions may be used to prepare spray tank mixes or may be stored for subsequent disposal in accordance with label instructions. One of the following methods of drum disposal must be used:

   - Require chemical companies, distributors, or suppliers to accept empty triple-rinsed drums.

   - Transfer the empty triple-rinsed drums to State cooperators.

   - Crush and/or puncture the empty triple-rinsed drums and dispose of as scrap metal.

b. Protection of the Public

1. Application aircraft shall avoid direct spraying of residences, garden plots, and adjacent crops at all times.

2. Program personnel shall immediately cease spraying operations if members of the public are observed within 100 feet of a cotton field being sprayed with chlorpyrifos.

3. Program personnel will establish a central telephone hot line (operational while the program is operational) for the public that can provide times and places of treatments, program information, and emergency referrals.

4. Program personnel will make available to the public, upon request, data from program environmental monitoring efforts.

5. 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 EA will be provided to local libraries.

c. Protection of Bees

Before beginning treatment with chlorpyrifos, program personnel shall notify all registered apiarists in or near the treatment area of the date and the approximate time of chemical treatment.

d. Protection of Wildlife

All control operations will be conducted in a manner that avoids potential impact on endangered, threatened, and proposed species, and their critical habitats.

IV. Agencies, Organizations, and Individuals Consulted

Government Agencies

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Finding of No Significant Impact
for
El Paso/Trans Pecos Pink Bollworm Cooperative Eradication Program
Environmental Assessment
April 2001

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), has prepared an environmental assessment (EA) that analyzes the potential environmental consequences of alternatives for eradication of the pink bollworm, a serious pest of cotton, in the El Paso/Trans Pecos region of Texas. The EA incorporated by reference in this document is available from:

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Program Support
4700 River Road, Unit 134
Riverdale, MD 20737-1234

or

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Western Regional Office
9580 Micron Ave., Suite 1
Sacramento, CA 95827

The EA analyzed the following alternatives: no action, pink bollworm suppression, and pink bollworm cooperative eradication (the proposed program). Each alternative was determined to have potential environmental consequences. The cooperative eradication program was preferred because of its capability to achieve the eradication objective in a way that reduces the magnitude of those potential environmental consequences. Program standard operational procedures and mitigative measures serve to negate or reduce the potential environmental consequences of this program.

APHIS has determined that there would be no significant impact to the human environment from the implementation of the proposed program. APHIS' Finding of No Significant Impact for this program was based upon the limited scope of the program and its expected environmental consequences, as analyzed in the EA. APHIS has considered the potential effects on endangered and threatened species and their critical habitats, and has concluded that the program would have no effect.

I find that the proposed program will pose no disproportionate adverse effects to minority and low-income populations and the actions undertaken for this program are entirely consistent with the principles of "environmental justice," as expressed in Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations." 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 proposed program may be implemented.

/s/ James R. Reynolds

James R. Reynolds
Western Regional Director
Plant Protection and Quarantine
Animal and Plant Health Inspection Service

6-20-01

Date